ISSN 0111 — 2236

New Zealand Department of Scientific and Industrial Research

GEOPHYSICS DIVISION

NEW ZEALAND SEISMOLOGICAL REPORT 1986

SEISMOLOGICAL OBSERVATORY BULLETIN

E — 170

ISSN 0111 — 2236

New Zealand Department of Scientific and Industrial Research

GEOPHYSICS DIVISION

NEW ZEALAND SEISMOLOGICAL REPORT 1986

SEISMOLOGICAL OBSERVATORY BULLETIN

E — 170

POSTAL SERVICE

All measurement and interpretation of records is carried out at the central station. Requests and communications should therefore be sent to:

The Superintendent
Seismological Observatory
P O Box 1320
Wellington
NEW ZEALAND

Correspondents are asked to note that surface mails from Europe and the Americas are infrequent, and that articles not sent by airmail may take four or five months to reach us.

Published in 1988

CONTENTS

SCIENTIFIC STAFF IN 1986

Wellington

Superintendent:	W.D. Smith, M.Sc.(Auck.), M.A., Ph.D.(Calif.)
Seismologists:	D.A. Adams, M.Sc. (from May) K. Gledhill, M.Sc.(Hons.) A.J. Haines, M.Sc., Ph.D.(Cantab.) M.A. Lowry, B.Sc. M.G. Muir, M.Sc. M.J. Randall, M.Sc.(N.Z.), Ph.D.(Calif.) M.E. Reyners, B.Sc.(Hons.), Ph.D. R. Robinson, M.Sc., Ph.D.(Stanford) E.G.C. Smith, B.Sc.(Hons.), Ph.D. A.A. Thomson, M.Sc. T.H. Webb, B.Sc.(Hons.), Ph.D.
Research Associate:	G.A. Eiby, M.Sc.
Technical Officers:	B.G. Ferris M. King R.C. Martindale R.D. Maunder P.D. Turner (until June) A. Cresswell (from August)
Technicians:	A. Ball (from November) G. Clendon (April to September) S.C. Ede J.S. Harris M.M. Kopeykin E.A. Kuna F. Langford (from April) M.L. Rogers

SCIENTIFIC STAFF IN 1986

Apia

Superintendent:	L.V. Ioane
Observer:	S. Iosa
Technician:	F. Solaese

Rarotonga

Observer in Charge:	R. Taia

Niue

Observer:	L.I. Lavini

Nadi

Observer:	E. Puamau

Raoul Island

Observer:	W. Percy

Campbell Island

Observer:	D. Willem

Scott Base

Observer:	R. Paterson

INTRODUCTION

The form and content of this bulletin follow the lines laid down in the 1984 Report (E-168).

Phase data are not published here, but are instead sent to the International Seismological Centre, and appear in their bulletins, which constitute the only medium now in use for routine reporting of arrival time observations made in New Zealand. For those willing to accept the Observatory's interpretation of seismic events in the New Zealand region, however, lists of origin coordinates and magnitudes, with sufficient supplementary information to assess the quality of the data on which they are based are given in the following pages.

Seismologists urgently requiring unpublished New Zealand data may apply to the Observatory. Historic data is also avaialble, but unless a two way information exchange is involved it is the Observatory's practice to make a charge for recovery of this material.

Definitive origin data for local earthquakes is usually available within a few months of their occurrence.

NEW ZEALAND SEISMICITY IN 1986

1986 was a particularly quiet year for New Zealand seismicity. No earthquake within the Observatory's surveillance area (see map page 22) reached a magnitude of 6 or more. The highest magnitude (M_L) assigned to a shallow shock was 5.5, for an earthquake in a remote area at the south-western tip of the country (Ref. 86/431). The other two shallow earthquakes with magnitudes 5.0 or more were also in the South Island, but considerably farther north (86/435 & 86/594). The strongest deep earthquake (86/693) attained a magnitude of 5.9. The highest intensity reported during the year was MM VI, which was reported once only from the mainland, but also once from Raoul Island in the Kermadec group.

Reviewing the more notable earthquakes of the year in chronological order, a shock of M_L 4.9 on Feb. 12 (86/092) produced reports of Modified Mercalli intensity V from Table Flat (58) to Waipukurau (60). For numbers after place-names, see p102. The area in which it was felt extended from Taihape (58) to Palmerston North (62) and Waipukurau (64). In March an earthquake of M_L 5.6 with a deep focus beneath the sea north of Tasman Bay (86/147) was felt from Kutarere (35), in the Bay of Plenty, to the Okuti Valley (110) on Banks Peninsula. March also saw an event (86/207) which was felt at intensity MM VI on the Tasman Glacier (105). All reports of this earthquake being felt came from a very restricted area near the glacier, and the magnitude was only 3.4, so it is natural to consider the possibility that the event originated in the glacier, rather than in the earth beneath it. The quality of the origin determination does not deteriorate if the depth is restricted at 0 km instead of 12 km. A magnitude 3.4 earthquake releases energy comparable to that from the explosion of about 100 tons of TNT. Although this is only a relatively small amount of energy for an earthquake, it seems rather a lot to come from a small glacier, but magnitudes as high as 3.1 have been assigned to glacial events in Antarctica.

In May a deep earthquake of magnitude 5.0 (86/311) gave rise to reports of MM V from both sides of Cook Strait. Kutarere was once again the northernmost source of a report, but most of the others came from south-western parts of the North Island.

July was quite a busy month, with three deep earthquakes of similar strength that not only had magnitudes of more than five, but also produced reports of MM V. The first of these (86/433) was felt only in the South Island, from Lake Coleridge (100) to Dunedin (145). MM V was reported only from Mount White Station (100). The next (86/441) was felt at its highest intensity from Hawea (55) to Greymouth (92). Only one report of this shock being felt originated farther north than Hawea, none farther south than Greymouth. The outlying observation came from Kahui (46). Although the last of the July trio (86/469) was deeper seated and had a different epicentre from 86/441, the extent of the area from which felt reports were received was rather similar.

In September, a shallow earthquake (85/594) of magnitude 5.2 on the West Coast of the South island was felt from Westport (79) to Dunedin (145). MM V was reported from Inchbonnie (92), Arthur's Pass (93) and Lake Coleridge (100).

In October a teleseism (86/674) attained MM VI at Raoul Island and was felt at several places in the North Island and at Lake Rotoiti (81) in the South Island. (For earthquakes of this magnitude which have been felt in New Zealand, and for which data from a station close to the source is available, the Observatory will attempt to determine an origin, even if it lies outside our usual surveillance area). At the end of the same month a deep shock (86/693) of magnitude 5.9 was felt from the Bay of Plenty (35) to Blenheim (83) but only Raumati South (61) experienced MM V.

Finally in November, a shallow shock of only magnitude 4.5 (86/736) produced 7 reports of MM V from the Wellington area (68), where it was felt more strongly than any other earthquake for several years.

During the year North Island volcanoes were quiet but White Island volcano was more active than normal.

THE INSTRUMENTAL NETWORKS

DESCRIPTION

The system of seismograph stations under the scientific direction of the Seismological Observatory at Wellington in 1986, comprised a standard network of stations covering the main islands of New Zealand and extending over the south-west Pacific from Samoa, Fiji, and Rarotonga, to Ross Island in the Antarctic; one smaller and closer-spaced network near Wellington; a similar network surrounding Lake Taupo; seismographs deployed to provide some information on the existing seismic environment in the area where a new dam is being built at Clyde; and specialised or temporary stations established for research purposes.

The stations of the standard network are of two kinds, one having short-period instruments intended to record shocks originating within about 1000 km, and the other equipped with long-period instruments designed to provide information about more distant earthquakes and about the internal structure of the Earth. These functions overlap, and every station yields information of both kinds. Most of the instruments produce records on photographic paper, but a growing number of them use pen-and-ink or heated stylus recorders instead.

Wellington Network stations transmit their outputs to a central recorder at the Seismological Observatory. The network has thirteen stations, and is intended primarily for research but is also used in the rapid location of shocks of interest to the public or civil defence officials.

The Clyde dam surveillance stations operate in the same way as the Wellington Network but their telemetered output is recorded at Clyde and thence sent to Wellington for analysis.

A network of telemetering stations, with central recording at Wairakei, is intended to monitor possible volcanic hazards in the region of Lake Taupo. This network started to operate in 1984 and two more stations have been added during 1985.

There is also a 'Seismic Research Observatory' located at South Karori near Wellington. This is an instrument package sponsored by the United States Geological Survey and is one of about ten similar installations distributed around the world. The three-component seismometer is enclosed in a gas-filled capsule and has been lowered to a position about 10 m below sea-level in a bore-hole 165 mm in diameter and about 100 m deep. Seismic signals are transmitted by landline to the Observatory at Kelburn, where both analogue records on heat-sensitive paper and digital records on magnetic tape are made. Three-component long-period and vertical component short-period motions are recorded. Paper records are retained and archived by the Observatory, but tapes are sent to the U.S.G.S.

In addition to information from the above networks, data is contributed by one station operated by the Royal New Zealand Navy Field Station on Great Barrier Island for the Defence Scientific Establishment, another belonging to the Geology Department of Otago University at Dunedin, and volcanological research or surveillance stations, operated in various collaborations by the Geological and Geophysical Surveys of the D.S.I.R., the Universities of Auckland and Wellington and the Ministry of Works and Development. These volcanological stations are on White Island, in the Rotorua geothermal area, in Tongariro National Park. They are not under the control of the Observatory, but their readings are freely available for use in the local origin determination programme and the Observatory archives their records. Temporary stations set up by the Observatory, for research or to monitor unusual seismic activity, sometimes provide additional data for use in origin determinations.

CHANGES TO THE NETWORKS IN 1986

The most important change for the networks in 1986 came in December, when the Clyde Network was expanded from two stations to eight. The name and identification code of one of the two existing stations, Clyde (CYZ) was changed to Trig B (TBC). The need for this change arose from the location of two of the new stations closer to the town of Clyde than the older station.

The Wellington Network also gained a three-component station, Quartz Hill (QHW), which was located on a quieter site with the intention of replacing the Makara Radio (MRW) station. However, because of persistent problems with the telemetry link from Quartz Hill MRZ has continued to operate. The instruments of this network were connected to an automatic event detection and location system from September. The data capture software for this system (known as SNARE - Seismic Network Automatic Recording Equipment) was developed at the Observatory by K.R. Gledhill, to extend the usefulness and improve on the reliability of an earlier automatic printout system for arrival times devised by Dr M.J. Randall.

Another telemetered network to gain a new station was the one around Lake Taupo, to which the station at Tuhingamata (TUT) was added.

The station at Rainbow Mountain (RBZ) did not function at all in 1986, having been superseded by Tarawera (TAZ) in 1985.

INDEX OF STATION CODES AND POSITIONS

Throughout the tabular sections of this Report, stations are identified by the internationally recognised abbreviations allotted by the United States National Earthquake Information Service and used by the International Seismological Centre.

CODE	NAME	LATITUDE	LONGITUDE	ALT
		d m s	d m s	m
	SEISMIC RESEARCH OBSERVATORY			
SNZO	South Karori	41 18 37 S	174 42 17 E	-10
	STANDARD NETWORK			
AFI	Afiamalu	13 54 34 S	171 46 38 W	706
API	Apia	13 48 26 S	171 46 30 W	2
AUC	Auckland	36 51 36 S	174 46 41 E	79
BRZ	Borland Lodge	45 46 45 S	167 32 19 E	190
CAZ	Castlepoint	40 54 15 S	176 13 34 E	6
CBZ	Campbell Island	52 33 03 S	169 09 33 E	30
CIZ	Chatham Island	43 57 18 S	176 33 56 W	45
CMZ	Cashmere	43 35 10 S	172 38 23 E	255
COB	Cobb River	41 05 16 S	172 44 02 E	213
CRZ	Cape Reinga	34 25 55 S	172 40 47 E	140
GNZ	Gisborne	38 38 39 S	178 01 21 E	30
HBZ	Hicks Bay	37 35 57 S	178 18 05 E	0
KAI	Kaimata	42 31 33 S	171 24 31 E	82
KKZ	Kaikoura	42 25 19 S	173 41 17 E	105
KRP	Karapiro	37 55 30 S	175 32 15 E	64

CODE	NAME	LATITUDE d m s	LONGITUDE d m s	ALT m
MNG	Mangahao	40 37 07 S	175 28 55 E	396
MSZ	Milford Sound	44 40 14 S	167 55 01 E	38
NDF	Nadi	17 45 25 S	177 27 00 E	30
NEZ	North Egmont	39 16 22 S	174 05 46 E	920
NUE	Niue	19 04 35 S	169 55 41 W	56
OBZ	Oban	46 54 18 S	168 06 55 E	26
OMZ	Oamaru	45 04 14 S	170 54 53 E	95
RAO	Raoul Island	29 15 06 S	177 55 06 W	110
RAR	Rarotonga	21 12 45 S	159 46 24 W	28
RGZ	Rangipo	39 09 19 S	175 50 02 E	667
RTY	Rotoiti	41 48 27 S	172 50 35 E	635
SBA	Scott Base	77 51 01 S	166 45 22 E	38
TMP	Tomahawk	44 18 54 S	170 07 12 E	720
TRZ	Taradale	39 33 12 S	176 49 17 E	17
TUA	Tuai	38 48 29 S	177 09 02 E	274
WEL	Wellington	41 17 10 S	174 46 06 E	122
WIZ	White Island	37 31 42 S	177 11 21 E	40
WTZ	Whakatane	37 59 05 S	176 59 18 E	4
		CLYDE NETWORK		
CFC	Cairnmuir Flats	45 11 03 S	169 17 35 E	576
CMC	Cairnmuir Mts	45 08 48 S	169 16 25 E	1 039
LRC	Leaning Rock	45 03 44 S	169 20 10 E	1 533
LSC	Lilico Spur	45 06 50 S	169 22 12 E	759
MHZ	Mount Horn	45 03 43 S	169 16 47 E	1 127
MSC	Moutere Station	45 05 33 S	169 24 42 E	701
SBC	Sonora Basin	45 05 32 S	169 18 42 E	801
TBC	Trig B	45 08 49 S	169 19 50 E	619
		CONTRIBUTING STATIONS		
CNZ	Chateau	39 12 00 S	175 32 51 E	1 116
DNZ	Dunedin	45 51 59 S	170 30 54 E	15
DRZ	Dome Shelter	39 16 35 S	175 33 49 E	2 600
GBZ	Great Barrier	36 13 04 S	175 28 52 E	70
MGZ	Maungaku	39 00 07 S	175 32 20 E	806
NGZ	Ngauruhoe	39 10 39 S	175 36 12 E	1 400
TAZ	Tarawera	38 13 59 S	176 30 28 E	1 027
UTU	Utuhina	38 10 39 S	176 11 32 E	410
		TAUPO NETWORK		
HAT	Hinemaiaia	38 53 32 S	176 05 31 E	492
HIT	Hingarae	38 42 31 S	175 45 59 E	458
HUT	Huka	38 38 02 S	176 05 41 E	360
KET	Ketatahi	39 06 02 S	175 39 06 E	1 208
RAT	Rangitukua	38 52 07 S	175 46 16 E	649
TUT	Tuhingamata	38 42 42 S	175 59 28 E	614

CODE	NAME	LATITUDE d m s	LONGITUDE d m s	ALT m
		WELLINGTON NETWORK		
BHW	Baring Head	41 24 33 S	174 52 17 E	10
BLW	Big Hill	41 22 07 S	175 28 29 E	340
CAW	Cannon Point	41 06 32 S	175 04 04 E	330
CCW	Cape Campbell	41 45 17 S	174 12 54 E	216
KIW	Kapiti Island	40 51 50 S	174 54 42 E	320
MOW	Moikau	41 25 18 S	175 15 07 E	430
MRW	Makara Radio	41 13 57 S	174 42 18 E	235
MTW	Mount Morrison	41 09 34 S	175 30 07 E	282
QHW	Quartz Hill	41 15 07 S	174 41 26 E	190
TCW	Tory Channel	41 12 48 S	174 16 33 E	150
WDW	Wainui Dam	41 16 07 S	174 59 37 E	130
WEL	Wellington	41 17 10 S	174 46 06 E	122
WHW	Wrights Hill	41 17 51 S	174 44 17 E	383

INSTRUMENTATION AND LITHOLOGY

STANDARD NETWORK AND CONTRIBUTING STATIONS

Stations are listed in the alphabetical order of their abbreviations. Pendulum and galvanometer periods, To and Tg, are given in seconds. The damping of electromagnetic instruments, when not listed, may be assumed to be critical. Magnifications listed are for the period of maximum response, except in the case of World-Wide Standard instruments, where the magnifications are given at the conventional periods of 1·0 and 15 seconds. Typical period response curves for Willmore II, Benioff, Wood-Anderson and Mark Products L-4C seismographs are shown at the end of this section.

	Instrument	Compt.	To	Tg	Damping	Magnification
AFI	AFIAMALU (World-Wide Standard Station)					
	Foundation: Basaltic lava flows.					
	Benioff	ZNE	1·0	0·75		12 500 at 1·0s
	Press-Ewing	ZNE	15	100		750 at 15s
API	APIA					
	Foundation: Coral sand on Recent and Pleistocene basalt.					
	Johnson-Matheson (photo-cell amplifier with hot stylus recorder).					
		Z	1·2	0·20		Uncertain
AUC	AUCKLAND					
	Foundation: Volcanic beds on Tertiary sandstone and mudstone.					
	Mark Products L-4C (with Kinemetrics VR-1 pen-recorder).					
		Z	1·0			3 800 at 0·25s
BRZ	BORLAND LODGE					
	Foundation: Quaternary gravels.					
	Willmore II	Z	1·0	0·25		29 100 at 0·25s
	Wood-Anderson	X	0·80	crit.		2 800 at 0·80s
	The Wood-Anderson is oriented with the X component northeast.					
CAZ	CASTLEPOINT					
	Foundation: Quaternary mudstone.					
	Willmore II (with Kinemetrics VR-1 pen-recorder).					
		Z	1·0			Variable
	The magnification may be reduced when high seas are running.					
CBZ	CAMPBELL ISLAND					
	Foundation: Basalt.					
	Willmore II	Z	1·0	0·25		5 000 at 0·25s
CIZ	CHATHAM ISLANDS					
	Foundation: Clay over basalt.					
	Willmore II	Z	1·0	0·25		4 440 at 0·20s
		N	1·0	0·25		5 110 at 0·20s
		E	1·0	0·25		4 400 at 0·20s
CMZ	CASHMERE					
	Foundation: Rhyolite.					
	Mark Products L-4C (Telemetered to Kinemetrics VR-1 pen-recorder).					
		Z	1·0			24 000 at 0·20s

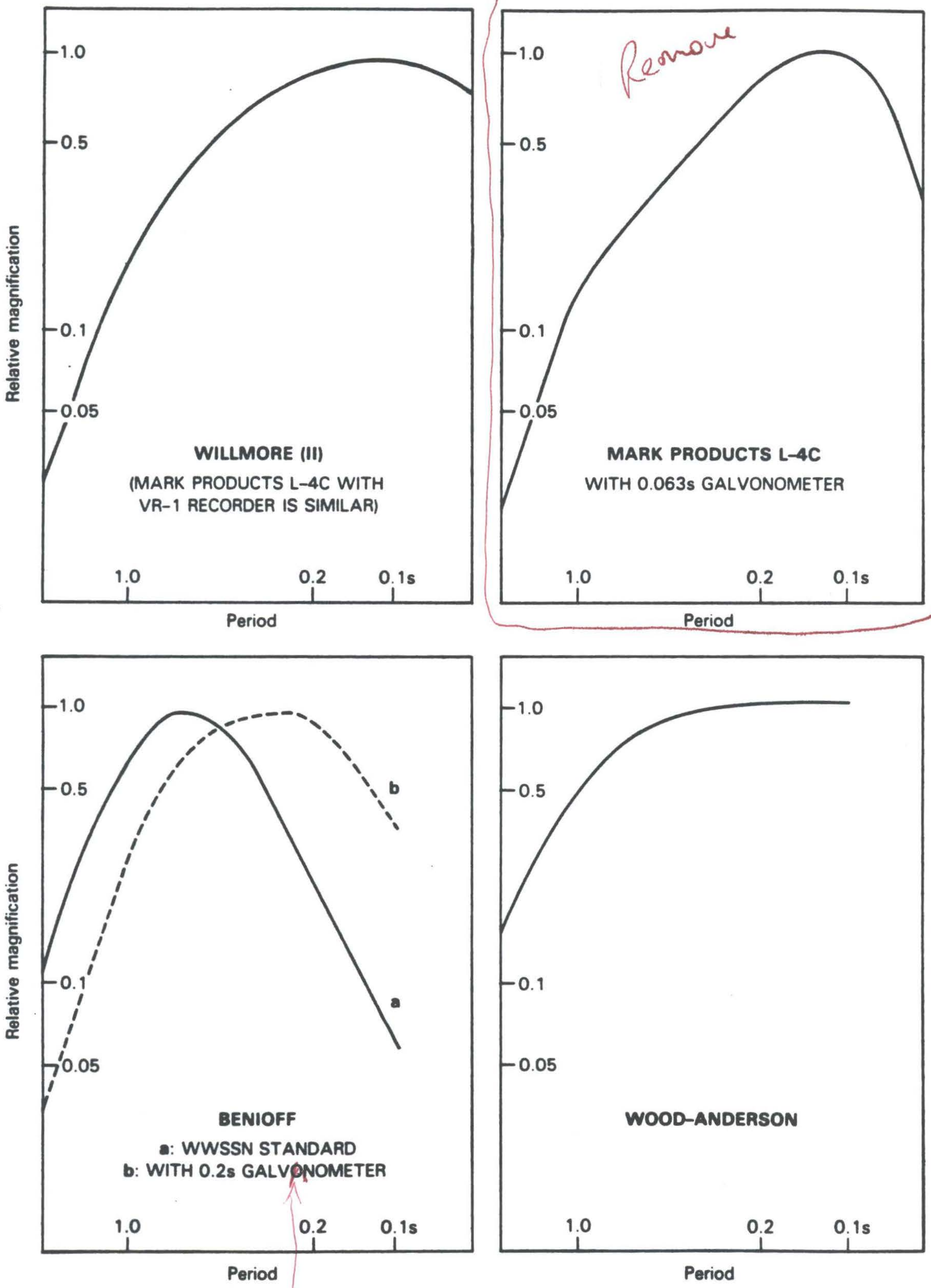
	Instrument	Compt.	To	Tg	Damping	Magnification
CNZ	CHATEAU (Geophysical Survey)					
	Foundation: Volcanic ash and lava.					
	Willmore I (Telemetered to Kinemetrics VR-1 pen-recorder).					
		Z	1·0			Variable
COB	COBB RIVER					
	Foundation: Schist.					
	Willmore II	Z	1·0	0·25		27 300 at 0·20s
CRZ	CAPE REINGA					
	Foundation: Cretaceous basic volcanics.					
	Willmore II	Z	1·0	0·25		9 350 at 0·25s
		N	1·0	0·25		10 200 at 0·20s
DNZ	DUNEDIN (University of Otago)					
	Foundation: Basaltic lava flow.					
	Willmore III with Kinemetrics pen-recorder.					
		Z	1·0			Variable
		N	1·0			Variable
		E	1·0			Variable
DRZ	DOME SHELTER (Geophysical Survey)					
	Foundation: Recent andesitic ash.					
	Mark Products L-4C (High and low magnifications, telemetered to Kinemetrics VR-1 pen-recorders).					
		Z	1·0			Variable
ECZ	EAST CAPE					
	Foundation: Mudstone and sandstone.					
	Willmore II	Z	1·0	0·25		4 800 at 0·33s
GBZ	GREAT BARRIER (Defence Scientific Establishment)					
	Foundation: Tertiary volcanics.					
	Willmore II	Z	1·0	0·25		23 800 at 0·25s
GNZ	GISBORNE					
	Foundation: Alluvium on Tertiary mudstone.					
	Willmore I	Z	1·0	0·25		27 000 at 0·25s
		N	1·0	0·25		29 500 at 0·20s
HBZ	HICKS BAY					
	Foundation: Consolidated conglomerate.					
	Mark Products L-4C in borehole (with Kinemetrics VR-1 pen-recorder).					
		Z	1.0			50 700 at 0.10s
KAI	KAIMATA					
	Foundation: Moraine and river gravels over Tertiary mudstone and sandstone.					
	Wood-Anderson	X	0·80		crit.	2 800 at 0·80s
	This instrument is oriented with the X component northeast.					
KKZ	KAIKOURA					
	Foundation: Tertiary limestone and mudstone.					
	Willmore II	Z	1·0	0·25		12 000 at 0·25s
KRP	KARAPIRO					
	Foundation: Greywacke.					
	Benioff	Z	1·0	0·20		46 700 at 0·25s
		E	1·0	0·20		41 000 at 0·50s

	Instrument	Compt.	To	Tg	Damping	Magnification
MGZ	MAUNGAKU (Ministry of Works)					
	Foundation: Quaternary andesite.					
	Mark Products L-4C (Telemetered to Kinemetrics VR-1 pen-recorder).					
		Z	1·0			Variable
MNG	MANGAHAO					
	Foundation: Greywacke.					
	Willmore II	Z	1·0	0·25		52 000 at 0·33s
MSZ	MILFORD SOUND					
	Foundation: Gneiss.					
	Willmore II	Z	1·0	0·25		49 800 at 0·25s
NDF	NADI					
	Foundation: Recent clays.					
	Willmore II (photo-cell amplifier with hot stylus recorder).					
		Z	1·25	0·20		6 000 approx.
NEZ	NORTH EGMONT					
	Foundation: Volcanic ash.					
	Mark Products L-4C (with Kinemetrics VR-1 pen-recorder).					
		Z	1.0			25 100 at 0·10s
NGZ	NGAURUHOE (Geophysical Survey)					
	Foundation: Recent volcanic flows.					
	Mark Products L-4C (Telemetered to Kinemetrics VR-1 pen-recorder).					
		Z	1·0			Variable
NUE	NIUE					
	Foundation: Hard coral.					
	Willmore II (with Kinemetrics VR-1 pen-recorder).					
		Z	1·0			17 200 at 0·10s
OBZ	OBAN					
	Foundation: Weathered granite.					
	Mark Products L-4C (with Kinemetrics VR-1 pen-recorder).					
		Z	1·0			12 000 at 1·0s
OMZ	OAMARU					
	Foundation: Recent deposits overlying Tertiary limestone.					
	Willmore II	Z	1·0	0·20		11 500 at 0·20s
ONE	ONERAHI					
	Foundation: Basalt.					
	Wood-Anderson	E	0·80		crit.	2 800 at 0·80s
RAO	RAOUL ISLAND					
	Foundation: Volcanic rock.					
	Willmore II	Z	1·0	0·25		4 800 at 0·25s
RAR	RAROTONGA (World-Wide Standard Station)					
	Foundation: Basalt.					
	Benioff	ZNE	1·0	0·75		6 250 at 1·0s
	Press-Ewing	ZNE	15	100		375 at 15s
RGZ	RANGIPO					
	Foundation: Volcanic rock.					
	Mark Products L-4C (with Kinemetrics VR-1 pen-recorder).					
		Z	1·0	0·25		8 000 at 1.0s

Instrument	Compt.	To	Tg	Damping	Magnification
ROX	ROXBURGH				
	Foundation: chlorite schist.				
	Willmore I	Z	1·0	0·25	11 500 at 0·25s
RTY	ROTOITI				
	Foundation: Glacial gravels.				
	Mark Products L-4C (with Kinemetrics VR-1 pen-recorder).				
		Z	1·0	0·25	Uncertain
SBA	SCOTT BASE (World-Wide Standard Station)				
	Foundation: Frozen basaltic debris resting on lava flows.				
	Benioff	ZNE	1·0	0·75	50 000 at 1·0s
					25 000 (Feb 10 onw'd)
					12 500 (Feb 26 onw'd)
					25 000 (Mar 24 onw'd)
					50 000 (Apr 27 onw'd)
	Press-Ewing	ZNE	15	100	750 at 15s
TAZ	TARAWERA (Geological Survey)				
	Foundation: Rhyolite lava.				
	Mark Products L-4C (Telemetered to Kinemetrics VR-1 pen-recorder).				
		Z	1·0	0·25	Variable
TMP	TOMAHAWK GULLY				
	Foundation: Mesozoic Greywacke				
	Mark Products L-4C (Telemetered to Kinemetrics VR-1 pen-recorder).				
		Z	1.0		750 000 at 0·20s
		N	1.0		100 000 at 0·20s
TNZ	TARATA				
	Foundation: Pleistocene mudstone.				
	Willmore II	Z	1·0	0·25	4 570 at 0·20s
TRZ	TARADALE				
	Foundation: Quaternary sands and silts, overlying Quaternary limestone.				
	Willmore II	Z	1·0	0·25	5 550 at 0·25s
TUA	TUAI				
	Foundation: Thick Tertiary sandstone and mudstone.				
	Willmore II	Z	1·0	0·25	7 080 at 0·25s
UTU	UTUHINA (Geological Survey)				
	Foundation: Ignimbrite.				
	Mark Products L-4C (Telemetered to Kinemetrics VR-1 pen-recorder).				
		Z	1·0	0·25	Variable
WEL	WELLINGTON (World-Wide Standard Station)				
	Foundation: Greywacke.				
	Benioff	ZNE	1·0	0·75	6 250 at 1·0s
	Press-Ewing	ZNE	15	100	750 at 15s
	Wood-Anderson	NE	0·80	crit.	1 400 at 0·8s
	Imamura	Z	1	5:1	2
		NE	4	5:1	2

The Benioff vertical component operates both photographic and heated-stylus recorders. There is also a pen-recorder operated by a Willmore I seismometer.

	Instrument	Compt.	To	Tg	Damping	Magnification
WIZ	WHITE ISLAND (Geological Survey/Victoria University)					
	Foundation: Recent andesite.					
	Mark Products L-4C (Telemetered to Kinemetrics VR-1 pen-recorder).					
		Z	1·0			Variable
WNZ	WAIRAKEI					
	Foundation: Pumice breccia.					
	Willmore I	Z	1·0	0·25		200 (nominal)
WTZ	WHAKATANE					
	Foundation: Weathered Jurassic greywacke.					
	Willmore II	Z	1·0	0·20		24 000 at 0·20s



PERIOD RESPONSE CURVES
Short Period Seismographs

SEISMIC RESEARCH OBSERVATORY

This station is sponsored by the United States Geological Survey. A three-component seismometer sealed in a gas-filled capsule is placed in a borehole 165mm in diameter and about 100m deep, located at a quiet site several kilometres from the Observatory. The ground surface there is 88m above, and the seismometer 10m below, sea level. Both digital and analogue recordings are made from the three long-period and the vertical component short-period outputs. Paper analogue records are archived by the Observatory, but the digital tape records of detected events are held by the USGS. The recorder is at the observatory site in Kelburn, and the signals are transmitted to it by landline.

Code	Station	Component	Magnification
SNZO	South Karori	ZNE	20 000 at 25s
		Z	6 250 at 1·0s

The lithological foundation is Jurassic-Permian Greywacke.

CLYDE NETWORK

The two seismometers originally located near Clyde to collect data on the prevailing level of microseismicity in the area of the dam now being constructed on the Clutha River have been augmented by six more instruments. All are operated by New Zealand Electricity, (division of the Ministry of Energy) and will be used to monitor any changes in local seismicity associated with the use of the lake for the generation of electricity. The recording system has been changed to digital, on magnetic tape. Tapes are interpreted and retained at the Observatory where they are available for other seismological use. Until the end of 1986, data from the two original stations (recorded using the older system) were treated no differently from data recorded by the standard network. Clyde network stations are linked by radio telemetry to a multi-channel EARSS (Equipment for Automatic Recording of Seismic Signals) recorder at Clyde. The seismometers are Mark Products L-4C instruments with a natural period of one second and the lithological foundation at all stations is Schist. The new system provides for waveform display on variable scales, so it is not appropriate to quote magnifications for the new stations (or for Mount Horn after the renovation of the network).

Because some of the new stations are closer to the town of Clyde than the original Clyde station (CYZ), the name of this station has been changed to Trig B (TBC).

Code	Station	Component	Magnification
CFC	Cairnmuir Flats	Z	as required
CMC	Cairnmuir Mountains	Z	as required
CYZ	Clyde	Z	275 000 at 0.10s
LRC	Leaning Rock	Z	as required
LSC	Lilico Spur	Z	as required
MHZ	Mount Horn	Z	275 000 at 0·10s
MSC	Moutere Station	Z	as required
SBC	Sonora Basin	Z	as required
TBC	Trig B	Z	as required

TAUPO NETWORK

This network is intended to monitor volcanic and geothermal activity in the Taupo Volcanic Region. Although relatively quiet in historic times, (the 1886 Tarawera eruption notwithstanding), the geological record shows that the Region has been the scene of larger-scale activity at a number of times in the more distant past. The first two stations of the new network were installed in 1984. Although six seismometers had been installed by the end of 1986, there were only two recorders, so that only two stations were active at any one time. When fully active, the network will record on a SNARE system.

Code	Station	Component	Magnification	Foundation
HAT	Hinemaiaia	Z	43 100 at 0·10s	Ignimbrite
HIT	Hingarae	Z	54 600 at 0·10s	Ignimbrite
HUT	Huka	Z	5 600 at 0·10s	Pumice breccia
KET	Ketatahi	Z	70 800 at 0·10s	Andesite
RAT	Rangitukua	Z	44 700 at 0·10s	Rhyolite
[illegible]	Tuhingmata	Z	22 000 at 0·10s	Rhyolite

WELLINGTON NETWORK

The stations of the Wellington network were linked by radio or land-line to a common recorder at the main observatory site at Kelburn until September, when the recorder was replaced by a SNARE event-detecting and recording system. The seismometers used are Mark Products L-4C instruments with a natural period of 1·0 second. Recording before SNARE took over was by a Teledyne Develocorder with galvanometers having a period of 0·063s (frequency 16Hz). Magnifications quoted refer to the trace as seen when projected on the screen of the Develocorder, which magnifies the film trace ten times. At Wellington, only a low gain Develocorder channel was operated in 1986. SNARE records are made on magnetic tape and may be presented on a monitor screen at any required magnification. The lithological foundation at all of these stations is Jurassic- Permian Greywacke, except for CCW where it is Miocene sandstone.

N.B. The films from the Wellington network are normally read on a viewer which has a magnification approximately twice that of the Develocorder.

Code	Station	Component	Magnification at 0·10s
BHW	Baring Head	Z	380 000
BLW	Big Hill	Z	340 000
CAW	Cannon Point	Z	420 000
CCW	Cape Campbell	Z	135 000
KIW	Kapiti Island	Z	500 000
MOW	Moikau	Z	210 000
MRW	Makara Radio	Z	400 000
MTW	Mount Morrison	Z	420 000
QHW	Quartz Hill	ZNE	variable
TCW	Tory Channel	Z	710 000
WDW	Wainui Dam	Z	640 000
WEL	Wellington	N	110 000

TIMING ARRANGEMENTS

Unless stated otherwise, times in this Report are given in Universal Time (U.T. or, more strictly, U.T.C., defined in a later section). For most seismological and civil purposes this may be regarded as the Mean Solar Time of the Greenwich meridian.

Throughout the standard network, minute marks, derived from quartz crystal clocks of high stability, appear on records as abrupt trace deflections of about two seconds duration. Radio time signals also operate the trace deflector so that the relationship between the locally generated minute marks and Universal Time can be established. In most cases the radio signals are those of the New Zealand Time Service, transmitted hourly through the stations of Radio New Zealand, but in areas where local reception is bad, the Australian station VNG is used. It is estimated that the total error in time-signal recording resulting from signal transmission and delay in operation of the trace deflector should never exceed 30 milliseconds. Further details of the New Zealand Time Service appear later in this Report.

Stations of the World-Wide Standard Seismograph Network have the timing arrangements usual at such stations. At other stations beyond New Zealand, time signals originating from the national Time Service or from VNG are used. Time-pulse signals of one second duration derived directly from the national Time Service are displayed on the topmost and lowest traces of the Wellington network records. Pulses of longer duration mark minutes and hours.

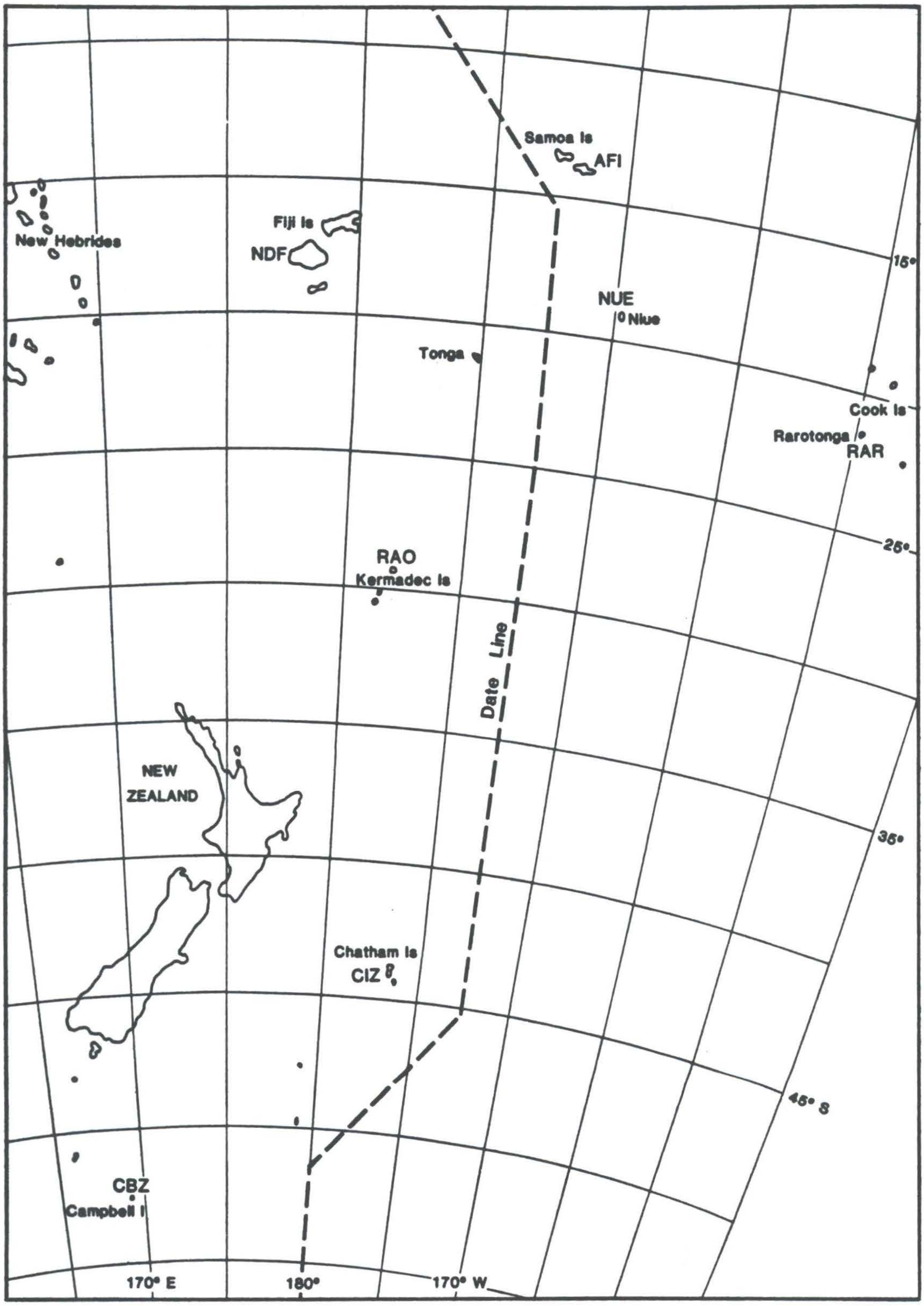
It is sometimes desirable to know the local civil time at which an earthquake occurred. The times now used for civil purposes in New Zealand (except the Chatham Islands) are New Zealand Standard Time, and New Zealand Daylight Time, which are defined in the Time Act, 1974. New Zealand Standard Time is 12 hours, and New Zealand Daylight Time 13 hours, ahead of U.T. The period of Daylight Time is specified by Order in Council, as provided by the Act, normally extending from 02h NZST on the last Sunday in October until 02h NZST on the first Sunday in March of the following year.

The time observed in the Chatham Islands is 45 minutes in advance of that currently in use in New Zealand. New Zealand Standard Time is observed at Scott Base, in Fiji and on Raoul and Campbell Islands. Times kept elsewhere in the South Pacific are set by the governments of the respective countries. Those used in places which sometimes report earthquakes to the Observatory are listed below.

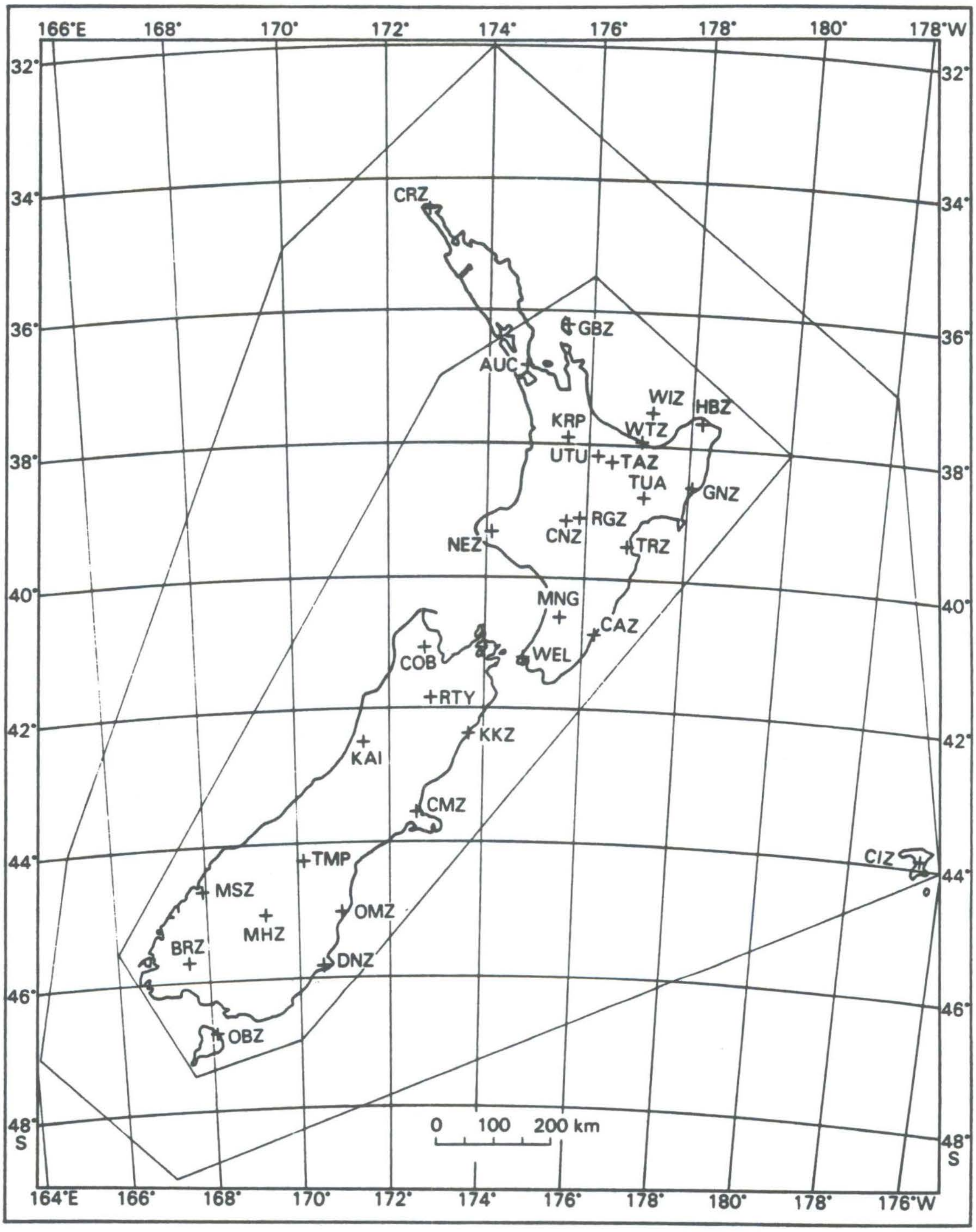
Western Samoa	11h 00m behind U.T.
Niue	11h 00m behind U.T.
Rarotonga	10h 00m behind U.T.
Tonga	13h 00m ahead of U.T.
Norfolk Island	11h 30m ahead of U.T.
French Polynesia	10h 00m behind U.T.

Note that Western Samoa, Niue, Rarotonga and French Polynesia are on the opposite side of the International Date Line from New Zealand.

OK for 1987



Map Of Pacific Island Stations.



Map showing seismograph stations and the areas within which the Observatory attempts to determine origins for all shallow earthquakes of magnitude (M_L) 3·7 or more (inner polygon) and all earthquakes of magnitude 4·0 or greater (outer polygon). For the positions of other stations in the densely instrumented areas near CNZ, WEL and MHZ, see the Map Section at the end of this Report.

INSTRUMENTAL DATA

CONTENT

This section contains origin times, epicentres, focal depths, and magnitudes of earthquakes in the New Zealand region that the Observatory has located from instrumental data, together with indicators of the quality of the data used.

In the areas within the inner and outer polygons outlined on the map opposite, the Observatory attempts to determine origins for all shallow earthquakes of M_L 3·7 or more, and all shocks of M_L 4·0 or more, respectively. (Origins are regarded as shallow if their depth is less than 60km.) Origins are also calculated for smaller or more distant earthquakes reported to have been felt in New Zealand. Weak shocks felt during earthquake swarms do not automatically get this individual attention, but an origin is found for at least one shock in any sequence giving rise to felt reports. Once an origin has been calculated, the data and determination are listed regardless of whether the outcome satisfies the selection criteria.

Within the more intensively studied area around Wellington, coordinates of all seismic events of magnitude M_L 2·3 or more are calculated using data from a closely spaced local network of seismometers. Thus fewer indicators of data quality are needed with these origins and magnitudes, which appear at the end of this section.

DETERMINATION OF ORIGINS

Earthquake origins were determined using the phases P, Pn, P*, Pg, and the corresponding S phases. In computing travel times, (except for origins listed under the Wellington Network heading), it was assumed that the New Zealand crust was 33 km thick, and divided into two uniform layers by a discontinuity at a depth of 12 km. Above the discontinuity the velocities of P and S were 5·5 and 3·3 km/s respectively (Pg and Sg) and below it they were 6·5 and 3·7 km/s (P* and S*). Travel times for Pn and Sn, which travel in the mantle, were calculated using mantle velocities of 8·1 km/s for Pn and 4·6 km/s for Sn. Several studies have shown that these values are close to the average velocities for Pn and Sn in New Zealand. Travel times for P and S from sub-crustal earthquakes were derived from the Jeffreys-Bullen Tables (British Association for the Advancement of Science, 1958), and, at the base of the crust, corresponded to a velocity of 7·8 km/s for P and 4·4 km/s for S. It is known that the mantle in New Zealand is not laterally homogeneous, but until more accurate travel times can be routinely calculated, Jeffreys-Bullen Tables will continue to be used, to maintain consistency with earlier Reports.

Calculations were carried out on a VAXStation II computer using FORTRAN programs developed by W. D. Smith, E. G. C. Smith, A. J. Haines and T. H. Webb. A provisional origin was repeatedly adjusted to obtain the best agreement between the observed arrival times for the various phases, and times computed from tables. More precisely, the origin was adjusted to minimise the sum of the squares of the weighted residuals (i.e. observed minus computed arrival times).

Weights in the range 0-100% were initially assigned to phase arrival times according to whether the phase was P or S and the precision of the measurement. S phases were given half the weight of P phases and phases labelled "e" or measured only to the nearest second were given half the weight of corresponding phases measured to a tenth of a second. A sharp P arrival was thus at first assigned 100% weight and an emergent S 25%. The weight of readings was further modified by the location program, which, after each iteration, weighted the residuals used to adjust the trial origin. The procedure (see Jeffreys, H., 1939: Probability Theory, Cambridge University Press.) greatly reduced the weight given to phases with residuals greater than three standard errors.

In general, all four coordinates of the earthquake origin were calculated (origin time, latitude, longitude, and focal depth). In some cases, however, the focal depth was not allowed to vary, but restricted to some chosen depth. This was most commonly done for crustal earthquakes. Unless there was a station within 25 km of a shock in the upper crust, or within 50 km of a shock in the lower crust, a nominal depth of either 12 or 33 km was usually assigned, according to the crustal phases present and the goodness of fit of the resulting solution. Less often, the depth was restricted to a smaller value, particularly when the strengths of locally reported felt intensities indicated an uncommonly shallow focus. The letter R printed after the depth in the lists which follow betokens a restriction for any of the foregoing reasons. There were also times when data not suitable for input to the location program (e.g. overseas PKP readings), indicated the depth of focus; in such cases the depth was similarly fixed and the restriction shown by following the depth by the letter G (to indicate intervention by a Geophysicist). When convergence of the location program failed for lack of enough data, both epicentre and depth were fixed at values consistent with the available information, and computation limited to finding a compatible origin time. Such doubly-restricted origins have the letters RR printed after the depth.

In routine origin determinations, sufficient of the stations nearest to the epicentre were read to yield enough data for a satisfactory solution, together with a selection of other stations from which readings were recorded but not used. When enough observations were available, arrival times recorded at stations more than three degrees from the epicentre were excluded from the calculations. Observatory analysts were free to reject data which they thought to be unreliable completely, or to halve the weight given to it in the location program's procedure for minimising mean residuals. (See later details of the weighting procedure).

Origins determined from Wellington network data were obtained using a modified location program with different convergence criteria, in conjunction with a velocity model that has been found to be appropriate for the area. Details of this model are given immediately before the listing of origins from the Wellington network.

In using the results in this section, it is essential to keep in mind that the positions of earthquakes with epicentres outside the network of seismograph stations can be very uncertain, even though the mean residual is small. With the the aim of helping the reader to assess the reliability of the results presented here, the positional relationships between an epicentre, and the stations which recorded the data used to find it, are given after the calculated origin coordinates. Similarly, the number of magnitude estimates contributing to the mean value, and an indication of their scatter, are also shown.

The solutions presented here are in all cases based upon uniform procedures applied to laterally homogeneous models. For origins determined using the standard network, the model approximates average conditions in the New Zealand region, but as the real structure is known to be asymmetrical, the true origin can be somewhat different from the one calculated. Care should therefore be taken not to attach significance to an epicentre in an unusual place or a focus at an unusual depth, without investigating the uncertainties of the determination.

Because a well-established local model has been used to calculate the origins listed under the Wellington Network heading, systematic errors in this area should be considerably smaller than in other parts of the country.

MAGNITUDES

The magnitudes assigned to local earthquakes are intended to be the values of M_L as originally defined by C.F. Richter (Bull. Seism. Soc. Am 25: 1-32, 1935), but his procedure for performing the magnitude calculation at other than the standard distance of 100 km has been modified, so as to take account of the observed characteristics of energy propagation in New Zealand, including the effect of focal depth. (For details, see Haines, A.J.: A local magnitude scale for New Zealand earthquakes. Bull. Seism. Soc. Am. 71: 275-94.)

STANDARD NETWORK

Magnitudes of earthquakes recorded by the standard network are based on the largest amplitudes in the P and S groups, recorded by Willmore vertical and Wood-Anderson seismographs. (The deployment of these is described in the earlier section on instrumentation.) At Wellington, where two-component Wood-Anderson instruments are installed, the root-mean-square amplitude is used. An amplitude-distance relationship of the form

$$A = A_o R^{-N} \exp (- \alpha R)$$

where A is a trace amplitude recorded at an epicentral distance R, A_o is a calibration function, N is a geometric spreading factor and α is an inelastic attenuation coefficient, has been found appropriate for all parts of the country.

For all New Zealand crustal earthquakes N is 2 and α generally takes a value close to 0. With these values, the relationship describes head-wave propagation with no attenuation. In the Central Volcanic Region, however, (see Map, page 27), α takes values of 0.8 deg^{-1} for P waves and 1.05 deg^{-1} for S waves. Adjustments are therefore made according to the distance travelled in the volcanic region.

For deep earthquakes in the Main Seismic Region the same parameters as for crustal earthquakes apply ($N = 2$, $\alpha = 0$), provided that (i) R now measures the slant distance from the focus to the base of the crust, and (ii) stations to the west of the volcanic region or south of the Main Seismic Region are not used, because the structure there necessitates different

TABLE 1

MAGNITUDE CORRECTIONS FOR THE TWO CLASSES OF FOCAL DEPTH, FOR P AND S PHASES RECORDED ON WILLMORE AND WOOD-ANDERSON INSTRUMENTS

Station	Willmore P		Willmore S		Wood-Anderson	
	≤33 km	>33 km	≤33 km	>33 km	≤33 km	>33 km
BRZ Fiordland only		0·05		-0·20		0·05
All shallow	0·15		-0·10		0·15	
CMZ	0·05		-0·15			
COB	0·15		-0·40			
CRZ	0·25		0·20			
ECZ	0·60	0·40	0·50	0·40		
GNZ	0·00	0·00	-0·20	-0·20		
KAI						0·30
KKZ	0·25	0·25	0·05	0·05		
KRP	-0·25		-0·30			
MNG	-0·35	-0·40	-0·45	-0·50		
MSZ Fiordland only		-0·35		-0·60		
All shallow	-0·25		-0·50			
OBZ	0·00		-0·40			
OMZ	0·15		-0·15			
ONE					0·15	
ROX	0·15		-0·25			
TNZ	0·40		0·25			
TRZ	0·30	0·45	0·15	0·10		
TUA	0·40	0·40	0·35	0·40		
WEL					0·30	0·30
WNZ	0·95	1·30	0·75	1·35		
WTZ	-0·10	0·05	0·05	0·00		

spreading and attenuation terms.

For deep earthquakes in Fiordland the same amplitude-distance relationship is used, with (i) N given the value 1 (body wave propagation), (ii) α increasing with focal depth, and (iii) stations in the Main Seismic Region (apart from COB) not used, because of variations of the coefficients N and α. Milford Sound (MSZ) and Borland Lodge (BRZ) should ideally be excluded for the same reason, but as they are sometimes the only stations from which any estimate of magnitude can be made, they are used when necessary, with $N = 2$ and $\alpha = 0$.

Corrections are applied to allow for station characteristics. These include differences in site effects, frequency responses and magnifications of the instruments. Their determination is empirical, and made in such a manner as to give the most consistent estimates of magnitude from the different stations, and their absolute level is adjusted to give a standard Wood-Anderson instrument at Wellington a zero correction, a procedure that can be justified on a priori grounds and provides a smooth connection with New Zealand magnitudes published before 1977. Station corrections (Table 1) are added to the individual estimates of magnitude, which are then averaged. The trace amplitudes on which magnitude calculations are based are no longer published, but the number of measurements and the number of stations contributing to the average magnitude are listed. (e.g. "5M/4stn" appearing in a data summary indicates that 5 amplitude measurements of records from 4 stations were used to compute an average). When amplitude measurements from other stations are available, the BRZ and MSZ estimates are only given half weight in the calculation of the average magnitude.

Clyde and Taupo Networks

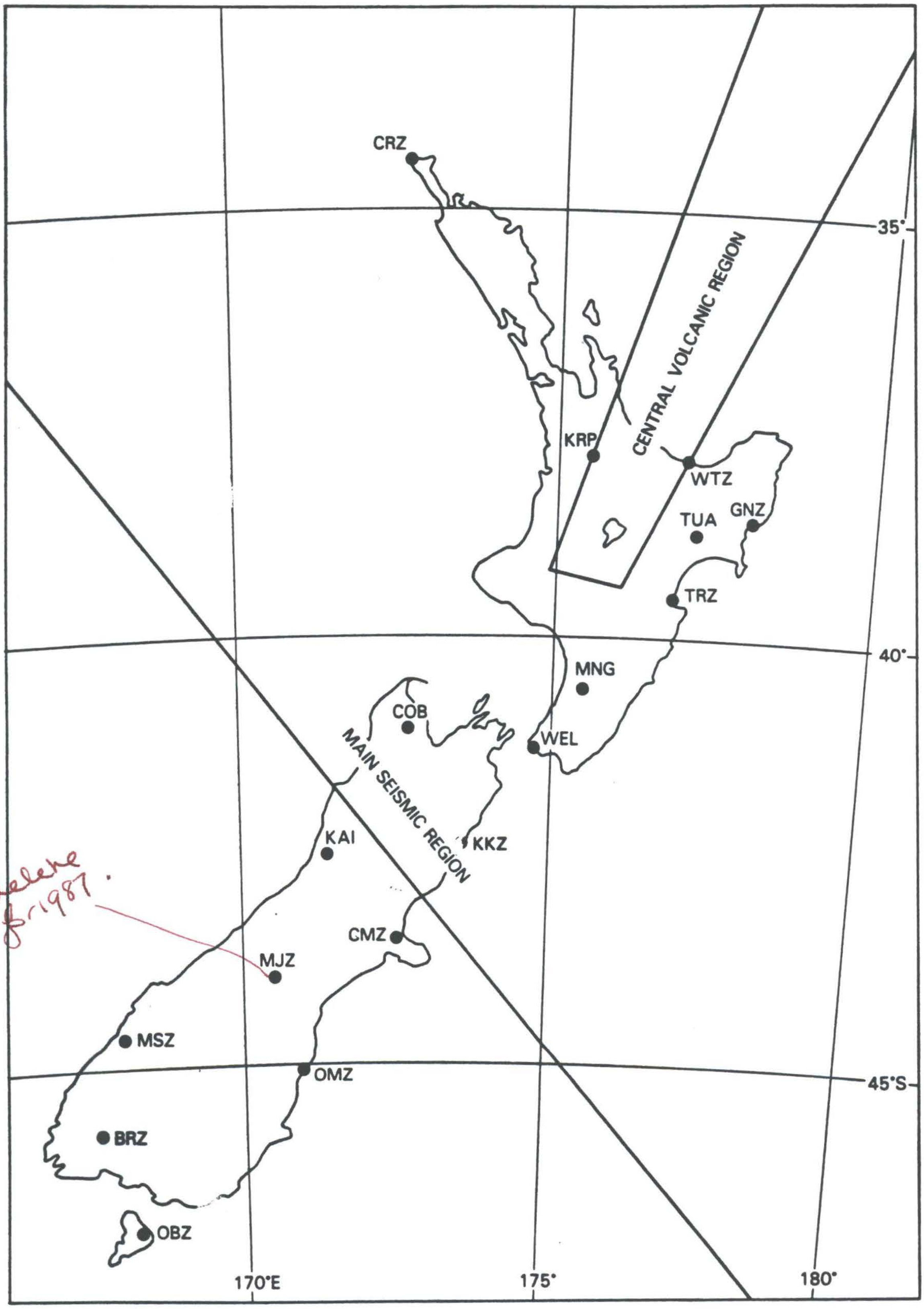
Neither the Clyde nor the Taupo network stations were used for magnitude determinations during 1986.

WELLINGTON NETWORK

Magnitudes are calculated using both the maximum amplitude on the viewing screen and the duration of the signal. The formulae are empirical, developed by R. Robinson for maximum consistency among stations. Both scales were calibrated against the Wood-Anderson determination at Wellington, for a selection of shocks that were large enough to record there. The formulae are listed below, where T_i is the duration in seconds at station i, A_i is the amplitude (in millimetres) on the viewing screen, R_i is the slant distance from the focus (in kilometres), and C_i and K_i are station corrections for determinations made from durations and amplitudes respectively. All of the individual estimates are averaged to give the final values which appear in the list of origins.

$$M_T = -0.8 + 2.30 \log_{10} T_i + C_i$$

$$M_A = \log_{10} A_i - 1.71 + 1.56 \log_{10} R_i + K_i$$



Stations and regions used in Standard Magnitude determinations.

DATA FROM THE STANDARD NETWORK

LAYOUT

The first entry for each earthquake is the reference number, used throughout the Report. The second line gives the origin coordinates and the magnitude and the third line shows, beneath each of the coordinates in line two, its standard error. Where depth has been restricted, the letter R or G in place of the standard error indicates the fact. The fourth line starts with Rsd, the standard deviation of residuals, an indication of how well the adopted origin reconciles the available data with the standard earth model used by the location program. Formally,

$$Rsd = \left[\sum_{i=1}^{n} \{(w_i\ r_i\ /\ 100)^2 / \ (n-m)\} \right]^{1/2}$$

where r_i is the ith residual, w_i its weight, n the number of readings and m the number of parameters determined. (4 for unrestricted depth, 3 when depth is restricted.) When the number of readings used and the number of parameters are the same, the standard errors and Rsd are not defined. This is shown by the letters ND. The remainder of the fourth line and most of the fifth line present information indicating to the reader the degree of constraint on the adopted origin. Xph/Ystn shows that X phases from Y stations were used in the determination of the origin. (All phases given non-zero weight are counted but stations which failed to provide such a phase are not). Dmin is the distance from the epicentre to the nearest of these Y stations and Az. gap is the greatest angular gap in their distribution about the epicentre.

Corr. is the correlation coefficient of the errors in latitude and longitude. It may be used to construct an epicentral confidence region. (See Flinn, E.A., 1965. "Confidence regions and error determinations for seismic event locations." Rev. Geophys. 3: 157-185.) pM/Qstn shows that p magnitude estimates from phases recorded at Q stations contributed to the average value shown on line two. Msd is the standard deviation of the magnitude estimates.

The numbers of upward and downward first motions recorded are indicated at the end of line five.

Additional information may be appended to the above. This usually consists of a short summary of the places where a shock has been felt and the intensities there, but may include other comments. Further details of reports received by the Observatory concerning the effects of earthquakes and the intensities assessed from these observations appear in later sections of this Report.

86/1
JAN 01 0847 37·0s 47·20S 165·23E 33km M=3·9
1·1 0·08 0·10 R
Rsd 0·5s 5ph/4stn Dmin 222km Az.gap 334°
Corr. -0·126 3M/2stn Msd 0·2

86/2
JAN 01 2054 28·7s 40·54S 172·45E 1km M=2·6
1·5 0·06 0·08 R
Rsd 0·6s 7ph/4stn Dmin 65km Az.gap 295°
Corr. -0·526 3M/2stn Msd 0·2
Felt Paturau (71) MM V.

