WAVE DATA COLLECTION
TONGATAPU, KINGDOM OF TONGA

May 1987 - July 1992

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December 1993

SOPAC Technical Report 185

This report was originally submitted to SOPAC by the Oceanographic Company of Norway AS (OCEANOR) as OCEANOR Report OCN R-93077

Prepared for: South Pacific Applied Geoscience Commission (SOPAC)
Coastal Program

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RAPPORT/REPORT

Tittel/Title	Rapport nr./Report no.
WAVE DATA COLLECTION, TONGATAPU, KINGDOM OF TONGA, MAY 1987 - JULY 1992	**OCN R-93077**
Oppdragsgiver/Client **Ministry of Land, Survey and Natural Resources**	Prosjektnr./Project no. **28400**
Kontaktperson/Client Reference: **Sione L. Tongilava**	Tilgjengelighet/Availability **Restricted**
Saksbehandler/Author **Egil Olsen and Karl A. Selanger**	Dato/Date **26 November 1993**
	ISBN

Sammendrag/Abstract

Since May 1987 waves have been recorded south of Tongatapu at two locations, 21°13.26'S, 175°12.90'W and 21°14.22'S, 175°16.20'W.

The measurements have been financed by NORAD and carried out by SOPAC, Techsec. OCEANOR was contracted by SOPAC as consultant to assist in the work.

This report presents statistics for wave height, wave periods and wave energy accumulated for 1987 - 1992 and for the year 1992.

Stikkord/Keywords

Waves
Energy
Oceanography

Ansvarlig underskrift/
Authorized signature

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Contents

List of Symbols

Wave Parameters

(Definitions, see section 3.1)

Hm0 (m)	- significant wave height
Tp (s)	- peak period
Tm-10(s)	- energy wave period
Tm02 (s)	- mean wave period
J Tot (kW/m)	- total wave power flux
J T-60 (kW/m)	- mean wave power over time (with records > 60 kW/m rejected)
m_n	- spectral moments, $m_n = \int S(f) f^n df$
S(f) (m's)	- wave spectrum as a function of frequency

Time

We note that unless specifically stated all times referred to in this report are UTC times (GMT).

Statistical Tables in Appendix A and B

DATA COVERAGE	Percentage of good quality 3 hourly data samples within observation period
CUM PROB.	Cumulative probability distribution
MARG.PROB.	Probability distribution
AVERAGE	Average value of one parameter (for each class of a second parameter)
ST.DEV.	Standard deviation of one parameter (for each class of a second parameter)

1 Introduction

The wave power data collection programme in the South Pacific started in 1987. The work was initially financed by the Norwegian Agency for Development Cooperation, NORAD and organized through an agreement between the Norwegian Engineering Council on Oceanic Resources, NECOR, and the Norwegian Hydrotechnical Laboratory, NHL a member of the SINTEF Group. In 1990, the Oceanographic Company of Norway A/S, OCEANOR, signed an agreement with NECOR and took over NHL's role in the project. The wave measurement programme provides technical support to the intergovernmental organization SOPAC (South Pacific Applied Geoscience Commission) through its Technical Secretariat (TechSec) in Suva, Fiji.

The wave measurement programme was proposed by NHL in 1985 as the most appropriate continuation of Norwegian NECOR organized assistance to the SOPAC region, following the one-year stay at TechSec in 1984 by one of their oceanographers. After a visit to Norway by Cruz Matos of TechSec, SOPAC endorsed the programme.

A TechSec technician, James Kamsoo, was trained in Norway in 1985. Regretfully he resigned from SOPAC TechSec in January 1989. In 1986 the first two buoys were delivered. After considerable delay the buoys were deployed in April 1987 at Tongatapu, Kingdom of Tonga, and in July 1987 at Rarotonga, Cook Islands, by TechSec. In July 1989 a third wave buoy was delivered and deployed in Western Samoa. Another two buoys were delivered in December 1989. One was deployed in Tonga. In 1990 two more buoys were delivered and deployed off Funafuti in the Tuvalu group and Efate Island in the Vanuatu group (see Fig. 1.1). In June 1991 a Waverider buoy was also deployed south of Kadavu, Fiji.

While TechSec was responsible for deployment and servicing, NHL, and from 1990, OCEANOR, was responsible for procurement and for the data processing and analysis. The data are reported in separate summary reports for each location and year. Data are presented as plots and statistical tables for each year and accumulated years.

As part of the agreement between NECOR and OCEANOR, an engineer from OCEANOR was in 1990 assigned to SOPAC TechSec for 18 months, to take charge of the measurements and training within the wave programme.

In 1992 SOPAC signed a two year contract directly with NORAD, and contracted OCEANOR as consultant.

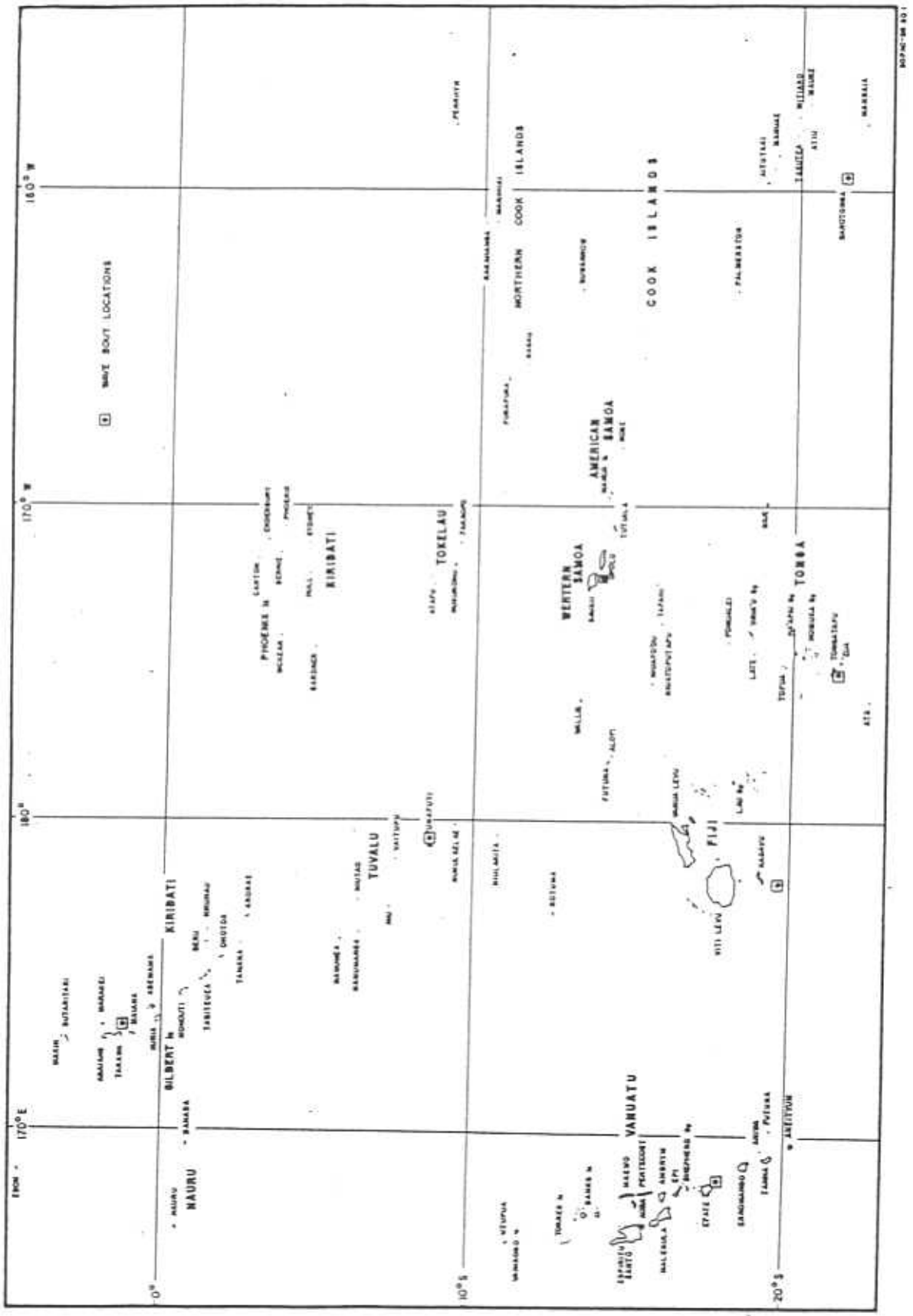


Figure 1.1 Map of the area with measurement sites.

2 Measurement Programme

2.1 Overview of Measurement Sites

The wave measurement programme started in May 1987 at a position south of Tongatapu (Position 1). In December 1989 the location was changed to a deeper and more exposed site (Position 2).

Figure 2.1 shows the measurement positions. Position 1: 21°13.26'S, 175°12.90'W. Water depth: 154 m. Position 2: 21°14.22'S, 175°16.20'W. Water depth: 309 m.

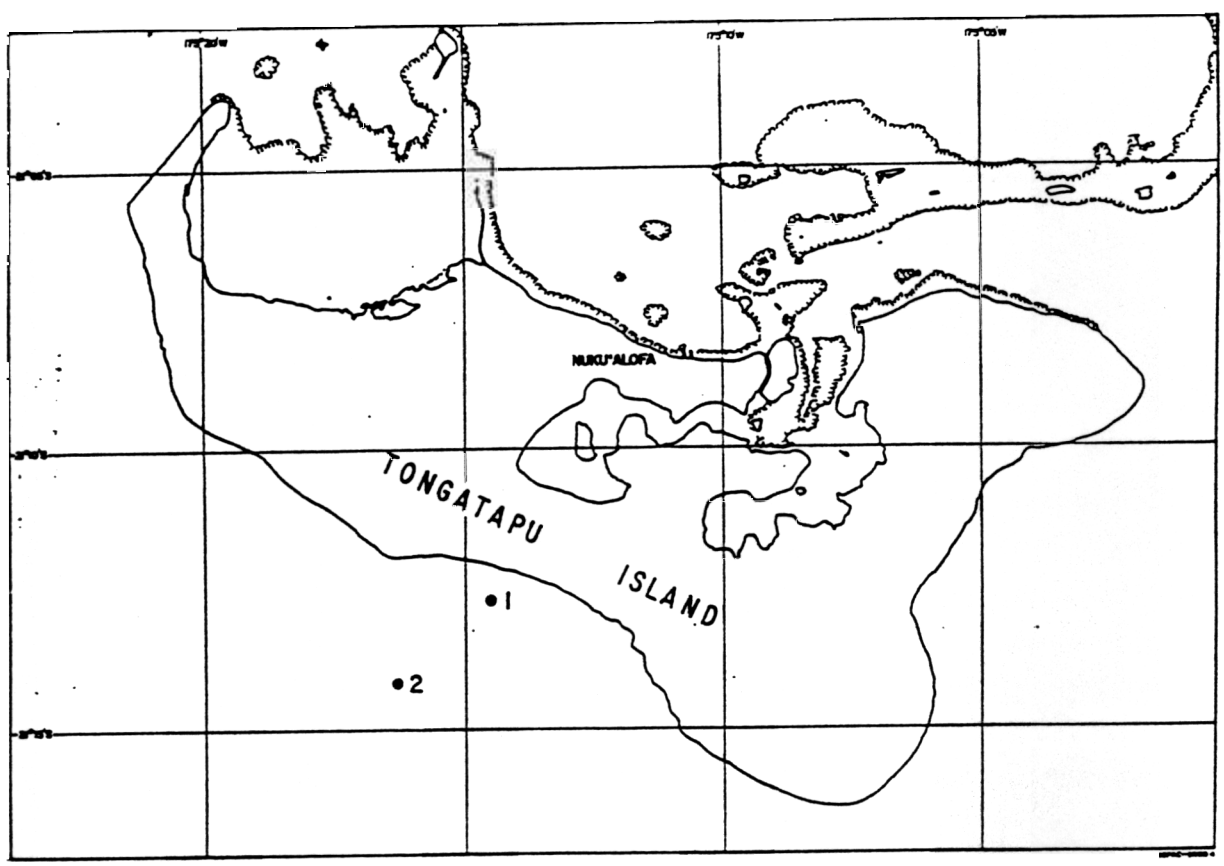


Figure 2.1 Locations of the wave buoys at Tongatapu.

2.2 Instrumentation System

The instrumentation system consists of 3 main components:

a) Datawell Waverider buoy
b) Data processing in the Waverider buoy
c) Satellite transmission via the Argos system.

2.2.1 DATAWELL WAVERIDER BUOY

The Waverider is a surface-following, spherical buoy with a diameter of 90 cm used to measure wave heights.

The Waverider is manufactured by Datawell b.v. in the Netherlands. The buoy senses the vertical acceleration. This is twice integrated in the buoy in order to give a measure of the water surface elevation.

The Waverider accelerometer is mounted on a stabilized platform having a natural period of 40 seconds and a critical damping of 0.8 for amplitudes larger than 2°. The resulting sensitivity to horizontal accelerations is below 3%.

A brief summary of specifications given by the manufacturer is given below:

Wave Height	:	Resolution 0.02 m
Accelerometer linearity	:	Non-linear specification $< 2 \times 10^{-3}$ m/s^2 for 6 m/s^2 amplitude
Horizontal sensitivity	:	< 3% of vertical sensitivity
Battery life	:	> 16 months
Maximum changes during one year:		
Sensitivity	:	1%
Zero offset	:	1 meter
Platform angle	:	1°

The amplitude and phase transfer functions of the Datawell Waverider, resulting from the double integration of acceleration to heave are shown in Fig. 2.2.

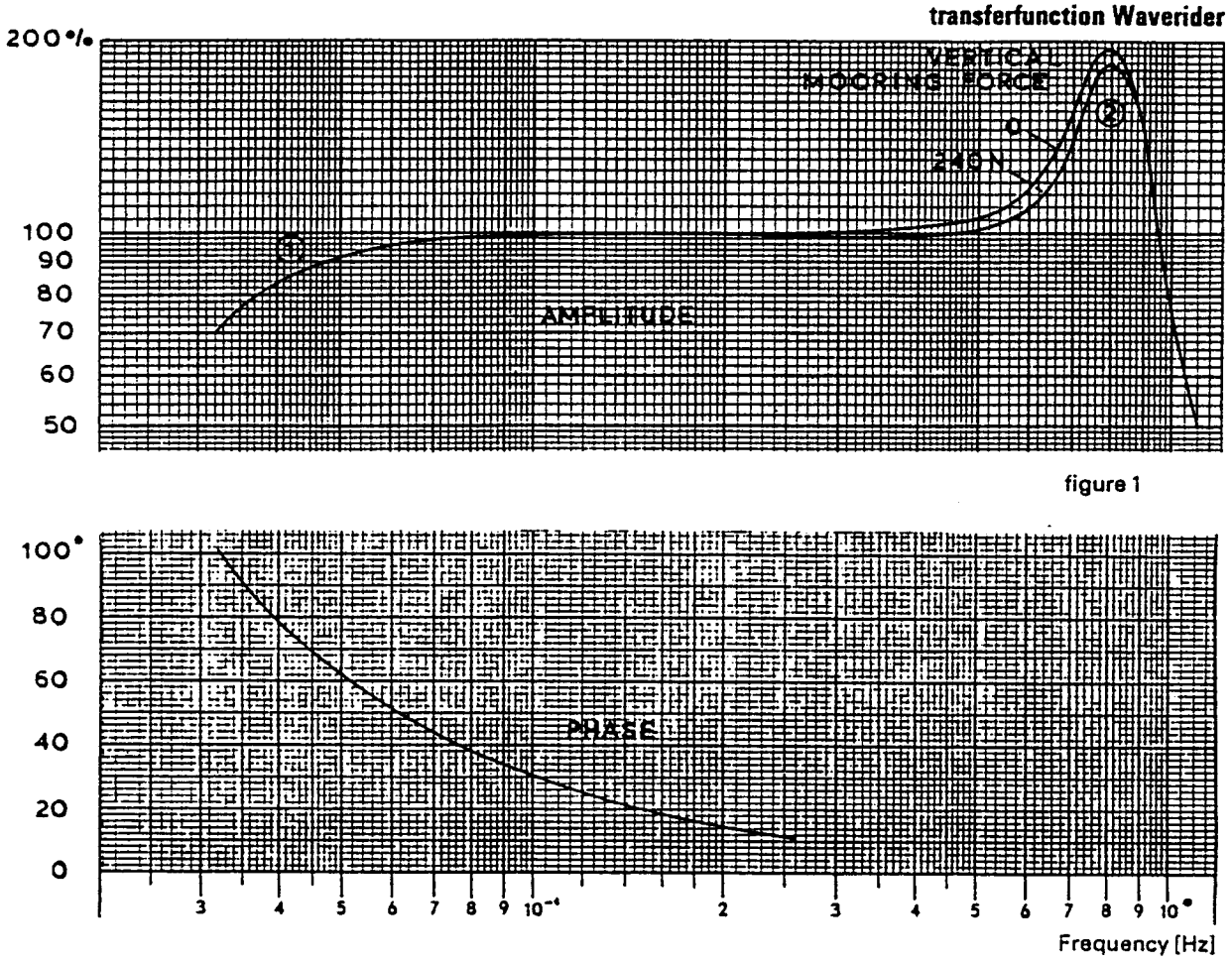


Figure 2.2 *Amplitude and phase transfer functions of the Datawell Waverider.*

3 Processing of Data

3.1 Data Processing within the Waverider Buoy

The wave buoy is equipped with the ARGOS system for satellite transmission. The buoy has no internal logging of data. The data transmitted are computed from the raw wave measurement time series that are processed internally in the buoy. Two processing systems and three different output formats have been used at different times. The first processing/output system was delivered by OCEANOR. The second processing system and second and third output formats were delivered by Datawell as an integrated part of the Waverider. In the following is given a detailed description of the on-board processing and contents of the Argos message for each configuration. Table 3.1 gives, however, a quick reference to data availability.

Table 3.1 Data availability summary for the Tongatapu Waverider.

Date	ARGOS Version	Buffering	Parameters Available					Wave Spectra
			Hm0	Tp	Tm-10	J_{Tot}	Tm02	
May 87 - July 89	OCEANOR	Yes	✓		✓	✓		Wave Energy Flux J_1, ..., J_8
Dec. 90 - April 91	Datawell	No	✓	*	*	*	✓	S(f) in 28 frequency bands
May 91 - Dec. 91	Revised Datawell	Yes	✓	✓	✓	✓	✓	S(f) in 13 frequency bands

* Computed from wave spectra.

3.1.1 Data Processing - OCEANOR System

In the OCEANOR system the following parameters are computed and transmitted to the ARGOS receiving station:

Hm0	Significant wave height (dm)
Tm-10	Wave period (.1 s)
S1 - S8	Scaled wave energy flux

The wave energy flux J is obtained from S by the following transformation:

$$J = (S/3)^2 \quad (W/m)$$

The raw data sampling procedures within the buoy are

Sampling interval:	Δt = 1.0 s
Measuring period :	t = 1024 s, i.e. 17 min 4 s
Repetition period:	T = 3 hours

The first step in the internal data processing is a Fourier transform and computation of a raw spectrum from a series of 1024 samples of wave elevation:

$$S_i = .5\left(a_i^2 + b_i^2\right), \quad i = 1,512$$

where

S_i = power density spectrum for frequency i
a_i = cosine Fourier coefficients
b_i = sine Fourier coefficients
i = frequency component number

The zeroth and first order moments are computed directly from the raw spectrum

$$m_0 = \sum_{i=1}^{512} S_i$$
$$m_{-1} = \sum_{i=1}^{512} S_i \cdot f_i^{-1}$$

Here

m_0 = zeroth order moment
m_{-1} = -1st order moment
f_i = frequency i (Hz)

The significant wave height and energy period are then found from

$$Hm0 = 4\sqrt{m_0}$$
$$Tm\text{-}10 = \frac{m_{-1}}{m_0}$$

The wave power flux can then be computed from

$$J_j = c \cdot \sum_{i=i_1}^{i_2} S_i / f_i \quad \text{(kW/m)}$$

where

$$c = \rho g^2 / 8\pi = 3.83 \text{ kg/m} \cdot \text{s}^4$$

for the eight period bands T:

J	i_1	i_2	T
1	172	256	$4.0 < T_1 < 6.0$ s
2	129	171	$6.0 < T_2 < 8.0$ s
3	103	128	$8.0 < T_3 < 10.0$ s
4	86	102	$10.0 < T_4 < 12.0$ s
5	74	85	$12.0 < T_5 < 14.0$ s
6	65	73	$14.0 < T_6 < 16.0$ s
7	52	64	$16.0 < T_7 < 20.0$ s
8	10	51	$20.0 < T_8$

In addition to the most recent data set, data sets from the previous and previous but one data cycle (T-3 and T-6 hours) are also transmitted to ensure 100% data recovery.

More details and technical specifications can be found in Kollstad and Carstens (1988).

3.1.2 DATA PROCESSING - DATAWELL SYSTEM

In the following, the parameters which are computed and transmitted to the ARGOS receiving station from the Datawell system are described.

3.1.2.1 Standard Datawell ARGOS Message

Fourier transforms are made of 200 second periods of heave data. The first and the last 25 seconds of the 200 seconds data blocks are tapered (cosine tapering) to minimize leaking of energy to other frequencies. The spectral density is averaged over 8 consecutive 200 seconds data blocks which thus results in spectral estimates with 16 degrees of freedom and a frequency resolution of 0.005 Hz. The spectral density function is compressed for transmission to 28 8-bit numbers.

The spectrum is coded relative to the maximum density (= 1). To attain a sufficiently large range and a practically constant relative resolution the transmitted number G_n is not the relative spectral density S_n itself but:

$$G_n = B\log_{(e)}(1 + CS_n)$$

where $B = 32$ and $C = 2888.24$ are chosen constants.

The sequence of the numbers giving the mean spectral density in an indicated frequency range is given by Table 3.2.

The absolute spectral density function can be obtained from the square root of the zeroth order moment ($\sqrt{m_0}$) which is also given. As G_n is represented as an 8-bit number its range is 0 - 255.

The relative spectral density can then be calculated from

$$S_{rel_n} = (\exp(G_n/32) - 1)/2888.24$$

Therefore, if $G_n = 1$, then $S_{rel_n} = 1.1 \cdot 10^{-5}$ and for $G_n = 255$, $S_{rel_n} = 1.0$.

The zeroth order moment, $\sqrt{m_0}$ is also represented by 8-bits and is decoded as follows:

$$\sqrt{m_0} = 0.16(\exp(G/64) - 1) \text{ m}$$

giving a range of 0 - 8.44 m. The significant wave height,

$$Hm0 = 4\sqrt{m_0}$$

has then a range of 0 - 33.76 m.

As $\sqrt{m_0} = \sqrt{\sum_{n=5}^{23} S_{rel_n} \cdot S_{\max} \cdot \Delta f_n}$, where $S_{\max}$ is the spectral density at the spectral peak, the spectrum can be retrieved.

In addition, the mean wave frequency,

$$f_z = \sqrt{(m_2/m_0)} = 1/Tm02$$

is given and is determined by the 6 most significant bits of G_3.

f_z is retrieved from:

$$fz = 0.32(\exp(z/64) - 1)Hz$$

where $z = G\ 3/4$ (=integer $G\ 3/4$.

NB! m_0 and m_2 are the zeroth and second order moments of the spectral density function, and Tm02 is the mean wave period. Finally, battery voltage and status are given as follows.

Battery voltage — is determined by the 3 last significant bits of $G_1 = 2(G_1 \bmod 8) + 7$ Volts.

Status — is determined by the 2 most significant bits of G1
S= G 1 /64 (integer G1/64)
S should be 0, S = 1 indicates a memory error

Count — C = (G 1 mod 64)/8 indicates the time elapsed in minutes since the new spectrum was valid = 5 * C.

Table 3.2 Construction of the ARGOS satellite message for the standard Datawell ARGOS version of the Waverider.

Sequence number N of transmitted number $G_{(N)}$	**Gives mean spectral density in frequency range of**	**$\Delta f_n \times 200$**	**Remarks**
1*	not applicable	-	Battery voltage, count, status
2*	not applicable	-	"RMSH"
3*	not applicable	-	Temp. and fz
4*	not applicable	-	
5	0.0225 - 0.0275 Hz	1	
6	0.0275 - 0.0325 Hz	1	
7	0.0325 - 0.0375 Hz	1	
8	0.0375 - 0.0425 Hz	1	
9	0.0425 - 0.0475 Hz	1	
10	0.0475 - 0.0525 Hz	1	
11	0.0525 - 0.0575 Hz	1	
12	0.0575 - 0.0625 Hz	1	
13	0.0625 - 0.0725 Hz	2	
14	0.0725 - 0.0825 Hz	2	
15	0.0825 - 0.0925 Hz	2	
16	0.0925 - 0.1025 Hz	2	
17	0.1025 - 0.1125 Hz	2	
18	0.1125 - 0.1225 Hz	2	
19	0.1225 - 0.1325 Hz	2	
20	0.1325 - 0.1425 Hz	2	
21	0.1425 - 0.1625 Hz	4	
22	0.1625 - 0.1825 Hz	4	
23	0.1825 - 0.2025 Hz	4	
24	0.2025 - 0.2225 Hz	4	
25	0.2225 - 0.2425 Hz	4	
26	0.2425 - 0.2625 Hz	4	
27	0.2625 - 0.2825 Hz	4	
28	0.2825 - 0.3025 Hz	4	
29	0.3025 - 0.3825 Hz	16	
30	0.3825 - 0.4625 Hz	16	
31	0.4625 - 0.5425 Hz	16	
32	0.5425 - 0.6225 Hz	16	

* See explanation of $G_{(1)}$ - $G_{(4)}$.

3.1.2.2 Revised Datawell ARGOS Message

The ARGOS message described in section 3.1.2.1 above does not allow for buffering of old data (i.e. transmission of the latest and previous messages). This is essential near the equator due to the relatively poor coverage of the ARGOS system in this error. As a result of this need for improved data recovery, OCEANOR specified a new method of compressing the Waverider spectra allowing also buffering of the previous record (T-3 hours) to be camed out. This method is based on the data compression technique used by Datawell in their Directional Waverider buoy.

From inspection of Table 3.3 one can see that there are basically two wave spectra stored on the ARGOS message together with the 4 wave parameters, $/m_0$, Tm-10, Tp and Tm02.

The most recent spectrum is transferred in bytes 18 - 32 of the 32 byte message whilst the previous spectrum (T-3 hrs) is stored in bytes 2 -18.

Every three hours one spectrum is calculated and updated for satellite transmission. Every satellite transmission during the next three hours contains:

1. the latest updated spectral density function
2. time elapse between updating and moment of transmission
3. spectral density function which was updated three hours earlier.

For assembly of the message, the frequency range of the spectrum is divided into 13 bands. each containing a certain fraction of the total variance. The square root of the total variance $/m_0$ is given as an eight bit number n, and is decoded from $/m_0 = 16(\exp(n/64) - 1)$ cm. Its range is 8.44 m. Knowing the total variance allows the wave spectrum to be computed in the 13 frequency bands from the variable band widths.

The frequency band widths are given as 6 bit numbers n; = .04(exp(n/32)-1) Hz (B1 up to B14).

Further, the spectral peak, Tp, mean wave period, Tm02, and energy period Tm-10 are given as eight bit numbers, with all wave period parameters retrieved by T = 400/n. Time elapsed is a three bit number in byte 17. AT = .5 n hours. Battery voltage is a three bit number in byte 17.V = 7 + 2 n volts.

Table 3.3 Construction of the ARGOS satellite message for the revised Datawell version of the Waverider.

Bits									Most significant bit is indicated
Byte n	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
1	*								Checksum
2	*								$\sqrt{m_0}$ = .16(exp(m/64) - 1) cm
3	*								Tm-10 = 400/n
4	*								T_{peak} = 400/n
5	*								Tm02 = 400/n
6	*			F0			*	B1	
7		B1			*		B2		
8	B2		*			B3			
9	*			B4			*	B5	
10	B5				*		B6		
11	B6		*				B7		
12	*		B8				*	B9	
13		B9			*		B10		
14	B10		*			B11			
15	*			B12			*	B13	
16		B13			—	—	—	—	
17	*	ΔT		*	batt.		—	—	
18	*								$\sqrt{m_0}$
19	*								Tm-10
20	*								Tp
21	*								Tm02
22	*			F0			*	B1	B1 contains 1/256 of total variance
23		B1			*		B2		B2 contains 1/128 of total variance
24			*			B3			B3 contains 1/64 of total variance
25	*			B4			*	B5	B4 contains 1/32 of total variance
26		B5			*		B6		B5 contains 1/16 of total variance
27			*			B7			B6 contains 1/8 of total variance
28	*			B8			*	B9	B7 contains 1/8 of total variance
29		B9			*	B10			B8 contains 1/8 of total variance
30			*	B11					B9 contains 1/8 of total variance
31	*	B12					*	B13	B10 contains 1/8 of total variance
32		B13			—	—	—	—	B11 contains 1/8 of total variance
									B12 contains 1/16 of total variance
									B13 contains 1/32 of total variance

3.2 Communication with ARGOS

The ARGOS system offers capabilities for satellite based location of fixed and moving platforms, in addition to the collection of environmental data.

ARGOS is the result of a cooperative venture between the Centre National d'Etudes Spatiales (CNES, France), the National Aeronautics and Space Administration (NASA, USA) and the National Oceanic and Atmospheric Administration (NOAA, USA).

The ARGOS onboard package is carried by NOAA satellites. Two space craft in circular, polar orbits (altitude approximately 800 km), are operationally scheduled to provide the ARGOS system with complete global coverage.

