UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Processed Strong-Motion Records
From the Solomon Islands Earthquakes of December 13, 1981
and March 18, 1983

by

B.L. Silverstein

Open-File Report 85-261

This report is preliminary and has not been reviewed for conformity with U.S.
Geological Survey editorial standards and stratigraphic nomenclature. Any use
of trade names is for descriptive purposes only and does not imply endorsement
by the USGS.
ABSTRACT

The U.S. Geological Survey (USGS) has maintained some contact with operators of other strong-motion accelerograph networks throughout the world. As a result, the USGS occasionally receives a small number of records for routine processing. This report describes the processing of five records from a network on Bougainville Island, Papua New Guinea.

Three earthquakes, two on December 13, 1981 and one on March 18, 1983, occurred in the Solomon Islands region. The first two events, magnitude 6.0 $M_L$ and magnitude 5.7 $M_L$ were recorded at the 460 Bench, Panguna Mine Station on Bougainville Island; the third event, magnitude 7.9 Ms, was recorded at stations in Arawa Town, at Bato Bridge, and in Panguna on Bougainville Island.

This report contains the processed records from these events.
Processed Strong-Motion Records from Solomon Islands Earthquakes
December 13, 1981 (0139 UTC and 1324 UTC) and
March 18, 1983 (0905 UTC)

Earthquake Data

Figures 1 and 2 show the location of Bougainville Island, Papua New Guinea and three earthquakes that occurred in the Solomon Islands region that were recorded by strong-motion accelerographs located on Bougainville Island.

The largest of these earthquakes was a magnitude 7.9 (Ms) and was recorded by the Arawa Town, Bato Bridge and BVE 80 (Panguna) stations. All stations, except Bato Bridge are known to be located either in Arawa or Panguna areas (Kevin McCue, Bougainville Copper, written commun., October 1983). Based on Kevin McCue's estimates of epicentral distances (Table 2), Bato Bridge is believed to be in the same area.

The two earthquakes, on December 13, 1981, were recorded by the 460 Bench (Panguna Mine) station. These events were magnitude 5.9 M_B (0139 UTC) and 5.5 M_B (1324 UTC). Source data for all three events are listed in Table 1.

Station Data

<table>
<thead>
<tr>
<th>Station</th>
<th>Location Details</th>
<th>Elevation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arawa Town</td>
<td>1/4 g SMA-1 located on rock. Elevation 30 m.</td>
<td>30 m</td>
</tr>
<tr>
<td>Bato Bridge</td>
<td>1/2 g SMA-1 located on rock. Elevation 30 m.</td>
<td>30 m</td>
</tr>
<tr>
<td>Bench (Panguna Mine)</td>
<td>1/2 g SMA-1 located on rock.</td>
<td></td>
</tr>
<tr>
<td>BVE 80 (Panguna)</td>
<td>1 g SMA-1 located on volcanic ash over weathered rock.</td>
<td>Elevation 300 m</td>
</tr>
</tbody>
</table>

Records Data

Figure 3a through 3g present reproductions of the original records. Negatives were scaled for peak amplitudes; the scaled uncorrected and corrected data are presented in Table 2.
DIGITIZING AND PROCESSING

The computer plots provide a visual description of the recorded accelerations and their processed results. They are reproduced in the Appendix. These plots may be used to measure specific earthquake or record parameters directly and to select records for further study using available digital data.

The steps for processing are:

1. A commercial digitizing firm (IOM-TOWILL in Santa Clara, California) digitizes the records on a trace-following, computer-controlled laser scanner. The data is digitized at unequal time intervals, at an average of 600 samples per second.

2. If a strong-motion record has a duration longer than about 10 sec, then it is divided into approximately 10 sec segments, each segment being digitized separately. The segments are reassembled using specially inserted vertical lines, the lines mark the end and/or beginning of each segment. Each vertical line is digitized twice, once in each adjacent segment, and then used in reassembling the record.

3. The UNCORRECTED DATA are prepared by subtracting the digitized reference traces from the data traces; and using the digitized time marks to determine the time scale. The instrument sensitivities scale the ordinates to accelerations.

4. The data are passed through a correction algorithm that applies a high-frequency filter (50 Hz), instrument corrections, base line correction, in the form of a low frequency filter, and decimation to 200 sps. Plots of the CORRECTED ACCELERATION, VELOCITY, and DISPLACEMENTS for the three components of each recording are included. Butterworth filter parameters for each station are listed in table 3.
5. The maximum relative velocity response spectra (RV) are calculated for
damping values of 0, 2, 5, 10 and 20 percent of critical. This
RESPONSE SPECTRA are calculated for a period range starting at 0.04
sec and ending with the long period corresponding to the low frequency
filter limit used in the base-line correction algorithm. The dashed
curve on this plot is the unsmoothed Fourier amplitude spectrum, FAS,
calculated at the same periods as the relative velocity response
spectra.
The second RESPONSE SPECTRUM plot is that of the pseudo-velocity
response spectra, PSRV, calculated for the same five damping values
used in calculating the RV spectra. This tripartite plot also has the
values for the maximum relative displacement response spectrum (RD) as
well as the pseudo-acceleration spectrum (PSAA).
6. FOURIER AMPLITUDE SPECTRA, calculated by FFT, are presented on linear
and log-log axes to accent the particular characteristics at each end
of the spectrum.

Initial selection of filters for Step 4 are based on the convention of
retaining a period content somewhat longer than the strong motion duration of
the records. The final Butterworth filter parameters are chosen to eliminate
any apparent serious noise content in the calculated displacements.

The digital data from which these plots are produced are available on tape
from the National Geophysical Data Center (NGDC), NOAA, Mail Stop E/GC11, 325
Broadway, Boulder, Colorado 80303.

For a more complete description see: Converse, A., 1984; AGRAM: A Series
of Computer Programs for Processing Digitized Strong-Motion Accelerograms,
Version 2.0; USGS Open-File Report 81-525.
Computer Plots

The Appendix contains computer plots for the following processing stages:

- Uncorrected accelerogram.
- Corrected acceleration velocity and displacement.
- Relative velocity response spectra linear plot.
- Response spectra, tripartite log-log plot.
- Fourier amplitude spectrum calculated by FFT, linear plot.
- Fourier amplitude spectrum calculated by FFT, log-log plot.
Table 1: Source Data for Papua New Guinea Events*

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Epicenter</th>
<th>Depth</th>
<th>Magnitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/13/81</td>
<td>0139 14.3 UTC</td>
<td>6.387S, 154.929E</td>
<td>50 Km</td>
<td>5.9 $M_B$, 6.0 $M_L^+$</td>
</tr>
<tr>
<td>12/13/81</td>
<td>1324 17.3 UTC</td>
<td>6.343S, 154.923E</td>
<td>48 Km</td>
<td>5.5 $M_B$, 5.7 $M_L^+$</td>
</tr>
<tr>
<td>03/18/83</td>
<td>0905 50.0</td>
<td>4.833S, 153.581E</td>
<td>89 Km</td>
<td>7.9 $M_S$, 7.7 $M_S^+$</td>
</tr>
</tbody>
</table>

* Unless otherwise noted, all seismological data in this report is taken from Preliminary Determination of Epicenters (PDE) published by the U.S. Geological Survey.