86/3
JAN 02 0024 48·7s 37·59S 176·98E 1km M=3·5
0·6 0·03 0·04 R
Rsd 0·6s 6ph/5stn Dmin 19km Az.gap 177°
Corr. -0·591 4M/4stn Msd 0·3

86/4
JAN 02 2129 34·5s 36·89S 177·51E 33km M=3·7
1·2 0·07 0·05 R
Rsd 0·6s 10ph/7stn Dmin 77km Az.gap 263°
Corr. 0·272 4M/4stn Msd 0·3

86/5
JAN 03 1522 52·7s 37·54S 178·75E 53km M=3·4
3·5 0·11 0·27 24
Rsd 1·0s 7ph/5stn Dmin 40km Az.gap 307°
Corr. 0·017 4M/2stn Msd 0·2

86/6
JAN 04 1404 14·4s 41·83S 174·82E 48km M=3·7
0·4 0·03 0·04 6
Rsd 0·7s 22ph/16stn Dmin 47km Az.gap 173°
Corr. -0·627 5M/3stn Msd 0·2 2↑ 5↓

86/7
JAN 04 2057 47·2s 45·00S 167·65E 93km M=3·6
0·5 0·02 0·04 4
Rsd 0·4s 13ph/7stn Dmin 42km Az.gap 203°
Corr. -0·424 6M/3stn Msd 0·2 1↑

86/8
JAN 05 0305 38·5s 44·16S 169·37E 12km M=3·6
0·5 0·03 0·03 R
Rsd 0·8s 15ph/8stn Dmin 62km Az.gap 160°
Corr. -0·440 9M/5stn Msd 0·2

86/9
JAN 05 0918 10·6s 38·10S 177·87E 60km M=3·9
0·6 0·02 0·04 8
Rsd 0·6s 13ph/11stn Dmin 62km Az.gap 134°
Corr. -0·219 5M/3stn Msd 0·2 1↓

86/10
JAN 05 0945 01·9s 33·09S 179·87W 33km M=5·4
3·0 0·21 0·33 R
Rsd 1·4s 13ph/10stn Dmin 526km Az.gap 327°
Corr. -0·153 11M/8stn Msd 0·3

86/11
JAN 05 0951 03·1s 38·12S 177·87E 53km M=3·7
0·5 0·02 0·03 7
Rsd 0·5s 13ph/9stn Dmin 59km Az.gap 134°
Corr. -0·192 4M/2stn Msd 0·2

86/12
JAN 05 1037 12·1s 38·12S 177·87E 55km M=3·6
0·9 0·03 0·05 12
Rsd 0·6s 11ph/11stn Dmin 59km Az.gap 134°
Corr. -0·289 3M/2stn Msd 0·2 1↑

86/13
JAN 05 1541 55·0s 38·36S 176·81E 60km M=3·9
0·3 0·02 0·02 6
Rsd 0·6s 19ph/16stn Dmin 30km Az.gap 49°
Corr. -0·132 5M/4stn Msd 0·1 1↑

86/14
JAN 05 2317 06·1s 37·12S 177·55E 12km M=3·8
0·4 0·02 0·03 R
Rsd 0·3s 9ph/9stn Dmin 55km Az.gap 191°
Corr. 0·433 3M/3stn Msd 0·3

86/15
JAN 06 0809 08·1s 38·82S 175·93E 145km M=3·9
0·5 0·03 0·05 5
Rsd 0·7s 21ph/14stn Dmin 19km Az.gap 104°
Corr. -0·603 4M/3stn Msd 0·2 1↑2↓

86/16
JAN 06 1523 33·4s 38·64S 175·75E 172km M=4·4
0·6 0·03 0·05 5
Rsd 0·7s 27ph/17stn Dmin 7km Az.gap 104°
Corr. -0·658 6M/4stn Msd 0·1 5↑5↓

86/17
JAN 07 1532 47·3s 38·85S 178·95E 12km M=3·7
1·2 0·04 0·09 R
Rsd 0·6s 10ph/7stn Dmin 83km Az.gap 283°
Corr. -0·591 3M/2stn Msd 0·2 1↑

86/18
JAN 08 0135 54·4s 37·71S 176·40E 12km M=3·5
0·9 0·06 0·03 R
Rsd 0·9s 9ph/8stn Dmin 59km Az.gap 194°
Corr. -0·041 4M/3stn Msd 0·5

86/19
JAN 09 0117 03·0s 45·93S 166·47E 12km M=3·9
1·2 0·04 0·13 R
Rsd 0·7s 8ph/5stn Dmin 85km Az.gap 269°
Corr. 0·057 5M/3stn Msd 0·2

86/20
JAN 09 1522 44·7s 38·17S 176·23E 1km
R R R R
Rsd 0·6s 2ph/1stn Dmin 25km Az.gap 360°
Corr. R 0M/0stn Msd ND
Felt Tihiotonga (33). M less than 2·3.

86/21
JAN 09 2237 53·7s 41·88S 171·83E 12km M=3·7
0·4 0·03 0·04 R
Rsd 0·6s 16ph/12stn Dmin 79km Az.gap 187°
Corr. -0·688 7M/4stn Msd 0·2

86/22
JAN 10 0152 22·7s 38·76S 177·18E 33km M=3·4
0·5 0·03 0·05 4
Rsd 1·1s 20ph/14stn Dmin 6km Az.gap 123°
Corr. -0·454 3M/3stn Msd 0·2 1↓

86/23
JAN 10 0517 50·6s 34·73S 179·91W 343km M=5·3
1·3 0·14 0·21 12
Rsd 1·1s 24ph/18stn Dmin 356km Az.gap 315°
Corr. -0·548 6M/4stn Msd 0·1 1↑

86/24
JAN 10 1252 34·9s 38·50S 175·93E 8km M=3·0
0·3 0·02 0·03 3
Rsd 0·6s 16ph/11stn Dmin 21km Az.gap 121°
Corr. -0·324 3M/3stn Msd 0·2
Felt Waihora Road (40) MM IV.

86/25
JAN 10 1916 39·6s 37·13S 176·68E 422km M=4·7
0·6 0·04 0·05 5
Rsd 0·4s 17ph/12stn Dmin 98km Az.gap 157°
Corr. -0·075 7M/4stn Msd 0·4 2↑ 1↓

86/26
JAN 11 1513 46·1s 43·48S 170·24E 12km M=3·6
0·6 0·03 0·08 R
Rsd 0·9s 12ph/7stn Dmin 93km Az.gap 168°
Corr. -0·670 7M/5stn Msd 0·3
Felt Lilybank (106) MM V.

86/27
JAN 12 0746 04·2s 44·95S 167·32E 12km M=4·0
1·0 0·04 0·08 R
Rsd 0·8s 10ph/6stn Dmin 57km Az.gap 253°
Corr. -0·435 4M/2stn Msd 0·2

86/28
JAN 12 0810 29·0s 43·55S 170·50E 5km M=3·7
0·7 0·04 0·05 4
Rsd 0·7s 14ph/8stn Dmin 91km Az.gap 155°
Corr. -0·691 7M/5stn Msd 0·2
Felt Erewhon Station (107) MM IV.

86/29
JAN 12 0810 50·7s 43·55S 170·50E 5km M=3·7
R R R R
Rsd 0·7s 8ph/8stn Dmin 90km Az.gap 155°
Corr. R 4M/4stn Msd 0·3

86/30
JAN 14 0129 40·0s 43·84S 168·83E 33km M=3·5
0·9 0·05 0·04 R
Rsd 0·6s 9ph/6stn Dmin 116km Az.gap 259°
Corr. -0·356 7M/4stn Msd 0·2

86/31
JAN 14 1726 22·8s 37·62S 177·20E 5km M=3·6
0·4 0·03 0·03 5
Rsd 0·9s 12ph/8stn Dmin 11km Az.gap 135°
Corr. -0·315 5M/3stn Msd 0·3
Largest shock of a small swarm.

86/32
JAN 15 0849 09·1s 49·28S 164·41E 33km M=4·0
1·8 0·09 0·29 R
Rsd 1·0s 9ph/6stn Dmin 382km Az.gap 250°
Corr. -0·548 6M/3stn Msd 0·2

86/33
JAN 16 1656 19·2s 47·69S 165·45E 33km M=3·9
1·4 0·10 0·12 R
Rsd 0·5s 6ph/4stn Dmin 219km Az.gap 322°
Corr. 0·081 4M/2stn Msd 0·1

86/34
JAN 16 2037 50·7s 40·81S 175·14E 25km M=3·9
0·1 0·02 0·02 2
Rsd 0·6s 25ph/20stn Dmin 20km Az.gap 71°
Corr. -0·436 6M/5stn Msd 0·3 2↑ 3↓
Felt Paraparaumu (65) MM V; Waikawa Beach (65) MM IV; Kelburn (68) MM III.

86/35
JAN 16 2128 20·4s 38·13S 176·30E 1km M=2·6
0·1 0·01 0·01 R
Rsd 0·1s 5ph/3stn Dmin 21km Az.gap 193°
Corr. 0·551 1M/1stn Msd ND
Felt Rotorua, Whakarewarewa (33) MM V.

86/36
JAN 17 0432 40·2s 39·27S 173·83E 16km
0·7 0·03 0·05 5
Rsd 0·4s 14ph/8stn Dmin 23km Az.gap 260°
Corr. -0·720 0M/0stn Msd ND

86/37
JAN 17 1412 39·7s 35·60S 179·28E 33km M=4·5
2·2 0·10 0·18 R
Rsd 0·8s 15ph/11stn Dmin 238km Az.gap 300°
Corr. 0·601 8M/5stn Msd 0·2

86/38
JAN 17 2046 00·9s 36·86S 177·43E 179km M=4·1
1·5 0·11 0·08 10
Rsd 0·8s 11ph/9stn Dmin 77km Az.gap 263°
Corr. 0·071 3M/2stn Msd 0·1

86/39
JAN 18 1140 18·0s 45·28S 166·65E 12km M=3·5
0·9 0·04 0·09 R
Rsd 0·6s 10ph/6stn Dmin 121km Az.gap 268°
Corr. -0·500 6M/3stn Msd 0·2

86/40
JAN 19 0752 11·4s 45·39S 167·21E 78km M=3·4
0·8 0·03 0·06 11
Rsd 0·6s 12ph/6stn Dmin 97km Az.gap 237°
Corr. -0·358 6M/3stn Msd 0·2

86/41
JAN 19 1028 53·7s 45·28S 166·91E 12km M=3·4
1·2 0·04 0·10 R
Rsd 0·7s 9ph/5stn Dmin 104km Az.gap 257°
Corr. -0·273 7M/4stn Msd 0·3

86/42
JAN 20 0634 53·1s 47·97S 166·04E 33km M=4·4
0·9 0·04 0·12 R
Rsd 0·7s 12ph/7stn Dmin 196km Az.gap 224°
Corr. -0·300 6M/4stn Msd 0·2

86/43
JAN 20 1903 58·7s 47·97S 165·96E 33km M=4·3
0·6 0·03 0·09 R
Rsd 0·5s 11ph/7stn Dmin 201km Az.gap 226°
Corr. -0·341 6M/4stn Msd 0·2

86/44
JAN 20 2337 35·7s 38·61S 177·41E 23km
0·3 0·03 0·02 2
Rsd 0·5s 9ph/5stn Dmin 32km Az.gap 156°
Corr. -0·199 0M/0stn Msd ND

86/45
JAN 21 0118 08·5s 38·33S 176·04E 203km M=4·7
0·7 0·03 0·05 6
Rsd 0·8s 22ph/17stn Dmin 35km Az.gap 78°
Corr. -0·242 3M/2stn Msd 0·2 6↑ 4↓

86/46
JAN 21 1422 17·7s 46·14S 165·95E 12km M=4·2
1·0 0·04 0·09 R
Rsd 0·6s 9ph/5stn Dmin 187km Az.gap 286°
Corr. 0·130 6M/3stn Msd 0·2

86/47
JAN 23 0144 22·2s 40·19S 174·95E 12km M=4·2
0·2 0·01 0·02 R
Rsd 0·7s 23ph/16stn Dmin 66km Az.gap 100°
Corr. -0·164 6M/5stn Msd 0·3 6↑ 2↓
Felt Himatangi Beach (61) MM V; Waikawa Beach (65) MM IV; Ahuahu Valley, Wanganui (57).

86/48
JAN 23 0635 03·2s 47·16S 165·17E 33km M=4·2
0·9 0·05 0·10 R
Rsd 0·7s 10ph/6stn Dmin 225km Az.gap 243°
Corr. -0·131 4M/3stn Msd 0·1

86/49
JAN 23 1410 04·8s 37·33S 179·60E 33km M=3·8
1·1 0·05 0·10 R
Rsd 0·7s 12ph/9stn Dmin 119km Az.gap 296°
Corr. -0·036 6M/4stn Msd 0·2

86/50
JAN 24 1625 03·3s 45·02S 167·66E 123km M=3·4
1·0 0·08 0·06 8
Rsd 0·5s 8ph/5stn Dmin 44km Az.gap 274°
Corr. 0·475 3M/2stn Msd 0·2

86/51
JAN 24 1902 02·5s 44·92S 167·67E 101km M=4·1
0·7 0·04 0·05 5
Rsd 0·4s 10ph/6stn Dmin 34km Az.gap 279°
Corr. 0·290 3M/2stn Msd 0·2

86/52
JAN 25 0353 41·1s 37·98S 176·60E 12km M=3·5
1·2 0·07 0·05 R
Rsd 1·0s 7ph/4stn Dmin 30km Az.gap 208°
Corr. 0·059 4M/3stn Msd 0·4
Felt Kawerau (34).

86/53
JAN 25 0419 36·6s 37·99S 176·59E 12km M=3·6
0·9 0·06 0·04 R
Rsd 1·0s 8ph/5stn Dmin 28km Az.gap 207°
Corr. 0·456 5M/3stn Msd 0·4
Felt Kawerau (34). Smaller shock at 04h 03m also felt at Kawerau.

86/54
JAN 25 1141 03·5s 37·11S 177·33E 147km M=4·1
1·7 0·11 0·07 16
Rsd 1·0s 10ph/6stn Dmin 102km Az.gap 243°
Corr. 0·008 5M/3stn Msd 0·2

86/55
JAN 25 1730 38·0s 38·29S 176·08E 198km M=4·1
0·8 0·05 0·05 6
Rsd 0·5s 13ph/9stn Dmin 63km Az.gap 154°
Corr. -0·303 4M/3stn Msd 0·1 2↑ 3↓

86/56
JAN 27 0328 41·4s 39·62S 174·35E 275km M=4·0
0·7 0·04 0·06 7
Rsd 0·5s 14ph/11stn Dmin 45km Az.gap 111°
Corr. -0·549 4M/3stn Msd 0·2 1↑ 1↓

86/57
JAN 27 0846 35·7s 41·10S 174·64E 31km
0·2 0·02 0·02 1
Rsd 0·5s 14ph/13stn Dmin 16km Az.gap 110°
Corr. -0·016 0M/0stn Msd ND 2↑ 3↓
Felt Titahi Bay (68).

86/58
JAN 27 1635 28·7s 42·20S 172·72E 5km M=3·9
0·3 0·02 0·03 R
Rsd 0·7s 14ph/13stn Dmin 45km Az.gap 109°
Corr. -0·264 7M/5stn Msd 0·2 1↓

86/59
JAN 29 1912 02·8s 37·71S 178·78E 32km M=3·8
0·6 0·02 0·05 1
Rsd 0·2s 8ph/6stn Dmin 44km Az.gap 286°
Corr. 0·399 4M/2stn Msd 0·2

86/60
JAN 29 2044 44·7s 37·82S 178·66E 26km M=3·9
1·7 0·08 0·18 7
Rsd 0·7s 7ph/5stn Dmin 40km Az.gap 264°
Corr. 0·608 2M/1stn Msd 0·1

86/61
JAN 29 2222 52·2s 37·79S 178·67E 28km M=3·7
0·3 0·01 0·03 0
Rsd 0·1s 7ph/6stn Dmin 39km Az.gap 269°
Corr. 0·240 3M/2stn Msd 0·2 1↓

86/62
JAN 30 0901 58·5s 40·81S 174·23E 67km M=3·4
0·6 0·04 0·03 11
Rsd 0·6s 16ph/15stn Dmin 45km Az.gap 100°
Corr. -0·266 3M/2stn Msd 0·1 3↑ 1↓

86/63
FEB 01 0459 45·6s 37·80S 178·66E 33km M=4·0
1·3 0·04 0·13 R
Rsd 0·6s 8ph/6stn Dmin 39km Az.gap 267°
Corr. 0·440 5M/4stn Msd 0·1 1↓
Several aftershocks at HBZ with S-P 6 seconds.

86/64
FEB 01 1105 06·9s 35·91S 179·47E 33km M=4·6
2·6 0·17 0·20 R
Rsd 0·9s 6ph/4stn Dmin 215km Az.gap 326°
Corr. 0·315 3M/3stn Msd 0·4

86/65
FEB 01 1827 04·9s 44·19S 169·65E 12km M=3·4
0·5 0·03 0·03 R
Rsd 0·6s 10ph/6stn Dmin 40km Az.gap 150°
Corr. -0·080 5M/3stn Msd 0·3

86/66
FEB 02 1342 54·3s 40·39S 173·54E 163km M=4·0
0·9 0·03 0·05 8
Rsd 0·6s 14ph/11stn Dmin 103km Az.gap 160°
Corr. -0·188 4M/3stn Msd 0·1 3↑ 2↓

86/67
FEB 02 1639 41·9s 45·17S 167·27E 81km M=3·5
1·0 0·05 0·07 14
Rsd 0·6s 10ph/6stn Dmin 76km Az.gap 241°
Corr. -0·303 4M/2stn Msd 0·1

86/68
FEB 03 0025 34·6s 45·07S 167·57E 100km M=3·5
0·5 0·02 0·03 3
Rsd 0·3s 10ph/5stn Dmin 52km Az.gap 224°
Corr. -0·252 6M/3stn Msd 0·3

86/69
FEB 04 0034 50·3s 38·36S 176·94E 98km M=3·5
1·4 0·08 0·06 17
Rsd 1·3s 12ph/10stn Dmin 40km Az.gap 124°
Corr. -0·127 2M/1stn Msd 0·2
A strong second phase at MNG and Wellington net stations fits a P* velocity. KIW (S) fits S* The depth may be shallower than 98kms.

86/70
FEB 04 1435 17·2s 44·54S 170·11E 9km M=3·4
0·2 0·02 0·03 4
Rsd 0·4s 10ph/5stn Dmin 25km Az.gap 132°
Corr. 0·382 4M/2stn Msd 0·5

86/71
FEB 05 1533 20·1s 38·96S 175·46E 129km M=3·6
0·7 0·03 0·05 7
Rsd 0·7s 19ph/12stn Dmin 27km Az.gap 110°
Corr. -0·311 6M/4stn Msd 0·2 1↑ 1↓

86/72
FEB 05 2153 50·8s 39·21S 176·20E 90km M=3·7
0·4 0·02 0·03 5
Rsd 0·6s 25ph/15stn Dmin 33km Az.gap 69°
Corr. -0·695 9M/5stn Msd 0·3

86/73
FEB 05 2157 31·9s 45·92S 165·68E 33km M=4·1
0·8 0·07 0·10 R
Rsd 0·4s 7ph/4stn Dmin 224km Az.gap 321°
Corr. -0·594 3M/2stn Msd 0·1

86/74
FEB 06 1103 44·4s 35·62S 178·84E 229km M=4·3
0·9 0·09 0·09 9
Rsd 0·5s 10ph/6stn Dmin 224km Az.gap 324°
Corr. 0·024 7M/4stn Msd 0·3

86/75
FEB 07 1110 23·0s 45·66S 166·68E 1km M=4·0
1·1 0·03 0·09 R
Rsd 0·8s 12ph/6stn Dmin 147km Az.gap 260°
Corr. -0·087 8M/5stn Msd 0·2

86/76
FEB 07 1643 47·6s 38·61S 176·02E 158km M=3·5
0·8 0·04 0·05 7
Rsd 0·8s 19ph/12stn Dmin 60km Az.gap 86°
Corr. -0·538 8M/5stn Msd 0·3 1↑I 1↓

86/77
FEB 07 2327 27·5s 45·26S 167·26E 103km M=4·0
0·6 0·03 0·05 6
Rsd 0·5s 12ph/6stn Dmin 83km Az.gap 239°
Corr. -0·320 6M/3stn Msd 0·2

86/78
FEB 08 0545 39·6s 38·89S 177·51E 33km M=3·7
0·6 0·04 0·07 R
Rsd 1·3s 15ph/14stn Dmin 32km Az.gap 155°
Corr. -0·388 6M/4stn Msd 0·2 2↓

86/79
FEB 08 1551 02·9s 38·19S 176·21E 1km M=3·0
0·3 0·02 0·02 R
Rsd 0·4s 6ph/5stn Dmin 26km Az.gap 165°
Corr. -0·120 4M/4stn Msd 0·2
Felt Tihiotonga (33) MM IV. Several smaller shocks recorded at TAZ.

86/80
FEB 08 2203 35·7s 37·17S 177·50E 141km M=3·4
0·6 0·05 0·04 4
Rsd 0·3s 9ph/7stn Dmin 86km Az.gap 268°
Corr. -0·307 6M/3stn Msd 0·3

86/81
FEB 09 1858 46·5s 40·23S 175·30E 1km M=4·2
0·3 0·02 0·05 R
Rsd 1·0s 16ph/12stn Dmin 78km Az.gap 108°
Corr. -0·496 5M/3stn Msd 0·6 2↑ 2↓
Felt Feilding (62) MM IV, Bulls, Foxton (61).

86/82
FEB 09 2043 56·3s 38·10S 176·25E 1km
R R R R
Rsd 0·1s 2ph/1stn Dmin 27km Az.gap 360°
Corr. R 0M/0stn Msd ND
Felt Rotorua (33) MM IV, Tihiotonga (33) MM III. Magnitude 2 or less.

86/83
FEB 10 0903 27·9s 39·37S 175·38E 79km M=3·8
0·5 0·03 0·05 8
Rsd 1·0s 24ph/20stn Dmin 24km Az.gap 105°
Corr. -0·477 9M/5stn Msd 0·2 1↑ 1↓

86/84
FEB 10 1610 41·1s 38·98S 176·15E 86km M=3·8
0·5 0·03 0·04 7
Rsd 1·0s 22ph/16stn Dmin 34km Az.gap 60°
Corr. -0·392 8M/5stn Msd 0·2

86/85
FEB 10 1725 51·0s 45·01S 167·58E 96km M=3·8
0·5 0·02 0·04 4
Rsd 0·3s 12ph/6stn Dmin 46km Az.gap 226°
Corr. -0·255 6M/3stn Msd 0·3 1↑

86/86
FEB 10 1956 21·4s 39·18S 173·83E 12km M=4·0
0·4 0·03 0·03 R
Rsd 0·5s 18ph/13stn Dmin 25km Az.gap 204°
Corr. -0·682 5M/3stn Msd 0·2
Felt Okato (46) MM V, Warea (46) MM IV, New Plymouth (47).

86/87
FEB 11 0903 28·3s 39·37S 174·79E 49km M=3·5
0·3 0·02 0·02 5
Rsd 0·4s 18ph/11stn Dmin 60km Az.gap 102°
Corr. -0·371 3M/2stn Msd 0·1 1↓

86/88
FEB 11 1509 19·3s 38·79S 175·90E 12km M=3·3
0·2 0·02 0·03 R
Rsd 0·8s 14ph/13stn Dmin 14km Az.gap 96°
Corr. -0·566 5M/5stn Msd 0·2

86/89
FEB 11 1509 41·3s 38·82S 175·93E 10km M=3·7
0·2 0·01 0·02 2
Rsd 0·6s 19ph/15stn Dmin 15km Az.gap 101°
Corr. -0·577 9M/7stn Msd 0·2

86/90
FEB 12 0623 53·2s 41·43S 172·31E 12km M=3·4
0·8 0·02 0·07 R
Rsd 0·6s 9ph/6stn Dmin 52km Az.gap 193°
Corr. 0·180 5M/3stn Msd 0·1 1↓
Felt MM IV Arapito (74).

86/91
FEB 12 0645 50·4s 44·11S 168·09E 12km M=4·7
1·1 0·07 0·08 R
Rsd 0·9s 10ph/8stn Dmin 64km Az.gap 225°
Corr. -0·568 7M/4stn Msd 0·2 1↑ 1↓

86/92
FEB 12 2232 32·3s 40·04S 176·92E 33km M=4·9
0·4 0·03 0·05 R
Rsd 0·7s 19ph/19stn Dmin 55km Az.gap 179°
Corr. -0·609 11M/9stn Msd 0·3 4↑ 6↓
Felt Hawkes Bay to Wanganui. Maximum intensity MM V at Table Flat (58), Mount Vernon and Waipukurau (60).

86/93
FEB 13 1426 14·4s 40·87S 176·31E 37km M=3·7
0·9 0·04 0·07 5
Rsd 0·6s 15ph/9stn Dmin 8km Az.gap 200°
Corr. -0·651 3M/2stn Msd 0·1 2↑

86/94
FEB 14 0622 32·7s 36·88S 177·54E 12km M=3·8
0·6 0·04 0·05 R
Rsd 0·4s 8ph/7stn Dmin 78km Az.gap 209°
Corr. 0·284 5M/3stn Msd 0·4 1↓

86/95
FEB 15 0705 30·4s 39·87S 174·49E 109km M=3·5
0·7 0·03 0·04 9
Rsd 0·5s 12ph/7stn Dmin 75km Az.gap 106°
Corr. -0·476 3M/2stn Msd 0·3 2↓

86/96
FEB 16 0421 12·9s 38·70S 175·81E 163km M=3·8
1·0 0·04 0·05 9
Rsd 0·6s 12ph/8stn Dmin 19km Az.gap 142°
Corr. -0·354 6M/4stn Msd 0·3 2↑ 1↓

86/97
FEB 16 1300 35·4s 37·93S 176·26E 199km M=3·7
0·8 0·06 0·08 7
Rsd 0·6s 12ph/7stn Dmin 65km Az.gap 236°
Corr. -0·688 7M/4stn Msd 0·3 1↓

86/98
FEB 16 2142 13·5s 39·03S 175·79E 101km M=3·6
0·4 0·02 0·04 4
Rsd 0·4s 15ph/8stn Dmin 15km Az.gap 114°
Corr. -0·554 4M/2stn Msd 0·1 2↑

86/99
FEB 17 0034 09·4s 37·31S 177·41E 100km M=4·0
0·6 0·05 0·03 4
Rsd 0·4s 15ph/11stn Dmin 31km Az.gap 225°
Corr. 0·199 6M/3stn Msd 0·1 1↑

86/100
FEB 17 0222 53·8s 32·05S 179·75W 527km M=5·2
1·1 0·12 0·21 32
Rsd 0·6s 14ph/9stn Dmin 638km Az.gap 333°
Corr. 0·068 8M/5stn Msd 0·2

86/101
FEB 17 0748 10·1s 37·32S 177·61E 12km M=3·6
0·7 0·05 0·03 R
Rsd 0·7s 16ph/10stn Dmin 43km Az.gap 175°
Corr. -0·080 7M/4stn Msd 0·3

86/102
FEB 17 1056 10·8s 41·24S 175·18E 19km M=2·9
0·2 0·01 0·01 2
Rsd 0·3s 12ph/10stn Dmin 16km Az.gap 93°
Corr. -0·052 4M/3stn Msd 0·2 3↑ 4↓
Felt MM IV Karori (68).

86/103
FEB 17 1108 23·2s 41·19S 172·71E 219km M=3·9
0·6 0·03 0·05 4
Rsd 0·3s 14ph/9stn Dmin 11km Az.gap 201°
Corr. -0·301 6M/4stn Msd 0·2 3↑

86/104
FEB 18 1458 49·5s 42·08S 173·68E 23km M=3·6
0·4 0·05 0·04 8
Rsd 0·7s 13ph/7stn Dmin 38km Az.gap 132°
Corr. -0·317 6M/4stn Msd 0·4 1↑

86/105
FEB 18 1815 44·5s 36·91S 176·93E 290km M=4·4
0·6 0·06 0·05 5
Rsd 0·4s 15ph/10stn Dmin 119km Az.gap 256°
Corr. -0·317 9M/5stn Msd 0·3

86/106
FEB 19 0716 31·6s 37·48S 177·72E 114km M=4·5
0·6 0·03 0·03 5
Rsd 0·5s 21ph/18stn Dmin 47km Az.gap 161°
Corr. -0·091 6M/4stn Msd 0·2 5↑ 3↓

86/107
FEB 20 0528 55·0s 32·05S 178·94W 452km M=5·8
1·0 0·08 0·16 18
Rsd 0·5s 19ph/17stn Dmin 665km Az.gap 333°
Corr. -0·126 8M/5stn Msd 0·2 1↑

86/108
FEB 20 0746 06·7s 37·76S 178·81E 28km M=4·2
0·5 0·02 0·04 2
Rsd 0·3s 13ph/10stn Dmin 48km Az.gap 283°
Corr. 0·096 10M/5stn Msd 0·2 2↓
Small aftershocks recorded at HBZ.

86/109
FEB 20 1226 43·5s 40·04S 175·73E 53km M=3·5
0·3 0·01 0·03 5
Rsd 0·4s 18ph/11stn Dmin 67km Az.gap 145°
Corr. -0·308 5M/4stn Msd 0·1 2↑ 3↓

86/110
FEB 20 1827 57·6s 37·28S 177·25E 12km M=3·8
1·0 0·06 0·04 R
Rsd 0·8s 14ph/7stn Dmin 28km Az.gap 227°
Corr. -0·550 7M/4stn Msd 0·4 1↑

86/111
FEB 21 1524 51·1s 38·40S 176·03E 164km M=4·2
0·6 0·03 0·04 6
Rsd 0·7s 20ph/12stn Dmin 46km Az.gap 82°
Corr. -0·223 7M/4stn Msd 0·4 3↑ 1↓

86/112
FEB 23 0342 52·6s 37·78S 179·04E 33km M=3·5
2·0 0·07 0·17 R
Rsd 0·9s 10ph/4stn Dmin 68km Az.gap 296°
Corr. 0·234 3M/2stn Msd 0·2 1↓

86/113
FEB 23 1225 42·9s 40·39S 173·35E 171km M=4·5
0·7 0·03 0·05 7
Rsd 0·7s 23ph/16stn Dmin 94km Az.gap 173°
Corr. -0·525 8M/5stn Msd 0·2 2↓

86/114
FEB 24 0520 15·3s 38·73S 177·47E 65km M=3·4
0·6 0·03 0·04 8
Rsd 0·6s 15ph/8stn Dmin 49km Az.gap 141°
Corr. -0·050 4M/2stn Msd 0·3 1↓

86/115
FEB 24 1624 56·2s 37·81S 176·48E 181km M=5·0
0·7 0·03 0·05 7
Rsd 0·7s 20ph/17stn Dmin 49km Az.gap 90°
Corr. -0·289 3M/2stn Msd 0·6 7↑ 6↓
Felt MM IV Wellington (68).

86/116
FEB 24 2033 56·8s 38·09S 176·03E 201km M=4·7
0·8 0·05 0·05 6
Rsd 0·6s 19ph/14stn Dmin 44km Az.gap 142°
Corr. -0·478 7M/5stn Msd 0·2 4↑ 2↓

86/117
FEB 25 0011 03·3s 39·42S 174·46E 201km M=4·5
0·6 0·03 0·04 6
Rsd 0·7s 24ph/15stn Dmin 35km Az.gap 92°
Corr. -0·562 7M/4stn Msd 0·3 3↑ 1↓

86/118
FEB 26 1748 15·3s 36·22S 178·32E 12km M=4·2
1·5 0·09 0·13 R
Rsd 0·6s 9ph/6stn Dmin 153km Az.gap 309°
Corr. 0·061 3M/2stn Msd 0·4 1↑

86/119
FEB 27 0314 36·7s 44·77S 167·76E 75km M=3·6
0·4 0·02 0·04 2
Rsd 0·1s 6ph/4stn Dmin 16km Az.gap 299°
Corr. 0·289 1M/1stn Msd ND 1↑

86/120
FEB 28 1141 18·7s 38·38S 177·14E 33km M=3·4
0·3 0·03 0·04 4
Rsd 0·8s 12ph/9stn Dmin 46km Az.gap 67°
Corr. 0·003 10M/6stn Msd 0·2 3↑ 1↓

86/121
FEB 28 1406 07·8s 40·42S 178·59E 33km M=3·7
1·4 0·09 0·13 R
Rsd 0·4s 6ph/4stn Dmin 179km Az.gap 269°
Corr. -0·849 8M/5stn Msd 0·2 1↑

86/122
FEB 28 1517 08·9s 44·58S 167·97E 26km M=4·4
0·7 0·09 0·09 6
Rsd 0·8s 9ph/6stn Dmin 11km Az.gap 240°
Corr. 0·539 7M/4stn Msd 0·2 1↓

86/123
FEB 28 2349 39·9s 35·40S 178·28E 33km M=4·6
0·8 0·05 0·05 R
Rsd 0·3s 7ph/5stn Dmin 243km Az.gap 290°
Corr. 0·847 5M/3stn Msd 0·1

86/124
MAR 01 0501 10·9s 45·51S 167·34E 12km M=3·5
1·0 0·03 0·08 R
Rsd 0·4s 7ph/4stn Dmin 104km Az.gap 227°
Corr. 0·461 4M/2stn Msd 0·3 1↓
Five other smaller events were recorded on this day with S-P times at MSZ of less than 13 seconds.

86/125
MAR 01 1326 46·4s 38·27S 179·50W 33km M=4·0
ND ND ND R
Rsd ND 3ph/2stn Dmin 207km Az.gap 328°
Corr. ND 2M/1stn Msd 0·2 1↑

86/126
MAR 02 0349 29·4s 37·01S 177·91E 133km M=4·1
0·4 0·03 0·02 3
Rsd 0·2s 6ph/4stn Dmin 74km Az.gap 269°
Corr. 0·011 4M/2stn Msd 0·2 1↑ 1↓

86/127
MAR 02 2014 39·6s 39·52S 175·85E 33km M=3·4
0·3 0·01 0·05 R
Rsd 0·4s 9ph/7stn Dmin 40km Az.gap 197°
Corr. -0·060 3M/2stn Msd 0·2 1↑ 1↓

86/128
MAR 02 2330 21·9s 34·68S 179·52E 259km M=5·1
1·3 0·17 0·15 28
Rsd 0·4s 10ph/6stn Dmin 341km Az.gap 332°
Corr. -0·377 9M/6stn Msd 0·1

86/129
MAR 04 0125 40·6s 37·00S 179·10E 12km M=4·4
4·6 0·16 0·47 R
Rsd 1·0s 6ph/5stn Dmin 97km Az.gap 336°
Corr. -0·375 3M/2stn Msd 0·3 1↓
This event is associated with the one at 07h 10m 52·7s and another at 00h 00m, not listed here.

86/130
MAR 04 0408 21·4s 37·76S 176·67E 12km M=3·6
0·2 0·02 0·02 R
Rsd 0·5s 7ph/5stn Dmin 37km Az.gap 162°
Corr. -0·401 3M/2stn Msd 0·1
This event is probably associated with listed events occurring at 12h 42m, 17h 04m, and 17h 06m. At least 10 other events, probably in this sequence, were observed at WTZ but not located.

86/131
MAR 04 0710 53·2s 36·94S 178·89E 12km M=4·2
3·2 0·18 0·26 R
Rsd 0·6s 5ph/4stn Dmin 89km Az.gap 326°
Corr. 0·299 2M/2stn Msd 0·4

86/132
MAR 04 0856 58·3s 36·97S 176·96E 244km M=5·4
1·6 0·06 0·07 13
Rsd 0·6s 11ph/10stn Dmin 66km Az.gap 179°
Corr. 0·452 9M/5stn Msd 0·3 3↑ 2↓

86/133
MAR 04 1201 11·5s 33·78S 178·14W 33km M=5·3
1·5 0·12 0·16 R
Rsd 0·3s 6ph/5stn Dmin 532km Az.gap 347°
Corr. -0·285 5M/3stn Msd 0·2

86/134
MAR 04 1242 40·7s 37·58S 177·03E 12km M=3·4
1·1 0·07 0·09 R
Rsd 0·7s 5ph/5stn Dmin 15km Az.gap 216°
Corr. -0·868 2M/2stn Msd 0·4 1↑

86/135
MAR 04 1526 28·8s 38·07S 177·80E 32km M=3·4
1·2 0·04 0·05 12
Rsd 0·6s 6ph/4stn Dmin 68km Az.gap 175°
Corr. -0·386 3M/2stn Msd 0·1 2↓

86/136
MAR 04 1704 57·7s 37·49S 176·97E 12km M=3·7
0·4 0·03 0·02 R
Rsd 0·5s 7ph/6stn Dmin 20km Az.gap 207°
Corr. -0·438 3M/2stn Msd 0·2

86/137
MAR 04 1706 07·2s 37·47S 176·92E 12km M=3·6
4·7 0·22 0·25 R
Rsd 0·7s 4ph/3stn Dmin 24km Az.gap 283°
Corr. -0·967 1M/1stn Msd ND

86/138
MAR 05 0503 02·6s 38·41S 176·04E 200km M=3·7
1·2 0·05 0·08 11
Rsd 0·6s 9ph/6stn Dmin 70km Az.gap 117°
Corr. -0·631 5M/3stn Msd 0·3 1↑

86/139
MAR 05 0711 08·0s 37·72S 178·91E 33km M=4·6
1·5 0·06 0·14 R
Rsd 0·6s 10ph/8stn Dmin 55km Az.gap 298°
Corr. -0·013 9M/5stn Msd 0·1 1↑

86/140
MAR 05 0713 39·5s 37·15S 179·56E 33km M=4·3
2·6 0·41 0·32 R
Rsd 0·6s 6ph/4stn Dmin 122km Az.gap 347°
Corr. -0·642 3M/2stn Msd 0·1

86/141
MAR 05 0732 28·1s 37·61S 179·98W 33km M=4·3
1·6 0·07 0·15 R
Rsd 0·4s 8ph/6stn Dmin 151km Az.gap 327°
Corr. -0·235 1M/1stn Msd ND 1↑

86/142
MAR 05 2257 51·5s 33·98S 177·90W 33km M=5·2
1·0 0·08 0·12 R
Rsd 0·3s 9ph/7stn Dmin 528km Az.gap 331°
Corr. -0·432 12M/9stn Msd 0·3
USGS origin 34·281S 178·871W 33R

86/143
MAR 06 1657 00·4s 38·21S 178·78E 36km M=3·7
1·1 0·02 0·09 9
Rsd 0·3s 7ph/5stn Dmin 80km Az.gap 266°
Corr. -0·591 5M/3stn Msd 0·1 1↓

86/144
MAR 06 2211 49·6s 37·74S 179·86W 33km M=4·5
2·2 0·07 0·20 R
Rsd 0·7s 11ph/9stn Dmin 163km Az.gap 299°
Corr. 0·408 11M/6stn Msd 0·2 1↑ 1↓

86/145
MAR 07 1955 52·9s 41·69S 171·99E 12km M=4·0
0·5 0·02 0·04 R
Rsd 0·6s 11ph/8stn Dmin 72km Az.gap 187°
Corr. -0·264 7M/5stn Msd 0·3 1↓
Felt Greymouth (92) MM 4.

86/146
MAR 08 1618 05·9s 39·32S 175·23E 33km M=3·7
1·9 0·13 0·11 R
Rsd 0·6s 4ph/3stn Dmin 157km Az.gap 296°
Corr. 0·795 5M/4stn Msd 0·5 1↓

86/147
MAR 09 0917 51·5s 40·33S 173·42E 220km M=5·6
0·7 0·05 0·06 8
Rsd 0·8s 17ph/17stn Dmin 102km Az.gap 173°
Corr. -0·561 9M/5stn Msd 0·3 6↑ 6↓
Felt throughout central New Zealand with maximum intensity MM V from Patoka (52) to Rangiora (102).

86/148
MAR 10 0356 59·3s 36·87S 177·22E 223km M=4·8
1·1 0·08 0·08 9
Rsd 0·5s 11ph/8stn Dmin 73km Az.gap 259°
Corr. 0·162 11M/6stn Msd 0·2 2↓

86/149
MAR 10 1137 30·9s 40·54S 173·56E 169km M=3·9
0·6 0·04 0·03 4
Rsd 0·3s 11ph/8stn Dmin 93km Az.gap 225°
Corr. -0·429 5M/3stn Msd 0·1 4↑

86/150
MAR 11 0506 57·7s 38·78S 175·24E 247km M=4·1
1·3 0·06 0·12 11
Rsd 0·8s 10ph/7stn Dmin 53km Az.gap 135°
Corr. -0·240 2M/1stn Msd 0·1 2↑ 2↓

86/151
MAR 11 0651 07·3s 38·49S 176·08E 188km M=3·8
1·8 0·07 0·09 15
Rsd 0·6s 8ph/7stn Dmin 79km Az.gap 133°
Corr. 0·408 3M/2stn Msd 0·1 2↑ 1↓

86/152
MAR 11 0920 25·7s 36·85S 177·40E 249km M=3·9
0·9 0·26 0·39 29
Rsd 0·3s 9ph/5stn Dmin 206km Az.gap 317°
Corr. -0·971 4M/2stn Msd 0·2

86/153
MAR 11 1357 35·3s 39·64S 174·14E 202km M=4·0
0·7 0·04 0·05 7
Rsd 0·5s 10ph/8stn Dmin 41km Az.gap 139°
Corr. -0·525 4M/2stn Msd 0·3 1↑ 2↓

86/154
MAR 11 1439 22·1s 34·97S 178·20W 33km M=4·4
ND ND ND R
Rsd ND 3ph/3stn Dmin 528km Az.gap 348°
Corr. ND 1M/1stn Msd ND

86/155
MAR 11 2042 26·5s 38·53S 175·88E 136km M=4·1
0·6 0·04 0·06 5
Rsd 0·6s 17ph/14stn Dmin 44km Az.gap 214°
Corr. -0·733 7M/4stn Msd 0·3 3↑ 2↓

86/156
MAR 12 0252 42·5s 38·23S 176·26E 173km M=3·7
0·6 0·04 0·04 5
Rsd 0·5s 12ph/8stn Dmin 21km Az.gap 130°
Corr. -0·246 6M/4stn Msd 0·3 1↑

86/157
MAR 12 1822 49·8s 40·80S 175·14E 12km M=3·5
0·2 0·02 0·02 R
Rsd 0·4s 18ph/10stn Dmin 35km Az.gap 113°
Corr. -0·534 6M/4stn Msd 0·6 1↑

86/158
MAR 12 2259 25·9s 40·38S 176·52E 33km M=3·8
0·5 0·03 0·07 R
Rsd 0·7s 18ph/14stn Dmin 63km Az.gap 169°
Corr. -0·558 8M/5stn Msd 0·3 3↑

86/159
MAR 13 0333 24·1s 38·36S 176·01E 186km M=3·6
1·0 0·04 0·06 8
Rsd 0·6s 13ph/9stn Dmin 45km Az.gap 105°
Corr. -0·597 4M/3stn Msd 0·2 1↑

86/160
MAR 14 0019 42·8s 40·93S 174·95E 53km M=3·9
0·2 0·01 0·02 3
Rsd 0·4s 28ph/26stn Dmin 8km Az.gap 72°
Corr. -0·352 7M/5stn Msd 0·2 3↑ 7↓
Felt Bunnythorpe (62) and Wellington region (68, 69).

86/161
MAR 14 0152 39·4s 40·93S 174·16E 33km M=4·0
0·3 0·03 0·02 R
Rsd 0·6s 17ph/14stn Dmin 64km Az.gap 97°
Corr. -0·212 8M/5stn Msd 0·3 1↑ 2↓
Felt Island Bay (68).

86/162
MAR 14 0229 32·1s 40·77S 174·62E 60km M=3·9
0·4 0·02 0·03 6
Rsd 0·6s 24ph/21stn Dmin 27km Az.gap 88°
Corr. -0·292 5M/3stn Msd 0·1 6↑ 3↓

86/163
MAR 14 0344 57·0s 33·75S 179·30W 264km M=4·5
1·6 0·13 0·26 23
Rsd 0·7s 15ph/9stn Dmin 479km Az.gap 324°
Corr. -0·448 7M/4stn Msd 0·2

86/164
MAR 14 1635 28·2s 41·14S 174·66E 30km M=3·4
0·1 0·01 0·02 1
Rsd 0·4s 23ph/19stn Dmin 11km Az.gap 75°
Corr. -0·201 5M/3stn Msd 0·5 4↑ 6↓
Felt Karori (68).

86/165
MAR 15 1506 12·9s 41·01S 172·40E 12km M=3·6
1·0 0·06 0·06 R
Rsd 0·6s 11ph/8stn Dmin 29km Az.gap 208°
Corr. -0·741 6M/4stn Msd 0·2 1↓

86/166
MAR 16 0144 51·7s 39·44S 175·65E 12km M=3·4
0·4 0·02 0·04 R
Rsd 0·9s 17ph/13stn Dmin 28km Az.gap 89°
Corr. -0·080 7M/4stn Msd 0·4 3↑ 2↓

86/167
MAR 16 0752 50·8s 39·61S 174·42E 217km M=3·9
1·0 0·05 0·05 8
Rsd 0·6s 15ph/10stn Dmin 46km Az.gap 103°
Corr. -0·560 6M/4stn Msd 0·1 2↑ 1↓

86/168
MAR 17 0206 17·5s 40·11S 175·05E 33km M=3·4
0·3 0·02 0·04 R
Rsd 0·5s 13ph/7stn Dmin 67km Az.gap 115°
Corr. -0·020 6M/3stn Msd 0·4 1↑
Felt Wanganui Aerodrome (57).

86/169
MAR 17 1019 36·6s 39·20S 173·73E 12km M=3·2
0·8 0·05 0·06 R
Rsd 0·6s 11ph/6stn Dmin 33km Az.gap 207°
Corr. -0·265 6M/3stn Msd 0·2 1↓
Felt MM IV at Pungarehu (46).

86/170
MAR 18 0955 52·4s 38·05S 176·90E 12km M=3·4
0·3 0·02 0·03 R
Rsd 0·7s 13ph/9stn Dmin 11km Az.gap 108°
Corr. -0·183 7M/4stn Msd 0·2 3↑ 1↓

86/171
MAR 18 1116 40·9s 41·81S 174·59E 29km M=3·7
0·2 0·02 0·01 1
Rsd 0·3s 22ph/16stn Dmin 32km Az.gap 170°
Corr. -0·485 6M/4stn Msd 0·4 4↑ 6↓

86/172
MAR 18 1253 31·3s 37·36S 177·71E 33km M=3·4
0·9 0·08 0·04 R
Rsd 0·8s 12ph/7stn Dmin 58km Az.gap 226°
Corr. -0·089 4M/2stn Msd 0·2 2↑

86/173
MAR 18 1957 03·0s 37·98S 176·17E 209km M=4·3
0·5 0·04 0·03 4
Rsd 0·5s 17ph/14stn Dmin 41km Az.gap 145°
Corr. -0·303 8M/5stn Msd 0·3 2↑ 3↓

86/174
MAR 19 0159 56·8s 38·10S 176·46E 187km M=3·5
1·4 0·08 0·11 15
Rsd 0·7s 7ph/5stn Dmin 83km Az.gap 149°
Corr. -0·565 3M/2stn Msd 0·4 1↑

86/175
MAR 19 0251 03·1s 38·14S 176·28E 182km M=3·7
0·7 0·04 0·04 6
Rsd 0·5s 12ph/8stn Dmin 23km Az.gap 142°
Corr. -0·358 6M/3stn Msd 0·3 1↑

86/176
MAR 19 1958 01·4s 40·54S 174·67E 80km M=3·8
0·3 0·01 0·02 4
Rsd 0·4s 24ph/14stn Dmin 41km Az.gap 92°
Corr. -0·283 6M/4stn Msd 0·3 6↑ 3↓
Felt Foxton (61) MM IV.

86/177
MAR 20 0751 26·8s 38·63S 176·31E 96km M=3·5
0·5 0·03 0·03 5
Rsd 0·5s 16ph/11stn Dmin 47km Az.gap 70°
Corr. -0·082 8M/4stn Msd 0·3 6↑

86/178
MAR 20 1307 38·8s 38·22S 176·06E 179km M=3·9
0·4 0·03 0·03 4
Rsd 0·5s 19ph/11stn Dmin 39km Az.gap 126°
Corr. -0·391 9M/5stn Msd 0·4 2↑ 1↓

86/179
MAR 21 0122 26·0s 45·48S 166·67E 12km M=4·3
1·6 0·05 0·14 R
Rsd 0·9s 8ph/7stn Dmin 76km Az.gap 290°
Corr. 0·197 7M/4stn Msd 0·1

86/180
MAR 21 1505 47·6s 36·94S 177·05E 269km M=4·4
0·8 0·09 0·09 10
Rsd 0·7s 14ph/11stn Dmin 116km Az.gap 286°
Corr. -0·220 11M/6stn Msd 0·2 2↑

86/181
MAR 21 2349 44·9s 39·09S 175·82E 101km M=3·6
0·6 0·05 0·05 5
Rsd 0·8s 15ph/15stn Dmin 8km Az.gap 86°
Corr. -0·577 7M/5stn Msd 0·4 1↓ 1↓

86/182
MAR 22 1123 47·5s 45·12S 167·64E 120km M=3·5
0·9 0·05 0·06 7
Rsd 0·6s 11ph/6stn Dmin 54km Az.gap 198°
Corr. -0·390 5M/3stn Msd 0·3 1↑ 2↓

86/183
MAR 22 1625 04·8s 41·73S 174·33E 16km M=3·5
0·2 0·02 0·03 2
Rsd 0·4s 15ph/11stn Dmin 10km Az.gap 162°
Corr. -0·661 5M/3stn Msd 0·4 6↑ 3↓

86/184
MAR 22 1831 49·8s 32·83S 178·92W 33km M=4·5
2·6 0·15 0·46 R
Rsd 0·7s 10ph/7stn Dmin 586km Az.gap 342°
Corr. -0·546 4M/2stn Msd 0·3

86/185
MAR 22 2032 12·5s 39·19S 175·03E 206km M=3·9
0·8 0·04 0·05 7
Rsd 0·6s 15ph/9stn Dmin 45km Az.gap 115°
Corr. -0·564 5M/3stn Msd 0·2 1↑

86/186
MAR 22 2313 29·3s 39·44S 176·60E 20km M=3·6
0·3 0·03 0·02 3
Rsd 0·7s 20ph/14stn Dmin 23km Az.gap 92°
Corr. 0·015 11M/6stn Msd 0·2 2↑ 4↓

86/187
MAR 23 2221 56·4s 39·92S 172·81E 12km M=3·8
0·9 0·04 0·09 R
Rsd 0·7s 16ph/10stn Dmin 130km Az.gap 206°
Corr. -0·860 6M/4stn Msd 0·2 1↑

86/188
MAR 24 0553 59·7s 39·97S 172·79E 12km M=3·9
0·9 0·04 0·08 R
Rsd 0·8s 22ph/19stn Dmin 125km Az.gap 205°
Corr. -0·752 10M/6stn Msd 0·2

86/189
MAR 24 1850 11·4s 39·96S 172·95E 12km M=3·6
0·8 0·04 0·09 R
Rsd 0·6s 8ph/7stn Dmin 125km Az.gap 225°
Corr. -0·798 2M/2stn Msd 0·1

86/190
MAR 24 1850 16·4s 39·88S 172·84E 12km M=4·7
0·5 0·03 0·04 R
Rsd 0·6s 20ph/17stn Dmin 127km Az.gap 192°
Corr. -0·658 21M/12stn Msd 0·3
Felt New Plymouth (47) and Wellington (68).
Smaller earthquake about 5 s earlier.

86/191
MAR 25 0310 47·3s 36·03S 178·67E 81km M=4·2
1·2 0·09 0·10 24
Rsd 0·5s 12ph/7stn Dmin 177km Az.gap 333°
Corr. -0·352 4M/2stn Msd 0·2

86/192
MAR 25 1544 10·2s 40·62S 173·40E 12km M=3·7
0·2 0·02 0·02 R
Rsd 0·5s 23ph/17stn Dmin 77km Az.gap 155°
Corr. -0·486 7M/5stn Msd 0·2 2↑ 1↓

86/193
MAR 25 1733 21·6s 38·01S 177·26E 60km M=3·8
0·3 0·02 0·02 4
Rsd 0·5s 24ph/14stn Dmin 24km Az.gap 77°
Corr. -0·099 4M/2stn Msd 0·1 4↑

86/194
MAR 26 0624 45·6s 38·36S 176·27E 6km M=2·4
R R R G
Rsd 0·8s 3ph/2stn Dmin 25km Az.gap 359°
Corr. R 1M/1stn Msd ND
Felt Reporoa (33) MM IV.

86/195
MAR 26 0747 04·1s 38·36S 176·27E 6km M=2·2
R R R G
Rsd 0·5s 4ph/3stn Dmin 25km Az.gap 250°
Corr. R 2M/2stn Msd 0·2
Felt Reporoa (33) MM IV.

86/196
MAR 27 1209 30·0s 38·36S 176·27E 6km M=3·0
0·3 0·02 0·02 3
Rsd 0·6s 14ph/10stn Dmin 25km Az.gap 108°
Corr. -0·396 6M/5stn Msd 0·3
Felt Reporoa (33) MM V.

86/197
MAR 27 1210 21·0s 38·36S 176·28E 6km M=2·5
0·3 0·02 0·03 G
Rsd 0·5s 10ph/7stn Dmin 24km Az.gap 109°
Corr. -0·703 3M/3stn Msd 0·3

86/198
MAR 27 1217 04·8s 38·37S 176·30E 6km M=2·9
0·2 0·02 0·02 G
Rsd 0·5s 13ph/9stn Dmin 23km Az.gap 105°
Corr. -0·577 6M/4stn Msd 0·3
Felt Reporoa (33) MM IV.

86/199
MAR 27 1229 15·8s 38·36S 176·27E 6km M=2·7
R R R G
Rsd 0·4s 7ph/4stn Dmin 25km Az.gap 202°
Corr. R 2M/1stn Msd 0·0
Felt Reporoa (33).

86/200
MAR 27 1248 39·3s 38·37S 176·29E 6km M=2·5
0·3 0·03 0·04 G
Rsd 0·5s 7ph/5stn Dmin 24km Az.gap 113°
Corr. -0·804 3M/3stn Msd 0·5
Felt Reporoa (33).

86/201
MAR 27 1917 08·9s 34·45S 179·45E 246km M=4·2
2·3 0·21 0·41 44
Rsd 0·9s 10ph/7stn Dmin 364km Az.gap 343°
Corr. -0·576 5M/3stn Msd 0·2

86/202
MAR 28 0540 12·2s 33·55S 179·54E 257km M=4·9
2·4 0·25 0·32 53
Rsd 1·1s 11ph/12stn Dmin 463km Az.gap 337°
Corr. -0·324 8M/5stn Msd 0·1

86/203
MAR 28 0553 25·1s 45·76S 166·97E 79km M=3·7
1·4 0·08 0·13 10
Rsd 0·8s 8ph/4stn Dmin 44km Az.gap 300°
Corr. -0·172 3M/2stn Msd 0·1

86/204
MAR 30 0137 27·7s 40·24S 173·50E 165km M=3·9
0·5 0·03 0·04 5
Rsd 0·5s 21ph/15stn Dmin 114km Az.gap 202°
Corr. -0·634 6M/4stn Msd 0·2 2↑ 2↓

86/205
MAR 30 0212 35·4s 37·96S 176·24E 200km M=4·1
0·9 0·05 0·06 8
Rsd 0·7s 16ph/10stn Dmin 61km Az.gap 164°
Corr. -0·371 10M/6stn Msd 0·2

86/206
MAR 30 2231 16·1s 42·86S 171·48E 12km M=3·1
0·5 0·02 0·05 R
Rsd 0·8s 8ph/4stn Dmin 124km Az.gap 174°
Corr. -0·470 5M/3stn Msd 0·2
Felt Arthurs Pass (93) MM IV, Otira (93).

86/207
MAR 31 0308 42·9s 43·24S 170·20E 12km M=3·4
1·0 0·06 0·09 R
Rsd 0·9s 10ph/6stn Dmin 120km Az.gap 174°
Corr. -0·591 10M/6stn Msd 0·3
Felt Tasman Glacier (105) MM VI; Beetham Hut, Tasman Saddle (105) MM IV.

86/208
MAR 31 0434 11·3s 46·24S 167·12E 33km M=4·3
1·8 0·11 0·16 R
Rsd 0·8s 6ph/4stn Dmin 186km Az.gap 312°
Corr. 0·250 7M/4stn Msd 0·3
Felt Centre Is (148) MM V.

86/209
APR 01 0626 31·4s 43·98S 171·04E 4km M=4·3
0·7 0·03 0·04 5
Rsd 0·7s 14ph/9stn Dmin 82km Az.gap 133°
Corr. -0·493 12M/8stn Msd 0·3
Felt Airies, Fairlie (117) MM V; Hakataramea Valley (117) MM IV; Riverview (117), Timaru (118).

86/210
APR 02 0111 43·2s 45·20S 170·32E 1km M=3·5
0·4 0·04 0·02 R
Rsd 0·6s 12ph/7stn Dmin 49km Az.gap 180°
Corr. -0·273 7M/4stn Msd 0·3 1↓

86/211
APR 02 1358 05·2s 41·86S 172·69E 89km M=4·5
0·4 0·03 0·05 5
Rsd 0·7s 19ph/16stn Dmin 14km Az.gap 129°
Corr. -0·655 4M/3stn Msd 0·3 2↑ 7↓

86/212
APR 02 1526 13·8s 34·68S 179·71W 264km M=4·9
2·4 0·18 0·27 24
Rsd 1·0s 14ph/16stn Dmin 370km Az.gap 336°
Corr. -0·029 7M/5stn Msd 0·5

86/213
APR 03 0208 51·0s 42·37S 172·49E 1km M=3·7
0·5 0·01 0·05 3
Rsd 0·5s 14ph/11stn Dmin 69km Az.gap 193°
Corr. -0·306 9M/6stn Msd 0·2

86/214
APR 03 1409 03·5s 45·86S 164·75E 33km M=5·2
1·2 0·12 0·12 R
Rsd 0·7s 9ph/8stn Dmin 217km Az.gap 331°
Corr. -0·302 13M/9stn Msd 0·3 2↑ 1↓
No aftershocks. Seismograms show appearance of depth.

86/215
APR 03 2131 49·1s 40·00S 173·80E 213km M=4·4
0·6 0·02 0·05 6
Rsd 0·5s 22ph/15stn Dmin 85km Az.gap 176°
Corr. -0·678 10M/6stn Msd 0·2 1↑ 3↓

86/216
APR 04 1222 20·2s 40·91S 174·84E 33km M=3·5
0·1 0·01 0·02 R
Rsd 0·5s 25ph/19stn Dmin 8km Az.gap 78°
Corr. 0·014 5M/3stn Msd 0·3 4↑ 4↓

86/217
APR 04 1859 57·0s 38·07S 176·31E 1km M=2·6
0·2 0·02 0·02 R
Rsd 0·2s 4ph/3stn Dmin 25km Az.gap 159°
Corr. 0·797 2M/2stn Msd 0·4
Felt Rotorua, Tihiotonga (33) MM IV.

86/218
APR 04 2128 24·7s 45·15S 167·07E 72km M=3·8
1·4 0·06 0·13 12
Rsd 0·8s 9ph/5stn Dmin 79km Az.gap 260°
Corr. -0·275 3M/2stn Msd 0·1

86/219
APR 05 0354 07·4s 36·47S 178·46E 33km M=4·3
2·0 0·11 0·14 R
Rsd 0·8s 13ph/12stn Dmin 126km Az.gap 309°
Corr. 0·600 12M/7stn Msd 0·2

86/220
APR 05 0517 43·6s 44·59S 167·44E 1km M=3·4
0·8 0·04 0·05 R
Rsd 0·5s 8ph/4stn Dmin 39km Az.gap 266°
Corr. -0·688 4M/2stn Msd 0·3 1↓

86/221
APR 05 0834 06·6s 40·73S 173·40E 24km M=4·1
0·4 0·03 0·04 4
Rsd 0·9s 20ph/16stn Dmin 69km Az.gap 146°
Corr. -0·198 10M/8stn Msd 0·2 2↑

86/222
APR 06 0101 52·9s 37·43S 177·76E 75km M=3·9
0·7 0·04 0·04 7
Rsd 0·6s 18ph/12stn Dmin 51km Az.gap 214°
Corr. 0·038 6M/4stn Msd 0·2 1↑ 1↓

86/223
APR 06 1831 37·1s 37·69S 176·37E 197km M=4·2
0·7 0·04 0·04 6
Rsd 0·6s 19ph/11stn Dmin 61km Az.gap 197°
Corr. -0·345 9M/5stn Msd 0·2 1↓

86/224
APR 09 0543 20·6s 44·35S 168·29E 5km M=4·5
1·0 0·07 0·06 R
Rsd 0·9s 9ph/7stn Dmin 46km Az.gap 218°
Corr. -0·810 5M/3stn Msd 0·2 1↑
Felt Mount Aspiring Station (113) MM V, Minaret Station (114) MM IV.

86/225
APR 09 1949 01·5s 39·78S 175·32E 92km M=4·0
0·6 0·02 0·03 9
Rsd 0·5s 10ph/7stn Dmin 68km Az.gap 110°
Corr. -0·063 5M/4stn Msd 0·1 1↑ 1↓

86/226
APR 10 1049 00·1s 34·49S 179·34E 33km M=4·7
2·9 0·20 0·29 R
Rsd 0·9s 9ph/6stn Dmin 357km Az.gap 334°
Corr. -0·088 4M/2stn Msd 0·1

86/227
APR 10 2255 21·6s 36·54S 177·58E 200km M=4·3
1·5 0·11 0·06 10
Rsd 0·3s 6ph/5stn Dmin 134km Az.gap 283°
Corr. 0·199 4M/2stn Msd 0·2

86/228
APR 11 1108 35·2s 44·39S 170·75E 5km M=3·4
0·7 0·04 0·05 R
Rsd 0·4s 9ph/5stn Dmin 51km Az.gap 251°
Corr. 0·803 4M/2stn Msd 0·1
Felt Round Hill (117) MM IV.

86/229
APR 12 1016 43·7s 35·66S 179·16E 33km M=4·2
1·2 0·08 0·10 R
Rsd 0·3s 7ph/5stn Dmin 229km Az.gap 337°
Corr. 0·337 3M/2stn Msd 0·3

86/230
APR 12 1543 53·3s 36·34S 177·98E 222km M=4·1
1·3 0·16 0·14 13
Rsd 0·3s 5ph/3stn Dmin 143km Az.gap 324°
Corr. 0·588 3M/2stn Msd 0·3

86/231
APR 13 0146 51·5s 39·68S 174·14E 231km M=4·7
0·8 0·03 0·05 8
Rsd 0·6s 19ph/14stn Dmin 46km Az.gap 138°
Corr. -0·561 11M/7stn Msd 0·3 4↑ 3↓

86/232
APR 14 1647 27·8s 45·23S 167·20E 12km M=3·9
0·5 0·01 0·05 R
Rsd 0·3s 6ph/3stn Dmin 66km Az.gap 245°
Corr. -0·552 3M/2stn Msd 0·1 1↑

86/233
APR 14 2210 38·0s 40·76S 175·80E 33km M=4·5
0·2 0·01 0·02 R
Rsd 0·4s 10ph/10stn Dmin 31km Az.gap 118°
Corr. -0·065 6M/5stn Msd 0·4 2↑ 3↓
Felt Eketehuna, Masterton (66), Akitio (67).

86/234
APR 15 1228 57·0s 37·15S 177·69E 33km M=3·6
1·0 0·10 0·05 R
Rsd 0·5s 6ph/4stn Dmin 61km Az.gap 248°
Corr. 0·063 4M/3stn Msd 0·2 1↓

86/235
APR 16 0355 01·1s 42·11S 172·65E 12km M=3·7
0·5 0·03 0·05 R
Rsd 0·7s 9ph/8stn Dmin 38km Az.gap 119°
Corr. 0·334 4M/2stn Msd 0·2 1↓

86/236
APR 16 1631 32·3s 39·62S 174·23E 187km M=3·4
1·3 0·05 0·09 13
Rsd 0·4s 9ph/6stn Dmin 123km Az.gap 211°
Corr. -0·395 2M/1stn Msd 0·4 1↑ 1↓

86/237
APR 16 2122 05·0s 45·18S 168·24E 12km M=4·0
0·2 0·01 0·02 R
Rsd 0·3s 7ph/4stn Dmin 62km Az.gap 131°
Corr. -0·162 2M/1stn Msd 0·5 1↑

86/238
APR 17 0311 53·6s 38·23S 176·73E 184km M=3·8
1·4 0·10 0·08 11
Rsd 0·5s 6ph/4stn Dmin 74km Az.gap 251°
Corr. -0·471 5M/3stn Msd 0·3

86/239
APR 17 0835 10·4s 38·17S 176·23E 5km
R R R R
Rsd ND 1ph/1stn Dmin 25km Az.gap 360°
Corr. R 0M/0stn Msd ND
Felt Tihiotonga (33) MM IV, Rotorua (33) MM III.