User relations and technical and administrative management are handled by CLS/Service Argos in Toulouse, France.

Each time the ARGOS Processing Center receives a telemetered data set, the computer determines the platform location and processes the sensor data for the messages contained in the data set. The two sets of results (location and sensor data) are pooled, then stored on disk.

The disk file contains the most recent and significant message for each platform in the ARGOS system. It is therefore updated each time a new data set is processed. Data are transferred online every day to OCEANOR's VAX computer for control.

The file also contains the complete set of consecutive messages generated by all platforms during the current two-week period. Identical consecutive messages for any given platform in a single satellite pass are replaced by a single message, the last in the series. Each message is also assigned a value called the compression index, stating the number of identical messages received consecutively. The messages are sorted by platform number and in chronological order of satellite reception.

The data is fed into a data bank containing all the results for the current month and the three previous months. Updating is done twice a month. Data for each month are transferred to OCEANOR by magnetic tape for in-house analysis.

The ARGOS system is documented in the "ARGOS User Manual" and the "Guide to the ARGOS System" issued by the ARGOS User Office.

3.3 Inhouse Data Processing

3.3.1 ROUTINE HANDLING PROCEDURE

The ARGOS data are handled in two modes:

1. Daily reception and processing for near real time data from the buoys. These data are transmitted on data line from ARGOS to OCEANOR. To minimize the tele costs a strongly reduced number of messages selected by ARGOS is transmitted (TXC format).

2. Monthly updating of the wave data base by processing all transmitted data since last month. These data are sent to OCEANOR on a monthly backup tape from ARGOS (DS format).

Except for the different ways of data distribution and different format of the raw ARGOS data, the inhouse data processing is exactly the same for the two runs.

3.3.2 GENERAL

The wave analysis is performed internally in the buoys, and the result is stored on a compressed ARGOS message consisting of 32 bytes as described in section 3.1. The transmission rate by the PTT (Platform Transmitter Terminal) in the buoy is once per minute. However, the number of messages distributed by Service ARGOS is reduced by two factors:

1. The polar orbiting satellite is visible from the buoy at irregular intervals. If one divides the day into 3 hourly segments, the satellite will only on average be visible at least once during 6 of these periods at the latitude of Tongatapu. Up to 8 hours of continuous lack of visibility may occur. With 30 minutes sampling rate in the buoy (i.e. wave data updated to the PTT each 1/2 hour) this effect gives maximum 25% data recovery out of all possible 1/2 hourly records, while 75% recovery can be attained if data is updated 3 hourly. Buffering of the previous 3 hourly wave record (i.e. both the latest and the last but one data sets transmitted) increases the data coverage to 98%. The three different data transfer schemes used were described in Section 3.1.

2. Service ARGOS reduces redundant information by extracting one message of each contiguous series of equal PTT transmissions, limited to a period of up to 15 minutes. The number of messages from ARGOS then becomes about 1500 and 500 per month with 30 and 180 minutes sampling, respectively.

The inhouse data processing has two purposes which require slightly different data control procedures. One purpose is to monitor the function and position of the buoy, and the other is to establish the wave data base with quality controlled wave data. It is an inherent problem that errors originating from the satellite transmission may cloud the quality of the buoy data. This problem is solved by a careful setting of error criteria on the first automatic inhouse data control. The buoy function parameters (clock and battery) and the position are next checked. Finally, a manual check of the physical values is undertaken.

3.3.3 PROCEDURE

The data processing is performed as follows:

1. Import of raw ARGOS data

   An import module standardises the raw data on the ORKAN file format for compact storage and simple data retrieval.

2. Selection of best sample

   A selection module picks out the best set of wave parameters for each sampling period.

3. Bit unpacking

   This routine unpacks the information in the ARGOS bitstream into separate computer words.

4. Data control and correction, including

   - position check
   - missing data
   - illegal values
   - periods of constant (flat) values,
   - spikes
   - manual check
   - correction by linear interpolation to fill gaps (not carried out on the data reported here)

   The error criteria are set for each of the individual wave parameters that are measured.

5. Conversion to physical values.

6. Correction by:

   - Removal of periods when the buoy is far out of position or on land.

The data are stored on the ORKAN data base, organized as one separate file for each measuring site. Different buoy versions are handled by the data base. Results from each of the processing steps are also stored on the ORKAN data base to simplify tracing of special events.

4 Accumulated Wave Statistics

In this section are presented wave statistics for Tongatapu from the start of measurement in May 1987 to July 1992. A maximum of one measurement each third hour is included in the statistics. For periods where measurements are updated every half hour, the nearest measurement to each synoptic hour (0, 3, 6, ... UTC) is picked out. No interpolation is carried out to fill in gaps due, for example, to poor coverage from the satellite.

4.1 Data Recovery, Average Conditions and Maximum Values

Full wave statistics are presented in Appendix A.

Included are the following:

- Joint frequency of occurrence tables for Hm0 - Tm-10, Hm0 - Tp for all data combined and monthly classes.
- Joint occurrence tables for Hm0 - J_{Tot} (all data).
- Monthly frequency of occurrence table for J_{T-60}.

The data recovery and mean values of Hm0, Tm-10 and J_{Tot} are summarised in Table 4.1 for the entire measurement period and the highest measured values for Hm0, Tm-10 and J_{Tot} are given in Table 4.2 on a monthly basis again for the entire measurement period. In Table 4.3 are given the average wave power (J_{T-60}) for each month to give an indication of the inter-monthly variability in wave power.

Table 4.1 Monthly data recovery and average values for Tongatapu, 1987 - 1992.

Month	Data Recovery		Mean Values		
	No. of records	%	Hm0 (m)	Tm-10 (s)	J_{T-60}
January	974	79	1.4	8.7	10.1
February	866	76	1.7	9.2	14.8
March	726	59	1.9	9.8	16.8
April	601	50	1.8	9.9	17.9
May	613	41	2.0	9.6	19.9
June	1 143	79	1.9	10.0	18.8
July	920	62	2.0	9.9	21.0
August	730	59	1.9	9.9	18.1
September	672	56	1.8	9.9	17.3
October	666	54	1.7	9.7	14.5
November	473	39	1.6	8.8	11.7
December	837	68	1.6	8.7	12.3
Annual	9 221	60	1.8	9.5	16.2

Note: J_{T-60} is computed by averaging J_{Tot} over the data class, rejecting high values of J_{Tot} (> 60 kW/m) which would otherwise significantly bias the average conditions.

Table 4.2 Maximum values for each month from May 1987 to July 1992 (maximum values for different parameters do not necessarily occur simultaneously).

Month (yymm)	Hm0 (m)	Tm-10 (s)	J_{Tot} (kW/m)
8705	3.70	13.00	64
8706	3.20	13.90	62
8707	3.80	13.90	97
8708	3.50	14.60	74
8709	3.00	13.50	55
8710	3.20	13.20	55
8812	3.00	10.80	38
8901	2.50	12.80	26
8902	4.40	12.70	111
8906	3.20	14.20	52
8907	2.70	12.20	40
8912	3.87	12.24	88
9001	2.66	12.15	32
9002	3.47	12.37	65
9003	6.03	12.83	221
9004	3.40	13.05	69
9005	3.22	12.98	41
9006	3.28	13.12	58
9007	4.24	14.09	94
9008	3.28	13.56	65
9009	3.73	13.44	74
9010	3.80	13.74	54
9011	6.68	14.74	203
9012	2.46	11.53	29
9101	4.32	13.38	95
9102	3.16	14.03	45
9103	3.47	12.69	59
9104	2.99	13.48	51
9105	3.53	13.33	61
9106	5.25	14.29	193
9107	3.16	12.90	63
9108	3.94	13.33	76

Month (yymm)	Hm0 (m)	Tm-10 (s)	J_{Tot} (kW/m)
9109	3.22	12.50	54
9110	4.47	14.29	107
9111	2.46	11.43	31
9112	2.82	12.50	48
9201	4.2	11.4	86
9202	3.3	9.1	76
9203	4.2	13.3	86
9204	3.0	13.3	49
9206	3.2	13.3	48
9207	3.0	13.8	58

Table 4.3 Monthly variation of mean J_{Tot} for all records where $J_{Tot} < 60$ kW/m.

Month	Mean (kW/m)	No. of Records
8705	22.26	238
8706	20.52	238
8707	23.29	227
8708	18.69	232
8709	20.70	239
8710	13.71	183
8812	15.03	198
8901	6.87	247
8902	15.46	199
8906	14.08	225
8907	16.41	73
8912	11.62	137
9001	7.58	223
9002	20.33	195
9003	11.23	209
9004	17.05	215
9005	15.30	225
9006	21.41	209
9007	24.08	214
9008	19.65	222
9009	17.45	214
9010	14.35	223
9011	11.77	212
9012	9.67	221
9101	14.79	221
9102	12.87	199
9103	18.79	221
9104	16.24	209
9105	23.53	127
9106	23.29	213
9107	20.75	245

Month	Mean (kW/m)	No. of Records
9108	16.14	242
9109	13.22	202
9110	15.25	232
9111	11.62	240
9112	12.83	247
9201	10.7	248
9202	11.0	227
9203	20.2	238
9204	21.3	144
9206	14.6	213
9207	14.9	131

5 Wave Statistics for 1992

In this chapter are presented summary wave statistics for Tongatapu for 1992 (section 5.1) and information on events which affected the data recovery in 1992 (section 5.2).

5.1 Data Recovery, Average and Maximum Values

Full wave statistics for 1992 are presented in Appendix B, including the following:

- Time series plots for Hm0, Tp, Tm-10 and J_{Tot} for each month in 1992.
- Joint frequency of occurrence tables for Hm0 - Tp and Hm0 - Tm-10 for the year as a whole.

Data recovery and mean values are summarised in Table 5.1 for 1992 and the highest measured values for Hm0, Tm-10 and J_{Tot} were shown in Table 4.3 on a monthly basis.

Table 5.1 Monthly data recovery and average values for Tongatapu, 1992.

Month	Data Recovery		Mean Values		
	No. of records	%	Hm0 (m)	Tm-10 (s)	J_{T-60}
January	248	100	1.5	8.4	10.7
February	232	100	1.5	9.1	11.0
March	246	100	2.1	9.4	20.2
April	145	60	2.0	9.8	21.3
June	214	89	1.7	9.6	14.6
July	131	53	1.7	9.7	14.9

Note: J_{T-60} is computed by averaging J_{Tot} over the data class, rejecting high values of J_{Tot} (> 60 kW/m) which would otherwise significantly bias the average conditions.

5.2 Events Effecting the Measurements (Log)

As a result of the wave buoy breaking loose from its mooring in July 1989, subsequently being damaged on the reef, no measurements were carried out during August - November 1989. In December 1989, a new wave buoy was purchased from Datawell and deployed south of Tongatapu on 12 December 1989.

January - December 1990

Through the whole year the wave buoy S/N 68658-6A has been deployed in location 21'14.22'S, 175'16.20'W.

Data has been transmitted uninterrupted, and the data quality is good. The data coverage is close to 100%.

January - December 1991

In late April - early May the buoy was serviced. On 15 May the buoy came adrift. the buoy was rescued by one of Tonga's Patrol vessels with people from the energy office onboard. Since 29 May when the buoy was redeployed, there have been no interruptions.

January - July 1992

The Waverider stopped transmitting 19 April 1992 due to low battery voltage. On 2 June the batteries was changed and the buoy put into operation in its previous location. On 18 July the buoy stopped transmitting, reason unknown. Attempts to find the buoy was unsuccessful. It was then decided to stop the measurement campaign in Tonga.

6 Conclusions

Since the start in 1987 until December 1989 the data recovery has been rather sporadic. The total data coverage during that period is only 26%. From December 1989 data has been gathered continuously, and the data coverage in 1990 and 1991 is close to 100%. The highest measured wave occurred in November 1990. The significant wave height (Hm0) was 6.7 m with a period of 14.7 s and a corresponding wave energy of 203 kW/m.

On averagem the significant wave height (Hm0) is 1.8 m, with an average energy period (Tm-10) of 9.5 s and an average wave energy of 16.2 kW/m.

During the winter period from April to September the average wave energy is 19.0 kW/m. In the summer (October - March) the average wave energy is 13.2 kW/m.

The Waverider measurement campaign stopped 18 July 1993.

7 References

ARGOS User Office: ARGOS User Manual.

ARGOS User Office: Guide to the ARGOS System.

Datawell User Manual, Datawell b.v., The Netherlands.

Kollstad, T. and Carstens, T. (1988): Waverider Processor and PTT-system Description. SINTEF Report No. STF60 A88088, Trondheim, Norway.

8 Project Reports

8.1 1990 Annual Reports

Olsen, E., Barstow, S.F. and Selanger, K., 1991: Wave Data Collection, Tongatapu, Kingdom of Tonga, May 1987 - December 1990, OCEANOR Report No. OCN R-91068.

Olsen, E., Barstow, S.F. and Selanger, K., 1991: Wave Data Collection, Rarotonga, Cook Islands, July 1987 - January 1991, OCEANOR Report No. OCN R-91071.

Olsen, E., Barstow, S.F. and Selanger, K., 1991: Wave Data Collection, Western Samoa (Inner), September 1989 - April 1990, OCEANOR Report No. OCN R-91072.

Olsen, E., Barstow, S.F. and Selanger, K., 1991: Wave Data Collection, Funafuti, Tuvalu, May - December 1990, OCEANOR Report No. OCN R-91075.

Olsen, E., Barstow, S.F. and Selanger, K., 1991: Wave Data Collection, Efate, Vanuatu, November - December 1990, OCEANOR Report No. OCN R-91076.

8.2 1991 Annual Reports

Barstow, S.F. and Olsen, E., 1992: Wave Data Collection, Kadavu, Fiji, June - December 1991, OCEANOR Report No. OCN R-92088.

Barstow, S.F. and Olsen, E., 1992: Wave Data Collection, Efate, Vanuatu, November 1990 - December 1991, OCEANOR Report No. OCN R-92089.

Barstow, S.F. and Olsen, E., 1992: Wave Data Collection, Tongatapu, Kingdom of Tonga, May 1987 - July 1992, OCEANOR Report No. OCN R-92090.

Barstow, S.F. and Olsen, E., 1992: Wave Data Collection, Funafuti, Tuvalu, May 1990 - December 1991, OCEANOR Report No. OCN R-92091.

Barstow, S.F. and Olsen, E., 1992: Wave Data Collection, Western Samoa (Outer), May 1990 - December 1991, OCEANOR Report No. OCN R-92092.

8.3 1992 Annual Reports

Below are listed the companion reports to the present report, containing annual and accumulated wave statistics for each of the measurement stations in the SOPAC wave measurement programme:

Barstow, S.F. and Olsen, E., 1993: Wave Data Collection, Efate, Vanuatu, November 1990 - February 1993, OCEANOR Report No. OCN R-93074.

Barstow, S.F. and Olsen, E., 1993: Wave Data Collection, Funafuti, Tuvalu, May 1990 - April 1992, OCEANOR Report No. OCN R-93075.

Barstow, S.F. and Olsen, E., 1993: Wave Data Collection, Western Samoa (Outer), May 1990 - July 1992, OCEANOR Report No. OCN R-93076.

Barstow, S.F. and Olsen, E., 1993: Wave Data Collection, Kadavu, Fiji, June 1991 - December 1992, OCEANOR Report No. OCN R-93078.

8.4 Other Reports

Barstow, S.F., 1992: Report of Visit to SOPAC Techsec as Programme Officer in the Wave Energy Programme, 2nd March - 27th March 1992, OCEANOR Report No. OCN R-92068.

Barstow, S.F., 1990: Wave Data from the Datawell Waverider Buoys offshore Tonga, Rarotonga, Western Samoa and Tuvalu for January - September 1990, Technical Note to SOPAC.

Barstow, S.F. and Patiale, M., 1992: An Appraisal of the Visual Wave Observations at Funafuti, 1984 - 1992, Technical Note.

Torsethaugen, K., 1990: Site Selection Study in the SOPAC Region, NHL Report No. STF60 F90078.

Torsethaugen, K., 1991: Calibration of Hindcast Data in the SOPAC Region, NHL Report No. STF60 F91004.

APPENDIX A

ACCUMULATED WAVE STATISTICS FOR 1987 - 1992

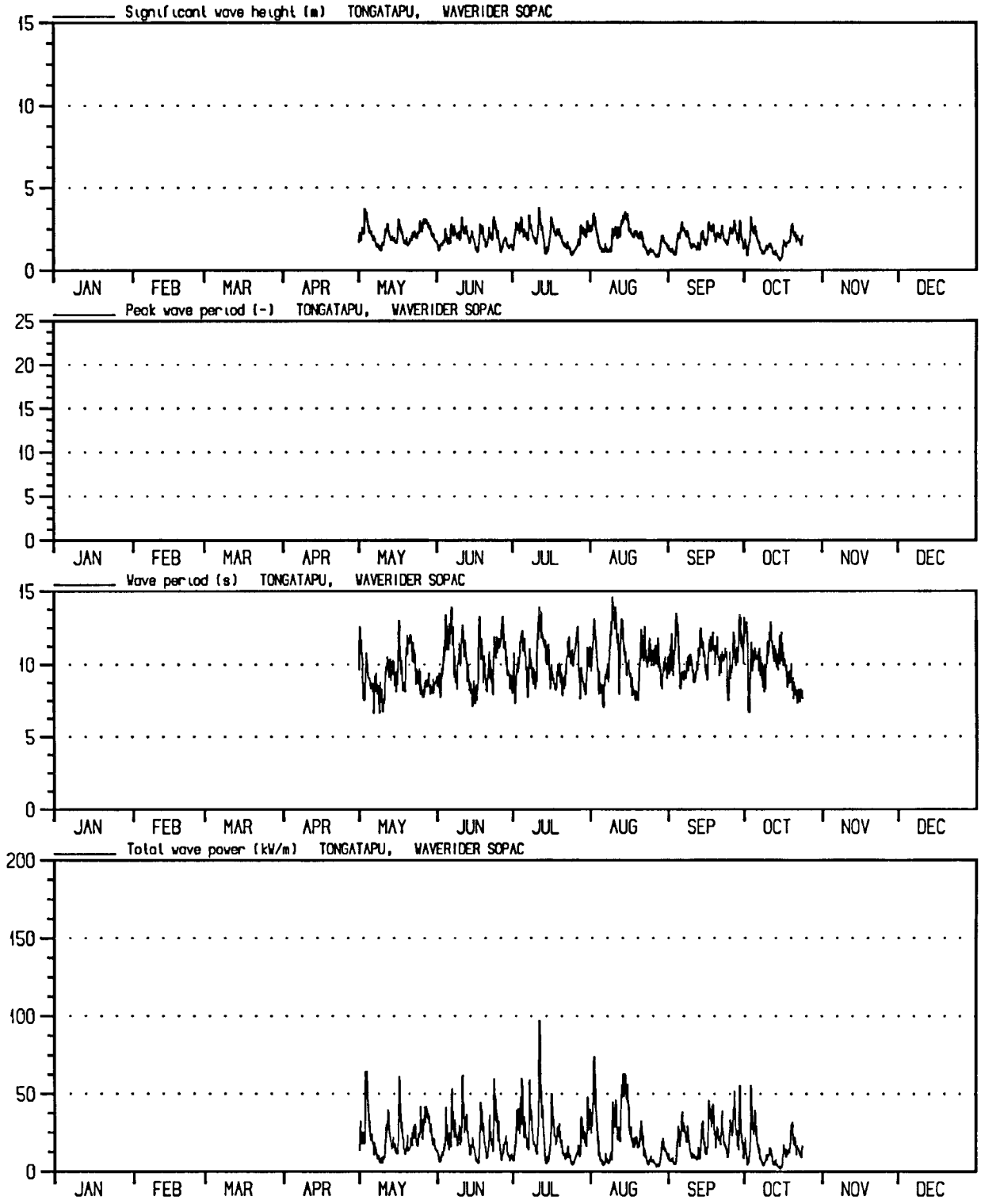
TONGATAPU

The following tables and plots are presented:

Joint frequency tables (accumulated for all years and 1992). Both monthly and annual tables and plots are presented.

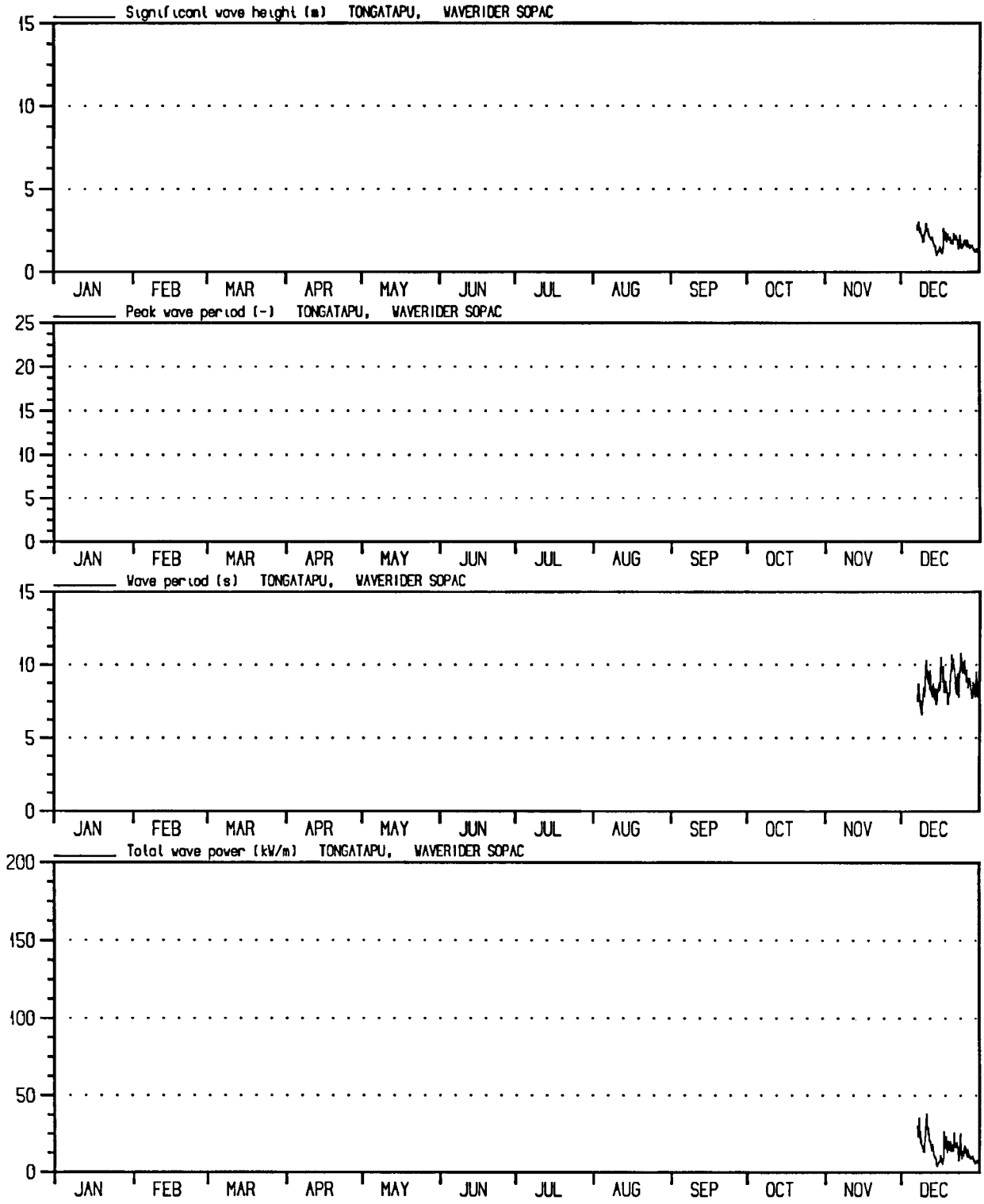
Parameters: Hm0 - Tm10
Hm0 - Tp
Hm0 - J_{Tot} (Accumulated all years)

Time series plots for all years for Hm0, Tp, Tm-10 and J_{Tot} (when available).



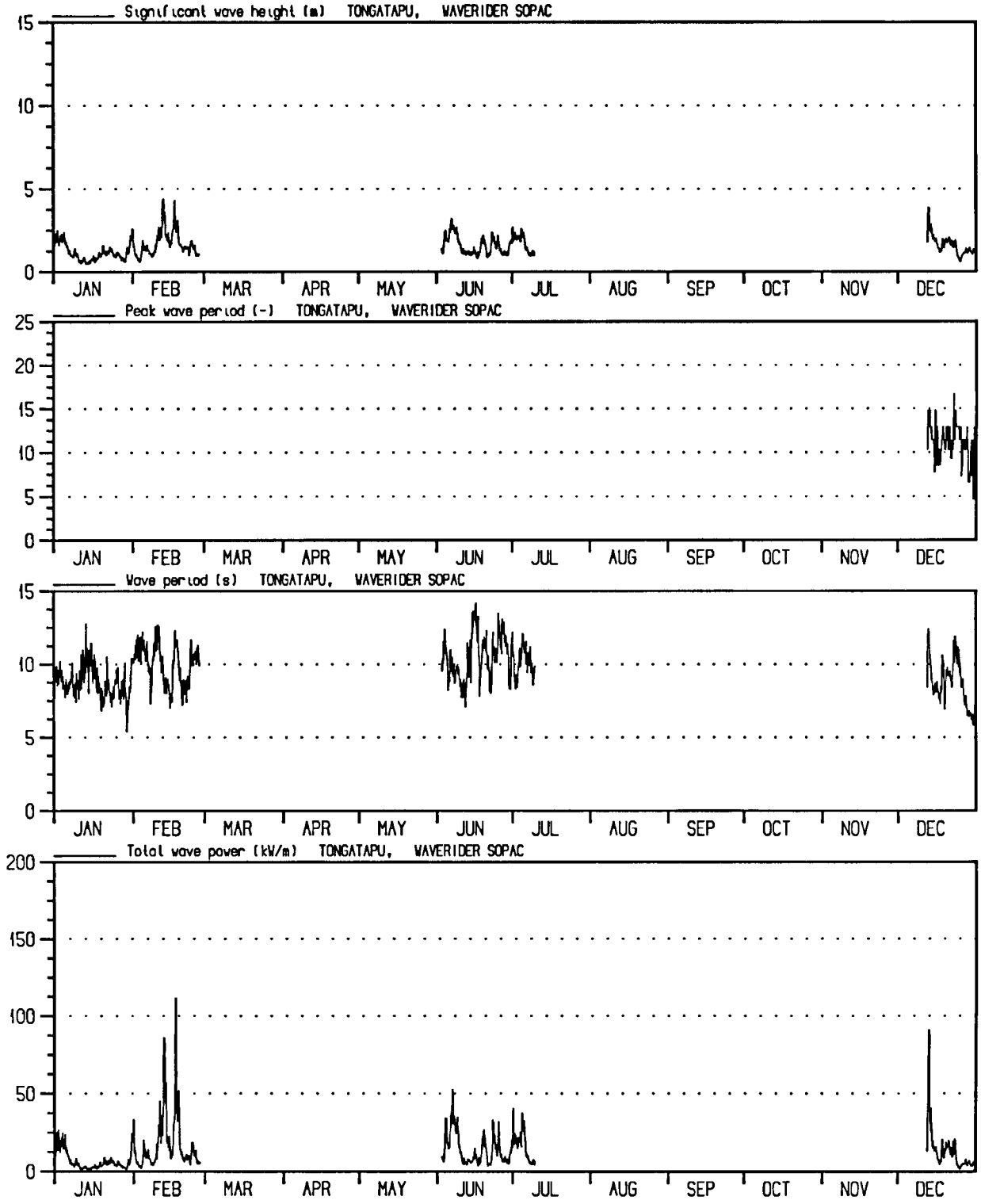
SOPAC WAVE MEASUREMENTS				INSTRUMENT WAVERIDER
LOCATION TONGATAPU	STATION 01	WATER DEPTH 154 m	INSTRUMENT HEIGHT 0 m	OBSERVATION PERIOD 1987.01.01-1987.12.31 gmt
OCEANOR OCEANOGRAPHIC COMPANY OF NORWAY			PROJECT 28400	FIGURE 1