+ Kevin McCue, Bougainville Copper, written communication, Oct. 1983.
Table 2: Peak Value of Processed Records

<table>
<thead>
<tr>
<th>Earthquake</th>
<th>Station</th>
<th>Distances (Km)</th>
<th>Components</th>
<th>Peak Acceleration</th>
<th>Corrected Peak Motion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(All distance + 10 Km)</td>
<td></td>
<td>Scaled*</td>
<td>Digitized</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Epi</td>
<td>Hypo</td>
<td>(g)</td>
<td>(cm/s²)</td>
</tr>
<tr>
<td>13 Dec. 1981</td>
<td>460 Bench, Panguna Mine</td>
<td>= 63</td>
<td>= 80</td>
<td>.07</td>
<td>- 70.56</td>
</tr>
<tr>
<td>0139 UTC</td>
<td></td>
<td>Long.</td>
<td></td>
<td>.02</td>
<td>22.13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Up</td>
<td></td>
<td>.08</td>
<td>- 79.99</td>
</tr>
<tr>
<td>13 Dec. 1981</td>
<td>460 Bench, Panguna Mine</td>
<td>= 64</td>
<td>= 80</td>
<td>.03</td>
<td>- 25.16</td>
</tr>
<tr>
<td>1324 UTC</td>
<td></td>
<td>Long.</td>
<td></td>
<td>.02</td>
<td>15.56</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Up</td>
<td></td>
<td>.04</td>
<td>41.31</td>
</tr>
<tr>
<td>18 March 1983</td>
<td>Arawa Town</td>
<td>=267</td>
<td>=281</td>
<td>.02</td>
<td>- 22.06</td>
</tr>
<tr>
<td>0905 UTC</td>
<td></td>
<td>Long.</td>
<td></td>
<td>.02</td>
<td>17.97</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Up</td>
<td></td>
<td>.02</td>
<td>25.34</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tran.</td>
<td></td>
<td>.04</td>
<td>34.94</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Long.</td>
<td></td>
<td>.02</td>
<td>18.62</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Up</td>
<td></td>
<td>.03</td>
<td>32.59</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tran.</td>
<td></td>
<td>.30</td>
<td>283.43</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Up</td>
<td></td>
<td>.12</td>
<td>115.15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tran.</td>
<td></td>
<td>.27</td>
<td>271.54</td>
</tr>
</tbody>
</table>

* Scaled from Duplicate Records
Table 3: Long-Period, Low Frequency, Filter Parameters

<table>
<thead>
<tr>
<th>Location</th>
<th>Final Butterworth (Hz)</th>
<th>Order</th>
<th>Original Butterworth (Hz)</th>
<th>Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arawa Town</td>
<td>0.125</td>
<td>4</td>
<td>0.083</td>
<td>4</td>
</tr>
<tr>
<td>Bato Bridge</td>
<td>0.20</td>
<td>4</td>
<td>0.125</td>
<td>4</td>
</tr>
<tr>
<td>Bench (0139)</td>
<td>0.50</td>
<td>4</td>
<td>0.25</td>
<td>4</td>
</tr>
<tr>
<td>Bench (1324)</td>
<td>1.0</td>
<td>4</td>
<td>0.125</td>
<td>4</td>
</tr>
<tr>
<td>BVE 80 (Panguna Mine)</td>
<td>0.20</td>
<td>4</td>
<td>0.125</td>
<td>4</td>
</tr>
</tbody>
</table>
FIGURE 1: Map showing location of Bougainville Island.
FIGURE 2: Map showing epicenters and strong-motion instrument locations.
<table>
<thead>
<tr>
<th>#1</th>
<th>Long.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Up</td>
</tr>
<tr>
<td></td>
<td>Tran.</td>
</tr>
</tbody>
</table>

5 sec.

---

**FIGURE 3A:** Original records, Arawa Town.
BATO BRIDGE
18 MARCH 1983

FIGURE 3C: Original Records, Bato Bridge.
FIGURE 3D: Bato Bridge continued.
FIGURE 3E: Original records, Bench, Panguna Mine.
FIGURE 3F: Original records, BVE 80.
FIGURE 3G: BVE continued.
<table>
<thead>
<tr>
<th>Station</th>
<th>Page No. for plots of six processing steps*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>460 Bench, Panguna Mine</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>21</td>
</tr>
<tr>
<td>13 December, 1981; 0139 UTC</td>
<td></td>
</tr>
<tr>
<td>Long., Up, Tran.</td>
<td></td>
</tr>
<tr>
<td>460 Bench, Panguna Mine</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>21</td>
</tr>
<tr>
<td>13 December, 1981; 1324 UTC</td>
<td></td>
</tr>
<tr>
<td>Long., Up, Tran.</td>
<td></td>
</tr>
<tr>
<td>Arawa Town</td>
<td>55</td>
</tr>
<tr>
<td>18 March, 1983; 0905 UTC</td>
<td></td>
</tr>
<tr>
<td>Long., Up, Tran.</td>
<td></td>
</tr>
<tr>
<td>Bato Bridge</td>
<td>59</td>
</tr>
<tr>
<td>18 March, 1983; 0905 UTC</td>
<td></td>
</tr>
<tr>
<td>Long., Up, Tran.</td>
<td></td>
</tr>
<tr>
<td>BVE 80 (Panguna)</td>
<td>63</td>
</tr>
<tr>
<td>18 March, 1983; 0905 UTC</td>
<td></td>
</tr>
<tr>
<td>Long., Up, Tran.</td>
<td></td>
</tr>
</tbody>
</table>

*Processing stages and plot format:
1) Uncorrected accelerogram
2) Corrected acceleration, velocity, displacement
3) Relative velocity response spectrum, linear plot
4) Response spectrum, tripartite log-log plot
5) Fourier amplitude spectrum, linear plot
6) Fourier, amplitude spectrum, log-log plot

In column 1 each plot contains all three components. For column 2 through 6, the indicated page number refers to the first three components for this record.
UNCORRECTED ACCELEROMGRAM
BENCH, PAPUA NEW GUINEA
LONG., VERT., TRAN.
EARTHQUAKE OF DECEMBER 13, 1983 0139 UTC
PEAK VALUES (CM/SEC/SEC):  -70.56  22.13  -79.99
UNCORRECTED ACCELEROMETER
BENCH, PAPUA NEW GUINEA
LONG. DECEMBER, 13, 1983 0139 UTC - 79.99

PEAK VALUES CM/SEC/SEC:

<table>
<thead>
<tr>
<th>CM/SEC/SEC</th>
<th>CM/SEC/SEC</th>
<th>CM/SEC/SEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>90</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

(Continued)
UNCORRECTED ACCELEROMGRAM
BENCH, PAPUA NEW GUINEA
LONG., VERT., TREN.
EARTHQUAKE OF DECEMBER 13, 1983 1324 UTC
PEAK VALUES (CM/SEC/SEC): -25.16 15.56 41.31