86/240
APR 17 1216 18·5s 46·24S 171·22E 12km M=3·6
1·4 0·09 0·14 R
Rsd 0·9s 6ph/4stn Dmin 69km Az.gap 313°
Corr. 0·570 3M/2stn Msd 0·2

86/241
APR 18 0340 27·9s 31·93S 179·38W 382km M=5·2
2·7 0·37 0·45 98
Rsd 0·6s 7ph/5stn Dmin 663km Az.gap 344°
Corr. 0·078 3M/2stn Msd 0·1

86/242
APR 18 0441 27·0s 37·02S 177·49E 147km M=3·9
0·9 0·06 0·03 8
Rsd 0·3s 5ph/4stn Dmin 97km Az.gap 253°
Corr. 0·129 3M/2stn Msd 0·1

86/243
APR 18 0756 20·1s 39·13S 177·35E 33km M=4·0
0·3 0·02 0·04 R
Rsd 0·6s 11ph/10stn Dmin 40km Az.gap 175°
Corr. -0·436 6M/4stn Msd 0·2 1↑ 4↓
Felt Wairoa (53) MM IV.

86/244
APR 18 0808 40·6s 40·34S 176·40E 33km M=3·5
0·4 0·03 0·07 R
Rsd 0·7s 10ph/6stn Dmin 64km Az.gap 170°
Corr. -0·519 4M/2stn Msd 0·1 1↑ 3↓
The depth of this event is poorly constrained.

86/245
APR 18 1405 28·5s 37·46S 176·84E 213km M=4·1
2·5 0·12 0·08 21
Rsd 0·8s 9ph/8stn Dmin 60km Az.gap 212°
Corr. -0·108 7M/5stn Msd 0·3

86/246
APR 18 1820 20·4s 38·17S 176·23E 5km
R R R R
Rsd ND 1ph/1stn Dmin 25km Az.gap 360°
Corr. R 0M/0stn Msd ND
Felt at Tihiotonga (33) MM IV. This was the largest event in a swarm observed at Tarawera and by a portable instrument at Utuhina (33). Seven events were felt.

86/247
APR 19 0124 14·3s 39·23S 173·84E 13km M=3·5
0·8 0·04 0·06 3
Rsd 0·4s 10ph/7stn Dmin 23km Az.gap 245°
Corr. -0·497 3M/2stn Msd 0·1

86/248
APR 20 1409 20·0s 40·34S 174·29E 33km M=3·9
0·3 0·03 0·04 R
Rsd 0·8s 11ph/9stn Dmin 78km Az.gap 115°
Corr. -0·142 8M/5stn Msd 0·2 2↑ 1↓

86/249
APR 20 1714 16·9s 36·57S 178·23E 33km M=3·7
3·3 0·16 0·26 R
Rsd 0·9s 8ph/6stn Dmin 114km Az.gap 300°
Corr. 0·754 4M/3stn Msd 0·1

86/250
APR 20 1853 55·9s 38·05S 176·35E 5km M=2·7
R R R R
Rsd 0·8s 2ph/2stn Dmin 25km Az.gap 225°
Corr. R 1M/1stn Msd ND
Felt Rotorua (33) MM IV.

86/251
APR 20 2256 52·1s 39·48S 174·19E 216km M=4·5
0·9 0·04 0·08 8
Rsd 0·6s 14ph/10stn Dmin 25km Az.gap 126°
Corr. -0·661 4M/3stn Msd 0·3 1↑ 2↓

86/252
APR 21 0115 49·4s 45·07S 168·26E 12km M=3·6
0·1 0·01 0·01 R
Rsd 0·2s 6ph/4stn Dmin 52km Az.gap 124°
Corr. -0·464 4M/2stn Msd 0·3

86/253
APR 22 1123 27·1s 33·38S 178·80W 33km M=4·8
2·7 0·17 0·40 R
Rsd 0·6s 6ph/4stn Dmin 536km Az.gap 341°
Corr. -0·363 4M/3stn Msd 0·2

86/254
APR 22 1145 29·2s 44·19S 169·85E 12km M=3·9
1·1 0·13 0·04 R
Rsd 0·4s 5ph/3stn Dmin 26km Az.gap 232°
Corr. 0·742 5M/4stn Msd 0·3

86/255
APR 22 1216 44·8s 34·73S 179·18E 33km M=4·5
5·1 0·33 0·38 R
Rsd 0·9s 5ph/4stn Dmin 327km Az.gap 331°
Corr. 0·435 2M/2stn Msd 0·4

86/256
APR 22 1251 34·7s 37·94S 176·29E 5km M=2·5
ND ND ND R
Rsd ND 3ph/3stn Dmin 37km Az.gap 182°
Corr. ND 2M/2stn Msd 0·2 1↑
Felt Rotorua (33) MM V.

86/257
APR 23 0818 12·4s 44·78S 167·54E 12km M=4·0
1·5 0·16 0·14 R
Rsd 0·8s 6ph/3stn Dmin 32km Az.gap 331°
Corr. -0·575 4M/2stn Msd 0·4

86/258
APR 23 1538 15·6s 40·61S 174·29E 87km M=3·5
0·3 0·01 0·02 4
Rsd 0·3s 19ph/13stn Dmin 60km Az.gap 107°
Corr. -0·522 5M/4stn Msd 0·5 2↓

86/259
APR 24 0012 36·0s 40·63S 172·43E 1km M=2·5
R R R R
Rsd 0·3s 2ph/1stn Dmin 57km Az.gap 360°
Corr. R 3M/2stn Msd 0·3
Felt Paturau (71) MM V.

86/260
APR 24 0338 30·3s 38·97S 174·91E 220km M=4·2
0·7 0·03 0·06 6
Rsd 0·6s 20ph/13stn Dmin 65km Az.gap 141°
Corr. -0·173 6M/5stn Msd 0·3 2↑ 1↓

86/261
APR 24 0543 21·9s 37·07S 177·54E 162km M=4·6
0·7 0·05 0·04 4
Rsd 0·5s 17ph/10stn Dmin 60km Az.gap 250°
Corr. -0·145 9M/5stn Msd 0·3 4↑

86/262
APR 24 0935 26·2s 36·13S 178·17E 235km M=4·7
0·7 0·06 0·06 5
Rsd 0·4s 17ph/12stn Dmin 163km Az.gap 307°
Corr. -0·008 9M/5stn Msd 0·2 2↓

86/263
APR 24 1533 37·2s 40·00S 176·82E 60km M=3·7
0·3 0·02 0·03 5
Rsd 0·5s 25ph/17stn Dmin 50km Az.gap 171°
Corr. -0·695 11M/6stn Msd 0·3 1↓

86/264
APR 25 1046 35·5s 36·10S 178·55E 33km M=3·9
2·2 0·13 0·18 R
Rsd 0·9s 9ph/7stn Dmin 168km Az.gap 315°
Corr. 0·379 8M/5stn Msd 0·1

86/265
APR 25 1144 24·7s 37·27S 177·27E 185km M=4·0
0·6 0·05 0·03 5
Rsd 0·4s 14ph/8stn Dmin 83km Az.gap 228°
Corr. 0·002 9M/5stn Msd 0·2 1↑

86/266
APR 26 1101 31·3s 35·45S 174·17E 12km M=3·2
R R R R
Rsd 0·7s 2ph/2stn Dmin 177km Az.gap 207°
Corr. R 2M/2stn Msd 0·0
Felt Kawakawa, Paihia (7); Whangarei (9).

86/267
APR 27 1323 45·7s 34·98S 179·00E 251km M=4·0
1·3 0·14 0·18 28
Rsd 0·4s 7ph/4stn Dmin 297km Az.gap 329°
Corr. -0·038 7M/4stn Msd 0·2

86/268
APR 27 2145 51·6s 35·73S 178·36E 226km M=5·1
1·4 0·07 0·13 11
Rsd 0·8s 14ph/11stn Dmin 207km Az.gap 285°
Corr. 0·448 8M/5stn Msd 0·1

86/269
APR 28 0505 25·0s 39·72S 175·74E 24km M=3·6
0·3 0·02 0·03 3
Rsd 0·6s 17ph/14stn Dmin 69km Az.gap 108°
Corr. -0·342 8M/6stn Msd 0·3

86/270
APR 29 0029 33·8s 38·78S 175·78E 129km M=3·9
0·6 0·03 0·04 5
Rsd 0·8s 25ph/16stn Dmin 30km Az.gap 98°
Corr. -0·529 10M/6stn Msd 0·3 2↓

86/271
APR 30 0607 33·5s 40·13S 172·92E 1km M=3·6
0·5 0·02 0·04 R
Rsd 0·6s 16ph/11stn Dmin 107km Az.gap 199°
Corr. -0·639 7M/5stn Msd 0·2

86/272
APR 30 0802 24·1s 45·45S 167·42E 107km M=3·9
1·0 0·05 0·08 7
Rsd 0·5s 8ph/4stn Dmin 38km Az.gap 218°
Corr. -0·355 7M/5stn Msd 0·3

86/273
APR 30 1634 59·3s 34·48S 178·33W 33km M=4·4
1·6 0·16 0·26 R
Rsd 0·7s 8ph/5stn Dmin 460km Az.gap 340°
Corr. -0·738 8M/5stn Msd 0·3

86/274
MAY 02 0445 13·8s 40·75S 172·82E 1km M=3·7
0·5 0·02 0·05 R
Rsd 0·7s 13ph/11stn Dmin 38km Az.gap 203°
Corr. -0·527 7M/5stn Msd 0·3
Felt Paturau (71) MM V; Bainham (72).

86/275
MAY 02 0512 14·8s 38·34S 176·20E 161km M=4·6
0·8 0·04 0·06 8
Rsd 1·0s 21ph/16stn Dmin 29km Az.gap 97°
Corr. -0·459 10M/6stn Msd 0·2 2↑ 1↓

86/276
MAY 02 1627 59·8s 37·58S 177·19E 1km M=3·7
0·4 0·02 0·04 R
Rsd 0·9s 10ph/8stn Dmin 5km Az.gap 94°
Corr. -0·134 7M/6stn Msd 0·3 1↑
One foreshock Mag 2·5 16h 25m. Several aftershocks largest Mag 2·7 at 16h 35m.

86/277
MAY 03 2341 16·4s 38·31S 177·82E 12km M=4·0
0·3 0·02 0·03 R
Rsd 0·6s 10ph/8stn Dmin 41km Az.gap 126°
Corr. -0·114 6M/5stn Msd 0·2 1↓

86/278
MAY 04 1142 38·5s 40·32S 176·82E 33km M=4·5
0·3 0·02 0·04 R
Rsd 0·6s 17ph/17stn Dmin 82km Az.gap 189°
Corr. -0·534 13M/8stn Msd 0·3 5↑ 3↓
Felt Waipukurau (60), Aramoana (64) MM V; Moawhango, Table Flat (58), Mount Vernon (60) MM IV.

86/279
MAY 04 2038 07·5s 38·77S 175·36E 282km M=4·3
0·5 0·03 0·05 4
Rsd 0·5s 21ph/14stn Dmin 45km Az.gap 126°
Corr. -0·544 8M/5stn Msd 0·3 2↓

86/280
MAY 05 1540 39·4s 36·84S 177·33E 283km M=4·4
0·9 0·07 0·08 8
Rsd 0·4s 12ph/8stn Dmin 121km Az.gap 263°
Corr. -0·263 9M/5stn Msd 0·2

86/281
MAY 05 2322 03·0s 36·83S 176·96E 253km M=4·1
0·9 0·07 0·07 10
Rsd 0·4s 11ph/8stn Dmin 128km Az.gap 260°
Corr. -0·381 7M/4stn Msd 0·2

86/282
MAY 06 0146 53·1s 38·69S 177·83E 33km M=3·7
0·4 0·04 0·04 R
Rsd 0·7s 13ph/13stn Dmin 17km Az.gap 147°
Corr. -0·417 10M/6stn Msd 0·3 1↓

86/283
MAY 06 0742 21·2s 38·14S 176·37E 153km M=3·5
0·8 0·05 0·05 7
Rsd 0·7s 16ph/11stn Dmin 16km Az.gap 143°
Corr. -0·342 10M/6stn Msd 0·3

86/284
MAY 07 1058 34·7s 37·71S 178·19E 64km M=4·0
0·6 0·03 0·04 5
Rsd 0·5s 17ph/9stn Dmin 16km Az.gap 150°
Corr. 0·375 10M/5stn Msd 0·4 3↑

86/285
MAY 07 2058 36·3s 36·16S 178·35E 144km M=4·6
1·1 0·08 0·11 16
Rsd 0·6s 14ph/12stn Dmin 159km Az.gap 247°
Corr. 0·768 9M/6stn Msd 0·2 1↓

86/286
MAY 07 2335 19·1s 42·26S 173·58E 12km M=3·5
0·2 0·01 0·02 R
Rsd 0·4s 12ph/7stn Dmin 21km Az.gap 108°
Corr. 0·406 9M/6stn Msd 0·3 2↑

86/287
MAY 08 0200 25·6s 38·65S 177·53E 61km M=3·7
0·4 0·03 0·03 5
Rsd 0·6s 14ph/11stn Dmin 38km Az.gap 121°
Corr. -0·228 8M/4stn Msd 0·3 5↓

86/288
MAY 08 1202 00·5s 38·32S 176·27E 158km M=3·4
0·9 0·04 0·05 7
Rsd 0·7s 14ph/8stn Dmin 23km Az.gap 116°
Corr. -0·335 6M/4stn Msd 0·4 2↑

86/289
MAY 08 1432 08·3s 38·63S 175·81E 166km M=3·6
0·7 0·03 0·03 6
Rsd 0·5s 18ph/11stn Dmin 63km Az.gap 99°
Corr. -0·330 7M/5stn Msd 0·2 2↑

86/290
MAY 08 2330 10·4s 35·60S 178·78E 238km M=4·6
1·1 0·10 0·13 12
Rsd 0·6s 15ph/8stn Dmin 226km Az.gap 324°
Corr. -0·375 8M/4stn Msd 0·2 2↓

86/291
MAY 09 0648 30·9s 38·63S 177·45E 33km M=4·2
0·3 0·03 0·03 R
Rsd 0·7s 14ph/13stn Dmin 32km Az.gap 116°
Corr. -0·076 9M/5stn Msd 0·2 1↑ 5↓
Felt Te Whaiti (42) MM IV.

86/292
MAY 09 0727 33·9s 37·62S 179·70W 33km M=5·1
0·7 0·06 0·04 R
Rsd 0·4s 10ph/20stn Dmin 177km Az.gap 249°
Corr. 0·787 19M/10stn Msd 0·2 2↑ 2↓

86/293
MAY 09 1243 05·4s 37·56S 176·32E 314km M=4·3
0·4 0·02 0·03 3
Rsd 0·3s 17ph/13stn Dmin 75km Az.gap 114°
Corr. 0·005 10M/6stn Msd 0·2 2↑

86/294
MAY 09 1920 37·2s 37·97S 178·64E 33km M=3·5
1·0 0·03 0·09 R
Rsd 0·7s 11ph/8stn Dmin 51km Az.gap 252°
Corr. 0·073 6M/3stn Msd 0·3 1↓

86/295
MAY 10 1403 13·9s 40·77S 173·49E 138km M=3·9
0·5 0·03 0·04 6
Rsd 0·6s 22ph/13stn Dmin 73km Az.gap 138°
Corr. -0·592 7M/5stn Msd 0·2 3↑ 1↓

86/296
MAY 11 0534 50·6s 37·23S 178·48E 33km M=3·7
0·5 0·03 0·04 R
Rsd 0·2s 10ph/5stn Dmin 44km Az.gap 301°
Corr. 0·436 5M/3stn Msd 0·0 2↓

86/297
MAY 11 1141 39·8s 37·64S 178·73E 33km M=3·8
1·5 0·06 0·12 R
Rsd 0·7s 9ph/6stn Dmin 38km Az.gap 292°
Corr. 0·582 6M/4stn Msd 0·2 3↑

86/298
MAY 12 0203 48·7s 36·98S 177·74E 121km M=3·5
0·8 0·05 0·05 11
Rsd 0·2s 6ph/4stn Dmin 85km Az.gap 263°
Corr. -0·454 2M/1stn Msd 0·1 1↑

86/299
MAY 12 0620 38·2s 38·59S 175·63E 168km M=3·6
1·0 0·04 0·13 8
Rsd 0·5s 9ph/5stn Dmin 66km Az.gap 171°
Corr. 0·319 3M/2stn Msd 0·5 1↑ 1↓

86/300
MAY 13 0310 39·6s 44·95S 167·82E 87km M=3·7
0·7 0·07 0·06 5
Rsd 0·5s 9ph/5stn Dmin 32km Az.gap 257°
Corr. 0·607 2M/1stn Msd 0·2 2↑ 1↓

86/301
MAY 13 0741 02·4s 40·48S 173·45E 143km M=3·5
0·4 0·02 0·02 3
Rsd 0·2s 10ph/6stn Dmin 90km Az.gap 191°
Corr. -0·487 3M/2stn Msd 0·2 1↑ 1↓

86/302
MAY 14 0136 56·3s 40·95S 176·21E 33km M=3·5
0·2 0·02 0·03 R
Rsd 0·3s 12ph/9stn Dmin 5km Az.gap 221°
Corr. -0·438 2M/1stn Msd 0·2 1↑ 5↓

86/303
MAY 14 0749 20·9s 40·21S 173·61E 156km M=3·9
0·9 0·04 0·04 8
Rsd 0·5s 10ph/6stn Dmin 112km Az.gap 165°
Corr. -0·467 4M/2stn Msd 0·2 3↑ 2↓

86/304
MAY 14 0754 06·3s 38·27S 177·06E 12km M=4·7
0·3 0·02 0·03 R
Rsd 0·8s 18ph/17stn Dmin 33km Az.gap 60°
Corr. -0·119 14M/8stn Msd 0·3 6↑ 5↓
Felt Bay of Plenty to Gisborne. Maximum intensity MM V at Whakatane (27) and Wairoa (53).

86/305
MAY 14 0944 46·6s 40·59S 173·34E 12km M=3·7
0·2 0·02 0·02 R
Rsd 0·4s 15ph/9stn Dmin 76km Az.gap 161°
Corr. -0·563 8M/5stn Msd 0·2 1↑

86/306
MAY 14 0949 56·3s 37·99S 175·86E 302km M=4·0
1·2 0·09 0·12 11
Rsd 0·8s 17ph/13stn Dmin 29km Az.gap 155°
Corr. -0·728 6M/4stn Msd 0·1

86/307
MAY 14 1817 50·5s 37·04S 177·35E 12km M=3·8
0·5 0·03 0·04 R
Rsd 0·5s 13ph/9stn Dmin 56km Az.gap 189°
Corr. 0·459 4M/2stn Msd 0·2 1↑ 2↓

86/308
MAY 14 2246 31·0s 36·93S 177·69E 33km M=3·6
0·7 0·05 0·03 R
Rsd 0·4s 10ph/6stn Dmin 80km Az.gap 265°
Corr. 0·361 6M/3stn Msd 0·3

86/309
MAY 15 1602 33·3s 38·09S 176·31E 12km M=2·6
0·5 0·04 0·04 R
Rsd 0·5s 8ph/6stn Dmin 23km Az.gap 126°
Corr. 0·148 3M/2stn Msd 0·3
Felt Rotorua (33). Maximum intensity MM V.

86/310
MAY 15 1611 29·6s 39·96S 174·62E 105km M=3·6
0·4 0·01 0·03 4
Rsd 0·5s 20ph/13stn Dmin 89km Az.gap 99°
Corr. -0·260 5M/3stn Msd 0·2 1↓

86/311
MAY 16 0027 40·4s 39·38S 175·17E 120km M=5·0
0·4 0·02 0·03 5
Rsd 0·6s 19ph/24stn Dmin 36km Az.gap 88°
Corr. -0·340 9M/5stn Msd 0·3 11↑ 5↓
Felt southern North Island. Maximum intensity MM V at Table Flat (58) and Patarau (71).

86/312
MAY 16 1101 37·2s 41·05S 175·48E 14km M=3·5
0·1 0·01 0·01 2
Rsd 0·3s 18ph/15stn Dmin 12km Az.gap 95°
Corr. -0·217 6M/4stn Msd 0·4 5↑ 4↓
Aftershocks at 11h47m and 12h17m.

86/313
MAY 16 1104 50·5s 44·65S 168·25E 59km M=4·5
0·7 0·03 0·04 8
Rsd 0·4s 9ph/11stn Dmin 26km Az.gap 137°
Corr. -0·151 6M/4stn Msd 0·2 1↑ 4↓
Felt Milford Sound (120) and Earnslaw Station (121), maximum intensity MM IV.

86/314
MAY 17 0451 33·0s 38·85S 175·99E 12km M=3·2
0·4 0·02 0·05 R
Rsd 0·6s 13ph/7stn Dmin 25km Az.gap 159°
Corr. -0·632 2M/1stn Msd 0·3 2↓
Felt Moerangi (40) MM IV.

86/315
MAY 17 1451 07·3s 38·22S 176·09E 164km M=3·4
0·5 0·03 0·03 4
Rsd 0·3s 15ph/10stn Dmin 56km Az.gap 127°
Corr. 0·211 5M/4stn Msd 0·3

86/316
MAY 18 0230 49·7s 36·99S 178·94E 33km M=4·0
1·6 0·12 0·10 R
Rsd 0·5s 8ph/10stn Dmin 88km Az.gap 313°
Corr. -0·042 8M/4stn Msd 0·3

86/317
MAY 18 0659 12·5s 37·24S 177·81E 42km M=3·8
0·5 0·04 0·04 7
Rsd 0·7s 17ph/11stn Dmin 58km Az.gap 194°
Corr. 0·261 7M/4stn Msd 0·2 2↑ 1↓

86/318
MAY 18 1258 22·7s 38·60S 175·83E 165km M=3·6
0·9 0·04 0·05 8
Rsd 0·7s 19ph/12stn Dmin 19km Az.gap 141°
Corr. -0·306 9M/5stn Msd 0·3 2↑ 3↓

86/319
MAY 19 0117 52·0s 39·22S 177·40E 33km M=3·9
0·3 0·02 0·04 R
Rsd 0·6s 17ph/15stn Dmin 51km Az.gap 184°
Corr. -0·446 10M/5stn Msd 0·2 1↑ 4↓

86/320
MAY 19 0607 10·4s 38·67S 176·07E 138km M=3·4
0·8 0·04 0·06 8
Rsd 0·6s 13ph/8stn Dmin 8km Az.gap 171°
Corr. -0·656 7M/5stn Msd 0·2 2↑ 2↓

86/321
MAY 19 0732 51·9s 37·14S 177·08E 308km M=4·7
0·9 0·08 0·07 7
Rsd 0·5s 17ph/11stn Dmin 44km Az.gap 238°
Corr. -0·024 10M/6stn Msd 0·2 4↑ 4↓

86/322
MAY 19 1724 03·7s 37·60S 177·21E 129km M=3·7
0·5 0·03 0·03 4
Rsd 0·4s 14ph/10stn Dmin 8km Az.gap 195°
Corr. -0·108 5M/3stn Msd 0·3 2↑ 1↓

86/323
MAY 20 0047 28·9s 38·72S 176·55E 99km M=3·8
0·5 0·02 0·03 5
Rsd 0·7s 20ph/15stn Dmin 48km Az.gap 66°
Corr. -0·351 8M/5stn Msd 0·3 1↑ 1↓

86/324
MAY 20 0656 43·5s 38·49S 175·84E 199km M=4·2
0·6 0·03 0·04 5
Rsd 0·4s 13ph/8stn Dmin 68km Az.gap 141°
Corr. -0·428 5M/4stn Msd 0·2 1↓

86/325
MAY 21 1037 37·3s 39·82S 179·16E 33km M=4·8
0·6 0·03 0·06 R
Rsd 0·6s 20ph/13stn Dmin 163km Az.gap 260°
Corr. -0·488 14M/8stn Msd 0·3 2↑ 1↓

86/326
MAY 22 0844 10·6s 38·66S 176·01E 135km M=4·1
0·4 0·02 0·04 4
Rsd 0·6s 23ph/16stn Dmin 57km Az.gap 86°
Corr. -0·510 9M/5stn Msd 0·3 3↑ 2↓

86/327
MAY 24 0950 52·0s 37·13S 177·42E 33km M=3·8
0·8 0·06 0·05 R
Rsd 0·8s 13ph/13stn Dmin 94km Az.gap 184°
Corr. 0·246 10M/6stn Msd 0·2

86/328
MAY 25 0420 54·2s 38·25S 178·73E 65km M=3·8
0·7 0·02 0·06 6
Rsd 0·3s 7ph/4stn Dmin 75km Az.gap 261°
Corr. -0·456 4M/3stn Msd 0·2
TUA drum rotation uneven.

86/329
MAY 25 0810 37·2s 38·29S 178·08E 52km M=3·9
0·4 0·02 0·03 5
Rsd 0·4s 19ph/10stn Dmin 39km Az.gap 173°
Corr. -0·245 9M/5stn Msd 0·2 1↓

86/330
MAY 25 1014 54·3s 38·62S 175·90E 1km M=2·8
0·5 0·03 0·05 R
Rsd 0·9s 8ph/7stn Dmin 13km Az.gap 133°
Corr. 0·360 3M/2stn Msd 0·2
Twin Shocks.

86/331
MAY 25 1015 16·0s 38·63S 175·89E 1km M=2·9
0·4 0·03 0·04 R
Rsd 0·8s 7ph/6stn Dmin 13km Az.gap 133°
Corr. 0·398 2M/2stn Msd 0·2
Felt Cnr. Oruanui/Forest Roads (40), Acacia Bay, Taupo (41) MM IV.

86/332
MAY 26 2335 37·1s 43·24S 172·08E 12km M=4·1
0·5 0·03 0·05 R
Rsd 0·7s 11ph/6stn Dmin 96km Az.gap 148°
Corr. -0·444 11M/7stn Msd 0·2
Felt Arthurs Pass (93) MM IV.

86/333
MAY 27 0424 40·6s 33·42S 179·26W 33km M=4·9
1·1 0·10 0·20 R
Rsd 0·3s 6ph/5stn Dmin 514km Az.gap 329°
Corr. -0·672 9M/6stn Msd 0·3

86/334
MAY 27 1413 29·4s 38·44S 175·96E 172km M=4·2
0·6 0·03 0·05 5
Rsd 0·7s 22ph/13stn Dmin 30km Az.gap 87°
Corr. -0·453 11M/6stn Msd 0·2 2↑ 1↓

86/335
MAY 27 2002 04·3s 35·72S 178·67E 239km M=4·2
0·8 0·12 0·13 13
Rsd 0·3s 7ph/6stn Dmin 211km Az.gap 330°
Corr. -0·735 6M/4stn Msd 0·2

86/336
MAY 30 0225 26·1s 34·53S 179·77W 33km M=4·3
0·5 0·04 0·08 R
Rsd 0·1s 4ph/3stn Dmin 382km Az.gap 347°
Corr. -0·724 3M/3stn Msd 0·1

86/337
MAY 30 0504 59·1s 41·86S 171·84E 20km M=3·6
0·7 0·03 0·04 28
Rsd 0·5s 9ph/5stn Dmin 82km Az.gap 195°
Corr. -0·563 10M/6stn Msd 0·3

86/338
MAY 30 1449 32·9s 36·58S 179·35W 33km M=4·1
1·0 0·08 0·10 R
Rsd 0·4s 9ph/8stn Dmin 237km Az.gap 334°
Corr. -0·570 9M/6stn Msd 0·2

86/339
MAY 30 2012 26·9s 45·29S 167·33E 103km M=4·2
1·0 0·07 0·09 10
Rsd 0·6s 10ph/6stn Dmin 83km Az.gap 288°
Corr. 0·350 6M/3stn Msd 0·2

86/340
MAY 31 0138 00·5s 46·03S 167·14E 33km M=3·7
1·6 0·09 0·12 R
Rsd 0·8s 8ph/4stn Dmin 163km Az.gap 295°
Corr. 0·387 4M/2stn Msd 0·1

86/341
MAY 31 0430 02·6s 38·71S 176·11E 1km M=4·0
0·2 0·01 0·02 R
Rsd 0·7s 16ph/15stn Dmin 20km Az.gap 80°
Corr. -0·461 8M/7stn Msd 0·3 1↑
Felt Taupo, Wairakei (41) MM V; Acacia Bay, Oruanui Bay (41) MM IV.

86/342
MAY 31 1959 24·1s 45·37S 167·13E 86km M=3·7
0·9 0·06 0·07 13
Rsd 0·6s 10ph/5stn Dmin 100km Az.gap 296°
Corr. 0·287 4M/2stn Msd 0·1

86/343
JUN 01 0018 18·4s 39·95S 176·84E 54km M=3·8
0·4 0·03 0·05 10
Rsd 0·8s 18ph/13stn Dmin 44km Az.gap 171°
Corr. -0·684 9M/6stn Msd 0·2 1↓
Felt Waipukurau (60) MM IV.

86/344
JUN 01 0423 18·3s 40·47S 176·71E 51km M=3·4
0·5 0·02 0·05 8
Rsd 0·4s 14ph/9stn Dmin 63km Az.gap 214°
Corr. -0·565 6M/4stn Msd 0·1

86/345
JUN 01 0551 29·7s 44·57S 168·30E 68km M=3·9
1·0 0·06 0·07 12
Rsd 0·7s 10ph/5stn Dmin 33km Az.gap 189°
Corr. 0·040 7M/4stn Msd 0·4 1↑

86/346
JUN 02 0409 19·6s 39·03S 175·07E 217km M=4·0
0·9 0·05 0·07 8
Rsd 0·8s 16ph/11stn Dmin 46km Az.gap 170°
Corr. -0·584 7M/5stn Msd 0·3 3↑ 1↓

86/347
JUN 02 0854 20·6s 38·93S 175·03E 234km M=4·4
0·6 0·04 0·06 5
Rsd 0·7s 28ph/18stn Dmin 54km Az.gap 174°
Corr. -0·711 12M/7stn Msd 0·2 6↑ 2↓

86/348
JUN 02 2007 50·1s 40·32S 173·87E 195km M=4·1
0·9 0·04 0·06 8
Rsd 0·7s 17ph/11stn Dmin 105km Az.gap 142°
Corr. -0·608 8M/5stn Msd 0·3 1↑ 1↓

86/349
JUN 03 0528 25·2s 38·01S 179·23W 33km M=4·4
1·3 0·09 0·11 R
Rsd 0·7s 17ph/11stn Dmin 222km Az.gap 321°
Corr. -0·538 12M/7stn Msd 0·2

86/350
JUN 04 1828 20·3s 39·07S 175·11E 224km M=4·2
0·6 0·03 0·04 4
Rsd 0·5s 15ph/11stn Dmin 41km Az.gap 158°
Corr. -0·378 8M/5stn Msd 0·2 1↑

86/351
JUN 05 0606 55·7s 42·23S 172·60E 12km M=4·0
0·3 0·02 0·03 R
Rsd 0·4s 16ph/10stn Dmin 51km Az.gap 145°
Corr. 0·077 10M/6stn Msd 0·2 3↑ 2↓

86/352
JUN 05 2047 43·6s 38·80S 175·81E 125km M=3·7
0·5 0·03 0·04 3
Rsd 0·4s 15ph/8stn Dmin 19km Az.gap 206°
Corr. -0·519 4M/2stn Msd 0·3 1↑ 2↓

86/353
JUN 06 0615 08·3s 38·83S 176·05E 111km M=3·7
0·7 0·04 0·06 6
Rsd 0·9s 19ph/12stn Dmin 41km Az.gap 83°
Corr. -0·562 8M/4stn Msd 0·3 1↑ 1↓

86/354
JUN 06 0959 12·9s 40·04S 175·08E 33km M=3·4
0·2 0·01 0·03 R
Rsd 0·5s 18ph/12stn Dmin 73km Az.gap 118°
Corr. 0·035 5M/3stn Msd 0·3 2↑ 3↓

86/355
JUN 07 1829 30·7s 36·02S 178·96E 33km M=4·2
0·6 0·04 0·05 R
Rsd 0·3s 9ph/5stn Dmin 184km Az.gap 333°
Corr. -0·066 5M/3stn Msd 0·3

86/356
JUN 07 1841 03·4s 38·29S 176·19E 161km M=3·8
0·8 0·05 0·05 6
Rsd 0·7s 18ph/12stn Dmin 49km Az.gap 119°
Corr. -0·323 8M/4stn Msd 0·5 1↑ 3↓

86/357
JUN 08 0503 20·5s 36·24S 178·42E 33km M=4·2
0·5 0·04 0·04 R
Rsd 0·3s 9ph/6stn Dmin 151km Az.gap 311°
Corr. -0·621 10M/6stn Msd 0·2 1↑

86/358
JUN 08 0623 53·4s 41·31S 172·94E 125km M=3·5
0·6 0·03 0·04 4
Rsd 0·4s 18ph/13stn Dmin 30km Az.gap 136°
Corr. -0·100 3M/3stn Msd 0·3 2↑ 1↓

86/359
JUN 09 1700 33·5s 38·21S 176·29E 167km M=3·8
1·1 0·08 0·10 8
Rsd 0·7s 14ph/8stn Dmin 66km Az.gap 133°
Corr. -0·823 4M/3stn Msd 0·4 2↓

86/360
JUN 10 0826 01·1s 44·95S 166·89E 12km M=4·1
2·0 0·09 0·16 R
Rsd 0·7s 9ph/5stn Dmin 87km Az.gap 318°
Corr. 0·006 4M/2stn Msd 0·2 1↑

86/361
JUN 10 2130 50·7s 38·85S 175·21E 238km M=4·0
0·8 0·06 0·07 6
Rsd 0·7s 21ph/13stn Dmin 47km Az.gap 175°
Corr. -0·682 5M/3stn Msd 0·3 1↑ 1↓

86/362
JUN 11 1718 11·2s 37·74S 179·17E 33km M=3·5
0·9 0·05 0·08 R
Rsd 0·3s 10ph/5stn Dmin 78km Az.gap 303°
Corr. 0·193 2M/1stn Msd 0·1 1↑

86/363
JUN 12 0955 06·6s 36·47S 177·83E 234km M=4·0
1·6 0·15 0·19 14
Rsd 0·8s 8ph/5stn Dmin 132km Az.gap 312°
Corr. -0·149 2M/1stn Msd 0·6

86/364
JUN 12 1240 46·8s 44·91S 167·79E 84km M=4·1
1·0 0·06 0·07 9
Rsd 0·5s 8ph/5stn Dmin 29km Az.gap 264°
Corr. -0·090 5M/3stn Msd 0·1 2↑ 1↓

86/365
JUN 13 0113 13·2s 39·44S 174·77E 161km M=3·9
0·6 0·03 0·04 5
Rsd 0·5s 17ph/12stn Dmin 61km Az.gap 124°
Corr. -0·497 8M/5stn Msd 0·2 4↑ 1↓

86/366
JUN 13 1919 46·2s 38·31S 178·60E 33km M=3·5
0·7 0·03 0·06 R
Rsd 0·5s 12ph/7stn Dmin 63km Az.gap 247°
Corr. -0·492 4M/2stn Msd 0·1

86/367
JUN 14 0142 21·9s 38·66S 175·92E 159km M=3·7
0·6 0·04 0·05 5
Rsd 0·6s 19ph/13stn Dmin 54km Az.gap 92°
Corr. -0·591 5M/4stn Msd 0·2 2↑

86/368
JUN 14 1234 06·8s 39·68S 174·21E 194km M=3·8
0·9 0·03 0·05 7
Rsd 0·4s 13ph/10stn Dmin 47km Az.gap 129°
Corr. -0·153 4M/3stn Msd 0·1 1↑

86/369
JUN 14 1505 18·6s 37·51S 177·35E 113km M=3·9
0·2 0·02 0·02 2
Rsd 0·3s 15ph/11stn Dmin 14km Az.gap 147°
Corr. 0·064 6M/4stn Msd 0·2 1↑ 1↓

86/370
JUN 15 0509 51·8s 37·27S 177·79E 33km M=4·0
0·5 0·04 0·03 R
Rsd 0·7s 16ph/11stn Dmin 58km Az.gap 190°
Corr. 0·279 7M/4stn Msd 0·2 3↑

86/371
JUN 15 1753 04·9s 37·31S 177·82E 33km M=3·7
0·5 0·04 0·03 R
Rsd 0·5s 12ph/10stn Dmin 53km Az.gap 187°
Corr. 0·113 5M/3stn Msd 0·2 2↑ 1↓

86/372
JUN 15 2338 42·7s 39·48S 175·81E 12km M=3·7
0·3 0·02 0·04 R
Rsd 0·5s 12ph/7stn Dmin 31km Az.gap 169°
Corr. -0·009 1M/1stn Msd ND 2↑ 2↓

86/373
JUN 16 0338 37·6s 40·21S 176·11E 101km M=4·8
0·5 0·02 0·04 6
Rsd 0·8s 31ph/27stn Dmin 70km Az.gap 133°
Corr. -0·637 9M/5stn Msd 0·2 11↑ 15↓
Felt lower North Island, from Ohakune (49) to Wellington (68). Maximum intensity MM V at Palmerston North (62).

86/374
JUN 16 0833 29·4s 44·66S 168·02E 102km M=3·7
0·9 0·05 0·06 6
Rsd 0·4s 7ph/4stn Dmin 9km Az.gap 177°
Corr. -0·361 1M/1stn Msd ND

86/375
JUN 16 1410 11·2s 38·27S 176·25E 159km M=3·6
0·7 0·05 0·07 4
Rsd 0·5s 15ph/11stn Dmin 72km Az.gap 124°
Corr. -0·762 6M/4stn Msd 0·4 3↑ 1↓

86/376
JUN 17 0726 24·6s 39·09S 175·51E 140km M=3·6
0·6 0·04 0·04 5
Rsd 0·7s 23ph/15stn Dmin 12km Az.gap 147°
Corr. -0·576 5M/3stn Msd 0·3 2↑ 1↓

86/377
JUN 17 1722 29·2s 38·67S 176·16E 122km M=3·9
0·6 0·04 0·06 6
Rsd 0·8s 23ph/16stn Dmin 15km Az.gap 74°
Corr. -0·685 10M/6stn Msd 0·3 1↑ 5↓

86/378
JUN 17 2135 03·7s 41·44S 172·92E 118km M=4·1
0·6 0·03 0·04 5
Rsd 0·6s 20ph/14stn Dmin 42km Az.gap 111°
Corr. -0·331 5M/3stn Msd 0·3 5↑ 4↓

86/379
JUN 18 2024 06·8s 44·90S 167·69E 107km M=4·2
0·2 0·02 0·01 1
Rsd 0·1s 5ph/5stn Dmin 31km Az.gap 278°
Corr. -0·107 5M/3stn Msd 0·4 1↑ 1↓

86/380
JUN 19 1731 19·8s 40·29S 175·66E 24km M=3·8
0·4 0·03 0·05 4
Rsd 0·6s 12ph/12stn Dmin 40km Az.gap 111°
Corr. -0·653 10M/6stn Msd 0·3 4↑ 3↓

86/381
JUN 20 0238 07·6s 33·12S 178·41W 236km
1·5 0·12 0·15 40
Rsd 0·4s 8ph/6stn Dmin 579km Az.gap 312°
Corr. 0·231 0M/0stn Msd ND 1↑
Magnitude aproximately 5·2.

86/382
JUN 20 0858 27·9s 38·59S 176·07E 12km M=3·3
2·3 0·20 0·12 R
Rsd 0·7s 6ph/4stn Dmin 15km Az.gap 252°
Corr. -0·932 2M/2stn Msd 0·3 1↑
Felt Taupo (41) MM V.

86/383
JUN 20 1346 00·1s 37·28S 177·68E 33km M=3·9
0·8 0·07 0·03 R
Rsd 0·4s 9ph/8stn Dmin 51km Az.gap 235°
Corr. -0·739 7M/4stn Msd 0·1 1↑ 2↓

86/384
JUN 20 1529 57·8s 37·28S 177·83E 33km M=4·1
0·4 0·03 0·03 R
Rsd 0·5s 10ph/10stn Dmin 55km Az.gap 191°
Corr. 0·177 11M/6stn Msd 0·3 4↑ 1↓

86/385
JUN 20 2326 34·9s 36·22S 177·38E 285km M=5·0
1·5 0·12 0·14 14
Rsd 0·6s 7ph/9stn Dmin 146km Az.gap 242°
Corr. 0·643 8M/4stn Msd 0·3 2↑ 1↓

86/386
JUN 22 1651 53·6s 39·78S 177·01E 33km M=3·4
1·5 0·10 0·10 R
Rsd 0·6s 9ph/7stn Dmin 30km Az.gap 227°
Corr. -0·795 5M/3stn Msd 0·2 1↑ 6↓

86/387
JUN 22 1725 39·1s 37·24S 177·34E 156km M=4·6
0·6 0·04 0·05 5
Rsd 0·5s 13ph/10stn Dmin 34km Az.gap 171°
Corr. -0·302 9M/5stn Msd 0·3 5↑ 3↓

86/388
JUN 22 2251 42·9s 37·64S 177·71E 167km M=3·7
1·2 0·09 0·08 9
Rsd 0·6s 8ph/6stn Dmin 53km Az.gap 185°
Corr. -0·425 5M/3stn Msd 0·1 2↓

86/389
JUN 23 0713 10·8s 38·44S 175·75E 198km M=3·9
1·9 0·10 0·11 17
Rsd 0·9s 11ph/10stn Dmin 37km Az.gap 231°
Corr. -0·549 9M/5stn Msd 0·4 3↑ 2↓

86/390
JUN 24 0713 50·8s 38·00S 176·13E 184km M=3·5
0·4   0·04   0·04   2
Rsd 0·2s 7ph/5stn   Dmin 52km Az.gap 159°
Corr. -0·568 7M/4stn   Msd 0·3

86/391
JUN 24 1759 59·6s 44·84S 167·95E 65km M=4·1
0·7   0·03   0·06   7
Rsd 0·3s 9ph/6stn   Dmin 19km Az.gap 231°
Corr. 0·051   8M/5stn   Msd 0·4 2↑ 2↓

86/392
JUN 24 2020 07·8s 38·55S 175·95E 178km M=3·7
0·6   0·05   0·06   5
Rsd 0·5s 13ph/12stn Dmin 18km Az.gap 90°
Corr. -0·750 4M/3stn   Msd 0·1 5↑ 3↓

86/393
JUN 25 1630 39·5s 40·64S 173·94E 33km M=3·8
0·3   0·02   0·03   R
Rsd 0·7s 14ph/12stn Dmin 70km Az.gap 121°
Corr. -0·246 10M/7stn   Msd 0·3 2↑ 3↓

86/394
JUN 26 1511 00·5s 39·53S 175·64E   5km M=3·3
0·3   0·02   0·06   R
Rsd 0·8s 13ph/13stn Dmin 29km Az.gap 158°
Corr. -0·431 9M/5stn   Msd 0·2 5↑ 1↓
Felt Moawhango (58) MM IV.

86/395
JUN 27 0409 51·9s 38·35S 177·16E 33km M=3·5
0·2   0·02   0·02   R
Rsd 0·6s 11ph/12stn Dmin 43km Az.gap 67°
Corr. -0·169 10M/5stn   Msd 0·4 1↑ 1↓

86/396
JUN 28 1109 05·5s 37·07S 176·86E 226km M=4·3
1·0   0·04   0·06   10
Rsd 0·5s 10ph/11stn Dmin 59km Az.gap 168°
Corr. 0·333   9M/5stn   Msd 0·3 4↑ 1↓

86/397
JUN 28 2133 40·5s 39·19S 175·30E 23km M=3·7
0·3   0·04   0·03   3
Rsd 0·5s 10ph/9stn   Dmin 22km Az.gap 105°
Corr. 0·222   5M/3stn   Msd 0·2 2↑ 2↓

86/398
JUN 28 2241 00·8s 38·72S 177·41E 30km M=3·6
0·2   0·02   0·02   1
Rsd 0·4s 10ph/10stn Dmin 24km Az.gap 128°
Corr. -0·402 5M/3stn   Msd 0·2 1↓

86/399
JUN 29 1600 00·4s 37·65S 176·96E 233km M=4·0
3·8   0·27   0·22   27
Rsd 0·8s 7ph/6stn   Dmin 38km Az.gap 237°
Corr. -0·799 6M/4stn   Msd 0·3 2↑

86/400
JUN 29 1955 59·9s 42·35S 174·03E 11km M=4·1
1·4   0·04   0·05   11
Rsd 0·6s 10ph/10stn Dmin 29km Az.gap 186°
Corr. -0·741 8M/5stn   Msd 0·2 5↑ 1↓
Felt Meriburn (90).

86/401
JUN 30 1008 14·2s 42·99S 171·10E 26km M=3·4
0·7   0·08   0·14   8
Rsd 0·5s 8ph/7stn   Dmin 57km Az.gap 153°
Corr. -0·903 7M/4stn   Msd 0·2

86/402
JUL 01 0245 27·0s 39·41S 175·02E   5km M=4·1
0·3   0·03   0·03   R
Rsd 0·7s 13ph/11stn Dmin 65km Az.gap 127°
Corr. -0·454 10M/6stn   Msd 0·3 5↑ 1↓
Felt Uruti (38) and Pukeiti (46) MM IV.
Also felt Ohakune (49).

86/403
JUL 01 0953 12·8s 37·17S 176·48E 307km M=4·3
2·7   0·17   0·20   23
Rsd 0·7s 7ph/6stn   Dmin 101km Az.gap 273°
Corr. -0·575 7M/4stn   Msd 0·4 1↑ 1↓

86/404
JUL 01 1336 09·3s 37·70S 179·52E 33km M=4·9
5·9   0·14   0·55   R
Rsd 0·6s 7ph/7stn   Dmin 108km Az.gap 312°
Corr. 0·929   7M/4stn   Msd 0·2 7↑ 3↓

86/405
JUL 01 1628 41·0s 37·35S 179·62E 12km M=4·1
2·6   0·11   0·23   R
Rsd 0·8s 9ph/7stn   Dmin 120km Az.gap 296°
Corr. 0·406   8M/5stn   Msd 0·2 1↑

86/406
JUL 02 0017 03·4s 42·31S 174·03E 12km M=3·6
0·4   0·03   0·03   R
Rsd 0·6s 13ph/9stn Dmin 30km Az.gap 169°
Corr. -0·522 6M/4stn   Msd 0·2 2↑ 3↓

86/407
JUL 02 0500 35·1s 45·21S 171·15E 12km M=3·9
0·7   0·04   0·06   R
Rsd 0·7s 14ph/7stn Dmin 24km Az.gap 180°
Corr. -0·142 4M/2stn   Msd 0·2 2↓

86/408
JUL 02 0659 02·0s 43·26S 173·85E 33km M=3·9
0·6   0·03   0·06   R
Rsd 0·5s 16ph/8stn Dmin 94km Az.gap 203°
Corr. -0·643 7M/5stn   Msd 0·5 1↑

86/409
JUL 03 1014 02·3s 42·32S 174·03E 16km M=3·6
0·3 0·03 0·03 2
Rsd 0·4s 17ph/11stn Dmin 30km Az.gap 183°
Corr. -0·715 6M/4stn Msd 0·3 6↑ 2↓

86/410
JUL 03 1527 15·0s 39·74S 176·71E 58km M=3·8
0·3 0·02 0·02 3
Rsd 0·5s 19ph/14stn Dmin 23km Az.gap 180°
Corr. -0·521 4M/3stn Msd 0·2 2↑ 2↓

86/411
JUL 03 1641 06·0s 38·33S 176·34E 5km M=3·6
1·4 0·10 0·10 R
Rsd 1·1s 9ph/7stn Dmin 18km Az.gap 112°
Corr. -0·675 6M/4stn Msd 0·3
Felt Waimangu and Ngapouri Road (33) maximum intensity MM V. Largest event in a swarm sequence starting July 03d 11h 15m.

86/412
JUL 03 1646 54·0s 38·25S 176·46E 5km M=2·8
0·9 0·07 0·08 R
Rsd 0·9s 7ph/5stn Dmin 5km Az.gap 126°
Corr. -0·294 2M/1stn Msd 0·5
Second largest in swarm sequence. Others recorded on TAZ at 16h 32m, 16h 34m, 16h 36m, 16h 40m, 17h 10m, 17h 35m and 17h 38m.

86/413
JUL 03 1758 49·6s 37·27S 177·35E 160km M=3·7
0·6 0·05 0·04 5
Rsd 0·4s 10ph/9stn Dmin 32km Az.gap 229°
Corr. -0·449 4M/3stn Msd 0·2

86/414
JUL 03 1915 15·4s 45·07S 167·71E 110km M=4·3
0·7 0·05 0·05 5
Rsd 0·4s 8ph/6stn Dmin 48km Az.gap 267°
Corr. 0·315 8M/5stn Msd 0·3 2↑ 1↓

86/415
JUL 03 1920 56·4s 38·30S 176·40E 5km
R R R R
Rsd 0·6s 2ph/1stn Dmin 12km Az.gap 360°
Corr. R 0M/0stn Msd ND
Felt Waimangu (33) MM IV. Magnitude about 2.

86/416
JUL 04 0418 33·9s 39·46S 175·76E 12km M=3·4
0·3 0·02 0·04 R
Rsd 0·6s 17ph/10stn Dmin 26km Az.gap 131°
Corr. -0·355 5M/3stn Msd 0·4 3↑ 1↓

86/417
JUL 04 1337 47·3s 38·30S 176·40E 5km M=2·4
R R R R
Rsd 0·6s 2ph/1stn Dmin 12km Az.gap 360°
Corr. R 1M/1stn Msd ND 1↓
Felt Ngapouri Road (33) MM IV. Further swarm sequence with other earthquakes of similar magnitude at 13h 01m and 13h 18m.

86/418
JUL 04 2220 54·3s 46·64S 167·18E 12km M=3·6
3·3 0·17 0·16 R
Rsd 0·8s 5ph/4stn Dmin 227km Az.gap 302°
Corr. 0·266 3M/2stn Msd 0·1

86/419
JUL 05 2149 48·9s 44·46S 168·16E 12km M=3·5
0·8 0·06 0·04 R
Rsd 0·8s 10ph/5stn Dmin 31km Az.gap 226°
Corr. -0·459 1M/1stn Msd ND 1↑

86/420
JUL 06 0323 48·2s 39·47S 177·05E 33km M=3·6
0·5 0·04 0·04 R
Rsd 0·7s 17ph/11stn Dmin 22km Az.gap 183°
Corr. -0·511 3M/2stn Msd 0·4 1↑ 1↓

86/421
JUL 06 1235 02·2s 39·49S 175·49E 66km M=3·8
0·4 0·02 0·03 5
Rsd 0·4s 17ph/12stn Dmin 24km Az.gap 112°
Corr. -0·148 3M/2stn Msd 0·3 5↑ 2↓

86/422
JUL 07 0518 05·1s 40·90S 174·70E 50km M=4·6
0·2 0·02 0·02 4
Rsd 0·4s 22ph/26stn Dmin 18km Az.gap 82°
Corr. -0·602 7M/4stn Msd 0·1 10↑ 5↓
Felt about Cook Strait (68, 73, 77, 78). Maximum intensity MM V at Cape Jackson (78).

86/423
JUL 08 0035 13·3s 41·36S 174·49E 47km M=3·5
1·0 0·08 0·07 11
Rsd 0·8s 12ph/7stn Dmin 24km Az.gap 172°
Corr. -0·727 2M/1stn Msd 0·1 1↑ 1↓

86/424
JUL 08 0904 07·8s 38·55S 178·19E 33km M=3·7
0·9 0·06 0·10 R
Rsd 1·0s 11ph/8stn Dmin 18km Az.gap 220°
Corr. -0·676 3M/2stn Msd 0·3 2↑

86/425
JUL 08 1018 00·2s 37·92S 176·44E 259km M=3·8
1·5 0·09 0·11 14
Rsd 0·7s 14ph/9stn Dmin 35km Az.gap 169°
Corr. -0·544 3M/2stn Msd 0·1

86/426
JUL 09 1240 04·1s 36·74S 176·92E 317km M=4·6
1·1 0·07 0·07 10
Rsd 0·5s 16ph/11stn Dmin 139km Az.gap 194°
Corr. -0·038 10M/5stn Msd 0·3 2↑

86/427
JUL 09 1940 47·9s 41·23S 173·62E 12km M=3·4
0·3 0·02 0·02 R
Rsd 0·5s 13ph/9stn Dmin 55km Az.gap 89°
Corr. -0·230 7M/4stn Msd 0·3 4↑ 1↓

86/428
JUL 10 0713 49·3s 36·17S 177·96E 170km M=4·1
1·4 0·08 0·09 15
Rsd 0·7s 10ph/6stn Dmin 161km Az.gap 261°
Corr. 0·544 6M/3stn Msd 0·2

86/429
JUL 10 2036 27·9s 37·02S 176·99E 243km M=5·4
1·1 0·05 0·07 9
Rsd 0·6s 12ph/13stn Dmin 59km Az.gap 176°
Corr. 0·331 7M/4stn Msd 0·2 8↑ 11↓

86/430
JUL 11 0642 23·2s 45·95S 165·44E 33km M=4·5
1·0 0·08 0·11 R
Rsd 0·4s 9ph/8stn Dmin 241km Az.gap 320°
Corr. -0·540 4M/3stn Msd 0·2

86/431
JUL 11 0827 48·0s 46·00S 166·22E 33km M=5·5
2·6 0·10 0·38 R
Rsd 1·4s 9ph/15stn Dmin 199km Az.gap 238°
Corr. -0·745 20M/11stn Msd 0·3 1↑ 1↓
Felt Fiordland (130, 138, 139) and Southland (148, 149). Maximum intensity MM V at Te Anau Downs Station (130).

86/432
JUL 11 0852 54·0s 46·03S 165·79E 33km M=4·4
1·5 0·09 0·15 R
Rsd 0·5s 9ph/7stn Dmin 225km Az.gap 319°
Corr. -0·207 7M/4stn Msd 0·2

86/433
JUL 11 1656 43·9s 44·69S 167·88E 12km M=4·7
1·1 0·10 0·11 R
Rsd 0·8s 9ph/8stn Dmin 4km Az.gap 286°
Corr. 0·422 10M/6stn Msd 0·3 2↑ 1↓

86/434
JUL 11 1726 53·9s 37·42S 178·59E 19km M=3·8
0·8 0·05 0·05 2
Rsd 0·4s 12ph/8stn Dmin 32km Az.gap 296°
Corr. 0·198 4M/2stn Msd 0·4 1↑ 1↓

86/435
JUL 11 2303 32·5s 43·23S 172·14E 12km M=5·2
0·2 0·02 0·04 R
Rsd 0·7s 14ph/27stn Dmin 57km Az.gap 79°
Corr. -0·341 21M/11stn Msd 0·2 5↑ 1↓
Felt central South Island from Paroa (92) to Christchurch (110). Maximum intensity MM V at Mount White Station (100). CMZ record gives small aftershocks with S-P about 9 s.

86/436
JUL 12 0029 01·0s 43·12S 172·28E 12km M=3·7
0·4 0·03 0·05 R
Rsd 0·7s 13ph/10stn Dmin 60km Az.gap 94°
Corr. 0·465 13M/7stn Msd 0·3 1↑

86/437
JUL 12 0621 00·4s 35·13S 177·84W 33km M=4·6
1·4 0·21 0·21 R
Rsd 0·6s 13ph/9stn Dmin 441km Az.gap 342°
Corr. -0·791 7M/5stn Msd 0·1

86/438
JUL 12 0940 04·8s 40·91S 172·86E 231km M=4·4
0·8 0·04 0·07 6
Rsd 0·6s 20ph/14stn Dmin 22km Az.gap 168°
Corr. -0·620 10M/6stn Msd 0·2 3↑

86/439
JUL 12 1131 09·8s 44·75S 167·70E 12km M=3·7
1·4 0·06 0·12 R
Rsd 0·8s 10ph/5stn Dmin 20km Az.gap 304°
Corr. -0·030 2M/1stn Msd 0·4 1↓

86/440
JUL 12 1139 36·9s 38·34S 176·07E 170km M=3·8
0·7 0·03 0·05 5
Rsd 0·5s 17ph/9stn Dmin 40km Az.gap 111°
Corr. -0·087 7M/5stn Msd 0·4 2↑ 2↓

86/441
JUL 14 1703 09·0s 40·53S 174·28E 107km M=5·3
0·4 0·02 0·03 6
Rsd 0·7s 22ph/30stn Dmin 65km Az.gap 104°
Corr. -0·516 7M/4stn Msd 0·3 13↑ 9↓
Felt central New Zealand from Hawera (55) to Greymouth(92). Maximum intensity MM V at Hawera (55); Okoia (57); Karori, Lower Hutt (68); Stephens Island (73); Havelock (77) and Greymouth (92).

86/442
JUL 15 1026 37·2s 39·76S 174·20E 183km M=3·8
0·9 0·03 0·05 7
Rsd 0·6s 13ph/8stn Dmin 54km Az.gap 131°
Corr. -0·341 6M/4stn Msd 0·2 1↑

86/443
JUL 15 1631 14·3s 39·36S 177·37E 33km M=3·4
0·8 0·04 0·09 R
Rsd 0·9s 16ph/10stn Dmin 52km Az.gap 192°
Corr. -0·515 10M/5stn Msd 0·2 1↑ 1↓

86/444
JUL 15 2131 27·5s 40·91S 174·69E 45km M=3·4
0·4 0·02 0·03 5
Rsd 0·4s 17ph/13stn Dmin 19km Az.gap 81°
Corr. -0·566 5M/3stn Msd 0·2 10↑ 1↓
Felt Ohariu Valley (68).

86/445
JUL 16 1615 56·9s 42·95S 171·57E 5km M=2·7
R R R R
Rsd ND 1ph/1stn Dmin 49km Az.gap 360°
Corr. R 1M/1stn Msd ND
Felt Arthurs Pass (93) MM IV.

86/446
JUL 17 1115 58·1s 37·62S 176·45E 236km M=4·2
2·9 0·14 0·09 24
Rsd 0·7s 7ph/6stn Dmin 87km Az.gap 203°
Corr. -0·090 5M/3stn Msd 0·1 1↑

86/447
JUL 19 0145 16·1s 39·19S 175·52E 12km M=3·9
0·2 0·02 0·02 1
Rsd 0·4s 11ph/7stn Dmin 3km Az.gap 96°
Corr. -0·124 4M/2stn Msd 0·3 1↑

86/448
JUL 19 0442 37·4s 42·58S 172·50E 5km M=4·0
0·2 0·01 0·02 R
Rsd 0·4s 16ph/10stn Dmin 90km Az.gap 94°
Corr. -0·337 9M/6stn Msd 0·2

86/449
JUL 19 0456 51·4s 37·73S 179·79W 33km M=3·8
ND ND ND R
Rsd ND 3ph/2stn Dmin 169km Az.gap 327°
Corr. ND 2M/1stn Msd 0·0 1↑

86/450
JUL 19 0756 04·3s 37·47S 176·78E 266km M=4·3
2·7 0·15 0·15 23
Rsd 0·7s 6ph/5stn Dmin 88km Az.gap 260°
Corr. -0·471 6M/3stn Msd 0·2 1↑ 1↓

86/451
JUL 19 1637 03·1s 41·16S 172·37E 5km M=3·8
1·1 0·04 0·09 R
Rsd 0·7s 13ph/8stn Dmin 32km Az.gap 229°
Corr. -0·396 5M/3stn Msd 0·1
Felt Arapito (74) MM V.

86/452
JUL 19 1945 33·3s 39·18S 174·80E 194km M=4·0
1·7 0·05 0·09 17
Rsd 0·9s 9ph/6stn Dmin 62km Az.gap 124°
Corr. -0·388 4M/2stn Msd 0·3 1↑

86/453
JUL 21 0046 51·4s 39·16S 173·94E 5km M=3·3
1·4 0·06 0·09 2
Rsd 0·3s 5ph/3stn Dmin 18km Az.gap 307°
Corr. -0·586 2M/1stn Msd 0·2
Felt Pukeiti (46) MM IV.

86/454
JUL 21 1259 48·9s 38·35S 177·62E 59km M=4·0
0·8 0·03 0·06 12
Rsd 0·9s 14ph/10stn Dmin 48km Az.gap 97°
Corr. -0·140 7M/4stn Msd 0·2 3↓

86/455
JUL 22 0212 44·6s 33·49S 177·72W 33km M=5·7
1·3 0·08 0·09 R
Rsd 0·6s 14ph/15stn Dmin 581km Az.gap 274°
Corr. 0·387 12M/8stn Msd 0·2
USGS solution is 33·435S 178·472W 33R.
Clear T-phases observed.

86/456
JUL 22 0808 00·3s 36·64S 177·65E 235km M=4·1
0·8 0·06 0·08 7
Rsd 0·3s 6ph/3stn Dmin 121km Az.gap 310°
Corr. -0·054 4M/2stn Msd 0·1

86/457
JUL 22 1550 03·5s 33·33S 178·25W 12km M=5·1
3·7 0·35 0·29 R
Rsd 0·6s 8ph/8stn Dmin 567km Az.gap 330°
Corr. -0·346 10M/5stn Msd 0·3
Clear T-phases observed.

86/458
JUL 22 1606 15·1s 37·74S 176·35E 12km M=3·1
0·5 0·05 0·03 R
Rsd 0·9s 7ph/5stn Dmin 51km Az.gap 179°
Corr. -0·212 4M/2stn Msd 0·2 1↑ 1↓
Felt Te Puke (26).

86/459
JUL 22 1730 17·1s 36·72S 177·18E 280km M=4·5
0·8 0·07 0·08 10
Rsd 0·4s 10ph/6stn Dmin 141km Az.gap 294°
Corr. 0·439 10M/5stn Msd 0·2 1↑

86/460
JUL 23 0354 06·9s 45·71S 166·79E 5km M=4·7
1·4 0·08 0·12 R
Rsd 0·6s 7ph/6stn Dmin 59km Az.gap 300°
Corr. 0·242 7M/5stn Msd 0·2 1↓

86/461
JUL 24 0313 34·8s 38·14S 176·35E 167km M=4·1
0·6 0·04 0·04 5
Rsd 0·6s 15ph/12stn Dmin 14km Az.gap 68°
Corr. -0·498 7M/4stn Msd 0·3 2↑ 2↓

86/462
JUL 25 0402 04·7s 38·15S 176·41E 162km M=3·7
1·0 0·05 0·05 9
Rsd 0·6s 9ph/5stn Dmin 54km Az.gap 142°
Corr. -0·458 6M/3stn Msd 0·4 1↓

86/463
JUL 27 0635 41·3s 36·93S 177·67E 126km M=4·1
0·7 0·05 0·04 7
Rsd 0·4s 8ph/5stn Dmin 79km Az.gap 264°
Corr. 0·135 7M/5stn Msd 0·1 1↓

86/464
JUL 27 0944 34·2s 38·37S 176·06E 148km M=4·0
0·3 0·02 0·02 2
Rsd 0·3s 14ph/9stn Dmin 39km Az.gap 118°
Corr. -0·315 7M/5stn Msd 0·3 2↑ 3↓

86/465
JUL 27 1217 40·6s 37·64S 176·48E 12km M=3·9
2·2 0·06 0·17 R
Rsd 0·9s 6ph/4stn Dmin 58km Az.gap 308°
Corr. -0·052 3M/2stn Msd 0·2 2↓

86/466
JUL 27 2347 37·1s 33·43S 178·11W 33km M=5·3
3·3 0·26 0·37 R
Rsd 1·1s 6ph/4stn Dmin 622km Az.gap 343°
Corr. -0·583 6M/4stn Msd 0·3
USGS solution is 32·99S 178·13W.