arkan33/app



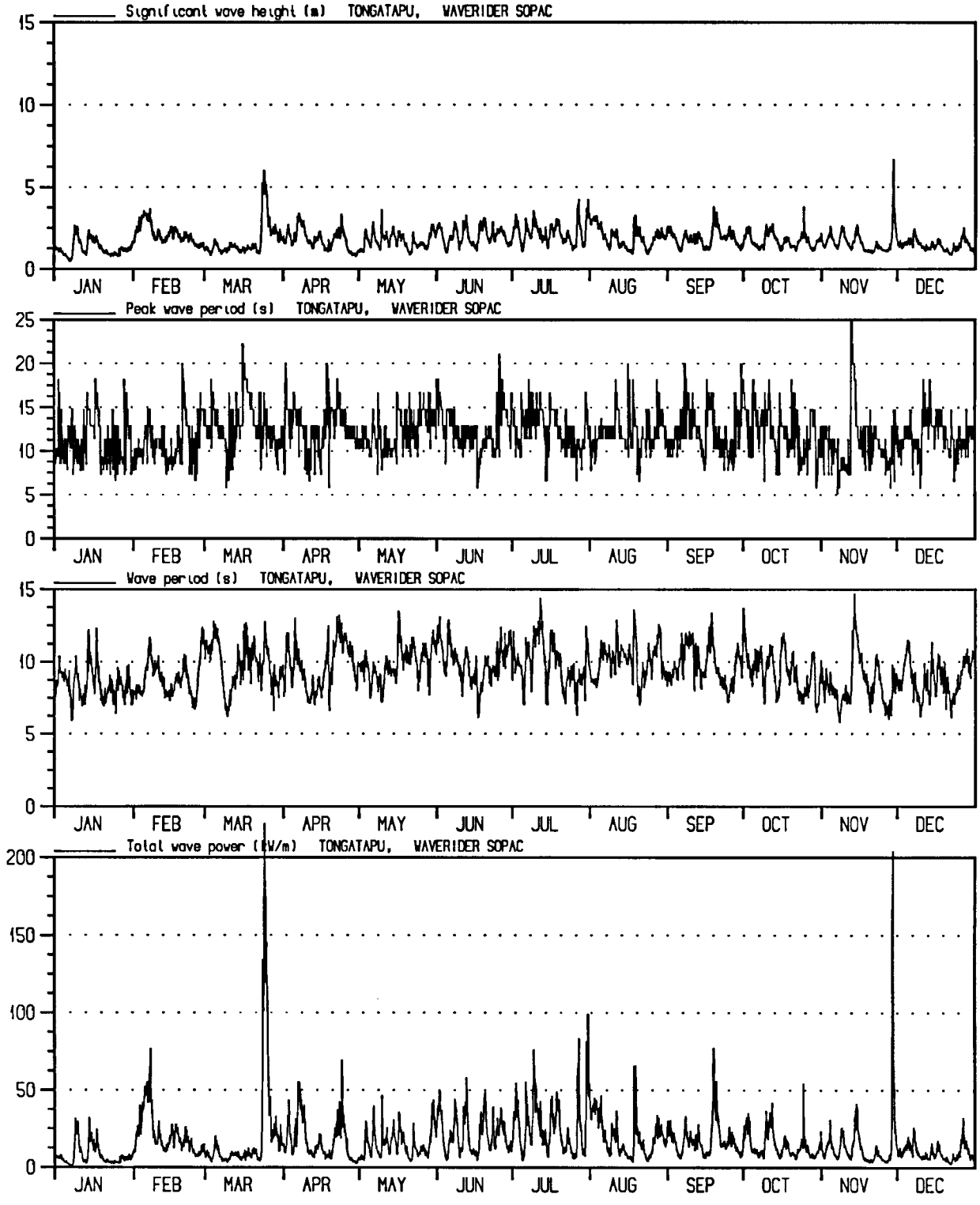
SOPAC WAVE MEASUREMENTS				INSTRUMENT WAVERIDER
LOCATION TONGATAPU	STATION 01	WATER DEPTH 154 m	INSTRUMENT HEIGHT 0 m	OBSERVATION PERIOD 1988.01.01-1988.12.31 gmt
OCEANOR OCEANOGRAPHIC COMPANY OF NORWAY			PROJECT 28400	FIGURE 1

arkan33/app



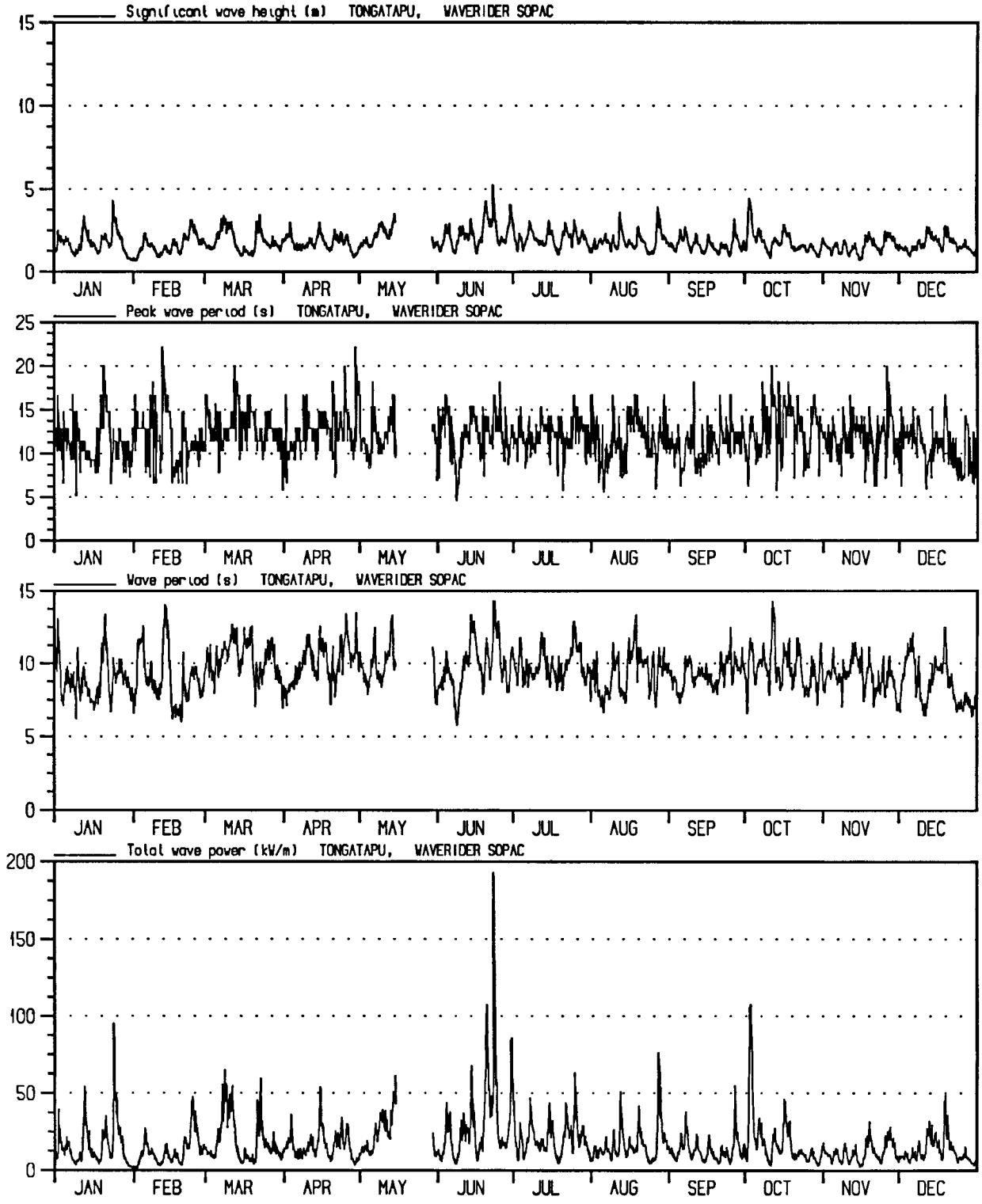
SOPAC WAVE MEASUREMENTS				INSTRUMENT WAVERIDER
LOCATION TONGATAPU	STATION 01	WATER DEPTH 154 m	INSTRUMENT HEIGHT 0 m	OBSERVATION PERIOD 1989.01.01-1989.12.31 gmt
OCEANOR OCEANOGRAPHIC COMPANY OF NORWAY			PROJECT 28400	FIGURE 1

arkan33/app



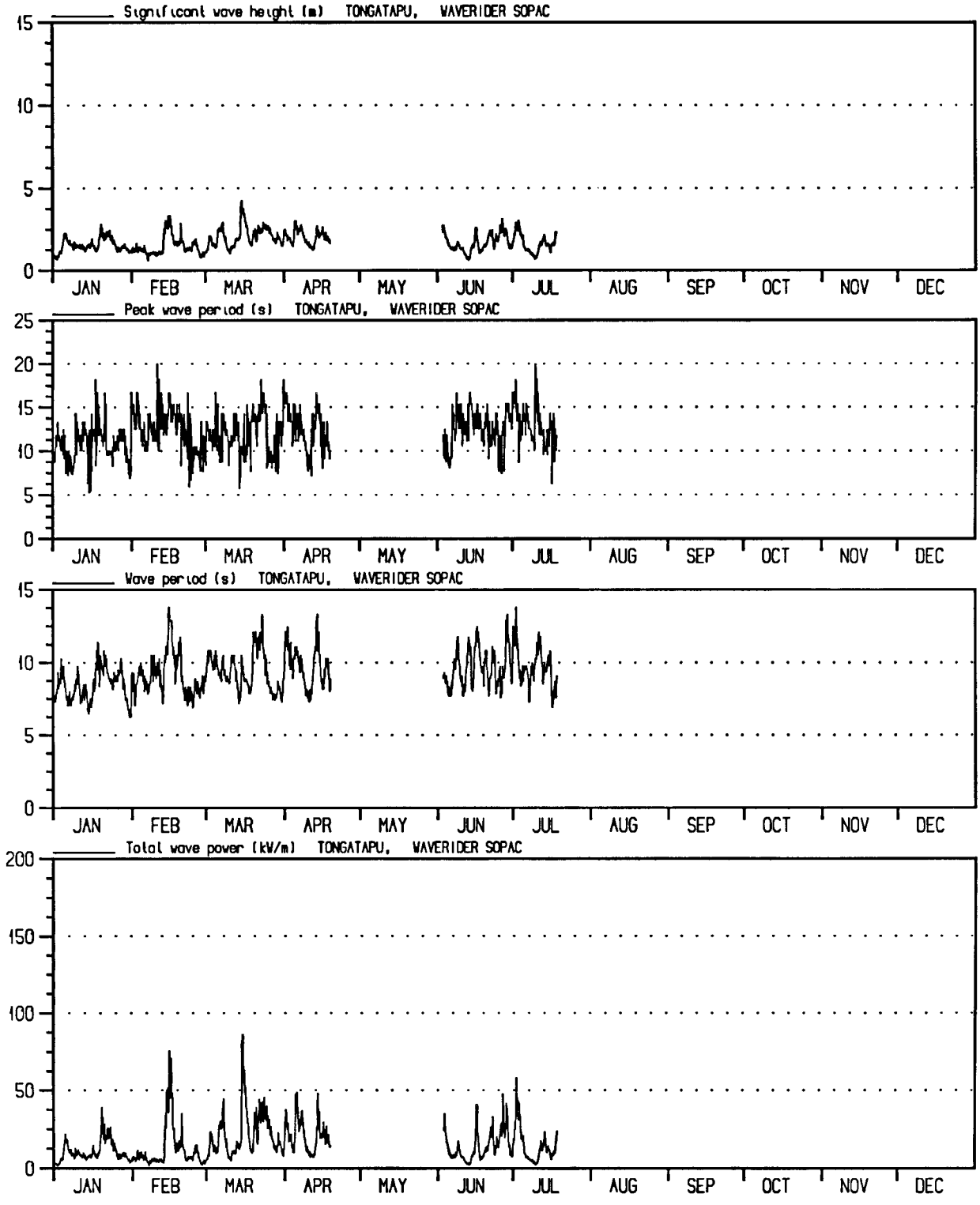
SOPAC WAVE MEASUREMENTS				INSTRUMENT WAVERIDER
LOCATION TONGATAPU	STATION 01	WATER DEPTH 309 m	INSTRUMENT HEIGHT 0 m	OBSERVATION PERIOD 1990.01.01-1990.12.31 gmt
OCEANOR OCEANOGRAPHIC COMPANY OF NORWAY			PROJECT 28400	FIGURE 1

orkan33/app



SOPAC WAVE MEASUREMENTS				INSTRUMENT WAVERIDER
LOCATION TONGATAPU	STATION 01	WATER DEPTH 309 m	INSTRUMENT HEIGHT 0 m	OBSERVATION PERIOD 1991.01.01-1991.12.31 gmt
OCEANOR OCEANOGRAPHIC COMPANY OF NORWAY			PROJECT 28400	FIGURE 1

arkan33/app



SOPAC WAVE MEASUREMENTS				INSTRUMENT WAVERIDER
LOCATION TONGATAPU	STATION 01	WATER DEPTH 309 m	INSTRUMENT HEIGHT 0 m	OBSERVATION PERIOD 1992.01.01-1992.12.31 gmt
OCEANOR OCEANOGRAPHIC COMPANY OF NORWAY			PROJECT 28400	FIGURE 1

orkan33/app

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Jtot Total wave power (kW/m) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 154.00 m
Sampling interval: 3 hours
Period : 1987.05.01 00:00 - 1993.02.12 23:59 9230 recs.

Hm0(m) / Jtot(kW/m)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 5.0		490	317													807	8.7	807	0.08742	0.5	0.9	1.3	0.24
5.0 - 10.0		11	2190	278												2479	26.9	3286	0.35597	1.0	1.3	1.7	0.16
10.0 - 15.0			299	1606	13											1918	20.8	5204	0.56375	1.2	1.7	2.1	0.19
15.0 - 20.0				853	474											1327	14.4	6531	0.70751	1.5	1.9	2.4	0.24
20.0 - 25.0				102	751	21										874	9.5	7405	0.80219	1.7	2.2	2.6	0.18
25.0 - 30.0					484	135										619	6.7	8024	0.86924	2.0	2.4	2.8	0.21
30.0 - 35.0					142	241										383	4.1	8407	0.91074	2.1	2.6	3.0	0.24
35.0 - 40.0					25	234	16									275	3.0	8682	0.94053	2.3	2.7	3.2	0.19
40.0 - 45.0					1	126	47									174	1.9	8856	0.95938	2.5	2.9	3.3	0.23
45.0 - 50.0						58	46	2								106	1.1	8962	0.97086	2.6	3.0	3.6	0.27
50.0 - 55.0						19	52	6								77	0.8	9039	0.97920	2.8	3.2	3.8	0.27
55.0 - 60.0						4	37	7								48	0.5	9087	0.98440	2.9	3.3	3.7	0.24
60.0 - 65.0							25	16								41	0.4	9128	0.98884	3.0	3.4	3.9	0.24
65.0 - 70.0							11	6	1							18	0.2	9146	0.99079	3.2	3.5	4.2	0.30
70.0 - 75.0							3	16								19	0.2	9165	0.99285	3.3	3.7	3.9	0.18
75.0 - 80.0							1	8	2							11	0.1	9176	0.99404	3.3	3.8	4.1	0.26
80.0 - 85.0								5	3							8	0.1	9184	0.99491	3.8	3.9	4.4	0.24
85.0 - 90.0								1	3							4	0.0	9188	0.99534	3.8	4.1	4.3	0.22
90.0 - 95.0								3	7							10	0.1	9198	0.99643	3.7	4.1	4.5	0.23
95.0 -100.0								2	2							4	0.0	9202	0.99686	3.8	4.0	4.3	0.25
100.0 -105.0									1	1						2	0.0	9204	0.99708	4.3	4.5	4.6	0.25
105.0 -110.0								1	4	2						7	0.1	9211	0.99783	3.9	4.3	4.8	0.32
110.0 -115.0									1	2						3	0.0	9214	0.99816	4.3	4.6	4.8	0.24
115.0 -120.0										1						1	0.0	9215	0.99827	4.6	4.8	4.6	0.00
120.0 -125.0										2						2	0.0	9217	0.99848	4.6	4.8	5.0	0.00
125.0 -130.0																0	0.0	9217	0.99848				
130.0 -135.0									2		1					3	0.0	9220	0.99881	4.3	4.6	5.2	0.47
135.0 -140.0																0	0.0	9220	0.99881				
140.0 -145.0										1						1	0.0	9221	0.99892	5.0	4.8	5.0	0.00
145.0 -150.0											1					1	0.0	9222	0.99903	5.2	5.2	5.2	0.00
150.0 -155.0												1				1	0.0	9223	0.99913	5.7	5.8	5.7	0.00
155.0 -160.0																0	0.0	9223	0.99913				
160.0 -165.0											1					1	0.0	9224	0.99924	5.2	5.2	5.2	0.00
165.0 -170.0																0	0.0	9224	0.99924				
170.0 -175.0																0	0.0	9224	0.99924				
175.0 -180.0											1					1	0.0	9225	0.99935	5.1	5.2	5.1	0.00
180.0 -185.0																0	0.0	9225	0.99935				
185.0 -190.0											1					1	0.0	9226	0.99946	5.4	5.2	5.4	0.00
190.0 -195.0											1					1	0.0	9227	0.99957	5.2	5.2	5.2	0.00
195.0 -200.0																0	0.0	9227	0.99957				
200.0 -205.0												1		1		2	0.0	9229	0.99978	5.8	6.2	6.7	0.50
205.0 -210.0																0	0.0	9229	0.99978				
210.0 -215.0																0	0.0	9229	0.99978				
215.0 -220.0																0	0.0	9229	0.99978				
220.0 -225.0													1			1	0.0	9230	0.99989	6.0	6.2	6.0	0.00
>= 225.0																0	0.0	9230	0.99989				
SUM	0	501	2806	2839	1890	838	238	73	26	9	6	2	1	1	0	9230	100.0	9230	0.99989	0.5	1.8	6.7	0.62
% OF TOTAL	0.0	5.4	30.4	30.8	20.5	9.1	2.6	0.8	0.3	0.1	0.1	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	501	3307	6146	8036	8874	9112	9185	9211	9220	9226	9228	9229	9230	9230	9230							
CUM. PROB.	0.0000	0.0543	0.3582	0.6658	0.8705	0.9613	0.9871	0.9950	0.9978	0.9988	0.9995	0.9997	0.9998	0.9999	0.9999	0.99989							
MIN. VALUE		1.0	3.3	7.4	12.5	22.2	35.8	46.5	67.0	100.9	134.4	154.0	221.9	203.9		1.0							
AVE. VALUE		2.6	7.5	13.9	23.4	36.0	51.4	69.6	95.6	116.4	166.7	177.5	222.5	202.5		17.2							
MAX. VALUE		5.6	14.9	24.7	41.8	58.1	75.5	105.1	130.8	144.8	193.2	204.3	221.9	203.9		221.9							
STD. DEV.		0.73	2.34	3.42	4.82	6.65	8.43	12.24	15.00	11.25	21.49	25.00	0.00	0.00		14.36							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Tm-10 Wave period (s) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 154.00 m
Sampling interval: 3 hours
Period : 1987.05.01 00:00 - 1992.07.18 23:59 9232 recs.

Hm0(m) / Tm-10(s)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 1.0																0	0.0	0	0.00000				
1.0 - 2.0																0	0.0	0	0.00000				
2.0 - 3.0																0	0.0	0	0.00000				
3.0 - 4.0																0	0.0	0	0.00000				
4.0 - 5.0																0	0.0	0	0.00000				
5.0 - 6.0		1	5	2												8	0.1	8	0.00087	0.6	1.3	1.7	0.30
6.0 - 7.0		13	126	69	8	1										217	2.4	225	0.02437	0.5	1.4	2.6	0.33
7.0 - 8.0		68	399	392	153	42	6	2	1							1063	11.5	1288	0.13950	0.5	1.6	4.2	0.49
8.0 - 9.0		140	717	715	454	153	40	16	1							2236	24.2	3524	0.38167	0.6	1.7	4.4	0.58
9.0 - 10.0		100	650	730	479	210	62	14	5	3	1	1		1		2256	24.4	5780	0.62602	0.5	1.8	6.7	0.63
10.0 - 11.0		114	568	523	402	202	53	19	6	3						1890	20.5	7670	0.83072	0.5	1.8	5.0	0.65
11.0 - 12.0		59	249	287	263	129	40	11	10	2	1					1051	11.4	8721	0.94455	0.5	1.9	5.2	0.69
12.0 - 13.0		6	72	101	103	79	26	7	1	1	2	1	1			400	4.3	9121	0.98787	0.5	2.2	6.0	0.75
13.0 - 14.0			19	18	24	22	11	4	1							99	1.1	9220	0.99859	1.0	2.3	4.5	0.73
14.0 - 15.0			1	3	4	1			1		2					12	0.1	9232	0.99989	1.2	2.8	5.2	1.32
>= 15.0																0	0.0	9232	0.99989				
SUM	0	501	2806	2840	1890	839	238	73	26	9	6	2	1	1	0	9232	100.0	9232	0.99989	0.5	1.8	6.7	0.62
% OF TOTAL	0.0	5.4	30.4	30.8	20.5	9.1	2.6	0.8	0.3	0.1	0.1	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	501	3307	6147	8037	8876	9114	9187	9213	9222	9228	9230	9231	9232	9232	9232							
CUM. PROB.	0.0000	0.0543	0.3582	0.6658	0.8705	0.9613	0.9871	0.9950	0.9978	0.9988	0.9995	0.9997	0.9998	0.9999	0.9999	0.99989							
MIN. VALUE		5.9	5.4	5.8	6.3	6.9	7.8	7.3	7.9	9.5	9.9	9.6	12.4	9.3		5.4							
AVE. VALUE		9.4	9.3	9.4	9.8	10.2	10.4	10.3	10.8	10.6	12.5	11.0	12.5	9.5		9.5							
MAX. VALUE		12.8	14.2	14.3	14.7	14.6	13.8	13.9	14.3	12.1	14.3	12.3	12.4	9.3		14.7							
STD. DEV.		1.37	1.46	1.44	1.42	1.45	1.47	1.52	1.44	0.99	1.73	1.50	0.00	0.00		1.45							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Jtot Total wave power (kW/m) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 309.00 m
Sampling interval: 3 hours
Period : 1988.01.01 00:00 - 1988.01.31 23:59 0 recs.
1989.01.01 00:00 - 1989.01.31 23:59 247 recs.
1990.01.01 00:00 - 1990.01.31 23:59 239 recs.
1991.01.01 00:00 - 1991.01.31 23:59 240 recs.
1992.01.01 00:00 - 1992.01.31 23:59 248 recs.

Hm0(m) / Jtot(kW/m)	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 2.0	2.0 - 2.5	2.5 - 3.0	3.0 - 3.5	3.5 - 4.0	4.0 - 4.5	4.5 - 5.0	5.0 - 5.5	5.5 - 6.0	6.0 - 6.5	6.5 - 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 5.0		208	98													306	31.4	306	0.31385	0.5	0.9	1.2	0.23
5.0 - 10.0		1	288	49												338	34.7	644	0.66051	1.0	1.3	1.7	0.18
10.0 - 15.0			3	117												120	12.3	764	0.78359	1.4	1.7	2.0	0.08
15.0 - 20.0				45	34											79	8.1	843	0.86462	1.7	2.0	2.3	0.25
20.0 - 25.0				8	59											67	6.9	910	0.93333	1.9	2.2	2.5	0.16
25.0 - 30.0					27	7										34	3.5	944	0.96821	2.0	2.4	2.7	0.20
30.0 - 35.0					2	8										10	1.0	954	0.97846	2.2	2.7	2.8	0.20
35.0 - 40.0					1	5										6	0.6	960	0.98462	2.3	2.7	2.9	0.19
40.0 - 45.0							1									1	0.1	961	0.98564	3.0	3.2	3.0	0.00
45.0 - 50.0							6									6	0.6	967	0.99179	3.1	3.2	3.3	0.00
50.0 - 55.0							3									3	0.3	970	0.99487	3.3	3.2	3.3	0.00
55.0 - 60.0								1								1	0.1	971	0.99590	3.5	3.8	3.5	0.00
60.0 - 65.0																0	0.0	971	0.99590				
65.0 - 70.0																0	0.0	971	0.99590				
70.0 - 75.0								1								1	0.1	972	0.99692	3.9	3.8	3.9	0.00
75.0 - 80.0									1							1	0.1	973	0.99795	4.0	4.2	4.0	0.00
80.0 - 85.0																0	0.0	973	0.99795				
85.0 - 90.0																0	0.0	973	0.99795				
90.0 - 95.0																0	0.0	973	0.99795				
95.0 -100.0									1							1	0.1	974	0.99897	4.3	4.2	4.3	0.00
100.0 -105.0																0	0.0	974	0.99897				
105.0 -110.0																0	0.0	974	0.99897				
110.0 -115.0																0	0.0	974	0.99897				
115.0 -120.0																0	0.0	974	0.99897				
120.0 -125.0																0	0.0	974	0.99897				
125.0 -130.0																0	0.0	974	0.99897				
130.0 -135.0																0	0.0	974	0.99897				
135.0 -140.0																0	0.0	974	0.99897				
140.0 -145.0																0	0.0	974	0.99897				
145.0 -150.0																0	0.0	974	0.99897				
150.0 -155.0																0	0.0	974	0.99897				
155.0 -160.0																0	0.0	974	0.99897				
160.0 -165.0																0	0.0	974	0.99897				
165.0 -170.0																0	0.0	974	0.99897				
170.0 -175.0																0	0.0	974	0.99897				
175.0 -180.0																0	0.0	974	0.99897				
180.0 -185.0																0	0.0	974	0.99897				
185.0 -190.0																0	0.0	974	0.99897				
190.0 -195.0																0	0.0	974	0.99897				
195.0 -200.0																0	0.0	974	0.99897				
200.0 -205.0																0	0.0	974	0.99897				
205.0 -210.0																0	0.0	974	0.99897				
210.0 -215.0																0	0.0	974	0.99897				
215.0 -220.0																0	0.0	974	0.99897				
220.0 -225.0																0	0.0	974	0.99897				
>= 225.0																0	0.0	974	0.99897				
SUM	0	209	389	219	123	20	10	2	2	0	0	0	0	0	0	974	100.0	974	0.99897	0.5	1.4	4.3	0.55
% OF TOTAL	0.0	21.5	39.9	22.5	12.6	2.1	1.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	209	598	817	940	960	970	972	974	974	974	974	974	974	974	974							
CUM. PROB.	0.0000	0.2144	0.6133	0.8379	0.9641	0.9846	0.9949	0.9969	0.9990	0.9990	0.9990	0.9990	0.9990	0.9990	0.9990	0.99897							
MIN. VALUE		1.0	3.3	7.7	15.2	25.7	41.1	56.6	79.3							1.0							
AVE. VALUE		2.5	6.3	12.8	22.5	32.0	48.5	65.0	87.5							10.3							
MAX. VALUE		5.4	11.1	22.5	35.3	39.9	53.3	71.8	95.4							95.4							
STD. DEV.		0.35	2.24	3.78	3.98	3.84	3.00	7.50	10.00							9.36							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Jtot Total wave power (kW/m) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 309.00 m
Sampling interval: 3 hours
Period : 1988.02.01 00:00 - 1988.02.29 23:59 0 recs.
1989.02.01 00:00 - 1989.02.28 23:59 207 recs.
1990.02.01 00:00 - 1990.02.28 23:59 211 recs.
1991.02.01 00:00 - 1991.02.28 23:59 216 recs.
1992.02.01 00:00 - 1992.02.29 23:59 232 recs.

Hm0(m) / Jtot(kW/m)	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 2.0	2.0 - 2.5	2.5 - 3.0	3.0 - 3.5	3.5 - 4.0	4.0 - 4.5	4.5 - 5.0	5.0 - 5.5	5.5 - 6.0	6.0 - 6.5	6.5 - 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 5.0		74	43													117	13.5	117	0.13495	0.6	0.9	1.2	0.24
5.0 - 10.0			207	45												252	29.1	369	0.42561	1.0	1.3	1.7	0.19
10.0 - 15.0			24	163	1											188	21.7	557	0.64245	1.3	1.7	2.0	0.17
15.0 - 20.0				63	47											110	12.7	667	0.76932	1.5	2.0	2.2	0.25
20.0 - 25.0				3	52	3										58	6.7	725	0.83622	1.9	2.2	2.6	0.16
25.0 - 30.0					21	10										31	3.6	756	0.87197	2.1	2.4	2.6	0.23
30.0 - 35.0					5	19										24	2.8	780	0.89965	2.3	2.6	3.0	0.20
35.0 - 40.0						16	3									19	2.2	799	0.92157	2.6	2.8	3.2	0.18
40.0 - 45.0						6	5									11	1.3	810	0.93426	2.7	3.0	3.3	0.25
45.0 - 50.0						10	8	1								19	2.2	829	0.95617	2.7	3.0	3.5	0.30
50.0 - 55.0							11	2								13	1.5	842	0.97116	3.0	3.3	3.6	0.18
55.0 - 60.0						1	5	1								7	0.8	849	0.97924	2.9	3.2	3.6	0.27
60.0 - 65.0							6	2								8	0.9	857	0.98847	3.0	3.4	3.9	0.22
65.0 - 70.0							2									2	0.2	859	0.99077	3.4	3.2	3.4	0.00
70.0 - 75.0							1	1								2	0.2	861	0.99308	3.3	3.5	3.9	0.25
75.0 - 80.0							1	1								2	0.2	863	0.99539	3.3	3.5	3.6	0.25
80.0 - 85.0									1							1	0.1	864	0.99654	4.4	4.2	4.4	0.00
85.0 - 90.0									1							1	0.1	865	0.99769	4.3	4.2	4.3	0.00
90.0 - 95.0																0	0.0	865	0.99769				
95.0 -100.0																0	0.0	865	0.99769				
100.0 -105.0																0	0.0	865	0.99769				
105.0 -110.0																0	0.0	865	0.99769				
110.0 -115.0									1							1	0.1	866	0.99885	4.3	4.2	4.3	0.00
115.0 -120.0																0	0.0	866	0.99885				
120.0 -125.0																0	0.0	866	0.99885				
125.0 -130.0																0	0.0	866	0.99885				
130.0 -135.0																0	0.0	866	0.99885				
135.0 -140.0																0	0.0	866	0.99885				
140.0 -145.0																0	0.0	866	0.99885				
145.0 -150.0																0	0.0	866	0.99885				
150.0 -155.0																0	0.0	866	0.99885				
155.0 -160.0																0	0.0	866	0.99885				
160.0 -165.0																0	0.0	866	0.99885				
165.0 -170.0																0	0.0	866	0.99885				
170.0 -175.0																0	0.0	866	0.99885				
175.0 -180.0																0	0.0	866	0.99885				
180.0 -185.0																0	0.0	866	0.99885				
185.0 -190.0																0	0.0	866	0.99885				
190.0 -195.0																0	0.0	866	0.99885				
195.0 -200.0																0	0.0	866	0.99885				
200.0 -205.0																0	0.0	866	0.99885				
205.0 -210.0																0	0.0	866	0.99885				
210.0 -215.0																0	0.0	866	0.99885				
215.0 -220.0																0	0.0	866	0.99885				
220.0 -225.0																0	0.0	866	0.99885				
>= 225.0																0	0.0	866	0.99885				
SUM	0	74	274	274	126	65	42	8	3	0	0	0	0	0	0	866	100.0	866	0.99885	0.6	1.7	4.4	0.66
% OF TOTAL	0.0	8.5	31.6	31.6	14.5	7.5	4.8	0.9	0.3	0.0	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	74	348	622	748	813	855	863	866	866	866	866	866	866	866	866							
CUM. PROB.	0.0000	0.0854	0.4014	0.7174	0.8627	0.9377	0.9862	0.9954	0.9988	0.9988	0.9988	0.9988	0.9988	0.9988	0.9988	0.99885							
MIN. VALUE		1.5	3.6	7.5	14.7	23.8	36.8	49.4	83.6							1.5							
AVE. VALUE		2.5	7.2	12.9	21.8	36.1	53.1	60.6	94.2							15.9							
MAX. VALUE		4.8	14.9	22.5	33.3	56.2	75.5	76.3	111.6							111.6							
STD. DEV.		0.00	2.45	3.28	4.21	7.42	9.21	9.66	13.12							14.07							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Jtot Total wave power (kW/m) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 309.00 m
Sampling interval: 3 hours
Period : 1988.03.01 00:00 - 1988.03.31 23:59 0 recs.
1989.03.01 00:00 - 1989.03.31 23:59 0 recs.
1990.03.01 00:00 - 1990.03.31 23:59 240 recs.
1991.03.01 00:00 - 1991.03.31 23:59 240 recs.
1992.03.01 00:00 - 1992.03.31 23:59 246 recs.