Scaled Instrument Response
CM/SEC/SEC

Scaled Instrument Response
CM/SEC/SEC

Scaled Instrument Response
CM/SEC/SEC

Scaled Instrument Response
CM/SEC/SEC

Seconds
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BENCH, PAPUA NEW GUINEA
LONG.
EARTHQUAKE OF DECEMBER 13, 1983 0139 UTC
BUTTERWORTH FILTER AT 0.50 HZ, ORDER 4
PEAK VALUES: ACCEL=-73.10 CM/SEC/SEC, VELOCITY=-1.54 CM/SEC, DISPL=0.11 CM
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BENCH, PAPUA NEW GUINEA
LONG.
EARTHQUAKE OF DECEMBER 13, 1983 0139 UTC
BUTTERWORTH FILTER AT 0.50 HZ, ORDER 4
PEAK VALUES: ACCEL=-73.10 CM/SEC/SEC, VELOCITY=-1.54 CM/SEC, DISPL=0.11 CM
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BENCH, PAPUA NEW GUINEA
VERT.
EARTHQUAKE OF DECEMBER 13, 1983 0139 UTC
BUTTERWORTH FILTER AT 0.50 HZ, ORDER 4
PEAK VALUES: ACCEL=27.94 CM/SEC/SEC, VELOCITY=-0.78 CM/SEC, DISPL=0.11 CM
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BENCH, PAPUA NEW GUINEA
VERT.
EARTHQUAKE OF DECEMBER 13, 1983 0139 UTC
BUTTERWORTH FILTER AT 0.50 Hz, ORDER 4
PEAK VALUES: ACCEL=27.94 CM/SEC/SEC, VELOCITY=-0.78 CM/SEC, DISPL=0.11 CM

ACCELERATION
CM/SEC/SEC

VELOCITY
CM/SEC

DISPLACEMENT
CM

SECONDS

(continued)
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BENCH, PAPUA NEW GUINEA
TRAN.
EARTHQUAKE OF DECEMBER 13, 1983 0139 UTC
BUTTERWORTH FILTER AT 0.50HZ, ORDER 4
PEAK VALUES: ACCEL=-95.33 CM/SEC/SEC, VELOCITY=-1.36 CM/SEC, DISPL=-0.19 CM
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BENCH, PAPUA NEW GUINEA
TRAN.
EARTHQUAKE OF DECEMBER 13, 1983 0139 UTC
BUTTERWORTH FILTER AT 0.50 HZ, ORDER 4
PEAK VALUES: ACCEL=-95.33 CM/SEC/SEC, VELOCITY=-1.36 CM/SEC, DISPL=-0.19 CM
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BENCH, PAPUA NEW GUINEA
LONG.
EARTHQUAKE OF DECEMBER 13, 1983 1324 UTC
BUTTERWORTH FILTER AT 1.0 Hz, ORDER 4
PEAK VALUES: ACCEL=25.74 CM/SEC/SEC, VELOCITY=0.61 CM/SEC, DISPL=-0.03 CM
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BENCH, PAPUA NEW GUINEA
VERT.
EARTHQUAKE OF DECEMBER 13, 1983 1324 UTC
BUTTERWORTH FILTER AT 1.0 Hz, ORDER 4
PEAK VALUES: ACCEL=16.15 CM/SEC/SEC, VELOCITY=0.32 CM/SEC, DISPL=0.02 CM
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BENCH, PAPUA NEW GUINEA
TRAN
EARTHQUAKE OF DECEMBER 13, 1983 1324 UTC
BUTTERWORTH FILTER AT 1.0 Hz, ORDER 4
PEAK VALUES: ACCEL=-62.43 CM/SEC/SEC, VELOCITY=0.91 CM/SEC, DISPL=-0.07 CM
RELATIVE VELOCITY RESPONSE SPECTRUM
BENCH, PAPUA NEW GUINEA, 12/13/83, 0139UTC
0.2, 5, 10, 20 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 0.500 HZ; ANTIALIAS 50 - 100 HZ
NATIONAL STRONG MOTION DATA CENTER

VELOCITY RESPONSE-CM/SEC

UNDAMPED NATURAL PERIOD-SECONDS
RELATIVE VELOCITY RESPONSE SPECTRUM
BENCH, PAPUA NEW GUINEA, 12/13/83, 0139UTC UP
0.2, 5, 10, 20 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 0.500 HZ; ANTI-ALIAS 50 - 100 HZ
NATIONAL STRONG MOTION DATA CENTER

VELOCITY RESPONSE-CM/SEC

UNDAMPED NATURAL PERIOD-SECONDS
RELATIVE VELOCITY RESPONSE SPECTRUM
BENCH, PAPUA NEW GUINEA, 12/13/83, 0139UTC
0.2, 0.5, 1.0, 2.0 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 0.500 HZ; ANTIALIAS 50 - 100 HZ
NATIONAL STRONG MOTION DATA CENTER

--- RV
-------- FAS
RELATIVE VELOCITY RESPONSE SPECTRUM
BENCH, PAPUA. NEW GUINEA, 12/13/83, 1324UTC
LONG.
0.2, 5, 10, 20 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 1.000 HZ; ANTIALIAS 50 - 100 HZ
NATIONAL STRONG MOTION DATA CENTER

--- RV

---- FAS

VELOCITY RESPONSE-CM/SEC

UNDAMPED NATURAL PERIOD-SECONDS
RELATIVE VELOCITY RESPONSE SPECTRUM
BENCH, PAPUA NEW GUINEA, 12/13/83, 1324UTC UP
0.2, 5, 10, 20 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 1,000 Hz; ANTIALIAS 50 - 100 Hz
NATIONAL STRONG MOTION DATA CENTER

---

VELOCITY RESPONSE-CM/SEC

UNDAMPED NATURAL PERIOD-SECONDS
RESPONSE SPECTRA
BENCH, PAPUA NEW GUINEA, 12/13/83, 0139 UTC
0.2, 5, 10, 20 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 0.500 Hz; ANTI-ALIAS 50 - 100 Hz
NATIONAL STRONG MOTION DATA CENTER