86/467
JUL 28 0104 25·1s 40·43S 174·58E 95km M=3·7
0·4 0·02 0·03 7
Rsd 0·3s 10ph/7stn Dmin 56km Az.gap 149°
Corr. -0·515 3M/2stn Msd 0·1 2↑ 1↓

86/468
JUL 28 0827 26·6s 38·18S 178·71W 33km M=4·2
0·8 0·06 0·07 R
Rsd 0·3s 4ph/2stn Dmin 271km Az.gap 336°
Corr. 0·004 2M/1stn Msd 0·4

86/469
JUL 28 1148 32·3s 39·19S 175·06E 175km M=5·3
0·4 0·02 0·03 4
Rsd 0·5s 22ph/21stn Dmin 42km Az.gap 104°
Corr. -0·481 4M/3stn Msd 0·3 10↑ 8↓
Felt Southern North Island maximum intensity MM V Moawhango (58)

86/470
JUL 28 1755 34·7s 38·80S 176·01E 136km M=3·9
0·9 0·04 0·06 10
Rsd 0·8s 13ph/9stn Dmin 59km Az.gap 115°
Corr. -0·254 7M/4stn Msd 0·2 4↑ 1↓

86/471
JUL 29 1019 54·0s 35·47S 178·66E 292km M=4·3
ND ND ND ND
Rsd ND 4ph/3stn Dmin 238km Az.gap 340°
Corr. ND 4M/2stn Msd 0·1

86/472
JUL 29 1107 24·7s 43·89S 168·07E 12km M=3·7
2·1 0·11 0·15 R
Rsd 0·9s 4ph/2stn Dmin 88km Az.gap 317°
Corr. -0·518 2M/1stn Msd 0·0 1↑

86/473
JUL 29 1508 07·8s 38·23S 177·57E 213km M=3·7
ND ND ND ND
Rsd ND 4ph/3stn Dmin 57km Az.gap 159°
Corr. ND 3M/2stn Msd 0·1

86/474
JUL 29 1823 42·5s 45·06S 167·72E 12km M=4·6
0·5 0·03 0·05 R
Rsd 0·7s 8ph/6stn Dmin 45km Az.gap 190°
Corr. -0·379 7M/5stn Msd 0·3 1↑
Felt Te Anua Downs Station (130) MM IV.

86/475
JUL 30 0957 31·6s 37·15S 176·67E 267km M=4·1
0·6 0·06 0·04 5
Rsd 0·3s 9ph/7stn Dmin 97km Az.gap 240°
Corr. -0·182 8M/4stn Msd 0·3 2↑

86/476
JUL 30 2050 39·3s 41·57S 172·51E 110km M=3·8
0·9 0·05 0·06 7
Rsd 0·7s 12ph/9stn Dmin 38km Az.gap 154°
Corr. -0·477 3M/2stn Msd 0·1 2↑ 1↓

86/477
JUL 31 2123 48·2s 35·54S 179·19E 246km M=4·2
0·8 0·09 0·13 9
Rsd 0·4s 10ph/5stn Dmin 242km Az.gap 338°
Corr. -0·433 4M/2stn Msd 0·1 1↓

86/478
AUG 01 2129 19·0s 46·99S 165·67E 33km M=4·6
2·2 0·14 0·17 R
Rsd 0·9s 7ph/5stn Dmin 197km Az.gap 322°
Corr. 0·019 6M/4stn Msd 0·1

86/479
AUG 02 1537 44·2s 38·07S 176·35E 170km M=3·7
0·9 0·05 0·05 7
Rsd 0·7s 16ph/9stn Dmin 57km Az.gap 152°
Corr. -0·218 8M/5stn Msd 0·4 1↑ 2↓

86/480
AUG 03 0309 48·7s 36·79S 179·38E 33km M=3·6
1·9 0·09 0·20 R
Rsd 0·9s 7ph/4stn Dmin 131km Az.gap 323°
Corr. -0·360 3M/2stn Msd 0·2

86/481
AUG 03 0751 55·1s 45·04S 167·66E 103km M=3·5
0·7 0·03 0·06 5
Rsd 0·4s 8ph/5stn Dmin 46km Az.gap 199°
Corr. -0·562 3M/2stn Msd 0·2

86/482
AUG 03 1718 15·1s 38·74S 177·43E 32km M=4·0
0·4 0·03 0·04 3
Rsd 0·7s 15ph/15stn Dmin 25km Az.gap 132°
Corr. -0·238 11M/6stn Msd 0·1 2↑ 3↓

86/483
AUG 03 2101 46·1s 35·39S 179·46E 179km M=4·4
0·7 0·08 0·10 13
Rsd 0·3s 10ph/9stn Dmin 266km Az.gap 329°
Corr. -0·175 8M/4stn Msd 0·2

86/484
AUG 04 1428 08·9s 37·76S 177·55E 95km M=3·8
0·5 0·02 0·03 5
Rsd 0·5s 15ph/12stn Dmin 41km Az.gap 126°
Corr. 0·086 6M/3stn Msd 0·3 1↑ 2↓

86/485
AUG 05 0117 55·2s 42·26S 172·83E 12km M=3·5
0·3 0·02 0·03 R
Rsd 0·6s 15ph/11stn Dmin 51km Az.gap 101°
Corr. -0·098 10M/6stn Msd 0·3 1↑
Felt Gracefield (68) MM I.

86/486
AUG 05 0139 01·3s 44·96S 167·64E 90km M=3·6
0·4 0·02 0·03 3
Rsd 0·2s 10ph/5stn Dmin 39km Az.gap 210°
Corr. -0·554 5M/3stn Msd 0·3 1↑ 1↓

86/487
AUG 06 0605 33·5s 41·86S 171·74E 12km M=4·1
0·4 0·03 0·04 R
Rsd 0·5s 14ph/11stn Dmin 79km Az.gap 199°
Corr. -0·762 10M/6stn Msd 0·2 1↓
Felt intensity MM V at Westport (79) and Greymouth (85).

86/488
AUG 06 1018 48·0s 42·19S 172·87E 12km M=3·6
0·6 0·05 0·07 R
Rsd 0·9s 11ph/11stn Dmin 43km Az.gap 103°
Corr. 0·221 2M/2stn Msd 0·3

86/489
AUG 06 1018 52·2s 42·26S 172·79E 12km M=4·2
0·3 0·02 0·03 R
Rsd 0·6s 15ph/19stn Dmin 50km Az.gap 103°
Corr. -0·105 17M/10stn Msd 0·2
Felt Greymouth (92) MM IV.

86/490
AUG 06 1426 24·4s 37·82S 176·79E 12km M=3·4
0·8 0·06 0·05 R
Rsd 1·0s 8ph/6stn Dmin 25km Az.gap 143°
Corr. -0·123 3M/3stn Msd 0·3 1↓
Largest in a swarm sequence. Others at 13h 42m and 14h 36m; and August 07d 03h 28m, 03h 49m and 04h 47m.

86/491
AUG 06 1832 53·5s 39·47S 177·18E 29km M=3·4
0·4 0·02 0·04 1
Rsd 0·3s 12ph/7stn Dmin 32km Az.gap 189°
Corr. -0·728 7M/4stn Msd 0·2 1↑ 2↓

86/492
AUG 07 0206 50·2s 39·95S 175·15E 33km M=3·6
0·2 0·02 0·04 R
Rsd 0·7s 22ph/16stn Dmin 79km Az.gap 86°
Corr. -0·279 6M/4stn Msd 0·3 3↑ 4↓

86/493
AUG 07 1839 28·8s 39·02S 175·68E 132km M=3·9
0·6 0·03 0·04 5
Rsd 0·5s 17ph/10stn Dmin 9km Az.gap 96°
Corr. -0·525 5M/3stn Msd 0·3 1↑ 1↓

86/494
AUG 09 0401 20·7s 36·72S 177·21E 259km M=4·0
0·5 0·04 0·05 4
Rsd 0·3s 10ph/7stn Dmin 137km Az.gap 269°
Corr. -0·211 7M/4stn Msd 0·3

86/495
AUG 09 0904 29·4s 42·28S 172·82E 12km M=4·0
0·3 0·02 0·03 R
Rsd 0·7s 18ph/16stn Dmin 52km Az.gap 101°
Corr. -0·180 10M/7stn Msd 0·3 2↑ 2↓

86/496
AUG 09 1205 33·6s 38·30S 177·02E 20km M=3·8
0·3 0·02 0·03 4
Rsd 0·7s 13ph/11stn Dmin 57km Az.gap 83°
Corr. -0·247 6M/3stn Msd 0·2 1↑ 2↓

86/497
AUG 09 2344 38·0s 37·27S 177·63E 144km M=3·7
0·9 0·05 0·06 8
Rsd 0·4s 7ph/5stn Dmin 69km Az.gap 234°
Corr. 0·234 2M/1stn Msd 0·1

86/498
AUG 10 0948 32·3s 39·85S 174·19E 12km M=3·5
0·2 0·01 0·03 R
Rsd 0·4s 12ph/7stn Dmin 64km Az.gap 132°
Corr. 0·259 6M/3stn Msd 0·3

86/499
AUG 10 1530 15·2s 39·07S 177·91E 33km M=3·4
0·5 0·03 0·04 R
Rsd 0·4s 13ph/10stn Dmin 48km Az.gap 218°
Corr. -0·674 6M/3stn Msd 0·1 2↑

86/500
AUG 11 0324 55·2s 38·65S 175·90E 143km M=3·6
1·0 0·04 0·06 9
Rsd 0·7s 11ph/7stn Dmin 57km Az.gap 131°
Corr. -0·488 6M/3stn Msd 0·3 1↑

86/501
AUG 11 0343 11·2s 40·18S 174·61E 33km M=3·9
0·2 0·02 0·03 R
Rsd 0·6s 20ph/12stn Dmin 80km Az.gap 99°
Corr. -0·019 7M/4stn Msd 0·3 2↑ 1↓

86/502
AUG 11 1201 05·3s 40·94S 174·11E 32km M=3·8
0·4 0·04 0·02 3
Rsd 0·6s 12ph/8stn Dmin 34km Az.gap 133°
Corr. -0·251 2M/2stn Msd 0·4 3↑ 1↓

86/503
AUG 11 1227 27·1s 39·09S 176·20E 65km M=3·6
0·7 0·03 0·03 7
Rsd 0·6s 17ph/9stn Dmin 33km Az.gap 122°
Corr. 0·231 7M/4stn Msd 0·4 3↑ 4↓

86/504
AUG 12 1249 32·3s 36·69S 177·65E 169km M=3·9
0·7 0·07 0·07 8
Rsd 0·3s 6ph/3stn Dmin 116km Az.gap 308°
Corr. 0·204 3M/2stn Msd 0·4

86/505
AUG 12 1414 36·5s 44·99S 167·63E 12km M=3·5
0·6 0·03 0·06 R
Rsd 0·6s 9ph/5stn Dmin 42km Az.gap 208°
Corr. -0·596 4M/3stn Msd 0·3 2↑

86/506
AUG 13 0354 41·2s 40·08S 176·70E 59km M=3·7
0·3 0·02 0·03 5
Rsd 0·5s 22ph/15stn Dmin 60km Az.gap 184°
Corr. -0·578 10M/5stn Msd 0·2 2↑ 3↓

86/507
AUG 13 0412 05·3s 35·22S 179·33E 231km M=5·5
1·5 0·10 0·14 14
Rsd 1·1s 19ph/12stn Dmin 279km Az.gap 306°
Corr. 0·419 6M/4stn Msd 0·2 1↑

86/508
AUG 13 1347 23·7s 42·09S 176·77E 12km M=3·7
1·0 0·06 0·08 R
Rsd 0·7s 18ph/12stn Dmin 134km Az.gap 286°
Corr. -0·488 13M/7stn Msd 0·2

86/509
AUG 14 0822 52·9s 34·53S 179·94W 33km M=5·0
1·1 0·05 0·10 R
Rsd 0·5s 15ph/11stn Dmin 375km Az.gap 317°
Corr. 0·393 13M/8stn Msd 0·1

86/510
AUG 14 1551 28·0s 41·12S 174·05E 64km M=3·7
0·4 0·03 0·02 6
Rsd 0·6s 20ph/19stn Dmin 21km Az.gap 89°
Corr. -0·348 5M/3stn Msd 0·4 1↑ 3↓
Felt Titahi Bay (68) MM IV.

86/511
AUG 15 1315 54·9s 37·57S 178·02E 74km M=3·9
0·7 0·03 0·04 8
Rsd 0·5s 14ph/8stn Dmin 25km Az.gap 199°
Corr. 0·104 10M/6stn Msd 0·3 2↑

86/512
AUG 15 2234 04·3s 41·15S 175·14E 9km M=4·5
0·2 0·02 0·02 1
Rsd 0·8s 25ph/23stn Dmin 8km Az.gap 55°
Corr. -0·239 13M/9stn Msd 0·4 5↑ 5↓
Felt Wellington (68) MM IV; Upper Hutt (69).

86/513
AUG 16 0218 34·6s 36·44S 177·45E 292km M=4·8
0·4 0·04 0·05 5
Rsd 0·2s 13ph/8stn Dmin 149km Az.gap 285°
Corr. -0·576 9M/5stn Msd 0·2

86/514
AUG 16 1158 37·5s 38·67S 175·78E 170km M=3·9
0·6 0·03 0·04 5
Rsd 0·7s 22ph/15stn Dmin 19km Az.gap 101°
Corr. -0·516 10M/6stn Msd 0·3 1↓

86/515
AUG 16 1252 22·9s 37·58S 177·20E 131km M=3·9
0·4 0·03 0·03 4
Rsd 0·4s 13ph/9stn Dmin 48km Az.gap 161°
Corr. -0·016 11M/6stn Msd 0·4 2↑

86/516
AUG 16 2035 10·2s 38·70S 179·06E 33km M=3·5
0·1 0·01 0·01 R
Rsd 0·0s 5ph/3stn Dmin 90km Az.gap 302°
Corr. -0·734 5M/3stn Msd 0·1

86/517
AUG 17 0419 04·5s 40·88S 174·74E 1km M=3·5
0·2 0·01 0·02 R
Rsd 0·5s 23ph/18stn Dmin 15km Az.gap 81°
Corr. -0·253 8M/5stn Msd 0·3 6↑ 4↓

86/518
AUG 17 1120 57·5s 45·16S 167·57E 63km M=3·8
0·7 0·02 0·06 8
Rsd 0·3s 9ph/5stn Dmin 61km Az.gap 205°
Corr. -0·239 4M/3stn Msd 0·1

86/519
AUG 17 2123 36·1s 39·03S 175·68E 121km M=3·9
0·4 0·02 0·03 4
Rsd 0·6s 26ph/16stn Dmin 8km Az.gap 95°
Corr. -0·530 11M/6stn Msd 0·4 3↑ 2↓

86/520
AUG 18 0152 12·9s 35·09S 179·13E 237km M=4·5
2·3 0·18 0·18 19
Rsd 0·6s 9ph/7stn Dmin 288km Az.gap 329°
Corr. 0·243 7M/5stn Msd 0·1

86/521
AUG 18 0542 34·0s 38·70S 177·01E 33km M=3·5
0·3 0·03 0·03 R
Rsd 0·9s 19ph/14stn Dmin 17km Az.gap 56°
Corr. -0·391 10M/6stn Msd 0·4

86/522
AUG 18 2027 58·7s 45·35S 167·21E 60km M=3·4
0·9 0·03 0·07 8
Rsd 0·4s 9ph/5stn Dmin 54km Az.gap 244°
Corr. 0·314 4M/2stn Msd 0·1

86/523
AUG 20 0621 00·5s 40·16S 173·53E 160km M=3·9
0·7 0·03 0·04 7
Rsd 0·5s 15ph/13stn Dmin 109km Az.gap 173°
Corr. -0·489 5M/4stn Msd 0·4 5↑ 3↓

86/524
AUG 20 1150 32·0s 38·58S 175·97E 167km M=3·8
0·6 0·04 0·04 6
Rsd 0·8s 21ph/12stn Dmin 64km Az.gap 91°
Corr. -0·490 9M/5stn Msd 0·3 1↑ 3↓

86/525
AUG 21 2005 41·5s 40·15S 173·64E 174km M=4·7
0·8 0·03 0·05 8
Rsd 0·8s 26ph/19stn Dmin 105km Az.gap 166°
Corr. -0·574 7M/5stn Msd 0·3 9↑ 1↓
Felt Kelburn (68) MM I; Mount Victoria (68).

86/526
AUG 22 0730 11·7s 40·11S 174·86E 12km M=3·7
0·3 0·01 0·04 R
Rsd 0·5s 15ph/9stn Dmin 78km Az.gap 172°
Corr. -0·448 3M/2stn Msd 0·2 2↑ 1↓

86/527
AUG 23 1143 17·3s 34·11S 179·87E 33km M=4·7
1·3 0·06 0·12 R
Rsd 0·4s 13ph/12stn Dmin 412km Az.gap 293°
Corr. 0·479 11M/9stn Msd 0·3

86/528
AUG 24 0351 58·5s 33·92S 179·78E 33km M=4·6
3·1 0·12 0·30 R
Rsd 0·8s 7ph/5stn Dmin 430km Az.gap 293°
Corr. 0·622 4M/3stn Msd 0·2

86/529
AUG 25 1827 24·1s 45·23S 167·69E 12km M=3·8
0·8 0·04 0·08 R
Rsd 1·2s 7ph/5stn Dmin 62km Az.gap 185°
Corr. -0·293 1M/1stn Msd ND 1↑

86/530
AUG 26 2107 58·2s 39·24S 175·30E 146km M=3·7
0·4 0·02 0·03 3
Rsd 0·6s 21ph/13stn Dmin 22km Az.gap 100°
Corr. -0·566 6M/4stn Msd 0·3 4↑ 1↓

86/531
AUG 27 0527 10·7s 40·94S 175·98E 33km M=3·7
0·2 0·02 0·02 R
Rsd 0·5s 15ph/14stn Dmin 21km Az.gap 150°
Corr. -0·494 7M/5stn Msd 0·3 1↑
Felt Purunui (65) .

86/532
AUG 27 0736 35·3s 45·16S 166·78E 12km M=3·9
1·0 0·03 0·10 R
Rsd 0·5s 10ph/5stn Dmin 91km Az.gap 279°
Corr. -0·535 7M/4stn Msd 0·3

86/533
AUG 27 1924 16·4s 39·14S 173·80E 11km M=3·6
0·7 0·03 0·04 2
Rsd 0·5s 14ph/10stn Dmin 29km Az.gap 207°
Corr. -0·614 5M/3stn Msd 0·2 1↓

86/534
AUG 27 2038 14·6s 44·26S 168·32E 33km M=3·4
1·0 0·09 0·07 R
Rsd 0·8s 9ph/5stn Dmin 56km Az.gap 238°
Corr. -0·715 4M/2stn Msd 0·4

86/535
AUG 27 2242 05·8s 37·14S 176·96E 227km M=4·6
0·6 0·05 0·04 6
Rsd 0·4s 11ph/7stn Dmin 129km Az.gap 239°
Corr. -0·201 7M/4stn Msd 0·3 2↑

86/536
AUG 28 2153 51·9s 43·29S 170·53E 12km M=4·4
0·3 0·02 0·04 R
Rsd 0·7s 13ph/11stn Dmin 111km Az.gap 164°
Corr. -0·587 11M/6stn Msd 0·3
Felt MM V Whataroa (97), also felt Hokitika (91) and Harihari (98).

86/537
AUG 29 0441 50·6s 37·77S 177·04E 133km M=4·2
0·4 0·02 0·02 5
Rsd 0·4s 15ph/12stn Dmin 25km Az.gap 66°
Corr. 0·008 7M/4stn Msd 0·3 2↑

86/538
AUG 29 0609 54·1s 34·07S 178·34E 238km M=4·3
0·8 0·08 0·16 14
Rsd 0·4s 10ph/7stn Dmin 391km Az.gap 340°
Corr. -0·513 4M/2stn Msd 0·1

86/539
AUG 30 0822 34·8s 45·04S 167·68E 115km M=4·3
0·7 0·04 0·04 5
Rsd 0·3s 10ph/8stn Dmin 45km Az.gap 271°
Corr. 0·301 8M/5stn Msd 0·4 1↑

86/540
AUG 30 1741 08·8s 39·68S 174·82E 148km M=3·9
0·4 0·02 0·04 4
Rsd 0·7s 29ph/19stn Dmin 77km Az.gap 78°
Corr. -0·604 12M/7stn Msd 0·2 1↑ 1↓

86/541
AUG 31 1408 59·9s 42·74S 172·91E 33km M=4·0
0·2 0·01 0·03 R
Rsd 0·5s 13ph/12stn Dmin 74km Az.gap 131°
Corr. -0·331 10M/7stn Msd 0·2 1↑

86/542
AUG 31 1739 29·9s 39·55S 175·66E 12km M=3·5
0·1 0·01 0·02 R
Rsd 0·4s 21ph/15stn Dmin 32km Az.gap 129°
Corr. -0·298 12M/8stn Msd 0·3 2↑ 1↓

86/543
AUG 31 1941 51·3s 38·14S 176·11E 1km M=2·7
0·2 0·02 0·02 R
Rsd 0·3s 4ph/4stn Dmin 8km Az.gap 185°
Corr. 0·634 1M/1stn Msd ND 1↓
Felt Rotorua (33) MM IV.

86/544
SEP 01 0313 30·6s 38·10S 176·39E 169km M=4·0
0·6 0·03 0·03 5
Rsd 0·5s 16ph/11stn Dmin 18km Az.gap 148°
Corr. -0·371 5M/4stn Msd 0·2 1↑ 1↓

86/545
SEP 01 2153 06·3s 36·76S 175·86E 12km M=3·8
0·5 0·03 0·05 R
Rsd 1·0s 12ph/9stn Dmin 69km Az.gap 155°
Corr. 0·480 3M/2stn Msd 0·4

86/546
SEP 03 0044 53·3s 44·52S 168·51E 33km M=3·4
0·1 0·02 0·01 R
Rsd 0·2s 8ph/4stn Dmin 50km Az.gap 191°
Corr. -0·266 4M/2stn Msd 0·7 1↓

86/547
SEP 03 1230 11·4s 40·89S 175·64E 1km M=3·4
0·4 0·03 0·04 R
Rsd 1·0s 8ph/11stn Dmin 32km Az.gap 103°
Corr. -0·004 6M/4stn Msd 0·5 2↑ 1↓

86/548
SEP 03 2325 02·1s 37·97S 176·55E 186km M=4·6
0·5 0·03 0·03 4
Rsd 0·4s 17ph/10stn Dmin 29km Az.gap 163°
Corr. -0·295 9M/5stn Msd 0·2 4↑

86/549
SEP 04 1116 16·4s 37·41S 178·86E 12km M=3·6
0·6 0·03 0·04 R
Rsd 0·4s 9ph/6stn Dmin 53km Az.gap 304°
Corr. 0·294 4M/3stn Msd 0·2

86/550
SEP 04 1346 31·8s 39·76S 176·62E 51km M=3·6
0·2 0·01 0·02 4
Rsd 0·5s 22ph/15stn Dmin 29km Az.gap 166°
Corr. -0·358 8M/5stn Msd 0·2
Felt Dannevirke (63) MM IV.

86/551
SEP 04 1916 04·4s 44·51S 168·24E 12km M=3·4
0·3 0·02 0·02 R
Rsd 0·4s 10ph/5stn Dmin 31km Az.gap 207°
Corr. -0·529 3M/2stn Msd 0·1 1↑

86/552
SEP 05 1429 37·9s 40·12S 174·46E 31km M=4·1
0·2 0·01 0·02 2
Rsd 0·6s 30ph/21stn Dmin 91km Az.gap 109°
Corr. -0·403 19M/10stn Msd 0·3 3↑ 1↓
Felt Ahuahu Valley (57).

86/553
SEP 05 1754 30·6s 34·63S 179·72E 33km M=4·4
3·2 0·19 0·29 R
Rsd 0·8s 10ph/8stn Dmin 353km Az.gap 333°
Corr. 0·226 7M/5stn Msd 0·2
T phases recorded at HBZ 57m 58s, WIZ 58m 25s, WTZ 58m 56s, KRP 59m 20s.

86/554
SEP 05 1847 16·4s 39·89S 175·35E 1km M=3·8
0·3 0·02 0·04 R
Rsd 0·9s 20ph/14stn Dmin 70km Az.gap 98°
Corr. -0·311 11M/8stn Msd 0·3 4↑ 1↓

86/555
SEP 05 1913 42·8s 41·21S 174·59E 30km M=3·4
0·1 0·01 0·01 1
Rsd 0·4s 19ph/16stn Dmin 10km Az.gap 106°
Corr. -0·190 5M/3stn Msd 0·3 1↓
Felt Khandallah (68) MM IV; Johnsonville (68) MM III.

86/556
SEP 05 2217 54·9s 34·53S 179·78E 33km M=4·4
5·2 0·29 0·47 R
Rsd 0·8s 10ph/9stn Dmin 365km Az.gap 335°
Corr. 0·392 3M/3stn Msd 0·2
T phases recorded at HBZ 21m 25s, WIZ 22m 49s, WTZ 22m 22s.

86/557
SEP 06 1103 16·7s 39·28S 174·98E 202km M=3·6
0·5 0·02 0·03 4
Rsd 0·3s 12ph/8stn Dmin 50km Az.gap 165°
Corr. -0·515 6M/4stn Msd 0·4 4↑ 2↓

86/558
SEP 06 1411 52·4s 40·33S 173·49E 153km M=3·9
0·6 0·02 0·04 5
Rsd 0·5s 18ph/12stn Dmin 105km Az.gap 167°
Corr. -0·496 8M/5stn Msd 0·2 1↓

86/559
SEP 06 1635 34·1s 36·90S 177·60E 269km M=3·8
0·8 0·06 0·12 6
Rsd 0·4s 13ph/9stn Dmin 99km Az.gap 287°
Corr. -0·441 8M/4stn Msd 0·2 1↓

86/560
SEP 06 2157 01·1s 42·31S 172·79E 12km M=3·5
0·6 0·03 0·06 R
Rsd 0·7s 12ph/9stn Dmin 56km Az.gap 173°
Corr. 0·470 7M/5stn Msd 0·3 1↑ 1↓

86/561
SEP 06 2317 27·1s 36·06S 178·56E 225km M=3·9
2·7 0·19 0·28 22
Rsd 0·8s 7ph/5stn Dmin 172km Az.gap 316°
Corr. -0·181 3M/2stn Msd 0·3

86/562
SEP 07 2223 02·9s 38·24S 176·35E 181km M=4·0
0·8 0·04 0·06 6
Rsd 0·7s 16ph/10stn Dmin 63km Az.gap 128°
Corr. -0·629 7M/5stn Msd 0·2 3↓

86/563
SEP 09 0029 05·6s 34·39S 179·84W 33km M=5·1
3·3 0·15 0·28 R
Rsd 0·9s 9ph/8stn Dmin 393km Az.gap 293°
Corr. 0·831 9M/6stn Msd 0·3
T phases recorded at HBZ 32m 28s, WIZ 33m 10s.

86/564
SEP 09 1121 56·7s 40·01S 176·94E 58km M=4·2
0·3 0·02 0·03 5
Rsd 0·5s 24ph/15stn Dmin 52km Az.gap 199°
Corr. -0·641 8M/5stn Msd 0·1 3↑ 1↓
Felt Whakatu (60) MM V; Hastings (60).

86/565
SEP 09 1406 20·4s 40·15S 174·98E 12km M=4·2
0·1 0·01 0·02 R
Rsd 0·5s 26ph/18stn Dmin 67km Az.gap 81°
Corr. -0·222 12M/9stn Msd 0·4 2↑ 3↓
Felt Wanganui (57).

86/566
SEP 09 1743 13·2s 39·49S 175·71E 5km M=3·6
0·2 0·01 0·03 R
Rsd 0·5s 18ph/14stn Dmin 35km Az.gap 90°
Corr. -0·180 11M/8stn Msd 0·3 2↓
Felt Moawhango(58) MM V.

86/567
SEP 09 2348 40·8s 39·25S 174·72E 214km M=4·1
0·8 0·04 0·06 7
Rsd 0·5s 14ph/10stn Dmin 54km Az.gap 119°
Corr. -0·017 4M/3stn Msd 0·3 1↑ 2↓

86/568
SEP 10 0440 44·3s 45·09S 167·64E 94km M=3·9
0·3 0·03 0·02 3
Rsd 0·1s 5ph/3stn Dmin 51km Az.gap 294°
Corr. -0·372 2M/2stn Msd 0·4 1↑

86/569
SEP 10 1628 02·1s 38·47S 175·76E 183km M=3·6
2·1 0·10 0·31 15
Rsd 0·5s 8ph/7stn Dmin 27km Az.gap 340°
Corr. -0·110 2M/1stn Msd 0·5 1↑ 1↓

86/570
SEP 10 2054 26·2s 38·65S 177·95E 11km M=3·7
0·4 0·03 0·04 3
Rsd 0·5s 9ph/6stn Dmin 6km Az.gap 173°
Corr. -0·641 4M/2stn Msd 0·2 2↓

86/571
SEP 10 2103 00·6s 38·67S 177·97E 12km M=4·4
0·3 0·02 0·04 2
Rsd 0·4s 12ph/9stn Dmin 5km Az.gap 201°
Corr. -0·609 7M/5stn Msd 0·1 2↑ 2↓
Felt Ormond (44) MM IV. Associated events at 2054 hours and 2059 hours (not located).

86/572
SEP 11 1604 11·1s 38·69S 177·13E 33km M=3·9
0·2 0·02 0·03 R
Rsd 0·6s 13ph/10stn Dmin 13km Az.gap 84°
Corr. -0·147 6M/3stn Msd 0·2 2↑ 2↓

86/573
SEP 12 0406 00·3s 42·29S 172·80E 12km M=3·4
2·0 0·11 0·19 R
Rsd 0·4s 4ph/3stn Dmin 54km Az.gap 257°
Corr. 0·982 3M/2stn Msd 0·5

86/574
SEP 12 1044 26·5s 37·29S 176·83E 197km M=4·2
0·3 0·02 0·01 3
Rsd 0·1s 7ph/6stn Dmin 78km Az.gap 227°
Corr. 0·003 8M/5stn Msd 0·4 1↑ 1↓

86/575
SEP 12 1232 10·5s 34·76S 178·09E 33km M=4·5
2·4 0·13 0·24 R
Rsd 0·5s 5ph/4stn Dmin 316km Az.gap 325°
Corr. 0·594 3M/2stn Msd 0·2

86/576
SEP 12 1447 30·2s 38·21S 176·18E 162km M=3·7
1·0 0·04 0·05 9
Rsd 0·7s 12ph/9stn Dmin 58km Az.gap 132°
Corr. -0·397 8M/4stn Msd 0·2 2↑

86/577
SEP 13 0310 29·5s 36·40S 178·34E 142km M=3·9
0·3 0·02 0·03 3
Rsd 0·1s 6ph/4stn Dmin 134km Az.gap 306°
Corr. 0·170 4M/2stn Msd 0·2 2↑

86/578
SEP 13 0643 53·1s 38·51S 175·90E 177km M=3·8
0·9 0·04 0·06 8
Rsd 0·7s 14ph/10stn Dmin 72km Az.gap 132°
Corr. -0·525 9M/5stn Msd 0·2 4↑ 2↓

86/579
SEP 13 1517 33·9s 32·76S 179·88W 112km M=6·4
8·0 0·47 0·45 91
Rsd 2·3s 19ph/28stn Dmin 562km Az.gap 275°
Corr. 0·833 11M/6stn Msd 0·2 4↑ 2↓
The USGS epicentre is 31·647S 179·967W 243km. Felt at Ruatuna Road (35) and Khandallah (68) MM IV.

86/580
SEP 13 1942 23·8s 38·58S 175·80E 200km M=4·5
0·7 0·03 0·04 5
Rsd 0·5s 22ph/16stn Dmin 22km Az.gap 101°
Corr. -0·375 11M/6stn Msd 0·3 5↑ 6↓

86/581
SEP 13 2356 44·5s 41·60S 174·28E 12km M=4·5
0·3 0·03 0·03 R
Rsd 0·8s 17ph/16stn Dmin 17km Az.gap 123°
Corr. -0·431 7M/5stn Msd 0·4 1↑ 3↓

86/582
SEP 14 0659 03·0s 38·60S 175·95E 165km M=3·8
0·6 0·03 0·04 6
Rsd 0·5s 14ph/9stn Dmin 63km Az.gap 126°
Corr. -0·596 4M/3stn Msd 0·4 2↑ 2↓

86/583
SEP 14 1014 07·8s 42·23S 172·83E 12km M=4·0
0·3 0·03 0·05 R
Rsd 0·9s 13ph/10stn Dmin 47km Az.gap 120°
Corr. -0·620 5M/5stn Msd 0·3 3↑

86/584
SEP 14 2021 37·7s 35·58S 178·76E 222km M=4·4
1·1 0·09 0·19 10
Rsd 0·3s 5ph/3stn Dmin 228km Az.gap 340°
Corr. -0·201 3M/2stn Msd 0·1 1↓

86/585
SEP 15 0207 22·5s 38·95S 179·80E 33km M=4·0
1·0 0·05 0·08 R
Rsd 0·4s 6ph/4stn Dmin 199km Az.gap 284°
Corr. -0·572 3M/2stn Msd 0·2

86/586
SEP 16 0029 52·8s 36·27S 177·89E 267km M=4·6
2·8 0·19 0·08 16
Rsd 0·2s 7ph/7stn Dmin 151km Az.gap 298°
Corr. 0·753 2M/2stn Msd 0·1 1↓

86/587
SEP 16 0325 26·1s 44·08S 168·70E 5km M=3·8
0·5 0·04 0·03 R
Rsd 0·5s 9ph/6stn Dmin 91km Az.gap 190°
Corr. -0·492 7M/5stn Msd 0·3 2↓

86/588
SEP 16 1954 32·9s 38·05S 176·25E 12km M=3·0
R R R R
Rsd 0·2s 3ph/3stn Dmin 64km Az.gap 162°
Corr. R 2M/2stn Msd 0·4 1↓
Felt Rotorua (33) MM IV.

86/589
SEP 16 2212 13·0s 37·56S 176·30E 204km M=3·9
0·5 0·04 0·05 3
Rsd 0·1s 5ph/3stn Dmin 77km Az.gap 323°
Corr. 0·438 4M/2stn Msd 0·5 1↓

86/590
SEP 17 0207 48·0s 45·28S 168·10E 12km M=4·1
0·2 0·02 0·03 R
Rsd 0·5s 7ph/5stn Dmin 69km Az.gap 130°
Corr. -0·185 3M/2stn Msd 0·2 1↑ 2↓

86/591
SEP 17 0850 12·9s 39·42S 174·08E 244km M=4·4
1·6 0·04 0·08 18
Rsd 0·6s 10ph/10stn Dmin 134km Az.gap 187°
Corr. -0·645 7M/4stn Msd 0·2 1↑

86/592
SEP 17 2235 46·1s 40·71S 175·83E 33km M=4·5
0·1 0·01 0·02 R
Rsd 0·5s 25ph/23stn Dmin 31km Az.gap 83°
Corr. -0·454 8M/5stn Msd 0·4 2↑ 2↓
Felt Palmerston North (62) and Levin (65) MM IV. Also felt Purunui (65), Masterton (66) and Gladstone (70).

86/593
SEP 17 2235 52·5s 40·60S 175·51E 33km M=4·4
0·3 0·03 0·03 R
Rsd 0·1s 4ph/4stn Dmin 161km Az.gap 211°
Corr. -0·813 1M/1stn Msd ND

86/594
SEP 18 0105 41·7s 42·96S 171·42E 5km M=5·2
0·3 0·02 0·04 R
Rsd 0·8s 19ph/12stn Dmin 48km Az.gap 145°
Corr. -0·556 18M/10stn Msd 0·2 4↑ 3↓
Felt from Greymouth (92) to Dunedin (145). Maximum intensity MM V at Inchbonnie (92), Arthur's Pass (93) and Lake Coleridge (100).

86/595
SEP 18 0357 50·0s 42·24S 173·38E 5km M=3·5
1·2 0·04 0·18 R
Rsd 0·5s 4ph/3stn Dmin 66km Az.gap 225°
Corr. 0·430 8M/5stn Msd 0·4 1↑

86/596
SEP 18 0549 36·0s 40·01S 174·15E 116km M=3·7
0·9 0·03 0·05 12
Rsd 0·8s 20ph/18stn Dmin 82km Az.gap 132°
Corr. -0·283 2M/1stn Msd 0·4 4↑

86/597
SEP 18 1017 16·2s 46·07S 166·41E 12km M=3·2
ND ND ND R
Rsd ND 3ph/2stn Dmin 93km Az.gap 328°
Corr. ND 4M/2stn Msd 0·1
Felt Puysegur Point (146) MM IV.

86/598
SEP 18 1024 01·3s 38·10S 176·58E 140km M=4·4
0·8 0·03 0·05 8
Rsd 1·0s 20ph/17stn Dmin 35km Az.gap 65°
Corr. -0·181 10M/6stn Msd 0·2 6↑ 8↓

86/599
SEP 18 1416 57·8s 42·22S 172·81E 12km M=3·7
0·4 0·03 0·03 R
Rsd 0·7s 15ph/13stn Dmin 46km Az.gap 117°
Corr. -0·249 8M/5stn Msd 0·2 1↑ 1↓

86/600
SEP 18 1800 06·0s 33·30S 179·53W 454km M=5·0
1·8 0·17 0·28 19
Rsd 0·5s 9ph/6stn Dmin 516km Az.gap 340°
Corr. -0·329 5M/3stn Msd 0·2 1↑ 1↓

86/601
SEP 18 1829 51·0s 43·01S 171·47E 5km M=3·9
0·2 0·02 0·04 R
Rsd 0·6s 12ph/7stn Dmin 54km Az.gap 139°
Corr. -0·480 9M/5stn Msd 0·3
Felt Greymouth (92) and Arthur's Pass (93) MM IV.

86/602
SEP 18 1907 31·7s 43·00S 171·44E 5km M=3·3
0·3 0·02 0·04 R
Rsd 0·5s 6ph/5stn Dmin 53km Az.gap 141°
Corr. -0·300 3M/3stn Msd 0·1
Felt Arthur's Pass (93).

86/603
SEP 19 1230 02·8s 37·32S 177·35E 138km M=3·9
1·8 0·10 0·07 14
Rsd 0·5s 7ph/5stn Dmin 80km Az.gap 223°
Corr. 0·548 4M/3stn Msd 0·3 1↓

86/604
SEP 20 0158 13·2s 41·04S 173·16E 33km M=3·9
0·3 0·03 0·03 R
Rsd 0·4s 9ph/6stn Dmin 36km Az.gap 176°
Corr. -0·464 8M/6stn Msd 0·5 1↑ 2↓

86/605
SEP 20 2118 24·4s 38·59S 177·96E 33km M=3·7
0·3 0·02 0·03 R
Rsd 0·5s 9ph/6stn Dmin 8km Az.gap 121°
Corr. -0·299 4M/2stn Msd 0·2

86/606
SEP 21 2312 40·9s 38·60S 177·69E 60km M=4·0
0·3 0·01 0·02 5
Rsd 0·2s 8ph/7stn Dmin 29km Az.gap 116°
Corr. -0·503 5M/3stn Msd 0·2 1↑ 2↓

86/607
SEP 22 1600 00·2s 40·56S 174·15E 75km M=3·7
0·3 0·02 0·02 6
Rsd 0·3s 16ph/14stn Dmin 73km Az.gap 156°
Corr. -0·628 3M/3stn Msd 0·1 5↑ 3↓

86/608
SEP 23 0137 45·4s 37·03S 177·69E 139km M=4·3
0·6 0·05 0·03 5
Rsd 0·3s 6ph/4stn Dmin 84km Az.gap 258°
Corr. -0·019 5M/3stn Msd 0·2 1↑ 1↓

86/609
SEP 23 1619 36·0s 40·93S 176·81E 50km M=3·5
1·4 0·07 0·14 9
Rsd 0·8s 10ph/8stn Dmin 49km Az.gap 274°
Corr. -0·056 2M/1stn Msd 0·1 3↑ 1↓
This event was the first in a group of three. Wellington network film difficult to read.

86/610
SEP 24 0433 57·4s 32·64S 179·21W 509km M=5·7
1·5 0·12 0·21 16
Rsd 0·7s 19ph/17stn Dmin 595km Az.gap 331°
Corr. -0·250 10M/5stn Msd 0·2 1↓

86/611
SEP 24 1925 46·8s 41·26S 173·30E 85km M=3·6
0·9 0·06 0·05 13
Rsd 0·8s 12ph/11stn Dmin 51km Az.gap 120°
Corr. -0·174 6M/4stn Msd 0·3 2↑ 1↓

86/612
SEP 25 0414 17·4s 40·50S 173·83E 108km M=4·0
0·7 0·03 0·03 10
Rsd 0·5s 13ph/12stn Dmin 88km Az.gap 136°
Corr. -0·280 2M/1stn Msd 0·1 2↑ 2↓

86/613
SEP 25 1849 43·3s 37·79S 176·38E 285km M=4·7
1·0 0·06 0·06 8
Rsd 0·5s 14ph/12stn Dmin 57km Az.gap 169°
Corr. -0·403 9M/5stn Msd 0·2 7↑ 2↓

86/614
SEP 26 0433 53·2s 42·99S 172·21E 12km M=3·6
0·3 0·02 0·04 R
Rsd 0·5s 10ph/8stn Dmin 75km Az.gap 147°
Corr. -0·332 13M/7stn Msd 0·2

86/615
SEP 26 0732 34·3s 43·88S 169·80E 12km M=4·7
0·2 0·01 0·02 R
Rsd 0·2s 7ph/8stn Dmin 55km Az.gap 177°
Corr. -0·232 16M/9stn Msd 0·3 1↓
Felt Mahitahi (104) MM 5 and Greymouth (92) MM 4. Also felt Paringa (103).

86/616
SEP 26 0734 41·6s 43·71S 169·91E 12km M=3·9
1·7 0·11 0·15 R
Rsd 0·6s 5ph/4stn Dmin 69km Az.gap 294°
Corr. 0·607 3M/3stn Msd 0·5

86/617
SEP 26 0734 56·2s 43·92S 169·92E 12km M=4·4
0·6 0·02 0·09 R
Rsd 0·6s 9ph/5stn Dmin 46km Az.gap 176°
Corr. -0·367 11M/7stn Msd 0·3
Felt Westland to South Westland. Maximum Intensity MM 5 at Mahitahi (104) and Mount Cook (105).

86/618
SEP 26 0735 55·6s 43·87S 169·80E 12km M=3·9
R R R R
Rsd 0·9s 2ph/1stn Dmin 56km Az.gap 360°
Corr. R 4M/4stn Msd 0·3

86/619
SEP 26 0740 58·0s 43·78S 169·84E 12km M=3·9
0·5 0·02 0·07 R
Rsd 0·5s 8ph/5stn Dmin 64km Az.gap 184°
Corr. -0·288 8M/4stn Msd 0·3
Felt Mahitahi (104) MM 5.

86/620
SEP 26 0745 22·3s 43·36S 170·82E 12km M=3·3
0·4 0·03 0·09 R
Rsd 0·4s 6ph/5stn Dmin 104km Az.gap 180°
Corr. -0·698 7M/4stn Msd 0·4
Felt Erewhon Station (107) MM 4.

86/621
SEP 26 0932 37·7s 43·81S 169·49E 12km M=3·4
4·3 0·11 0·42 R
Rsd 0·8s 4ph/3stn Dmin 75km Az.gap 267°
Corr. -0·311 2M/2stn Msd 0·3
Felt Mahitahi (104) MM 3.

86/622
SEP 26 2249 42·7s 35·15S 179·31E 368km M=4·3
1·5 0·10 0·17 8
Rsd 0·5s 10ph/9stn Dmin 286km Az.gap 329°
Corr. 0·045 4M/2stn Msd 0·1 1↑

86/623
SEP 27 0713 56·8s 41·65S 174·18E 7km M=3·7
0·3 0·02 0·02 3
Rsd 0·6s 14ph/14stn Dmin 11km Az.gap 95°
Corr. -0·220 10M/6stn Msd 0·2 4↑ 4↓

86/624
SEP 27 1045 10·9s 38·54S 175·91E 181km M=4·3
1·1 0·05 0·07 10
Rsd 0·9s 19ph/16stn Dmin 19km Az.gap 92°
Corr. -0·545 11M/6stn Msd 0·3 6↑ 3↓

86/625
SEP 27 2014 27·9s 37·14S 177·40E 141km M=3·6
0·8 0·05 0·04 8
Rsd 0·3s 7ph/5stn Dmin 95km Az.gap 242°
Corr. 0·007 5M/3stn Msd 0·3 1↑

86/626
SEP 28 0424 50·1s 42·20S 172·83E 12km M=3·9
0·2 0·03 0·02 R
Rsd 0·4s 12ph/11stn Dmin 44km Az.gap 144°
Corr. -0·382 14M/8stn Msd 0·3 5↑

86/627
SEP 28 1717 01·0s 42·13S 172·93E 12km M=3·4
0·3 0·02 0·02 R
Rsd 0·4s 10ph/9stn Dmin 37km Az.gap 188°
Corr. 0·161 8M/5stn Msd 0·2 4↑

86/628
SEP 28 2138 41·1s 38·18S 176·19E 5km M=2·3
R R R G
Rsd 0·6s 3ph/2stn Dmin 0km Az.gap 296°
Corr. R 1M/1stn Msd ND 1↓
Felt Rotorua (33) MM 4.

86/629
SEP 29 0018 08·8s 39·14S 177·96E 33km M=3·5
0·5 0·03 0·06 R
Rsd 0·7s 16ph/13stn Dmin 55km Az.gap 212°
Corr. -0·539 11M/6stn Msd 0·3 1↑

86/630
SEP 30 1005 21·5s 41·70S 174·14E 21km M=3·7
0·3 0·03 0·02 3
Rsd 0·5s 12ph/10stn Dmin 9km Az.gap 132°
Corr. -0·449 12M/7stn Msd 0·4 3↑ 5↓

86/631
SEP 30 1830 49·4s 37·56S 176·58E 224km M=4·0
1·7 0·09 0·08 15
Rsd 0·6s 10ph/10stn Dmin 59km Az.gap 206°
Corr. -0·026 7M/4stn Msd 0·4 3↑ 1↓

86/632
OCT 01 0141 22·3s 38·12S 176·26E 5km M=2·5
0·4 0·03 0·01 G
Rsd 0·3s 5ph/3stn Dmin 9km Az.gap 191°
Corr. 0·104 1M/1stn Msd ND 1↓
Felt Rotorua (33) MM 4.

86/633
OCT 01 0453 44·8s 37·08S 177·71E 141km M=3·7
0·6 0·03 0·03 5
Rsd 0·3s 10ph/8stn Dmin 78km Az.gap 255°
Corr. 0·204 6M/3stn Msd 0·4 1↑

86/634
OCT 01 1433 17·4s 34·76S 179·27W 222km M=4·4
1·7 0·12 0·24 16
Rsd 0·5s 11ph/10stn Dmin 383km Az.gap 337°
Corr. -0·144 6M/4stn Msd 0·2

86/635
OCT 04 0053 50·4s 39·67S 174·17E 141km M=4·3
0·7 0·02 0·04 8
Rsd 0·5s 18ph/16stn Dmin 45km Az.gap 135°
Corr. -0·509 7M/4stn Msd 0·2 3↑ 3↓

86/636
OCT 04 0121 08·2s 45·73S 167·27E 114km M=4·7
0·7 0·04 0·04 5
Rsd 0·4s 9ph/5stn Dmin 22km Az.gap 279°
Corr. 0·160 8M/5stn Msd 0·3 2↑

86/637
OCT 04 0703 08·3s 43·07S 171·24E 12km M=4·6
0·2 0·03 0·06 R
Rsd 0·3s 9ph/8stn Dmin 127km Az.gap 155°
Corr. -0·889 17M/9stn Msd 0·3 2↑ 1↓
Felt Hokitika (91), Greymouth (92) and Lake Coleridge (100) areas. Maximum Intensity MM 5 at Greymouth.

86/638
OCT 04 1233 45·0s 45·15S 167·67E 118km M=3·5
0·7 0·03 0·06 6
Rsd 0·3s 5ph/3stn Dmin 56km Az.gap 193°
Corr. -0·558 5M/3stn Msd 0·2 1↓

86/639
OCT 04 1241 25·7s 43·15S 171·43E 12km M=3·8
0·3 0·05 0·09 R
Rsd 0·5s 8ph/5stn Dmin 109km Az.gap 167°
Corr. -0·915 13M/6stn Msd 0·3

86/640
OCT 05 0328 05·7s 45·99S 166·35E 12km M=3·9
1·8 0·15 0·11 R
Rsd 0·6s 7ph/5stn Dmin 96km Az.gap 312°
Corr. 0·144 7M/3stn Msd 0·3 1↑

86/641
OCT 05 1139 31·4s 42·12S 172·41E 12km M=3·4
1·2 0·06 0·10 R
Rsd 0·7s 7ph/6stn Dmin 50km Az.gap 298°
Corr. 0·325 6M/3stn Msd 0·3 3↑

86/642
OCT 05 1205 55·7s 44·32S 167·75E 0km M=4·0
1·5 0·08 0·13 R
Rsd 0·9s 8ph/5stn Dmin 41km Az.gap 265°
Corr. -0·749 10M/5stn Msd 0·4 1↑

86/643
OCT 07 0602 13·8s 35·41S 179·10E 308km M=4·3
1·1 0·07 0·13 7
Rsd 0·4s 7ph/6stn Dmin 253km Az.gap 327°
Corr. 0·031 4M/2stn Msd 0·3

86/644
OCT 07 1126 10·3s 37·09S 176·80E 319km M=4·5
1·0 0·06 0·05 10
Rsd 0·4s 10ph/9stn Dmin 100km Az.gap 243°
Corr. -0·293 8M/4stn Msd 0·3 5↑ 1↓

86/645
OCT 07 1312 30·9s 38·83S 175·85E 132km M=4·2
0·5 0·03 0·04 5
Rsd 0·6s 17ph/15stn Dmin 15km Az.gap 94°
Corr. -0·536 11M/6stn Msd 0·2 6↑ 6↓

86/646
OCT 07 1813 36·3s 35·79S 178·46W 33km M=4·5
2·0 0·12 0·24 R
Rsd 0·6s 9ph/7stn Dmin 352km Az.gap 338°
Corr. -0·587 9M/6stn Msd 0·3

86/647
OCT 08 0252 44·1s 34·94S 179·55W 33km M=5·1
3·9 0·19 0·31 R
Rsd 1·4s 19ph/16stn Dmin 352km Az.gap 295°
Corr. 0·667 13M/7stn Msd 0·2
U.S.G.S. epicentre: 35·03S 179·66W Depth 33 km. 4·9m_b

86/648
OCT 08 1021 10·0s 40·87S 172·16E 5km M=4·6
0·6 0·03 0·06 R
Rsd 0·6s 12ph/10stn Dmin 54km Az.gap 205°
Corr. -0·183 14M/8stn Msd 0·1 1↑ 1↓
Felt Paturau (71), Bainham (72), Westport (79) and Greymouth (92). Maximum intensity MM V at Westport (79).

86/649
OCT 08 1513 15·2s 40·05S 176·92E 33km M=4·1
0·3 0·02 0·04 R
Rsd 0·6s 20ph/16stn Dmin 136km Az.gap 192°
Corr. -0·643 7M/4stn Msd 0·2 5↑ 6↓

86/650
OCT 08 1808 06·2s 35·73S 178·98E 295km M=4·7
2·9 0·19 0·27 17
Rsd 1·1s 12ph/11stn Dmin 307km Az.gap 323°
Corr. 0·340 6M/3stn Msd 0·3 1↑

86/651
OCT 08 2105 17·0s 38·70S 175·57E 213km M=4·0
1·0 0·04 0·06 9
Rsd 0·5s 14ph/13stn Dmin 17km Az.gap 115°
Corr. -0·563 6M/3stn Msd 0·1 4↑ 3↓

86/652
OCT 09 0343 15·4s 38·55S 178·63E 33km M=4·2
1·3 0·06 0·14 R
Rsd 0·6s 10ph/10stn Dmin 54km Az.gap 245°
Corr. -0·831 10M/6stn Msd 0·2 3↑ 1↓

86/653
OCT 09 0346 03·6s 38·76S 176·04E 116km M=3·5
0·6 0·03 0·04 6
Rsd 0·4s 12ph/10stn Dmin 25km Az.gap 70°
Corr. -0·638 8M/5stn Msd 0·2 1↓

86/654
OCT 09 0800 34·4s 36·96S 177·05E 222km M=4·5
1·0 0·04 0·04 8
Rsd 0·4s 13ph/11stn Dmin 114km Az.gap 183°
Corr. 0·396 11M/6stn Msd 0·2 1↑ 1↓

86/655
OCT 09 1040 45·4s 37·40S 176·77E 303km M=4·1
1·9 0·09 0·07 16
Rsd 0·5s 9ph/8stn Dmin 68km Az.gap 219°
Corr. -0·192 7M/4stn Msd 0·1

86/656
OCT 09 1041 36·2s 41·45S 174·66E 55km M=4·3
0·2 0·01 0·02 2
Rsd 0·3s 16ph/17stn Dmin 21km Az.gap 130°
Corr. -0·580 6M/5stn Msd 0·4 5↑ 5↓
Felt in Wellington (68) MM IV, also felt in Paraparaumu (65), Eastbourne, Stokes Valley and Tawa (68).

86/657
OCT 09 1224 49·7s 45·07S 167·54E 119km M=4·0
0·7 0·02 0·05 5
Rsd 0·3s 8ph/5stn Dmin 53km Az.gap 214°
Corr. -0·192 5M/3stn Msd 0·2 2↑ 1↓

86/658
OCT 10 0034 15·9s 39·67S 176·31E 33km M=4·9
0·2 0·02 0·03 R
Rsd 0·7s 21ph/20stn Dmin 46km Az.gap 109°
Corr. -0·276 14M/8stn Msd 0·3 3↑ 9↓
Felt MM V at Waihi (21) and Taihape (58), also felt at scattered places throughout the central North Island. U.S.G.S. epicentre: 36·63S 176·23E Depth 54 km. 4·6m_b

86/659
OCT 10 2119 20·8s 36·11S 178·79E 219km M=4·3
4·7 0·28 0·31 27
Rsd 0·9s 8ph/7stn Dmin 171km Az.gap 319°
Corr. 0·677 7M/4stn Msd 0·2

86/660
OCT 11 0934 06·4s 39·45S 176·49E 89km M=4·0
0·4 0·02 0·04 7
Rsd 0·7s 15ph/13stn Dmin 31km Az.gap 91°
Corr. -0·567 9M/5stn Msd 0·2 3↑ 6↓
Felt Patoka (52) MM IV.

86/661
OCT 11 1733 55·5s 35·36S 178·97E 33km M=4·2
5·1 0·26 0·47 R
Rsd 1·1s 9ph/8stn Dmin 255km Az.gap 275°
Corr. 0·834 7M/4stn Msd 0·2

86/662
OCT 11 1909 49·6s 38·10S 177·01E 66km M=3·9
0·6 0·04 0·03 9
Rsd 0·7s 12ph/10stn Dmin 13km Az.gap 73°
Corr. 0·069 9M/5stn Msd 0·2 1↑ 1↓

86/663
OCT 12 0600 55·2s 39·47S 174·48E 204km M=4·4
1·5 0·06 0·08 14
Rsd 0·9s 15ph/13stn Dmin 40km Az.gap 85°
Corr. -0·572 9M/5stn Msd 0·3 5↑ 5↓

86/664
OCT 12 1600 13·8s 45·05S 167·67E 97km M=4·7
0·2 0·01 0·01 2
Rsd 0·1s 8ph/5stn Dmin 46km Az.gap 198°
Corr. -0·312 5M/3stn Msd 0·3 1↓

86/665
OCT 13 0852 32·1s 37·55S 176·69E 196km M=4·1
1·7 0·07 0·04 15
Rsd 0·5s 11ph/10stn Dmin 55km Az.gap 206°
Corr. -0·401 7M/4stn Msd 0·4 1↑

86/666
OCT 15 0229 42·1s 42·15S 173·89E 12km M=3·9
0·3 0·03 0·04 R
Rsd 0·7s 9ph/8stn Dmin 35km Az.gap 156°
Corr. -0·488 6M/4stn Msd 0·3 6↑ 2↓
Felt Kaikoura (90) MM V.

86/667
OCT 15 1033 04·1s 45·07S 167·71E 108km M=4·6
0·6 0·02 0·04 4
Rsd 0·2s 6ph/4stn Dmin 47km Az.gap 268°
Corr. 0·170 4M/3stn Msd 0·3 1↑

86/668
OCT 15 1505 21·1s 45·12S 167·62E 117km M=5·0
1·3 0·05 0·10 11
Rsd 0·4s 6ph/4stn Dmin 55km Az.gap 275°
Corr. 0·205 6M/4stn Msd 0·3 1↑ 1↓

86/669
OCT 17 0420 36·8s 33·17S 177·81W 33km M=5·1
6·1 0·33 0·56 R
Rsd 1·0s 9ph/8stn Dmin 605km Az.gap 332°
Corr. 0·276 12M/7stn Msd 0·2
U.S.G.S. epicentre: 33·33S 179·59W 33KM
4·8m_b HBZ has T wave at 04 26

86/670
OCT 17 0939 41·7s 37·35S 176·55E 208km M=4·0
1·9 0·10 0·07 17
Rsd 0·6s 6ph/5stn Dmin 81km Az.gap 227°
Corr. 0·170 7M/4stn Msd 0·3

86/671
OCT 18 1901 02·8s 42·89S 170·91E 12km M=3·8
0·4 0·07 0·13 R
Rsd 0·4s 7ph/5stn Dmin 57km Az.gap 168°
Corr. -0·954 11M/6stn Msd 0·2

86/672
OCT 19 1216 53·1s 37·79S 177·57E 33km M=3·7
0·1 0·02 0·01 R
Rsd 0·3s 13ph/11stn Dmin 44km Az.gap 121°
Corr. 0·030 9M/5stn Msd 0·2 2↑ 2↓
Felt Ruatuna Road (35) MM IV.

86/673
OCT 20 0448 32·5s 38·02S 177·26E 33km M=3·7
0·2 0·02 0·03 R
Rsd 0·6s 13ph/11stn Dmin 55km Az.gap 80°
Corr. -0·169 6M/3stn Msd 0·3 6↑ 3↓

86/674
OCT 20 0646 09·5s 28·34S 175·70W 33km M=6·9
0·8 0·09 0·13 R
Rsd 2·3s 30ph/28stn Dmin 239km Az.gap 115°
Corr. -0·573 15M/8stn Msd 0·3 5↑ 1↓
Felt Raoul Island MM VI. Also felt throughout North Island, and at Lake Rotoiti (81). Maximum intensity MM IV at Ruatuna Road (35) and at Palmerston North (62). U.S.G.S. epicentre: 28·12S 176·37W Depth 29 km. 6·6m_b.

86/675
OCT 20 1034 20·9s 37·03S 176·97E 249km M=4·2
1·9 0·12 0·09 16
Rsd 0·5s 7ph/5stn Dmin 134km Az.gap 248°
Corr. -0·422 3M/2stn Msd 0·1

86/676
OCT 20 1427 42·2s 45·66S 170·15E 12km M=4·1
0·0 0·00 0·00 R
Rsd 0·1s 7ph/5stn Dmin 37km Az.gap 136°
Corr. 0·261 7M/3stn Msd 0·2 1↑ 1↓
Felt Pinewood (144).

86/677
OCT 21 0450 53·3s 38·55S 175·91E 166km M=3·9
0·9 0·05 0·06 8
Rsd 0·7s 15ph/13stn Dmin 49km Az.gap 130°
Corr. -0·617 7M/4stn Msd 0·1 2↑ 1↓

86/678
OCT 21 0855 41·6s 37·44S 177·20E 127km M=3·8
3·1 0·14 0·14 37
Rsd 0·8s 5ph/4stn Dmin 99km Az.gap 211°
Corr. 0·165 6M/4stn Msd 0·3 1↑

86/679
OCT 21 2312 08·9s 44·28S 167·97E 5km M=4·2
1·0 0·06 0·09 R
Rsd 0·3s 7ph/5stn Dmin 44km Az.gap 261°
Corr. -0·906 6M/3stn Msd 0·2 1↓

86/680
OCT 22 1540 54·6s 42·29S 171·31E 12km M=3·3
0·5 0·02 0·05 R
Rsd 0·3s 11ph/7stn Dmin 27km Az.gap 199°
Corr. -0·596 4M/2stn Msd 0·1 1↑
Felt Greymouth (92), MM V.

86/681
OCT 22 1749 49·0s 39·23S 175·35E 22km M=3·6
0·1 0·01 0·01 1
Rsd 0·3s 14ph/8stn Dmin 18km Az.gap 100°
Corr. -0·430 4M/2stn Msd 0·3 2↑ 2↓
Felt Ohakune (49), MM IV.

86/682
OCT 23 0455 59·8s 38·11S 179·56W 33km M=3·9
0·6 0·04 0·05 R
Rsd 0·2s 7ph/5stn Dmin 196km Az.gap 327°
Corr. -0·337 6M/4stn Msd 0·2

86/683
OCT 23 1724 49·2s 40·56S 176·31E 33km M=3·6
0·4 0·02 0·04 R
Rsd 0·8s 24ph/16stn Dmin 39km Az.gap 155°
Corr. -0·179 7M/5stn Msd 0·2 3↓

86/684
OCT 24 0749 37·9s 39·19S 175·26E 12km M=4·1
0·2 0·02 0·02 R
Rsd 0·8s 26ph/18stn Dmin 25km Az.gap 106°
Corr. -0·437 7M/4stn Msd 0·3 3↑ 1↓
Small aftershock at 12h 03m.

86/685
OCT 24 1039 31·7s 38·50S 176·08E 158km M=3·7
0·7 0·03 0·04 6
Rsd 0·7s 25ph/14stn Dmin 37km Az.gap 80°
Corr. -0·338 8M/4stn Msd 0·3 1↑

86/686
OCT 24 1100 41·7s 36·97S 179·96W 33km M=3·7
0·7 0·06 0·06 R
Rsd 0·4s 9ph/5stn Dmin 169km Az.gap 337°
Corr. -0·314 4M/2stn Msd 0·2

86/687
OCT 24 1540 57·9s 33·30S 179·36W 414km M=5·1
1·9 0·19 0·36 30
Rsd 0·9s 16ph/13stn Dmin 521km Az.gap 340°
Corr. -0·668 11M/6stn Msd 0·2

86/688
OCT 24 2009 14·8s 38·34S 175·99E 183km M=4·2
0·7 0·04 0·05 5
Rsd 0·8s 23ph/13stn Dmin 61km Az.gap 107°
Corr. -0·361 10M/5stn Msd 0·3 3↑ 5↓

86/689
OCT 25 2354 22·5s 39·95S 175·46E 12km M=4·1
0·2 0·01 0·03 R
Rsd 0·6s 26ph/19stn Dmin 75km Az.gap 108°
Corr. -0·337 14M/8stn Msd 0·5 2↑ 2↓
Felt Ohakune (49) and Ohingaiti (58) MM IV.