Hm0(m) / Jtot(kW/m)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 5.0		22	15													37	5.1	37	0.05089	0.8	1.0	1.2	0.25
5.0 - 10.0		4	205	9												218	30.0	255	0.35076	1.0	1.3	1.6	0.12
10.0 - 15.0			48	113	1											162	22.3	417	0.57359	1.3	1.6	2.0	0.23
15.0 - 20.0				48	32											80	11.0	497	0.68363	1.6	2.0	2.2	0.24
20.0 - 25.0				7	37	1										45	6.2	542	0.74553	1.8	2.2	2.5	0.20
25.0 - 30.0					29	17										46	6.3	588	0.80880	2.1	2.4	2.7	0.24
30.0 - 35.0					13	26										39	5.4	627	0.86245	2.3	2.6	2.8	0.24
35.0 - 40.0					1	27	1									29	4.0	656	0.90234	2.5	2.8	3.0	0.13
40.0 - 45.0						15	1									16	2.2	672	0.92435	2.6	2.8	3.1	0.12
45.0 - 50.0						10	5									15	2.1	687	0.94498	2.8	2.9	3.3	0.24
50.0 - 55.0						3	5									8	1.1	695	0.95598	2.9	3.1	3.5	0.24
55.0 - 60.0							2	1								3	0.4	698	0.96011	3.2	3.4	3.6	0.24
60.0 - 65.0								4								4	0.6	702	0.96561	3.7	3.8	3.8	0.00
65.0 - 70.0							2	1								3	0.4	705	0.96974	3.4	3.4	3.8	0.24
70.0 - 75.0								2								2	0.3	707	0.97249	3.8	3.8	3.9	0.00
75.0 - 80.0																0	0.0	707	0.97249				
80.0 - 85.0								2								2	0.3	709	0.97524	3.9	3.8	3.9	0.00
85.0 - 90.0									1							1	0.1	710	0.97662	4.2	4.2	4.2	0.00
90.0 - 95.0									1							1	0.1	711	0.97799	4.5	4.2	4.5	0.00
95.0 -100.0																0	0.0	711	0.97799				
100.0 -105.0										1						1	0.1	712	0.97937	4.6	4.8	4.6	0.00
105.0 -110.0									1	1						2	0.3	714	0.98212	4.5	4.5	4.7	0.25
110.0 -115.0										2						2	0.3	716	0.98487	4.6	4.8	4.8	0.00
115.0 -120.0										1						1	0.1	717	0.98624	4.6	4.8	4.6	0.00
120.0 -125.0										2						2	0.3	719	0.98900	4.6	4.8	5.0	0.00
125.0 -130.0																0	0.0	719	0.98900				
130.0 -135.0											1					1	0.1	720	0.99037	5.2	5.2	5.2	0.00
135.0 -140.0																0	0.0	720	0.99037				
140.0 -145.0										1						1	0.1	721	0.99175	5.0	4.8	5.0	0.00
145.0 -150.0											1					1	0.1	722	0.99312	5.2	5.2	5.2	0.00
150.0 -155.0																0	0.0	722	0.99312				
155.0 -160.0																0	0.0	722	0.99312				
160.0 -165.0											1					1	0.1	723	0.99450	5.2	5.2	5.2	0.00
165.0 -170.0																0	0.0	723	0.99450				
170.0 -175.0																0	0.0	723	0.99450				
175.0 -180.0																0	0.0	723	0.99450				
180.0 -185.0																0	0.0	723	0.99450				
185.0 -190.0											1					1	0.1	724	0.99587	5.4	5.2	5.4	0.00
190.0 -195.0																0	0.0	724	0.99587				
195.0 -200.0																0	0.0	724	0.99587				
200.0 -205.0												1				1	0.1	725	0.99725	5.8	5.8	5.8	0.00
205.0 -210.0																0	0.0	725	0.99725				
210.0 -215.0																0	0.0	725	0.99725				
215.0 -220.0																0	0.0	725	0.99725				
220.0 -225.0													1			1	0.1	726	0.99862	6.0	6.2	6.0	0.00
>= 225.0																0	0.0	726	0.99862				
SUM	0	26	268	177	113	99	16	10	3	8	4	1	1	0	0	726	100.0	726	0.99862	0.8	1.9	6.0	0.79
% OF TOTAL	0.0	3.6	36.9	24.4	15.6	13.6	2.2	1.4	0.4	1.1	0.6	0.1	0.1	0.0	0.0	100.0							
SUM ACCUM.	0	26	294	471	584	683	699	709	712	720	724	725	726	726	726	726							
CUM. PROB.	0.0000	0.0358	0.4044	0.6479	0.8033	0.9395	0.9615	0.9752	0.9794	0.9904	0.9959	0.9972	0.9986	0.9986	0.9986	0.99862							
MIN. VALUE		3.1	4.1	8.4	14.7	24.2	39.4	55.3	86.1	100.9	134.4	204.3	221.9			3.1							
AVE. VALUE		3.3	8.1	14.0	23.6	36.5	51.9	68.5	95.8	117.5	157.5	202.5	222.5			20.3							
MAX. VALUE		5.6	13.6	22.7	36.0	54.7	65.2	80.6	107.4	144.8	185.6	204.3	221.9			221.9							
STD. DEV.		1.80	2.34	3.12	5.17	6.77	7.68	8.31	8.50	11.46	20.31	0.00	0.00			22.83							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Jtot Total wave power (kW/m) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 309.00 m
Sampling interval: 3 hours
Period : 1988.04.01 00:00 - 1988.04.30 23:59 0 recs.
1989.04.01 00:00 - 1989.04.30 23:59 0 recs.
1990.04.01 00:00 - 1990.04.30 23:59 232 recs.
1991.04.01 00:00 - 1991.04.30 23:59 225 recs.
1992.04.01 00:00 - 1992.04.30 23:59 144 recs.

Hm0(m) / Jtot(kW/m)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 5.0		26														26	4.3	26	0.04319	0.7	0.8	1.0	0.00
5.0 - 10.0		4	106	18												128	21.3	154	0.25581	1.0	1.3	1.7	0.20
10.0 - 15.0			12	121	1											134	22.3	288	0.47841	1.4	1.7	2.0	0.15
15.0 - 20.0				69	33											102	17.0	390	0.64784	1.6	1.9	2.2	0.23
20.0 - 25.0				14	68	1										83	13.8	473	0.78571	1.9	2.2	2.5	0.20
25.0 - 30.0					45	5										50	8.3	523	0.86877	2.0	2.3	2.7	0.15
30.0 - 35.0					20	14										34	5.7	557	0.92525	2.2	2.5	2.9	0.25
35.0 - 40.0					3	16										19	3.2	576	0.95681	2.4	2.7	3.0	0.18
40.0 - 45.0						5	2									7	1.2	583	0.96844	2.6	2.9	3.1	0.23
45.0 - 50.0						8	3									11	1.8	594	0.98671	2.7	2.9	3.2	0.22
50.0 - 55.0						1	2									3	0.5	597	0.99169	3.0	3.1	3.3	0.24
55.0 - 60.0							3									3	0.5	600	0.99668	3.1	3.2	3.2	0.00
60.0 - 65.0							1									1	0.2	601	0.99834	3.2	3.2	3.2	0.00
65.0 - 70.0																0	0.0	601	0.99834				
70.0 - 75.0																0	0.0	601	0.99834				
75.0 - 80.0																0	0.0	601	0.99834				
80.0 - 85.0																0	0.0	601	0.99834				
85.0 - 90.0																0	0.0	601	0.99834				
90.0 - 95.0																0	0.0	601	0.99834				
95.0 -100.0																0	0.0	601	0.99834				
100.0 -105.0																0	0.0	601	0.99834				
105.0 -110.0																0	0.0	601	0.99834				
110.0 -115.0																0	0.0	601	0.99834				
115.0 -120.0																0	0.0	601	0.99834				
120.0 -125.0																0	0.0	601	0.99834				
125.0 -130.0																0	0.0	601	0.99834				
130.0 -135.0																0	0.0	601	0.99834				
135.0 -140.0																0	0.0	601	0.99834				
140.0 -145.0																0	0.0	601	0.99834				
145.0 -150.0																0	0.0	601	0.99834				
150.0 -155.0																0	0.0	601	0.99834				
155.0 -160.0																0	0.0	601	0.99834				
160.0 -165.0																0	0.0	601	0.99834				
165.0 -170.0																0	0.0	601	0.99834				
170.0 -175.0																0	0.0	601	0.99834				
175.0 -180.0																0	0.0	601	0.99834				
180.0 -185.0																0	0.0	601	0.99834				
185.0 -190.0																0	0.0	601	0.99834				
190.0 -195.0																0	0.0	601	0.99834				
195.0 -200.0																0	0.0	601	0.99834				
200.0 -205.0																0	0.0	601	0.99834				
205.0 -210.0																0	0.0	601	0.99834				
210.0 -215.0																0	0.0	601	0.99834				
215.0 -220.0																0	0.0	601	0.99834				
220.0 -225.0																0	0.0	601	0.99834				
>= 225.0																0	0.0	601	0.99834				
SUM	0	30	118	222	170	50	11	0	0	0	0	0	0	0	0	601	100.0	601	0.99834	0.7	1.8	3.3	0.51
% OF TOTAL	0.0	5.0	19.6	36.9	28.3	8.3	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	30	148	370	540	590	601	601	601	601	601	601	601	601	601	601							
CUM. PROB.	0.0000	0.0498	0.2458	0.6146	0.8970	0.9801	0.9983	0.9983	0.9983	0.9983	0.9983	0.9983	0.9983	0.9983	0.9983	0.99834							
MIN. VALUE		2.3	5.0	8.2	14.1	23.9	43.6									2.3							
AVE. VALUE		3.2	8.0	14.3	24.2	37.2	51.6									17.9							
MAX. VALUE		5.6	11.5	23.2	37.3	51.9	63.1									63.1							
STD. DEV.		1.70	1.51	3.60	4.98	6.66	6.33									10.61							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Jtot Total wave power (kW/m) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 154.00 m
Sampling interval: 3 hours
Period : 1987.05.01 00:00 - 1987.05.31 23:59 242 recs.
1988.05.01 00:00 - 1988.05.31 23:59 0 recs.
1989.05.01 00:00 - 1989.05.31 23:59 0 recs.
1990.05.01 00:00 - 1990.05.31 23:59 242 recs.
1991.05.01 00:00 - 1991.05.31 23:59 129 recs.
1992.05.01 00:00 - 1992.05.31 23:59 0 recs.

Hm0(m) / Jtot(kW/m)	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 2.0	2.0 - 2.5	2.5 - 3.0	3.0 - 3.5	3.5 - 4.0	4.0 - 4.5	4.5 - 5.0	5.0 - 5.5	5.5 - 6.0	6.0 - 6.5	6.5 - 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 5.0		9	2													11	1.8	11	0.01792	0.9	0.8	1.0	0.19
5.0 - 10.0		1	83	16												100	16.3	111	0.18078	1.0	1.3	1.7	0.19
10.0 - 15.0			18	125												143	23.3	254	0.41368	1.4	1.7	1.9	0.17
15.0 - 20.0				55	39											94	15.3	348	0.56678	1.7	2.0	2.2	0.25
20.0 - 25.0				12	78	3										93	15.2	441	0.71824	1.8	2.2	2.5	0.19
25.0 - 30.0					43	12										55	9.0	496	0.80782	2.1	2.4	2.7	0.21
30.0 - 35.0					13	38										51	8.3	547	0.89088	2.2	2.6	2.9	0.22
35.0 - 40.0					3	23	5									31	5.1	578	0.94137	2.3	2.8	3.1	0.25
40.0 - 45.0						9	7									16	2.6	594	0.96743	2.5	3.0	3.1	0.25
45.0 - 50.0						1	2	1								4	0.7	598	0.97394	2.9	3.2	3.6	0.35
50.0 - 55.0						1	4									5	0.8	603	0.98208	2.9	3.2	3.3	0.20
55.0 - 60.0							2	3								5	0.8	608	0.99023	3.4	3.5	3.7	0.24
60.0 - 65.0							1	4								5	0.8	613	0.99837	3.1	3.7	3.7	0.20
65.0 - 70.0																0	0.0	613	0.99837				
70.0 - 75.0																0	0.0	613	0.99837				
75.0 - 80.0																0	0.0	613	0.99837				
80.0 - 85.0																0	0.0	613	0.99837				
85.0 - 90.0																0	0.0	613	0.99837				
90.0 - 95.0																0	0.0	613	0.99837				
95.0 -100.0																0	0.0	613	0.99837				
100.0 -105.0																0	0.0	613	0.99837				
105.0 -110.0																0	0.0	613	0.99837				
110.0 -115.0																0	0.0	613	0.99837				
115.0 -120.0																0	0.0	613	0.99837				
120.0 -125.0																0	0.0	613	0.99837				
125.0 -130.0																0	0.0	613	0.99837				
130.0 -135.0																0	0.0	613	0.99837				
135.0 -140.0																0	0.0	613	0.99837				
140.0 -145.0																0	0.0	613	0.99837				
145.0 -150.0																0	0.0	613	0.99837				
150.0 -155.0																0	0.0	613	0.99837				
155.0 -160.0																0	0.0	613	0.99837				
160.0 -165.0																0	0.0	613	0.99837				
165.0 -170.0																0	0.0	613	0.99837				
170.0 -175.0																0	0.0	613	0.99837				
175.0 -180.0																0	0.0	613	0.99837				
180.0 -185.0																0	0.0	613	0.99837				
185.0 -190.0																0	0.0	613	0.99837				
190.0 -195.0																0	0.0	613	0.99837				
195.0 -200.0																0	0.0	613	0.99837				
200.0 -205.0																0	0.0	613	0.99837				
205.0 -210.0																0	0.0	613	0.99837				
210.0 -215.0																0	0.0	613	0.99837				
215.0 -220.0																0	0.0	613	0.99837				
220.0 -225.0																0	0.0	613	0.99837				
>= 225.0																0	0.0	613	0.99837				
SUM	0	10	103	208	176	87	21	8	0	0	0	0	0	0	0	613	100.0	613	0.99837	0.9	2.0	3.7	0.54
% OF TOTAL	0.0	1.6	16.8	33.9	28.7	14.2	3.4	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	10	113	321	497	584	605	613	613	613	613	613	613	613	613	613							
CUM. PROB.	0.0000	0.0163	0.1840	0.5228	0.8094	0.9511	0.9853	0.9984	0.9984	0.9984	0.9984	0.9984	0.9984	0.9984	0.9984	0.99837							
MIN. VALUE		4.0	4.4	7.5	15.5	24.8	35.8	46.5								4.0							
AVE. VALUE		3.0	8.3	14.0	23.6	34.2	46.1	58.8								20.1							
MAX. VALUE		5.1	12.0	24.7	36.8	51.0	61.3	64.9								64.9							
STD. DEV.		1.50	2.06	3.47	4.65	5.30	7.42	4.84								11.37							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Jtot Total wave power (kW/m) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 154.00 m
Sampling interval: 3 hours
Period : 1987.06.01 00:00 - 1987.06.30 23:59 239 recs.
1988.06.01 00:00 - 1988.06.30 23:59 0 recs.
1989.06.01 00:00 - 1989.06.30 23:59 225 recs.
1990.06.01 00:00 - 1990.06.30 23:59 226 recs.
1991.06.01 00:00 - 1991.06.30 23:59 240 recs.
1992.06.01 00:00 - 1992.06.30 23:59 213 recs.

Hm0(m) / Jtot(kW/m)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 5.0		24	19													43	3.8	43	0.03759	0.6	1.0	1.2	0.25
5.0 - 10.0			230	24												254	22.2	297	0.25962	1.0	1.3	1.7	0.15
10.0 - 15.0			37	184												221	19.3	518	0.45280	1.2	1.7	2.0	0.19
15.0 - 20.0				142	41											183	16.0	701	0.61276	1.6	1.9	2.3	0.21
20.0 - 25.0				12	99	1										112	9.8	813	0.71066	1.8	2.2	2.5	0.16
25.0 - 30.0					88	20										108	9.4	921	0.80507	2.0	2.3	2.8	0.19
30.0 - 35.0					29	37										66	5.8	987	0.86276	2.2	2.5	2.8	0.25
35.0 - 40.0					6	57	1									64	5.6	1051	0.91871	2.4	2.7	3.0	0.16
40.0 - 45.0						26	5									31	2.7	1082	0.94580	2.5	2.8	3.3	0.18
45.0 - 50.0						4	9									13	1.1	1095	0.95717	2.7	3.1	3.2	0.23
50.0 - 55.0						3	9									12	1.0	1107	0.96766	2.8	3.1	3.5	0.22
55.0 - 60.0							8									8	0.7	1115	0.97465	3.0	3.2	3.3	0.00
60.0 - 65.0							3	2								5	0.4	1120	0.97902	3.1	3.5	3.6	0.24
65.0 - 70.0							3	1								4	0.3	1124	0.98252	3.2	3.4	3.6	0.22
70.0 - 75.0								3								3	0.3	1127	0.98514	3.7	3.8	3.7	0.00
75.0 - 80.0								2								2	0.2	1129	0.98689	3.7	3.8	3.9	0.00
80.0 - 85.0									1							1	0.1	1130	0.98776	4.1	4.2	4.1	0.00
85.0 - 90.0									1							1	0.1	1131	0.98864	4.0	4.2	4.0	0.00
90.0 - 95.0								1	3							4	0.3	1135	0.99213	3.7	4.1	4.2	0.22
95.0 -100.0								1	1							2	0.2	1137	0.99388	3.9	4.0	4.2	0.25
100.0 -105.0																0	0.0	1137	0.99388				
105.0 -110.0								1	1							2	0.2	1139	0.99563	3.9	4.0	4.3	0.25
110.0 -115.0																0	0.0	1139	0.99563				
115.0 -120.0																0	0.0	1139	0.99563				
120.0 -125.0																0	0.0	1139	0.99563				
125.0 -130.0																0	0.0	1139	0.99563				
130.0 -135.0									2							2	0.2	1141	0.99738	4.3	4.2	4.5	0.00
135.0 -140.0																0	0.0	1141	0.99738				
140.0 -145.0																0	0.0	1141	0.99738				
145.0 -150.0																0	0.0	1141	0.99738				
150.0 -155.0																0	0.0	1141	0.99738				
155.0 -160.0																0	0.0	1141	0.99738				
160.0 -165.0																0	0.0	1141	0.99738				
165.0 -170.0																0	0.0	1141	0.99738				
170.0 -175.0																0	0.0	1141	0.99738				
175.0 -180.0											1					1	0.1	1142	0.99825	5.1	5.2	5.1	0.00
180.0 -185.0																0	0.0	1142	0.99825				
185.0 -190.0																0	0.0	1142	0.99825				
190.0 -195.0											1					1	0.1	1143	0.99913	5.2	5.2	5.2	0.00
195.0 -200.0																0	0.0	1143	0.99913				
200.0 -205.0																0	0.0	1143	0.99913				
205.0 -210.0																0	0.0	1143	0.99913				
210.0 -215.0																0	0.0	1143	0.99913				
215.0 -220.0																0	0.0	1143	0.99913				
220.0 -225.0																0	0.0	1143	0.99913				
>= 225.0																0	0.0	1143	0.99913				
SUM	0	24	286	362	263	148	38	11	9	0	2	0	0	0	0	1143	100.0	1143	0.99913	0.6	1.9	5.2	0.64
% OF TOTAL	0.0	2.1	25.0	31.7	23.0	12.9	3.3	1.0	0.8	0.0	0.2	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	24	310	672	935	1083	1121	1132	1141	1141	1143	1143	1143	1143	1143	1143							
CUM. PROB.	0.0000	0.0210	0.2710	0.5874	0.8173	0.9467	0.9799	0.9895	0.9974	0.9974	0.9991	0.9991	0.9991	0.9991	0.9991	0.99913							
MIN. VALUE		2.4	4.2	7.6	15.5	23.3	36.3	60.6	84.2		179.4					2.4							
AVE. VALUE		2.5	7.8	14.5	24.8	36.2	52.6	78.4	101.9		185.0					20.6							
MAX. VALUE		5.0	13.1	22.5	38.3	54.8	67.8	105.1	130.8		193.2					193.2							
STD. DEV.		0.00	2.19	3.31	4.79	5.60	7.48	13.95	17.55		7.50					16.74							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Jtot Total wave power (kW/m) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 154.00 m
Sampling interval: 3 hours
Period : 1987.07.01 00:00 - 1987.07.31 23:59 231 recs.
1988.07.01 00:00 - 1988.07.31 23:59 0 recs.
1989.07.01 00:00 - 1989.07.31 23:59 73 recs.
1990.07.01 00:00 - 1990.07.31 23:59 239 recs.
1991.07.01 00:00 - 1991.07.31 23:59 246 recs.
1992.07.01 00:00 - 1992.07.31 23:59 131 recs.

Hm0(m) / Jtot(kW/m)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 5.0		17	13													30	3.3	30	0.03257	0.7	1.0	1.1	0.25
5.0 - 10.0			141	13												154	16.7	184	0.19978	1.0	1.3	1.7	0.14
10.0 - 15.0			17	126	1											144	15.7	328	0.35613	1.4	1.7	2.1	0.17
15.0 - 20.0				107	59											166	18.0	494	0.53637	1.7	1.9	2.3	0.24
20.0 - 25.0				13	104	1										118	12.8	612	0.66450	1.8	2.2	2.6	0.16
25.0 - 30.0					76	20										96	10.4	708	0.76873	2.0	2.4	2.7	0.20
30.0 - 35.0					23	35										58	6.3	766	0.83170	2.3	2.6	2.8	0.24
35.0 - 40.0					5	43										48	5.2	814	0.88382	2.3	2.7	2.9	0.15
40.0 - 45.0					1	36	11									48	5.2	862	0.93594	2.5	2.9	3.3	0.23
45.0 - 50.0						13	6									19	2.1	881	0.95657	2.7	2.9	3.2	0.23
50.0 - 55.0						5	6									11	1.2	892	0.96851	2.8	3.0	3.3	0.25
55.0 - 60.0						1	9	1								11	1.2	903	0.98046	2.9	3.2	3.7	0.21
60.0 - 65.0							3	2								5	0.5	908	0.98588	3.2	3.5	3.9	0.24
65.0 - 70.0								1								1	0.1	909	0.98697	3.9	3.8	3.9	0.00
70.0 - 75.0								4								4	0.4	913	0.99131	3.5	3.8	3.7	0.00
75.0 - 80.0								3								3	0.3	916	0.99457	3.5	3.8	3.7	0.00
80.0 - 85.0									1							1	0.1	917	0.99566	4.2	4.2	4.2	0.00
85.0 - 90.0																0	0.0	917	0.99566				
90.0 - 95.0								1	1							2	0.2	919	0.99783	3.7	4.0	4.2	0.25
95.0 -100.0								1								1	0.1	920	0.99891	3.8	3.8	3.8	0.00
100.0 -105.0																0	0.0	920	0.99891				
105.0 -110.0																0	0.0	920	0.99891				
110.0 -115.0																0	0.0	920	0.99891				
115.0 -120.0																0	0.0	920	0.99891				
120.0 -125.0																0	0.0	920	0.99891				
125.0 -130.0																0	0.0	920	0.99891				
130.0 -135.0																0	0.0	920	0.99891				
135.0 -140.0																0	0.0	920	0.99891				
140.0 -145.0																0	0.0	920	0.99891				
145.0 -150.0																0	0.0	920	0.99891				
150.0 -155.0																0	0.0	920	0.99891				
155.0 -160.0																0	0.0	920	0.99891				
160.0 -165.0																0	0.0	920	0.99891				
165.0 -170.0																0	0.0	920	0.99891				
170.0 -175.0																0	0.0	920	0.99891				
175.0 -180.0																0	0.0	920	0.99891				
180.0 -185.0																0	0.0	920	0.99891				
185.0 -190.0																0	0.0	920	0.99891				
190.0 -195.0																0	0.0	920	0.99891				
195.0 -200.0																0	0.0	920	0.99891				
200.0 -205.0																0	0.0	920	0.99891				
205.0 -210.0																0	0.0	920	0.99891				
210.0 -215.0																0	0.0	920	0.99891				
215.0 -220.0																0	0.0	920	0.99891				
220.0 -225.0																0	0.0	920	0.99891				
>= 225.0																0	0.0	920	0.99891				
SUM	0	17	171	259	269	154	35	13	2	0	0	0	0	0	0	920	100.0	920	0.99891	0.7	2.0	4.2	0.59
% OF TOTAL	0.0	1.8	18.6	28.2	29.2	16.7	3.8	1.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	17	188	447	716	870	905	918	920	920	920	920	920	920	920	920							
CUM. PROB.	0.0000	0.0185	0.2041	0.4853	0.7774	0.9446	0.9826	0.9967	0.9989	0.9989	0.9989	0.9989	0.9989	0.9989	0.9989	0.99891							
MIN. VALUE		2.5	4.3	8.6	14.2	24.8	40.3	58.9	83.4							2.5							
AVE. VALUE		2.5	7.6	14.8	24.0	37.6	50.6	74.0	87.5							22.0							
MAX. VALUE		4.9	12.8	22.6	41.8	58.1	64.8	97.1	94.6							97.1							
STD. DEV.		0.00	2.09	3.35	4.99	6.66	6.87	10.81	5.00							14.13							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Jtot Total wave power (kW/m) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 154.00 m
Sampling interval: 3 hours
Period : 1987.08.01 00:00 - 1987.08.31 23:59 245 recs.
1988.08.01 00:00 - 1988.08.31 23:59 0 recs.
1989.08.01 00:00 - 1989.08.31 23:59 0 recs.
1990.08.01 00:00 - 1990.08.31 23:59 239 recs.
1991.08.01 00:00 - 1991.08.31 23:59 246 recs.