VELOCITY RESPONSE-CM/SEC

ACCELERATION

UNDAMPED NATURAL PERIOD-SECONDS

0.04 0.1 0.2 0.4 1 2 4 10 20

0.001

0.040

0.020

0.010

0.005

0.001
RESPONSE SPECTRA
BENCH, PAPUA NEW GUINEA, 12/13/83, 0139UTC
0, 2.5, 10, 20 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 0.500 HZ; ANTI-ALIAS 50 - 100 HZ
NATIONAL STRONG MOTION DATA CENTER
RESPONSE SPECTRA
BENCH, PAPUA NEW GUINEA, 12/13/83, 1324 UTC LONG.
0.2, 5, 10, 20 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 1.000 HZ; ANTIALIAS 50 - 100 HZ
NATIONAL STRONG MOTION DATA CENTER
RESPONSE SPECTRA
BENCH, PAPUA NEW GUINEA, 12/13/83, 1324UTC UP
0.2, 5, 10, 20 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 1,000 Hz; ANTI-ALIAS 50 - 100 Hz
NATIONAL STRONG MOTION DATA CENTER
FIGURE
FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
BENCH, PAPUA NEW GUINEA
VERT.
EARTHQUAKE OF DECEMBER 13, 1983 0139 UTC
BUTTERWORTH FILTER AT 0.50 HZ, ORDER 4
DATA BAND PASSED FROM 0.50 TO 50.00 HZ.
COMPUTING OPTIONS= ZCROSS, NONOISE.
Figure
FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
BENCH, PAPUA NEW GUINEA
TRAN.
EARTHQUAKE OF DECEMBER 13, 1983 0139 UTC
BUTTERWORTH FILTER AT 0.50 Hz, ORDER 4
DATA BAND PASSED FROM 0.50 TO 50.00 Hz.
COMPUTING OPTIONS= ZCROSS, NONOISE.
FIGURE
FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
BENCH, PAPUA NEW GUINEA
LONG.
EARTHQUAKE OF DECEMBER 13, 1983 1324 UTC
BUTTERWORTH FILTER AT 1.0 Hz, ORDER 4
DATA BAND PASSED FROM 1.00 TO 50.00 Hz.
COMPUTING OPTIONS= ZCROSS,NONoise.
FIGURE
FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
BENCH, PAPUA NEW GUINEA
VERT.
EARTHQUAKE OF DECEMBER 13, 1983 1324 UTC
BUTTERWORTH FILTER AT 1.0 HZ, ORDER 4
DATA BAND PASSED FROM 1.00 TO 50.00 HZ.
COMPUTING OPTIONS= ZCROSS, NONOISE.
FIGURE
FOURIER AMPLITUDE SPECTRUM OF ACCELERATION,
BENCH, PAPUA NEW GUINEA
TRAN.
EARTHQUAKE OF DECEMBER 13, 1983 1324 UTC
BUTTERWORTH FILTER AT 1.0 HZ, ORDER 4
DATA BAND PASSED FROM 1.00 TO 50.00 HZ.
COMPUTING OPTIONS= ZCROSS, NONOISE.
FIGURE

LOG-LOG FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
BENCH, PAPUA NEW GUINEA
VERT.
EARTHQUAKE OF DECEMBER 13, 1983 0139 UTC
BUTTERWORTH FILTER AT 0.50 HZ, ORDER 4
DATA BAND PASSED FROM 0.50 TO 50.00 HZ.
COMPUTING OPTIONS = ZCROSS, NONOISE.
FIGURE

LOG-LOG FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
BENCH, PAPUA NEW GUINEA
EARTHQUAKE OF DECEMBER 13, 1983 0139 UTC
BUTTERWORTH FILTER AT 0.50 Hz, ORDER 4
DATA BAND PASSED FROM 0.50 TO 50.00 Hz.
COMPUTING OPTIONS= ZCROSS, NOISE.
FIGURE
LOG-LOG FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
BENCH, PAPUA NEW GUINEA
LONG.
EARTHQUAKE OF DECEMBER 13, 1983 1324 UTC
BUTTERWORTH FILTER AT 1.0 HZ, ORDER 4
DATA BAND PASSED FROM 1.00 TO 50.00 HZ.
COMPUTING OPTIONS= ZCROSS, NONOISE.
FIGURE

LOG-LOG FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
BENCH, PAPUA NEW GUINEA
VERT.
EARTHQUAKE OF DECEMBER 13, 1983 1324 UTC
BUTTERWORTH FILTER AT 1.0 HZ, ORDER 4
DATA BAND PASSED FROM 1.00 TO 50.00 HZ.
COMPUTING OPTIONS= ZCROSS, NONOISE.
FIGURE
LOG-LOG FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
BENCH, PAPUA NEW GUINEA
TRAN.
EARTHQUAKE OF DECEMBER 13, 1983 1324 UTC
BUTTERWORTH FILTER AT 1.0 HZ, ORDER 4
DATA BAND PASSED FROM 1.00 TO 50.00 HZ.
COMPUTING OPTIONS= ZCROSS, NONOISE.
FIGURE

FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
BENCH, PAPUA NEW GUINEA
LONG.
EARTHQUAKE OF DECEMBER 13, 1983 0139 UTC
BUTTERWORTH FILTER AT 0.50 Hz, ORDER 4
DATA BAND PASSED FROM 0.50 TO 50.00 Hz.
COMPUTING OPTIONS= ZCROSS, NONOISE.
UNCORRECTED ACCELEROMGRAM
ARAFA TOWN, PAPUA NEW GUINEA
LONG., VERT., TRAN.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
PEAK VALUES (CM/SEC/SEC): -22.06 17.97 -25.34
UNCORRECTED ACCELEROMETER
ARAWA TOWN, PAPUA NEW GUINEA
LONG., VERT., TRAN.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
PEAK VALUES (CM/SEC/SEC): -22.06 17.97 -25.34

SCALED INSTRUMENT RESPONSE CM/SEC/SEC
(CONTINUED)

SCALED INSTRUMENT RESPONSE CM/SEC/SEC
( CONTINUED)

SCALED INSTRUMENT RESPONSE CM/SEC/SEC
( CONTINUED)

SCALED INSTRUMENT RESPONSE CM/SEC/SEC
( CONTINUED)

SECONDS
UNCORRECTED ACCELEROMGRAM
ARA WA TOWN, PAPUA NEW GUINEA
LONG., VERT., TRAN.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
PEAK VALUES (CM/SEC/SEC): -22.06 17.97 -25.34
UNCORRECTED ACCELEROMETER
ARAWA TOWN, PAPUA NEW GUINEA
LONG., VERT., TRAN.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
PEAK VALUES (CM/SEC/SEC):  -22.06  17.97  -25.34

Scaled Instrument Response
CM/SEC/SEC

(continued)

Scaled Instrument Response
CM/SEC/SEC

(continued)

Scaled Instrument Response
CM/SEC/SEC

(continued)

Scaled Instrument Response
CM/SEC/SEC

(continued)

Seconds
UNCORRECTED ACCELEROMGRAM
BATÓ BRIDGE, PAPUA NEW GUINEA
LONG., VERT., TRAN.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
PEAK VALUES (CM/SEC/SEC): -34.94 18.62 -32.59

Scaled Instrument Response CM/SEC/SEC

Scaled Instrument Response CM/SEC/SEC

Scaled Instrument Response CM/SEC/SEC

Scaled Instrument Response CM/SEC/SEC

Seconds
UNCORRECTED ACCELEROMGRAM
BATO BRIDGE, PAPUA NEW GUINEA
LONG., VERT., TRAN.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
PEAK VALUES (CM/SEC/SEC): -34.94 18.62 -32.59

Scaled Instrument Response (CM/SEC/SEC)

Scaled Instrument Response (CM/SEC/SEC)

Scaled Instrument Response (CM/SEC/SEC)

Scaled Instrument Response (CM/SEC/SEC)

Seconds
UNCORRECTED ACCELEROMGRAM
BATO BRIDGE, PAPUA NEW GUINEA
LONG., VERT., TRAN.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
PEAK VALUES (CM/SEC/SEC): -34.94 18.62 -32.59

Scaled Instrument Response (cm/sec/sec)