86/690
OCT 26 0855 06·7s 39·83S 176·88E 33km M=3·4
0·7 0·04 0·07 R
Rsd 0·6s 12ph/7stn Dmin 31km Az.gap 196°
Corr. -0·363 2M/2stn Msd 0·1 1↑

86/691
OCT 26 1126 56·2s 38·65S 175·85E 184km M=3·7
0·5 0·03 0·04 4
Rsd 0·6s 26ph/16stn Dmin 53km Az.gap 96°
Corr. -0·426 6M/4stn Msd 0·2 3↑ 1↓

86/692
OCT 26 1134 51·7s 38·64S 175·81E 186km M=4·2
0·5 0·03 0·04 4
Rsd 0·7s 27ph/20stn Dmin 25km Az.gap 99°
Corr. -0·467 11M/7stn Msd 0·2 9↑ 6↓

86/693
OCT 27 0425 21·4s 38·73S 175·79E 152km M=5·9
0·6 0·02 0·05 6
Rsd 0·9s 22ph/23stn Dmin 16km Az.gap 89°
Corr. -0·272 3M/2stn Msd 0·4 21↑ 10↓
Felt central New Zealand, from Ruatuna Road (35) to Blenheim (83). Maximum intensity MM V at Raumati South (65).

86/694
OCT 27 0658 39·7s 37·99S 176·97E 88km M=3·5
0·8 0·04 0·03 6
Rsd 0·6s 13ph/8stn Dmin 0km Az.gap 129°
Corr. 0·279 5M/3stn Msd 0·1 1↑ 1↓

86/695
OCT 28 1345 42·2s 38·31S 176·04E 166km M=3·8
1·1 0·06 0·06 10
Rsd 0·8s 17ph/13stn Dmin 62km Az.gap 113°
Corr. -0·262 10M/5stn Msd 0·2 1↑ 2↓

86/696
OCT 28 1608 06·7s 40·67S 178·27E 33km M=3·9
1·1 0·05 0·09 R
Rsd 0·7s 15ph/15stn Dmin 175km Az.gap 255°
Corr. -0·598 11M/6stn Msd 0·3

86/697
OCT 30 0041 13·4s 34·75S 179·40E 287km M=4·5
0·5 0·05 0·07 7
Rsd 0·2s 8ph/6stn Dmin 331km Az.gap 333°
Corr. 0·007 6M/3stn Msd 0·2

86/698
OCT 30 1148 01·5s 37·80S 176·33E 206km M=3·7
1·3 0·08 0·08 9
Rsd 0·6s 11ph/7stn Dmin 61km Az.gap 184°
Corr. -0·191 5M/3stn Msd 0·3

86/699
OCT 30 1425 39·9s 35·30S 179·03E 287km M=4·5
1·3 0·13 0·19 13
Rsd 0·7s 13ph/9stn Dmin 263km Az.gap 327°
Corr. -0·390 7M/4stn Msd 0·3 1↑

86/700
OCT 30 1515 47·1s 37·98S 176·45E 173km M=3·7
1·3 0·08 0·07 9
Rsd 0·8s 15ph/9stn Dmin 31km Az.gap 162°
Corr. -0·161 7M/4stn Msd 0·4 1↑ 1↓

86/701
OCT 30 2126 32·6s 39·28S 174·68E 213km M=4·2
0·9 0·05 0·05 8
Rsd 0·5s 17ph/13stn Dmin 51km Az.gap 166°
Corr. -0·407 3M/2stn Msd 0·2 5↑ 3↓

86/702
OCT 30 2140 06·0s 40·37S 174·17E 89km M=3·7
0·3 0·01 0·02 5
Rsd 0·4s 24ph/17stn Dmin 83km Az.gap 121°
Corr. -0·365 6M/4stn Msd 0·3 3↑ 1↓

86/703
OCT 31 0443 25·7s 37·80S 177·02E 116km M=3·8
0·6 0·04 0·03 4
Rsd 0·5s 17ph/10stn Dmin 21km Az.gap 175°
Corr. 0·127 7M/4stn Msd 0·3 1↑

86/704
OCT 31 0600 14·3s 42·60S 170·58E 12km M=3·9
0·9 0·06 0·08 R
Rsd 0·8s 14ph/9stn Dmin 68km Az.gap 186°
Corr. -0·717 9M/5stn Msd 0·2

86/705
OCT 31 1624 16·6s 45·13S 166·96E 12km M=3·7
0·9 0·03 0·08 R
Rsd 0·4s 9ph/6stn Dmin 85km Az.gap 260°
Corr. -0·404 8M/4stn Msd 0·2 1↑

86/706
OCT 31 1720 58·9s 45·29S 166·87E 12km M=3·5
0·6 0·03 0·05 R
Rsd 0·6s 9ph/5stn Dmin 75km Az.gap 274°
Corr. -0·300 5M/3stn Msd 0·2

86/707
OCT 31 1739 59·2s 45·07S 167·74E 90km M=3·4
0·9 0·04 0·07 7
Rsd 0·4s 8ph/5stn Dmin 47km Az.gap 187°
Corr. -0·558 5M/3stn Msd 0·4 1↑

86/708
OCT 31 1844 50·6s 37·36S 177·53E 115km M=3·5
1·0 0·06 0·04 6
Rsd 0·5s 10ph/9stn Dmin 73km Az.gap 222°
Corr. -0·082 5M/3stn Msd 0·1

86/709
OCT 31 2113 28·5s 35·78S 178·41E 202km M=4·1
1·1 0·10 0·12 12
Rsd 0·4s 9ph/7stn Dmin 202km Az.gap 317°
Corr. 0·000 6M/3stn Msd 0·2

86/710
OCT 31 2119 11·2s 35·77S 178·58E 204km M=4·1
0·9 0·09 0·12 11
Rsd 0·4s 7ph/4stn Dmin 205km Az.gap 319°
Corr. -0·095 4M/2stn Msd 0·3

86/711
NOV 01 0212 40·6s 37·50S 177·10E 137km M=3·6
0·8 0·05 0·04 7
Rsd 0·6s 11ph/7stn Dmin 55km Az.gap 142°
Corr. 0·092 4M/2stn Msd 0·3 1↓

86/712
NOV 01 0228 04·7s 46·01S 167·10E 98km M=4·5
0·6 0·04 0·05 5
Rsd 0·5s 9ph/8stn Dmin 43km Az.gap 296°
Corr. -0·067 9M/5stn Msd 0·2 1↑ 2↓

86/713
NOV 01 0859 56·8s 39·27S 175·06E 145km M=3·8
0·6 0·03 0·04 6
Rsd 0·6s 20ph/12stn Dmin 43km Az.gap 107°
Corr. -0·326 6M/4stn Msd 0·3 3↑ 1↓

86/714
NOV 03 0009 08·3s 40·90S 175·46E 12km M=3·9
0·2 0·01 0·02 R
Rsd 0·5s 17ph/13stn Dmin 29km Az.gap 83°
Corr. -0·176 5M/3stn Msd 0·2 3↑ 1↓

86/715
NOV 03 0303 36·8s 37·42S 176·81E 187km M=3·7
0·8 0·05 0·08 8
Rsd 0·4s 8ph/4stn Dmin 64km Az.gap 261°
Corr. -0·535 4M/2stn Msd 0·6

86/716
NOV 03 0706 45·8s 43·05S 167·42E 12km M=3·7
1·6 0·13 0·08 R
Rsd 0·5s 5ph/4stn Dmin 185km Az.gap 316°
Corr. 0·488 1M/1stn Msd ND 1↑

86/717
NOV 03 1330 27·3s 41·21S 172·69E 213km M=3·6
0·7 0·04 0·06 5
Rsd 0·3s 16ph/11stn Dmin 14km Az.gap 206°
Corr. -0·296 2M/1stn Msd 0·1 4↑ 3↓

86/718
NOV 03 1336 47·1s 38·07S 176·29E 199km M=3·9
0·7 0·04 0·04 6
Rsd 0·5s 19ph/11stn Dmin 62km Az.gap 151°
Corr. -0·180 5M/3stn Msd 0·3 1↑ 1↓

86/719
NOV 03 1955 30·1s 38·31S 175·96E 179km M=3·6
0·6 0·04 0·03 5
Rsd 0·3s 12ph/9stn Dmin 57km Az.gap 109°
Corr. -0·169 3M/2stn Msd 0·2

86/720
NOV 04 0939 29·8s 41·68S 173·67E 33km M=3·4
0·2 0·02 0·02 R
Rsd 0·5s 15ph/10stn Dmin 46km Az.gap 95°
Corr. -0·324 6M/3stn Msd 0·2 2↑ 6↓

86/721
NOV 05 0122 06·4s 38·99S 175·03E 207km M=4·4
0·7 0·04 0·06 7
Rsd 0·8s 21ph/13stn Dmin 50km Az.gap 162°
Corr. -0·687 10M/6stn Msd 0·2 2↑ 2↓

86/722
NOV 05 0409 34·7s 39·65S 177·21E 28km M=3·7
0·5 0·02 0·04 2
Rsd 0·5s 20ph/15stn Dmin 35km Az.gap 195°
Corr. -0·411 10M/7stn Msd 0·3 2↓

86/723
NOV 05 1240 36·5s 37·11S 177·61E 114km M=5·0
0·7 0·04 0·05 6
Rsd 0·7s 17ph/16stn Dmin 59km Az.gap 195°
Corr. 0·363 7M/4stn Msd 0·2 4↑

86/724
NOV 05 1249 28·4s 36·45S 177·27E 267km M=4·2
0·4 0·04 0·06 4
Rsd 0·2s 10ph/5stn Dmin 157km Az.gap 316°
Corr. -0·302 10M/6stn Msd 0·2

86/725
NOV 06 0532 54·9s 39·09S 175·30E 166km M=3·9
0·6 0·03 0·04 5
Rsd 0·8s 27ph/17stn Dmin 25km Az.gap 111°
Corr. -0·602 10M/6stn Msd 0·3 3↑ 2↓

86/726
NOV 06 1245 04·1s 37·17S 177·32E 145km M=4·3
0·5 0·04 0·03 4
Rsd 0·4s 19ph/13stn Dmin 41km Az.gap 201°
Corr. -0·140 11M/6stn Msd 0·3 1↑

86/727
NOV 08 0634 45·3s 46·65S 166·40E 12km M=3·9
2·3 0·11 0·20 R
Rsd 0·8s 7ph/4stn Dmin 131km Az.gap 313°
Corr. -0·098 6M/3stn Msd 0·1

86/728
NOV 08 1304 49·9s 39·21S 175·29E 20km M=3·8
0·2 0·01 0·02 2
Rsd 0·5s 16ph/11stn Dmin 22km Az.gap 103°
Corr. -0·241 8M/5stn Msd 0·3 1↑ 1↓

86/729
NOV 09 1111 40·1s 41·59S 172·06E 1km M=3·9
0·4 0·02 0·03 R
Rsd 0·5s 13ph/12stn Dmin 69km Az.gap 198°
Corr. -0·349 11M/7stn Msd 0·2 1↓

86/730
NOV 09 1511 30·3s 38·28S 177·07E 15km M=3·9
0·3 0·02 0·03 5
Rsd 0·9s 18ph/12stn Dmin 34km Az.gap 62°
Corr. 0·021 8M/5stn Msd 0·2 1↑ 1↓
Felt Ruatuna Road (35) MM IV.

86/731
NOV 10 2010 37·0s 39·05S 175·92E 97km M=3·8
0·5 0·04 0·05 5
Rsd 0·8s 20ph/17stn Dmin 14km Az.gap 62°
Corr. -0·659 10M/6stn Msd 0·1 2↓

86/732
NOV 12 0042 30·4s 36·82S 177·05E 286km M=4·1
0·8 0·07 0·07 8
Rsd 0·4s 12ph/8stn Dmin 130km Az.gap 261°
Corr. -0·502 8M/4stn Msd 0·3

86/733
NOV 12 0146 18·3s 45·08S 167·69E 100km M=4·2
1·2 0·07 0·08 12
Rsd 0·6s 7ph/4stn Dmin 49km Az.gap 269°
Corr. 0·299 5M/3stn Msd 0·5

86/734
NOV 12 0707 57·2s 37·30S 178·43E 35km M=3·9
0·8 0·04 0·06 5
Rsd 0·5s 14ph/9stn Dmin 35km Az.gap 296°
Corr. 0·570 7M/4stn Msd 0·4 1↓

86/735
NOV 12 1111 02·4s 38·39S 175·99E 188km M=3·9
0·7 0·04 0·06 6
Rsd 0·7s 18ph/12stn Dmin 29km Az.gap 100°
Corr. -0·633 9M/5stn Msd 0·4 1↑

86/736
NOV 12 2056 15·6s 41·49S 174·60E 6km M=4·5
0·4 0·02 0·03 2
Rsd 0·8s 22ph/20stn Dmin 27km Az.gap 134°
Corr. -0·327 8M/5stn Msd 0·5 1↑
Felt Wellington (68) MM V, Wellington (68), Paekakariki (65) and Fighting Bay (78) MM IV.

86/737
NOV 13 0210 25·6s 37·38S 177·60E 246km M=4·2
1·5 0·14 0·17 8
Rsd 0·6s 9ph/6stn Dmin 67km Az.gap 251°
Corr. -0·549 4M/2stn Msd 0·3

86/738
NOV 14 0106 52·1s 35·43S 179·14E 221km M=4·2
2·2 0·20 0·26 32
Rsd 0·9s 8ph/5stn Dmin 252km Az.gap 327°
Corr. -0·148 6M/3stn Msd 0·3

86/739
NOV 16 0104 29·7s 47·58S 165·93E 33km M=4·4
0·7 0·03 0·11 R
Rsd 0·6s 10ph/8stn Dmin 235km Az.gap 227°
Corr. -0·385 9M/5stn Msd 0·3

86/740
NOV 16 0442 16·5s 40·14S 175·02E 33km M=3·6
0·2 0·01 0·03 R
Rsd 0·6s 19ph/13stn Dmin 66km Az.gap 111°
Corr. -0·431 8M/5stn Msd 0·2 2↑

86/741
NOV 16 1229 04·1s 38·30S 176·89E 57km M=3·5
0·4 0·02 0·03 6
Rsd 0·6s 16ph/14stn Dmin 36km Az.gap 84°
Corr. -0·345 9M/5stn Msd 0·2 1↑

86/742
NOV 17 0438 35·5s 39·65S 176·42E 56km M=3·5
0·5 0·03 0·04 8
Rsd 0·9s 20ph/13stn Dmin 37km Az.gap 143°
Corr. -0·057 9M/6stn Msd 0·2 1↑ 1↓

86/743
NOV 17 1139 12·9s 38·57S 178·75E 33km M=3·9
0·4 0·03 0·04 R
Rsd 0·5s 18ph/10stn Dmin 64km Az.gap 256°
Corr. -0·434 12M/7stn Msd 0·3

86/744
NOV 18 1015 56·9s 36·26S 177·78E 276km M=5·3
0·9 0·06 0·08 8
Rsd 0·8s 19ph/12stn Dmin 155km Az.gap 231°
Corr. 0·325 12M/7stn Msd 0·2 2↑ 2↓

86/745
NOV 18 1412 46·3s 45·05S 167·65E 123km M=4·1
1·1 0·05 0·08 8
Rsd 0·7s 10ph/5stn Dmin 47km Az.gap 201°
Corr. -0·277 7M/4stn Msd 0·5

86/746
NOV 19 2243 33·8s 37·75S 177·42E 93km M=3·7
0·3 0·02 0·02 3
Rsd 0·3s 14ph/8stn Dmin 32km Az.gap 117°
Corr. -0·304 7M/4stn Msd 0·3 1↑ 1↓

86/747
NOV 20 0330 22·1s 42·68S 170·55E 12km M=3·6
1·0 0·05 0·09 R
Rsd 0·6s 8ph/5stn Dmin 72km Az.gap 215°
Corr. -0·627 5M/3stn Msd 0·3

86/748
NOV 21 1017 03·0s 41·61S 174·12E 12km M=4·3
0·2 0·02 0·02 R
Rsd 0·5s 14ph/16stn Dmin 18km Az.gap 93°
Corr. -0·198 11M/7stn Msd 0·3 5↑ 4↓
Felt Wellington (68) and Blenheim (77), MM IV. Small aftershock recorded about 4·5 minutes later on MNG, COB and Wellington Network stations.

86/749
NOV 21 1540 52·2s 36·96S 177·23E 109km M=3·6
0·4 0·05 0·03 9
Rsd 0·2s 7ph/5stn Dmin 116km Az.gap 253°
Corr. -0·648 4M/2stn Msd 0·4

86/750
NOV 22 0927 57·9s 43·10S 171·88E 12km M=3·5
0·4 0·02 0·06 R
Rsd 0·4s 9ph/5stn Dmin 75km Az.gap 170°
Corr. -0·337 3M/2stn Msd 0·3

86/751
NOV 23 1922 41·5s 40·95S 176·35E 31km M=3·6
0·8 0·05 0·09 2
Rsd 0·6s 13ph/13stn Dmin 12km Az.gap 222°
Corr. -0·556 4M/2stn Msd 0·3 1↓

86/752
NOV 23 2217 57·4s 37·74S 177·36E 129km M=4·3
0·4 0·02 0·03 3
Rsd 0·4s 14ph/10stn Dmin 28km Az.gap 113°
Corr. -0·332 9M/5stn Msd 0·3 2↑ 1↓

86/753
NOV 24 0833 19·0s 37·18S 177·50E 180km M=3·7
1·0 0·11 0·09 12
Rsd 0·5s 7ph/5stn Dmin 85km Az.gap 240°
Corr. -0·528 6M/4stn Msd 0·4

86/754
NOV 24 0937 23·9s 39·07S 175·48E 211km M=3·7
0·8 0·05 0·09 6
Rsd 0·5s 10ph/6stn Dmin 15km Az.gap 228°
Corr. -0·363 6M/4stn Msd 0·3 1↑

86/755
NOV 24 1028 43·0s 36·83S 177·71E 219km M=4·1
1·3 0·09 0·16 9
Rsd 0·8s 9ph/7stn Dmin 101km Az.gap 272°
Corr. 0·011 5M/3stn Msd 0·1

86/756
NOV 25 0442 01·0s 39·42S 174·44E 202km M=4·2
0·8 0·04 0·06 6
Rsd 0·7s 22ph/19stn Dmin 34km Az.gap 91°
Corr. -0·441 7M/4stn Msd 0·2 5↑ 3↓

86/757
NOV 25 1552 06·0s 40·08S 176·18E 33km M=3·5
0·6 0·03 0·07 R
Rsd 0·6s 10ph/6stn Dmin 81km Az.gap 178°
Corr. -0·347 3M/2stn Msd 0·2 1↑ 1↓

86/758
NOV 26 0559 13·9s 37·58S 178·36E 51km M=3·9
0·4 0·03 0·03 2
Rsd 0·3s 16ph/13stn Dmin 6km Az.gap 281°
Corr. -0·119 6M/4stn Msd 0·3 1↑ 1↓
Small aftershocks recorded on HBZ and WTZ at 06h 02m & 09h 18m.

86/759
NOV 26 1722 15·0s 38·75S 177·49E 84km M=3·9
0·8 0·04 0·08 7
Rsd 0·8s 15ph/16stn Dmin 47km Az.gap 137°
Corr. -0·182 8M/4stn Msd 0·3 2↓

86/760
NOV 26 2029 10·0s 40·22S 177·08E 33km M=3·8
0·6 0·02 0·06 R
Rsd 0·5s 15ph/16stn Dmin 77km Az.gap 203°
Corr. -0·286 8M/5stn Msd 0·2 1↑

86/761
NOV 27 0101 23·8s 39·66S 174·26E 192km M=3·7
0·8 0·03 0·05 7
Rsd 0·4s 12ph/8stn Dmin 46km Az.gap 123°
Corr. -0·313 2M/1stn Msd 0·1 5↑ 2↓

86/762
NOV 27 1243 32·7s 42·67S 171·74E 12km M=4·8
0·5 0·04 0·04 R
Rsd 0·8s 12ph/22stn Dmin 32km Az.gap 113°
Corr. -0·389 23M/12stn Msd 0·3 2↑
Felt from Westport (79) to Otira (93). Maximum intensity MM V at Arthur's Pass (93).

86/763
NOV 27 1555 02·1s 38·83S 175·40E 222km M=3·9
0·8 0·04 0·06 6
Rsd 0·5s 17ph/12stn Dmin 37km Az.gap 121°
Corr. 0·189 5M/3stn Msd 0·2 5↑ 3↓

86/764
NOV 27 1915 47·8s 40·15S 175·10E 33km M=3·7
0·2 0·02 0·05 R
Rsd 0·7s 20ph/12stn Dmin 62km Az.gap 118°
Corr. -0·181 7M/4stn Msd 0·4 4↑

86/765
NOV 28 0226 20·4s 38·17S 177·35E 33km M=3·4
0·4 0·03 0·04 R
Rsd 0·5s 15ph/12stn Dmin 38km Az.gap 80°
Corr. -0·274 8M/5stn Msd 0·2 1↓

86/766
NOV 28 2223 19·4s 41·79S 173·82E 69km M=4·5
0·4 0·02 0·02 6
Rsd 0·5s 17ph/18stn Dmin 34km Az.gap 106°
Corr. -0·281 8M/5stn Msd 0·3 6↑ 6↓
Felt Wellington (68) and Blenheim (77), maximum intensity MM IV.

86/767
NOV 29 0107 44·1s 38·10S 176·49E 151km M=4·6
0·5 0·03 0·04 4
Rsd 0·7s 24ph/16stn Dmin 15km Az.gap 68°
Corr. -0·330 7M/4stn Msd 0·3 3↑ 5↓
Felt Ruatuna Rd (35), MM III.

86/768
NOV 30 0150 43·3s 39·11S 175·59E 136km M=3·5
0·6 0·03 0·06 5
Rsd 0·6s 12ph/8stn Dmin 8km Az.gap 97°
Corr. -0·353 4M/3stn Msd 0·5 1↑

86/769
NOV 30 1115 14·3s 39·60S 177·50E 33km M=4·1
0·5 0·03 0·05 R
Rsd 0·8s 22ph/17stn Dmin 59km Az.gap 193°
Corr. -0·442 11M/7stn Msd 0·2 6↑ 6↓
Felt Patoka (52), MM IV.

86/770
NOV 30 1914 49·3s 38·59S 178·38E 33km M=3·8
0·8 0·04 0·07 R
Rsd 0·6s 8ph/5stn Dmin 32km Az.gap 231°
Corr. -0·546 3M/2stn Msd 0·4

86/771
DEC 01 1004 22·3s 37·91S 176·56E 135km M=3·4
1·0 0·06 0·07 10
Rsd 0·6s 8ph/7stn Dmin 39km Az.gap 169°
Corr. -0·228 4M/3stn Msd 0·2 1↓

86/772
DEC 02 0539 49·7s 35·74S 178·06E 33km M=4·4
1·9 0·11 0·18 R
Rsd 0·7s 9ph/6stn Dmin 207km Az.gap 312°
Corr. 0·092 6M/3stn Msd 0·2

86/773
DEC 03 1328 51·8s 39·57S 176·12E 96km M=4·4
0·3 0·01 0·03 4
Rsd 0·5s 26ph/22stn Dmin 52km Az.gap 87°
Corr. -0·484 12M/7stn Msd 0·2 5↑ 3↓
Felt Patoka (52) and Dannevirke (63) MM IV.

86/774
DEC 03 1515 53·8s 40·39S 176·54E 3km M=3·5
0·2 0·01 0·01 1
Rsd 0·1s 9ph/6stn Dmin 93km Az.gap 239°
Corr. -0·793 4M/2stn Msd 0·1 1↑ 1↓

86/775
DEC 03 1640 07·6s 37·80S 177·52E 60km M=4·1
0·8 0·05 0·04 12
Rsd 0·6s 11ph/11stn Dmin 51km Az.gap 167°
Corr. -0·288 9M/5stn Msd 0·2 2↑ 5↓

86/776
DEC 04 1631 40·1s 45·42S 170·93E 5km M=3·4
0·7 0·02 0·10 R
Rsd 0·5s 6ph/4stn Dmin 38km Az.gap 215°
Corr. -0·792 4M/2stn Msd 0·4
Felt Shag Point (136) MM IV and Islay Downs (135).

86/777
DEC 04 1713 05·1s 37·33S 179·63E 33km M=3·7
6·7 1·52 0·68 R
Rsd 1·2s 4ph/3stn Dmin 121km Az.gap 354°
Corr. -0·524 2M/1stn Msd 0·0

86/778
DEC 05 0933 45·5s 43·31S 168·58E 12km M=3·7
0·7 0·10 0·14 R
Rsd 0·3s 5ph/3stn Dmin 167km Az.gap 341°
Corr. 0·785 4M/3stn Msd 0·3

86/779
DEC 06 0817 19·1s 40·18S 173·58E 179km M=4·1
0·7 0·03 0·04 7
Rsd 0·6s 21ph/16stn Dmin 110km Az.gap 169°
Corr. -0·343 7M/4stn Msd 0·3 4↑ 3↓

86/780
DEC 07 0207 25·7s 33·35S 178·26W 368km M=5·8
0·9 0·13 0·20 11
Rsd 0·6s 20ph/18stn Dmin 565km Az.gap 345°
Corr. -0·691 11M/6stn Msd 0·3 1↑
USGS solution is 32·530 S, 179·991 E, 182 km.

86/781
DEC 08 0325 38·2s 42·94S 171·79E 12km M=3·0
0·7 0·04 0·04 R
Rsd 0·3s 5ph/4stn Dmin 55km Az.gap 186°
Corr. -0·471 1M/1stn Msd ND
Felt Arthurs Pass (93) MM III.

86/782
DEC 08 1241 14·7s 45·21S 167·57E 112km M=4·6
0·7 0·04 0·05 6
Rsd 0·5s 7ph/5stn Dmin 63km Az.gap 203°
Corr. -0·212 5M/3stn Msd 0·5 1↑

86/783
DEC 10 1011 46·1s 38·33S 178·95E 33km M=4·0
1·2 0·06 0·10 R
Rsd 0·3s 5ph/3stn Dmin 99km Az.gap 307°
Corr. -0·674 3M/2stn Msd 0·2 1↓

86/784
DEC 11 0802 29·7s 41·83S 165·94E 12km M=4·5
1·9 0·10 0·19 R
Rsd 1·0s 11ph/8stn Dmin 354km Az.gap 280°
Corr. -0·338 7M/4stn Msd 0·3 1↓

86/785
DEC 13 1412 23·8s 39·15S 174·79E 232km M=4·6
0·9 0·04 0·06 8
Rsd 0·7s 20ph/16stn Dmin 62km Az.gap 129°
Corr. -0·669 8M/5stn Msd 0·1 8↑ 5↓

86/786
DEC 14 0220 44·0s 38·68S 175·47E 187km M=4·4
0·9 0·05 0·06 8
Rsd 0·7s 15ph/13stn Dmin 56km Az.gap 123°
Corr. -0·602 6M/4stn Msd 0·3 5↑ 6↓

86/787
DEC 15 1700 23·8s 37·52S 176·50E 361km M=4·3
0·8 0·07 0·11 7
Rsd 0·6s 7ph/5stn Dmin 97km Az.gap 212°
Corr. -0·571 3M/2stn Msd 0·1

86/788
DEC 17 0241 00·3s 33·76S 179·37W 329km M=4·9
1·2 0·21 0·40 25
Rsd 0·8s 11ph/7stn Dmin 475km Az.gap 340°
Corr. -0·861 7M/4stn Msd 0·1

86/789
DEC 17 1324 28·6s 43·10S 173·17E 12km M=3·3
0·6 0·04 0·05 R
Rsd 0·4s 10ph/8stn Dmin 87km Az.gap 204°
Corr. -0·651 5M/3stn Msd 0·2
Felt Domett (96). Maximum intensity MM V.

86/790
DEC 17 1345 12·7s 43·13S 173·21E 12km M=3·0
1·2 0·05 0·08 R
Rsd 0·4s 7ph/4stn Dmin 88km Az.gap 267°
Corr. -0·718 4M/3stn Msd 0·2
Felt Domett (96). Maximum intensity MM V.

86/791
DEC 17 1355 58·2s 37·86S 176·96E 12km M=3·7
0·4 0·03 0·05 R
Rsd 0·8s 10ph/11stn Dmin 14km Az.gap 94°
Corr. -0·362 10M/5stn Msd 0·2 1↑ 1↓
Felt: early event in sequence from 17d 06h 00m to about 18d 03h with S-P intervals at WTZ of 2·0 to 2·6 s. Larger shocks felt in Whakatane (27)/Ohope Beach (35) area.

86/792
DEC 17 1405 49·4s 37·84S 176·94E 12km M=3·8
0·3 0·03 0·03 R
Rsd 0·7s 16ph/12stn Dmin 17km Az.gap 87°
Corr. -0·267 10M/5stn Msd 0·2 2↓
Felt Whakatane (27), MM V.

86/793
DEC 17 1436 54·9s 37·88S 176·97E 12km M=3·6
0·4 0·03 0·04 R
Rsd 0·7s 14ph/13stn Dmin 11km Az.gap 96°
Corr. -0·024 9M/5stn Msd 0·2 1↑ 1↓
Felt Whakatane (27), MM IV.

86/794
DEC 17 1513 12·5s 37·88S 176·97E 12km M=3·4
0·6 0·05 0·05 R
Rsd 0·7s 10ph/10stn Dmin 12km Az.gap 119°
Corr. -0·237 7M/4stn Msd 0·2 2↓
Felt Whakatane (27), Ohope Beach (35).

86/795
DEC 17 2002 20·7s 43·11S 171·65E 12km M=4·4
0·2 0·02 0·03 R
Rsd 0·4s 14ph/21stn Dmin 68km Az.gap 129°
Corr. -0·487 15M/8stn Msd 0·3 1↑ 1↓
Felt MM IV at Arthur's Pass (93).

86/796
DEC 18 0008 20·1s 40·01S 175·53E 33km M=3·8
0·2 0·02 0·05 R
Rsd 0·7s 21ph/19stn Dmin 68km Az.gap 115°
Corr. -0·540 14M/8stn Msd 0·3 5↑ 3↓

86/797
DEC 18 0654 02·4s 34·86S 179·25E 207km M=4·5
1·0 0·13 0·24 25
Rsd 0·6s 13ph/10stn Dmin 315km Az.gap 331°
Corr. -0·625 7M/4stn Msd 0·2

86/798
DEC 18 1001 26·1s 41·67S 175·39E 12km M=4·1
0·5 0·03 0·03 R
Rsd 0·5s 21ph/20stn Dmin 30km Az.gap 199°
Corr. -0·682 9M/5stn Msd 0·4 7↑ 5↓

86/799
DEC 18 1242 07·9s 42·98S 173·16E 12km M=4·3
0·3 0·02 0·03 R
Rsd 0·5s 16ph/20stn Dmin 76km Az.gap 166°
Corr. -0·422 15M/9stn Msd 0·3
Felt Motunau Homestead (96), MM IV, and Kilmarnock (96).

86/800
DEC 18 1818 47·3s 38·32S 176·27E 155km M=3·6
1·0 0·05 0·07 8
Rsd 0·7s 15ph/10stn Dmin 61km Az.gap 115°
Corr. -0·271 5M/4stn Msd 0·4 1↑

86/801
DEC 18 1947 46·2s 34·64S 179·24E 33km M=4·1
1·4 0·10 0·30 R
Rsd 0·5s 7ph/7stn Dmin 339km Az.gap 341°
Corr. -0·644 5M/3stn Msd 0·1

86/802
DEC 19 0205 55·1s 45·02S 167·67E 73km M=4·6
1·6 0·05 0·11 18
Rsd 0·9s 9ph/11stn Dmin 43km Az.gap 199°
Corr. -0·409 7M/3stn Msd 0·3 3↑ 2↓

86/803
DEC 19 0731 37·7s 36·96S 177·24E 274km M=3·7
0·6 0·05 0·08 5
Rsd 0·5s 10ph/6stn Dmin 116km Az.gap 253°
Corr. -0·421 6M/3stn Msd 0·1

86/804
DEC 20 0114 39·6s 36·57S 179·52E 33km M=4·0
1·4 0·15 0·18 R
Rsd 0·6s 11ph/9stn Dmin 158km Az.gap 323°
Corr. -0·720 7M/4stn Msd 0·2

86/805
DEC 20 0121 51·2s 38·33S 176·19E 169km M=3·7
0·5 0·03 0·04 4
Rsd 0·4s 15ph/10stn Dmin 30km Az.gap 114°
Corr. -0·525 5M/3stn Msd 0·3 1↑ 2↓

86/806
DEC 20 0509 09·5s 41·72S 172·46E 12km M=3·7
1·1 0·04 0·09 R
Rsd 0·6s 13ph/10stn Dmin 33km Az.gap 250°
Corr. 0·774 4M/3stn Msd 0·3 3↑ 2↓

86/807
DEC 20 2030 09·7s 39·31S 175·48E 14km M=3·6
0·1 0·01 0·02 1
Rsd 0·3s 19ph/11stn Dmin 8km Az.gap 116°
Corr. -0·271 4M/2stn Msd 0·2 2↑ 2↓

86/808
DEC 21 0546 53·5s 45·39S 166·62E 12km M=3·9
1·9 0·05 0·15 R
Rsd 0·8s 7ph/4stn Dmin 84km Az.gap 291°
Corr. -0·088 5M/3stn Msd 0·0

86/809
DEC 21 0721 45·9s 43·96S 172·10E 12km M=3·6
1·3 0·05 0·12 R
Rsd 0·6s 6ph/5stn Dmin 155km Az.gap 207°
Corr. -0·502 3M/2stn Msd 0·2

86/810
DEC 22 0027 23·1s 37·34S 177·40E 137km M=4·1
0·6 0·03 0·03 5
Rsd 0·4s 17ph/10stn Dmin 80km Az.gap 164°
Corr. -0·015 8M/5stn Msd 0·3 1↑ 1↓

86/811
DEC 22 0901 01·6s 37·50S 177·11E 12km M=3·6
0·7 0·05 0·04 R
Rsd 0·6s 11ph/8stn Dmin 8km Az.gap 206°
Corr. -0·541 6M/3stn Msd 0·3
Largest in a sequence near White Island.

86/812
DEC 22 1228 00·3s 47·61S 165·39E 33km M=4·2
1·2 0·09 0·13 R
Rsd 0·5s 8ph/5stn Dmin 262km Az.gap 326°
Corr. -0·201 6M/3stn Msd 0·1

86/813
DEC 22 1946 46·3s 38·43S 175·88E 219km M=3·8
0·7 0·05 0·06 6
Rsd 0·5s 16ph/9stn Dmin 80km Az.gap 185°
Corr. -0·744 6M/4stn Msd 0·2

86/814
DEC 22 2326 28·4s 45·10S 167·66E 129km M=3·8
0·8 0·04 0·04 6
Rsd 0·5s 8ph/5stn Dmin 52km Az.gap 196°
Corr. -0·243 5M/3stn Msd 0·1 1↑

86/815
DEC 24 0325 23·2s 42·15S 172·79E 12km M=3·6
0·4 0·03 0·03 R
Rsd 0·5s 12ph/9stn Dmin 38km Az.gap 109°
Corr. -0·470 8M/5stn Msd 0·3 1↑

86/816
DEC 25 0905 38·0s 39·05S 175·32E 162km M=3·8
0·6 0·03 0·04 5
Rsd 0·6s 22ph/12stn Dmin 26km Az.gap 113°
Corr. -0·517 6M/4stn Msd 0·3 3↑ 2↓

86/817
DEC 25 1709 09·5s 38·40S 176·01E 179km M=5·0
0·4 0·02 0·03 4
Rsd 0·6s 28ph/19stn Dmin 47km Az.gap 82°
Corr. -0·284 12M/7stn Msd 0·2 10↑ 8↓

86/818
DEC 26 0330 59·0s 41·16S 172·66E 0km M=3·8
0·3 0·01 0·02 3
Rsd 0·2s 11ph/9stn Dmin 10km Az.gap 177°
Corr. -0·585 6M/4stn Msd 0·2

86/819
DEC 26 0635 53·1s 36·40S 178·04E 190km M=4·7
0·6 0·04 0·04 5
Rsd 0·4s 18ph/11stn Dmin 135km Az.gap 256°
Corr. 0·303 10M/5stn Msd 0·2 4↑ 1↓

86/820
DEC 26 0945 32·6s 44·06S 168·68E 12km M=3·4
1·0 0·08 0·05 R
Rsd 0·7s 9ph/5stn Dmin 91km Az.gap 192°
Corr. -0·683 5M/2stn Msd 0·1

86/821
DEC 27 0232 33·9s 36·24S 179·18E 280km M=4·0
0·4 0·06 0·04 7
Rsd 0·1s 7ph/4stn Dmin 170km Az.gap 322°
Corr. 0·215 4M/2stn Msd 0·2

86/822
DEC 27 2333 43·7s 38·83S 175·88E 121km M=3·5
0·7 0·05 0·06 7
Rsd 0·9s 15ph/10stn Dmin 36km Az.gap 154°
Corr. -0·520 8M/4stn Msd 0·3 1↑

86/823
DEC 29 0143 36·0s 36·45S 177·76E 274km M=4·4
1·6 0·10 0·13 13
Rsd 0·7s 11ph/10stn Dmin 136km Az.gap 242°
Corr. 0·260 8M/4stn Msd 0·2 1↓

86/824
DEC 29 0931 56·1s 37·72S 177·07E 84km M=3·4
0·5 0·04 0·03 5
Rsd 0·5s 10ph/9stn Dmin 30km Az.gap 183°
Corr. -0·161 6M/3stn Msd 0·2 1↓

86/825
DEC 30 0625 23·7s 41·17S 173·55E 81km M=4·2
0·4 0·03 0·02 6
Rsd 0·6s 19ph/19stn Dmin 61km Az.gap 95°
Corr. -0·251 9M/6stn Msd 0·3 5↑ 3↓
Felt Khandallah (68), MM IV.

86/826
DEC 30 1307 58·5s 40·22S 173·48E 181km M=4·9
0·5 0·02 0·03 6
Rsd 0·6s 27ph/24stn Dmin 115km Az.gap 174°
Corr. -0·539 13M/7stn Msd 0·3 7↑ 9↓
Felt about Cook Strait from Raumati (65) to Blenheim (77). Maximum intensity MM IV at Tawa (68) and Blenheim (77).

86/827
DEC 30 1950 08·9s 45·58S 167·10E 12km M=3·8
0·5 0·03 0·04 R
Rsd 0·4s 8ph/4stn Dmin 120km Az.gap 295°
Corr. 0·079 4M/2stn Msd 0·2 1↑

86/828
DEC 31 1851 20·0s 37·88S 179·12E 12km M=3·7
1·4 0·03 0·12 R
Rsd 0·5s 9ph/7stn Dmin 78km Az.gap 295°
Corr. 0·027 4M/2stn Msd 0·2 1↑

86/829
DEC 31 2026 40·8s 34·36S 179·87W 343km M=4·6
1·7 0·20 0·26 27
Rsd 0·8s 15ph/9stn Dmin 395km Az.gap 336°
Corr. -0·380 6M/3stn Msd 0·2

86/830
DEC 31 2035 06·9s 41·18S 174·06E 57km M=3·4
0·5 0·04 0·03 8
Rsd 0·6s 16ph/12stn Dmin 18km Az.gap 86°
Corr. -0·276 3M/2stn Msd 0·2 1↑ 1↓

LISTS OF ORIGINS AND MAGNITUDE DETERMINATIONS

STANDARD NETWORK

A chronological list of the New Zealand earthquake origins determined from the data summarised in the preceding pages follows. A reference number at the beginning of each entry identifies the origin with the instrumental data summary, and also with the appropriate full listing of non-instrumental data (if there is any) that appears in a later section.

The letter "R" following a depth indicates that the depth was restricted to some likely value because the data did not provide sufficient constraint for the depth to be determined by calculation. Choice of the depth of restriction is usually made on the basis the crustal phases observed or the predominant depth of shallow earthquakes in the epicentral area. (For sub-crustal earthquakes, depth restriction is seldom necessary.)

The letter "G" after a depth shows that the depth was restricted on the basis of information that could not be used by the location program, such as macroseismic information, overseas PKP observations etc.

The letter "F" following a magnitude indicates that at least one report of the earthquake being felt has been received by the Observatory.

NUM	DATE	TIME	LAT	LONG	DEP	MAG
1	JAN 01	0847 37·0	47·20S	165·23E	33R	3·9
2	JAN 01	2054 28·7	40·54S	172·45E	1R	2·6F
3	JAN 02	0024 48·7	37·59S	176·98E	1R	3·5
4	JAN 02	2129 34·5	36·89S	177·51E	33R	3·7
5	JAN 03	1522 52·7	37·54S	178·75E	53	3·4
6	JAN 04	1404 14·4	41·83S	174·82E	48	3·7
7	JAN 04	2057 47·2	45·00S	167·65E	93	3·6
8	JAN 05	0305 38·5	44·16S	169·37E	12R	3·6
9	JAN 05	0918 10·6	38·10S	177·87E	60	3·9
10	JAN 05	0945 01·9	33·09S	179·87W	33R	5·4
11	JAN 05	0951 03·1	38·12S	177·87E	53	3·7
12	JAN 05	1037 12·1	38·12S	177·87E	55	3·6
13	JAN 05	1541 55·0	38·36S	176·81E	60	3·9
14	JAN 05	2317 06·1	37·12S	177·55E	12R	3·8
15	JAN 06	0809 08·1	38·82S	175·93E	145	3·9
16	JAN 06	1523 33·4	38·64S	175·75E	172	4·4
17	JAN 07	1532 47·3	38·85S	178·95E	12R	3·7
18	JAN 08	0135 54·4	37·71S	176·40E	12R	3·5
19	JAN 09	0117 03·0	45·93S	166·47E	12R	3·9
20	JAN 09	1522 44·7	38·17S	176·23E	1R	F
21	JAN 09	2237 53·7	41·88S	171·83E	12R	3·7
22	JAN 10	0152 22·7	38·76S	177·18E	33	3·4
23	JAN 10	0517 50·6	34·73S	179·91W	343	5·3
24	JAN 10	1252 34·9	38·50S	175·93E	8	3·0F
25	JAN 10	1916 39·6	37·13S	176·68E	422	4·7
26	JAN 11	1513 46·1	43·48S	170·24E	12R	3·6F
27	JAN 12	0746 04·2	44·95S	167·32E	12R	4·0
28	JAN 12	0810 29·0	43·55S	170·50E	5	3·7F
29	JAN 12	0810 50·7	43·55S	170·50E	5R	3·7
30	JAN 14	0129 40·0	43·84S	168·83E	33R	3·5
31	JAN 14	1726 22·8	37·62S	177·20E	5	3·6
32	JAN 15	0849 09·1	49·28S	164·41E	33R	4·0
33	JAN 16	1656 19·2	47·69S	165·45E	33R	3·9
34	JAN 16	2037 50·7	40·81S	175·14E	25	3·9F
35	JAN 16	2128 20·4	38·13S	176·30E	1R	2·6F
36	JAN 17	0432 40·2	39·27S	173·83E	16	
37	JAN 17	1412 39·7	35·60S	179·28E	33R	4·5
38	JAN 17	2046 00·9	36·86S	177·43E	179	4·1
39	JAN 18	1140 18·0	45·28S	166·65E	12R	3·5
40	JAN 19	0752 11·4	45·39S	167·21E	78	3·4
41	JAN 19	1028 53·7	45·28S	166·91E	12R	3·4
42	JAN 20	0634 53·1	47·97S	166·04E	33R	4·4
43	JAN 20	1903 58·7	47·97S	165·96E	33R	4·3
44	JAN 20	2337 35·7	38·61S	177·41E	23	
45	JAN 21	0118 08·5	38·33S	176·04E	203	4·7
46	JAN 21	1422 17·7	46·14S	165·95E	12R	4·2
47	JAN 23	0144 22·2	40·19S	174·95E	12R	4·2F
48	JAN 23	0635 03·2	47·16S	165·17E	33R	4·2
49	JAN 23	1410 04·8	37·33S	179·60E	33R	3·8
50	JAN 24	1625 03·3	45·02S	167·66E	123	3·4
51	JAN 24	1902 02·5	44·92S	167·67E	101	4·1
52	JAN 25	0353 41·1	37·98S	176·60E	12R	3·5F
53	JAN 25	0419 36·6	37·99S	176·59E	12R	3·6F
54	JAN 25	1141 03·5	37·11S	177·33E	147	4·1
55	JAN 25	1730 38·0	38·29S	176·08E	198	4·1
56	JAN 27	0328 41·4	39·62S	174·35E	275	4·0
57	JAN 27	0846 35·7	41·10S	174·64E	31	F
58	JAN 27	1635 28·7	42·20S	172·72E	5R	3·9
59	JAN 29	1912 02·8	37·71S	178·78E	32	3·8
60	JAN 29	2044 44·7	37·82S	178·66E	26	3·9
61	JAN 29	2222 52·2	37·79S	178·67E	28	3·7
62	JAN 30	0901 58·5	40·81S	174·23E	67	3·4
63	FEB 01	0459 45·6	37·80S	178·66E	33R	4·0
64	FEB 01	1105 06·9	35·91S	179·47E	33R	4·6
65	FEB 01	1827 04·9	44·19S	169·65E	12R	3·4
66	FEB 02	1342 54·3	40·39S	173·54E	163	4·0
67	FEB 02	1639 41·9	45·17S	167·27E	81	3·5
68	FEB 03	0025 34·6	45·07S	167·57E	100	3·5
69	FEB 04	0034 50·3	38·36S	176·94E	98	3·5
70	FEB 04	1435 17·2	44·54S	170·11E	9	3·4
71	FEB 05	1533 20·1	38·96S	175·46E	129	3·6
72	FEB 05	2153 50·8	39·21S	176·20E	90	3·7
73	FEB 05	2157 31·9	45·92S	165·68E	33R	4·1
74	FEB 06	1103 44·4	35·62S	178·84E	229	4·3
75	FEB 07	1110 23·0	45·66S	166·68E	1R	4·0
76	FEB 07	1643 47·6	38·61S	176·02E	158	3·5
77	FEB 07	2327 27·5	45·26S	167·26E	103	4·0
78	FEB 08	0545 39·6	38·89S	177·51E	33R	3·7
79	FEB 08	1551 02·9	38·19S	176·21E	1R	3·0F
80	FEB 08	2203 35·7	37·17S	177·50E	141	3·4
81	FEB 09	1858 46·5	40·23S	175·30E	1R	4·2F
82	FEB 09	2043 56·3	38·10S	176·25E	1R	F
83	FEB 10	0903 27·9	39·37S	175·38E	79	3·8
84	FEB 10	1610 41·1	38·98S	176·15E	86	3·8
85	FEB 10	1725 51·0	45·01S	167·58E	96	3·8
86	FEB 10	1956 21·4	39·18S	173·83E	12R	4·0F
87	FEB 11	0903 28·3	39·37S	174·79E	49	3·5
88	FEB 11	1509 19·3	38·79S	175·90E	12R	3·3
89	FEB 11	1509 41·3	38·82S	175·93E	10	3·7
90	FEB 12	0623 53·2	41·43S	172·31E	12R	3·4F
91	FEB 12	0645 50·4	44·11S	168·09E	12R	4·7
92	FEB 12	2232 32·3	40·04S	176·92E	33R	4·9F
93	FEB 13	1426 14·4	40·87S	176·31E	37	3·7
94	FEB 14	0622 32·7	36·88S	177·54E	12R	3·8
95	FEB 15	0705 30·4	39·87S	174·49E	109	3·5
96	FEB 16	0421 12·9	38·70S	175·81E	163	3·8
97	FEB 16	1300 35·4	37·93S	176·26E	199	3·7
98	FEB 16	2142 13·5	39·03S	175·79E	101	3·6
99	FEB 17	0034 09·4	37·31S	177·41E	100	4·0
100	FEB 17	0222 53·8	32·05S	179·75W	527	5·2

NUM	DATE	TIME	LAT	LONG	DEP	MAG
101	FEB 17	0748 10·1	37·32S	177·61E	12R	3·6
102	FEB 17	1056 10·8	41·24S	175·18E	19	2·9F
103	FEB 17	1108 23·2	41·19S	172·71E	219	3·9
104	FEB 18	1458 49·5	42·08S	173·68E	23	3·6
105	FEB 18	1815 44·5	36·91S	176·93E	290	4·4
106	FEB 19	0716 31·6	37·48S	177·72E	114	4·5
107	FEB 20	0528 55·0	32·05S	178·94W	452	5·8
108	FEB 20	0746 06·7	37·76S	178·81E	28	4·2
109	FEB 20	1226 43·5	40·04S	175·73E	53	3·5
110	FEB 20	1827 57·6	37·28S	177·25E	12R	3·8
111	FEB 21	1524 51·1	38·40S	176·03E	164	4·2
112	FEB 23	0342 52·6	37·78S	179·04E	33R	3·5
113	FEB 23	1225 42·9	40·39S	173·35E	171	4·5
114	FEB 24	0520 15·3	38·73S	177·47E	65	3·4
115	FEB 24	1624 56·2	37·81S	176·48E	181	5·0F
116	FEB 24	2033 56·8	38·09S	176·03E	201	4·7
117	FEB 25	0011 03·3	39·42S	174·46E	201	4·5
118	FEB 26	1748 15·3	36·22S	178·32E	12R	4·2
119	FEB 27	0314 36·7	44·77S	167·76E	75	3·6
120	FEB 28	1141 18·7	38·38S	177·14E	33	3·4
121	FEB 28	1406 07·8	40·42S	178·59E	33R	3·7
122	FEB 28	1517 08·9	44·58S	167·97E	26	4·4
123	FEB 28	2349 39·9	35·40S	178·28E	33R	4·6
124	MAR 01	0501 10·9	45·51S	167·34E	12R	3·5
125	MAR 01	1326 46·4	38·27S	179·50W	33R	4·0
126	MAR 02	0349 29·4	37·01S	177·91E	133	4·1
127	MAR 02	2014 39·6	39·52S	175·85E	33R	3·4
128	MAR 02	2330 21·9	34·68S	179·52E	259	5·1
129	MAR 04	0125 40·6	37·00S	179·10E	12R	4·4
130	MAR 04	0408 21·4	37·76S	176·67E	12R	3·6
131	MAR 04	0710 53·2	36·94S	178·89E	12R	4·2
132	MAR 04	0856 58·3	36·97S	176·96E	244	5·4
133	MAR 04	1201 11·5	33·78S	178·14W	33R	5·3
134	MAR 04	1242 40·7	37·58S	177·03E	12R	3·4
135	MAR 04	1526 28·8	38·07S	177·80E	32	3·4
136	MAR 04	1704 57·7	37·49S	176·97E	12R	3·7
137	MAR 04	1706 07·2	37·47S	176·92E	12R	3·6
138	MAR 05	0503 02·6	38·41S	176·04E	200	3·7
139	MAR 05	0711 08·0	37·72S	178·91E	33R	4·6
140	MAR 05	0713 39·5	37·15S	179·56E	33R	4·3
141	MAR 05	0732 28·1	37·61S	179·98W	33R	4·3
142	MAR 05	2257 51·5	33·98S	177·90W	33R	5·2
143	MAR 06	1657 00·4	38·21S	178·78E	36	3·7
144	MAR 06	2211 49·6	37·74S	179·86W	33R	4·5
145	MAR 07	1955 52·9	41·69S	171·99E	12R	4·0F
146	MAR 08	1618 05·9	39·32S	175·23E	33R	3·7
147	MAR 09	0917 51·5	40·33S	173·42E	220	5·6F
148	MAR 10	0356 59·3	36·87S	177·22E	223	4·8
149	MAR 10	1137 30·9	40·54S	173·56E	169	3·9
150	MAR 11	0506 57·7	38·78S	175·24E	247	4·1

NUM	DATE	TIME	LAT	LONG	DEP	MAG
151	MAR 11	0651 07·3	38·49S	176·08E	188	3·8
152	MAR 11	0920 25·7	36·85S	177·40E	249	3·9
153	MAR 11	1357 35·3	39·64S	174·14E	202	4·0
154	MAR 11	1439 22·1	34·97S	178·20W	33R	4·4
155	MAR 11	2042 26·5	38·53S	175·88E	136	4·1
156	MAR 12	0252 42·5	38·23S	176·26E	173	3·7
157	MAR 12	1822 49·8	40·80S	175·14E	12R	3·5
158	MAR 12	2259 25·9	40·38S	176·52E	33R	3·8
159	MAR 13	0333 24·1	38·36S	176·01E	186	3·6
160	MAR 14	0019 42·8	40·93S	174·95E	53	3·9F
161	MAR 14	0152 39·4	40·93S	174·16E	33R	4·0F
162	MAR 14	0229 32·1	40·77S	174·62E	60	3·9
163	MAR 14	0344 57·0	33·75S	179·30W	264	4·5
164	MAR 14	1635 28·2	41·14S	174·66E	30	3·4F
165	MAR 15	1506 12·9	41·01S	172·40E	12R	3·6
166	MAR 16	0144 51·7	39·44S	175·65E	12R	3·4
167	MAR 16	0752 50·8	39·61S	174·42E	217	3·9
168	MAR 17	0206 17·5	40·11S	175·05E	33R	3·4F
169	MAR 17	1019 36·6	39·20S	173·73E	12R	3·2F
170	MAR 18	0955 52·4	38·05S	176·90E	12R	3·4
171	MAR 18	1116 40·9	41·81S	174·59E	29	3·7
172	MAR 18	1253 31·3	37·36S	177·71E	33R	3·4
173	MAR 18	1957 03·0	37·98S	176·17E	209	4·3
174	MAR 19	0159 56·8	38·10S	176·46E	187	3·5
175	MAR 19	0251 03·1	38·14S	176·28E	182	3·7
176	MAR 19	1958 01·4	40·54S	174·67E	80	3·8F
177	MAR 20	0751 26·8	38·63S	176·31E	96	3·5
178	MAR 20	1307 38·8	38·22S	176·06E	179	3·9
179	MAR 21	0122 26·0	45·48S	166·67E	12R	4·3
180	MAR 21	1505 47·6	36·94S	177·05E	269	4·4
181	MAR 21	2349 44·9	39·09S	175·82E	101	3·6
182	MAR 22	1123 47·5	45·12S	167·64E	120	3·5
183	MAR 22	1625 04·8	41·73S	174·33E	16	3·5
184	MAR 22	1831 49·8	32·83S	178·92W	33R	4·5
185	MAR 22	2032 12·5	39·19S	175·03E	206	3·9
186	MAR 22	2313 29·3	39·44S	176·60E	20	3·6
187	MAR 23	2221 56·4	39·92S	172·81E	12R	3·8
188	MAR 24	0553 59·7	39·97S	172·79E	12R	3·9
189	MAR 24	1850 11·4	39·96S	172·95E	12R	3·6
190	MAR 24	1850 16·4	39·88S	172·84E	12R	4·7F
191	MAR 25	0310 47·3	36·03S	178·67E	81	4·2
192	MAR 25	1544 10·2	40·62S	173·40E	12R	3·7
193	MAR 25	1733 21·6	38·01S	177·26E	60	3·8
194	MAR 26	0624 45·6	38·36S	176·27E	6G	2·4F
195	MAR 26	0747 04·1	38·36S	176·27E	6G	2·2F
196	MAR 27	1209 30·0	38·36S	176·27E	6	3·0F
197	MAR 27	1210 21·0	38·36S	176·28E	6G	2·5
198	MAR 27	1217 04·8	38·37S	176·30E	6G	2·9F
199	MAR 27	1229 15·8	38·36S	176·27E	6G	2·7F
200	MAR 27	1248 39·3	38·37S	176·29E	6G	2·5F

NUM	DATE	TIME	LAT	LONG	DEP	MAG
201	MAR 27	1917 08·9	34·45S	179·45E	246	4·2
202	MAR 28	0540 12·2	33·55S	179·54E	257	4·9
203	MAR 28	0553 25·1	45·76S	166·97E	79	3·7
204	MAR 30	0137 27·7	40·24S	173·50E	165	3·9
205	MAR 30	0212 35·4	37·96S	176·24E	200	4·1
206	MAR 30	2231 16·1	42·86S	171·48E	12R	3·1F
207	MAR 31	0308 42·9	43·24S	170·20E	12R	3·4F
208	MAR 31	0434 11·3	46·24S	167·12E	33R	4·3F
209	APR 01	0626 31·4	43·98S	171·04E	4	4·3F
210	APR 02	0111 43·2	45·20S	170·32E	1R	3·5
211	APR 02	1358 05·2	41·86S	172·69E	89	4·5
212	APR 02	1526 13·8	34·68S	179·71W	264	4·9
213	APR 03	0208 51·0	42·37S	172·49E	1	3·7
214	APR 03	1409 03·5	45·86S	164·75E	33R	5·2
215	APR 03	2131 49·1	40·00S	173·80E	213	4·4
216	APR 04	1222 20·2	40·91S	174·84E	33R	3·5
217	APR 04	1859 57·0	38·07S	176·31E	1R	2·6F
218	APR 04	2128 24·7	45·15S	167·07E	72	3·8
219	APR 05	0354 07·4	36·47S	178·46E	33R	4·3
220	APR 05	0517 43·6	44·59S	167·44E	1R	3·4
221	APR 05	0834 06·6	40·73S	173·40E	24	4·1
222	APR 06	0101 52·9	37·43S	177·76E	75	3·9
223	APR 06	1831 37·1	37·69S	176·37E	197	4·2
224	APR 09	0543 20·6	44·35S	168·29E	5R	4·5F
225	APR 09	1949 01·5	39·78S	175·32E	92	4·0
226	APR 10	1049 00·1	34·49S	179·34E	33R	4·7
227	APR 10	2255 21·6	36·54S	177·58E	200	4·3
228	APR 11	1108 35·2	44·39S	170·75E	5R	3·4F
229	APR 12	1016 43·7	35·66S	179·16E	33R	4·2
230	APR 12	1543 53·3	36·34S	177·98E	222	4·1
231	APR 13	0146 51·5	39·68S	174·14E	231	4·7
232	APR 14	1647 27·8	45·23S	167·20E	12R	3·9
233	APR 14	2210 38·0	40·76S	175·80E	33R	4·5F
234	APR 15	1228 57·0	37·15S	177·69E	33R	3·6
235	APR 16	0355 01·1	42·11S	172·65E	12R	3·7
236	APR 16	1631 32·3	39·62S	174·23E	187	3·4
237	APR 16	2122 05·0	45·18S	168·24E	12R	4·0
238	APR 17	0311 53·6	38·23S	176·73E	184	3·8
239	APR 17	0835 10·4	38·17S	176·23E	5R	F
240	APR 17	1216 18·5	46·24S	171·22E	12R	3·6
241	APR 18	0340 27·9	31·93S	179·38W	382	5·2
242	APR 18	0441 27·0	37·02S	177·49E	147	3·9
243	APR 18	0756 20·1	39·13S	177·35E	33R	4·0F
244	APR 18	0808 40·6	40·34S	176·40E	33R	3·5
245	APR 18	1405 28·5	37·46S	176·84E	213	4·1
246	APR 18	1820 20·4	38·17S	176·23E	5R	F
247	APR 19	0124 14·3	39·23S	173·84E	13	3·5
248	APR 20	1409 20·0	40·34S	174·29E	33R	3·9
249	APR 20	1714 16·9	36·57S	178·23E	33R	3·7
250	APR 20	1853 55·9	38·05S	176·35E	5R	2·7F
251	APR 20	2256 52·1	39·48S	174·19E	216	4·5
252	APR 21	0115 49·4	45·07S	168·26E	12R	3·6
253	APR 22	1123 27·1	33·38S	178·80W	33R	4·8
254	APR 22	1145 29·2	44·19S	169·85E	12R	3·9
255	APR 22	1216 44·8	34·73S	179·18E	33R	4·5
256	APR 22	1251 34·7	37·94S	176·29E	5R	2·5F
257	APR 23	0818 12·4	44·78S	167·54E	12R	4·0
258	APR 23	1538 15·6	40·61S	174·29E	87	3·5
259	APR 24	0012 36·0	40·63S	172·43E	1R	2·5F
260	APR 24	0338 30·3	38·97S	174·91E	220	4·2
261	APR 24	0543 21·9	37·07S	177·54E	162	4·6
262	APR 24	0935 26·2	36·13S	178·17E	235	4·7
263	APR 24	1533 37·2	40·00S	176·82E	60	3·7
264	APR 25	1046 35·5	36·10S	178·55E	33R	3·9
265	APR 25	1144 24·7	37·27S	177·27E	185	4·0
266	APR 26	1101 31·3	35·45S	174·17E	12R	3·2F
267	APR 27	1323 45·7	34·98S	179·00E	251	4·0
268	APR 27	2145 51·6	35·73S	178·36E	226	5·1
269	APR 28	0505 25·0	39·72S	175·74E	24	3·6
270	APR 29	0029 33·8	38·78S	175·78E	129	3·9
271	APR 30	0607 33·5	40·13S	172·92E	1R	3·6
272	APR 30	0802 24·1	45·45S	167·42E	107	3·9
273	APR 30	1634 59·3	34·48S	178·33W	33R	4·4
274	MAY 02	0445 13·8	40·75S	172·82E	1R	3·7F
275	MAY 02	0512 14·8	38·34S	176·20E	161	4·6
276	MAY 02	1627 59·8	37·58S	177·19E	1R	3·7
277	MAY 03	2341 16·4	38·31S	177·82E	12R	4·0
278	MAY 04	1142 38·5	40·32S	176·82E	33R	4·5F
279	MAY 04	2038 07·5	38·77S	175·36E	282	4·3
280	MAY 05	1540 39·4	36·84S	177·33E	283	4·4
281	MAY 05	2322 03·0	36·83S	176·96E	253	4·1
282	MAY 06	0146 53·1	38·69S	177·83E	33R	3·7
283	MAY 06	0742 21·2	38·14S	176·37E	153	3·5
284	MAY 07	1058 34·7	37·71S	178·19E	64	4·0
285	MAY 07	2058 36·3	36·16S	178·35E	144	4·6
286	MAY 07	2335 19·1	42·26S	173·58E	12R	3·5
287	MAY 08	0200 25·6	38·65S	177·53E	61	3·7
288	MAY 08	1202 00·5	38·32S	176·27E	158	3·4
289	MAY 08	1432 08·3	38·63S	175·81E	166	3·6
290	MAY 08	2330 10·4	35·60S	178·78E	238	4·6
291	MAY 09	0648 30·9	38·63S	177·45E	33R	4·2F
292	MAY 09	0727 33·9	37·62S	179·70W	33R	5·1
293	MAY 09	1243 05·4	37·56S	176·32E	314	4·3
294	MAY 09	1920 37·2	37·97S	178·64E	33R	3·5
295	MAY 10	1403 13·9	40·77S	173·49E	138	3·9
296	MAY 11	0534 50·6	37·23S	178·48E	33R	3·7
297	MAY 11	1141 39·8	37·64S	178·73E	33R	3·8
298	MAY 12	0203 48·7	36·98S	177·74E	121	3·5
299	MAY 12	0620 38·2	38·59S	175·63E	168	3·6
300	MAY 13	0310 39·6	44·95S	167·82E	87	3·7