Hm0(m) / Jtot(kW/m)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 5.0		23	11													34	4.7	34	0.04651	0.8	0.9	1.1	0.23
5.0 - 10.0			163	11												174	23.8	208	0.28454	1.0	1.3	1.7	0.12
10.0 - 15.0			38	103	3											144	19.7	352	0.48153	1.3	1.6	2.0	0.24
15.0 - 20.0				80	40											120	16.4	472	0.64569	1.6	1.9	2.3	0.24
20.0 - 25.0				14	62	4										80	11.0	552	0.75513	1.9	2.2	2.6	0.23
25.0 - 30.0					45	10										55	7.5	607	0.83037	2.1	2.3	2.8	0.19
30.0 - 35.0					11	17										28	3.8	635	0.86867	2.2	2.6	2.9	0.24
35.0 - 40.0					2	17	5									24	3.3	659	0.90150	2.4	2.8	3.1	0.26
40.0 - 45.0						11	13									24	3.3	683	0.93434	2.5	3.0	3.3	0.25
45.0 - 50.0						4	4									8	1.1	691	0.94528	2.6	3.0	3.2	0.25
50.0 - 55.0						6	7	2								15	2.1	706	0.96580	2.8	3.1	3.6	0.34
55.0 - 60.0						1	4									5	0.7	711	0.97264	3.0	3.2	3.4	0.20
60.0 - 65.0							10	1								11	1.5	722	0.98769	3.1	3.3	3.5	0.14
65.0 - 70.0							2	1								3	0.4	725	0.99179	3.2	3.4	3.5	0.24
70.0 - 75.0							2	2								4	0.5	729	0.99726	3.4	3.5	3.8	0.25
75.0 - 80.0								1								1	0.1	730	0.99863	3.9	3.8	3.9	0.00
80.0 - 85.0																0	0.0	730	0.99863				
85.0 - 90.0																0	0.0	730	0.99863				
90.0 - 95.0																0	0.0	730	0.99863				
95.0 -100.0																0	0.0	730	0.99863				
100.0 -105.0																0	0.0	730	0.99863				
105.0 -110.0																0	0.0	730	0.99863				
110.0 -115.0																0	0.0	730	0.99863				
115.0 -120.0																0	0.0	730	0.99863				
120.0 -125.0																0	0.0	730	0.99863				
125.0 -130.0																0	0.0	730	0.99863				
130.0 -135.0																0	0.0	730	0.99863				
135.0 -140.0																0	0.0	730	0.99863				
140.0 -145.0																0	0.0	730	0.99863				
145.0 -150.0																0	0.0	730	0.99863				
150.0 -155.0																0	0.0	730	0.99863				
155.0 -160.0																0	0.0	730	0.99863				
160.0 -165.0																0	0.0	730	0.99863				
165.0 -170.0																0	0.0	730	0.99863				
170.0 -175.0																0	0.0	730	0.99863				
175.0 -180.0																0	0.0	730	0.99863				
180.0 -185.0																0	0.0	730	0.99863				
185.0 -190.0																0	0.0	730	0.99863				
190.0 -195.0																0	0.0	730	0.99863				
195.0 -200.0																0	0.0	730	0.99863				
200.0 -205.0																0	0.0	730	0.99863				
205.0 -210.0																0	0.0	730	0.99863				
210.0 -215.0																0	0.0	730	0.99863				
215.0 -220.0																0	0.0	730	0.99863				
220.0 -225.0																0	0.0	730	0.99863				
>= 225.0																0	0.0	730	0.99863				
SUM	0	23	212	208	163	70	47	7	0	0	0	0	0	0	0	730	100.0	730	0.99863	0.8	1.9	3.9	0.62
% OF TOTAL	0.0	3.2	29.0	28.5	22.3	9.6	6.4	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	23	235	443	606	676	723	730	730	730	730	730	730	730	730	730							
CUM. PROB.	0.0000	0.0315	0.3215	0.6060	0.8290	0.9248	0.9891	0.9986	0.9986	0.9986	0.9986	0.9986	0.9986	0.9986	0.9986	0.99863							
MIN. VALUE		3.1	4.2	8.7	13.9	22.6	38.5	50.9								3.1							
AVE. VALUE		2.5	8.1	14.8	23.3	36.9	51.8	65.4								19.3							
MAX. VALUE		4.9	14.5	24.3	39.6	57.0	74.3	76.2								76.2							
STD. DEV.		0.00	2.32	3.50	4.87	8.22	10.16	9.20								13.90							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Jtot Total wave power (kW/m) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 154.00 m
Sampling interval: 3 hours
Period : 1987.09.01 00:00 - 1987.09.30 23:59 239 recs.
1988.09.01 00:00 - 1988.09.30 23:59 0 recs.
1989.09.01 00:00 - 1989.09.30 23:59 0 recs.
1990.09.01 00:00 - 1990.09.30 23:59 231 recs.
1991.09.01 00:00 - 1991.09.30 23:59 202 recs.

Hm0(m) / Jtot(kW/m)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 5.0		4	6													10	1.5	10	0.01486	0.9	1.0	1.1	0.24
5.0 - 10.0			161	5												166	24.7	176	0.26152	1.0	1.3	1.6	0.09
10.0 - 15.0			22	135	1											158	23.5	334	0.49629	1.3	1.7	2.0	0.18
15.0 - 20.0				89	32											121	18.0	455	0.67608	1.7	1.9	2.3	0.22
20.0 - 25.0				3	92	1										96	14.3	551	0.81872	1.8	2.2	2.6	0.10
25.0 - 30.0					40	10										50	7.4	601	0.89302	2.1	2.3	2.6	0.20
30.0 - 35.0					10	20										30	4.5	631	0.93759	2.3	2.6	2.8	0.24
35.0 - 40.0					1	12										13	1.9	644	0.95691	2.5	2.7	2.9	0.13
40.0 - 45.0						11	2									13	1.9	657	0.97623	2.5	2.8	3.1	0.18
45.0 - 50.0						3	2									5	0.7	662	0.98366	2.9	3.0	3.2	0.24
50.0 - 55.0							4									4	0.6	666	0.98960	3.0	3.2	3.4	0.00
55.0 - 60.0						1	2									3	0.4	669	0.99406	2.9	3.1	3.3	0.24
60.0 - 65.0																0	0.0	669	0.99406				
65.0 - 70.0							1	1								2	0.3	671	0.99703	3.5	3.5	3.5	0.25
70.0 - 75.0								1								1	0.1	672	0.99851	3.7	3.8	3.7	0.00
75.0 - 80.0																0	0.0	672	0.99851				
80.0 - 85.0																0	0.0	672	0.99851				
85.0 - 90.0																0	0.0	672	0.99851				
90.0 - 95.0																0	0.0	672	0.99851				
95.0 -100.0																0	0.0	672	0.99851				
100.0 -105.0																0	0.0	672	0.99851				
105.0 -110.0																0	0.0	672	0.99851				
110.0 -115.0																0	0.0	672	0.99851				
115.0 -120.0																0	0.0	672	0.99851				
120.0 -125.0																0	0.0	672	0.99851				
125.0 -130.0																0	0.0	672	0.99851				
130.0 -135.0																0	0.0	672	0.99851				
135.0 -140.0																0	0.0	672	0.99851				
140.0 -145.0																0	0.0	672	0.99851				
145.0 -150.0																0	0.0	672	0.99851				
150.0 -155.0																0	0.0	672	0.99851				
155.0 -160.0																0	0.0	672	0.99851				
160.0 -165.0																0	0.0	672	0.99851				
165.0 -170.0																0	0.0	672	0.99851				
170.0 -175.0																0	0.0	672	0.99851				
175.0 -180.0																0	0.0	672	0.99851				
180.0 -185.0																0	0.0	672	0.99851				
185.0 -190.0																0	0.0	672	0.99851				
190.0 -195.0																0	0.0	672	0.99851				
195.0 -200.0																0	0.0	672	0.99851				
200.0 -205.0																0	0.0	672	0.99851				
205.0 -210.0																0	0.0	672	0.99851				
210.0 -215.0																0	0.0	672	0.99851				
215.0 -220.0																0	0.0	672	0.99851				
220.0 -225.0																0	0.0	672	0.99851				
>= 225.0																0	0.0	672	0.99851				
SUM	0	4	189	232	176	58	11	2	0	0	0	0	0	0	0	672	100.0	672	0.99851	0.9	1.8	3.7	0.49
% OF TOTAL	0.0	0.6	28.1	34.5	26.2	8.6	1.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	4	193	425	601	659	670	672	672	672	672	672	672	672	672	672							
CUM. PROB.	0.0000	0.0059	0.2868	0.6315	0.8930	0.9792	0.9955	0.9985	0.9985	0.9985	0.9985	0.9985	0.9985	0.9985	0.9985	0.99851							
MIN. VALUE		4.1	4.6	9.3	14.9	24.3	44.2	67.0								4.1							
AVE. VALUE		2.5	7.9	14.4	23.3	35.6	52.0	70.0								17.6							
MAX. VALUE		4.8	12.0	23.6	35.8	55.3	66.6	74.9								74.9							
STD. DEV.		0.00	1.88	2.77	4.13	6.55	6.89	2.50								10.32							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Jtot Total wave power (kW/m) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 154.00 m
Sampling interval: 3 hours
Period : 1987.10.01 00:00 - 1987.10.31 23:59 183 recs.
1988.10.01 00:00 - 1988.10.31 23:59 0 recs.
1989.10.01 00:00 - 1989.10.31 23:59 0 recs.
1990.10.01 00:00 - 1990.10.31 23:59 240 recs.
1991.10.01 00:00 - 1991.10.31 23:59 243 recs.

Hm0(m) / Jtot(kW/m)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 5.0		33	15													48	7.2	48	0.07196	0.6	0.9	1.1	0.23
5.0 - 10.0			174	22												196	29.4	244	0.36582	1.0	1.3	1.7	0.16
10.0 - 15.0			37	152	1											190	28.5	434	0.65067	1.4	1.7	2.0	0.20
15.0 - 20.0				52	32											84	12.6	518	0.77661	1.6	1.9	2.4	0.24
20.0 - 25.0				12	30											42	6.3	560	0.83958	1.7	2.1	2.4	0.23
25.0 - 30.0					42	4										46	6.9	606	0.90855	2.0	2.3	2.5	0.14
30.0 - 35.0					8	19										27	4.1	633	0.94903	2.4	2.6	2.9	0.23
35.0 - 40.0						11										11	1.7	644	0.96552	2.6	2.8	2.7	0.00
40.0 - 45.0						4										4	0.6	648	0.97151	2.8	2.8	2.9	0.00
45.0 - 50.0						3	1									4	0.6	652	0.97751	2.9	2.9	3.0	0.22
50.0 - 55.0								2								2	0.3	654	0.98051	3.5	3.8	3.8	0.00
55.0 - 60.0							1									1	0.2	655	0.98201	3.2	3.2	3.2	0.00
60.0 - 65.0							1									1	0.2	656	0.98351	3.4	3.2	3.4	0.00
65.0 - 70.0																0	0.0	656	0.98351				
70.0 - 75.0								1								1	0.2	657	0.98501	3.9	3.8	3.9	0.00
75.0 - 80.0								1								1	0.2	658	0.98651	3.9	3.8	3.9	0.00
80.0 - 85.0								3								3	0.5	661	0.99100	3.8	3.8	3.9	0.00
85.0 - 90.0																0	0.0	661	0.99100				
90.0 - 95.0									2							2	0.3	663	0.99400	4.1	4.2	4.1	0.00
95.0 -100.0																0	0.0	663	0.99400				
100.0 -105.0									1							1	0.2	664	0.99550	4.3	4.2	4.3	0.00
105.0 -110.0									2							2	0.3	666	0.99850	4.3	4.2	4.5	0.00
110.0 -115.0																0	0.0	666	0.99850				
115.0 -120.0																0	0.0	666	0.99850				
120.0 -125.0																0	0.0	666	0.99850				
125.0 -130.0																0	0.0	666	0.99850				
130.0 -135.0																0	0.0	666	0.99850				
135.0 -140.0																0	0.0	666	0.99850				
140.0 -145.0																0	0.0	666	0.99850				
145.0 -150.0																0	0.0	666	0.99850				
150.0 -155.0																0	0.0	666	0.99850				
155.0 -160.0																0	0.0	666	0.99850				
160.0 -165.0																0	0.0	666	0.99850				
165.0 -170.0																0	0.0	666	0.99850				
170.0 -175.0																0	0.0	666	0.99850				
175.0 -180.0																0	0.0	666	0.99850				
180.0 -185.0																0	0.0	666	0.99850				
185.0 -190.0																0	0.0	666	0.99850				
190.0 -195.0																0	0.0	666	0.99850				
195.0 -200.0																0	0.0	666	0.99850				
200.0 -205.0																0	0.0	666	0.99850				
205.0 -210.0																0	0.0	666	0.99850				
210.0 -215.0																0	0.0	666	0.99850				
215.0 -220.0																0	0.0	666	0.99850				
220.0 -225.0																0	0.0	666	0.99850				
>= 225.0																0	0.0	666	0.99850				
SUM	0	33	226	238	113	41	3	7	5	0	0	0	0	0	0	666	100.0	666	0.99850	0.6	1.7	4.5	0.56
% OF TOTAL	0.0	5.0	33.9	35.7	17.0	6.2	0.5	1.1	0.8	0.0	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	33	259	497	610	651	654	661	666	666	666	666	666	666	666	666							
CUM. PROB.	0.0000	0.0495	0.3883	0.7451	0.9145	0.9760	0.9805	0.9910	0.9985	0.9985	0.9985	0.9985	0.9985	0.9985	0.9985	0.99850							
MIN. VALUE		1.8	4.0	8.6	13.5	25.1	49.0	52.0	93.8							1.8							
AVE. VALUE		2.5	8.0	13.6	23.6	35.4	55.8	71.8	100.5							15.7							
MAX. VALUE		4.6	13.0	23.2	32.6	47.5	63.0	84.0	107.7							107.7							
STD. DEV.		0.00	2.35	3.40	4.82	5.18	6.24	12.66	6.78							13.01							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Jtot Total wave power (kW/m) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 309.00 m
Sampling interval: 3 hours
Period : 1987.11.01 00:00 - 1987.11.30 23:59 0 recs.
1988.11.01 00:00 - 1988.11.30 23:59 0 recs.
1989.11.01 00:00 - 1989.11.30 23:59 0 recs.
1990.11.01 00:00 - 1990.11.30 23:59 233 recs.
1991.11.01 00:00 - 1991.11.30 23:59 240 recs.

Hm0(m) / Jtot(kW/m)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 5.0		19	52													71	15.0	71	0.14979	0.7	1.1	1.3	0.22
5.0 - 10.0			143	19												162	34.2	233	0.49156	1.0	1.3	1.7	0.16
10.0 - 15.0			20	101	3											124	26.2	357	0.75316	1.5	1.7	2.0	0.20
15.0 - 20.0				23	26											49	10.4	406	0.85654	1.6	2.0	2.3	0.25
20.0 - 25.0					34	1										35	7.4	441	0.93038	2.0	2.3	2.5	0.08
25.0 - 30.0					11	3										14	3.0	455	0.95992	2.0	2.4	2.8	0.21
30.0 - 35.0					5											5	1.1	460	0.97046	2.1	2.2	2.5	0.00
35.0 - 40.0					2	2										4	0.8	464	0.97890	2.4	2.5	2.5	0.25
40.0 - 45.0						1										1	0.2	465	0.98101	2.7	2.8	2.7	0.00
45.0 - 50.0																0	0.0	465	0.98101				
50.0 - 55.0							1									1	0.2	466	0.98312	3.5	3.2	3.5	0.00
55.0 - 60.0																0	0.0	466	0.98312				
60.0 - 65.0								1								1	0.2	467	0.98523	3.7	3.8	3.7	0.00
65.0 - 70.0								1	1							2	0.4	469	0.98945	3.9	4.0	4.2	0.25
70.0 - 75.0																0	0.0	469	0.98945				
75.0 - 80.0									1							1	0.2	470	0.99156	4.1	4.2	4.1	0.00
80.0 - 85.0																0	0.0	470	0.99156				
85.0 - 90.0																0	0.0	470	0.99156				
90.0 - 95.0																0	0.0	470	0.99156				
95.0 -100.0																0	0.0	470	0.99156				
100.0 -105.0																0	0.0	470	0.99156				
105.0 -110.0										1						1	0.2	471	0.99367	4.8	4.8	4.8	0.00
110.0 -115.0																0	0.0	471	0.99367				
115.0 -120.0																0	0.0	471	0.99367				
120.0 -125.0																0	0.0	471	0.99367				
125.0 -130.0																0	0.0	471	0.99367				
130.0 -135.0																0	0.0	471	0.99367				
135.0 -140.0																0	0.0	471	0.99367				
140.0 -145.0																0	0.0	471	0.99367				
145.0 -150.0																0	0.0	471	0.99367				
150.0 -155.0												1				1	0.2	472	0.99578	5.7	5.8	5.7	0.00
155.0 -160.0																0	0.0	472	0.99578				
160.0 -165.0																0	0.0	472	0.99578				
165.0 -170.0																0	0.0	472	0.99578				
170.0 -175.0																0	0.0	472	0.99578				
175.0 -180.0																0	0.0	472	0.99578				
180.0 -185.0																0	0.0	472	0.99578				
185.0 -190.0																0	0.0	472	0.99578				
190.0 -195.0																0	0.0	472	0.99578				
195.0 -200.0																0	0.0	472	0.99578				
200.0 -205.0															1	1	0.2	473	0.99789	6.7	6.8	6.7	0.00
205.0 -210.0																0	0.0	473	0.99789				
210.0 -215.0																0	0.0	473	0.99789				
215.0 -220.0																0	0.0	473	0.99789				
220.0 -225.0																0	0.0	473	0.99789				
>= 225.0																0	0.0	473	0.99789				
SUM	0	19	215	143	81	7	1	2	2	1	0	1	0	1	0	473	100.0	473	0.99789	0.7	1.6	6.7	0.58
% OF TOTAL	0.0	4.0	45.5	30.2	17.1	1.5	0.2	0.4	0.4	0.2	0.0	0.2	0.0	0.2	0.0	100.0							
SUM ACCUM.	0	19	234	377	458	465	466	468	470	471	471	472	472	473	473	473							
CUM. PROB.	0.0000	0.0401	0.4937	0.7954	0.9662	0.9810	0.9831	0.9873	0.9916	0.9937	0.9937	0.9958	0.9958	0.9979	0.9979	0.99789							
MIN. VALUE		2.2	3.6	8.3	12.5	24.1	53.6	63.1	67.0	107.5		154.0		203.9		2.2							
AVE. VALUE		2.5	6.8	12.6	22.2	31.8	52.5	65.0	72.5	107.5		152.5		202.5		13.0							
MAX. VALUE		4.5	12.1	18.8	36.4	40.9	53.6	69.8	77.1	107.5		154.0		203.9		203.9							
STD. DEV.		0.00	2.80	2.71	5.17	6.78	0.00	2.50	5.00	0.00		0.00		0.00		14.71							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Jtot Total wave power (kW/m) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 309.00 m
Sampling interval: 3 hours
Period : 1987.12.01 00:00 - 1987.12.31 23:59 0 recs.
1988.12.01 00:00 - 1988.12.31 23:59 198 recs.
1989.12.01 00:00 - 1989.12.31 23:59 152 recs.
1990.12.01 00:00 - 1990.12.31 23:59 240 recs.
1991.12.01 00:00 - 1991.12.31 23:59 247 recs.

Hm0(m) / Jtot(kW/m)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 5.0		30	43													73	8.7	73	0.08711	0.6	1.0	1.2	0.25
5.0 - 10.0		1	287	46												334	39.9	407	0.48568	1.0	1.3	1.7	0.18
10.0 - 15.0			22	162	1											185	22.1	592	0.70644	1.4	1.7	2.0	0.17
15.0 - 20.0				80	59											139	16.6	731	0.87232	1.6	2.0	2.4	0.25
20.0 - 25.0				4	36	5										45	5.4	776	0.92601	1.9	2.3	2.6	0.22
25.0 - 30.0					17	17										34	4.1	810	0.96659	2.0	2.5	2.8	0.25
30.0 - 35.0					3	8										11	1.3	821	0.97971	2.4	2.6	2.9	0.22
35.0 - 40.0					1	5	1									7	0.8	828	0.98807	2.5	2.8	3.0	0.27
40.0 - 45.0						2										2	0.2	830	0.99045	2.8	2.8	2.8	0.00
45.0 - 50.0						2										2	0.2	832	0.99284	2.7	2.8	2.8	0.00
50.0 - 55.0																0	0.0	832	0.99284				
55.0 - 60.0							1									1	0.1	833	0.99403	3.2	3.2	3.2	0.00
60.0 - 65.0																0	0.0	833	0.99403				
65.0 - 70.0							1									1	0.1	834	0.99523	3.4	3.2	3.4	0.00
70.0 - 75.0								1								1	0.1	835	0.99642	3.5	3.8	3.5	0.00
75.0 - 80.0																0	0.0	835	0.99642				
80.0 - 85.0																0	0.0	835	0.99642				
85.0 - 90.0								1								1	0.1	836	0.99761	3.8	3.8	3.8	0.00
90.0 - 95.0								1								1	0.1	837	0.99881	3.9	3.8	3.9	0.00
95.0 -100.0																0	0.0	837	0.99881				
100.0 -105.0																0	0.0	837	0.99881				
105.0 -110.0																0	0.0	837	0.99881				
110.0 -115.0																0	0.0	837	0.99881				
115.0 -120.0																0	0.0	837	0.99881				
120.0 -125.0																0	0.0	837	0.99881				
125.0 -130.0																0	0.0	837	0.99881				
130.0 -135.0																0	0.0	837	0.99881				
135.0 -140.0																0	0.0	837	0.99881				
140.0 -145.0																0	0.0	837	0.99881				
145.0 -150.0																0	0.0	837	0.99881				
150.0 -155.0																0	0.0	837	0.99881				
155.0 -160.0																0	0.0	837	0.99881				
160.0 -165.0																0	0.0	837	0.99881				
165.0 -170.0																0	0.0	837	0.99881				
170.0 -175.0																0	0.0	837	0.99881				
175.0 -180.0																0	0.0	837	0.99881				
180.0 -185.0																0	0.0	837	0.99881				
185.0 -190.0																0	0.0	837	0.99881				
190.0 -195.0																0	0.0	837	0.99881				
195.0 -200.0																0	0.0	837	0.99881				
200.0 -205.0																0	0.0	837	0.99881				
205.0 -210.0																0	0.0	837	0.99881				
210.0 -215.0																0	0.0	837	0.99881				
215.0 -220.0																0	0.0	837	0.99881				
220.0 -225.0																0	0.0	837	0.99881				
>= 225.0																0	0.0	837	0.99881				
SUM	0	31	352	292	117	39	3	3	0	0	0	0	0	0	0	837	100.0	837	0.99881	0.6	1.6	3.9	0.45
% OF TOTAL	0.0	3.7	42.1	34.9	14.0	4.7	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	31	383	675	792	831	834	837	837	837	837	837	837	837	837	837							
CUM. PROB.	0.0000	0.0370	0.4570	0.8055	0.9451	0.9916	0.9952	0.9988	0.9988	0.9988	0.9988	0.9988	0.9988	0.9988	0.9988	0.99881							
MIN. VALUE		1.7	3.6	7.4	14.3	22.2	35.8	73.7								1.7							
AVE. VALUE		2.7	7.2	13.2	21.0	31.0	54.2	84.2								12.5							
MAX. VALUE		5.2	12.1	20.8	36.0	48.8	66.2	91.1								91.1							
STD. DEV.		0.88	2.13	3.41	4.40	6.42	12.47	8.50								8.69							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Tm-10 Wave period (s) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 309.00 m
Sampling interval: 3 hours
Period : 1988.01.01 00:00 - 1988.01.31 23:59 0 recs.
1989.01.01 00:00 - 1989.01.31 23:59 247 recs.
1990.01.01 00:00 - 1990.01.31 23:59 239 recs.
1991.01.01 00:00 - 1991.01.31 23:59 240 recs.
1992.01.01 00:00 - 1992.01.31 23:59 248 recs.

Hm0(m) / Tm-10(s)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 1.0																0	0.0	0	0.00000				
1.0 - 2.0																0	0.0	0	0.00000				
2.0 - 3.0																0	0.0	0	0.00000				
3.0 - 4.0																0	0.0	0	0.00000				
4.0 - 5.0																0	0.0	0	0.00000				
5.0 - 6.0		1	1													2	0.2	2	0.00205	0.6	1.0	1.2	0.25
6.0 - 7.0		4	22	8												34	3.5	36	0.03692	0.5	1.3	1.7	0.29
7.0 - 8.0		49	112	69	9											239	24.5	275	0.28205	0.5	1.3	2.3	0.39
8.0 - 9.0		85	157	78	25	9	1									355	36.4	630	0.64615	0.6	1.4	3.3	0.49
9.0 - 10.0		39	69	42	48	8	9	2								217	22.3	847	0.86872	0.5	1.6	3.9	0.69
10.0 - 11.0		19	22	10	26	2			2							81	8.3	928	0.95179	0.5	1.6	4.3	0.74
11.0 - 12.0		11	6	12	9											38	3.9	966	0.99077	0.5	1.5	2.3	0.57
12.0 - 13.0		1			3	1										5	0.5	971	0.99590	0.5	2.0	2.5	0.68
13.0 - 14.0					3											3	0.3	974	0.99897	2.1	2.2	2.3	0.00
14.0 - 15.0																0	0.0	974	0.99897				
>= 15.0																0	0.0	974	0.99897				
SUM	0	209	389	219	123	20	10	2	2	0	0	0	0	0	0	974	100.0	974	0.99897	0.5	1.4	4.3	0.55
% OF TOTAL	0.0	21.5	39.9	22.5	12.6	2.1	1.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	209	598	817	940	960	970	972	974	974	974	974	974	974	974	974							
CUM. PROB.	0.0000	0.2144	0.6133	0.8379	0.9641	0.9846	0.9949	0.9969	0.9990	0.9990	0.9990	0.9990	0.9990	0.9990	0.9990	0.99897							
MIN. VALUE		5.9	5.4	6.7	7.4	8.3	8.9	9.3	10.0							5.4							
AVE. VALUE		8.8	8.4	8.6	9.7	9.3	9.4	9.5	10.5							8.7							
MAX. VALUE		12.8	11.7	11.8	13.4	12.9	9.7	9.8	10.4							13.4							
STD. DEV.		1.18	1.04	1.15	1.26	0.98	0.30	0.00	0.00							1.16							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Tm-10 Wave period (s) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 309.00 m
Sampling interval: 3 hours
Period : 1988.03.01 00:00 - 1988.03.31 23:59 0 recs.
1989.03.01 00:00 - 1989.03.31 23:59 0 recs.
1990.03.01 00:00 - 1990.03.31 23:59 240 recs.
1991.03.01 00:00 - 1991.03.31 23:59 240 recs.
1992.03.01 00:00 - 1992.03.31 23:59 246 recs.

Hm0(m) / Tm-10(s)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 1.0																0	0.0	0	0.00000				
1.0 - 2.0																0	0.0	0	0.00000				
2.0 - 3.0																0	0.0	0	0.00000				
3.0 - 4.0																0	0.0	0	0.00000				
4.0 - 5.0																0	0.0	0	0.00000				
5.0 - 6.0																0	0.0	0	0.00000				
6.0 - 7.0		1	11	1												13	1.8	13	0.01788	1.0	1.2	2.0	0.20
7.0 - 8.0			15	30	11	1										57	7.9	70	0.09629	1.1	1.7	2.5	0.36
8.0 - 9.0		1	41	35	35	25	4	2								143	19.7	213	0.29298	1.0	2.0	3.8	0.62
9.0 - 10.0		10	57	49	30	16	5	5	2	2	1					177	24.4	390	0.53645	0.9	1.9	5.2	0.82
10.0 - 11.0		10	71	31	15	31	4	3		3						168	23.1	558	0.76754	0.8	1.8	5.0	0.81
11.0 - 12.0		4	58	21	16	16	3		1	2	1					122	16.8	680	0.93535	0.9	1.8	5.2	0.82
12.0 - 13.0			15	10	6	9				1	2	1	1			45	6.2	725	0.99725	1.1	2.3	6.0	1.27
13.0 - 14.0						1										1	0.1	726	0.99862	2.6	2.8	2.6	0.00
14.0 - 15.0																0	0.0	726	0.99862				
>= 15.0																0	0.0	726	0.99862				
SUM	0	26	268	177	113	99	16	10	3	8	4	1	1	0	0	726	100.0	726	0.99862	0.8	1.9	6.0	0.79
% OF TOTAL	0.0	3.6	36.9	24.4	15.6	13.6	2.2	1.4	0.4	1.1	0.6	0.1	0.1	0.0	0.0	100.0							
SUM ACCUM.	0	26	294	471	584	683	699	709	712	720	724	725	726	726	726	726							
CUM. PROB.	0.0000	0.0358	0.4044	0.6479	0.8033	0.9395	0.9615	0.9752	0.9794	0.9904	0.9959	0.9972	0.9986	0.9986	0.9986	0.99862							
MIN. VALUE		6.7	6.3	6.9	7.4	7.8	8.7	8.7	9.6	9.9	9.9	12.3	12.4			6.3							
AVE. VALUE		10.0	10.0	9.5	9.6	10.2	9.9	9.6	10.2	10.8	11.5	12.5	12.5			9.8							
MAX. VALUE		11.7	12.8	12.6	12.4	13.3	11.5	10.6	11.0	12.1	12.8	12.3	12.4			13.3							
STD. DEV.		1.05	1.47	1.44	1.37	1.33	1.05	0.70	0.94	0.97	1.22	0.00	0.00			1.38							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Tm-10 Wave period (s) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 309.00 m
Sampling interval: 3 hours
Period : 1988.04.01 00:00 - 1988.04.30 23:59 0 recs.
1989.04.01 00:00 - 1989.04.30 23:59 0 recs.
1990.04.01 00:00 - 1990.04.30 23:59 232 recs.
1991.04.01 00:00 - 1991.04.30 23:59 225 recs.
1992.04.01 00:00 - 1992.04.30 23:59 145 recs.