(Continued)

Scale: 35.0
-35.0

Scale: 19.0
-19.0

Scale: 33.0
-33.0

Seconds
UNCORRECTED ACCELEROMGRAM
BATO BRIDGE, PAPUA NEW GUINEA
LONG., VERT., TRAN.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
PEAK VALUES (CM/SEC/SEC): -34.94 18.62 -32.59

Scaled Instrument Response CM/SEC/SEC

Scaled Instrument Response CM/SEC/SEC

Scaled Instrument Response CM/SEC/SEC

Scaled Instrument Response CM/SEC/SEC

Seconds
UNCORRECTED ACCELEROMGRAM
BVE 80, PAPUA NEW GUINEA
LONG., VERT., TRAN.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
PEAK VALUES (CM/SEC/SEC): 283.43 115.15 271.54
UNCORRECTED ACCELEROMGRAM
BVE 80, PAPUA NEW GUINEA
LONG., VERT., TRAN.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
PEAK VALUES (CM/SEC/SEC): 283.43 115.15 271.54

Scaled Instrument Response
CM/SEC/SEC

Scaled Instrument Response
CM/SEC/SEC

Scaled Instrument Response
CM/SEC/SEC

Scaled Instrument Response
CM/SEC/SEC

Seconds
UNCORRECTED ACCELEROMETER
BYE 80, PAPUA NEW GUINEA
LONG., VERT., TRAN.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
PEAK VALUES (CM/SEC/SEC): 283.43 115.15 271.54

Scaled Instrument Response CM/SEC/SEC

Scaled Instrument Response CM/SEC/SEC

Scaled Instrument Response CM/SEC/SEC

Scaled Instrument Response CM/SEC/SEC

Seconds
UNCORRECTED ACCELEROMGRAM
BUE 80, PAPUA NEW GUINEA
LONG., VERT., TRAN.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
PEAK VALUES (CM/SEC/SEC):  283.43   115.15   271.54

Scaled Instrument Response
CM/SEC/SEC

Scaled Instrument Response
CM/SEC/SEC

Scaled Instrument Response
CM/SEC/SEC

Scaled Instrument Response
CM/SEC/SEC

Scaled Instrument Response
CM/SEC/SEC

Scaled Instrument Response
CM/SEC/SEC

Scaled Instrument Response
CM/SEC/SEC
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
ARAWA TOWN, PAPUA NEW GUINEA
LONG.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.125 Hz, ORDER 4
PEAK VALUES: ACCEL=-21.64 CM/SEC/SEC, VELOCITY=-3.35 CM/SEC, DISPL=1.51 CM

![Graph showing corrected acceleration, velocity, and displacement over time.](image-url)
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
ARAWA TOWN, PAPUA NEW GUINEA
LONG.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.125 HZ, ORDER 4
PEAK VALUES: ACCEL=-21.64 CM/SEC/SEC, VELOCITY=-3.35 CM/SEC, DISPL=1.51 CM

ACCELERATION CM/SEC/SEC

VELOCITY CM/SEC

DISPLACEMENT CM

SECONDS
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
ARAHA TOWN, PAPUA NEW GUINEA
LONG.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.125 Hz, ORDER 4
PEAK VALUES: ACCEL=-21.64 CM/SEC/SEC, VELOCITY=-3.35 CM/SEC, DISPL=1.51 CM

(Continued)
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
ARAWA TOWN, PAPUA NEW GUINEA
LONG.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.125 Hz, ORDER 4
PEAK VALUES: ACCEL=-21.64 CM/SEC/SEC, VELOCITY=-3.35 CM/SEC, DISPL=1.51 CM
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
ARAWA TOWN, PAPUA NEW GUINEA
VERT.
EARTHQUAKE OF MARCH 18, 1983, 0905 UTC
BUTTERWORTH FILTER AT 0.125 Hz, ORDER 4
PEAK VALUES: ACCEL=18.00 CM/SEC/SEC, VELOCITY=-6.11 CM/SEC, DISPL=-3.56 CM

ACCELERATION
CM/SEC/SEC

VELOCITY
CM/SEC

DISPLACEMENT
CM

SECONDS
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
ARAWA TOWN, PAPUA NEW GUINEA
VERT.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.125 Hz, ORDER 4
PEAK VALUES: ACCEL=18.00 CM/SEC/SEC, VELOCITY=-6.11 CM/SEC, DISPL=-3.56 CM

ACCELERATION CM/SEC/SEC

VELOCITY CM/SEC

DISPLACEMENT CM

SECONDS
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
ARAWA TOWN, PAPUA NEW GUINEA

EARTHQUAKE OF MARCH 18, 1983, 0905 UTC
BUTTERWORTH FILTER AT 0.125 HZ, ORDER 4
PEAK VALUES: ACCEL=18.00 CM/SEC/SEC, VELOCITY=-6.11 CM/SEC, DISPL=-3.56 CM

ACCELERATION CM/SEC/SEC
-18.0
18.0
(CONTINUED)

VELOCITY CM/SEC
-6.20
6.20
(CONTINUED)

DISPLACEMENT CM
-3.60
3.60
(CONTINUED)

SECONDS
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
ARAWA TOWN, PAPUA NEW GUINEA
VERT.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.125 Hz, ORDER 4
PEAK VALUES: ACCEL=18.00 CM/SEC/SEC, VELOCITY=-6.11 CM/SEC, DISPL=-3.56 CM
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
ARAWA TOWN, PAPUA NEW GUINEA
Earthquake of March 18, 1983 0905 UTC
Butterworth filter at 0.125 Hz, Order 4
Peak values: ACCEL=-25.77 CM/SEC/SEC, VELOCITY=-5.52 CM/SEC, DISPL=2.15 CM
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
ARAWA TOWN, PAPUA NEW GUINEA
TRAN.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.125 HZ, ORDER 4
PEAK VALUES: ACCEL=-25.77 CM/SEC/SEC, VELOCITY=-5.52 CM/SEC, DISPL=2.15 CM

[Graphs showing acceleration, velocity, and displacement over time]
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
ARAWA TOWN, PAPUA NEW GUINEA
TRAN.
EARTHQUAKE OF MARCH 18, 1983, 0905 UTC
BUTTERWORTH FILTER AT 0.125 HZ, ORDER 4
PEAK VALUES: ACCEL=-25.77 CM/SEC/SEC, VELOCITY=-5.52 CM/SEC, DISPL=2.15 CM
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
ARAJAVA TOWN, PAPUA NEW GUINEA
TRAN.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.125 HZ, ORDER 4
PEAK VALUES: ACCEL=-25.77 CM/SEC/SEC, VELOCITY=-5.52 CM/SEC, DISPL=2.15 CM
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BATO BRIDGE, PAPUA NEW GUINEA
LONG.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.20 HZ, ORDER 4
PEAK VALUES: ACCEL=-33.93 CM/SEC/SEC, VELOCITY=-4.00 CM/SEC, DISPL=-1.20 CM

ACCELERATION
CM/SEC/SEC
-34.0
-24.0
-14.0
-4.0
-1.0
1.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0