NUM	DATE	TIME	LAT	LONG	DEP	MAG
301	MAY 13	0741 02·4	40·48S	173·45E	143	3·5
302	MAY 14	0136 56·3	40·95S	176·21E	33R	3·5
303	MAY 14	0749 20·9	40·21S	173·61E	156	3·9
304	MAY 14	0754 06·3	38·27S	177·06E	12R	4·7F
305	MAY 14	0944 46·6	40·59S	173·34E	12R	3·7
306	MAY 14	0949 56·3	37·99S	175·86E	302	4·0
307	MAY 14	1817 50·5	37·04S	177·35E	12R	3·8
308	MAY 14	2246 31·0	36·93S	177·69E	33R	3·6
309	MAY 15	1602 33·3	38·09S	176·31E	12R	2·6F
310	MAY 15	1611 29·6	39·96S	174·62E	105	3·6
311	MAY 16	0027 40·4	39·38S	175·17E	120	5·0F
312	MAY 16	1101 37·2	41·05S	175·48E	14	3·5
313	MAY 16	1104 50·5	44·65S	168·25E	59	4·5F
314	MAY 17	0451 33·0	38·85S	175·99E	12R	3·2F
315	MAY 17	1451 07·3	38·22S	176·09E	164	3·4
316	MAY 18	0230 49·7	36·99S	178·94E	33R	4·0
317	MAY 18	0659 12·5	37·24S	177·81E	42	3·8
318	MAY 18	1258 22·7	38·60S	175·83E	165	3·6
319	MAY 19	0117 52·0	39·22S	177·40E	33R	3·9
320	MAY 19	0607 10·4	38·67S	176·07E	138	3·4
321	MAY 19	0732 51·9	37·14S	177·08E	308	4·7
322	MAY 19	1724 03·7	37·60S	177·21E	129	3·7
323	MAY 20	0047 28·9	38·72S	176·55E	99	3·8
324	MAY 20	0656 43·5	38·49S	175·84E	199	4·2
325	MAY 21	1037 37·3	39·82S	179·16E	33R	4·8
326	MAY 22	0844 10·6	38·66S	176·01E	135	4·1
327	MAY 24	0950 52·0	37·13S	177·42E	33R	3·8
328	MAY 25	0420 54·2	38·25S	178·73E	65	3·8
329	MAY 25	0810 37·2	38·29S	178·08E	52	3·9
330	MAY 25	1014 54·3	38·62S	175·90E	1R	2·8
331	MAY 25	1015 16·0	38·63S	175·89E	1R	2·9F
332	MAY 26	2335 37·1	43·24S	172·08E	12R	4·1F
333	MAY 27	0424 40·6	33·42S	179·26W	33R	4·9
334	MAY 27	1413 29·4	38·44S	175·96E	172	4·2
335	MAY 27	2002 04·3	35·72S	178·67E	239	4·2
336	MAY 30	0225 26·1	34·53S	179·77W	33R	4·3
337	MAY 30	0504 59·1	41·86S	171·84E	20	3·6
338	MAY 30	1449 32·9	36·58S	179·35W	33R	4·1
339	MAY 30	2012 26·9	45·29S	167·33E	103	4·2
340	MAY 31	0138 00·5	46·03S	167·14E	33R	3·7
341	MAY 31	0430 02·6	38·71S	176·11E	1R	4·0F
342	MAY 31	1959 24·1	45·37S	167·13E	86	3·7
343	JUN 01	0018 18·4	39·95S	176·84E	54	3·8F
344	JUN 01	0423 18·3	40·47S	176·71E	51	3·4
345	JUN 01	0551 29·7	44·57S	168·30E	68	3·9
346	JUN 02	0409 19·6	39·03S	175·07E	217	4·0
347	JUN 02	0854 20·6	38·93S	175·03E	234	4·4
348	JUN 02	2007 50·1	40·32S	173·87E	195	4·1
349	JUN 03	0528 25·2	38·01S	179·23W	33R	4·4
350	JUN 04	1828 20·3	39·07S	175·11E	224	4·2
351	JUN 05	0606 55·7	42·23S	172·60E	12R	4·0
352	JUN 05	2047 43·6	38·80S	175·81E	125	3·7
353	JUN 06	0615 08·3	38·83S	176·05E	111	3·7
354	JUN 06	0959 12·9	40·04S	175·08E	33R	3·4
355	JUN 07	1829 30·7	36·02S	178·96E	33R	4·2
356	JUN 07	1841 03·4	38·29S	176·19E	161	3·8
357	JUN 08	0503 20·5	36·24S	178·42E	33R	4·2
358	JUN 08	0623 53·4	41·31S	172·94E	125	3·5
359	JUN 09	1700 33·5	38·21S	176·29E	167	3·8
360	JUN 10	0826 01·1	44·95S	166·89E	12R	4·1
361	JUN 10	2130 50·7	38·85S	175·21E	238	4·0
362	JUN 11	1718 11·2	37·74S	179·17E	33R	3·5
363	JUN 12	0955 06·6	36·47S	177·83E	234	4·0
364	JUN 12	1240 46·8	44·91S	167·79E	84	4·1
365	JUN 13	0113 13·2	39·44S	174·77E	161	3·9
366	JUN 13	1919 46·2	38·31S	178·60E	33R	3·5
367	JUN 14	0142 21·9	38·66S	175·92E	159	3·7
368	JUN 14	1234 06·8	39·68S	174·21E	194	3·8
369	JUN 14	1505 18·6	37·51S	177·35E	113	3·9
370	JUN 15	0509 51·8	37·27S	177·79E	33R	4·0
371	JUN 15	1753 04·9	37·31S	177·82E	33R	3·7
372	JUN 15	2338 42·7	39·48S	175·81E	12R	3·7
373	JUN 16	0338 37·6	40·21S	176·11E	101	4·8F
374	JUN 16	0833 29·4	44·66S	168·02E	102	3·7
375	JUN 16	1410 11·2	38·27S	176·25E	159	3·6
376	JUN 17	0726 24·6	39·09S	175·51E	140	3·6
377	JUN 17	1722 29·2	38·67S	176·16E	122	3·9
378	JUN 17	2135 03·7	41·44S	172·92E	118	4·1
379	JUN 18	2024 06·8	44·90S	167·69E	107	4·2
380	JUN 19	1731 19·8	40·29S	175·66E	24	3·8
381	JUN 20	0238 07·6	33·12S	178·41W	236	
382	JUN 20	0858 27·9	38·59S	176·07E	12R	3·3F
383	JUN 20	1346 00·1	37·28S	177·68E	33R	3·9
384	JUN 20	1529 57·8	37·28S	177·83E	33R	4·1
385	JUN 20	2326 34·9	36·22S	177·38E	285	5·0
386	JUN 22	1651 53·6	39·78S	177·01E	33R	3·4
387	JUN 22	1725 39·1	37·24S	177·34E	156	4·6
388	JUN 22	2251 42·9	37·64S	177·71E	167	3·7
389	JUN 23	0713 10·8	38·44S	175·75E	198	3·9
390	JUN 24	0713 50·8	38·00S	176·13E	184	3·5
391	JUN 24	1759 59·6	44·84S	167·95E	65	4·1
392	JUN 24	2020 07·8	38·55S	175·95E	178	3·7
393	JUN 25	1630 39·5	40·64S	173·94E	33R	3·8
394	JUN 26	1511 00·5	39·53S	175·64E	5R	3·3F
395	JUN 27	0409 51·9	38·35S	177·16E	33R	3·5
396	JUN 28	1109 05·5	37·07S	176·86E	226	4·3
397	JUN 28	2132 40·5	39·19S	175·30E	23	3·7
398	JUN 28	2241 00·8	38·72S	177·41E	30	3·6
399	JUN 29	1600 00·4	37·65S	176·96E	233	4·0
400	JUN 29	1955 59·9	42·35S	174·03E	11	4·1F

NUM	DATE	TIME		LAT	LONG	DEP	MAG
401	JUN 30	1008	14·2	42·99S	171·10E	26	3·4
402	JUL 01	0245	27·0	39·41S	175·02E	5R	4·1F
403	JUL 01	0953	12·8	37·17S	176·48E	307	4·3
404	JUL 01	1336	09·3	37·70S	179·52E	33R	4·9
405	JUL 01	1628	41·0	37·35S	179·62E	12R	4·1
406	JUL 02	0017	03·4	42·31S	174·03E	12R	3·6
407	JUL 02	0500	35·1	45·21S	171·15E	12R	3·9
408	JUL 02	0659	02·0	43·26S	173·85E	33R	3·9
409	JUL 03	1014	02·3	42·32S	174·03E	16	3·6
410	JUL 03	1527	15·0	39·74S	176·71E	58	3·8
411	JUL 03	1641	06·0	38·33S	176·34E	5R	3·6F
412	JUL 03	1646	54·0	38·25S	176·46E	5R	2·8
413	JUL 03	1758	49·6	37·27S	177·35E	160	3·7
414	JUL 03	1915	15·4	45·07S	167·71E	110	4·3
415	JUL 03	1920	56·4	38·30S	176·40E	5R	F
416	JUL 04	0418	33·9	39·46S	175·76E	12R	3·4
417	JUL 04	1337	47·3	38·30S	176·40E	5R	2·4F
418	JUL 04	2220	54·3	46·64S	167·18E	12R	3·6
419	JUL 05	2149	48·9	44·46S	168·16E	12R	3·5
420	JUL 06	0323	48·2	39·47S	177·05E	33R	3·6
421	JUL 06	1235	02·2	39·49S	175·49E	66	3·8
422	JUL 07	0518	05·1	40·90S	174·70E	50	4·6F
423	JUL 08	0035	13·3	41·36S	174·49E	47	3·5
424	JUL 08	0904	07·8	38·55S	178·19E	33R	3·7
425	JUL 08	1018	00·2	37·92S	176·44E	259	3·8
426	JUL 09	1240	04·1	36·74S	176·92E	317	4·6
427	JUL 09	1940	47·9	41·23S	173·62E	12R	3·4
428	JUL 10	0713	49·3	36·17S	177·96E	170	4·1
429	JUL 10	2036	27·9	37·02S	176·99E	243	5·4
430	JUL 11	0642	23·2	45·95S	165·44E	33R	4·5
431	JUL 11	0827	48·0	46·00S	166·22E	33R	5·5F
432	JUL 11	0852	54·0	46·03S	165·79E	33R	4·4
433	JUL 11	1656	43·9	44·69S	167·88E	12R	4·7
434	JUL 11	1726	53·9	37·42S	178·59E	19	3·8
435	JUL 11	2303	32·5	43·23S	172·14E	12R	5·2F
436	JUL 12	0029	01·0	43·12S	172·28E	12R	3·7
437	JUL 12	0621	00·4	35·13S	177·84W	33R	4·6
438	JUL 12	0940	04·8	40·91S	172·86E	231	4·4
439	JUL 12	1131	09·8	44·75S	167·70E	12R	3·7
440	JUL 12	1139	36·9	38·34S	176·07E	170	3·8
441	JUL 14	1703	09·0	40·53S	174·28E	107	5·3F
442	JUL 15	1026	37·2	39·76S	174·20E	183	3·8
443	JUL 15	1631	14·3	39·36S	177·37E	33R	3·4
444	JUL 15	2131	27·5	40·91S	174·69E	45	3·4F
445	JUL 16	1615	56·9	42·95S	171·57E	5R	2·7F
446	JUL 17	1115	58·1	37·62S	176·45E	236	4·2
447	JUL 19	0145	16·1	39·19S	175·52E	12	3·9
448	JUL 19	0442	37·4	42·58S	172·50E	5R	4·0
449	JUL 19	0456	51·4	37·73S	179·79W	33R	3·8
450	JUL 19	0756	04·3	37·47S	176·78E	266	4·3
451	JUL 19	1637	03·1	41·16S	172·37E	5R	3·8F
452	JUL 19	1945	33·3	39·18S	174·80E	194	4·0
453	JUL 21	0046	51·4	39·16S	173·94E	5	3·3F
454	JUL 21	1259	48·9	38·35S	177·62E	59	4·0
455	JUL 22	0212	44·6	33·49S	177·72W	33R	5·7
456	JUL 22	0808	00·3	36·64S	177·65E	235	4·1
457	JUL 22	1550	03·5	33·33S	178·25W	12R	5·1
458	JUL 22	1606	15·1	37·74S	176·35E	12R	3·1F
459	JUL 22	1730	17·1	36·72S	177·18E	280	4·5
460	JUL 23	0354	06·9	45·71S	166·79E	5R	4·7
461	JUL 24	0313	34·8	38·14S	176·35E	167	4·1
462	JUL 25	0402	04·7	38·15S	176·41E	162	3·7
463	JUL 27	0635	41·3	36·93S	177·67E	126	4·1
464	JUL 27	0944	34·2	38·37S	176·06E	148	4·0
465	JUL 27	1217	40·6	37·64S	176·48E	12R	3·9
466	JUL 27	2347	37·1	33·43S	178·11W	33R	5·3
467	JUL 28	0104	25·1	40·43S	174·58E	95	3·7
468	JUL 28	0827	26·6	38·18S	178·71W	33R	4·2
469	JUL 28	1148	32·3	39·19S	175·06E	175	5·3F
470	JUL 28	1755	34·7	38·80S	176·01E	136	3·9
471	JUL 29	1019	54·0	35·47S	178·66E	292	4·3
472	JUL 29	1107	24·7	43·89S	168·07E	12R	3·7
473	JUL 29	1508	07·8	38·23S	177·57E	213	3·7
474	JUL 29	1823	42·5	45·06S	167·72E	12R	4·6F
475	JUL 30	0957	31·6	37·15S	176·67E	267	4·1
476	JUL 30	2050	39·3	41·57S	172·51E	110	3·8
477	JUL 31	2123	48·2	35·54S	179·19E	246	4·2
478	AUG 01	2129	19·0	46·99S	165·67E	33R	4·6
479	AUG 02	1537	44·2	38·07S	176·35E	170	3·7
480	AUG 03	0309	48·7	36·79S	179·38E	33R	3·6
481	AUG 03	0751	55·1	45·04S	167·66E	103	3·5
482	AUG 03	1718	15·1	38·74S	177·43E	32	4·0
483	AUG 03	2101	46·1	35·39S	179·46E	179	4·4
484	AUG 04	1428	08·9	37·76S	177·55E	95	3·8
485	AUG 05	0117	55·2	42·26S	172·83E	12R	3·5F
486	AUG 05	0139	01·3	44·96S	167·64E	90	3·6
487	AUG 06	0605	33·5	41·86S	171·74E	12R	4·1F
488	AUG 06	1018	48·0	42·19S	172·87E	12R	3·6
489	AUG 06	1018	52·2	42·26S	172·79E	12R	4·2F
490	AUG 06	1426	24·4	37·82S	176·79E	12R	3·4
491	AUG 06	1832	53·5	39·47S	177·18E	29	3·4
492	AUG 07	0206	50·2	39·95S	175·15E	33R	3·6
493	AUG 07	1839	28·8	39·02S	175·68E	132	3·9
494	AUG 09	0401	20·7	36·72S	177·21E	259	4·0
495	AUG 09	0904	29·4	42·28S	172·82E	12R	4·0
496	AUG 09	1205	33·6	38·30S	177·02E	20	3·8
497	AUG 09	2344	38·0	37·27S	177·63E	144	3·7
498	AUG 10	0948	32·3	39·85S	174·19E	12R	3·5
499	AUG 10	1530	15·2	39·07S	177·91E	33R	3·4
500	AUG 11	0324	55·2	38·65S	175·90E	143	3·6

NUM	DATE	TIME	LAT	LONG	DEP	MAG
501	AUG 11	0343 11·2	40·18S	174·61E	33R	3·9
502	AUG 11	1201 05·3	40·94S	174·11E	32	3·8
503	AUG 11	1227 27·1	39·09S	176·20E	65	3·6
504	AUG 12	1249 32·3	36·69S	177·65E	169	3·9
505	AUG 12	1414 36·5	44·99S	167·63E	12R	3·5
506	AUG 13	0354 41·2	40·08S	176·70E	59	3·7
507	AUG 13	0412 05·3	35·22S	179·33E	231	5·5
508	AUG 13	1347 23·7	42·09S	176·77E	12R	3·7
509	AUG 14	0822 52·9	34·53S	179·94W	33R	5·0
510	AUG 14	1551 28·0	41·12S	174·05E	64	3·7F
511	AUG 15	1315 54·9	37·57S	178·02E	74	3·9
512	AUG 15	2234 04·3	41·15S	175·14E	9	4·5F
513	AUG 16	0218 34·6	36·44S	177·45E	292	4·8
514	AUG 16	1158 37·5	38·67S	175·78E	170	3·9
515	AUG 16	1252 22·9	37·58S	177·20E	131	3·9
516	AUG 16	2035 10·2	38·70S	179·06E	33R	3·5
517	AUG 17	0419 04·5	40·88S	174·74E	1R	3·5
518	AUG 17	1120 57·5	45·16S	167·57E	63	3·8
519	AUG 17	2123 36·1	39·03S	175·68E	121	3·9
520	AUG 18	0152 12·9	35·09S	179·13E	237	4·5
521	AUG 18	0542 34·0	38·70S	177·01E	33R	3·5
522	AUG 18	2027 58·7	45·35S	167·21E	60	3·4
523	AUG 20	0621 00·5	40·16S	173·53E	160	3·9
524	AUG 20	1150 32·0	38·58S	175·97E	167	3·8
525	AUG 21	2005 41·5	40·15S	173·64E	174	4·7F
526	AUG 22	0730 11·7	40·11S	174·86E	12R	3·7
527	AUG 23	1143 17·3	34·11S	179·87E	33R	4·7
528	AUG 24	0351 58·5	33·92S	179·78E	33R	4·6
529	AUG 25	1827 24·1	45·23S	167·69E	12R	3·8
530	AUG 26	2107 58·2	39·24S	175·30E	146	3·7
531	AUG 27	0527 10·7	40·94S	175·98E	33R	3·7F
532	AUG 27	0736 35·3	45·16S	166·78E	12R	3·9
533	AUG 27	1924 16·4	39·14S	173·80E	11	3·6
534	AUG 27	2038 14·6	44·26S	168·32E	33R	3·4
535	AUG 27	2242 05·8	37·14S	176·96E	227	4·6
536	AUG 28	2153 51·9	43·29S	170·53E	12R	4·4F
537	AUG 29	0441 50·6	37·77S	177·04E	133	4·2
538	AUG 29	0609 54·1	34·07S	178·34E	238	4·3
539	AUG 30	0822 34·8	45·04S	167·68E	115	4·3
540	AUG 30	1741 08·8	39·68S	174·82E	148	3·9
541	AUG 31	1408 59·9	42·74S	172·91E	33R	4·0
542	AUG 31	1739 29·9	39·55S	175·66E	12R	3·5
543	AUG 31	1941 51·3	38·14S	176·11E	1R	2·7F
544	SEP 01	0313 30·6	38·10S	176·39E	169	4·0
545	SEP 01	2153 06·3	36·76S	175·86E	12R	3·8
546	SEP 03	0044 53·3	44·52S	168·51E	33R	3·4
547	SEP 03	1230 11·4	40·89S	175·64E	1R	3·4
548	SEP 03	2325 02·1	37·97S	176·55E	186	4·6
549	SEP 04	1116 16·4	37·41S	178·86E	12R	3·6
550	SEP 04	1346 31·8	39·76S	176·62E	51	3·6F
551	SEP 04	1916 04·4	44·51S	168·24E	12R	3·4
552	SEP 05	1429 37·9	40·12S	174·46E	31	4·1F
553	SEP 05	1754 30·6	34·63S	179·72E	33R	4·4
554	SEP 05	1847 16·4	39·89S	175·35E	1R	3·8
555	SEP 05	1913 42·8	41·21S	174·59E	30	3·4F
556	SEP 05	2217 54·9	34·53S	179·78E	33R	4·4
557	SEP 06	1103 16·7	39·28S	174·98E	202	3·6
558	SEP 06	1411 52·4	40·33S	173·49E	153	3·9
559	SEP 06	1635 34·1	36·90S	177·60E	269	3·8
560	SEP 06	2157 01·1	42·31S	172·79E	12R	3·5
561	SEP 06	2317 27·1	36·06S	178·56E	225	3·9
562	SEP 07	2223 02·9	38·24S	176·35E	181	4·0
563	SEP 09	0029 05·6	34·39S	179·84W	33R	5·1
564	SEP 09	1121 56·7	40·01S	176·94E	58	4·2F
565	SEP 09	1406 20·4	40·15S	174·98E	12R	4·2F
566	SEP 09	1743 13·2	39·49S	175·71E	5R	3·6F
567	SEP 09	2348 40·8	39·25S	174·72E	214	4·1
568	SEP 10	0440 44·3	45·09S	167·64E	94	3·9
569	SEP 10	1628 02·1	38·47S	175·76E	183	3·6
570	SEP 10	2054 26·2	38·65S	177·95E	11	3·7
571	SEP 10	2103 00·6	38·67S	177·97E	12	4·4F
572	SEP 11	1604 11·1	38·69S	177·13E	33R	3·9
573	SEP 12	0406 00·3	42·29S	172·80E	12R	3·4
574	SEP 12	1044 26·5	37·29S	176·83E	197	4·2
575	SEP 12	1232 10·5	34·76S	178·09E	33R	4·5
576	SEP 12	1447 30·2	38·21S	176·18E	162	3·7
577	SEP 13	0310 29·5	36·40S	178·34E	142	3·9
578	SEP 13	0643 53·1	38·51S	175·90E	177	3·8
579	SEP 13	1517 33·9	32·76S	179·88W	112	6·4F
580	SEP 13	1942 23·8	38·58S	175·80E	200	4·5
581	SEP 13	2356 44·5	41·60S	174·28E	12R	4·5
582	SEP 14	0659 03·0	38·60S	175·95E	165	3·8
583	SEP 14	1014 07·8	42·23S	172·83E	12R	4·0
584	SEP 14	2021 37·7	35·58S	178·76E	222	4·4
585	SEP 15	0207 22·5	38·95S	179·80E	33R	4·0
586	SEP 16	0029 52·8	36·27S	177·89E	267	4·6
587	SEP 16	0325 26·1	44·08S	168·70E	5R	3·8
588	SEP 16	1954 32·9	38·05S	176·25E	12R	3·0F
589	SEP 16	2212 13·0	37·56S	176·30E	204	3·9
590	SEP 17	0207 48·0	45·28S	168·10E	12R	4·1
591	SEP 17	0850 12·9	39·42S	174·08E	244	4·4
592	SEP 17	2235 46·1	40·71S	175·83E	33R	4·5F
593	SEP 17	2235 52·5	40·60S	175·51E	33R	4·4
594	SEP 18	0105 41·7	42·96S	171·42E	5R	5·2F
595	SEP 18	0357 50·0	42·24S	173·38E	5R	3·5
596	SEP 18	0549 36·0	40·01S	174·15E	116	3·7
597	SEP 18	1017 16·2	46·07S	166·41E	12R	3·2F
598	SEP 18	1024 01·3	38·10S	176·58E	140	4·4
599	SEP 18	1416 57·8	42·22S	172·81E	12R	3·7
600	SEP 18	1800 06·0	33·30S	179·53W	454	5·0

NUM	DATE	TIME	LAT	LONG	DEP	MAG
601	SEP 18	1829 51·0	43·01S	171·47E	5R	3·9F
602	SEP 18	1907 31·7	43·00S	171·44E	5R	3·3F
603	SEP 19	1230 02·8	37·32S	177·35E	138	3·9
604	SEP 20	0158 13·2	41·04S	173·16E	33R	3·9
605	SEP 20	2118 24·4	38·59S	177·96E	33R	3·7
606	SEP 21	2312 40·9	38·60S	177·69E	60	4·0
607	SEP 22	1600 00·2	40·56S	174·15E	75	3·7
608	SEP 23	0137 45·4	37·03S	177·69E	139	4·3
609	SEP 23	1619 36·0	40·93S	176·81E	50	3·5
610	SEP 24	0433 57·4	32·64S	179·21W	509	5·7
611	SEP 24	1925 46·8	41·26S	173·30E	85	3·6
612	SEP 25	0414 17·4	40·50S	173·83E	108	4·0
613	SEP 25	1849 43·3	37·79S	176·38E	285	4·7
614	SEP 26	0433 53·2	42·99S	172·21E	12R	3·6
615	SEP 26	0732 34·3	43·88S	169·80E	12R	4·7F
616	SEP 26	0734 41·6	43·71S	169·91E	12R	3·9
617	SEP 26	0734 56·2	43·92S	169·92E	12R	4·4F
618	SEP 26	0735 55·6	43·87S	169·80E	12R	3·9
619	SEP 26	0740 58·0	43·78S	169·84E	12R	3·9F
620	SEP 26	0745 22·3	43·36S	170·82E	12R	3·3F
621	SEP 26	0932 37·7	43·81S	169·49E	12R	3·4F
622	SEP 26	2249 42·7	35·15S	179·31E	368	4·3
623	SEP 27	0713 56·8	41·65S	174·18E	7	3·7
624	SEP 27	1045 10·9	38·54S	175·91E	181	4·3
625	SEP 27	2014 27·9	37·14S	177·40E	141	3·6
626	SEP 28	0424 50·1	42·20S	172·83E	12R	3·9
627	SEP 28	1717 01·0	42·13S	172·93E	12R	3·4
628	SEP 28	2138 41·1	38·18S	176·19E	5G	2·3F
629	SEP 29	0018 08·8	39·14S	177·96E	33R	3·5
630	SEP 30	1005 21·5	41·70S	174·14E	21	3·7
631	SEP 30	1830 49·4	37·56S	176·58E	224	4·0
632	OCT 01	0141 22·3	38·12S	176·26E	5G	2·5F
633	OCT 01	0453 44·8	37·08S	177·71E	141	3·7
634	OCT 01	1433 17·4	34·76S	179·27W	222	4·4
635	OCT 04	0053 50·4	39·67S	174·17E	141	4·3
636	OCT 04	0121 08·2	45·73S	167·27E	114	4·7
637	OCT 04	0703 08·3	43·07S	171·24E	12R	4·6F
638	OCT 04	1233 45·0	45·15S	167·67E	118	3·5
639	OCT 04	1241 25·7	43·15S	171·43E	12R	3·8
640	OCT 05	0328 05·7	45·99S	166·35E	12R	3·9
641	OCT 05	1139 31·4	42·12S	172·41E	12R	3·4
642	OCT 05	1205 55·7	44·32S	167·75E	0R	4·0
643	OCT 07	0602 13·8	35·41S	179·10E	308	4·3
644	OCT 07	1126 10·3	37·09S	176·80E	319	4·5
645	OCT 07	1312 30·9	38·83S	175·85E	132	4·2
646	OCT 07	1813 36·3	35·79S	178·46W	33R	4·5
647	OCT 08	0252 44·1	34·94S	179·55W	33R	5·1
648	OCT 08	1021 10·0	40·87S	172·16E	5R	4·6F
649	OCT 08	1513 15·2	40·05S	176·92E	33R	4·1
650	OCT 08	1808 06·2	35·73S	178·98E	295	4·7
651	OCT 08	2105 17·0	38·70S	175·57E	213	4·0
652	OCT 09	0343 15·4	38·55S	178·63E	33R	4·2
653	OCT 09	0346 03·6	38·76S	176·04E	116	3·5
654	OCT 09	0800 34·4	36·96S	177·05E	222	4·5
655	OCT 09	1040 45·4	37·40S	176·77E	303	4·1
656	OCT 09	1041 36·2	41·45S	174·66E	55	4·3F
657	OCT 09	1224 49·7	45·07S	167·54E	119	4·0
658	OCT 10	0034 15·9	39·67S	176·31E	33R	4·9F
659	OCT 10	2119 20·8	36·11S	178·79E	219	4·3
660	OCT 11	0934 06·4	39·45S	176·49E	89	4·0F
661	OCT 11	1733 55·5	35·36S	178·97E	33R	4·2
662	OCT 11	1909 49·6	38·10S	177·01E	66	3·9
663	OCT 12	0600 55·2	39·47S	174·48E	204	4·4
664	OCT 12	1600 13·8	45·05S	167·67E	97	4·7
665	OCT 13	0852 32·1	37·55S	176·69E	196	4·1
666	OCT 15	0229 42·1	42·15S	173·89E	12R	3·9F
667	OCT 15	1033 04·1	45·07S	167·71E	108	4·6
668	OCT 15	1505 21·1	45·12S	167·62E	117	5·0
669	OCT 17	0420 36·8	33·17S	177·81W	33R	5·1
670	OCT 17	0939 41·7	37·35S	176·55E	208	4·0
671	OCT 18	1901 02·8	42·89S	170·91E	12R	3·8
672	OCT 19	1216 53·1	37·79S	177·57E	33R	3·7F
673	OCT 20	0448 32·5	38·02S	177·26E	33R	3·7
674	OCT 20	0646 09·5	28·34S	175·70W	33R	6·9F
675	OCT 20	1034 20·9	37·03S	176·97E	249	4·2
676	OCT 20	1427 42·2	45·66S	170·15E	12R	4·1F
677	OCT 21	0450 53·3	38·55S	175·91E	166	3·9
678	OCT 21	0855 41·6	37·44S	177·20E	127	3·8
679	OCT 21	2312 08·9	44·28S	167·97E	5R	4·2
680	OCT 22	1540 54·6	42·29S	171·31E	12R	3·3F
681	OCT 22	1749 49·0	39·23S	175·35E	22	3·6F
682	OCT 23	0455 59·8	38·11S	179·56W	33R	3·9
683	OCT 23	1724 49·2	40·56S	176·31E	33R	3·6
684	OCT 24	0749 37·9	39·19S	175·26E	12R	4·1
685	OCT 24	1039 31·7	38·50S	176·08E	158	3·7
686	OCT 24	1100 41·7	36·97S	179·96W	33R	3·7
687	OCT 24	1540 57·9	33·30S	179·36W	414	5·1
688	OCT 24	2009 14·8	38·34S	175·99E	183	4·2
689	OCT 25	2354 22·5	39·95S	175·46E	12R	4·1F
690	OCT 26	0855 06·7	39·83S	176·88E	33R	3·4
691	OCT 26	1126 56·2	38·65S	175·85E	184	3·7
692	OCT 26	1134 51·7	38·64S	175·81E	186	4·2
693	OCT 27	0425 21·4	38·73S	175·79E	152	5·9F
694	OCT 27	0658 39·7	37·99S	176·97E	88	3·5
695	OCT 28	1345 42·2	38·31S	176·04E	166	3·8
696	OCT 28	1608 06·7	40·67S	178·27E	33R	3·9
697	OCT 30	0041 13·4	34·75S	179·40E	287	4·5
698	OCT 30	1148 01·5	37·80S	176·33E	206	3·7
699	OCT 30	1425 39·9	35·30S	179·03E	287	4·5
700	OCT 30	1515 47·1	37·98S	176·45E	173	3·7

NUM	DATE	TIME	LAT	LONG	DEP	MAG
701	OCT 30	2126 32·6	39·28S	174·68E	213	4·2
702	OCT 30	2140 06·0	40·37S	174·17E	89	3·7
703	OCT 31	0443 25·7	37·80S	177·02E	116	3·8
704	OCT 31	0600 14·3	42·60S	170·58E	12R	3·9
705	OCT 31	1624 16·6	45·13S	166·96E	12R	3·7
706	OCT 31	1720 58·9	45·29S	166·87E	12R	3·5
707	OCT 31	1739 59·2	45·07S	167·74E	90	3·4
708	OCT 31	1844 50·6	37·36S	177·53E	115	3·5
709	OCT 31	2113 28·5	35·78S	178·41E	202	4·1
710	OCT 31	2119 11·2	35·77S	178·58E	204	4·1
711	NOV 01	0212 40·6	37·50S	177·10E	137	3·6
712	NOV 01	0228 04·7	46·01S	167·10E	98	4·5
713	NOV 01	0859 56·8	39·27S	175·06E	145	3·8
714	NOV 03	0009 08·3	40·90S	175·46E	12R	3·9
715	NOV 03	0303 36·8	37·42S	176·81E	187	3·7
716	NOV 03	0706 45·8	43·05S	167·42E	12R	3·7
717	NOV 03	1330 27·3	41·21S	172·69E	213	3·6
718	NOV 03	1336 47·1	38·07S	176·29E	199	3·9
719	NOV 03	1955 30·1	38·31S	175·96E	179	3·6
720	NOV 04	0939 29·8	41·68S	173·67E	33R	3·4
721	NOV 05	0122 06·4	38·99S	175·03E	207	4·4
722	NOV 05	0409 34·7	39·65S	177·21E	28	3·7
723	NOV 05	1240 36·5	37·11S	177·61E	114	5·0
724	NOV 05	1249 28·4	36·45S	177·27E	267	4·2
725	NOV 06	0532 54·9	39·09S	175·30E	166	3·9
726	NOV 06	1245 04·1	37·17S	177·32E	145	4·3
727	NOV 08	0634 45·3	46·65S	166·40E	12R	3·9
728	NOV 08	1304 49·9	39·21S	175·29E	20	3·8
729	NOV 09	1111 40·1	41·59S	172·06E	1R	3·9
730	NOV 09	1511 30·3	38·28S	177·07E	15	3·9F
731	NOV 10	2010 37·0	39·05S	175·92E	97	3·8
732	NOV 12	0042 30·4	36·82S	177·05E	286	4·1
733	NOV 12	0146 18·3	45·08S	167·69E	100	4·2
734	NOV 12	0707 57·2	37·30S	178·43E	35	3·9
735	NOV 12	1111 02·4	38·39S	175·99E	188	3·9
736	NOV 12	2056 15·6	41·49S	174·60E	6	4·5F
737	NOV 13	0210 25·6	37·38S	177·60E	246	4·2
738	NOV 14	0106 52·1	35·43S	179·14E	221	4·2
739	NOV 16	0104 29·7	47·58S	165·93E	33R	4·4
740	NOV 16	0442 16·5	40·14S	175·02E	33R	3·6
741	NOV 16	1229 04·1	38·30S	176·89E	57	3·5
742	NOV 17	0438 35·5	39·65S	176·42E	56	3·5
743	NOV 17	1139 12·9	38·57S	178·75E	33R	3·9
744	NOV 18	1015 56·9	36·26S	177·78E	276	5·3
745	NOV 18	1412 46·3	45·05S	167·65E	123	4·1
746	NOV 19	2243 33·8	37·75S	177·42E	93	3·7
747	NOV 20	0330 22·1	42·68S	170·55E	12R	3·6
748	NOV 21	1017 03·0	41·61S	174·12E	12R	4·3F
749	NOV 21	1540 52·2	36·96S	177·23E	109	3·6
750	NOV 22	0927 57·9	43·10S	171·88E	12R	3·5
751	NOV 23	1922 41·5	40·95S	176·35E	31	3·6
752	NOV 23	2217 57·4	37·74S	177·36E	129	4·3
753	NOV 24	0833 19·0	37·18S	177·50E	180	3·7
754	NOV 24	0937 23·9	39·07S	175·48E	211	3·7
755	NOV 24	1028 43·0	36·83S	177·71E	219	4·1
756	NOV 25	0442 01·0	39·42S	174·44E	202	4·2
757	NOV 25	1552 06·0	40·08S	176·18E	33R	3·5
758	NOV 26	0559 13·9	37·58S	178·36E	51	3·9
759	NOV 26	1722 15·0	38·75S	177·49E	84	3·9
760	NOV 26	2029 10·0	40·22S	177·08E	33R	3·8
761	NOV 27	0101 23·8	39·66S	174·26E	192	3·7
762	NOV 27	1243 32·7	42·67S	171·74E	12R	4·8F
763	NOV 27	1555 02·1	38·83S	175·40E	222	3·9
764	NOV 27	1915 47·8	40·15S	175·10E	33R	3·7
765	NOV 28	0226 20·4	38·17S	177·35E	33R	3·4
766	NOV 28	2223 19·4	41·79S	173·82E	69	4·5F
767	NOV 29	0107 44·1	38·10S	176·49E	151	4·6F
768	NOV 30	0150 43·3	39·11S	175·59E	136	3·5
769	NOV 30	1115 14·3	39·60S	177·50E	33R	4·1F
770	NOV 30	1914 49·3	38·59S	178·38E	33R	3·8
771	DEC 01	1004 22·3	37·91S	176·56E	135	3·4
772	DEC 02	0539 49·7	35·74S	178·06E	33R	4·4
773	DEC 03	1328 51·8	39·57S	176·12E	96	4·4F
774	DEC 03	1515 53·8	40·39S	176·54E	3	3·5
775	DEC 03	1640 07·6	37·80S	177·52E	60	4·1
776	DEC 04	1631 40·1	45·42S	170·93E	5R	3·4F
777	DEC 04	1713 05·1	37·33S	179·63E	33R	3·7
778	DEC 05	0933 45·5	43·31S	168·58E	12R	3·7
779	DEC 06	0817 19·1	40·18S	173·58E	179	4·1
780	DEC 07	0207 25·7	33·35S	178·26W	368	5·8
781	DEC 08	0325 38·2	42·94S	171·79E	12R	3·0F
782	DEC 08	1241 14·7	45·21S	167·57E	112	4·6
783	DEC 10	1011 46·1	38·33S	178·95E	33R	4·0
784	DEC 11	0802 29·7	41·83S	165·94E	12R	4·5
785	DEC 13	1412 23·8	39·15S	174·79E	232	4·6
786	DEC 14	0220 44·0	38·68S	175·47E	187	4·4
787	DEC 15	1700 23·8	37·52S	176·50E	361	4·3
788	DEC 17	0241 00·3	33·76S	179·37W	329	4·9
789	DEC 17	1324 28·6	43·10S	173·17E	12R	3·3F
790	DEC 17	1345 12·7	43·13S	173·21E	12R	3·0F
791	DEC 17	1355 58·2	37·86S	176·96E	12R	3·7F
792	DEC 17	1405 49·4	37·84S	176·94E	12R	3·8F
793	DEC 17	1436 54·9	37·88S	176·97E	12R	3·6F
794	DEC 17	1513 12·5	37·88S	176·97E	12R	3·4F
795	DEC 17	2002 20·7	43·11S	171·65E	12R	4·4F
796	DEC 18	0008 20·1	40·01S	175·53E	33R	3·8
797	DEC 18	0654 02·4	34·86S	179·25E	207	4·5
798	DEC 18	1001 26·1	41·67S	175·39E	12R	4·1
799	DEC 18	1242 07·9	42·98S	173·16E	12R	4·3F
800	DEC 18	1818 47·3	38·32S	176·27E	155	3·6

NUM	DATE	TIME		LAT	LONG	DEP	MAG
801	DEC 18	1947	46·2	34·64S	179·24E	33R	4·1
802	DEC 19	0205	55·1	45·02S	167·67E	73	4·6
803	DEC 19	0731	37·7	36·96S	177·24E	274	3·7
804	DEC 20	0114	39·6	36·57S	179·52E	33R	4·0
805	DEC 20	0121	51·2	38·33S	176·19E	169	3·7
806	DEC 20	0509	09·5	41·72S	172·46E	12R	3·7
807	DEC 20	2030	09·7	39·31S	175·48E	14	3·6
808	DEC 21	0546	53·5	45·39S	166·62E	12R	3·9
809	DEC 21	0721	45·9	43·96S	172·10E	12R	3·6
810	DEC 22	0027	23·1	37·34S	177·40E	137	4·1
811	DEC 22	0901	01·6	37·50S	177·11E	12R	3·6
812	DEC 22	1228	00·3	47·61S	165·39E	33R	4·2
813	DEC 22	1946	46·3	38·43S	175·88E	219	3·8
814	DEC 22	2326	28·4	45·10S	167·66E	129	3·8
815	DEC 24	0325	23·2	42·15S	172·79E	12R	3·6
816	DEC 25	0905	38·0	39·05S	175·32E	162	3·8
817	DEC 25	1709	09·5	38·40S	176·01E	179	5·0
818	DEC 26	0330	59·0	41·16S	172·66E	0	3·8
819	DEC 26	0635	53·1	36·40S	178·04E	190	4·7
820	DEC 26	0945	32·6	44·06S	168·68E	12R	3·4
821	DEC 27	0232	33·9	36·24S	179·18E	280	4·0
822	DEC 27	2333	43·7	38·83S	175·88E	121	3·5
823	DEC 29	0143	36·0	36·45S	177·76E	274	4·4
824	DEC 29	0931	56·1	37·72S	177·07E	84	3·4
825	DEC 30	0625	23·7	41·17S	173·55E	81	4·2F
826	DEC 30	1307	58·5	40·22S	173·48E	181	4·9F
827	DEC 30	1950	08·9	45·58S	167·10E	12R	3·8
828	DEC 31	1851	20·0	37·88S	179·12E	12R	3·7
829	DEC 31	2026	40·8	34·36S	179·87W	343	4·6
830	DEC 31	2035	06·9	41·18S	174·06E	57	3·4

WELLINGTON NETWORK

The origins listed in this section have been determined from data provided by stations of the Wellington Network, details of which are given in an earlier section of this Report. For some large events, an alternative solution, found using stations of the standard network, may also exist. Because of the close spacing of the stations of the Wellington Network, and the well constrained velocity-structure in the region, the origins that follow are to be preferred for most studies of tectonic setting and structure, but for statistical work involving a larger part of the country, the results from the standard network will provide more homogeneous data.

The velocity/depth structure used to determine the origins is:

Depth km	P-velocity km/s	S-velocity km/s
0·0 - 0·4	4·40	2·54
0·4 - 5·0	5·63	3·16
5·0 - 15·0	5·77	3·49
15·0 - 25·0	6·39	3·50
25·0 - 35·0	6·79	3·92
35·0 - 45·0	8·07	4·80
45·0 -	8·77	4·86

This structure is the outcome of inversion of arrival time data from the network by R. Robinson, whose work also showed that the introduction of station delay terms, which are added to the raw arrival times, improves the consistency of results.

The program used for determining the origins is the same as that used for the standard network, except for the use of the above crustal model and more stringent convergence criteria. The format of the presentation is basically similar to that used in the list of origins derived from standard network data, but additional columns provide for listing here the number of phases read (NP), the number of stations that recorded the shock (NS), the standard error of residuals (S.E.), the distance in kilometres from the epicentre to the nearest recording station (DM) and the greatest angular gap (in degrees) in azimuthal distribution of these stations about the epicentre (GAP).

As has now become established practice, the less well recorded shocks were not processed to yield origins, but a magnitude threshold of about M_L 2·3 was used to decide which shocks were worthy of analysis.

NUM	DATE	TIME	LAT	LONG	DEP	MAG	NP	NS	S.E.	DM	GAP
W/001	JAN 01	0519 15·2	41·542S	174·562E	31·7	2·3	10	9	0·17	36	154
W/002	JAN 01	0732 37·0	40·367S	174·609E	75·6	2·6	9	8	0·13	61	303
W/003	JAN 01	1257 42·9	40·981S	174·462E	62·7	2·3	7	6	0·06	30	252
W/004	JAN 02	1014 00·8	40·614S	174·359E	73·2	2·6	8	7	0·09	54	295
W/005	JAN 02	1816 53·5	40·914S	174·693E	34·4	2·1	9	8	0·13	19	207
W/006	JAN 02	1936 13·2	40·728S	174·114E	82·0	2·5	7	6	0·16	56	297
W/007	JAN 03	0221 02·9	41·922S	173·975E	13·2	2·6	10	9	0·29	28	314
W/008	JAN 03	0936 37·1	41·076S	174·673E	32·6	2·2	10	9	0·12	18	155
W/009	JAN 03	1303 07·3	40·936S	175·454E	24·8	2·1	8	7	0·18	25	251
W/010	JAN 03	1341 02·5	41·003S	175·304E	22·6	2·4	10	9	0·06	23	201
W/011	JAN 03	1554 55·7	40·448S	174·381E	19·4	2·5	6	5	0·26	64	304
W/012	JAN 04	0838 56·5	41·588S	174·674E	31·9	2·2	8	7	0·14	40	252
W/013	JAN 04	1404 15·1	41·809S	174·825E	47·1	3·6	11	11	0·16	45	229
W/014	JAN 04	1539 25·1	41·206S	175·019E	22·8	1·9	9	9	0·13	7	78
W/015	JAN 04	1845 01·1	41·738S	174·106E	15·4	2·3	8	7	0·13	9	275
W/016	JAN 04	2020 20·1	41·200S	175·149E	28·7	2·7	12	10	0·12	12	109
W/017	JAN 04	2320 04·8	41·738S	174·503E	32·3	2·3	12	10	0·14	24	203
W/018	JAN 06	0254 32·1	41·268S	175·024E	25·5	1·8	10	9	0·09	3	87
W/019	JAN 06	1538 57·5	40·971S	175·647E	24·9	2·2	12	9	0·12	24	277
W/020	JAN 07	0011 30·1	40·732S	174·703E	13·3	3·2	10	10	0·19	23	271
W/021	JAN 10	0843 40·4	41·673S	174·313E	18·0	2·4	12	10	0·29	12	152
W/022	JAN 11	0746 10·8	41·191S	174·797E	35·4	2·1	10	9	0·05	9	108
W/023	JAN 12	1108 57·5	41·375S	173·778E	58·8	2·6	10	8	0·20	45	281
W/024	JAN 12	1439 49·3	41·683S	174·229E	15·3	2·2	9	8	0·17	8	176
W/025	JAN 14	0011 23·0	40·558S	174·650E	40·6	3·0	9	7	0·23	41	290
W/026	JAN 14	1357 53·9	41·509S	174·213E	2·6	2·1	8	7	0·26	27	190
W/027	JAN 15	1244 42·7	41·372S	175·108E	27·5	2·2	12	9	0·09	13	143
W/028	JAN 16	0850 23·5	40·987S	175·617E	29·2	2·4	12	9	0·10	21	273
W/029	JAN 16	1833 16·6	41·383S	174·543E	57·7	2·3	12	9	0·05	22	214
W/030	JAN 16	2037 49·9	40·774S	175·124E	34·6	3·9	11	11	0·16	21	263
W/031	JAN 17	2238 25·1	40·962S	175·658E	24·2	2·1	9	8	0·11	26	279
W/032	JAN 18	0033 13·7	40·716S	174·990E	37·7	2·3	10	9	0·35	18	272
W/033	JAN 19	0410 38·8	41·246S	175·173E	24·8	2·5	12	10	0·12	15	98
W/034	JAN 19	0552 15·3	41·389S	174·978E	27·7	3·2	11	11	0·06	9	138
W/035	JAN 19	1043 12·0	41·712S	174·491E	31·3	2·6	13	10	0·18	23	194
W/036	JAN 20	1152 56·9	40·881S	174·725E	12·8	2·5	10	8	0·16	16	217
W/037	JAN 20	1323 00·8	41·613S	174·665E	50·5	2·5	13	9	0·14	28	256
W/038	JAN 20	2329 41·7	41·269S	174·430E	59·8	3·3	11	11	0·06	14	106
W/039	JAN 21	0811 26·0	40·909S	174·611E	51·2	2·6	10	8	0·03	26	219
W/040	JAN 22	1802 31·7	40·677S	174·753E	24·8	2·1	7	6	0·16	25	277
W/041	JAN 22	2232 29·1	41·201S	174·584E	56·8	2·7	11	9	0·04	11	133
W/042	JAN 26	1651 59·8	41·311S	174·284E	34·8	2·8	12	9	0·15	36	220
W/043	JAN 27	0846 35·3	41·109S	174·610E	34·0	3·1	9	9	0·08	16	253
W/044	JAN 27	1107 27·0	42·030S	175·211E	33·6	3·1	11	9	0·25	68	273
W/045	JAN 29	0332 12·5	41·795S	174·318E	30·4	2·8	12	10	0·22	10	236
W/046	JAN 30	0901 57·9	40·667S	174·198E	73·5	3·6	7	7	0·06	61	296
W/047	JAN 30	1452 58·0	41·196S	173·792E	75·4	2·6	6	5	0·09	41	336
W/048	FEB 03	1327 31·1	41·215S	174·547E	58·2	2·4	12	9	0·08	13	141
W/049	FEB 05	0656 17·0	41·455S	173·933E	43·7	3·0	11	11	0·24	39	263
W/050	FEB 06	0512 13·8	40·835S	175·071E	32·4	2·7	12	9	0·24	14	239

NUM	DATE	TIME	LAT	LONG	DEP	MAG	NP	NS	S.E.	DM	GAP
W/051	FEB 08	0443 05·3	41·105S	174·570E	35·9	2·1	9	8	0·08	18	163
W/052	FEB 10	0004 19·8	41·422S	174·697E	26·5	2·2	15	10	0·16	15	213
W/053	FEB 11	1352 04·7	41·324S	174·579E	32·1	2·3	10	8	0·12	15	185
W/054	FEB 11	1643 40·3	41·418S	174·715E	25·5	2·1	9	8	0·08	13	216
W/055	FEB 12	0629 10·4	40·978S	175·426E	22·7	2·2	9	8	0·13	21	236
W/056	FEB 12	1459 20·1	41·940S	174·221E	21·0	2·5	11	10	0·26	21	300
W/057	FEB 14	1241 37·6	41·549S	174·463E	16·4	2·2	12	11	0·20	30	144
W/058	FEB 14	2218 52·3	41·547S	174·566E	31·7	2·4	14	10	0·21	30	155
W/059	FEB 16	0326 03·7	41·294S	174·894E	20·9	2·2	10	10	0·13	9	87
W/060	FEB 16	2259 54·6	41·267S	174·845E	25·1	2·0	14	10	0·10	7	80
W/061	FEB 17	0437 02·9	41·224S	173·870E	54·6	2·7	7	6	0·23	34	322
W/062	FEB 17	0915 07·4	41·215S	174·880E	17·4	2·7	11	10	0·15	11	94
W/063	FEB 17	0918 08·6	41·215S	174·882E	17·8	2·8	10	10	0·17	11	94
W/064	FEB 17	1056 10·4	41·246S	175·177E	22·9	3·2	10	10	0·06	16	99
W/065	FEB 17	1820 54·5	41·380S	173·884E	58·2	2·5	10	9	0·21	38	271
W/066	FEB 18	0302 53·0	41·268S	174·845E	26·4	2·7	11	10	0·13	7	80
W/067	FEB 20	1523 02·8	40·560S	174·740E	44·6	3·0	10	10	0·15	37	288
W/068	FEB 20	1804 23·5	40·979S	174·725E	49·7	2·2	9	7	0·05	20	176
W/069	FEB 20	1933 04·9	41·041S	173·812E	83·0	3·4	13	11	0·20	43	281
W/070	FEB 21	1011 42·3	40·562S	174·698E	44·2	2·5	6	4	0·10	38	306
W/071	FEB 21	1156 10·2	40·766S	175·133E	60·5	2·8	9	8	0·14	22	265
W/072	FEB 21	1537 59·2	41·320S	174·326E	38·1	3·0	11	9	0·18	13	149
W/073	FEB 22	0005 23·0	41·306S	175·036E	32·8	2·6	10	9	0·04	18	104
W/074	FEB 22	0359 51·4	41·584S	173·905E	19·5	2·7	11	9	0·27	32	271
W/075	FEB 23	0435 17·6	40·765S	174·763E	18·4	2·7	10	8	0·13	17	266
W/076	FEB 23	0724 29·5	40·832S	174·455E	43·3	2·3	8	5	0·08	39	255
W/077	FEB 24	1935 40·8	41·158S	175·676E	22·2	2·7	11	8	0·20	15	279
W/078	FEB 24	2228 08·6	40·488S	174·480E	63·4	2·8	7	6	0·06	55	299
W/079	FEB 26	2025 28·4	41·265S	175·237E	24·5	2·2	9	7	0·08	17	98
W/080	FEB 27	2146 33·7	41·414S	174·029E	42·9	2·9	10	10	0·22	30	246
W/081	FEB 28	1900 09·7	41·841S	174·198E	24·5	2·9	10	9	0·31	10	301
W/082	FEB 28	1949 38·1	41·853S	174·167E	24·7	2·6	10	9	0·23	12	303
W/083	MAR 01	0924 40·2	40·571S	174·629E	5·0	2·4	6	5	0·31	40	289
W/084	MAR 04	0232 56·9	40·766S	174·758E	41·7	3·4	9	8	0·08	17	266
W/085	MAR 04	0828 20·0	41·199S	174·290E	39·5	2·7	10	8	0·16	2	198
W/086	MAR 04	1419 17·5	41·120S	174·584E	33·4	2·6	12	9	0·13	16	156
W/087	MAR 05	0029 00·6	41·184S	174·342E	34·9	2·5	8	7	0·10	6	174
W/088	MAR 05	0206 18·7	41·066S	175·178E	25·0	2·3	11	8	0·09	10	156
W/089	MAR 05	1348 28·5	41·080S	174·668E	33·7	2·8	12	9	0·15	17	155
W/090	MAR 05	1445 50·4	42·018S	174·491E	30·2	3·1	10	9	0·24	37	274
W/091	MAR 05	2010 35·8	41·270S	174·838E	26·5	2·1	15	9	0·18	6	83
W/092	MAR 06	0003 35·3	41·591S	174·542E	30·1	2·2	13	8	0·21	34	259
W/093	MAR 06	0312 34·4	40·466S	174·301E	36·7	2·3	6	4	0·04	68	310
W/094	MAR 06	1202 12·6	41·247S	175·168E	24·9	2·3	15	10	0·17	15	98
W/095	MAR 06	1214 17·6	41·399S	175·054E	25·7	2·4	15	10	0·10	15	167
W/096	MAR 06	1537 51·6	40·889S	174·739E	13·7	2·0	8	6	0·16	15	212
W/097	MAR 07	0423 30·2	40·582S	174·649E	23·1	2·3	8	5	0·20	38	288
W/098	MAR 07	2301 06·1	41·745S	174·496E	35·4	2·7	9	7	0·19	49	290
W/099	MAR 07	2355 25·2	40·899S	175·093E	31·4	2·7	13	9	0·07	16	206
W/100	MAR 08	0347 33·8	40·893S	175·088E	31·1	2·1	10	8	0·13	15	208

NUM	DATE	TIME	LAT	LONG	DEP	MAG	NP	NS	S.E.	DM	GAP
W/101	MAR 08	0532 33·4	41·600S	174·008E	32·3	2·5	6	5	0·25	48	319
W/102	MAR 08	1246 27·7	41·356S	173·847E	63·0	3·0	10	8	0·39	39	274
W/103	MAR 09	0342 11·0	40·758S	175·688E	18·3	2·2	9	7	0·29	47	295
W/104	MAR 10	2047 12·1	41·112S	175·033E	26·1	2·5	13	10	0·20	3	102
W/105	MAR 11	2205 07·7	40·571S	174·895E	25·3	2·4	10	8	0·18	33	286
W/106	MAR 12	1822 49·4	40·817S	175·120E	28·9	3·4	11	10	0·10	18	247
W/107	MAR 13	1645 02·0	41·203S	174·556E	36·8	2·9	12	10	0·21	13	136
W/108	MAR 13	2311 25·9	41·416S	175·032E	22·6	2·3	13	8	0·07	13	181
W/109	MAR 14	0019 43·6	40·919S	174·943E	53·6	4·0	12	11	0·03	7	144
W/110	MAR 14	0152 37·9	40·961S	174·119E	65·8	4·1	9	8	0·10	31	286
W/111	MAR 14	0229 32·1	40·628S	174·610E	53·2	4·0	11	10	0·12	37	285
W/112	MAR 14	0321 14·6	40·586S	174·550E	43·7	2·8	11	7	0·17	43	291
W/113	MAR 14	0929 06·9	40·982S	175·454E	23·9	2·1	12	8	0·08	20	243
W/114	MAR 14	1524 25·0	41·546S	174·307E	31·5	2·5	10	8	0·17	37	276
W/115	MAR 14	1635 27·6	41·134S	174·627E	35·5	3·3	12	10	0·14	13	146
W/116	MAR 15	1243 25·2	40·717S	174·539E	71·9	3·0	11	8	0·16	35	275
W/117	MAR 17	1052 47·6	40·627S	174·647E	76·3	2·5	8	6	0·15	35	284
W/118	MAR 18	1116 40·8	41·790S	174·552E	32·7	3·4	14	11	0·13	28	220
W/119	MAR 19	1958 03·6	40·541S	174·704E	65·1	3·6	10	9	0·06	40	290
W/120	MAR 20	0030 03·3	40·917S	174·654E	5·0	2·2	9	6	0·11	22	211
W/121	MAR 20	2230 46·9	41·775S	174·500E	34·7	3·1	12	10	0·14	24	215
W/122	MAR 21	0556 34·4	41·432S	174·957E	26·9	2·5	13	10	0·09	8	203
W/123	MAR 22	1625 03·9	41·725S	174·246E	22·4	3·4	11	10	0·27	4	151
W/124	MAR 24	0145 50·2	41·354S	175·079E	37·5	2·1	14	9	0·07	16	134
W/125	MAR 25	0115 16·4	40·790S	175·044E	32·6	2·3	9	8	0·09	14	263
W/126	MAR 25	0529 08·9	41·578S	174·674E	33·9	2·3	10	9	0·20	25	249
W/127	MAR 25	1655 33·6	41·767S	174·321E	30·7	2·2	7	6	0·24	9	218
W/128	MAR 25	2003 00·9	41·379S	174·644E	32·2	2·5	11	8	0·12	15	201
W/129	MAR 26	0709 29·2	40·979S	175·593E	29·2	2·3	11	8	0·10	21	271
W/130	MAR 27	1155 29·1	40·905S	175·468E	22·8	2·0	7	6	0·06	28	259
W/131	MAR 27	1421 26·2	41·181S	174·646E	32·6	2·4	14	9	0·11	8	130
W/132	MAR 28	0223 55·4	41·102S	174·729E	54·4	2·7	11	9	0·04	15	138
W/133	MAR 28	0422 05·1	41·091S	174·239E	61·9	3·1	8	8	0·08	14	259
W/134	MAR 29	1337 16·0	40·340S	174·534E	55·5	2·5	6	5	0·17	66	305
W/135	MAR 29	1847 17·7	40·312S	174·531E	45·0	2·9	5	4	0·27	69	320
W/136	MAR 30	0314 20·1	40·520S	175·071E	32·4	2·4	8	7	0·13	41	310
W/137	MAR 31	0327 34·5	41·922S	174·010E	37·1	2·8	10	8	0·24	82	312
W/138	APR 02	0043 39·1	41·401S	175·075E	23·8	3·0	12	10	0·08	15	168
W/139	APR 02	0657 39·7	41·058S	174·656E	29·3	2·5	12	9	0·12	20	164
W/140	APR 02	2104 36·2	41·577S	174·295E	28·1	2·6	10	8	0·11	20	159
W/141	APR 03	1706 25·7	41·192S	173·789E	58·8	2·5	6	4	0·20	41	335
W/142	APR 04	1222 18·9	40·832S	174·757E	41·6	3·7	13	11	0·11	14	241
W/143	APR 04	1358 38·1	41·764S	174·518E	34·7	2·6	14	10	0·17	25	211
W/144	APR 04	1756 51·7	41·591S	174·272E	14·8	2·6	13	11	0·17	18	165
W/145	APR 05	1338 42·0	40·942S	174·446E	53·2	2·3	6	5	0·16	33	233
W/146	APR 06	1926 32·8	41·018S	174·528E	55·4	2·9	12	10	0·07	28	198
W/147	APR 07	1509 24·1	40·984S	175·151E	26·1	2·1	13	9	0·14	16	181
W/148	APR 08	0702 24·6	41·549S	174·551E	31·9	2·4	14	9	0·22	34	154
W/149	APR 08	0714 14·8	40·987S	174·482E	64·9	2·2	9	7	0·06	30	215
W/150	APR 08	1443 03·8	41·541S	174·556E	32·6	2·9	14	10	0·21	30	153

NUM	DATE	TIME	LAT	LONG	DEP	MAG	NP	NS	S.E.	DM	GAP
W/151	APR 09	0245 41·0	40·892S	175·502E	25·2	2·3	10	7	0·11	30	267
W/152	APR 10	0304 29·7	40·689S	174·763E	41·8	2·9	9	9	0·19	23	275
W/153	APR 10	1300 06·1	40·777S	174·880E	9·0	1·9	8	6	0·29	10	263
W/154	APR 10	1658 34·8	41·549S	174·602E	17·9	2·8	12	11	0·21	27	159
W/155	APR 11	0512 25·0	41·220S	174·551E	31·9	3·0	15	11	0·14	13	126
W/156	APR 11	0815 18·3	41·011S	174·340E	20·4	2·7	9	8	0·13	23	238
W/157	APR 11	1128 36·3	41·290S	174·874E	29·9	2·1	14	9	0·08	9	91
W/158	APR 11	1408 09·6	40·366S	174·565E	32·2	2·6	6	5	0·12	63	304
W/159	APR 11	1925 28·4	41·374S	175·114E	26·9	2·6	13	10	0·15	13	145
W/160	APR 13	1251 23·7	40·860S	174·736E	59·3	3·6	13	11	0·09	15	228
W/161	APR 13	1308 02·9	41·542S	174·337E	15·2	2·6	12	10	0·26	25	149
W/162	APR 13	1629 23·6	41·309S	174·274E	18·5	2·7	7	7	0·20	11	258
W/163	APR 14	1509 59·6	41·106S	173·839E	76·5	3·0	7	7	0·10	39	326
W/164	APR 14	2210 36·6	40·792S	175·955E	34·7	4·2	11	11	0·15	56	308
W/165	APR 14	2342 25·3	40·577S	174·860E	33·7	2·6	12	9	0·22	32	285
W/166	APR 16	0259 21·9	41·910S	174·083E	11·2	2·9	12	10	0·54	21	309
W/167	APR 16	0334 54·5	41·918S	174·093E	11·0	2·7	12	9	0·58	21	308
W/168	APR 17	1446 43·8	40·798S	174·094E	65·2	3·2	8	7	0·27	49	294
W/169	APR 17	2026 49·1	41·509S	174·394E	20·7	2·2	11	8	0·19	34	260
W/170	APR 17	2045 06·6	41·087S	175·264E	12·1	1·7	8	7	0·10	17	162
W/171	APR 17	2119 07·6	40·917S	175·238E	47·4	2·4	11	8	0·11	26	219
W/172	APR 18	0538 33·9	40·593S	174·363E	48·4	2·3	7	4	0·10	55	297
W/173	APR 18	0921 04·9	41·553S	174·158E	14·2	2·7	10	10	0·34	23	208
W/174	APR 18	2127 19·6	41·107S	175·518E	30·6	2·6	9	8	0·11	6	249
W/175	APR 19	1010 23·1	41·590S	174·294E	29·7	3·2	11	11	0·12	19	158
W/176	APR 19	2152 55·1	41·539S	174·329E	29·1	2·5	9	7	0·10	36	272
W/177	APR 21	0230 16·1	40·577S	174·453E	55·6	3·1	6	6	0·17	50	295
W/178	APR 23	1213 38·1	41·009S	175·319E	29·1	2·2	11	6	0·13	24	227
W/179	APR 23	1538 17·8	40·560S	174·329E	71·1	3·6	8	8	0·09	60	301
W/180	APR 24	1301 48·6	41·375S	175·070E	36·6	2·3	10	7	0·08	13	148
W/181	APR 26	2147 14·1	41·399S	174·952E	29·5	2·6	9	6	0·11	7	164
W/182	APR 29	0923 47·8	41·977S	174·139E	12·0	2·7	11	9	0·50	26	309
W/183	APR 29	1258 30·9	40·922S	176·159E	32·4	2·7	9	6	0·22	61	316
W/184	APR 29	1920 54·7	40·889S	175·369E	27·3	2·1	7	5	0·18	32	246
W/185	APR 30	0448 27·0	41·278S	175·196E	25·4	2·2	13	8	0·10	17	91
W/186	APR 30	0532 28·2	40·583S	174·228E	45·0	2·4	5	3	0·02	66	302
W/187	MAY 01	1005 52·5	41·005S	174·479E	61·9	2·3	9	5	0·12	29	211
W/188	MAY 03	0008 50·1	41·433S	175·332E	16·6	2·1	13	8	0·08	7	221
W/189	MAY 03	0340 58·4	41·293S	173·854E	50·8	2·6	11	8	0·20	36	323
W/190	MAY 03	0441 53·2	41·225S	173·718E	89·9	2·4	7	5	0·14	47	332
W/191	MAY 03	1310 57·6	40·968S	175·526E	29·5	3·5	11	10	0·07	21	263
W/192	MAY 04	0006 24·9	41·566S	175·575E	12·9	2·7	10	9	0·19	23	294
W/193	MAY 04	0705 30·7	41·534S	174·577E	19·7	2·2	12	11	0·21	28	153
W/194	MAY 05	2106 26·4	40·548S	174·808E	26·0	2·4	10	7	0·15	36	288
W/195	MAY 06	0511 58·3	40·723S	175·366E	28·1	2·6	9	8	0·21	41	285
W/196	MAY 06	0921 24·2	41·252S	174·552E	34·1	2·1	11	7	0·08	13	157
W/197	MAY 06	0945 10·0	40·898S	175·520E	26·6	2·7	11	8	0·16	45	270
W/198	MAY 06	2328 36·5	40·966S	173·893E	84·1	2·6	6	4	0·09	42	312
W/199	MAY 07	0024 15·2	40·488S	174·522E	80·6	2·5	7	5	0·16	53	308
W/200	MAY 08	0010 33·0	40·408S	174·331E	32·1	2·5	6	4	0·11	71	313