Hm0(m) / Tm-10(s)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 1.0																0	0.0	0	0.00000				
1.0 - 2.0																0	0.0	0	0.00000				
2.0 - 3.0																0	0.0	0	0.00000				
3.0 - 4.0																0	0.0	0	0.00000				
4.0 - 5.0																0	0.0	0	0.00000				
5.0 - 6.0																0	0.0	0	0.00000				
6.0 - 7.0				1												1	0.2	1	0.00166	1.7	1.8	1.7	0.00
7.0 - 8.0			11	37	7	1										56	9.3	57	0.09453	1.2	1.7	2.5	0.31
8.0 - 9.0		6	25	46	43	7										127	21.1	184	0.30514	0.7	1.8	3.0	0.48
9.0 - 10.0		9	34	40	23	13	5									124	20.6	308	0.51078	0.8	1.8	3.3	0.62
10.0 - 11.0		12	37	52	29	16	4									150	24.9	458	0.75954	0.8	1.8	3.2	0.60
11.0 - 12.0		2	8	37	42	6	1									96	15.9	554	0.91874	1.0	2.0	3.1	0.43
12.0 - 13.0		1	2	10	20	6	1									40	6.6	594	0.98507	1.0	2.1	3.2	0.47
13.0 - 14.0			1		6	1										8	1.3	602	0.99834	1.1	2.2	2.7	0.39
14.0 - 15.0																0	0.0	602	0.99834				
>= 15.0																0	0.0	602	0.99834				
SUM	0	30	118	223	170	50	11	0	0	0	0	0	0	0	0	602	100.0	602	0.99834	0.7	1.8	3.3	0.51
% OF TOTAL	0.0	5.0	19.6	37.0	28.2	8.3	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	30	148	371	541	591	602	602	602	602	602	602	602	602	602	602							
CUM. PROB.	0.0000	0.0498	0.2454	0.6153	0.8972	0.9801	0.9983	0.9983	0.9983	0.9983	0.9983	0.9983	0.9983	0.9983	0.9983	0.99834							
MIN. VALUE		8.1	7.2	6.6	7.1	7.7	9.4									6.6							
AVE. VALUE		9.9	9.6	9.6	10.3	10.3	10.3									9.9							
MAX. VALUE		12.2	13.5	12.6	13.4	13.3	12.4									13.5							
STD. DEV.		0.99	1.20	1.48	1.59	1.32	0.94									1.43							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Tm-10 Wave period (s) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 154.00 m
Sampling interval: 3 hours
Period : 1987.05.01 00:00 - 1987.05.31 23:59 242 recs.
1988.05.01 00:00 - 1988.05.31 23:59 0 recs.
1989.05.01 00:00 - 1989.05.31 23:59 0 recs.
1990.05.01 00:00 - 1990.05.31 23:59 242 recs.
1991.05.01 00:00 - 1991.05.31 23:59 129 recs.
1992.05.01 00:00 - 1992.05.31 23:59 0 recs.

Hm0(m) / Tm-10(s)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 1.0																0	0.0	0	0.00000				
1.0 - 2.0																0	0.0	0	0.00000				
2.0 - 3.0																0	0.0	0	0.00000				
3.0 - 4.0																0	0.0	0	0.00000				
4.0 - 5.0																0	0.0	0	0.00000				
5.0 - 6.0																0	0.0	0	0.00000				
6.0 - 7.0			1	5												6	1.0	6	0.00977	1.3	1.7	1.8	0.19
7.0 - 8.0			7	16	9	5	1	1								39	6.4	45	0.07329	1.2	2.0	3.6	0.58
8.0 - 9.0			23	54	42	29	7	2								157	25.6	202	0.32899	1.0	2.1	3.7	0.57
9.0 - 10.0		3	37	60	49	25	6	2								182	29.7	384	0.62541	0.9	2.0	3.7	0.58
10.0 - 11.0		6	33	45	37	12	6	3								142	23.2	526	0.85668	0.9	1.9	3.5	0.64
11.0 - 12.0		1	2	22	25	7										57	9.3	583	0.94951	0.9	2.1	2.9	0.41
12.0 - 13.0				5	13	8										26	4.2	609	0.99186	1.7	2.3	2.9	0.35
13.0 - 14.0				1	1	1	1									4	0.7	613	0.99837	2.0	2.5	3.1	0.56
14.0 - 15.0																0	0.0	613	0.99837				
>= 15.0																0	0.0	613	0.99837				
SUM	0	10	103	208	176	87	21	8	0	0	0	0	0	0	0	613	100.0	613	0.99837	0.9	2.0	3.7	0.54
% OF TOTAL	0.0	1.6	16.8	33.9	28.7	14.2	3.4	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	10	113	321	497	584	605	613	613	613	613	613	613	613	613	613							
CUM. PROB.	0.0000	0.0163	0.1840	0.5228	0.8094	0.9511	0.9853	0.9984	0.9984	0.9984	0.9984	0.9984	0.9984	0.9984	0.9984	0.99837							
MIN. VALUE		9.7	6.6	6.6	7.5	7.4	7.9	7.3								6.6							
AVE. VALUE		10.3	9.5	9.5	9.9	9.7	9.5	9.4								9.6							
MAX. VALUE		11.2	11.5	13.0	13.5	13.3	13.0	10.8								13.5							
STD. DEV.		0.60	0.99	1.31	1.35	1.42	1.25	1.05								1.26							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Tm-10 Wave period (s) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 154.00 m
Sampling interval: 3 hours
Period : 1987.06.01 00:00 - 1987.06.30 23:59 239 recs.
1988.06.01 00:00 - 1988.06.30 23:59 0 recs.
1989.06.01 00:00 - 1989.06.30 23:59 225 recs.
1990.06.01 00:00 - 1990.06.30 23:59 226 recs.
1991.06.01 00:00 - 1991.06.30 23:59 240 recs.
1992.06.01 00:00 - 1992.06.30 23:59 214 recs.

Hm0(m) / Tm-10(s)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 1.0																0	0.0	0	0.00000				
1.0 - 2.0																0	0.0	0	0.00000				
2.0 - 3.0																0	0.0	0	0.00000				
3.0 - 4.0																0	0.0	0	0.00000				
4.0 - 5.0																0	0.0	0	0.00000				
5.0 - 6.0			1	1												2	0.2	2	0.00175	1.5	1.5	1.7	0.25
6.0 - 7.0			3	9												12	1.0	14	0.01223	1.2	1.6	1.9	0.22
7.0 - 8.0			23	12	13	5										53	4.6	67	0.05852	1.1	1.8	2.8	0.51
8.0 - 9.0		2	75	90	47	25	4									243	21.2	310	0.27074	0.9	1.8	3.3	0.52
9.0 - 10.0		3	62	91	63	37	8	1								265	23.2	575	0.50218	0.8	1.9	3.6	0.56
10.0 - 11.0		8	48	71	71	38	11	5	2							254	22.2	829	0.72402	0.7	2.0	4.1	0.66
11.0 - 12.0		11	38	65	42	22	6	2	5							191	16.7	1020	0.89083	0.6	2.0	4.3	0.72
12.0 - 13.0			22	21	24	17	6	1								91	8.0	1111	0.97031	1.0	2.1	3.9	0.64
13.0 - 14.0			13	2	3	5	3	2	1							29	2.5	1140	0.99563	1.1	2.1	4.5	0.94
14.0 - 15.0			1						1		2					4	0.3	1144	0.99913	1.2	4.0	5.2	1.64
>= 15.0																0	0.0	1144	0.99913				
SUM	0	24	286	362	263	149	38	11	9	0	2	0	0	0	0	1144	100.0	1144	0.99913	0.6	1.9	5.2	0.64
% OF TOTAL	0.0	2.1	25.0	31.6	23.0	13.0	3.3	1.0	0.8	0.0	0.2	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	24	310	672	935	1084	1122	1133	1142	1142	1144	1144	1144	1144	1144	1144							
CUM. PROB.	0.0000	0.0210	0.2707	0.5869	0.8166	0.9467	0.9799	0.9895	0.9974	0.9974	0.9991	0.9991	0.9991	0.9991	0.9991	0.99913							
MIN. VALUE		8.0	5.8	5.8	7.1	7.5	8.0	9.5	10.3		14.3					5.8							
AVE. VALUE		10.7	9.9	9.9	10.1	10.3	10.8	11.3	11.8		14.5					10.0							
MAX. VALUE		11.9	14.2	13.5	13.5	13.9	13.3	13.8	14.3		14.3					14.3							
STD. DEV.		0.94	1.67	1.43	1.37	1.44	1.43	1.27	1.25		0.00					1.50							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Tm-10 Wave period (s) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 154.00 m
Sampling interval: 3 hours
Period : 1987.07.01 00:00 - 1987.07.31 23:59 231 recs.
1988.07.01 00:00 - 1988.07.31 23:59 0 recs.
1989.07.01 00:00 - 1989.07.31 23:59 73 recs.
1990.07.01 00:00 - 1990.07.31 23:59 239 recs.
1991.07.01 00:00 - 1991.07.31 23:59 246 recs.
1992.07.01 00:00 - 1992.07.31 23:59 131 recs.

Hm0(m) / Tm-10(s)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 1.0																0	0.0	0	0.00000				
1.0 - 2.0																0	0.0	0	0.00000				
2.0 - 3.0																0	0.0	0	0.00000				
3.0 - 4.0																0	0.0	0	0.00000				
4.0 - 5.0																0	0.0	0	0.00000				
5.0 - 6.0																0	0.0	0	0.00000				
6.0 - 7.0				2	1											3	0.3	3	0.00326	1.6	1.9	2.1	0.24
7.0 - 8.0			12	21	10	1										44	4.8	47	0.05103	1.2	1.8	2.6	0.38
8.0 - 9.0		1	47	48	66	12	3	4								181	19.7	228	0.24756	0.9	1.9	3.9	0.57
9.0 - 10.0		6	54	93	78	43	11		1							286	31.1	514	0.55809	0.8	2.0	4.2	0.58
10.0 - 11.0		8	38	50	52	44	6	2	1							201	21.8	715	0.77633	0.7	2.0	4.2	0.65
11.0 - 12.0		2	19	32	46	31	8	3								141	15.3	856	0.92942	0.9	2.2	3.7	0.61
12.0 - 13.0			1	13	12	20	6	2								54	5.9	910	0.98806	1.2	2.5	3.5	0.57
13.0 - 14.0					3	3	1	2								9	1.0	919	0.99783	2.0	2.9	3.8	0.57
14.0 - 15.0					1											1	0.1	920	0.99891	2.5	2.2	2.5	0.00
>= 15.0																0	0.0	920	0.99891				
SUM	0	17	171	259	269	154	35	13	2	0	0	0	0	0	0	920	100.0	920	0.99891	0.7	2.0	4.2	0.59
% OF TOTAL	0.0	1.8	18.6	28.2	29.2	16.7	3.8	1.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	17	188	447	716	870	905	918	920	920	920	920	920	920	920	920							
CUM. PROB.	0.0000	0.0185	0.2041	0.4853	0.7774	0.9446	0.9826	0.9967	0.9989	0.9989	0.9989	0.9989	0.9989	0.9989	0.9989	0.99891							
MIN. VALUE		8.7	7.1	6.5	6.3	7.7	8.1	8.6	9.5							6.3							
AVE. VALUE		10.1	9.5	9.7	9.9	10.6	10.7	10.9	10.0							9.9							
MAX. VALUE		11.4	12.1	12.8	14.1	13.8	13.0	13.9	10.7							14.1							
STD. DEV.		0.76	1.13	1.29	1.35	1.24	1.34	1.82	0.50							1.30							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Tm-10 Wave period (s) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 154.00 m
Sampling interval: 3 hours
Period : 1987.08.01 00:00 - 1987.08.31 23:59 245 recs.
1988.08.01 00:00 - 1988.08.31 23:59 0 recs.
1989.08.01 00:00 - 1989.08.31 23:59 0 recs.
1990.08.01 00:00 - 1990.08.31 23:59 239 recs.
1991.08.01 00:00 - 1991.08.31 23:59 246 recs.

Hm0(m) / Tm-10(s)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 1.0																0	0.0	0	0.00000				
1.0 - 2.0																0	0.0	0	0.00000				
2.0 - 3.0																0	0.0	0	0.00000				
3.0 - 4.0																0	0.0	0	0.00000				
4.0 - 5.0																0	0.0	0	0.00000				
5.0 - 6.0																0	0.0	0	0.00000				
6.0 - 7.0				2												2	0.3	2	0.00274	1.9	1.8	1.9	0.00
7.0 - 8.0			13	28	24	8										73	10.0	75	0.10260	1.1	1.9	2.8	0.45
8.0 - 9.0		2	29	32	27	16	16	2								124	17.0	199	0.27223	0.9	2.1	3.6	0.71
9.0 - 10.0		6	46	52	34	12	5									155	21.2	354	0.48427	0.8	1.8	3.4	0.56
10.0 - 11.0		9	90	69	37	9	9	4								227	31.1	581	0.79480	0.8	1.7	3.9	0.62
11.0 - 12.0		6	23	16	27	10	5	1								88	12.1	669	0.91518	0.8	1.9	3.5	0.68
12.0 - 13.0			10	6	8	7	8									39	5.3	708	0.96854	1.1	2.2	3.4	0.74
13.0 - 14.0			1	3	4	7	4									19	2.6	727	0.99453	1.5	2.5	3.4	0.57
14.0 - 15.0					2	1										3	0.4	730	0.99863	2.2	2.4	2.5	0.24
>= 15.0																0	0.0	730	0.99863				
SUM	0	23	212	208	163	70	47	7	0	0	0	0	0	0	0	730	100.0	730	0.99863	0.8	1.9	3.9	0.62
% OF TOTAL	0.0	3.2	29.0	28.5	22.3	9.6	6.4	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	23	235	443	606	676	723	730	730	730	730	730	730	730	730	730							
CUM. PROB.	0.0000	0.0315	0.3215	0.6060	0.8290	0.9248	0.9891	0.9986	0.9986	0.9986	0.9986	0.9986	0.9986	0.9986	0.9986	0.99863							
MIN. VALUE		8.4	7.0	6.7	7.0	7.1	8.0	8.0								6.7							
AVE. VALUE		10.3	10.0	9.7	9.9	10.2	10.4	10.1								9.9							
MAX. VALUE		11.8	13.3	13.7	14.5	14.6	13.4	11.1								14.6							
STD. DEV.		0.92	1.20	1.37	1.62	1.93	1.74	1.05								1.46							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Tm-10 Wave period (s) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 154.00 m
Sampling interval: 3 hours
Period : 1987.10.01 00:00 - 1987.10.31 23:59 183 recs.
1988.10.01 00:00 - 1988.10.31 23:59 0 recs.
1989.10.01 00:00 - 1989.10.31 23:59 0 recs.
1990.10.01 00:00 - 1990.10.31 23:59 240 recs.
1991.10.01 00:00 - 1991.10.31 23:59 243 recs.

Hm0(m) / Tm-10(s)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 1.0																0	0.0	0	0.00000				
1.0 - 2.0																0	0.0	0	0.00000				
2.0 - 3.0																0	0.0	0	0.00000				
3.0 - 4.0																0	0.0	0	0.00000				
4.0 - 5.0																0	0.0	0	0.00000				
5.0 - 6.0																0	0.0	0	0.00000				
6.0 - 7.0			6	4	2			1								12	1.8	12	0.01799	1.4	1.6	2.4	0.37
7.0 - 8.0		2	11	40	13	1		1								68	10.2	80	0.11994	1.0	1.8	3.8	0.44
8.0 - 9.0		5	51	59	16	3		1								135	20.3	215	0.32234	0.9	1.6	3.5	0.44
9.0 - 10.0		3	61	60	32	7		1								164	24.6	379	0.56822	0.8	1.7	3.9	0.47
10.0 - 11.0		13	65	36	39	19	1	1	1							175	26.3	554	0.83058	0.6	1.7	4.5	0.63
11.0 - 12.0		8	28	16	7	11	2	3	4							79	11.9	633	0.94903	0.7	1.9	4.3	0.92
12.0 - 13.0		2	4	15	1											22	3.3	655	0.98201	0.6	1.6	2.0	0.35
13.0 - 14.0				7	3											10	1.5	665	0.99700	1.6	1.9	2.0	0.23
14.0 - 15.0				1												1	0.2	666	0.99850	1.8	1.8	1.8	0.00
>= 15.0																0	0.0	666	0.99850				
SUM	0	33	226	238	113	41	3	7	5	0	0	0	0	0	0	666	100.0	666	0.99850	0.6	1.7	4.5	0.56
% OF TOTAL	0.0	5.0	33.9	35.7	17.0	6.2	0.5	1.1	0.8	0.0	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	33	259	497	610	651	654	661	666	666	666	666	666	666	666	666							
CUM. PROB.	0.0000	0.0495	0.3883	0.7451	0.9145	0.9760	0.9805	0.9910	0.9985	0.9985	0.9985	0.9985	0.9985	0.9985	0.9985	0.99850							
MIN. VALUE		7.1	6.7	6.5	6.6	7.5	10.8	7.7	10.8							6.5							
AVE. VALUE		10.3	9.7	9.5	9.7	10.4	11.2	10.1	11.3							9.6							
MAX. VALUE		12.2	12.9	14.3	13.3	11.5	11.1	11.4	11.8							14.3							
STD. DEV.		1.30	1.25	1.62	1.35	0.97	0.47	1.50	0.40							1.41							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Tm-10 Wave period (s) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 309.00 m
Sampling interval: 3 hours
Period : 1987.11.01 00:00 - 1987.11.30 23:59 0 recs.
1988.11.01 00:00 - 1988.11.30 23:59 0 recs.
1989.11.01 00:00 - 1989.11.30 23:59 0 recs.
1990.11.01 00:00 - 1990.11.30 23:59 233 recs.
1991.11.01 00:00 - 1991.11.30 23:59 240 recs.

Hm0(m) / Tm-10(s)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 1.0																0	0.0	0	0.00000				
1.0 - 2.0																0	0.0	0	0.00000				
2.0 - 3.0																0	0.0	0	0.00000				
3.0 - 4.0																0	0.0	0	0.00000				
4.0 - 5.0																0	0.0	0	0.00000				
5.0 - 6.0				1												1	0.2	1	0.00211	1.7	1.8	1.7	0.00
6.0 - 7.0			27	4	3											34	7.2	35	0.07384	1.1	1.4	2.3	0.31
7.0 - 8.0		1	50	28	16	2			1							98	20.7	133	0.28059	1.0	1.6	4.2	0.49
8.0 - 9.0		1	56	44	21	2										124	26.2	257	0.54219	0.9	1.6	2.8	0.40
9.0 - 10.0		9	53	41	17		1	2	1	1		1		1		127	26.8	384	0.81013	0.7	1.7	6.7	0.85
10.0 - 11.0		7	26	15	14											62	13.1	446	0.94093	0.8	1.5	2.4	0.48
11.0 - 12.0		1	3	6	4	2										16	3.4	462	0.97468	0.9	1.8	2.7	0.54
12.0 - 13.0				3	4	1										8	1.7	470	0.99156	1.5	2.1	2.5	0.33
13.0 - 14.0				1	1											2	0.4	472	0.99578	1.6	2.0	2.0	0.25
14.0 - 15.0					1											1	0.2	473	0.99789	2.1	2.2	2.1	0.00
>= 15.0																0	0.0	473	0.99789				
SUM	0	19	215	143	81	7	1	2	2	1	0	1	0	1	0	473	100.0	473	0.99789	0.7	1.6	6.7	0.58
% OF TOTAL	0.0	4.0	45.5	30.2	17.1	1.5	0.2	0.4	0.4	0.2	0.0	0.2	0.0	0.2	0.0	100.0							
SUM ACCUM.	0	19	234	377	458	465	466	468	470	471	471	472	472	473	473	473							
CUM. PROB.	0.0000	0.0401	0.4937	0.7954	0.9662	0.9810	0.9831	0.9873	0.9916	0.9937	0.9937	0.9958	0.9958	0.9979	0.9979	0.99789							
MIN. VALUE		7.6	6.0	5.8	6.3	7.5	9.1	9.5	7.9	9.5		9.6		9.3		5.8							
AVE. VALUE		9.8	8.5	9.0	9.3	9.6	9.5	9.5	8.5	9.5		9.5		9.5		8.8							
MAX. VALUE		11.1	11.4	13.1	14.7	12.1	9.1	9.5	9.4	9.5		9.6		9.3		14.7							
STD. DEV.		0.86	1.26	1.32	1.63	1.96	0.00	0.00	1.00	0.00		0.00		0.00		1.35							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Tm-10 Wave period (s) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 309.00 m
Sampling interval: 3 hours
Period : 1987.12.01 00:00 - 1987.12.31 23:59 0 recs.
1988.12.01 00:00 - 1988.12.31 23:59 198 recs.
1989.12.01 00:00 - 1989.12.31 23:59 152 recs.
1990.12.01 00:00 - 1990.12.31 23:59 240 recs.
1991.12.01 00:00 - 1991.12.31 23:59 247 recs.

Hm0(m) / Tm-10(s)	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 2.0	2.0 - 2.5	2.5 - 3.0	3.0 - 3.5	3.5 - 4.0	4.0 - 4.5	4.5 - 5.0	5.0 - 5.5	5.5 - 6.0	6.0 - 6.5	6.5 - 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 1.0																0	0.0	0	0.00000				
1.0 - 2.0																0	0.0	0	0.00000				
2.0 - 3.0																0	0.0	0	0.00000				
3.0 - 4.0																0	0.0	0	0.00000				
4.0 - 5.0																0	0.0	0	0.00000				
5.0 - 6.0			3													3	0.4	3	0.00358	1.2	1.2	1.4	0.00
6.0 - 7.0		7	42	16	2	1										68	8.1	71	0.08473	0.9	1.4	2.6	0.36
7.0 - 8.0		3	98	44	19	10										174	20.8	245	0.29236	0.9	1.6	2.9	0.46
8.0 - 9.0		6	100	84	47	10	1									248	29.6	493	0.58831	0.8	1.7	3.0	0.46
9.0 - 10.0		3	60	85	28	9										185	22.1	678	0.80907	0.6	1.7	2.9	0.43
10.0 - 11.0		10	40	46	17	5										118	14.1	796	0.94988	0.6	1.6	2.8	0.48
11.0 - 12.0		2	9	15	1	2	2									31	3.7	827	0.98687	0.9	1.7	3.4	0.59
12.0 - 13.0				2	3	2		3								10	1.2	837	0.99881	1.6	2.7	3.9	0.76
13.0 - 14.0																0	0.0	837	0.99881				
14.0 - 15.0																0	0.0	837	0.99881				
>= 15.0																0	0.0	837	0.99881				
SUM	0	31	352	292	117	39	3	3	0	0	0	0	0	0	0	837	100.0	837	0.99881	0.6	1.6	3.9	0.45
% OF TOTAL	0.0	3.7	42.1	34.9	14.0	4.7	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	31	383	675	792	831	834	837	837	837	837	837	837	837	837	837							
CUM. PROB.	0.0000	0.0370	0.4570	0.8055	0.9451	0.9916	0.9952	0.9988	0.9988	0.9988	0.9988	0.9988	0.9988	0.9988	0.9988	0.99881							
MIN. VALUE		6.1	5.8	6.5	6.6	6.9	8.1	12.1								5.8							
AVE. VALUE		8.9	8.4	9.0	9.0	9.0	10.5	12.5								8.7							
MAX. VALUE		11.2	11.8	12.1	12.5	12.5	11.7	12.4								12.5							
STD. DEV.		1.68	1.30	1.26	1.15	1.45	1.41	0.00								1.31							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Tp Peak wave period (s) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 309.00 m
Sampling interval: 3 hours
Period : 1990.01.01 00:00 - 1990.01.31 23:59 239 recs.
1991.01.01 00:00 - 1991.01.31 23:59 240 recs.
1992.01.01 00:00 - 1992.01.31 23:59 248 recs.

Hm0(m) / Tp(s)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 1.0																0	0.0	0	0.00000				
1.0 - 2.0																0	0.0	0	0.00000				
2.0 - 3.0																0	0.0	0	0.00000				
3.0 - 4.0																0	0.0	0	0.00000				
4.0 - 5.0																0	0.0	0	0.00000				
5.0 - 6.0			2	2												4	0.6	4	0.00549	1.3	1.5	1.6	0.25
6.0 - 7.0			5	2												7	1.0	11	0.01511	1.0	1.4	1.6	0.23
7.0 - 8.0		7	25	16	2											50	6.9	61	0.08379	0.7	1.4	2.1	0.37
8.0 - 9.0		22	26	23	1	1										73	10.0	134	0.18407	0.7	1.3	2.5	0.44
9.0 - 10.0		18	36	21	20	3										98	13.5	232	0.31868	0.7	1.5	2.9	0.55
10.0 - 11.0		14	42	31	23	7	2									119	16.4	351	0.48214	0.6	1.6	3.3	0.58
11.0 - 12.0		31	69	24	20	6	8	2	2							162	22.3	513	0.70467	0.5	1.6	4.3	0.76
12.0 - 13.0		22	51	36	13	1										123	16.9	636	0.87363	0.5	1.4	2.8	0.46
13.0 - 14.0		1	2	2	1											6	0.8	642	0.88187	0.7	1.5	2.0	0.48
14.0 - 15.0		4	16	19	8	1										48	6.6	690	0.94780	0.7	1.6	2.5	0.46
15.0 - 16.0			1	2	1											4	0.6	694	0.95330	1.4	1.8	2.0	0.35
16.0 - 17.0			13	5	5											23	3.2	717	0.98489	1.0	1.6	2.1	0.41
17.0 - 18.0																0	0.0	717	0.98489				
18.0 - 19.0			1	3	3											7	1.0	724	0.99451	1.3	1.9	2.3	0.35
19.0 - 20.0																0	0.0	724	0.99451				
20.0 - 21.0				1	2											3	0.4	727	0.99863	2.0	2.1	2.0	0.24
21.0 - 22.0																0	0.0	727	0.99863				
22.0 - 23.0																0	0.0	727	0.99863				
23.0 - 24.0																0	0.0	727	0.99863				
24.0 - 25.0																0	0.0	727	0.99863				
25.0 - 26.0																0	0.0	727	0.99863				
>= 26.0																0	0.0	727	0.99863				
SUM	0	119	289	187	99	19	10	2	2	0	0	0	0	0	0	727	100.0	727	0.99863	0.5	1.5	4.3	0.55
% OF TOTAL	0.0	16.4	39.8	25.7	13.6	2.6	1.4	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	119	408	595	694	713	723	725	727	727	727	727	727	727	727	727							
CUM. PROB.	0.0000	0.1635	0.5604	0.8173	0.9533	0.9794	0.9931	0.9959	0.9986	0.9986	0.9986	0.9986	0.9986	0.9986	0.9986	0.99863							
MIN. VALUE		7.3	5.2	5.3	7.4	8.5	10.3	11.4	11.4							5.2							
AVE. VALUE		10.6	11.0	11.1	11.8	10.9	11.3	11.5	11.5							11.1							
MAX. VALUE		14.8	18.2	20.0	20.0	14.8	11.4	11.4	11.4							20.0							
STD. DEV.		1.74	2.30	2.61	2.61	1.27	0.40	0.00	0.00							2.41							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Tp Peak wave period (s) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 309.00 m
Sampling interval: 3 hours
Period : 1990.02.01 00:00 - 1990.02.28 23:59 211 recs.
1991.02.01 00:00 - 1991.02.28 23:59 216 recs.

Hm0(m) / Tp(s)	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 2.0	2.0 - 2.5	2.5 - 3.0	3.0 - 3.5	3.5 - 4.0	4.0 - 4.5	4.5 - 5.0	5.0 - 5.5	5.5 - 6.0	6.0 - 6.5	6.5 - 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 1.0																0	0.0	0	0.00000				
1.0 - 2.0																0	0.0	0	0.00000				
2.0 - 3.0																0	0.0	0	0.00000				
3.0 - 4.0																0	0.0	0	0.00000				
4.0 - 5.0																0	0.0	0	0.00000				
5.0 - 6.0																0	0.0	0	0.00000				
6.0 - 7.0			4	2		1										6	1.4	6	0.01402	1.3	1.4	2.0	0.24
7.0 - 8.0			6	15	2	1										24	5.6	30	0.07009	1.2	1.7	2.5	0.35
8.0 - 9.0			9	26	9	3	2									49	11.5	79	0.18458	1.1	1.9	3.1	0.48
9.0 - 10.0		1	4	14	19	8	3									49	11.5	128	0.29907	1.0	2.1	3.3	0.54
10.0 - 11.0			3	21	19	7	2	1								53	12.4	181	0.42290	1.0	2.1	3.5	0.50
11.0 - 12.0		11	3	27	23	15	7									86	20.1	267	0.62383	0.7	2.0	3.5	0.69
12.0 - 13.0		5	30	27	13	4	8									87	20.4	354	0.82710	0.7	1.8	3.4	0.66
13.0 - 14.0			1	1												2	0.5	356	0.83178	1.5	1.5	1.6	0.25
14.0 - 15.0		6	21	13	2		3									45	10.5	401	0.93692	0.6	1.5	3.3	0.59
15.0 - 16.0																0	0.0	401	0.93692				
16.0 - 17.0		2	5	4	3											14	3.3	415	0.96963	0.7	1.5	2.2	0.49
17.0 - 18.0																0	0.0	415	0.96963				
18.0 - 19.0			2	5												7	1.6	422	0.98598	1.3	1.6	1.9	0.23
19.0 - 20.0																0	0.0	422	0.98598				
20.0 - 21.0			3	1												4	0.9	426	0.99533	1.2	1.4	1.9	0.22
21.0 - 22.0																0	0.0	426	0.99533				
22.0 - 23.0			1													1	0.2	427	0.99766	1.1	1.2	1.1	0.00
23.0 - 24.0																0	0.0	427	0.99766				
24.0 - 25.0																0	0.0	427	0.99766				
25.0 - 26.0																0	0.0	427	0.99766				
>= 26.0																0	0.0	427	0.99766				
SUM	0	25	92	156	90	38	25	1	0	0	0	0	0	0	0	427	100.0	427	0.99766	0.6	1.9	3.5	0.61
% OF TOTAL	0.0	5.9	21.5	36.5	21.1	8.9	5.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	25	117	273	363	401	426	427	427	427	427	427	427	427	427	427							
CUM. PROB.	0.0000	0.0584	0.2734	0.6379	0.8481	0.9369	0.9953	0.9977	0.9977	0.9977	0.9977	0.9977	0.9977	0.9977	0.9977	0.99766							
MIN. VALUE		9.3	6.6	6.6	7.8	7.8	8.5	10.3								6.6							
AVE. VALUE		12.7	12.5	11.1	10.9	10.7	11.6	10.5								11.5							
MAX. VALUE		16.7	22.2	20.0	16.7	12.9	14.8	10.3								22.2							
STD. DEV.		1.73	3.33	2.71	1.75	1.25	1.63	0.00								2.65							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Tp Peak wave period (s) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 309.00 m
Sampling interval: 3 hours
Period : 1990.03.01 00:00 - 1990.03.31 23:59 240 recs.
1991.03.01 00:00 - 1991.03.31 23:59 240 recs.
1992.03.01 00:00 - 1992.03.31 23:59 246 recs.