VELOCITY
CM/SEC
-4.00
-2.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00

DISPLACEMENT
CM
-1.30
-1.00
-0.70
-0.40
-0.10
0.20
0.50
0.80
1.10
1.40
1.70
2.00

SECONDS
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BATO BRIDGE, PAPUA NEW GUINEA
LONG.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.20 Hz, ORDER 4
PEAK VALUES: ACCEL=-33.93 CM/SEC/SEC, VELOCITY=-4.00 CM/SEC, DISPL=-1.20 CM
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BATO BRIDGE, PAPUA NEW GUINEA
LONG.
EARTHQUAKE OF MARCH 18, 1983, 0905 UTC
BUTTERWORTH FILTER AT 0.20 Hz, ORDER 4
PEAK VALUES: ACCEL=-33.93 CM/SEC/SEC, VELOCITY=-4.00 CM/SEC, DISPL=-1.20 CM

ACCELERATION
CM/SEC/SEC

VELOCITY
CM/SEC

DISPLACEMENT
CM

SECONDS

(CONTINUED)
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BATO BRIDGE, PAPUA NEW GUINEA

EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.20 Hz, ORDER 4

PEAK VALUES: ACCEL=-33.93 CM/SEC/SEC, VELOCITY=-4.00 CM/SEC, DISPL=-1.20 CM
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BATO BRIDGE, PAPUA NEW GUINEA
VEAT.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.20 Hz, ORDER 4
PEAK VALUES: ACCEL=18.47 CM/SEC/SEC, VELOCITY=-3.40 CM/SEC, DISPL=1.27 CM

ACCELERATION CM/SEC/SEC
-19.0
-19.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

VELOCITY CM/SEC
-3.40
3.40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

DISPLACEMENT CM
-1.30
1.30
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

SECONDS
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BATO BRIDGE, PAPUA NEW GUINEA
VERT.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.20 HZ, ORDER 4
PEAK VALUES: ACCEL=18.47 CM/SEC/SEC, VELOCITY=-3.40 CM/SEC, DISPL=1.27 CM

(continued)

ACCELERATION
CM/SEC/SEC

3.40

(continued)

VELOCITY
CM/SEC

1.30

(continued)

DISPLACEMENT
CM

SECONDS
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BATO BRIDGE, PAPUA NEW GUINEA

EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.20 Hz, ORDER 4

PEAK VALUES: ACCEL=18.47 CM/SEC/SEC, VELOCITY=-3.40 CM/SEC, DISPL=1.27 CM

ACCELERATION
CM/SEC/SEC

VELOCITY
CM/SEC

DISPLACEMENT
CM

(CONTINUED)

SECONDS
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BATO BRIDGE, PAPUA NEW GUINEA
VERT.
EARTHQUAKE OF MARCH 18, 1983, 0905 UTC
BUTTERWORTH FILTER AT 0.20 HZ, ORDER 4
PEAK VALUES: ACCEL=18.47 CM/SEC/SEC, VELOCITY=-3.40 CM/SEC, DISPL=1.27 CM

(CONTINUED)
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BATO BRIDGE, PAPUA NEW GUINEA
EARTHQUAKE OF MARCH 18, 1983, 0905 UTC
BUTTERWORTH FILTER AT 0.20 Hz, ORDER 4
PEAK VALUES: ACCEL=-32.29 CM/SEC/SEC, VELOCITY=-4.12 CM/SEC, DISPL=-1.92 CM
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BATO BRIDGE, PAPUA NEW GUINEA
TRAN.
EARTHQUAKE OF MARCH 18, 1983, 0905 UTC
BUTTERWORTH FILTER AT 0.20 HZ, ORDER 4
PEAK VALUES: ACCEL=-32.29 CM/SEC/SEC, VELOCITY=-4.12 CM/SEC, DISPL=-1.92 CM

ACCELERATION
CM/SEC/SEC

VELOCITY
CM/SEC

DISPLACEMENT
CM

SECONDS
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BATO BRIDGE, PAPUA NEW GUINEA

EARTHQUAKE OF MARCH 18, 1983 0905 UTC

BUTTERWORTH FILTER AT 0.20 HZ, ORDER 4

PEAK VALUES: ACCEL=-32.29 CM/SEC/SEC, VELOCITY=-4.12 CM/SEC, DISPL=-1.92 CM

(CONTINUED)
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BATO BRIDGE, PAPUA NEW GUINEA
TRAN.
EARTHQUAKE OF MARCH 16, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.20 HZ, ORDER 4
PEAK VALUES: ACCEL=-32.29 CM/SEC/SEC, VELOCITY=-4.12 CM/SEC, DISPL=-1.92 CM

ACCELERATION
CM/SEC/SEC
33.0
-33.0
(CONTINUED)

VELOCITY
CM/SEC
4.20
-4.20
(CONTINUED)

DISPLACEMENT
CM
2.00
-2.00
(CONTINUED)

SECONDS
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BYE 80, PAPUA NEW GUINEA

EARTHQUAKE OF MARCH 18, 1983 0905 UTC

BUTTERWORTH FILTER AT 0.20 Hz, ORDER 4

PEAK VALUES: ACCEL=283.51 CM/SEC/SEC, VELOCITY=28.64 CM/SEC, DISPL=3.56 CM
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BVE 80, PAPUA NEW GUINEA
LONG.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.20 HZ, ORDER 4
PEAK VALUES: ACCEL=283.51 CM/SEC/SEC, VELOCITY=28.64 CM/SEC, DISPL=3.56 CM

(CONTINUED)
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BVE 80, PAPUA NEW GUINEA
LONG.
EARTHQUAKE OF MARCH 18, 1983, 0905 UTC
BUTTERWORTH FILTER AT 0.20 HZ, ORDER 4
PEAK VALUES: ACCEL=283.51 CM/SEC/SEC, VELOCITY=28.64 CM/SEC, DISPL=3.56 CM

(CONTINUED)

ACCELERATION
CM/SEC/SEC

(CONTINUED)

VELOCITY
CM/SEC

(CONTINUED)

DISPLACEMENT
CM

SECONDS
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BEV 80, PAPUA NEW GUINEA
LONG.
EARTUQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.20 HZ, ORDER 4
PEAK VALUES: ACCEL=283.51 CM/SEC/SEC, VELOCITY=28.64 CM/SEC, DISPL=3.56 CM

(CONTINUED)
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BYE 80, PAPUA NEW GUINEA
VERT.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.20 Hz, ORDER 4
PEAK VALUES: ACCEL=115.41 CM/SEC/SEC, VELOCITY=-5.62 CM/SEC, DISPL=1.07 CM
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BVE 80, PAPUA NEW GUINEA

EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.20 Hz, ORDER 4

PEAK VALUES: ACCEL=115.41 CM/SEC/SEC, VELOCITY=-5.62 CM/SEC, DISPL=1.07 CM
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BVE 80, PAPUA NEW GUINEA
TRAN.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.20 Hz, ORDER 4
PEAK VALUES: ACCEL=269.65 CM/SEC/SEC, VELOCITY=-17.91 CM/SEC, DISPL=-2.61 CM

ACCELERATION CM/SEC/SEC

VELOCITY CM/SEC

DISPLACEMENT CM

SECONDS
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BEVE 80, PAPUA NEW GUINEA

TRAN.