NUM	DATE	TIME	LAT	LONG	DEP	MAG	NP	NS	S.E.	DM	GAP
W/201	MAY 09	0628 55·4	40·529S	174·439E	71·8	2·4	9	6	0·15	55	298
W/202	MAY 10	0930 26·6	41·071S	174·103E	58·4	2·3	7	4	0·17	21	294
W/203	MAY 10	1518 48·3	41·794S	174·507E	34·4	2·3	10	8	0·08	25	224
W/204	MAY 11	0929 19·8	40·980S	175·465E	8·5	2·6	9	8	0·32	20	246
W/205	MAY 11	2158 22·4	40·668S	174·551E	76·7	2·7	13	8	0·16	37	284
W/206	MAY 12	1006 26·5	41·711S	174·545E	31·2	2·3	14	9	0·22	28	197
W/207	MAY 12	2013 22·3	41·289S	174·590E	33·6	2·2	11	7	0·06	11	167
W/208	MAY 12	2045 50·3	40·979S	174·759E	35·8	2·7	14	10	0·11	18	168
W/209	MAY 13	0737 00·1	40·679S	175·419E	25·2	2·4	10	7	0·17	48	289
W/210	MAY 13	1259 02·9	41·721S	174·314E	21·8	3·0	10	11	0·12	9	179
W/211	MAY 14	0344 41·3	40·691S	173·997E	68·9	2·4	7	5	0·20	63	306
W/212	MAY 14	0427 19·9	41·369S	174·589E	14·4	2·7	14	11	0·26	18	115
W/213	MAY 14	1432 42·8	41·393S	174·473E	53·2	2·6	19	11	0·11	26	115
W/214	MAY 15	0658 50·0	41·055S	174·937E	28·4	2·5	11	10	0·10	13	110
W/215	MAY 15	2251 23·7	41·275S	174·452E	33·2	2·5	12	8	0·10	16	182
W/216	MAY 16	0246 48·5	40·312S	175·004E	8·7	2·8	11	9	0·12	62	305
W/217	MAY 16	1101 36·9	41·050S	175·477E	18·2	3·4	10	10	0·07	12	237
W/218	MAY 16	1147 02·4	41·044S	175·479E	18·9	2·7	12	9	0·18	13	238
W/219	MAY 16	1217 25·6	41·041S	175·492E	19·7	2·2	11	8	0·14	13	244
W/220	MAY 16	1702 52·8	41·406S	174·898E	14·3	1·9	11	8	0·13	2	168
W/221	MAY 17	1921 44·2	40·990S	175·651E	29·3	2·3	12	9	0·16	23	277
W/222	MAY 17	1925 45·4	40·959S	175·379E	17·0	2·1	12	9	0·21	25	230
W/223	MAY 17	2035 44·7	41·083S	174·869E	31·8	2·3	16	10	0·10	17	114
W/224	MAY 18	0114 31·2	40·894S	174·728E	34·6	2·6	11	10	0·13	16	211
W/225	MAY 18	0817 26·0	41·889S	174·262E	32·5	2·5	10	6	0·12	16	302
W/226	MAY 19	1541 53·1	41·637S	174·622E	33·0	2·7	13	10	0·15	33	181
W/227	MAY 21	0713 33·3	40·459S	174·405E	41·3	2·2	6	4	0·05	62	310
W/228	MAY 21	1232 07·7	41·105S	174·750E	34·4	2·2	13	10	0·10	15	134
W/229	MAY 22	0238 08·7	40·505S	174·416E	43·1	2·4	7	4	0·13	58	306
W/230	MAY 23	0539 26·4	41·616S	174·513E	53·8	2·8	15	10	0·13	29	168
W/231	MAY 23	1046 21·4	41·777S	174·355E	20·0	2·2	7	5	0·10	12	245
W/232	MAY 24	0753 15·9	40·933S	175·125E	32·0	2·2	11	9	0·14	20	196
W/233	MAY 24	1357 56·8	40·894S	174·685E	43·9	2·3	10	8	0·11	19	216
W/234	MAY 25	1621 48·1	41·532S	175·604E	26·2	2·4	10	9	0·13	21	294
W/235	MAY 26	0125 20·9	41·062S	174·644E	57·4	2·5	13	8	0·04	20	241
W/236	MAY 26	0729 45·9	41·597S	174·102E	14·4	2·2	9	7	0·15	20	228
W/237	MAY 28	0809 17·3	40·869S	175·018E	33·0	2·2	9	7	0·15	9	216
W/238	MAY 28	1705 52·3	41·261S	173·708E	88·3	2·6	6	4	0·10	48	339
W/239	MAY 29	0640 52·3	41·035S	174·522E	39·9	2·2	10	7	0·04	27	194
W/240	MAY 30	2154 33·8	41·191S	174·410E	58·8	2·4	7	5	0·08	12	152
W/241	MAY 31	1212 39·0	41·088S	175·190E	24·7	2·5	12	10	0·07	11	150
W/242	JUN 01	1231 27·1	40·667S	174·831E	41·8	2·4	12	10	0·17	23	277
W/243	JUN 03	2356 44·2	40·692S	174·648E	37·2	3·1	10	10	0·17	29	278
W/244	JUN 04	0803 34·3	41·434S	175·567E	18·2	2·6	11	9	0·32	11	282
W/245	JUN 05	0709 36·5	40·923S	174·618E	64·4	2·7	12	10	0·15	26	213
W/246	JUN 07	0840 15·2	40·976S	175·645E	25·0	2·5	11	8	0·13	24	277
W/247	JUN 08	0540 48·9	41·142S	174·832E	52·4	2·0	11	7	0·07	15	112
W/248	JUN 08	2336 04·9	40·629S	174·462E	45·8	2·3	9	6	0·08	46	290
W/249	JUN 09	0025 42·8	40·866S	173·956E	63·9	3·1	10	9	0·24	47	282
W/250	JUN 09	1513 36·3	41·266S	175·090E	20·2	2·0	13	9	0·22	8	87

NUM	DATE	TIME	LAT	LONG	DEP	MAG	NP	NS	S.E.	DM	GAP
W/251	JUN 09	1526 58·5	41·269S	175·105E	21·8	1·8	9	7	0·10	9	126
W/252	JUN 10	0215 10·2	40·875S	175·494E	27·6	2·6	13	9	0·24	32	268
W/253	JUN 10	1233 46·9	40·901S	175·639E	25·9	3·1	11	10	0·14	31	281
W/254	JUN 10	1737 23·0	41·262S	174·225E	38·3		11	8	0·11	7	217
W/255	JUN 11	0457 42·6	40·985S	174·198E	56·9	2·8	10	9	0·19	26	272
W/256	JUN 13	0740 54·6	40·910S	174·871E	53·5	2·0	8	5	0·10	6	158
W/257	JUN 13	0753 11·7	41·300S	174·876E	23·2	2·0	11	9	0·20	9	98
W/258	JUN 13	1128 51·5	40·728S	174·624E	43·8	2·6	9	7	0·12	29	274
W/259	JUN 13	1309 46·0	40·694S	174·588E	41·3	2·1	8	5	0·28	33	280
W/260	JUN 13	1351 55·0	41·353S	174·719E	2·8	1·7	10	8	0·22	8	176
W/261	JUN 14	0416 38·4	41·587S	173·917E	15·1	2·1	7	5	0·08	31	270
W/262	JUN 14	2312 10·0	41·442S	173·864E	49·8	2·5	7	5	0·20	43	336
W/263	JUN 15	2304 14·7	41·304S	173·749E	66·2	3·1	12	10	0·32	45	282
W/264	JUN 16	0843 17·6	41·728S	174·907E	30·3	2·3	11	7	0·09	36	277
W/265	JUN 18	0846 52·4	41·922S	173·959E	13·6	2·7	11	8	0·29	29	314
W/266	JUN 18	1928 50·7	40·898S	175·762E	33·7	2·2	9	7	0·21	36	292
W/267	JUN 19	0209 15·5	41·041S	174·725E	33·5	2·1	9	7	0·09	21	156
W/268	JUN 19	0211 23·6	41·039S	174·721E	34·1	1·8	8	6	0·09	22	158
W/269	JUN 19	1247 11·4	41·154S	174·746E	33·3	1·8	10	7	0·14	9	123
W/270	JUN 20	0259 43·3	41·025S	174·786E	33·6	1·9	7	5	0·20	21	147
W/271	JUN 21	0426 20·0	41·164S	175·118E	27·9	3·2	11	10	0·09	7	117
W/272	JUN 21	0823 01·0	40·972S	175·638E	23·9	2·0	8	6	0·18	24	276
W/273	JUN 21	0826 22·8	41·141S	174·366E	38·8	2·4	9	7	0·14	11	192
W/274	JUN 21	1714 55·3	40·927S	175·231E	26·4	2·2	12	8	0·16	24	214
W/275	JUN 21	2107 50·2	41·708S	174·544E	32·7	3·3	12	11	0·16	28	196
W/276	JUN 22	1503 42·6	41·253S	175·162E	24·9	2·2	15	10	0·18	14	96
W/277	JUN 22	2222 31·0	41·769S	174·194E	13·6	3·1	9	8	0·12	3	299
W/278	JUN 23	0737 13·2	40·514S	174·514E	42·5	2·2	8	5	0·10	51	305
W/279	JUN 23	1005 28·8	41·692S	174·963E	30·4	2·2	11	7	0·14	39	263
W/280	JUN 23	1943 33·2	40·902S	174·913E	35·0	2·1	10	8	0·04	26	243
W/281	JUN 23	2009 13·8	40·491S	173·926E	33·0	2·7	8	6	0·19	85	317
W/282	JUN 25	1009 11·1	41·595S	174·656E	33·4	2·4	12	10	0·10	27	253
W/283	JUN 25	1630 39·1	40·672S	174·027E	71·2	3·7	11	11	0·15	64	294
W/284	JUN 25	2005 09·7	41·372S	174·997E	26·3	2·6	11	10	0·08	11	144
W/285	JUN 25	2228 47·3	41·446S	174·341E	58·4	2·4	7	5	0·07	26	276
W/286	JUN 26	0247 57·9	40·681S	174·550E	70·9	2·3	8	6	0·14	37	283
W/287	JUN 26	0708 09·9	41·633S	174·765E	30·3	2·4	13	9	0·12	39	255
W/288	JUN 26	0901 32·1	40·904S	175·795E	33·1	2·6	8	7	0·23	38	294
W/289	JUN 26	1231 49·1	40·870S	173·912E	76·1	2·8	7	6	0·10	49	309
W/290	JUN 27	0420 03·1	41·638S	174·518E	51·4	2·3	10	7	0·20	39	280
W/291	JUN 27	0541 19·0	41·710S	174·977E	30·3	2·5	11	8	0·16	35	265
W/292	JUN 27	1043 18·9	41·660S	175·185E	40·5	2·3	13	9	0·10	27	266
W/293	JUN 27	1105 36·5	41·123S	174·635E	62·6	2·3	12	8	0·08	13	147
W/294	JUN 27	1637 40·8	41·114S	174·623E	48·6	3·1	11	10	0·07	15	152
W/295	JUN 28	0218 15·6	41·028S	174·094E	54·6	2·4	8	6	0·18	26	291
W/296	JUN 28	1307 03·6	40·717S	174·821E	14·4	2·1	11	7	0·17	18	271
W/297	JUN 28	1547 37·0	41·459S	175·304E	16·4	2·2	12	8	0·13	6	224
W/298	JUN 29	0112 53·6	41·408S	175·360E	17·7	1·9	14	8	0·09	9	196
W/299	JUN 29	1623 47·0	41·411S	175·001E	23·7	3·2	12	11	0·11	11	147
W/300	JUN 30	0220 13·2	40·629S	174·333E	49·3	2·9	6	6	0·18	55	294

NUM	DATE	TIME	LAT	LONG	DEP	MAG	NP	NS	S.E.	DM	GAP
W/301	JUN 30	0900 51·4	41·348S	175·593E	23·9	2·2	12	8	0·11	10	274
W/302	JUN 30	1735 35·8	40·391S	174·610E	54·9	2·8	7	5	0·04	58	317
W/303	JUN 30	2114 25·5	40·459S	174·664E	22·9	2·5	8	6	0·24	50	297
W/304	JUL 01	0153 31·8	40·856S	174·726E	15·6	1·9	9	5	0·09	16	229
W/305	JUL 01	1132 46·1	41·518S	174·969E	23·2	2·4	9	8	0·11	15	234
W/306	JUL 02	0127 06·6	40·938S	174·649E	57·9	2·7	7	7	0·05	24	204
W/307	JUL 02	1340 26·2	41·228S	175·059E	21·3	2·3	9	8	0·05	7	117
W/308	JUL 02	1620 17·5	41·533S	175·028E	31·4	2·5	9	6	0·14	19	255
W/309	JUL 03	1252 17·8	40·749S	174·524E	61·7	2·3	8	5	0·09	35	269
W/310	JUL 03	1836 35·3	41·900S	174·503E	31·4	2·5	10	7	0·18	29	259
W/311	JUL 04	1008 03·0	40·692S	174·638E	44·3	2·4	10	7	0·08	30	278
W/312	JUL 06	0910 29·8	40·674S	174·442E	71·0	2·6	8	6	0·07	45	285
W/313	JUL 06	1404 08·2	41·357S	174·796E	47·6	2·4	14	10	0·09	9	96
W/314	JUL 07	0504 35·4	41·314S	175·102E	37·6	2·4	14	10	0·08	10	107
W/315	JUL 07	0518 05·6	40·833S	174·686E	42·9	4·7	12	12	0·12	19	241
W/316	JUL 07	0524 19·2	40·811S	174·661E	45·6	2·7	12	10	0·09	22	250
W/317	JUL 07	0624 37·2	40·858S	174·678E	41·9	2·9	12	10	0·19	20	232
W/318	JUL 08	0035 13·1	41·360S	174·490E	47·0	3·5	1	1	ND	25	360
W/319	JUL 08	0921 46·3	40·963S	175·043E	39·5	2·3	11	8	0·12	16	165
W/320	JUL 08	1454 46·4	41·451S	174·029E	39·0	2·6	10	8	0·12	34	243
W/321	JUL 09	1940 49·4	41·277S	173·981E	56·1	3·1	10	9	0·12	26	260
W/322	JUL 11	2134 36·6	40·616S	174·835E	14·9	2·4	8	6	0·12	28	282
W/323	JUL 12	0204 39·7	41·603S	174·363E	17·9	2·4	9	7	0·11	20	141
W/324	JUL 12	2041 29·3	41·685S	174·171E	12·8	2·3	9	6	0·11	8	218
W/325	JUL 13	1600 54·9	40·997S	174·770E	32·3	2·1	12	8	0·08	19	159
W/326	JUL 13	2023 35·0	40·454S	174·258E	29·6	2·4	10	5	0·05	72	311
W/327	JUL 14	0201 59·1	40·889S	174·735E	56·1	2·5	11	9	0·07	15	212
W/328	JUL 14	0622 23·7	40·832S	174·210E	57·5	2·3	8	6	0·11	43	281
W/329	JUL 14	0951 47·1	41·244S	175·353E	29·8	3·2	10	10	0·13	16	94
W/330	JUL 14	1243 50·0	41·515S	174·974E	23·7	2·0	14	10	0·08	15	231
W/331	JUL 14	1719 11·6	40·518S	174·410E	25·4	3·1	10	10	0·16	57	300
W/332	JUL 15	0757 06·8	40·972S	174·580E	61·8	2·5	13	10	0·06	30	203
W/333	JUL 15	2127 11·0	40·988S	175·594E	28·7	2·7	11	10	0·09	21	270
W/334	JUL 15	2131 27·4	40·819S	174·674E	44·4	3·7	12	11	0·12	21	247
W/335	JUL 16	1517 20·4	40·879S	174·886E	33·7	2·6	11	10	0·15	3	178
W/336	JUL 17	1238 37·2	41·081S	174·578E	59·0	3·2	14	12	0·08	20	169
W/337	JUL 17	1325 48·2	41·199S	174·727E	30·9	2·0	11	9	0·07	4	116
W/338	JUL 20	1304 49·0	41·160S	174·916E	16·7	2·3	12	10	0·12	14	95
W/339	JUL 20	1353 02·5	41·160S	174·912E	16·9	1·9	11	10	0·16	14	97
W/340	JUL 20	2048 15·9	40·968S	174·519E	63·4	2·2	10	6	0·10	33	214
W/341	JUL 20	2307 52·4	41·566S	174·687E	30·4	2·3	12	8	0·15	23	248
W/342	JUL 21	0236 56·5	41·589S	174·444E	49·1	3·2	11	11	0·18	26	151
W/343	JUL 21	1030 24·1	40·630S	174·528E	45·0	2·6	8	6	0·17	42	288
W/344	JUL 22	0252 19·8	41·908S	174·018E	17·7	2·9	11	10	0·33	24	312
W/345	JUL 22	0618 29·4	41·543S	175·178E	41·7	2·4	12	9	0·14	15	244
W/346	JUL 22	0746 49·3	40·584S	174·818E	35·0	2·3	10	6	0·19	32	285
W/347	JUL 23	0542 30·7	40·781S	174·456E	82·8	2·6	13	10	0·14	40	267
W/348	JUL 23	1120 10·7	41·167S	175·103E	27·8	2·3	12	10	0·14	7	114
W/349	JUL 23	1637 27·5	41·298S	175·209E	23·8	2·0	11	7	0·13	14	107
W/350	JUL 23	1647 01·5	40·997S	175·545E	29·8	2·4	10	10	0·06	18	263

NUM	DATE	TIME	LAT	LONG	DEP	MAG	NP	NS	S.E.	DM	GAP
W/351	JUL 23	2253 57·3	40·937S	174·646E	37·8	2·3	10	8	0·09	24	205
W/352	JUL 24	1340 38·7	41·677S	174·514E	33·3	2·4	8	7	0·11	42	284
W/353	JUL 25	0331 10·7	41·387S	175·096E	20·4	2·0	12	9	0·11	14	155
W/354	JUL 25	0354 25·3	41·391S	175·095E	19·9	2·1	11	9	0·10	14	160
W/355	JUL 25	0457 00·7	41·392S	175·098E	19·8	2·1	10	9	0·08	13	160
W/356	JUL 26	1527 09·3	40·959S	175·414E	19·7	2·2	6	5	0·11	23	238
W/357	JUL 26	1548 46·6	41·333S	174·514E	52·4	2·4	6	4	0·07	20	309
W/358	JUL 27	1247 22·3	41·086S	174·703E	33·3	2·3	12	10	0·06	16	148
W/359	JUL 28	0905 48·4	41·512S	175·512E	27·9	2·2	10	8	0·18	16	283
W/360	JUL 30	1949 05·4	41·798S	174·143E	12·9	3·0	11	11	0·22	8	303
W/361	AUG 01	1725 38·0	40·580S	174·809E	28·8	2·2	8	7	0·11	33	286
W/362	AUG 02	1620 37·1	41·610S	173·734E	42·6	2·4	8	6	0·27	63	334
W/363	AUG 03	0437 56·7	40·964S	174·783E	5·0	2·2	8	7	0·18	15	167
W/364	AUG 03	2015 38·4	41·300S	173·766E	69·4	3·3	10	10	0·30	44	281
W/365	AUG 05	0801 23·1	40·500S	174·817E	2·0	2·9	10	9	0·16	41	292
W/366	AUG 05	0935 43·7	41·052S	175·281E	24·9	2·2	11	8	0·16	19	179
W/367	AUG 05	1218 58·9	41·050S	175·273E	22·2	2·4	10	9	0·14	18	178
W/368	AUG 05	1928 30·6	41·042S	175·287E	25·3	2·4	11	9	0·15	20	184
W/369	AUG 05	2331 53·2	41·724S	174·456E	31·1	3·1	12	11	0·17	20	196
W/370	AUG 06	0105 27·0	40·990S	175·909E	28·4	2·4	13	9	0·16	39	302
W/371	AUG 06	2029 23·2	41·133S	174·814E	50·0	2·5	12	10	0·05	14	116
W/372	AUG 08	0903 11·4	41·060S	174·190E	49·8	2·5	8	7	0·10	19	274
W/373	AUG 09	1030 34·9	41·698S	173·615E	41·2	2·7	7	7	0·13	77	336
W/374	AUG 10	1340 11·2	41·660S	174·216E	18·7	2·9	13	11	0·21	10	186
W/375	AUG 10	1639 58·6	41·369S	174·010E	40·0	2·5	10	9	0·17	28	254
W/376	AUG 11	0329 38·2	41·704S	174·168E	11·4	2·4	9	7	0·17	7	227
W/377	AUG 11	1201 04·0	41·015S	174·056E	58·6	3·6	9	8	0·09	29	297
W/378	AUG 12	0015 47·3	40·483S	174·665E	71·4	3·2	10	9	0·10	47	304
W/379	AUG 12	0058 28·4	41·463S	173·847E	44·5	2·3	7	6	0·07	45	334
W/380	AUG 12	1308 32·7	41·729S	173·948E	17·8	2·7	9	8	0·19	23	290
W/381	AUG 12	1641 06·5	41·784S	173·736E	13·9	2·8	9	8	0·11	40	311
W/382	AUG 12	1724 59·2	41·674S	173·843E	7·7	2·6	8	7	0·18	32	289
W/383	AUG 12	2237 54·7	41·394S	174·994E	24·6	2·1	9	6	0·11	10	250
W/384	AUG 13	0202 58·8	40·312S	174·553E	58·2	3·4	6	7	0·04	68	314
W/385	AUG 13	1032 41·3	41·070S	174·003E	63·4	2·4	7	6	0·14	28	309
W/386	AUG 13	2103 11·2	40·519S	174·356E	27·4	2·5	7	6	0·05	61	304
W/387	AUG 14	0811 10·7	40·870S	174·512E	70·8	2·6	14	11	0·10	34	242
W/388	AUG 14	1551 28·5	41·128S	173·977E	62·7	3·7	12	11	0·18	27	266
W/389	AUG 14	1902 31·6	41·171S	173·951E	57·4	2·3	7	6	0·06	28	327
W/390	AUG 15	1404 00·0	41·117S	173·986E	62·1	3·2	9	9	0·25	27	265
W/391	AUG 15	1406 46·4	40·268S	174·776E	19·2	2·7	8	7	0·02	67	306
W/392	AUG 15	1815 49·1	41·399S	175·459E	17·0	2·5	10	8	0·17	4	248
W/393	AUG 15	2234 04·1	41·127S	175·145E	13·2	4·2	12	11	0·14	7	131
W/394	AUG 15	2337 36·1	41·121S	175·151E	14·0	1·9	13	9	0·11	7	133
W/395	AUG 16	2322 03·0	40·794S	175·330E	27·0	3·2	10	10	0·12	36	263
W/396	AUG 17	0014 21·4	41·123S	175·150E	15·1	2·9	11	10	0·14	7	133
W/397	AUG 17	0419 04·3	40·863S	174·709E	13·0	3·6	11	11	0·13	17	227
W/398	AUG 17	0508 04·8	40·881S	174·720E	11·9	2·2	9	7	0·16	16	218
W/399	AUG 17	1006 47·1	40·666S	174·728E	5·0	2·6	9	8	0·27	27	278
W/400	AUG 17	1615 04·2	40·756S	175·350E	26·3	2·2	11	9	0·15	39	272

NUM	DATE	TIME	LAT	LONG	DEP	MAG	NP	NS	S.E.	DM	GAP
W/401	AUG 17	1913 13·7	41·029S	174·839E	26·1	1·9	11	10	0·08	19	132
W/402	AUG 17	2156 09·3	40·922S	175·416E	25·4	2·4	12	10	0·15	27	246
W/403	AUG 19	0933 19·3	40·443S	174·886E	44·4	3·1	7	7	0·08	47	317
W/404	AUG 19	2306 59·1	41·210S	175·399E	17·9	2·7	11	10	0·13	10	104
W/405	AUG 22	0426 44·1	41·442S	174·970E	19·9	2·6	10	8	0·11	9	208
W/406	AUG 22	0845 43·2	40·939S	174·653E	41·6	2·3	7	5	0·08	23	203
W/407	AUG 22	1428 24·5	40·942S	174·671E	38·5	2·4	9	8	0·06	22	199
W/408	AUG 25	0828 24·3	41·011S	174·487E	61·6	2·0	10	7	0·07	29	208
W/409	AUG 25	1900 18·6	41·064S	174·540E	33·1	2·4	13	10	0·11	23	182
W/410	AUG 27	1408 28·7	41·950S	174·029E	12·7	2·6	10	9	0·30	27	312
W/411	AUG 28	2040 45·6	41·268S	174·443E	37·6	3·4	10	10	0·09	15	179
W/412	AUG 29	0305 42·3	41·133S	174·932E	29·1	2·3	11	10	0·12	12	96
W/413	AUG 31	2111 05·5	40·478S	174·898E	25·7	2·5	10	9	0·17	43	293
W/414	AUG 31	2337 19·5	41·003S	174·747E	32·6	2·6	11	10	0·11	21	163
W/415	SEP 01	0156 01·2	40·970S	174·687E	42·5	2·3	11	8	0·18	22	186
W/416	SEP 01	0813 46·6	40·419S	174·533E	72·4	2·6	11	8	0·08	59	301
W/417	SEP 02	1502 34·5	41·172S	174·565E	32·8	2·8	12	10	0·12	14	142
W/418	SEP 03	0659 43·3	41·766S	173·980E	40·8	2·6	11	9	0·20	20	297
W/419	SEP 03	0838 13·9	41·135S	173·767E	67·5	2·5	7	6	0·16	44	331
W/420	SEP 03	0848 35·6	40·330S	174·917E	31·6	2·5	8	6	0·29	59	303
W/421	SEP 04	1415 28·5	41·122S	174·881E	26·5	1·9	9	8	0·04	16	106
W/422	SEP 05	1913 42·4	41·200S	174·566E	33·8	3·4	12	11	0·08	12	132
W/423	SEP 06	1231 16·0	40·899S	174·593E	68·0	2·3	9	7	0·10	27	225
W/424	SEP 07	0356 05·7	41·004S	175·590E	27·5	3·1	11	10	0·12	19	268
W/425	SEP 08	1458 18·7	41·480S	175·060E	21·9	2·1	10	7	0·08	17	226
W/426	SEP 09	1406 22·7	40·333S	174·854E	12·0	3·4	9	9	0·30	59	303
W/427	SEP 10	0239 14·6	40·998S	174·648E	57·3	2·3	13	9	0·11	26	183
W/428	SEP 10	0355 54·6	41·661S	173·879E	12·7	2·3	10	8	0·24	30	284
W/429	SEP 13	0756 49·1	40·885S	175·470E	23·6	2·6	12	9	0·16	31	262
W/430	SEP 13	1931 00·2	41·064S	174·397E	56·4	2·4	8	5	0·05	19	212
W/431	SEP 13	2356 43·3	41·574S	174·185E	12·2	4·1	11	11	0·36	20	199
W/432	SEP 14	0531 11·1	40·963S	175·508E	31·1	2·4	12	10	0·10	22	259
W/433	SEP 14	1122 07·3	41·307S	174·631E	31·9	2·7	11	10	0·09	10	170
W/434	SEP 17	0239 05·4	41·154S	174·655E	31·4	2·5	9	9	0·07	10	136
W/435	SEP 17	1254 16·4	41·351S	174·313E	72·6	2·3	7	7	0·07	16	250
W/436	SEP 18	0213 08·8	40·541S	174·406E	58·8	2·9	7	7	0·08	56	299
W/437	SEP 18	0704 52·4	40·968S	174·480E	10·1	2·7	10	9	0·07	32	221
W/438	SEP 21	1520 20·3	40·993S	174·859E	31·1	2·5	10	8	0·10	15	134
W/439	SEP 22	1215 10·4	41·158S	174·993E	22·7	1·9	9	6	0·17	8	131
W/440	SEP 23	0358 12·6	41·490S	174·388E	33·5	2·1	8	7	0·08	32	259
W/441	SEP 23	2055 30·6	41·445S	174·228E	24·5	2·0	9	6	0·24	26	187
W/442	SEP 24	0529 18·4	41·576S	173·894E	8·5	2·3	7	5	0·19	33	295
W/443	SEP 25	0754 58·5	41·261S	174·350E	60·6	2·2	9	7	0·18	8	216
W/444	SEP 25	0945 43·4	41·458S	174·547E	31·3	1·9	8	7	0·09	27	234
W/445	SEP 25	1028 56·7	41·350S	175·083E	37·4	2·2	14	9	0·07	12	129
W/446	SEP 26	0718 57·5	41·284S	175·276E	25·7	2·0	12	8	0·08	15	87
W/447	SEP 26	1507 57·1	41·039S	174·903E	55·9	2·3	9	6	0·05	16	112
W/448	SEP 26	1911 27·4	41·154S	174·872E	23·8	2·4	8	6	0·25	16	171
W/449	SEP 27	0713 55·6	41·705S	174·098E	17·2	3·4	11	11	0·28	11	258
W/450	SEP 27	1307 57·3	41·070S	173·922E	70·1	3·1	8	7	0·08	34	317

NUM	DATE	TIME	LAT	LONG	DEP	MAG	NP	NS	S.E.	DM	GAP
W/451	SEP 27	1427 42·2	41·174S	173·978E	62·0	2·5	9	6	0·11	25	317
W/452	SEP 29	0704 55·0	41·145S	173·837E	65·2	2·3	6	5	0·06	38	329
W/453	SEP 29	0750 02·3	41·076S	174·242E	53·1	2·6	6	6	0·09	16	259
W/454	SEP 30	1005 15·8	41·964S	173·893E	11·5	3·5	10	10	0·25	36	317
W/455	SEP 30	1101 49·3	41·591S	174·211E	14·6	2·3	7	7	0·13	18	189
W/456	OCT 01	0054 12·9	41·031S	175·308E	28·5	2·2	8	6	0·12	22	192
W/457	OCT 01	1109 21·7	41·565S	174·671E	32·6	2·2	7	6	0·12	32	281
W/458	OCT 01	1109 39·8	41·596S	174·657E	31·7	2·7	10	9	0·11	36	253
W/459	OCT 01	2211 37·9	41·507S	174·340E	31·5	2·6	7	7	0·09	33	268
W/460	OCT 01	2214 37·5	41·583S	174·294E	29·2	2·9	9	9	0·13	20	159
W/461	OCT 02	2038 02·6	40·927S	175·570E	28·8	2·9	8	7	0·12	26	272
W/462	OCT 03	1657 16·1	40·620S	174·269E	53·2	2·4	8	5	0·18	61	297
W/463	OCT 05	0431 22·0	41·309S	174·511E	33·4	3·0	10	10	0·15	18	104
W/464	OCT 05	0447 52·5	41·364S	175·105E	26·9	2·7	8	8	0·09	14	165
W/465	OCT 05	0910 02·7	40·821S	174·821E	18·1	2·2	6	5	0·07	9	256
W/466	OCT 06	0252 08·3	41·352S	175·098E	24·1	2·1	10	8	0·24	13	161
W/467	OCT 06	1014 17·0	41·223S	175·746E	27·6	2·5	8	8	0·16	22	295
W/468	OCT 06	1245 34·2	41·688S	174·351E	29·9	2·3	7	5	0·06	53	294
W/469	OCT 06	1611 44·5	41·336S	174·989E	27·1	2·5	9	9	0·05	7	169
W/470	OCT 08	0831 00·8	41·021S	174·502E	55·1	2·1	7	7	0·05	29	201
W/471	OCT 08	2320 02·0	40·766S	175·337E	26·0	2·6	11	8	0·15	37	269
W/472	OCT 09	0812 21·5	41·286S	175·259E	21·8	1·8	11	9	0·23	15	92
W/473	OCT 09	1041 36·8	41·450S	174·667E	57·4	4·1	10	10	0·05	20	141
W/474	OCT 09	1109 26·4	41·443S	174·684E	50·8	2·3	12	8	0·10	21	220
W/475	OCT 09	1110 35·4	41·456S	174·677E	53·6	3·2	11	10	0·07	20	143
W/476	OCT 10	1613 45·1	41·513S	174·169E	12·0	2·3	7	6	0·23	27	230
W/477	OCT 11	1736 19·5	40·525S	174·904E	12·0	2·2	5	4	0·32	38	336
W/478	OCT 12	0003 59·4	40·541S	174·934E	12·0	2·6	5	4	0·34	36	336
W/479	OCT 12	1253 22·6	41·679S	174·168E	16·5	3·0	8	8	0·08	9	242
W/480	OCT 13	1235 32·9	41·088S	175·524E	27·5	3·4	7	7	0·08	8	257
W/481	OCT 13	1323 43·4	41·131S	174·756E	34·0	2·9	6	6	0·05	12	127
W/482	OCT 14	0931 18·0	41·025S	173·783E	82·9	2·5	6	5	0·04	46	323
W/483	OCT 14	1800 31·2	41·014S	174·175E	52·8	2·5	7	5	0·11	24	276
W/484	OCT 14	2231 35·0	41·502S	173·736E	68·7	3·0	7	6	0·26	49	290
W/485	OCT 15	0307 34·8	41·288S	175·166E	23·7	2·6	8	8	0·06	16	116
W/486	OCT 15	0937 44·4	41·504S	174·476E	23·2	2·4	8	7	0·25	34	152
W/487	OCT 17	1208 32·2	41·896S	174·923E	31·8	2·6	9	8	0·17	59	247
W/488	OCT 18	1132 54·3	41·403S	175·062E	24·7	1·9	10	8	0·07	16	191
W/489	OCT 18	1610 52·3	41·283S	175·018E	26·3	2·2	8	8	0·05	3	149
W/490	OCT 19	1255 02·8	41·342S	174·840E	28·9	1·8	10	7	0·06	17	182
W/491	OCT 19	2311 46·7	41·336S	174·565E	45·7	2·1	10	7	0·09	16	199
W/492	OCT 20	0604 09·3	41·188S	173·938E	75·1	2·6	5	5	0·04	28	328
W/493	OCT 21	1446 13·9	41·363S	174·532E	33·7	2·6	8	8	0·11	20	115
W/494	OCT 22	0312 06·0	41·171S	174·867E	29·0	1·9	10	7	0·08	15	112
W/495	OCT 22	0732 46·3	41·040S	174·263E	50·5	3·4	9	9	0·15	19	248
W/496	OCT 22	2343 10·6	41·262S	174·098E	54·8	2·3	6	5	0·18	16	324
W/497	OCT 23	1820 09·9	40·614S	175·142E	34·3	2·7	7	7	0·30	34	286
W/498	OCT 24	1200 07·4	40·796S	174·283E	52·4	2·4	6	4	0·07	46	277
W/499	OCT 25	0642 06·1	40·437S	174·814E	32·5	2·4	6	4	0·25	48	322
W/500	OCT 25	1020 31·5	41·347S	175·102E	24·3	1·9	8	6	0·28	13	158

NUM	DATE	TIME	LAT	LONG	DEP	MAG	NP	NS	S.E.	DM	GAP
W/501	OCT 25	1350 36·4	41·300S	174·418E	58·5	2·6	8	5	0·17	15	112
W/502	OCT 25	1430 18·2	41·243S	175·298E	26·8	2·5	9	7	0·17	19	100
W/503	OCT 25	2210 03·7	40·447S	174·755E	34·1	2·4	7	5	0·21	48	297
W/504	OCT 26	1438 17·5	40·983S	175·368E	25·7	2·5	8	7	0·05	23	221
W/505	OCT 28	0352 32·5	40·627S	174·413E	56·1	2·9	8	6	0·05	50	292
W/506	OCT 28	1105 31·4	40·833S	174·745E	17·5	2·1	8	5	0·11	15	241
W/507	OCT 28	1117 35·0	41·215S	174·847E	27·5	2·9	9	9	0·06	10	98
W/508	OCT 28	1635 38·7	41·421S	174·008E	44·1	3·1	8	7	0·26	32	249
W/509	OCT 30	1033 50·8	41·318S	175·003E	26·8	2·2	11	9	0·17	6	161
W/510	OCT 31	0419 56·4	40·992S	175·322E	22·6	2·3	12	8	0·14	24	209
W/511	NOV 01	1617 35·2	41·219S	175·284E	24·2	2·0	12	8	0·10	19	109
W/512	NOV 01	2353 16·8	40·833S	174·881E	10·3	1·8	7	6	0·23	4	255
W/513	NOV 01	2358 44·7	41·018S	174·832E	27·8	2·5	10	8	0·08	18	136
W/514	NOV 02	2244 14·7	41·044S	174·924E	32·1	2·3	12	8	0·26	14	108
W/515	NOV 03	0009 08·3	40·935S	175·467E	12·9	3·6	8	8	0·13	25	254
W/516	NOV 03	0409 08·9	41·035S	174·579E	34·4	1·9	8	6	0·05	24	184
W/517	NOV 03	1758 12·0	41·237S	174·519E	34·6	2·2	11	9	0·10	16	168
W/518	NOV 03	2316 12·8	41·041S	175·571E	28·8	2·9	10	9	0·11	14	263
W/519	NOV 04	0939 28·8	41·799S	173·646E	57·2	3·2	12	10	0·26	48	315
W/520	NOV 04	1044 14·7	41·027S	175·171E	25·0	2·1	13	8	0·17	13	168
W/521	NOV 04	1307 43·4	40·542S	174·318E	66·3	2·8	10	8	0·08	62	302
W/522	NOV 05	1348 18·7	41·418S	174·616E	20·3	2·8	11	10	0·23	19	131
W/523	NOV 06	0132 53·8	40·945S	175·732E	29·8	3·2	8	8	0·16	31	309
W/524	NOV 06	1022 32·0	40·199S	174·455E	33·0	2·5	7	6	0·24	83	313
W/525	NOV 06	1552 50·2	41·232S	174·354E	10·4	2·0	8	7	0·27	7	181
W/526	NOV 07	1108 55·8	41·123S	173·857E	70·3	2·8	5	4	0·03	37	326
W/527	NOV 08	0331 25·8	40·942S	174·506E	56·6	2·2	8	5	0·15	35	223
W/528	NOV 08	0438 28·0	41·505S	175·561E	23·4	2·2	12	8	0·27	17	293
W/529	NOV 08	1218 46·3	41·469S	174·384E	34·0	2·5	12	9	0·27	30	138
W/530	NOV 09	2040 29·2	41·362S	173·827E	52·1	2·9	7	5	0·11	41	335
W/531	NOV 10	0745 32·6	41·608S	174·331E	16·0	2·3	11	8	0·21	19	143
W/532	NOV 10	0751 08·2	41·607S	174·338E	15·3	2·4	10	7	0·22	19	141
W/533	NOV 10	1939 59·6	41·994S	174·813E	32·5	2·7	11	9	0·11	56	259
W/534	NOV 10	1940 59·9	41·971S	174·800E	32·7	2·6	13	9	0·13	54	257
W/535	NOV 10	2130 50·6	40·702S	174·247E	67·0	3·5	9	9	0·15	57	287
W/536	NOV 11	0402 29·9	40·970S	175·383E	24·7	2·8	9	8	0·11	23	229
W/537	NOV 11	0813 18·9	41·089S	174·724E	32·8	2·0	7	5	0·13	16	142
W/538	NOV 12	0604 53·6	40·833S	175·478E	19·8	2·1	10	8	0·17	36	271
W/539	NOV 12	2056 16·7	41·413S	174·596E	13·3	4·7	7	7	0·11	22	129
W/540	NOV 12	2104 14·3	41·359S	174·596E	21·5	3·1	9	9	0·23	17	204
W/541	NOV 13	1047 07·3	41·835S	174·405E	30·0	2·5	8	5	0·10	18	263
W/542	NOV 15	1408 19·3	40·651S	174·326E	46·0	2·2	8	5	0·22	55	292
W/543	NOV 15	1534 17·8	41·252S	175·173E	22·9	1·8	11	8	0·07	15	102
W/544	NOV 16	0845 24·4	40·652S	174·862E	5·0	2·6	8	8	0·19	24	278
W/545	NOV 17	1228 49·3	41·398S	173·969E	45·3	2·1	8	6	0·13	33	260
W/546	NOV 18	0251 25·8	41·026S	174·167E	51·9	3·5	10	9	0·11	23	257
W/547	NOV 18	1044 23·8	41·610S	174·654E	33·1	2·0	10	8	0·18	42	255
W/548	NOV 21	1017 01·9	41·621S	174·055E	15·2	4·2	11	10	0·26	20	245
W/549	NOV 21	1021 37·5	41·624S	174·094E	15·3	2·5	9	7	0·25	17	234
W/550	NOV 22	2214 10·2	40·583S	175·023E	27·7	2·2	7	6	0·08	33	286

NUM	DATE	TIME	LAT	LONG	DEP	MAG	NP	NS	S.E.	DM	GAP
W/551	NOV 23	0454 50·7	40·964S	174·614E	53·5	2·9	9	8	0·10	27	200
W/552	NOV 24	0538 30·4	41·304S	174·841E	28·8	2·6	10	9	0·11	6	171
W/553	NOV 24	1035 05·7	40·973S	175·635E	29·4	2·5	9	9	0·18	24	276
W/554	NOV 25	0439 01·1	40·974S	174·345E	40·6	2·5	6	5	0·07	27	244
W/555	NOV 25	0519 15·4	41·505S	174·292E	19·7	2·2	4	3	ND	32	309
W/556	NOV 26	0133 47·5	40·943S	175·158E	26·6	2·3	8	7	0·15	20	197
W/557	NOV 26	0259 50·0	41·690S	174·616E	28·9	2·2	5	4	0·01	51	301
W/558	NOV 26	0352 54·8	41·375S	175·608E	17·3	2·2	9	7	0·25	11	293
W/559	NOV 27	0133 25·9	41·260S	175·496E	25·2	2·4	10	8	0·14	11	185
W/560	NOV 27	1222 49·7	40·894S	174·937E	50·9	2·4	10	7	0·11	4	154
W/561	NOV 27	2356 29·6	41·496S	174·484E	24·2	2·2	8	6	0·14	35	248
W/562	NOV 28	0215 02·0	41·784S	174·308E	20·7	2·4	10	9	0·27	8	231
W/563	NOV 28	0241 45·2	41·779S	174·360E	14·3	1·8	8	7	0·11	12	230
W/564	NOV 28	0722 30·8	41·258S	174·845E	26·3	2·6	10	8	0·11	7	126
W/565	NOV 28	1441 48·5	41·624S	174·098E	14·6	2·6	7	6	0·15	17	233
W/566	NOV 28	1452 25·2	40·674S	174·230E	46·8	2·4	8	4	0·35	60	294
W/567	NOV 28	2223 20·9	41·828S	173·874E	67·2	4·4	10	9	0·21	30	313
W/568	NOV 28	2225 51·2	41·828S	173·874E	67·2	3·1	1	1	ND	76	360
W/569	NOV 30	0143 05·7	41·119S	174·504E	40·2	2·1	9	6	0·08	21	170
W/570	NOV 30	1751 01·2	41·231S	175·562E	18·3	2·0	7	6	0·08	9	239
W/571	NOV 30	1933 40·5	40·968S	175·493E	26·8	2·3	9	7	0·13	21	255
W/572	DEC 01	0956 26·6	40·891S	175·705E	26·6	2·4	10	7	0·24	34	288
W/573	DEC 01	2040 17·1	40·949S	175·656E	23·4	2·1	8	6	0·16	27	280
W/574	DEC 01	2244 09·3	41·625S	174·651E	32·1	2·7	10	8	0·23	39	257
W/575	DEC 02	2141 02·0	41·646S	174·555E	34·0	2·0	7	5	0·16	48	267
W/576	DEC 02	2257 55·2	40·982S	174·744E	30·5	1·9	6	3	0·06	19	170
W/577	DEC 03	0530 42·3	41·572S	174·149E	14·7	2·4	7	6	0·25	21	211
W/578	DEC 05	1339 07·8	41·017S	174·645E	31·9	2·2	12	8	0·16	24	178
W/579	DEC 05	1446 46·7	41·022S	175·296E	32·4	2·0	9	6	0·23	21	194
W/580	DEC 07	1114 42·9	41·928S	174·628E	33·8	2·5	8	7	0·19	39	257
W/581	DEC 07	1443 29·9	40·904S	175·698E	28·2	2·9	8	7	0·29	33	286
W/582	DEC 07	1543 55·2	40·850S	174·747E	50·3	2·1	9	6	0·11	14	233
W/583	DEC 10	0354 26·9	41·061S	174·714E	60·1	2·3	9	5	0·05	19	152
W/584	DEC 12	2039 18·5	41·000S	175·321E	22·9	2·4	9	7	0·15	23	207
W/585	DEC 14	1329 24·2	41·967S	174·195E	20·1	3·5	8	8	0·19	84	307
W/586	DEC 14	1950 46·5	41·010S	175·351E	23·9	2·4	9	7	0·11	21	209
W/587	DEC 15	1927 52·4	40·902S	175·703E	30·8	2·6	10	7	0·12	33	287
W/588	DEC 16	0923 33·3	40·851S	174·963E	41·7	2·4	11	8	0·17	5	235
W/589	DEC 16	1235 29·2	40·733S	174·156E	60·4	2·3	6	5	0·05	54	294
W/590	DEC 17	1246 25·5	40·868S	175·553E	22·6	2·1	11	8	0·20	33	277
W/591	DEC 17	1718 38·6	40·980S	174·384E	67·0	2·6	8	6	0·05	27	235
W/592	DEC 18	1001 26·8	41·620S	175·343E	13·5	3·8	10	10	0·14	23	239
W/593	DEC 18	1014 34·0	40·723S	174·250E	76·8	2·4	6	5	0·10	54	288
W/594	DEC 18	1128 04·9	40·926S	175·569E	29·8	2·3	9	7	0·11	26	272
W/595	DEC 18	1538 07·3	41·690S	174·520E	31·7	2·4	12	8	0·16	26	189
W/596	DEC 18	2122 21·2	41·634S	174·147E	33·2	2·7	10	8	0·38	14	217
W/597	DEC 19	0746 41·1	41·110S	174·419E	32·9	2·2	6	5	0·08	17	191
W/598	DEC 20	0719 50·5	40·750S	174·456E	47·7	2·6	7	6	0·13	41	272
W/599	DEC 22	0500 15·6	41·732S	174·209E	14·6	2·1	7	5	0·10	2	203
W/600	DEC 22	1606 49·7	41·234S	173·792E	69·5	2·9	8	7	0·26	41	279

NUM	DATE	TIME	LAT	LONG	DEP	MAG	NP	NS	S.E.	DM	GAP
W/601	DEC 22	1927 53·8	40·587S	174·850E	3·4	2·3	7	6	0·18	31	284

Wellington Net data for the remainder of 1986 were processed using the CUSP suite of computer programs. One change introduced with the new system is that solutions can be restricted to a depth selected by the analyst. Where this has been done the depth is followed by the letter 'R'.

NUM	DATE	TIME	LAT	LONG	DEP	MAG	NP	NS	S.E.	DM	GAP
W/602	DEC 23	1633 55·4	41·55 S	173·47 E	27·4	2·7	6		0·22		
W/603	DEC 23	1715 40·2	40·73 S	174·94 E	11·3	2·7	7		0·19		
W/604	DEC 23	2156 38·0	41·51 S	175·30 E	13·4	2·5	6		0·21		
W/605	DEC 24	0820 57·0	40·64 S	174·25 E	37·2	2·9	8		0·09		
W/606	DEC 24	0910 47·0	40·98 S	174·56 E	57·6	2·6	6		0·07		
W/607	DEC 24	1333 31·3	41·74 S	174·51 E	31·2	2·3	6		0·10		
W/608	DEC 24	1852 24·7	41·46 S	173·71 E	91·0	3·7	13		0·09		
W/609	DEC 24	2215 52·3	41·01 S	175·30 E	19·9	2·5	8		0·10		
W/610	DEC 25	0152 30·0	41·41 S	175·03 E	27·7	2·6	9		0·06		
W/611	DEC 25	0324 34·7	41·72 S	174·44 E	24·2	2·6	6		0·07		
W/612	DEC 25	0640 43·3	41·01 S	175·17 E	25·2	2·4	7		0·14		
W/613	DEC 25	1123 00·3	41·39 S	174·58 E	33·0R	2·5	7		0·11		
W/614	DEC 25	1155 58·8	41·43 S	175·04 E	27·4	2·2	7		0·09		
W/615	DEC 25	1442 27·1	40·85 S	174·73 E	12·8	2·4	7		0·13		
W/616	DEC 25	1624 24·1	40·59 S	174·64 E	24·6	2·8	9		0·13		
W/617	DEC 25	1810 24·5	41·79 S	174·51 E	35·9	2·9	11		0·17		
W/618	DEC 26	0227 02·5	40·93 S	175·21 E	28·4	2·2	8		0·09		
W/619	DEC 26	0748 42·3	41·28 S	175·23 E	26·8	2·3	9		0·06		
W/620	DEC 26	1644 04·4	40·81 S	174·58 E	23·6	2·4	7		0·07		
W/621	DEC 26	1647 42·4	41·82 S	174·76 E	26·0	3·6	11		0·18		
W/622	DEC 26	1648 33·0	41·62 S	174·80 E	33·0	2·7	10		1·38		
W/623	DEC 26	1650 03·9	41·83 S	174·78 E	28·0	2·6	10		0·14		
W/624	DEC 26	1837 15·7	41·62 S	174·13 E	13·8	2·6	7		0·20		
W/625	DEC 26	1937 45·4	41·66 S	174·06 E	22·0	2·4	7		0·08		
W/626	DEC 26	2203 28·6	40·99 S	174·53 E	61·4	2·7	8		0·05		
W/627	DEC 26	2309 42·4	41·19 S	174·64 E	33·4	2·4	11		0·08		
W/628	DEC 27	0603 46·4	41·13 S	174·91 E	16·7	2·2	7		0·03		
W/629	DEC 27	0616 49·4	41·43 S	174·61 E	26·4	2·1	8		0·18		
W/630	DEC 27	0708 44·5	41·13 S	174·91 E	16·5	2·5	9		0·06		
W/631	DEC 27	0906 32·4	40·26 S	174·77 E	5·0R	2·5	8		0·27		
W/632	DEC 27	1128 19·2	40·97 S	174·81 E	13·5	1·9	6		2·97		
W/633	DEC 27	1552 24·7	41·13 S	174·82 E	29·0	2·4	10		0·10		
W/634	DEC 27	1811 28·7	41·58 S	174·41 E	23·3	2·8	9		0·16		
W/635	DEC 27	2215 56·4	41·30 S	174·72 E	28·2	2·1	8		0·06		
W/636	DEC 27	2226 42·7	41·38 S	175·12 E	27·1	2·2	6		0·05		
W/637	DEC 28	0157 12·9	40·86 S	175·18 E	28·4	2·3	7		0·12		
W/638	DEC 28	0734 11·0	41·13 S	174·91 E	17·5	2·2	8		0·04		
W/639	DEC 28	1021 29·4	41·06 S	175·53 E	25·0	2·2	8		0·08		
W/640	DEC 28	1103 15·2	40·70 S	175·45 E	32·2	2·5	5		0·03		
W/641	DEC 28	1111 25·5	40·78 S	174·52 E	50·7	2·3	6		0·11		
W/642	DEC 28	1117 34·4	41·13 S	174·91 E	16·6	2·8	13		0·06		
W/643	DEC 28	1120 33·5	40·81 S	174·55 E	47·2	2·4	8		0·08		
W/644	DEC 28	1652 46·4	40·82 S	174·49 E	24·5	2·4	7		0·09		
W/645	DEC 28	1919 31·2	40·64 S	173·59 E	33·0R	2·9	7		0·27		

NUM	DATE	TIME	LAT	LONG	DEP	MAG	NP	S.E.
W/646	DEC 28	2122 23·3	40·74 S	175·13 E	29·6	2·6	7	0·19
W/647	DEC 28	2353 01·7	41·37 S	174·45 E	17·9	2·3	7	0·17
W/648	DEC 29	1403 18·9	40·88 S	175·56 E	27·6	2·6	8	0·10
W/649	DEC 29	1818 05·8	40·48 S	174·85 E	9·5	3·2	10	0·17
W/650	DEC 30	0554 01·0	40·83 S	174·85 E	44·9	3·5	10	0·08
W/651	DEC 30	1643 04·6	41·10 S	175·33 E	14·7	1·9	8	0·23
W/652	DEC 30	1804 52·2	40·90 S	174·97 E	35·0	2·4	8	0·10
W/653	DEC 30	2159 54·6	41·22 S	174·31 E	33·0R	2·6	7	0·35
W/654	DEC 30	2340 47·8	40·82 S	174·13 E	46·4	2·2	5	0·31
W/655	DEC 31	0502 17·0	40·63 S	174·11 E	69·7	3·5	8	0·12
W/656	DEC 31	0544 15·0	40·70 S	175·43 E	24·5	2·5	6	0·20
W/657	DEC 31	0753 39·0	41·29 S	175·28 E	26·1	3·1	10	0·06
W/658	DEC 31	0934 17·9	40·94 S	174·97 E	32·7	2·4	8	0·05
W/659	DEC 31	1523 10·0	40·78 S	174·08 E	87·6	3·2	8	0·10
W/660	DEC 31	1600 35·2	41·00 S	174·53 E	32·6	2·4	7	0·11
W/661	DEC 31	1618 31·4	40·50 S	174·02 E	63·7	2·9	6	0·07
W/662	DEC 31	1730 49·1	40·47 S	174·36 E	77·8	2·5	6	0·19
W/663	DEC 31	1946 54·5	41·35 S	175·12 E	26·7	2·3	10	0·08
W/664	DEC 31	2035 06·8	41·15 S	174·04 E	67·0	3·9	11	0·24
W/665	DEC 31	2301 26·7	41·19 S	174·89 E	17·0	2·8	9	0·07
W/666	DEC 31	2333 45·6	41·70 S	174·95 E	29·2	2·4	6	0·12
W/667	DEC 31	2336 07·1	40·32 S	174·69 E	0·8	2·8	5	0·11

NON-INSTRUMENTAL DATA

THE FELT REPORTING SYSTEM

The Observatory has recruited a network of about 600 voluntary observers spread throughout the country, who use a standard form to describe the effects of any earthquake they feel. The Observatory also collects casual reports from newspapers, meteorological observers, postmasters and members of the local public. For large earthquakes, or ones with features of special interest, questionnaires are issued and assessed.

Several difficulties arise in assessing the distribution of felt intensity. The population of the country is very unevenly spread, and the observers' personal circumstances may prevent them from feeling a shock that has been noticed by others. These problems also affect lists of earthquakes felt in particular localities. It may reasonably be assumed that a strong earthquake reported from one township was felt in another nearby, even though the Observatory has received no report. However, an index of this kind must summarise data and not deductions, so the following scheme is used.

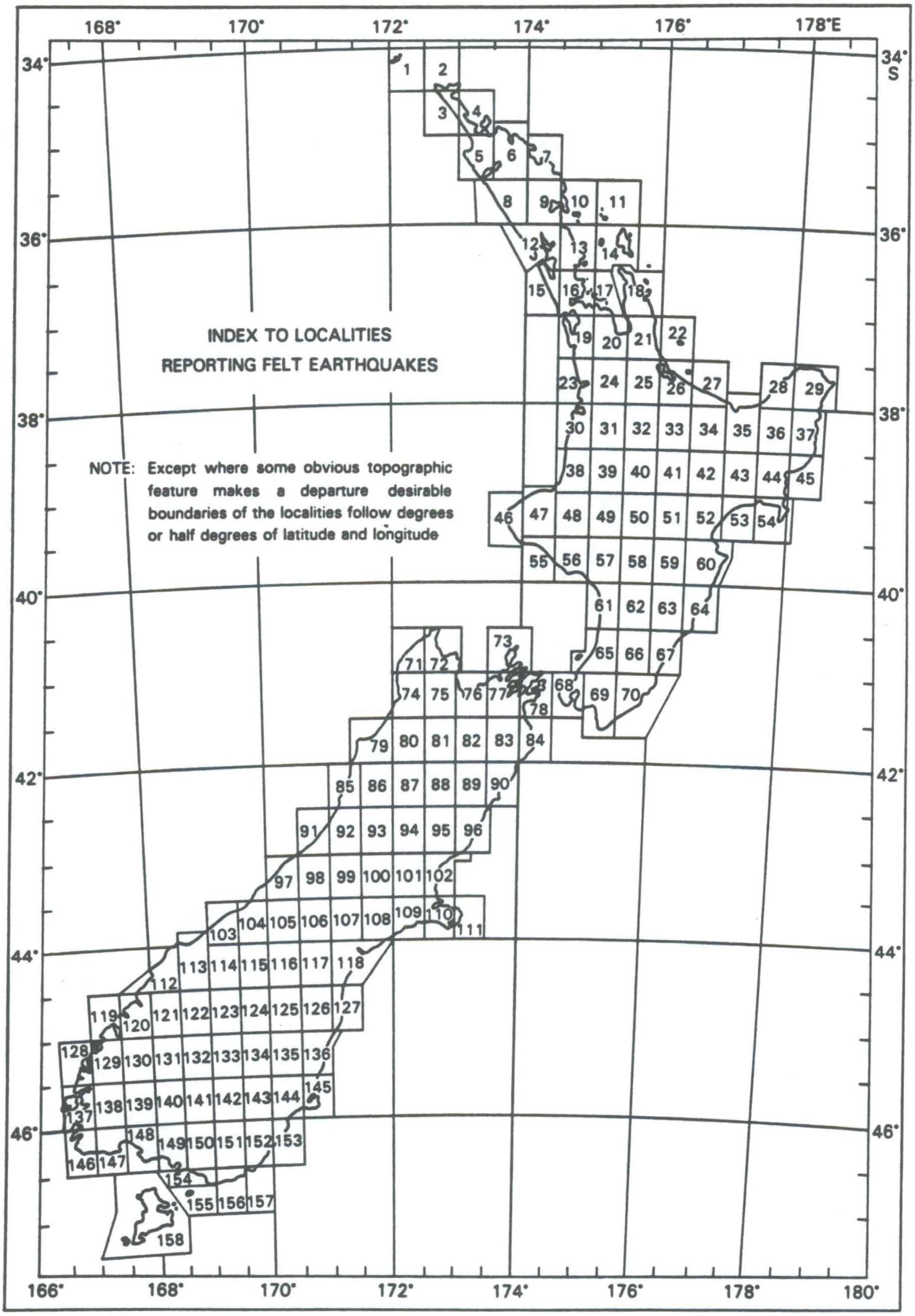
The land area of New Zealand has been divided into 'localities', mostly bounded by half-degree lines of latitude and longitude, but varied as necessary to avoid splitting obvious geographic or structural units (see map overleaf). Each locality has a number and a name, usually that of the principal population centre within it. The names are listed opposite the map. In most localities there are at least two well-separated reporters, but there are still some sparsely populated parts of the country without observers, notably in Southland.

The first part of this section gives, for each felt earthquake, its reference number ('86/' is omitted), origin, the intensities reported from named places and the numbers of the localities within which these places lie. The intensities on the Modified Mercalli scale have been assigned by the Observatory, on the basis of the New Zealand version set out in the N.Z. Journal of Geology and Geophysics, 9:122-9 (1966). When there is insufficient information to assign a scale value, the observer's comment, shortened if necessary, is listed in quotes ('...'). The word 'felt' indicates that no detailed information is available.

Small felt earthquakes (M_L<3.7) which occur during long sequences may have no individually calculated origin if, in the opinion of the analyst, their foci lie very close to that of a stronger shock of the sequence. Such reports are assigned the reference number of the stronger shock with a suffix added. Thus a suffix 'n' indicates that a report refers to the nth extra earthquake associated with a reference number. For example, 799_2 would be the second earthquake, reported as felt and instrumentally confirmed, but with no calculated origin, associated with reference number 799. The original felt reports would also be acknowledged in information lines following the Summary of Data for the worked origin, Ref. 799, as well as appearing at the end of the list of "Places reporting Felt Earthquakes". The existence of reports related to other associated earthquakes is indicated in the body of this list by an asterisk following the reference number.

In the second list, "Earthquakes Felt in Standard Localities", the localities which have reported shocks during the year are presented in alphabetical order, each followed by the reference numbers of the shocks felt and their respective maximum reported intensities within that locality. By comparing the reports from neighbouring localities, it is possible to form a truer estimate of the incidence of the felt effects than would be possible from a simple list of places reporting each shock. Reports of shocks with assigned origins appear in this list, identified by the Reference-Number-plus-Suffix notation described above.

Two more lists record shocks that cannot be instrumentally confirmed, and reports from places in the south-west Pacific that have not been acknowledged elsewhere.