Hm0(m) / Tp(s)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 1.0																0	0.0	0	0.00000				
1.0 - 2.0																0	0.0	0	0.00000				
2.0 - 3.0																0	0.0	0	0.00000				
3.0 - 4.0																0	0.0	0	0.00000				
4.0 - 5.0																0	0.0	0	0.00000				
5.0 - 6.0			1	1	1											3	0.4	3	0.00413	1.2	1.8	2.0	0.41
6.0 - 7.0			1	2	1											4	0.6	7	0.00963	1.2	1.8	2.0	0.35
7.0 - 8.0		1	4	5	3											13	1.8	20	0.02751	1.0	1.6	2.3	0.45
8.0 - 9.0			6	7	12	9	1	1								36	5.0	56	0.07703	1.1	2.2	3.6	0.60
9.0 - 10.0			9	6	8	9	1	2		1						36	5.0	92	0.12655	1.1	2.2	4.6	0.82
10.0 - 11.0		2	22	15	11	7	3	4	1							65	9.0	157	0.21596	0.9	2.0	4.2	0.81
11.0 - 12.0		8	46	48	26	15	4		1	2	1					151	20.8	308	0.42366	0.8	1.8	5.2	0.75
12.0 - 13.0		6	73	41	18	23	6	1	1	3	1					173	23.8	481	0.66162	0.9	1.8	5.2	0.81
13.0 - 14.0			6	14	6	3		1								30	4.1	511	0.70289	1.0	1.9	3.7	0.55
14.0 - 15.0		6	53	25	21	21	1	1		2	2		1			133	18.3	644	0.88583	1.0	1.9	6.0	0.92
15.0 - 16.0			2	3	3	9										17	2.3	661	0.90922	1.4	2.3	2.9	0.54
16.0 - 17.0		2	31	5		3						1				42	5.8	703	0.96699	0.9	1.5	5.8	0.79
17.0 - 18.0																0	0.0	703	0.96699				
18.0 - 19.0			9	3	1											13	1.8	716	0.98487	1.1	1.4	2.4	0.31
19.0 - 20.0																0	0.0	716	0.98487				
20.0 - 21.0		1	4	2	2											9	1.2	725	0.99725	0.9	1.5	2.1	0.48
21.0 - 22.0																0	0.0	725	0.99725				
22.0 - 23.0			1													1	0.1	726	0.99862	1.2	1.2	1.2	0.00
23.0 - 24.0																0	0.0	726	0.99862				
24.0 - 25.0																0	0.0	726	0.99862				
25.0 - 26.0																0	0.0	726	0.99862				
>= 26.0																0	0.0	726	0.99862				
SUM	0	26	268	177	113	99	16	10	3	8	4	1	1	0	0	726	100.0	726	0.99862	0.8	1.9	6.0	0.79
% OF TOTAL	0.0	3.6	36.9	24.4	15.6	13.6	2.2	1.4	0.4	1.1	0.6	0.1	0.1	0.0	0.0	100.0							
SUM ACCUM.	0	26	294	471	584	683	699	709	712	720	724	725	726	726	726	726							
CUM. PROB.	0.0000	0.0358	0.4044	0.6479	0.8033	0.9395	0.9615	0.9752	0.9794	0.9904	0.9959	0.9972	0.9986	0.9986	0.99862								
MIN. VALUE		7.3	5.8	5.8	5.7	8.0	8.7	8.7	10.5	9.3	11.4	16.7	14.8			5.7							
AVE. VALUE		12.9	13.1	12.3	11.9	12.4	11.6	11.0	11.5	12.4	13.2	16.5	14.5			12.6							
MAX. VALUE		20.0	22.2	20.0	20.0	16.7	14.3	14.8	12.9	14.8	14.8	16.7	14.8			22.2							
STD. DEV.		2.45	2.60	2.34	2.55	2.21	1.39	1.80	0.82	1.54	1.30	0.00	0.00			2.52							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Tp Peak wave period (s) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 309.00 m
Sampling interval: 3 hours
Period : 1990.04.01 00:00 - 1990.04.30 23:59 232 recs.
1991.04.01 00:00 - 1991.04.30 23:59 225 recs.
1992.04.01 00:00 - 1992.04.30 23:59 145 recs.

Hm0(m) / Tp(s)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 1.0																0	0.0	0	0.00000				
1.0 - 2.0																0	0.0	0	0.00000				
2.0 - 3.0																0	0.0	0	0.00000				
3.0 - 4.0																0	0.0	0	0.00000				
4.0 - 5.0																0	0.0	0	0.00000				
5.0 - 6.0				1												1	0.2	1	0.00166	1.7	1.8	1.7	0.00
6.0 - 7.0				2												2	0.3	3	0.00498	1.7	1.8	1.8	0.00
7.0 - 8.0			2	19	6	2										29	4.8	32	0.05307	1.4	1.9	2.6	0.34
8.0 - 9.0			2	8	2	1										13	2.2	45	0.07463	1.4	1.8	2.7	0.38
9.0 - 10.0		1	3	10	14											28	4.7	73	0.12106	1.0	1.9	2.4	0.40
10.0 - 11.0		5	8	26	14	3										56	9.3	129	0.21393	0.7	1.8	3.0	0.49
11.0 - 12.0		19	36	38	24	8										125	20.8	254	0.42123	0.8	1.6	3.0	0.56
12.0 - 13.0		4	37	53	31	15	2									142	23.6	396	0.65672	0.9	1.8	3.2	0.53
13.0 - 14.0			4	11	6	7										28	4.7	424	0.70315	1.2	2.0	2.8	0.51
14.0 - 15.0			10	32	40	9	9									100	16.6	524	0.86899	1.1	2.1	3.3	0.53
15.0 - 16.0				6	14	3										23	3.8	547	0.90713	1.6	2.2	2.9	0.31
16.0 - 17.0			2	9	17	2										30	5.0	577	0.95688	1.3	2.1	2.5	0.35
17.0 - 18.0																0	0.0	577	0.95688				
18.0 - 19.0			10	6	2											18	3.0	595	0.98673	1.0	1.5	2.2	0.34
19.0 - 20.0																0	0.0	595	0.98673				
20.0 - 21.0			4	2												6	1.0	601	0.99668	1.0	1.4	1.6	0.24
21.0 - 22.0																0	0.0	601	0.99668				
22.0 - 23.0		1														1	0.2	602	0.99834	1.0	0.8	1.0	0.00
23.0 - 24.0																0	0.0	602	0.99834				
24.0 - 25.0																0	0.0	602	0.99834				
25.0 - 26.0																0	0.0	602	0.99834				
>= 26.0																0	0.0	602	0.99834				
SUM	0	30	118	223	170	50	11	0	0	0	0	0	0	0	0	602	100.0	602	0.99834	0.7	1.8	3.3	0.51
% OF TOTAL	0.0	5.0	19.6	37.0	28.2	8.3	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	30	148	371	541	591	602	602	602	602	602	602	602	602	602	602							
CUM. PROB.	0.0000	0.0498	0.2454	0.6153	0.8972	0.9801	0.9983	0.9983	0.9983	0.9983	0.9983	0.9983	0.9983	0.9983	0.9983	0.99834							
MIN. VALUE		9.3	7.1	5.8	7.8	7.3	12.9									5.8							
AVE. VALUE		11.8	12.9	12.1	12.9	12.8	14.1									12.6							
MAX. VALUE		22.2	20.0	20.0	18.2	16.7	14.8									22.2							
STD. DEV.		2.10	2.69	2.68	2.41	1.92	0.77									2.58							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Tp Peak wave period (s) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 309.00 m
Sampling interval: 3 hours
Period : 1990.06.01 00:00 - 1990.06.30 23:59 226 recs.
1991.06.01 00:00 - 1991.06.30 23:59 240 recs.
1992.06.01 00:00 - 1992.06.30 23:59 214 recs.

Hm0(m) / Tp(s)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 1.0																0	0.0	0	0.00000				
1.0 - 2.0																0	0.0	0	0.00000				
2.0 - 3.0																0	0.0	0	0.00000				
3.0 - 4.0																0	0.0	0	0.00000				
4.0 - 5.0			2													2	0.3	2	0.00294	1.2	1.2	1.3	0.00
5.0 - 6.0			1	3												4	0.6	6	0.00881	1.5	1.6	1.9	0.22
6.0 - 7.0				6												6	0.9	12	0.01762	1.7	1.8	1.9	0.00
7.0 - 8.0			2	6	2	1	1									12	1.8	24	0.03524	1.1	2.0	3.0	0.56
8.0 - 9.0			4	5	4	5										18	2.6	42	0.06167	1.2	2.0	2.7	0.56
9.0 - 10.0			7	12	14	15	1									49	7.2	91	0.13363	1.1	2.2	3.3	0.54
10.0 - 11.0			9	15	23	8	3									58	8.5	149	0.21880	1.2	2.1	3.5	0.53
11.0 - 12.0		3	26	50	32	21	7		2							141	20.7	290	0.42584	0.6	2.0	4.1	0.64
12.0 - 13.0		3	37	39	25	16	7	3	2							132	19.4	422	0.61968	0.8	2.0	4.2	0.72
13.0 - 14.0		3	20	20	7	8	4	3	2							67	9.9	489	0.71806	0.7	2.0	4.2	0.84
14.0 - 15.0		1	24	40	21	9	1	2	1		1					100	14.7	589	0.86490	1.0	1.9	5.2	0.68
15.0 - 16.0		5	10	10	14	9	5	1	1							55	8.1	644	0.94567	0.7	2.1	4.5	0.80
16.0 - 17.0		2	2	2	7	9		2	1		1					26	3.8	670	0.98385	0.8	2.5	5.1	0.98
17.0 - 18.0					1											1	0.1	671	0.98532	2.3	2.2	2.3	0.00
18.0 - 19.0				1	4	2										7	1.0	678	0.99559	1.6	2.3	2.6	0.32
19.0 - 20.0																0	0.0	678	0.99559				
20.0 - 21.0					1											1	0.1	679	0.99706	2.4	2.2	2.4	0.00
21.0 - 22.0					1											1	0.1	680	0.99853	2.2	2.2	2.2	0.00
22.0 - 23.0																0	0.0	680	0.99853				
23.0 - 24.0																0	0.0	680	0.99853				
24.0 - 25.0																0	0.0	680	0.99853				
25.0 - 26.0																0	0.0	680	0.99853				
>= 26.0																0	0.0	680	0.99853				
SUM	0	17	144	209	156	103	29	11	9	0	2	0	0	0	0	680	100.0	680	0.99853	0.6	2.0	5.2	0.68
% OF TOTAL	0.0	2.5	21.2	30.7	22.9	15.1	4.3	1.6	1.3	0.0	0.3	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	17	161	370	526	629	658	669	678	678	680	680	680	680	680	680							
CUM. PROB.	0.0000	0.0250	0.2364	0.5433	0.7724	0.9236	0.9662	0.9824	0.9956	0.9956	0.9985	0.9985	0.9985	0.9985	0.9985	0.99853							
MIN. VALUE		11.1	4.5	5.7	7.4	7.7	7.4	12.5	11.8		14.3					4.5							
AVE. VALUE		14.0	12.4	12.1	12.6	12.4	12.5	14.1	13.5		15.5					12.4							
MAX. VALUE		16.7	16.7	18.2	21.1	18.2	15.4	16.7	16.7		16.7					21.1							
STD. DEV.		1.72	2.13	2.31	2.54	2.48	1.91	1.43	1.63		1.00					2.36							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Tp Peak wave period (s) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 309.00 m
Sampling interval: 3 hours
Period : 1990.10.01 00:00 - 1990.10.31 23:59 240 recs.
1991.10.01 00:00 - 1991.10.31 23:59 241 recs.

Hm0(m) / Tp(s)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 1.0																0	0.0	0	0.00000				
1.0 - 2.0																0	0.0	0	0.00000				
2.0 - 3.0																0	0.0	0	0.00000				
3.0 - 4.0																0	0.0	0	0.00000				
4.0 - 5.0																0	0.0	0	0.00000				
5.0 - 6.0				2												2	0.4	2	0.00415	1.6	1.8	1.9	0.00
6.0 - 7.0				6	3											9	1.9	11	0.02282	1.6	1.9	2.4	0.24
7.0 - 8.0		1	4	16		1										22	4.6	33	0.06846	0.9	1.7	2.9	0.36
8.0 - 9.0		1	7	8	3			2								21	4.4	54	0.11203	1.0	1.8	3.8	0.74
9.0 - 10.0			9	12	6	1										28	5.8	82	0.17012	1.2	1.7	2.6	0.41
10.0 - 11.0			15	23	11	3		1								53	11.0	135	0.28008	1.1	1.8	3.9	0.50
11.0 - 12.0		3	20	29	11	3		1	1							68	14.1	203	0.42116	0.8	1.8	4.3	0.59
12.0 - 13.0		1	43	26	8	4	1	1	1							85	17.7	288	0.59751	0.9	1.6	4.1	0.59
13.0 - 14.0		3	10	5	2	3		2	2							27	5.6	315	0.65353	1.0	1.9	4.5	1.03
14.0 - 15.0		2	35	12	21	2	1		1							74	15.4	389	0.80705	0.9	1.7	4.1	0.60
15.0 - 16.0			12	11	7	7										37	7.7	426	0.88382	1.2	1.9	2.9	0.55
16.0 - 17.0			13	15	11	2										41	8.5	467	0.96888	1.1	1.8	2.6	0.44
17.0 - 18.0																0	0.0	467	0.96888				
18.0 - 19.0			1	8	2											11	2.3	478	0.99170	1.4	1.8	2.4	0.26
19.0 - 20.0																0	0.0	478	0.99170				
20.0 - 21.0			2	1												3	0.6	481	0.99793	1.0	1.4	1.6	0.24
21.0 - 22.0																0	0.0	481	0.99793				
22.0 - 23.0																0	0.0	481	0.99793				
23.0 - 24.0																0	0.0	481	0.99793				
24.0 - 25.0																0	0.0	481	0.99793				
25.0 - 26.0																0	0.0	481	0.99793				
>= 26.0																0	0.0	481	0.99793				
SUM	0	11	171	174	85	26	2	7	5	0	0	0	0	0	0	481	100.0	481	0.99793	0.8	1.8	4.5	0.56
% OF TOTAL	0.0	2.3	35.6	36.2	17.7	5.4	0.4	1.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	11	182	356	441	467	469	476	481	481	481	481	481	481	481	481							
CUM. PROB.	0.0000	0.0228	0.3776	0.7386	0.9149	0.9689	0.9730	0.9876	0.9979	0.9979	0.9979	0.9979	0.9979	0.9979	0.9979	0.99793							
MIN. VALUE		7.4	7.1	5.7	6.2	7.1	12.5	8.5	11.8							5.7							
AVE. VALUE		12.0	12.9	12.0	13.0	13.2	13.5	11.2	13.1							12.6							
MAX. VALUE		14.3	20.0	20.0	18.2	16.7	14.3	13.3	14.3							20.0							
STD. DEV.		2.19	2.39	3.18	2.75	2.33	1.00	1.98	1.02							2.83							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Tp Peak wave period (s) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 309.00 m
Sampling interval: 3 hours
Period : 1990.04.01 00:00 - 1990.04.30 23:59 232 recs.
1991.04.01 00:00 - 1991.04.30 23:59 225 recs.
1992.04.01 00:00 - 1992.04.30 23:59 145 recs.

Hm0(m) / Tp(s)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 1.0																0	0.0	0	0.00000				
1.0 - 2.0																0	0.0	0	0.00000				
2.0 - 3.0																0	0.0	0	0.00000				
3.0 - 4.0																0	0.0	0	0.00000				
4.0 - 5.0																0	0.0	0	0.00000				
5.0 - 6.0				1												1	0.2	1	0.00166	1.7	1.8	1.7	0.00
6.0 - 7.0				2												2	0.3	3	0.00498	1.7	1.8	1.8	0.00
7.0 - 8.0			2	19	6	2										29	4.8	32	0.05307	1.4	1.9	2.6	0.34
8.0 - 9.0			2	8	2	1										13	2.2	45	0.07463	1.4	1.8	2.7	0.38
9.0 - 10.0		1	3	10	14											28	4.7	73	0.12106	1.0	1.9	2.4	0.40
10.0 - 11.0		5	8	26	14	3										56	9.3	129	0.21393	0.7	1.8	3.0	0.49
11.0 - 12.0		19	36	38	24	8										125	20.8	254	0.42123	0.8	1.6	3.0	0.56
12.0 - 13.0		4	37	53	31	15	2									142	23.6	396	0.65672	0.9	1.8	3.2	0.53
13.0 - 14.0			4	11	6	7										28	4.7	424	0.70315	1.2	2.0	2.8	0.51
14.0 - 15.0			10	32	40	9	9									100	16.6	524	0.86899	1.1	2.1	3.3	0.53
15.0 - 16.0				6	14	3										23	3.8	547	0.90713	1.6	2.2	2.9	0.31
16.0 - 17.0			2	9	17	2										30	5.0	577	0.95688	1.3	2.1	2.5	0.35
17.0 - 18.0																0	0.0	577	0.95688				
18.0 - 19.0			10	6	2											18	3.0	595	0.98673	1.0	1.5	2.2	0.34
19.0 - 20.0																0	0.0	595	0.98673				
20.0 - 21.0			4	2												6	1.0	601	0.99668	1.0	1.4	1.6	0.24
21.0 - 22.0																0	0.0	601	0.99668				
22.0 - 23.0		1														1	0.2	602	0.99834	1.0	0.8	1.0	0.00
23.0 - 24.0																0	0.0	602	0.99834				
24.0 - 25.0																0	0.0	602	0.99834				
25.0 - 26.0																0	0.0	602	0.99834				
>= 26.0																0	0.0	602	0.99834				
SUM	0	30	118	223	170	50	11	0	0	0	0	0	0	0	0	602	100.0	602	0.99834	0.7	1.8	3.3	0.51
% OF TOTAL	0.0	5.0	19.6	37.0	28.2	8.3	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	30	148	371	541	591	602	602	602	602	602	602	602	602	602	602							
CUM. PROB.	0.0000	0.0498	0.2454	0.6153	0.8972	0.9801	0.9983	0.9983	0.9983	0.9983	0.9983	0.9983	0.9983	0.9983	0.9983	0.99834							
MIN. VALUE		9.3	7.1	5.8	7.8	7.3	12.9									5.8							
AVE. VALUE		11.8	12.9	12.1	12.9	12.8	14.1									12.6							
MAX. VALUE		22.2	20.0	20.0	18.2	16.7	14.8									22.2							
STD. DEV.		2.10	2.69	2.68	2.41	1.92	0.77									2.58							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Tp Peak wave period (s) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 309.00 m
Sampling interval: 3 hours
Period : 1990.06.01 00:00 - 1990.06.30 23:59 226 recs.
1991.06.01 00:00 - 1991.06.30 23:59 240 recs.
1992.06.01 00:00 - 1992.06.30 23:59 214 recs.

Hm0(m) / Tp(s)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 1.0																0	0.0	0	0.00000				
1.0 - 2.0																0	0.0	0	0.00000				
2.0 - 3.0																0	0.0	0	0.00000				
3.0 - 4.0																0	0.0	0	0.00000				
4.0 - 5.0			2													2	0.3	2	0.00294	1.2	1.2	1.3	0.00
5.0 - 6.0			1	3												4	0.6	6	0.00881	1.5	1.6	1.9	0.22
6.0 - 7.0				6												6	0.9	12	0.01762	1.7	1.8	1.9	0.00
7.0 - 8.0			2	6	2	1	1									12	1.8	24	0.03524	1.1	2.0	3.0	0.56
8.0 - 9.0			4	5	4	5										18	2.6	42	0.06167	1.2	2.0	2.7	0.56
9.0 - 10.0			7	12	14	15	1									49	7.2	91	0.13363	1.1	2.2	3.3	0.54
10.0 - 11.0			9	15	23	8	3									58	8.5	149	0.21880	1.2	2.1	3.5	0.53
11.0 - 12.0		3	26	50	32	21	7		2							141	20.7	290	0.42584	0.6	2.0	4.1	0.64
12.0 - 13.0		3	37	39	25	16	7	3	2							132	19.4	422	0.61968	0.8	2.0	4.2	0.72
13.0 - 14.0		3	20	20	7	8	4	3	2							67	9.9	489	0.71806	0.7	2.0	4.2	0.84
14.0 - 15.0		1	24	40	21	9	1	2	1		1					100	14.7	589	0.86490	1.0	1.9	5.2	0.68
15.0 - 16.0		5	10	10	14	9	5	1	1							55	8.1	644	0.94567	0.7	2.1	4.5	0.80
16.0 - 17.0		2	2	2	7	9		2	1		1					26	3.8	670	0.98385	0.8	2.5	5.1	0.98
17.0 - 18.0					1											1	0.1	671	0.98532	2.3	2.2	2.3	0.00
18.0 - 19.0				1	4	2										7	1.0	678	0.99559	1.6	2.3	2.6	0.32
19.0 - 20.0																0	0.0	678	0.99559				
20.0 - 21.0					1											1	0.1	679	0.99706	2.4	2.2	2.4	0.00
21.0 - 22.0					1											1	0.1	680	0.99853	2.2	2.2	2.2	0.00
22.0 - 23.0																0	0.0	680	0.99853				
23.0 - 24.0																0	0.0	680	0.99853				
24.0 - 25.0																0	0.0	680	0.99853				
25.0 - 26.0																0	0.0	680	0.99853				
>= 26.0																0	0.0	680	0.99853				
SUM	0	17	144	209	156	103	29	11	9	0	2	0	0	0	0	680	100.0	680	0.99853	0.6	2.0	5.2	0.68
% OF TOTAL	0.0	2.5	21.2	30.7	22.9	15.1	4.3	1.6	1.3	0.0	0.3	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	17	161	370	526	629	658	669	678	678	680	680	680	680	680	680							
CUM. PROB.	0.0000	0.0250	0.2364	0.5433	0.7724	0.9236	0.9662	0.9824	0.9956	0.9956	0.9985	0.9985	0.9985	0.9985	0.9985	0.99853							
MIN. VALUE		11.1	4.5	5.7	7.4	7.7	7.4	12.5	11.8		14.3					4.5							
AVE. VALUE		14.0	12.4	12.1	12.6	12.4	12.5	14.1	13.5		15.5					12.4							
MAX. VALUE		16.7	16.7	18.2	21.1	18.2	15.4	16.7	16.7		16.7					21.1							
STD. DEV.		1.72	2.13	2.31	2.54	2.48	1.91	1.43	1.63		1.00					2.36							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Tp Peak wave period (s) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 309.00 m
Sampling interval: 3 hours
Period : 1990.10.01 00:00 - 1990.10.31 23:59 240 recs.
1991.10.01 00:00 - 1991.10.31 23:59 241 recs.

Hm0(m) / Tp(s)	0.0 0.5	0.5 1.0	1.0 1.5	1.5 2.0	2.0 2.5	2.5 3.0	3.0 3.5	3.5 4.0	4.0 4.5	4.5 5.0	5.0 5.5	5.5 6.0	6.0 6.5	6.5 7.0	>= 7.0	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
0.0 - 1.0																0	0.0	0	0.00000				
1.0 - 2.0																0	0.0	0	0.00000				
2.0 - 3.0																0	0.0	0	0.00000				
3.0 - 4.0																0	0.0	0	0.00000				
4.0 - 5.0																0	0.0	0	0.00000				
5.0 - 6.0				2												2	0.4	2	0.00415	1.6	1.8	1.9	0.00
6.0 - 7.0				6	3											9	1.9	11	0.02282	1.6	1.9	2.4	0.24
7.0 - 8.0		1	4	16		1										22	4.6	33	0.06846	0.9	1.7	2.9	0.36
8.0 - 9.0		1	7	8	3			2								21	4.4	54	0.11203	1.0	1.8	3.8	0.74
9.0 - 10.0			9	12	6	1										28	5.8	82	0.17012	1.2	1.7	2.6	0.41
10.0 - 11.0			15	23	11	3		1								53	11.0	135	0.28008	1.1	1.8	3.9	0.50
11.0 - 12.0		3	20	29	11	3		1	1							68	14.1	203	0.42116	0.8	1.8	4.3	0.59
12.0 - 13.0		1	43	26	8	4	1	1	1							85	17.7	288	0.59751	0.9	1.6	4.1	0.59
13.0 - 14.0		3	10	5	2	3		2	2							27	5.6	315	0.65353	1.0	1.9	4.5	1.03
14.0 - 15.0		2	35	12	21	2	1		1							74	15.4	389	0.80705	0.9	1.7	4.1	0.60
15.0 - 16.0			12	11	7	7										37	7.7	426	0.88382	1.2	1.9	2.9	0.55
16.0 - 17.0			13	15	11	2										41	8.5	467	0.96888	1.1	1.8	2.6	0.44
17.0 - 18.0																0	0.0	467	0.96888				
18.0 - 19.0			1	8	2											11	2.3	478	0.99170	1.4	1.8	2.4	0.26
19.0 - 20.0																0	0.0	478	0.99170				
20.0 - 21.0			2	1												3	0.6	481	0.99793	1.0	1.4	1.6	0.24
21.0 - 22.0																0	0.0	481	0.99793				
22.0 - 23.0																0	0.0	481	0.99793				
23.0 - 24.0																0	0.0	481	0.99793				
24.0 - 25.0																0	0.0	481	0.99793				
25.0 - 26.0																0	0.0	481	0.99793				
>= 26.0																0	0.0	481	0.99793				
SUM	0	11	171	174	85	26	2	7	5	0	0	0	0	0	0	481	100.0	481	0.99793	0.8	1.8	4.5	0.56
% OF TOTAL	0.0	2.3	35.6	36.2	17.7	5.4	0.4	1.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	11	182	356	441	467	469	476	481	481	481	481	481	481	481	481							
CUM. PROB.	0.0000	0.0228	0.3776	0.7386	0.9149	0.9689	0.9730	0.9876	0.9979	0.9979	0.9979	0.9979	0.9979	0.9979	0.9979	0.99793							
MIN. VALUE		7.4	7.1	5.7	6.2	7.1	12.5	8.5	11.8							5.7							
AVE. VALUE		12.0	12.9	12.0	13.0	13.2	13.5	11.2	13.1							12.6							
MAX. VALUE		14.3	20.0	20.0	18.2	16.7	14.3	13.3	14.3							20.0							
STD. DEV.		2.19	2.39	3.18	2.75	2.33	1.00	1.98	1.02							2.83							

APPENDIX B

WAVE STATISTICS FOR 1992

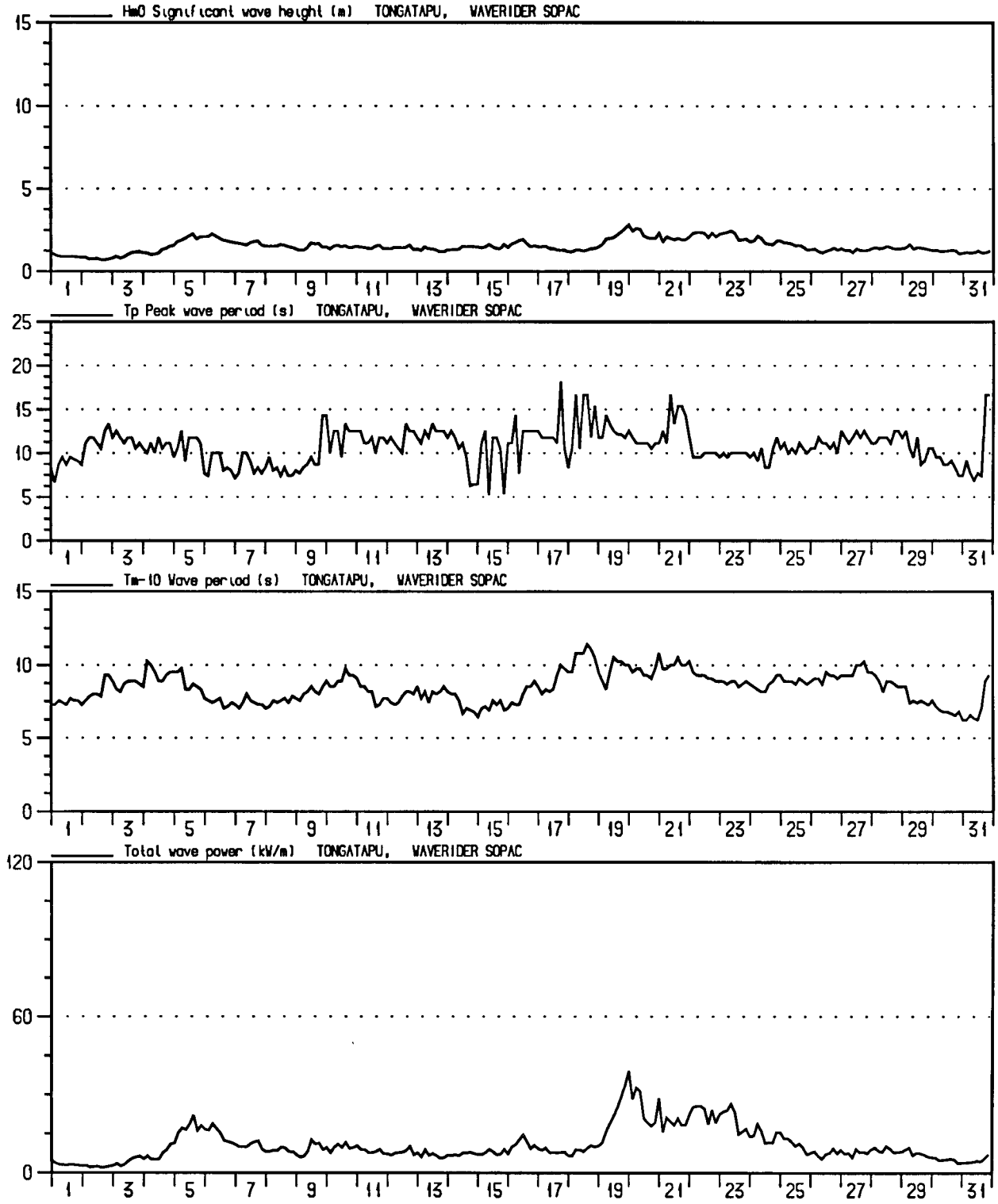
TONGATAPU

The following plots and tables are presented:

a) Time series plots of Hm0, Tp, Tm-10 and J Tot for each month.