EARTHQUAKE OF MARCH 15, 1983, 0905 UTC
BUTTERWORTH FILTER AT 0.20 Hz, ORDER 4
PEAK VALUES: ACCEL=269.65 CM/SEC/SEC, VELOCITY=-17.91 CM/SEC, DISPL=-2.61 CM
CORRECTED ACCELERATION, VELOCITY, AND DISPLACEMENT 200.00 SPS
BYE 80, PAPUA NEW GUINEA
TRAN.
EARTHQUAKE OF MARCH 18, 1983, 0905 UTC
BUTTERWORTH FILTER AT 0.20 HZ, ORDER 4
PEAK VALUES: ACCEL=269.65 CM/SEC/SEC, VELOCITY=-17.91 CM/SEC, DISPL=-2.61 CM
RELATIVE VELOCITY RESPONSE SPECTRUM
ARAWA TOWN, PAPUA NEW GUINEA, 3/18/83, 0905UTC
0.2.5.10.20 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 0.125 Hz; ANTI-ALIAS 50 - 100 Hz
NATIONAL STRONG MOTION DATA CENTER

VELOCITY RESPONSE-CM/SEC

UNDAMPED NATURAL PERIOD-SECONDS
RELATIVE VELOCITY RESPONSE SPECTRUM
ARAWA TOWN, PAPUA NEW GUINEA, 3/18/83, 0905UTC UP
0.2, 5, 10, 20 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 0.125 HZ; ANTIALIAS 50 - 100 HZ
NATIONAL STRONG MOTION DATA CENTER

VELOCITY RESPONSE-CM/SEC

0.0 0.5 1.0 1.5 2.0 2.5 3.0
UNDAMPED NATURAL PERIOD-SECONDS

0 1 2 3

RV

----- FAS

5
RELATIVE VELOCITY RESPONSE SPECTRUM
ARAWA TOWN, PAPUA NEW GUINEA, 3/18/83, 0905 UTC

0.2, 0.5, 1.0, 2.0 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 0.125 HZ; ANTI-ALIAS 50 - 100 HZ
NATIONAL STRONG MOTION DATA CENTER

VELOCITY RESPONSE-CM/SEC

UNDAMPED NATURAL PERIOD-SECONDS

RV

----- FAS

104
RELATIVE VELOCITY RESPONSE SPECTRUM
BATO BRIDGE, PAPUA NEW GUINEA, 3/18/83, 0905UTC UP
0.2, 5, 10, 20 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 0.200 HZ; ANTI-ALIAS 50 - 100 HZ
NATIONAL STRONG MOTION DATA CENTER

VELOCITY RESPONSE - CM/SEC

UNDAMPED NATURAL PERIOD - SECONDS
RELATIVE VELOCITY RESPONSE SPECTRUM
BATO BRIDGE, PAPUA NEW GUINEA, 3/18/83, 0905UTC
0.2, 5, 10, 20 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 0.200 Hz; ANTI-ALIAS 50 - 100 Hz
NATIONAL STRONG MOTION DATA CENTER
RELATIVE VELOCITY RESPONSE SPECTRUM
BVE 80, PAPUA NEW GUINEA, 3/18/83, 0905UTC
0.2, 5, 10, 20 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 0.125 Hz; ANTIALIAS 50 - 100 Hz
NATIONAL STRONG MOTION DATA CENTER

REPRESENTATION

VELOCITY RESPONSE-CM/SEC

UNDAMPED NATURAL PERIOD-SECONDS

108
RELATIVE VELOCITY RESPONSE SPECTRUM
BVE 80, PAPUA NEW GUINEA, 3/18/83, 0905UTC UP
0, 2, 5, 10, 20 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 0.125 HZ; ANTIALIAS 50 - 100 HZ
NATIONAL STRONG MOTION DATA CENTER

VELOCITY RESPONSE-CM/SEC

UNDAMPED NATURAL PERIOD-SECONDS

--- RV
----- FAS

35
30
25
20
15
10
5
0
RELATIVE VELOCITY RESPONSE SPECTRUM
BVE 80, PAPUA NEW GUINEA, 3/18/83, 0905UTC
0.2, 5, 10, 20 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 0.125 Hz; ANTI-ALIAS 50-100 Hz
NATIONAL STRONG MOTION DATA CENTER

- RV
- ------ FAS

VELOCITY RESPONSE-CM/SEC

UNDAMPED NATURAL PERIOD-SECONDS
RESPONSE SPECTRA

ARAWA TOWN, PAPUA NEW GUINEA, 3/18/83, 0905UTC  UP
0.25, 10, 20 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 0.125 Hz; ANTI-ALIAS 50 - 100 Hz

NATIONAL STRONG MOTION DATA CENTER

VELOCITY RESPONSE-CM/SEC

UNDAMPED NATURAL PERIOD-SECONDS
RESPONSE SPECTRA
BVE 80, PAPUA NEW GUINEA, 3/18/83, 0905 UTC
TRAN.
0.2, 5, 10, 20 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 0.125 Hz; ANTIALIAS 50 - 100 Hz
NATIONAL STRONG MOTION DATA CENTER

VELOCITY RESPONSE-CM/SEC

1000.00
400.00
200.00
100.00
11.00
4.00
2.00
1.00
0.40
0.25
0.04
0.1
0.2
0.4
1
2
4
10
20

UNDAMPED NATURAL PERIOD-SECONDS

113
BATO BRIDGE, PAPUA NEW GUINEA, 3/18/83, 0905 UTC LONG.
0.2, 5, 10, 20 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 0.0200 Hz, ANTI-ALIAS 50 - 100 Hz
NATIONAL STRONG MOTION DATA CENTER
RESPONSE SPECTRA

BATO BRIDGE, PAPUA NEW GUINEA, 3/18/83, 0905 UTC
0.25, 10, 20 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4. 0.200 HZ; ANTIALIAS 50 - 100 HZ
NATIONAL STRONG MOTION DATA CENTER

VELOCITY RESPONSE-CM/SEC

UNDAMPED NATURAL PERIOD-SECONDS

115
RESPONSE SPECTRA
BAT0 BRIDGE, PAPUA NEW GUINEA, 3/18/83, 0905UTC TRANS.
0, 2, 5, 10, 20 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 0.200 HZ; ANTI-ALIAS 50 - 100 HZ
NATIONAL STRONG MOTION DATA CENTER
RESPONSE SPECTRAS
BVE 80, PAPUA NEW GUINEA, 3/18/83, 0905UTC LONG.
0.2, 0.5, 1.0, 2.0 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 0.125 HZ; ANTIALIAS 50 - 100 HZ
NATIONAL STRONG MOTION DATA CENTER

VELOCITY RESPONSE-CM/SEC

1000.00
400.00
200.00
100.00
40.00
20.00
10.00
4.00
2.00
1.00
0.40
0.25

0.40 0.1 0.2 0.4 1 2 4 10 20
UNDAMPED NATURAL PERIOD-SECONDS

NATIONAL STRONG MOTION DATA CENTER
RESPONSE SPECTRA
BVE 80, PAPUA NEW GUINEA, 3/18/83, 0905 UTC UP
0.2, 0.5, 1.0, 2.0 PERCENT CRITICAL DAMPING
FILTERS: BUTTERWORTH, ORDER 4, 0.125 Hz, ANTI-ALIAS 50 - 100 Hz
NATIONAL STRONG MOTION DATA CENTER
RESPONSE SPECTRA

BVE 80, PAPUA NEW GUINEA, 3/18/83, 0905 UTC

TRAN.

0, 2.5, 10, 20 PERCENT CRITICAL DAMPING

FILTERS: BUTTERWORTH, ORDER 4, 0.125 Hz; ANTIALIAS 50 - 100 Hz

NATIONAL STRONG MOTION DATA CENTER

VELOCITY RESPONSE CM/SEC

UNDAMPED NATURAL PERIOD-SECONDS

1000.00
400.00
200.00
100.00
10.00
5.00
4.00
3.00
2.00
1.00
0.80
0.60
0.40
0.20
0.10
0.05
0.04
0.01
0.00
0.1
0.2
0.4
1.0
2.0
4.0
10.0
20.0

119
FIGURE

FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
ARAWA TOWN, PAPUA NEW GUINEA
LONG.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.125 HZ, ORDER 4
DATA BAND PASSED FROM 0.13 TO 50.00 HZ.
COMPUTING OPTIONS= ZCROSS,NONoise.
FIGURE
FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
ARAWA TOWN, PAPUA NEW GUINEA
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.125 HZ, ORDER 4
DATA BAND PASSED FROM 0.13 TO 50.00 HZ.
COMPUTING OPTIONS= ZCROSS, NONOISE.
FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
ARAWA TOWN, PAPUA NEW GUINEA
TRAN.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.125 HZ, ORDER 4
DATA BAND PASSED FROM 0.13 TO 50.00 HZ.
COMPUTING OPTIONS= ZCROSS, NONOISE.
FIGURE
FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
BATQ BRIDGE, PAPUA NEW GUINEA
LONG.
EARTHQUAKE OF MARCH 18, 1983, 0905 UTC
BUTTERWORTH FILTER AT 0.20 HZ, ORDER 4
DATA BAND PASSED FROM 0.20 TO 50.00 HZ.
COMPUTING OPTIONS= ZCROSS, NONOISE.
FIGURE.
FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
BATO BRIDGE, PAPUA NEW GUINEA
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.20 HZ, ORDER 4
DATA BAND PASSED FROM 0.20 TO 50.00 HZ.
COMPUTING OPTIONS: ZCROSS, NONOISE.
FIGURE

FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
BAT0 BRIDGE, PAPUA NEW GUINEA
TRAN.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.20 HZ, ORDER 4
DATA BAND PASSED FROM 0.20 TO 50.00 HZ.
COMPUTING OPTIONS= ZCROSS, NONOISE.
FIGURE

FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.

BYE 80, PAPUA NEW GUINEA

LONG.

EARTHQUAKE OF MARCH 18, 1983 0905 UTC

BUTTERWORTH FILTER AT 0.20 HZ, ORDER 4

DATA BAND PASSED FROM 0.20 TO 50.00 HZ.

COMPUTING OPTIONS= ZCROSS, NONOISE.
FIGURE 10
FREQUENCY, HZ

FOURIER AMPLITUDE, CM/SEC

FIGURE
FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
BWE 80, PAPUA NEW GUINEA
VERT.
EARTHQUAKE OF MARCH 18, 1983, 0905 UTC
BUTTERWORTH FILTER AT 0.20 HZ, ORDER 4
DATA BAND PASSED FROM 0.20 TO 50.00 HZ.
COMPUTING OPTIONS= ZCROSS, NONOISE.
FIGURE

FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.

BVE 80, PAPUA NEW GUINEA
TRAN.

EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.20 HZ, ORDER 4
DATA BAND PASSED FROM 0.20 TO 50.00 HZ.
COMPUTING OPTIONS= ZCROSS, NONOISE.
FIGURE

LOG-LOG FOURIER AMPLITUDE SPECTRUM OF ACCELERATION,
ARAWA TOWN, PAPUA NEW GUINEA
LONG.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.125 HZ ORDER 4
DATA BAND PASSED FROM 0.13 TO 50.00 HZ.
COMPUTING OPTIONS = ZCROSS, NONOISE.
LOG-LOG FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
ARAWA TOWN, PAPUA NEW GUINEA
VERT.
EARTHQUAKE OF MARCH 18, 1983 0905UTC
BUTTERWORTH FILTER AT 0.125 Hz, ORDER 4
DATA BAND PASSED FROM 0.13 TO 50.00 Hz.
COMPUTING OPTIONS = ZCROSS, NONOISE.
FIGURE
LOG-LOG FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
ARAWA TOWN, PAPUA NEW GUINEA
TRAN.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.125 HZ, ORDER 4
DATA BAND PASSED FROM 0.13 TO 50.00 HZ.
COMPUTING OPTIONS= ZCROSS, NONOISE.
FIGURE

LOG-LOG FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
BATO BRIDGE, PAPUA NEW GUINEA
LONG.
EARTHQUAKE OF MARCH 18, 1983, 0905 UTC
BUTTERWORTH FILTER AT 0.20 HZ, ORDER 4
DATA BAND PASSED FROM 0.20 TO 50.00 HZ.
COMPUTING OPTIONS= ZCROSS, NONOISE.
LOG-LOG FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
BATO BRIDGE, PAPUA NEW GUINEA

EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.20 HZ, ORDER 4
DATA BAND PASSED FROM 0.20 TO 50.00 HZ.
COMPUTING OPTIONS= ZCROSS, NONOISE.
Figure

Log-log Fourier amplitude spectrum of acceleration.
Bato Bridge, Papua New Guinea
Earthquake of March 18, 1983, 0905 UTC
Butterworth filter at 0.20 Hz, Order 4
Data band passed from 0.20 to 50.00 Hz.
Computing options = ZCROSS, NONOISE.
FIGURE
LOG-LOG FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
BEVE 80, PAPUA NEW GUINEA
LONG.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.20 HZ, ORDER 4
DATA BAND PASSED FROM 0.20 TO 50.00 HZ.
COMPUTING OPTIONS= ZCROSS,NONOISE.
FIGURE
LOG-LOG FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
BVE 80, PAPUA NEW GUINEA
VERT.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.20 HZ, ORDER 4
DATA BAND PASSED FROM 0.20 TO 50.00 HZ.
COMPUTING OPTIONS= ZCROSS,NONoise.
FIGURE
LOG-LOG FOURIER AMPLITUDE SPECTRUM OF ACCELERATION.
BYE 80, PAPUA NEW GUINEA
TRAN.
EARTHQUAKE OF MARCH 18, 1983 0905 UTC
BUTTERWORTH FILTER AT 0.20 Hz, ORDER 4
DATA BAND PASSED FROM 0.20 TO 50.00 Hz.
COMPUTING OPTIONS= ZCROSS, NONOISE.