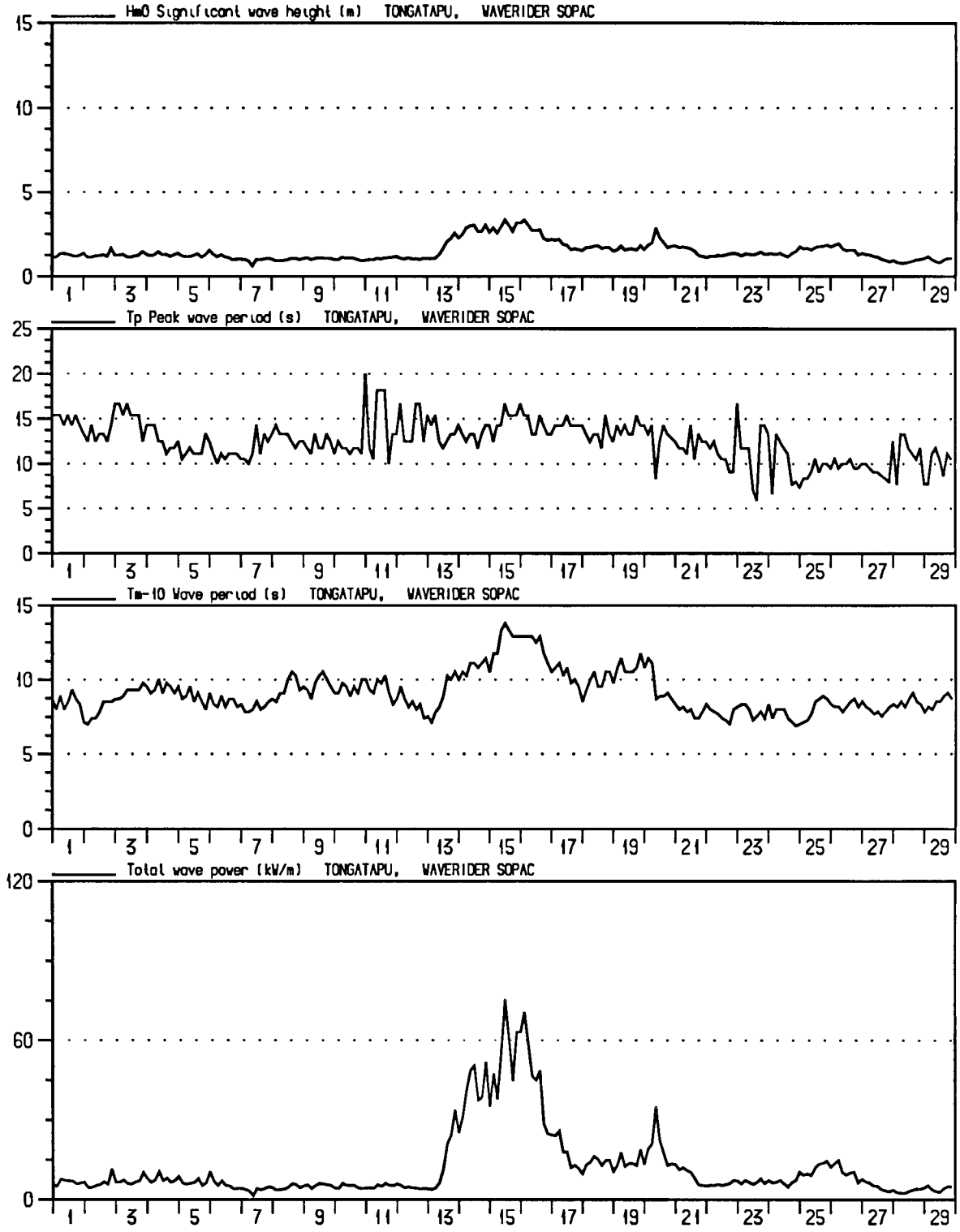
b) Joint frequency of occurrence tables of

Hm0- Tp
Hm0 - Tm-10
Hm0 - JTot



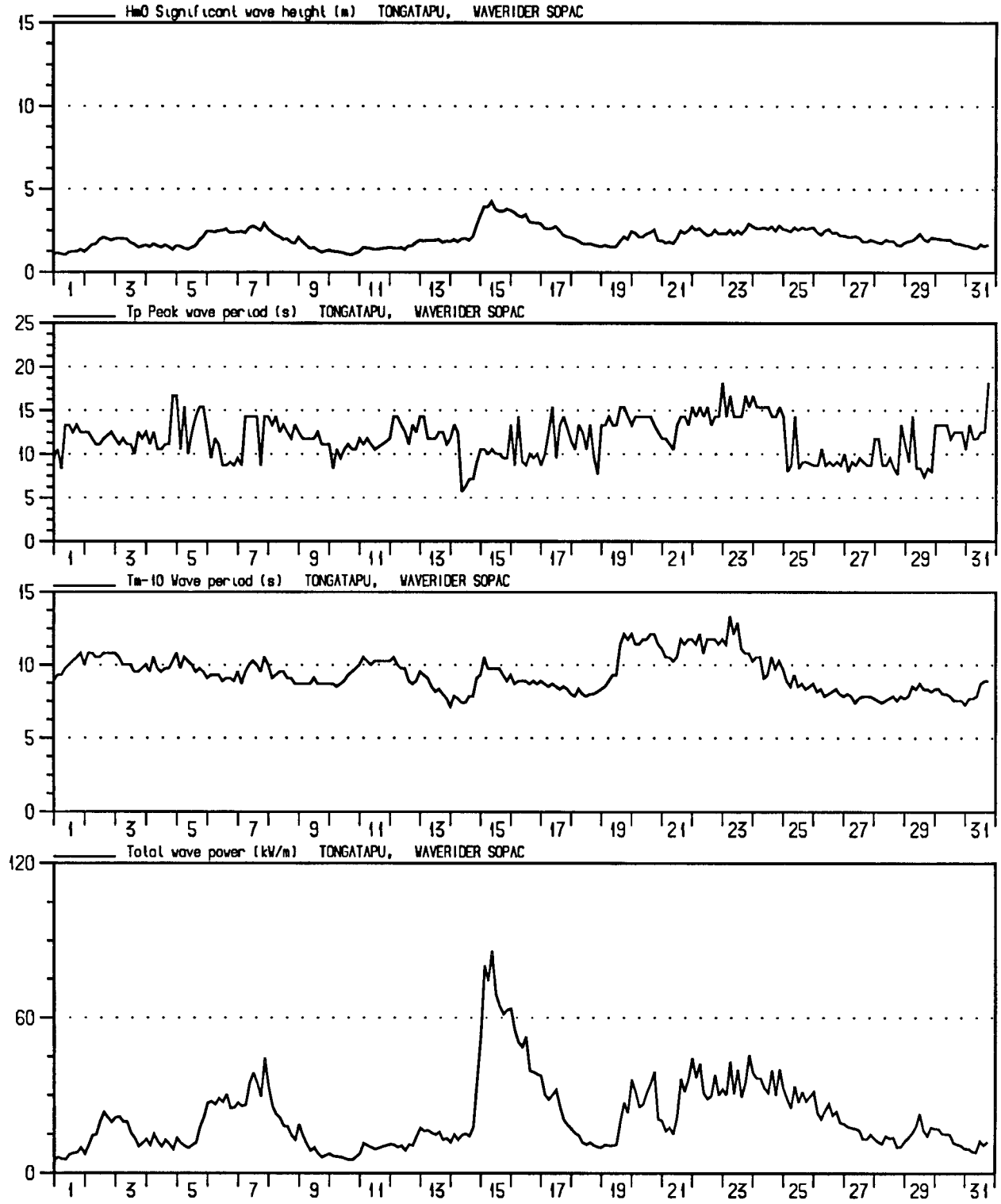
SOPAC WAVE MEASUREMENTS				INSTRUMENT WAVERIDER
LOCATION TONGATAPU	STATION 01	WATER DEPTH 309 m	INSTRUMENT HEIGHT 0 m	OBSERVATION PERIOD 1992.01.01-1992.01.31 gmt
OCEANOR OCEANOGRAPHIC COMPANY OF NORWAY			PROJECT 28400	FIGURE 1

orkan33/app



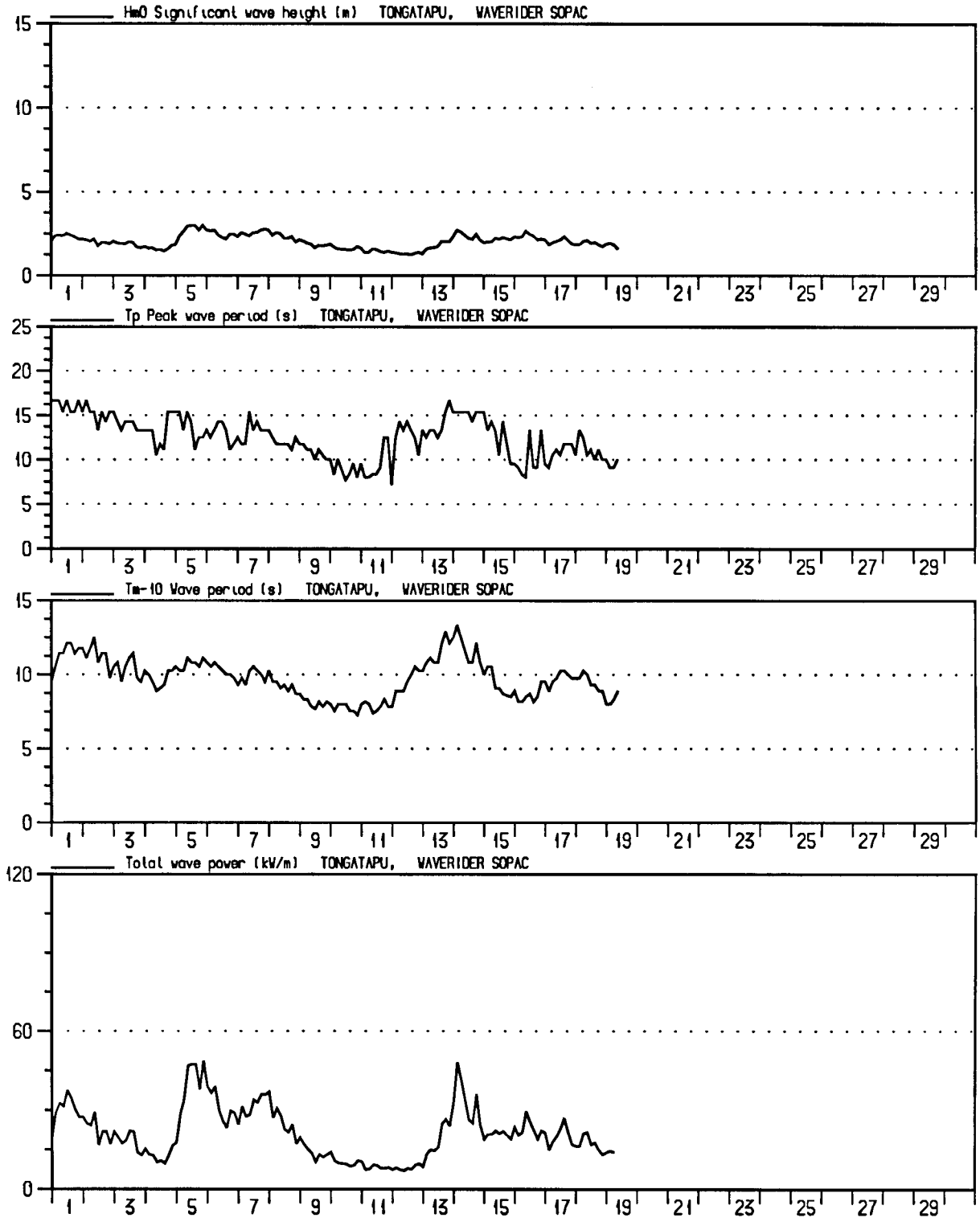
SOPAC WAVE MEASUREMENTS				INSTRUMENT WAVERIDER
LOCATION TONGATAPU	STATION 01	WATER DEPTH 309 m	INSTRUMENT HEIGHT 0 m	OBSERVATION PERIOD 1992.02.01-1992.02.29 gmt
OCEANOR OCEANOGRAPHIC COMPANY OF NORWAY			PROJECT 28400	FIGURE 1

orkan33/app



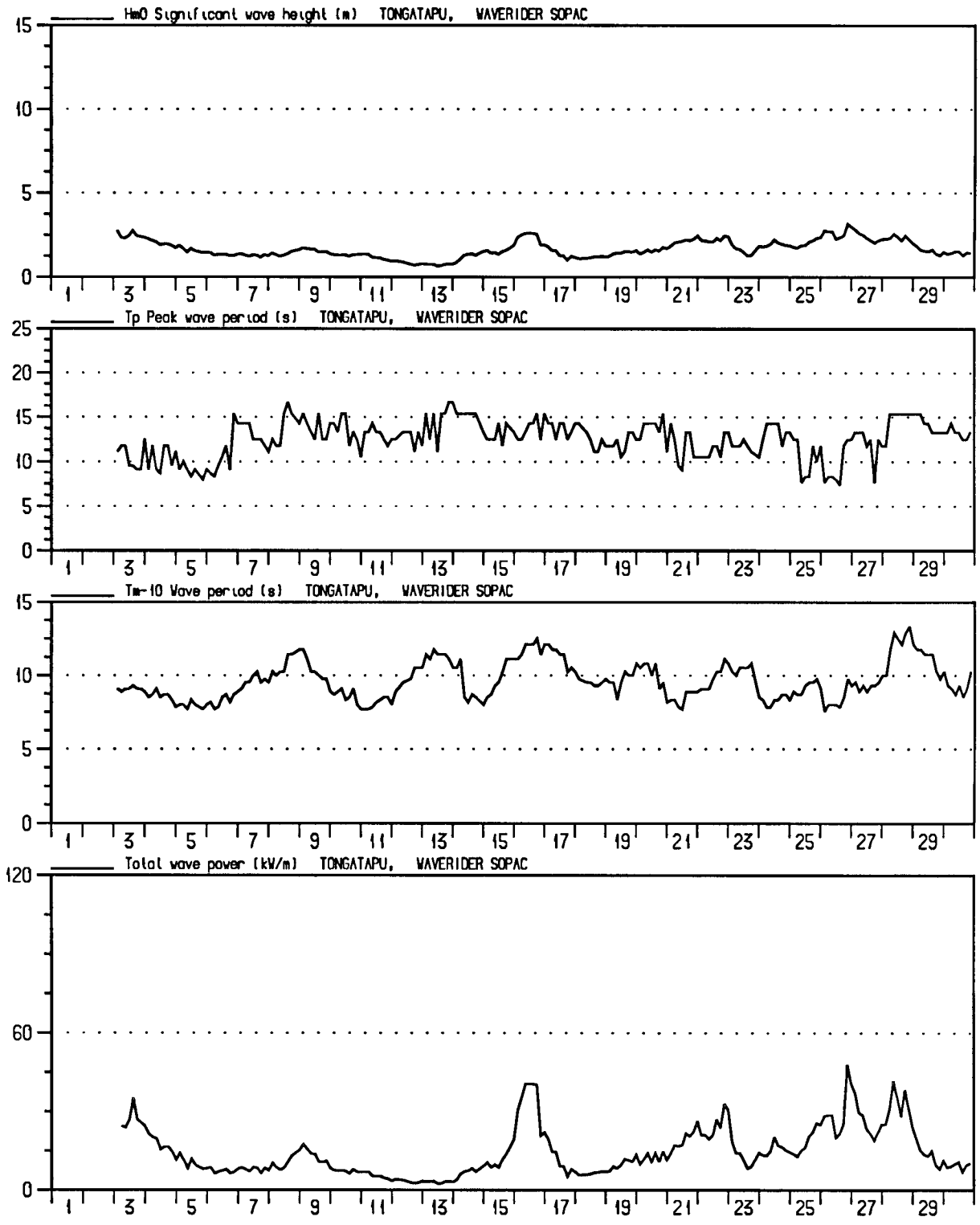
SOPAC WAVE MEASUREMENTS				INSTRUMENT WAVERIDER
LOCATION TONGATAPU	STATION 01	WATER DEPTH 309 m	INSTRUMENT HEIGHT 0 m	OBSERVATION PERIOD 1992.03.01-1992.03.31 gmt
OCEANOR OCEANOGRAPHIC COMPANY OF NORWAY			PROJECT 28400	FIGURE 1

orkan33/app



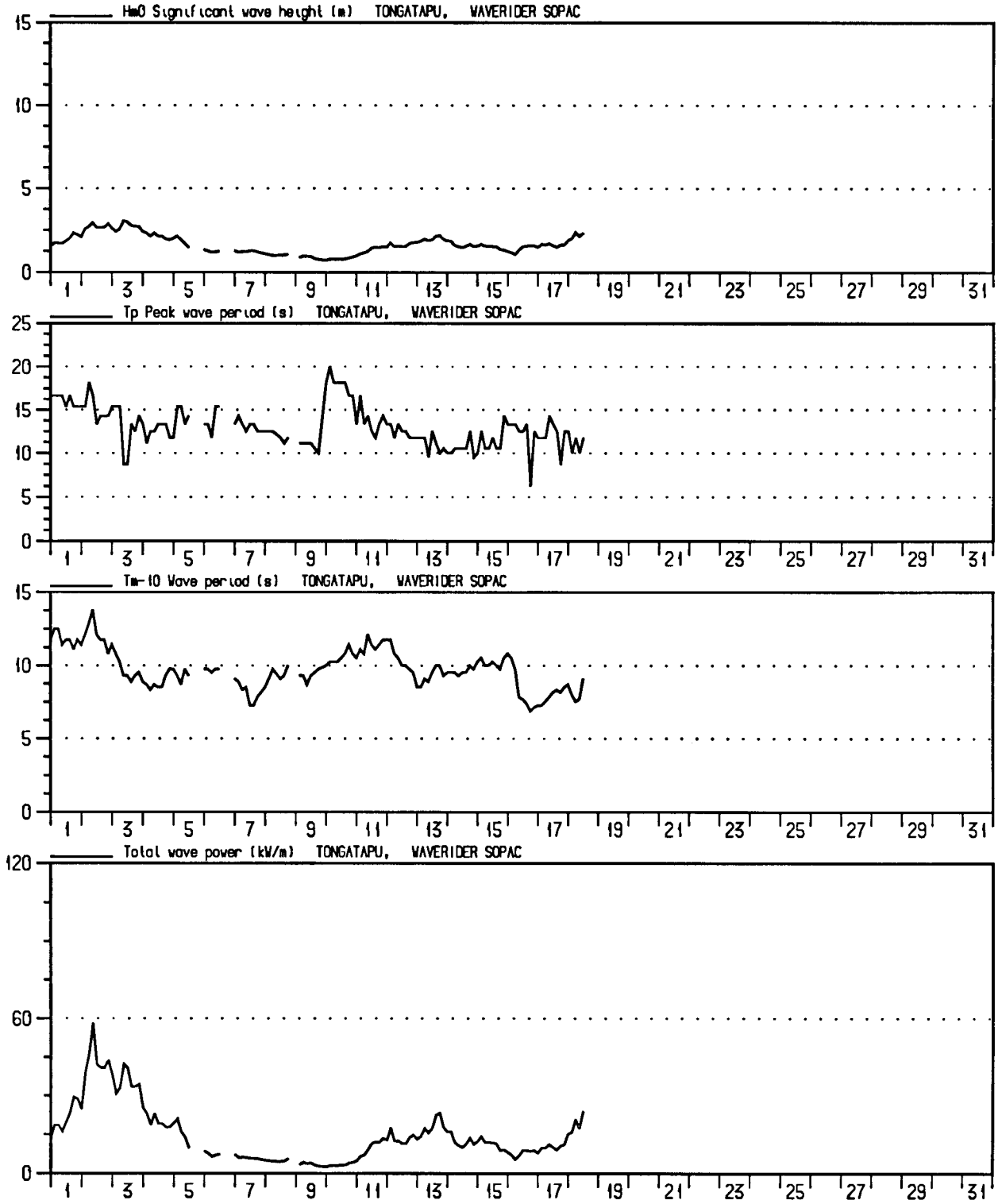
SOPAC WAVE MEASUREMENTS				INSTRUMENT WAVERIDER
LOCATION TONGATAPU	STATION 01	WATER DEPTH 309 m	INSTRUMENT HEIGHT 0 m	OBSERVATION PERIOD 1992.04.01-1992.04.30 gmt
OCEANOR OCEANOGRAPHIC COMPANY OF NORWAY			PROJECT 28400	FIGURE 1

orkan33/app



SOPAC WAVE MEASUREMENTS				INSTRUMENT WAVERIDER
LOCATION TONGATAPU	STATION 01	WATER DEPTH 309 m	INSTRUMENT HEIGHT 0 m	OBSERVATION PERIOD 1992.06.01-1992.06.30 gmt
OCEANOR OCEANOGRAPHIC COMPANY OF NORWAY			PROJECT 28400	FIGURE 1

orkan33/app



SOPAC WAVE MEASUREMENTS				INSTRUMENT WAVERIDER
LOCATION TONGATAPU	STATION 01	WATER DEPTH 309 m	INSTRUMENT HEIGHT 0 m	OBSERVATION PERIOD 1992.07.01-1992.07.31 gmt
OCEANOR OCEANOGRAPHIC COMPANY OF NORWAY			PROJECT 28400	FIGURE 1

orkan33/app

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Tp eak wave period (s) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 309.00 m
Sampling interval: 3 hours
Period : 1992.01.01 00:00 - 1992.07.18 23:59 1216 recs.

Hm0(m) / Tp(s)	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 2.0	2.0 - 2.5	2.5 - 3.0	3.0 - 3.5	3.5 - 4.0	4.0 - 4.5	4.5 - 5.0	5.0 - 5.5	5.5 - 6.0	6.0 - 6.5	>= 6.5	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
4.0 - 5.0															0	0.0	0	0.00000				
5.0 - 6.0			1	2	1										4	0.3	4	0.00329	1.3	1.8	2.0	0.35
6.0 - 7.0			5	2	1										8	0.7	12	0.00986	1.0	1.5	2.0	0.35
7.0 - 8.0		1	13	12	6	1									33	2.7	45	0.03698	0.8	1.6	2.8	0.44
8.0 - 9.0		6	18	29	14	14	2	1							84	6.9	129	0.10600	0.9	1.9	3.6	0.65
9.0 - 10.0		4	21	24	26	7	1	2							85	7.0	214	0.17584	0.9	1.9	3.8	0.61
10.0 - 11.0		8	47	51	28	2	2	4	1						143	11.8	357	0.29334	0.7	1.7	4.2	0.62
11.0 - 12.0		27	108	67	44	10									256	21.1	613	0.50370	0.6	1.6	3.0	0.51
12.0 - 13.0		9	76	46	22	10	1								164	13.5	777	0.63846	0.7	1.6	3.2	0.51
13.0 - 14.0		10	48	51	24	21	1	1							156	12.8	933	0.76664	0.7	1.8	3.7	0.59
14.0 - 15.0		2	35	38	28	24	2								129	10.6	1062	0.87264	0.9	1.9	3.4	0.58
15.0 - 16.0		5	25	20	28	19	4								101	8.3	1163	0.95563	0.7	2.0	3.3	0.64
16.0 - 17.0		5	14	5	8	5	2								39	3.2	1202	0.98767	0.8	1.8	3.3	0.72
17.0 - 18.0															0	0.0	1202	0.98767				
18.0 - 19.0		5	4	1	1	1									12	1.0	1214	0.99753	0.7	1.3	2.7	0.63
19.0 - 20.0															0	0.0	1214	0.99753				
20.0 - 21.0		2													2	0.2	1216	0.99918	0.8	0.8	0.9	0.00
>= 21.0															0	0.0	1216	0.99918				
SUM	0	84	415	348	231	114	15	8	1	0	0	0	0	0	1216	100.0	1216	0.99918	0.6	1.7	4.2	0.57
% OF TOTAL	0.0	6.9	34.1	28.6	19.0	9.4	1.2	0.7	0.1	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	84	499	847	1078	1192	1207	1215	1216	1216	1216	1216	1216	1216	1216							
CUM. PROB.	0.0000	0.0690	0.4100	0.6960	0.8858	0.9795	0.9918	0.9984	0.9992	0.9992	0.9992	0.9992	0.9992	0.9992	0.99918							
MIN. VALUE		7.7	5.9	5.3	5.7	7.7	8.7	8.7	10.5						5.3							
AVE. VALUE		12.6	12.1	11.8	12.2	13.0	13.2	10.4	10.5						12.1							
MAX. VALUE		20.0	18.2	18.2	18.2	18.2	16.7	13.3	10.5						20.0							
STD. DEV.		2.81	2.22	2.25	2.44	2.49	2.82	1.36	0.00						2.37							

Joint occurrence of:

Hm0 Significant wave height (m) TONGATAPU, WAVERIDER SOPAC
Tm-10 Wave period (s) TONGATAPU, WAVERIDER SOPAC

Measuring depth : 0.00 m
Water depth : 309.00 m
Sampling interval: 3 hours
Period : 1992.01.01 00:00 - 1992.07.18 23:59 1216 recs.

Hm0(m) / Tm-10(s)	0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 2.0	2.0 - 2.5	2.5 - 3.0	3.0 - 3.5	3.5 - 4.0	4.0 - 4.5	4.5 - 5.0	5.0 - 5.5	5.5 - 6.0	6.0 - 6.5	>= 6.5	SUM	% OF TOTAL	SUM ACC.	CUM. PROB.	MIN.	AVE.	MAX.	STD. DEV.
4.0 - 5.0															0	0.0	0	0.00000				
5.0 - 6.0															0	0.0	0	0.00000				
6.0 - 7.0			14	5											19	1.6	19	0.01561	1.1	1.4	1.6	0.22
7.0 - 8.0		13	76	70	18	2									179	14.7	198	0.16270	0.7	1.5	2.8	0.41
8.0 - 9.0		28	143	114	66	22	4	2							379	31.2	577	0.47412	0.6	1.7	3.8	0.55
9.0 - 10.0		19	102	64	55	23	3	5	1						272	22.4	849	0.69762	0.7	1.7	4.2	0.65
10.0 - 11.0		16	68	61	47	31		1							224	18.4	1073	0.88168	0.7	1.8	3.9	0.60
11.0 - 12.0		8	11	30	30	15	2								96	7.9	1169	0.96056	0.6	2.0	3.0	0.59
12.0 - 13.0			1	4	15	17	4								41	3.4	1210	0.99425	1.2	2.5	3.3	0.44
13.0 - 14.0						4	2								6	0.5	1216	0.99918	2.6	2.9	3.3	0.24
14.0 - 15.0															0	0.0	1216	0.99918				
>= 15.0															0	0.0	1216	0.99918				
SUM	0	84	415	348	231	114	15	8	1	0	0	0	0	0	1216	100.0	1216	0.99918	0.6	1.7	4.2	0.57
% OF TOTAL	0.0	6.9	34.1	28.6	19.0	9.4	1.2	0.7	0.1	0.0	0.0	0.0	0.0	0.0	100.0							
SUM ACCUM.	0	84	499	847	1078	1192	1207	1215	1216	1216	1216	1216	1216	1216	1216							
CUM. PROB.	0.0000	0.0690	0.4100	0.6960	0.8858	0.9795	0.9918	0.9984	0.9992	0.9992	0.9992	0.9992	0.9992	0.9992	0.99918							
MIN. VALUE		7.3	6.2	6.7	7.4	7.5	8.7	8.7	9.8						6.2							
AVE. VALUE		9.2	8.9	9.1	9.7	10.4	10.8	9.4	9.5						9.3							
MAX. VALUE		11.8	12.1	12.5	12.9	13.8	13.8	10.5	9.8						13.8							
STD. DEV.		1.21	1.15	1.32	1.36	1.47	1.89	0.60	0.00						1.36							