Standard Reporting Localities

STANDARD REPORTING LOCALITIES

1 Three Kings
2 Te Reinga
3 Ninety Mile Beach
4 Doubtless Bay
5 Kaitaia

6 Kaikohe
7 Bay of Islands
8 Dargaville
9 Whangarei
10 Bream Head

11 Moko Hinau
12 Kaipara
13 Warkworth
14 Barrier Islands
15 Helensville

16 Auckland
17 Waiheke
18 Coromandel
19 Pukekohe
20 Mercer

21 Thames
22 Mayor Is.
23 Raglan
24 Hamilton
25 Matamata

26 Tauranga
27 Whakatane
28 Te Kaha
29 East Cape
30 Kawhia

31 Te Kuiti
32 Tokoroa
33 Rotorua
34 Murupara
35 Opotiki

36 Motu
37 Tolaga Bay
38 Mokau
39 Taumarunui
40 Tokaanu

41 Taupo
42 Te Whaiti
43 Tuai
44 Whakapunaki
45 Gisborne

46 Cape Egmont
47 New Plymouth
48 Whangamomona
49 Ohakune
50 Chateau

51 Kaweka
52 Napier
53 Wairoa
54 Mahia
55 Hawera

56 Waverley
57 Wanganui
58 Taihape
59 Ruahine
60 Hastings

61 Bulls
62 Palmerston North
63 Dannevirke
64 Porangahau
65 Otaki

66 Masterton
67 Castlepoint
68 Wellington
69 Featherston
70 Martinborough

71 Mount Stevens
72 Takaka
73 D'Urville Island
74 Karamea
75 Motueka

76 Nelson
77 Blenheim
78 Picton
79 Westport
80 Murchison

81 Glenhope
82 Wairau
83 Awatere
84 Cape Campbell
85 Greymouth

86 Reefton
87 Maruia
88 Hanmer
89 Clarence
90 Kaikoura

91 Hokitika
92 Kumara
93 Arthur's Pass
94 Lake Sumner
95 Culverden

96 Cheviot
97 Franz Josef
98 Hari Hari
99 Whitcombe Pass
100 Lake Coleridge

101 Oxford
102 Rangiora
103 Haast
104 Bruce Bay
105 Mount Cook

106 Tekapo
107 Mount Somers
108 Ashburton
109 Rakaia
110 Christchurch

111 Akaroa
112 Big Bay
113 Jackson's Bay
114 Makarora
115 Lake Ohau

116 Pukaki
117 Fairlie
118 Timaru
119 George Sound
120 Milford

121 Glenorchy
122 Arrowtown
123 Wanaka
124 St Bathans
125 Kurow

126 Duntroon
127 Waimate
128 Secretary Is.
129 Doubtful Sound
130 Te Anau

131 Livingstone Mts
132 Kingston
133 Alexandra
134 Poolburn
135 Ranfurly

136 Oamaru
137 Resolution Island
138 Pillans Pass
139 Monowai
140 Mossburn

141 Waikaia
142 Roxburgh
143 Lawrence
144 Outram
145 Dunedin

146 Puysegur Point
147 Poteretere
148 Tuatapere
149 Invercargill
150 Gore

151 Clinton
152 Balclutha
153 Waihola
154 Bluff
155 Ruapuke

156 Tahakopa
157 Owaka
158 Stewart Is.
159 Chatham Islands

PLACES REPORTING FELT EARTHQUAKES

2 Jan 01 2054 40·54S 172·45E 1km M=2·6
MM 5 Paturau (71).

20 Jan 09 1522 38·17S 176·23E 1km
MM 4 Tihiotonga (33).

24 Jan 10 1252 38·50S 175·93E 8km M=3·0
MM 4 Waihora Rd (40).

26 Jan 11 1513 43·48S 170·24E 12km M=3·6
MM 5 Lilybank (106).

28 Jan 12 0810 43·55S 170·50E 5km M=3·7
MM 4 Erewhon Station (107).

34 Jan 16 2037 40·81S 175·14E 25km M=3·9
MM 5 Paraparaumu [2] (65);
MM 4 Waikawa Beach (65);
MM 3 Kelburn (68);
'felt' Kelburn (68).

35 Jan 16 2128 38·13S 176·30E 1km M=2·6
MM 5 Rotorua, Whakarewarewa (33).

47 Jan 23 0144 40·19S 174·95E 12km M=4·2
MM 5 Himatangi Beach (61);
MM 4 Waikawa Beach (65);
'F3' Ahuahu Valley (57);
'felt' Wanganui (57).

52 Jan 25 0353 37·98S 176·60E 12km M=3·5
'felt' Kawerau (34).

53 Jan 25 0419 37·99S 176·59E 12km M=3·6
'felt' Kawerau (34).

57 Jan 27 0846 41·10S 174·64E 31km
'felt' Titahi Bay (68).

79 Feb 08 1551 38·19S 176·21E 1km M=3·0
MM 4 Tihiotonga (33).

81 Feb 09 1858 40·23S 175·30E 1km M=4·2
MM 4 Feilding (62);
'felt' Bulls, Foxton (61).

82 Feb 09 2043 38·10S 176·25E 1km
MM 4 Rotorua (33);
MM 3 Tihiotonga (33).

86 Feb 10 1956 39·18S 173·83E 12km M=4·0
MM 5 Okato (46);
MM 4 Warea (46);
'sharp' New Plymouth (47).

90 Feb 12 0623 41·43S 172·31E 12km M=3·4
MM 4 Arapito (74).

92 Feb 12 2232 40·04S 176·92E 33km M=4·9
MM 5 Table Flat (58); Mount Vernon, Waipukurau (60);
MM 4 Taihape (58); Palmerston North (62);
'strong' Hastings (60);
'light' Wanganui (57); Napier (60);
'felt' Palmerston North (62); Waipukurau (64).

102 Feb 17 1056 41·24S 175·18E 19km M=2·9
MM 4 Karori (68).

115 Feb 24 1624 37·81S 176·48E 181km M=5·0
MM 4 Wellington (68).

145 Mar 07 1955 41·69S 171·99E 12km M=4·0
MM 4 Greymouth (92).

147 Mar 09 0917 40·33S 173·42E 220km M=5·6
MM 5 Patoka (52); Taihape (58); Palmerston North (62); Dannevirke (63); Ohau (68); Nelson (76); Cape Jackson (78); Blenheim [2] (77); Rangiora (102);
MM 4 Kutarere (35); Uruti (47); Moawhango (58), Table Flat (58); Waipukurau (60); Foxton (61); Pahiatua, Palmerston North [2] (62); Johnsonville, Khandallah [2], Strathmore, Wellington (68); Paturau (71); Arapito Rd (74); Maitai Valley (76); Brothers Island (78); Kaikoura (90); Greymouth (92); Okuti Valley (110);
MM 3 Tinui (67);
'F5' Ahuahu Valley (57);
'F2' Wellington (68);
'strong' Palmerston North (62);
'weak' Wanganui (57);
'slight' Mahia Beach (54);
'felt' Retaruke (49); Waituna (62); Levin H.R.C. (65); Wellington (68); Ocean Bay (78); Christchurch (110);
'not felt' Auckland (16); Whakatane (27); Opotiki (35).

160 Mar 14 0019 40·93S 174·95E 53km M=3·9
'strong' Naenae [2] (68);
'slight' Bunnythorpe (62);
'felt' Island Bay, Karori, Titahi Bay (68); Upper Hutt (69).

161 Mar 14 0152 40·93S 174·16E 33km M=4·0
'felt' Island Bay (68).

164 Mar 14 1635 41·14S 174·66E 30km M=3·4
'felt' Karori (68).

168 Mar 17 0206 40·11S 175·05E 33km M=3·4
'felt' Wanganui Aerodrome (57).

169 Mar 17 1019 39·20S 173·73E 12km M=3·2
MM 4 Pungarehu (46).

176 Mar 19 1958 40·54S 174·67E 80km M=3·8
MM 4 Foxton (61);
'felt' Foxton Beach (61).

190 Mar 24 1850 39·88S 172·84E 12km M=4·7
'strong' New Plymouth (47);
'felt' Wellington (68).

194 Mar 26 0624 38·36S 176·27E 6km M=2·4
MM 4 Reporoa [2] (33).

195 Mar 26 0747 38·36S 176·27E 6km M=2·2
MM 4 Reporoa (33).

196 Mar 27 1209 38·36S 176·27E 6km M=3·0
MM 5 Reporoa (33).

198 Mar 27 1217 38·37S 176·30E 6km M=2·9
MM 4 Reporoa (33).

199 Mar 27 1229 38·36S 176·27E 6km M=2·7
'felt' Reporoa (33).

200 Mar 27 1248 38·37S 176·29E 6km M=2·5
'felt' Reporoa (33).

206 Mar 30 2231 42·86S 171·48E 12km M=3·1
MM 4 Arthurs Pass (93);
'slight' Otira (93).

207 Mar 31 0308 43·24S 170·20E 12km M=3·4
MM 6 Tasman Glacier (105);
MM 4 Beetham Hut, Tasman Glacier, Tasman Saddle Hut (105).

208 Mar 31 0434 46·24S 167·12E 33km M=4·3
MM 5 Centre Island (148).

209 Apr 01 0626 43·98S 171·04E 4km M=4·3
MM 5 Aires, Fairlie (117);
MM 4 Hakataramea Valley (117);
'slight' Timaru (118);
'felt' Riverview Fairlie (117).

217 Apr 04 1859 38·07S 176·31E 1km M=2·6
MM 4 Rotorua [2], Tihiotonga (33).

224 Apr 09 0543 44·35S 168·29E 5km M=4·5
MM 5 Aspiring Hut, Mount Aspiring Station (113);
MM 4 Minaret Station (114).

228 Apr 11 1108 44·39S 170·75E 5km M=3·4
MM 4 Round Hill (117).

233 Apr 14 2210 40·76S 175·80E 33km M=4·5
'felt' Eketahuna, Masterton (66); Akitio (67).

239 Apr 17 0835 38·17S 176·23E 5km
MM 4 Tihiotonga (33);
MM 3 Rotorua (33).

243 Apr 18 0756 39·13S 177·35E 33km M=4·0
MM 4 Wairoa (53).

246* Apr 18 1820 38·17S 176·23E 5km
MM 4 Tihiotonga (33).

250 Apr 20 1853 38·05S 176·35E 5km M=2·7
MM 4 Rotorua (33).

256 Apr 22 1251 37·94S 176·29E 5km M=2·5
MM 5 Rotorua (33);
MM 4 Rotorua (33);
'F4' Rotorua Airport (33).

259 Apr 24 0012 40·63S 172·43E 1km M=2·5
MM 5 Paturau (71).

266 Apr 26 1101 35·45S 174·17E 12km M=3·2
'felt' Kawakawa, Paihia (7); Whangarei [2] (9).

274 May 02 0445 40·75S 172·82E 1km M=3·7
MM 5 Paturau (71);
'sharp jolt' Bainham (72).

278 May 04 1142 40·32S 176·82E 33km M=4·5
MM 5 Waipukurau (60); Aramoana (64);
MM 4 Moawhango, Table Flat (58); Mount Vernon (60);
'F4' Kopua (63);
'felt' Waipukurau [3] (64).

291 May 09 0648 38·63S 177·45E 33km M=4·2
MM 4 Te Whaiti (42).

304 May 14 0754 38·27S 177·06E 12km M=4·7
MM 5 Whakatane (27); Minginui Forest (42); Wairoa (53);
MM 4 Kopeopeo (27); Rerewhakaaitu, Settlers Rd, Waimangu Thermal Valley (33); Kutarere, Ohope, Opotiki, Waimana (35); Gisborne (45).

309 May 15 1602 38·09S 176·31E 12km M=2·6
MM 5 Rotorua [2] (33);
MM 4 Rotorua [3] (33);
'F4' Rotorua Airport (33).

311 May 16 0027 39·38S 175·17E 120km M=5·0
MM 5 Table Flat (58); Patarau (71);
MM 4 Taihape (58); Himatangi Beach (61); Palmerston North (62);
MM 3 Kutarere (35);
'F4' Ahuahu Valley (57);
'felt' New Plymouth (47); Wanganui (57); Marton (61); Palmerston North [4], Waituna (62); Lower Hutt, Wellington (68).

313 May 16 1104 44·65S 168·25E 59km M=4·5
MM 4 Milford Sound [5] (120); Earnslaw Station (121);
MM 3 Milford Sound (120).

314 May 17 0451 38·85S 175·99E 12km M=3·2
MM 4 Moerangi (40).

331 May 25 1015 38·63S 175·89E 1km M=2·9
MM 4 Oruanui/Forest Rd (40); Acacia Bay, Taupo (41).

332 May 26 2335 43·24S 172·08E 12km M=4·1
MM 4 Arthurs Pass (93).

341 May 31 0430 38·71S 176·11E 1km M=4·0
MM 5 Taupo [6], Wairakei (41);
MM 4 Acacia Bay, Oruanui Rd, Taupo [2] (41).

343 Jun 01 0018 39·95S 176·84E 54km M=3·8
MM 4 Waipukurau (60).

373 Jun 16 0338 40·21S 176·11E 101km M=4·8
MM 5 Palmerston North (62);
MM 4 Ohakune (49); Table Flat (58); Foxton (61); Feilding (62); Khandallah, Wellington (68);
MM 3 Kelburn (68);
'strong' Palmerston North (62);
'F3' Kairanga (61);
'felt' Wanganui (56); Palmerston (62); Dannevirke (63); Wellington (68).

382 Jun 20 0858 38·59S 176·07E 12km M=3·3
MM 5 Taupo (41);
MM 4 Taupo (41).

394 Jun 26 1511 39·53S 175·64E 5km M=3·3
MM 4 Moawhango (58).

400 Jun 29 1955 42·35S 174·03E 11km M=4·1
'heavy' Meriburn (90).

402 Jul 01 0245 39·41S 175·02E 5km M=4·1
MM 4 Uruti (38); Pukeiti (46);
'felt' Ohakune (49).

411 Jul 03 1641 38·33S 176·34E 5km M=3·6
MM 5 Waimangu (33).

415 Jul 03 1920 38·30S 176·40E 5km
MM 4 Waimangu (33).

417 Jul 04 1337 38·30S 176·40E 5km M=2·4
MM 4 Ngapouri Rd (33).

422 Jul 07 0518 40·90S 174·70E 50km M=4·6
MM 5 Cape Jackson (78);
MM 4 Kelburn [2], Khandallah [2], Seatoun (68); Stephens Island (73); Blenheim (77); Fighting Bay (78);
'felt' Hataitai, Kelburn, Pukerua Bay (68).

431 Jul 11 0827 46·00S 166·22E 33km M=5·5
MM 5 Te Anau Downs Station (130);
MM 4 West Arm Manapouri (138); Centre Island (148);
MM 3 Eastern Bush (139);
'slight' Invercargill (149);
'felt' Eastern Bush (139); Invercargill (149).

435 Jul 11 2303 43·23S 172·14E 12km M=5·2
MM 5 Mount White Station (100);
MM 4 Paroa (92); Arthurs Pass (93); Lake Coleridge (100); Woodend (102);
MM 3 Christchurch (110);
'F4-5' Lake Coleridge (100);
'F3' Christchurch Airport (110);
'felt' Woodend (102); Christchurch (110); Dunedin (145).

441 Jul 14 1703 40·53S 174·28E 107km M=5·3
MM 5 Hawera (55); Okoia (57); Karori, Lower Hutt (68); Stephens Island (73); Havelock (77); Greymouth (92);
MM 4 Foxton (61); Palmerston North (62); Levin (65); Khandallah, Lower Hutt,

Strathmore, Wellington (68); Upper Hutt (69); Matai Valley, Richmond (76); Blenheim (77);
MM 3 Lower Hutt (68);
'strong' Wanganui (57);
'light' Trentham (69);
'felt' Kahui (46); Hawera, Okaiawa (55); Wanganui (57); Palmerston North (62); Wellington (68); Silverstream (69); Tarakohe (72); Nelson (76); Waitaria (78).

444 Jul 15 2131 40·91S 174·69E 45km M=3·4
'felt' Ohariu Valley (68).

445 Jul 16 1615 42·95S 171·57E 5km M=2·7
MM 4 Arthurs Pass (93).

451 Jul 19 1637 41·16S 172·37E 5km M=3·8
MM 5 Arapito (74).

453 Jul 21 0046 39·16S 173·94E 5km M=3·3
MM 4 Pukeiti (46).

458 Jul 22 1606 37·74S 176·35E 12km M=3·1
'felt' Te Puke (26).

469 Jul 28 1148 39·19S 175·06E 175km M=5·3
MM 5 Moawhango (58);
MM 4 Table Flat, Taihape (58); Gwavas Forest Village (59); Palmerston North [3] (62); Dannevirke (63); Castlepoint (67); Greymouth (92);
'felt' Wanganui (57); Hastings (60); Pukewhinau (67); Palmerston North (68); Lower Hutt, Newtown, Tawa, Wainuiomata, Wellington (68);
'Not felt' Ohakune (49).

474 Jul 29 1823 45·06S 167·72E 12km M=4·6
MM 4 Te Anau Downs Station (130).

485 Aug 05 0117 42·26S 172·83E 12km M=3·5
MM 1 Gracefield (68).

487 Aug 06 0605 41·86S 171·74E 12km M=4·1
MM 5 Westport [2] (79); Greymouth (85);
MM 4 Greymouth (85);
'felt' Greymouth (85).

489 Aug 06 1018 42·26S 172·79E 12km M=4·2
MM 4 Greymouth (92).

510 Aug 14 1551 41·12S 174·05E 64km M=3·7
MM 4 Titahi Bay (68).

512 Aug 15 2234 41·15S 175·14E 9km M=4·5
MM 4 Khandallah [2], Miramar [2], Paekakariki Hill, Strathmore, Wilton (68);
'F3' Highland Park (68);
'noisy' Kaitoke, Upper Hutt [2] (69);
'felt' Lower Hutt, Titahi Bay, Wellington (68); Trentham (69).

525 Aug 21 2005 40·15S 173·64E 174km M=4·7
MM 1 Kelburn (68);
'slight' Mt Victoria (68).

531 Aug 27 0527 40·94S 175·98E 33km M=3·7
'felt' Purunui (65).

536 Aug 28 2153 43·29S 170·53E 12km M=4·4
MM 5 Whataroa (97);
'MM 3' Hokitika (91);
'felt' Harihari (98).

543 Aug 31 1941 38·14S 176·11E 1km M=2·7
MM 4 Rotorua [3] (33).

550 Sep 04 1346 39·76S 176·62E 51km M=3·6
MM 4 Dannevirke (63).

552 Sep 05 1429 40·12S 174·46E 31km M=4·1
'F3' Ahuahu Valley (57).

555 Sep 05 1913 41·21S 174·59E 30km M=3·4
MM 4 Khandallah (68);
MM 3 Johnsonville (68).

564 Sep 09 1121 40·01S 176·94E 58km M=4·2
MM 5 Whakatu (60);
'felt' Hasting (60).

565 Sep 09 1406 40·15S 174·98E 12km M=4·2
'noisy' Wanganui (57).

566 Sep 09 1743 39·49S 175·71E 5km M=3·6
MM 5 Moawhango (58).

571 Sep 10 2103 38·67S 177·97E 12km M=4·4
MM 4 Ormond (44);
'felt' Gisborne (45).

579 Sep 13 1517 32·76S 179·88W 112km M=6·4
MM 4 Ruatuna Rd (35); Khandallah (68).

588 Sep 16 1954 38·05S 176·25E 12km M=3·0
MM 4 Rotorua [3] (33).

592 Sep 17 2235 40·71S 175·83E 33km M=4·5
MM 4 Palmerston North (62); Levin [2] (65);
'felt' Purunui (65); Masterton [2] (66); Gladstone (70).

594 Sep 18 0105 42·96S 171·42E 5km M=5·2
MM 5 Inchbonnie (92); Arthurs Pass (93); Lake Coleridge (100);
MM 4 Greymouth, Kowhitirangi, Paroa (92);
'MM 4' Westport (79); Greymouth (85); Hokitika (91); Okarito (97);
'felt' Greymouth (85); Arthurs Pass (93); Otago University (145).

597 Sep 18 1017 46·07S 166·41E 12km M=3·2
MM 4 Puysegur Pt (146).

601 Sep 18 1829 43·01S 171·47E 5km M=3·9
MM 4 Greymouth (92); Arthurs Pass (93).

602 Sep 18 1907 43·00S 171·44E 5km M=3·3
'slight' Arthurs Pass (93).

615 Sep 26 0732 43·88S 169·80E 12km M=4·7
MM 5 Mahitahi (104);
MM 4 Greymouth (92);
'felt' Paringa (103).

617 Sep 26 0734 43·92S 169·92E 12km M=4·4
MM 5 Mahitahi (104); Mount Cook (105);
MM 4 Greymouth (92); Paringa (103).

619 Sep 26 0740 43·78S 169·84E 12km M=3·9
MM 5 Mahitahi (104).

620 Sep 26 0745 43·36S 170·82E 12km M=3·3
MM 4 Erewhon Sta (107).

621 Sep 26 0932 43·81S 169·49E 12km M=3·4
MM 3 Mahitahi (104).

628 Sep 28 2138 38·18S 176·19E 5km M=2·3
MM 4 Forest Research Institute (33).

632 Oct 01 0141 38·12S 176·26E 5km M=2·5
MM 4 Forest Research Instititute, N.Z.G.S. (33).

637 Oct 04 0703 43·07S 171·24E 12km M=4·6
MM 5 Greymouth (92);
MM 4 Kowhitirangi (92); Lake Coleridge Power Station (100);
'felt' Lake Coleridge Village (100);
'MM 2-3' Hokitika (91).

648 Oct 08 1021 40·87S 172·16E 5km M=4·6
MM 5 Westport (79);
MM 4 Paturau (71); Westport (79); Greymouth (92);
'felt' Bainham (72).

656 Oct 09 1041 41·45S 174·66E 55km M=4·3
MM 4 Karori, Khandallah, Strathmore, Wellington (68);
MM 3 Kilbirnie (68);
'felt' Paraparaumu (65); Berhampore, Eastbourne, Island Bay, Karori, Stokes Valley, Tawa, Wellington (68).

658 Oct 10 0034 39·67S 176·31E 33km M=4·9
MM 5 Waihi (21); Taihape (58);
MM 4 Patoka (52); Table Flat (58); Gwavas Forest H.Q. (59); Palmerston North (62); Dannevirke (63);
'F3' Kairanga (61);
'strong' Napier (52);
'moderate' Ohingaiti (58); Feilding (62);
'slight' Palmerston North (62);
'felt' Waihi (21); Tangoio (52).

660 Oct 11 0934 39·45S 176·49E 89km M=4·0
MM 4 Patoka (52).

666 Oct 15 0229 42·15S 173·89E 12km M=3·9
MM 5 Kaikoura (90);
'MM 3' Kaikoura (90).

672 Oct 19 1216 37·79S 177·57E 33km M=3·7
MM 4 Ruatuna Rd (35).

674 Oct 20 0646 28·34S 175·70W 33km M=6·9
MM 6 Raoul Is ;
MM 4 Ruatuna Rd (35); Palmerston Nth (62);
'felt' Napier (52); Mahia Beach (54); Lower Hutt, Tawa, Wellington (68); Lake Rotoiti (81).

676 Oct 20 1427 45·66S 170·15E 12km M=4·1
'sharp' Pinewood (144).

680 Oct 22 1540 42·29S 171·31E 12km M=3·3
MM 5 Greymouth (92).

681 Oct 22 1749 39·23S 175·35E 22km M=3·6
MM 4 Ohakune (49).

689 Oct 25 2354 39·95S 175·46E 12km M=4·1
MM 4 Ohakune (49); Ohingaiti (58).

693 Oct 27 0425 38·73S 175·79E 152km M=5·9
MM 5 Raumati South (65);
MM 4 Ruatuna Road (35); Napier (52); Moawhango, Table Flat, (58); Himatangi Beach (61); Palmerston North (62); Levin (65); Kilbirnie, Miramar, Strathmore (68); Paturau (71); Fighting Bay (78); Blenheim [2] (83);
MM 3 Raumati South (65);
'F3' Kairanga (61);
'jolts' Wanganui (57);
'felt' Napier, Tangoio (52); Palmerston North (62); Kilbirnie, Lower Hutt, Mount Victoria (68); Upper Hutt (69); Nelson Airport (76); Blenheim (77).

730 Nov 09 1511 38·28S 177·07E 15km M=3·9
MM 4 Ruatuna Rd (35).

736 Nov 12 2056 41·49S 174·60E 6km M=4·5
MM 5 Kelburn [3], Ngaio Gorge, Wellington [2] Whitby (68);
MM 4 Paekakariki (65); Kelburn [3], Khandallah, Wellington (68); Fighting Bay (78);
'MM 4' Wellington Airport (68);
'F4' Highland Park (68);
'felt' Wellington [2] (68).

748 Nov 21 1017 41·61S 174·12E 12km M=4·3
MM 4 Wellington (68); Blenheim (77).

762 Nov 27 1243 42·67S 171·74E 12km M=4·8
MM 5 Arthurs Pass (93);
MM 4 Westport [2] (79); Greymouth (92); Otira [2] (93);
'MM 4-5' Hokitika (91);
'sharp' Rotomanu (93).
'felt' Punakaiki (85); Hokitika (91); Greymouth (92).

766 Nov 28 2223 41·79S 173·82E 69km M=4·5
MM 4 Strathmore, Wellington (68); Blenheim (77);
MM 3 Khandallah (68);
'jolt' Tawa (68).

767 Nov 29 0107 38·10S 176·49E 151km M=4·6
MM 3 Ruatuna Rd (35).

769 Nov 30 1115 39·60S 177·50E 33km M=4·1
MM 4 Patoka (52).

773 Dec 03 1328 39·57S 176·12E 96km M=4·4
MM 4 Patoka (52); Dannevirke (63).

776 Dec 04 1631 45·42S 170·93E 5km M=3·4
MM 4 Shag Point (136);
'sharp' Islay Downs (135).

781 Dec 08 0325 42·94S 171·79E 12km M=3·0
MM 3 Arthurs Pass National Park H.Q. (93).

789 Dec 17 1324 43·10S 173·17E 12km M=3·3
MM 5 Domett [2] (96);
MM 4 Domett [2] (96).

790 Dec 17 1345 43·13S 173·21E 12km M=3·0
MM 5 Domett (96);
MM 4 Domett (96).

791 Dec 17 1355 37·86S 176·96E 12km M=3·7
'strong' Whakatane (27); Ohope Beach (35).

792 Dec 17 1405 37·84S 176·94E 12km M=3·8
MM 5 Whakatane (27);
'strong' Whakatane (27); Ohope Beach (35).

793 Dec 17 1436 37·88S 176·97E 12km M=3·6
MM 4 Whakatane (27);
'strong' Whakatane (27); Ohope Beach (35);
'small' Whakatane (27); Ohope Beach (35).

794 Dec 17 1513 37·88S 176·97E 12km M=3·4
'strong' Whakatane (27); Ohope Beach (35).

795 Dec 17 2002 43·11S 171·65E 12km M=4·4
MM 4 Arthurs Pass (93).

799 Dec 18 1242 42·98S 173·16E 12km M=4·3
MM 4 Motunau Homestead (96);
'rolled' Kilmarnock (96).

825 Dec 30 0625 41·17S 173·55E 81km M=4·2
MM 4 Khandallah (68).

826	**Dec**	**30**	**1307**	**40·22S**	**173·48E**	**181km**	**M=4·9**

MM 4 — Tawa, Wellington (68); Blenheim (77);
MM 3 — Khandallah (68);
'slight' — Nelson Airport (76);
'felt' — Raumati (65); Karori, Tawa, Wellington (68); Upper Hutt (69); Blenheim (77); Nelson (76).

The following shocks were felt during a sequence, but did not meet other criteria for full analysis. Their foci lie close to that of the stronger shock indicated by the serial number (see explanation on page 101).

DATE	TIME	PLACE	INTENSITY	ASSUMED FOCUS	REF
Apr 18	18h 22m	Tihiotonga (33)	MM IV	86/246	$86/246_1$
Apr 18	18h 23m -	Tihiotonga (33)	MM IV	86/246	$86/246_2$
	18h 41m	Tihiotonga (33)	MM IV	86/246	$86/246_3$
	(4 shocks)	Tihiotonga (33)	MM IV	86/246	$86/246_4$
		Tihiotonga (33)	MM IV	86/246	$86/246_5$
Apr 18	18h 42m	Tihiotonga (33)	MM IV	86/246	$86/246_6$

EARTHQUAKES FELT IN STANDARD LOCALITIES

Localities within which earthquakes were felt are listed in alphabetical order, each preceded by its number on the reference map. The figure following the name of the locality is the number of the epicentre followed by the maximum intensity (in brackets) reported within the district covered by the locality name. An asterisk (*) indicates that the particular intensity was not evaluated from the standard questionnaire. The location of the earthquake, the instrumental magnitude and the actual places at which it was reported felt may be found from the table of 'Places Reporting Felt Earthquakes'.

93	Arthur's Pass	206 (4), 332 (4), 435 (4), 445 (4), 594 (5), 601 (4), 602 (3*), 762 (5), 781 (3), 795 (4).
16	Auckland	147 (?).
83	Awatere	693 (4).
7	Bay of Islands	266 (4*).
77	Blenheim	147 (5), 422 (4), 441 (5), 748 (4), 766 (4), 826 (4).
104	Bruce Bay	615 (5), 617 (5), 619 (5), 621 (3).
61	Bulls	47 (5), 81 (4*), 147 (4), 176 (4), 311 (4), 373 (4), 441 (4), 658 (3*), 693 (4).
46	Cape Egmont	86 (5), 169 (4), 402 (4), 441 (4*), 453 (4).
67	Castlepoint	147 (3), 233 (4*), 469 (4).
96	Cheviot	789 (5), 790 (5), 799 (4).
110	Christchurch	147 (4), 435 (3).
63	Dannevirke	147 (5), 278 (4*), 373 (4*), 469 (4), 550 (4), 658 (4), 773 (4).
145	Dunedin	435 (4*), 594 (4*).
73	D'Urville Island	422 (4).
117	Fairlie	209 (5), 228 (4).
69	Featherston	160 (4*), 441 (4), 512 (4*), 693 (4*), 826 (4*).
97	Franz Josef	536 (5), 594 (4*).
45	Gisborne	304 (4), 571 (4*).
81	Glenhope	674 (4*).
121	Glenorchy	313 (4).

85	Greymouth	487 (5), 594 (4*), 762 (4*).
103	Haast	615 (4*), 617 (4).
98	Hari Hari	536 (4*).
60	Hastings	92 (5), 147 (4), 278 (5), 343 (4), 469 (4*), 564 (5).
55	Hawera	441 (5).
91	Hokitika	536 (3*), 594 (4*), 637 (3*), 762 (4*).
149	Invercargill	431 (3*).
113	Jackson's Bay	224 (5).
90	Kaikoura	147 (4), 400 (5*), 666 (5).
74	Karamea	90 (4), 147 (4), 451 (5).
92	Kumara	145 (4), 147 (4), 435 (4), 441 (5), 469 (4), 489 (4), 594 (5), 601 (4), 615 (4), 617 (4), 637 (5), 648 (4), 680 (5), 762 (4).
100	Lake Coleridge	435 (5), 594 (5), 637 (4).
54	Mahia	147 (3*), 674 (4*).
114	Makarora	224 (4).
70	Martinborough	592 (4*).
66	Masterton	233 (4*), 592 (4*).
120	Milford	313 (4).
38	Mokau	402 (4).
139	Monowai	431 (3).
105	Mount Cook	207 (6), 617 (5).
107	Mount Somers	28 (4), 620 (4).
71	Mount Stevens	2 (5), 259 (5), 274 (5), 311 (5), 648 (4), 693 (4).
34	Murupara	52 (4*), 53 (4*).
52	Napier	147 (5), 658 (4), 660 (4), 674 (4*), 693 (4), 769 (4), 773 (4).
76	Nelson	147 (5), 441 (4), 693 (4*), 826 (3*).
47	New Plymouth	86 (5*), 147 (4), 190 (5*), 311 (4*).
136	Oamaru	776 (4).
49	Ohakune	147 (4*), 373 (4), 402 (4*), 469 (?), 681 (4), 689 (4).

35	Opotiki	147 (4), 304 (4), 311 (3), 579 (4), 672 (4), 674 (4), 693 (4), 730 (4), 767 (3), 791 (5*), 792 (5*), 793 (5*), 794 (5*).
65	Otaki	34 (5), 47 (4), 147 (4*), 441 (4), 531 (4*), 592 (4), 656 (4*), 693 (5), 736 (4), 826 (4*).
144	Outram	676 (5*).
62	Palmerston North	81 (4), 92 (4), 147 (5), 160 (3*), 311 (4), 373 (5), 441 (4), 469 (4), 592 (4), 658 (4), 674 (4), 693 (4).
78	Picton	147 (5), 422 (5), 441 (4*), 693 (4), 736 (4).
138	Pillans Pass	431 (4).
64	Porangahau	92 (4*), 278 (5).
146	Puysegur Point	597 (4).
135	Ranfurly	776 (5*).
102	Rangiora	147 (5), 435 (4).
33	Rotorua	20 (4), 35 (5), 79 (4), 82 (4), 194 (4), 195 (4), 196 (5), 198 (4), 199 (4*), 200 (4*), 217 (4), 239 (4), 246 (4), 250 (4), 256 (5), 309 (5), 411 (5), 415 (4), 417 (4), 543 (4), 588 (4), 628 (4), 632 (4).
59	Ruahine	469 (4), 658 (4).
58	Taihape	92 (5), 147 (5), 278 (4), 311 (5), 373 (4), 394 (4), 469 (5), 566 (5), 658 (5), 689 (4), 693 (4).
72	Takaka	274 (5*), 441 (4*), 648 (4*).
41	Taupo	331 (4), 341 (5), 382 (5).
26	Tauranga	458 (4*).
130	Te Anau	431 (5), 474 (4).
42	Te Whaiti	291 (4), 304 (5).
106	Tekapo	26 (5).
21	Thames	658 (5).
118	Timaru	209 (3*).
40	Tokaanu	24 (4), 314 (4), 331 (4).
148	Tuatapere	208 (5), 431 (4).
53	Wairoa	243 (4), 304 (5).
57	Wanganui	47 (3*), 92 (3*), 147 (5*), 168 (4*), 311 (4*), 441 (5), 469 (4*), 552 (3*), 565 (4*), 693 (4*).

56	Waverley	373 (4*).
68	Wellington	34 (3), 57 (4*), 102 (4), 115 (4), 147 (5), 160 (5*), 161 (4*), 164 (4*), 190 (4*), 311 (4*), 373 (4), 422 (4), 441 (5), 444 (4*), 469 (4*), 485 (1), 510 (4), 512 (3*), 525 (1), 555 (4), 579 (4), 656 (4), 674 (4*), 693 (4), 736 (5), 748 (4), 766 (4), 825 (4), 826 (4).
79	Westport	487 (5), 594 (4*), 648 (5), 762 (4).
44	Whakapunaki	571 (4).
27	Whakatane	147 (?), 304 (5), 791 (5*), 792 (5), 793 (4), 794 (5*).
9	Whangarei	266 (4*).

UNCONFIRMED FELT REPORTS

The following shocks, reported to the Observatory as having been felt, cannot be confirmed by any instrumental record.

DATE	TIME	INTENSITY	PLACE
Jan 21	22h 43m	MM 4	Moawhango (58).
Jan 25	04h 00m - 04h 20m	'felt'	Kawerau (34).
Jan 27	19h 39m	MM 4	Rotorua (33).
Feb 18	02h 38m	'felt'	Waiheke Island (17).
Mar 11	06h 22m	MM 4	Seatoun (68).
Mar 28	12h 24m - 13h 24	'1 hour of light tremors and rumbles' - MM 5	Reporoa (33).
Apr 03	10h 45m	'felt'	Kahui (46).
May 11	10h 20m	MM 4	Rotorua (33).
May 15	02h 20m	MM 4	Ormond (44).
May 16	03h 30m	'felt'	Purunui (65).
Jun 16	06h 24m	MM 4	Himatangi Beach (61).
Jun 18	19h 30m	'slight'	Auckland (16).
Jun 28	12h 57m	'felt'	Meriburn (90).
Jul 03	16h 53m	'felt'	Ngapouri Rd (33).
Jul 03	19h 00m	MM 4	Waimangu (33).
Jul 03	19h 01m	MM 4	Waimangu (33).
Jul 14	16h 04m	MM 4	Eastbourne (68).
Jul 16	17h 00m	MM 4	Arapito (74).
Aug 04	17h 35m	'possible'	Pukeiti (46).
Oct 08	16h 40m	MM 4	New Plymouth (47).
Oct 19	10h 16m	MM 4	Strathmore (68).
Nov 9	15h 00m (uncertain time)	MM 3	Maungakaramea (9).
Nov 10	10h 37m	MM 4	Ngapouri Rd (33).
Nov 12	21h 30m (uncertain time)	MM 5	Lower Hutt (68).
Nov 19	23h 32m	MM 4	Ohope (35).
Nov 22	20h 15m	MM 4	Paroa (92).
Dec 12	20h 57m	'F4'	Highland Park (68).
Dec 15	00h 45m	MM 4	Westport (79).
Dec 17	15h 13m	MM 4	Domett (96).
Dec 17	15h 55m	MM 4	Maungakaramea (9).

REPORTS FROM OUTSIDE NEW ZEALAND

The Observatory sometimes receives reports of earthquakes felt on islands of the south-west Pacific and other places beyond the limits of its systematic reporting network. Where scale intensities are assigned, they have been estimated by the observers, not the Observatory. In 1986 the following reports were received.

DATE	TIME	INTENSITY	PLACE(S)
Feb 03	08h 46m	'felt'	Raoul Island
Feb 03	15h 08m	'felt'	Raoul Island
Feb 04	22h 33m	'felt'	Raoul Island
Mar 14	16h 56m	'felt'	Raoul Island
Mar 14	17h 14m	'felt'	Raoul Island
Apr 12	11h 41m	'MM 2'	Raoul Island
Apr 22	18h 35m	'MM 4'	Raoul Island
May 08	10h 16m	'MM 3'	Raoul Island
May 26	18h 44m	'felt'	Raoul Island, Fiji
May 26	19h 08m	'felt'	Raoul Island
Jun 16	10h 50m	'MM 2'	Raoul Island
Jun 16	23h 04m	'MM 2'	Raoul Island
Jun 18	22h 02m	'MM 3'	Raoul Island
Jun 19	20h 02m	'MM 4'	Raoul Island
Jun 20	02h 38m	'MM 2'	Raoul Island
Jun 24	17h 24m	'MM 2'	Raoul Island
Jun 24	19h 31m	'MM 2'	Raoul Island
Jun 25	11h 46m	'MM 4'	Raoul Island
Jun 26	19h 59m	'MM 2'	Raoul Island
Jun 29	11h 58m	'MM 4'	Raoul Island
Jul 11	20h 36m	'MM 4'	Raoul Island
Sep 13	15h 18m	'MM 3'	Raoul Island

TUAMOTU ARCHIPELAGO NUCLEAR EXPLOSIONS

Nuclear explosions at the French nuclear test sites in the Tuamotu Archipelago are often recorded at Rarotonga (RAR). The P-wave is usually not recorded but the T-waves have a rather distinctive signature with a very emergent onset, followed after a few seconds by a more prominent burst of energy which reaches its maximum and decays before the arrival of a smaller "echo" trailing the main energy by some 110 seconds. Although other teleseismic readings from the New Zealand instrumental networks are published by the International Seismological Centre, these T-wave observations are not.

Because the emergent first arrival cannot always be seen clearly when the explosions are relatively small, the instant of arrival is not recorded here. Instead, an inferred origin time is listed, based on the estimated travel time from the test site to Rarotonga, and indications that it is common practice to detonate tests exactly on the minute.

A means of estimating the magnitudes of these explosions has been devised, based on a comparison of maximum amplitudes of T-waves recorded at Rarotonga with magnitude estimates from the United States National Earthquake Information Service. (**W.D.Smith, 1987:** Underground nuclear explosions recorded at Rarotonga: estimation of m_b from T-phase amplitude. **Geophys. J. R. astr. Soc.** 90: 35-42.) These magnitudes are given, together with the N.E.I.S. and I.S.C. estimates where these are available. The maximum recorded trace amplitude at Rarotonga (in millimetres) is also listed.

DATE	TIME h m	AMPLITUDE millimetres	mb (T-wave)	mb (N.E.I.S.)	mb (I.S.C.)
Apr 26	17 02	2·0	4·77	4·8	
May 06	16 58	1·9	4·75		
May 27	17 15	1·6	4·67		
May 30	17 25	9·2	5·43	5·7	5·6
Nov 10	16 58	2·5	4·87		
Nov 12	17 02	7·5	5·34	5·3	
Dec 06	17 10	3·3	4·99		
Dec 10	17 15	9·5	5·45	5·3	

PUBLICATIONS BY STAFF MEMBERS

The following papers, which have not previously been given notice in an Annual Report, were published in 1985 and 1986.

S-300 GLEDHILL, K.R.: An Earthquake Detector Employing Frequency Domain Techniques.
Bull. Seism. Soc. Am. 75: 1827-1835.

A single-station real-time earthquake detector has been developed which operates in the frequency domain. Frequency domain operation is possible because the method of calculation of the discrete Fourier transform and the data format have been adapted to suit the architecture of the microprocessor used. A test period of 10 days resulted in a detection reliability of greater than 95 per cent, with a false detection rate of less than 10 per cent (241 earthquakes total sample). The spectral detector outperforms time domain detectors in two respects. It is much more likely to identify the more distant, emergent earthquakes, and those recorded with a low signal-to-noise ratio. The algorithm operates on a Motorola MC6809 microprocessor and uses less than a quarter of the available time at a 50-Hz sampling frequency.

S-301 SMITH, EUAN G.C. AND WEBB, TERRY H.: The Seismicity and Related Deformation of the Central Volcanic Region, North Island, New Zealand.
R. Soc. N.Z. Bull. 23: 112-133.

Earthquake activity in the Central Volcanic Region (CVR) has been concentrated in the Taupo Volcanic Zone and its extension offshore, but it is not uniform within the Zone. Prominent areas of activity include the western side of Lake Taupo and the Bay of Plenty coast, while the area around Mts Ruapehu and Ngauruhoe has been relatively inactive. Most earthquakes in the CVR are shallower than 12 km. In the last 20 years, swarms containing at least four earthquakes of magnitude four or greater have occurred at the average rate of about one every two years. The largest known events in the CVR occurred during the swarm of earthquakes near Taupo in 1922 and probably reached magnitude six. There have been substantial changes in the rate of occurrence but fluctuations do not correlate with episodes of eruptive volcanism.

Although there is clear geological and geodetic evidence that the Taupo Volcanic Zone is widening, a dominant strike slip component in the focal mechanisms shows that the Zone is not deforming by simple rifting. Surface deformation that accompanied swarms in 1922 and 1983 was very largely normal faulting and subsidence, but composite strike-slip mechanisms for events of the 1983 swarms suggests that weak materials at the surface mask transcurrent deformation at depth.

The mixture of dextral and sinistral faulting inferred from the focal mechanisms shows that there are either local reversals of the usual regional stress field, or that the Zone widening is complex.

S-303 ROBINSON, RUSSELL and NEIL E. WHITEHEAD: Radon Variations in the Wellington Region, New Zealand, and Their Relation to Earthquakes.
Earthq. Predict. Res. 4: 69-82.

Temporal changes in the radon content of ground water and soil gas have been monitored in the Wellington region since early 1978 in order to examine their relation to earthquakes. New Zealand is a region of plate convergence and subduction with a moderate level of seismicity, both crustal and deep. The measurement technique is of the "Track-Etch" type and is simple and inexpensive to implement but is subject to several sources of error. The major feature of the data, in the form of monthly mean radon levels, is a large long term rise and fall in level lasting 2 ½ to 3 years. Data from five sites are well correlated due to this feature but shorter term fluctuations are less well correlated. Effects of changes in the weather are small. It is not certain that the radon level is directly affected by earthquakes at all. It seems equally likely that the radon level reflects changes in regional strain rate that also modulate the seismicity.

S-304 GLEDHILL, K.R. and RANDALL, M.J.: SNARE: An earthquake detection and recording system for small seismograph networks. Bull. Seism. Soc. Am. 76: 1485-1489.

An earthquake detection and recording system called SNARE (Seismic Network Automatic Recording Equipment) has been developed for small telemetered seismograph networks of up to 16 seismic components. SNARE differs from several other systems for recording telemetered signals from seismograph networks in:

1) Using a frequency domain earthquake detector.
2) Using pre-event data buffering which is independent of the controlling microprocessor memory and hence of the microprocessor memory size.
3) It has been designed as a direct replacement for 16 mm from recorders.

A SNARE system used in place of a film recorder will reduce the recording cost for a small seismograph network by about an order of magnitude and simplify analysis procedures.

Using low-power versions of the microprocessor, adaptation of the system for field use is possible.

S-305 SMITH, WARWICK D.: Evidence for precursory changes in the frequency-magnitude b-value. Geophys. J. R. astr. Soc. 86: 815-838.

A clear case has been established for a significant increase in the slope of the frequency-magnitude relation for periods of up to six years before a number of earthquakes in New Zealand and California. In a region of about 200 km diameter in central New Zealand the b-value increased from near unity to more than 2.0 at the end of 1968, and remained abnormally high until the beginning of 1975. An earthquake of magnitude 6.0 followed in 1977 January, within 50 km of the location which had registered the highest b-value. This phenomenon of a high b-value has been found before all shallow New Zealand earthquakes of magnitude 6.0 or more since 1975, wherever the seismicity rate and detection threshold were adequate to resolve it. Further, the only statistically significant occurrences of high b-value were those which were followed by large earthquakes, two of magnitude 6.8 and 6.0 and a swarm of equivalent magnitude 5.3.

The phenomenon has also been found before the San Fernando and Coalinga earthquakes in California, both of which were thrust events, but it is not apparent before two large Californian earthquakes with strike-slip mechanisms. Observations of high b-value are consistent with reported instances of quiescence in background seismicity. In fact, what has been interpreted as quiescence may probably be more accurately described as a localised high b-value. The available data suggest that careful monitoring of the b-value may provide a tool for medium-term earthquake prediction, although perhaps not in all tectonic environments.

S-306 SMITH, W.D. and K.R. BERRYMAN: Earthquake hazard in New Zealand: inferences from seismology and geology. R. Soc. N.Z. Bull. 24: 223-243.

The results of an earlier study of earthquake hazard in New Zealand have been revised by incorporating not only seismological data on known large earthquakes and recent instrumental coverage of small earthquakes, but also geological studies at faults and folds active during post-glacial time. The procedure involves defining regions which may be assumed to be uniformly seismic, assigning seismicity parameters to each, and integrating to evaluate the hazard at each of a closely spaced set of locations throughout the country. The results are presented as contour maps of the mean return period for selected Modified Mercalli intensities, and tabulated figures of return periods for a number of cities and towns. Mean return periods for intensity MM VI range throughout the country from less than five years to more than 200 years, and for intensity MM VIII from less than 100 years to more than 2000 years. Comparison with the earlier published figures shows slightly reduced estimates of hazard for Auckland, Wellington and Christchurch, and significantly increased estimates for Dunedin.

S-307 ROBINSON, R.: Seismicity, structure and tectonics of the Wellington Region, New Zealand.

Geophys. J. R. astr. Soc. 87: 379-409.

The Wellington region is situated near the border between the subducting Pacific Plate and the Australian Plate, above their gently dipping interface, which lies at shallow depth. Hypocentres recorded by a local 12-station seismic network in the period 1978-82 have been refined by use of a three-dimensional velocity model derived from the inversion of arrival-time data. These hypocentres show the subducting Pacific Plate as a zone of relatively intense seismic activity, offset vertically by some 7 km along a NE-SW line through Cook Strait.

Composite focal mechanisms of events within the subducting plate imply down dip tension, indicating that the negative buoyancy of the descending Pacific lithosphere dominates the internal stress field throughout the length of the seismically active region. No evidence is found for a significant number of events indicating thrusting along the plate interface, nor for a substantial increase in velocity down-dip, as might be expected if a pervasive basalt-to-eclogite phase-change was taking place. Further details of structure beneath the region can be inferred, and their relationship to surface features is discussed.

S-308 TERRY H. WEBB; FERRIS, B.G.; HARRIS, J.S.: The Lake Taupo, New Zealand, earthquake swarms of 1983.
N.Z. J. Geol. Geophys. 29: 377-389.

The results of microearthquake surveys made during two earthquake swarms that occurred near Lake Taupo, New Zealand, are presented. The swarm of 1983 February was concentrated in an area of 30 km^2 while that in 1983 June-July covered an area of 300 km^2. Composite focal mechanisms show a predominance of strike-slip faulting with a consistent, but small thrust component. This is in sharp contrast with normal surface faulting observed at the time of the second swarm. For the February swarm the strike-slip motion is right-lateral on a northeast nodal plane and for the June-July swarm it is left-lateral on a northeast plane. The observed surface deformation is an order of magnitude larger than that expected due to seismic slip alone which, together with the gradual development of the surface faulting, suggests that the surface faulting was largely aseismic and may have been in response to subsurface deformation and earthquake shaking. No evidence is found for the swarms being caused by other than ongoing regional deformation. A coda magnitude relation suitable for the Taupo Volcanic Zone is $M_c = 0.03 \pm (1.00 \pm 0.03) \log^2 \tau + (0.041 \pm 0.007) R$.

S-315 BIBBY, H.M.; HAINES, A.J. and WALCOTT, R.I.: Geodetic strain and the present day plate boundary zone through New Zealand.
R. Soc. N.Z. Bull. 24: 427-438.

Estimates of shear strain rates derived from triangulation surveys cover about one-quarter of the area of the plate boundary zone within New Zealand, and are well distributed within it. By fitting a polynomial function to these shear strain rates, the velocity is determined within the deformation zone, together with the unmeasured rotation and dilatation components of strain, thus giving a smooth representation of the kinematics on a time scale of a few tens of years. On this time scale displacements due to earthquakes and fault movement are unimportant and the kinematic pattern represents the accumulation of strain owing to relative motion of the plates. The relative velocity of the Australian and Pacific plates derived from the geodetic measurements is in excellent agreement with the value predicted by sea floor spreading and the plate tectonic hypothesis. The oblique motion at the subduction zone is taken up in two distinct modes: near the subduction zone motion is predominantly thrusting normal to the trough axis, while at greater distances from the trough the component of motion parallel to the axis is taken up in a zone of strike-slip faulting. Along the southern part of the Hikurangi subduction zone all the plate motion is absorbed within the land area alone, suggesting that there is no motion at the trench and that the subduction thrust is locked in that region.

----- ANSELL, J.; ADAMS, D.: Unfolding the Wadati-Benioff zone in the Kermadec-New Zealand region.
Phys. Earth. Planet. Inter. 44: 274-280.

As the deep seismic zones are associated with subducted oceanic crust, it is important to establish the extent and continuity of each of these zones, using consistent earthquake locations. Then the former oceanic crust can be restored to the surface of the earth by unfolding the seismic zone about the trench. This unfolded crust should be used in plate reconstructions.

This process has been carried out for the deep seismic zone in the Kermadec-New Zealand region, where the deep seismic zone is defined by a careful selection of I.S.C. hypocenters and the former oceanic crust is established by unfolding. Plate reconstructions using two sets of rotation poles show that the deepest parts of the observed seismic zone along its length were not subducted at the same time. Further the currently observable zone is not directly associated with earlier volcanism in northwest New Zealand between 6 and 20 Ma ago.

E-168 New Zealand Seismological Report, 1984.

OBSERVATORY SERVICES

PUBLICATIONS

The Seismological Observatory issues the following series of publications:

1. E-bulletins. These consist of the 'New Zealand Seosmological Reports'. containing summaries of the data used for each origin determination, lists of origins, felt intensity data, and brief accounts of the principal earthquakes of the year. They also privide details of the instruments used to record earthquakes and descriptions of Observatory practices.

2. S-bulletins. These are mostly reprints of papers by members of the Observatory staff, but occasionally they have included other material not published elsewhere, such as the Eiby-Muir near-earthquake tables and a descriptive account of the Observatory and its work issued to conference delgates. Their automatic circulation is not as widespread now as in the past, but they are usually available from the Observatory on request.

Copies of this material may be purchased from the Observatory. In suitable cases the Observatory may be able to enter into agreements for a free exchange of publications on a continuing basis.

EARTHQUAKE CATALOGUE

The Observatory has a master file of some 25,000 earthquake origins and associated information stored on magnetic tape. From this, lists of earthquakes within particular geographical areas of New Zealand or in categories defined in other ways can be made available to researchers. Full details have been published elsewhere (W.D. Smith, 1976: 'A Computer File of New Zealand Earthquakes'; Bull. N.Z. Natl. Soc. Earthq. Eng., Vol.9, No.2, pp.136-7, or N.Z. J. Geol. Geophys., Vol.19, No.3, pp.393-4). Criteria that may be specified are dates, magnitudes, focal depths, intensities and regions bounded in a number of different ways. Because of the dangers inherent in the use of incompletely assessed data, it is recommended that users should discuss their search criteria with the Observatory.

THE NEW ZEALAND TIME SERVICE

Until 1987 the Seismological Observatory was responsible for the New Zealand Time Service, which distributes accurate time for civil and scientific purposes, both by radio and by land-line. The Observatory used three Hewlett-Packard double-oven quartz-crystal oscillators, with a measured stability exceeding two parts in 10^{11}. From these, suitable signals for wider distribution were generated by electronic sub-division. Stand-by power supplies and duplicated equipment ensure that failures were rare.

In 1986 the most accurate source of time in New Zealand was, as it still is in 1988, the caesium beam primary frequency standard at the Physics and Engineering Laboratory at Lower Hutt, which is periodically compared by flying clock with the standards at the U.S. National Bureau of Standards and other time-keeping observatories. The Observatory clocks were kept in close agreement with the P.E.L. standard by daily comparison, followed if necessary, by correction. (The comparison was made indirectly by comparing both the P.E.L. standard and the Time Service clocks with a synchronisation pulse transmitted by the national television network TV One. Details of the method may be found in P.E.L. Report No.600 "Frequency and Time in New Zealand via the T.V. Sync. Pulses").

The signals transmitted by the Time Service are an approximation (to the accuracy specified below) to Coordinated Universal Time (UTC), which is basically atomically kept time, adjusted when necessary by one second steps (leap seconds) to keep it in near agreement with the astronomically determined time known as UT1. Adjustments are normally made at the end of June or December.

The error of the signals seldom exceeded 100 microseconds, on leaving the Observatory, but delays were introduced by the circuits between the Observatory and the individual radio transmitters. A typical delay (that for station 2YA) was 1·8 milliseconds.

A formal discussion of time-scales is to be found in the Time Service Reports, Series 11, of the U.S. Naval Observatory. To the precision required for the great majority of civil purposes the distinctions between them are of no consequence.

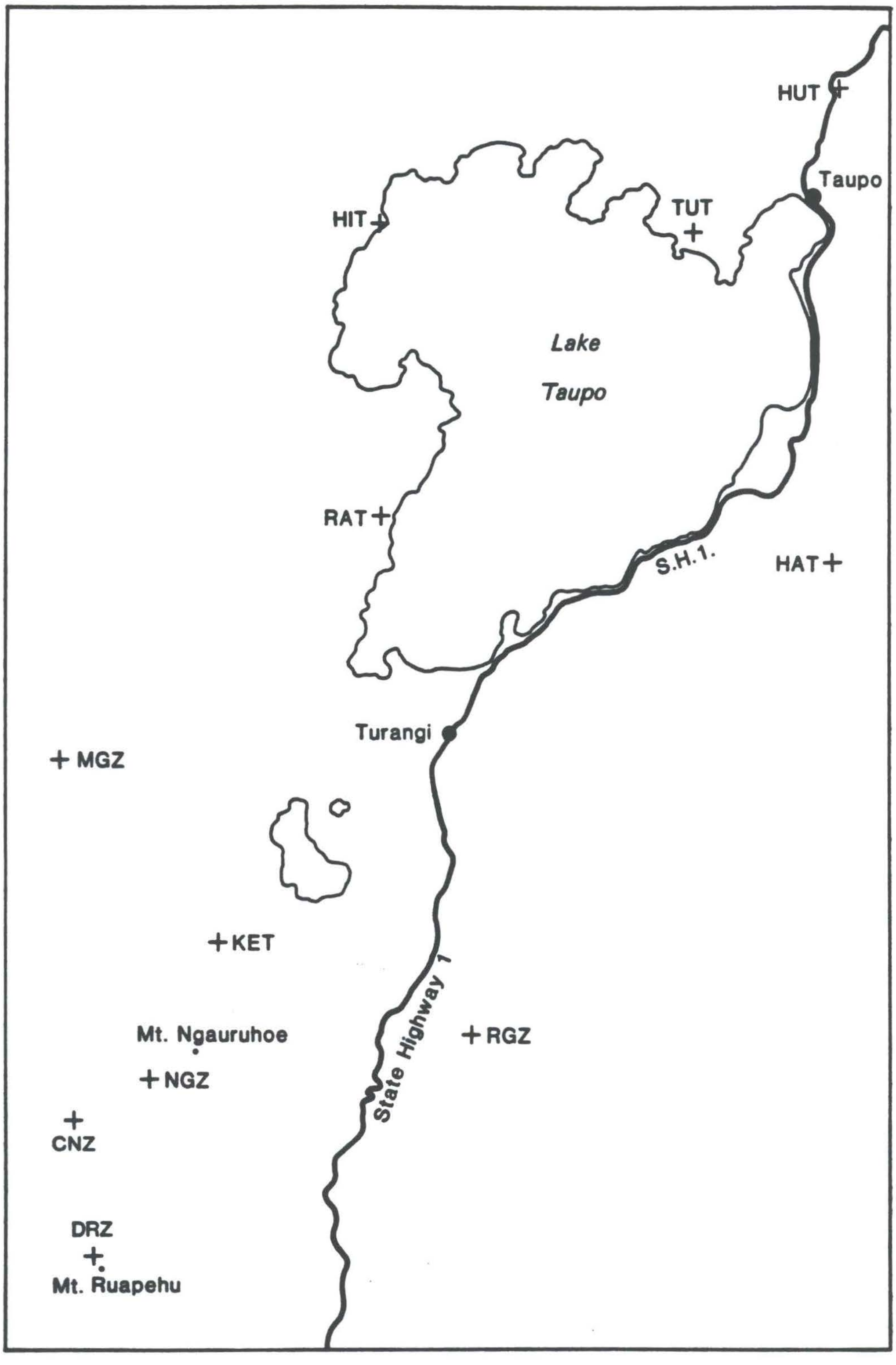
The most widely used signals from the Time Service are the six 'pips' transmitted by those stations of the Broadcasting Corporation of New Zealand that carry the National Programme. The beginnings of the pips mark the 55th to 60th seconds of a particular minute, and each consists of 150 ms of 1 kHz tone, except when the pip indicates an exact hour and its length is doubled. Signals are transmitted on each hour and at 22h 58m and 22h 59m U.T.

Time-pips originating at the Time Service are also transmitted by some commercial stations of the Broadcasting Corporation of New Zealand, by Radio Windy (Wellington) on 891 kHz and by Radio Rhema (Christchurch, Nelson and Wellington) on 1503 kHz, but signals from other private stations are not under Observatory control, and cannot be recommended for navigational or scientific purposes.

The more extended signal intended for navigational purposes, formerly transmitted by Wellington Radio on 417·5 kHz (call sign ZMO) between 22h 54m and 23h 00m each day was not broadcast in 1986.

In addition to the radio time signals, hourly signals are sent to the New Zealand Railways by land-line.

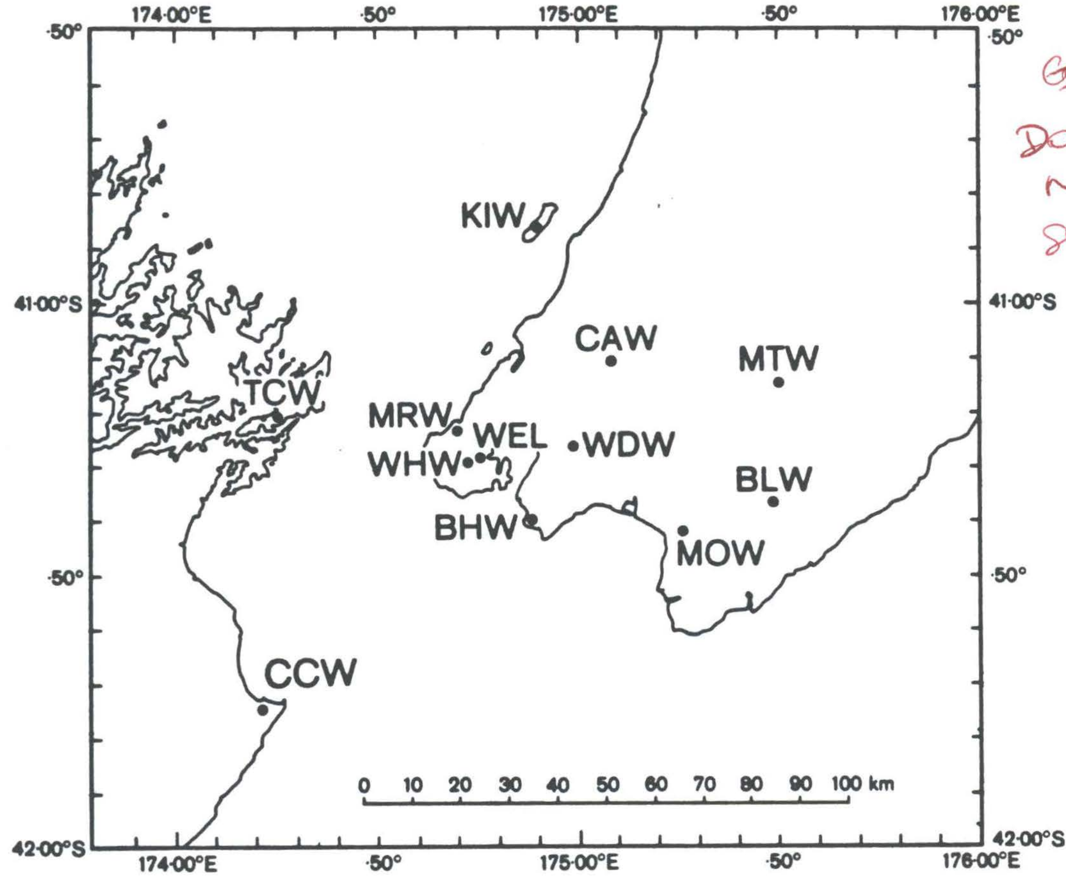
LIST OF MAPS 1986



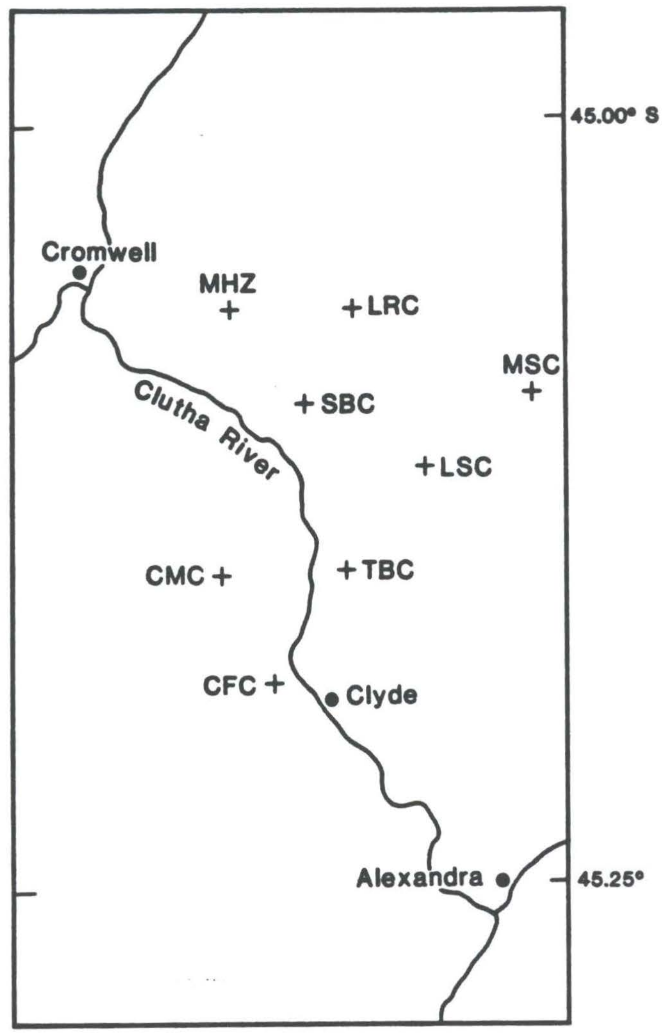
The stations of the Taupo Net are destined to become an integrated network, with central recording at Wairakei near Taupo, primarily for monitoring potential volcanic hazards in the area. Stations within the Tongariro National Park are used for volcano monitoring and research, as well as for determining the origins of tectonic earthquakes.

Make station symbol a +

~~Combine~~ Do not need this separate fig.

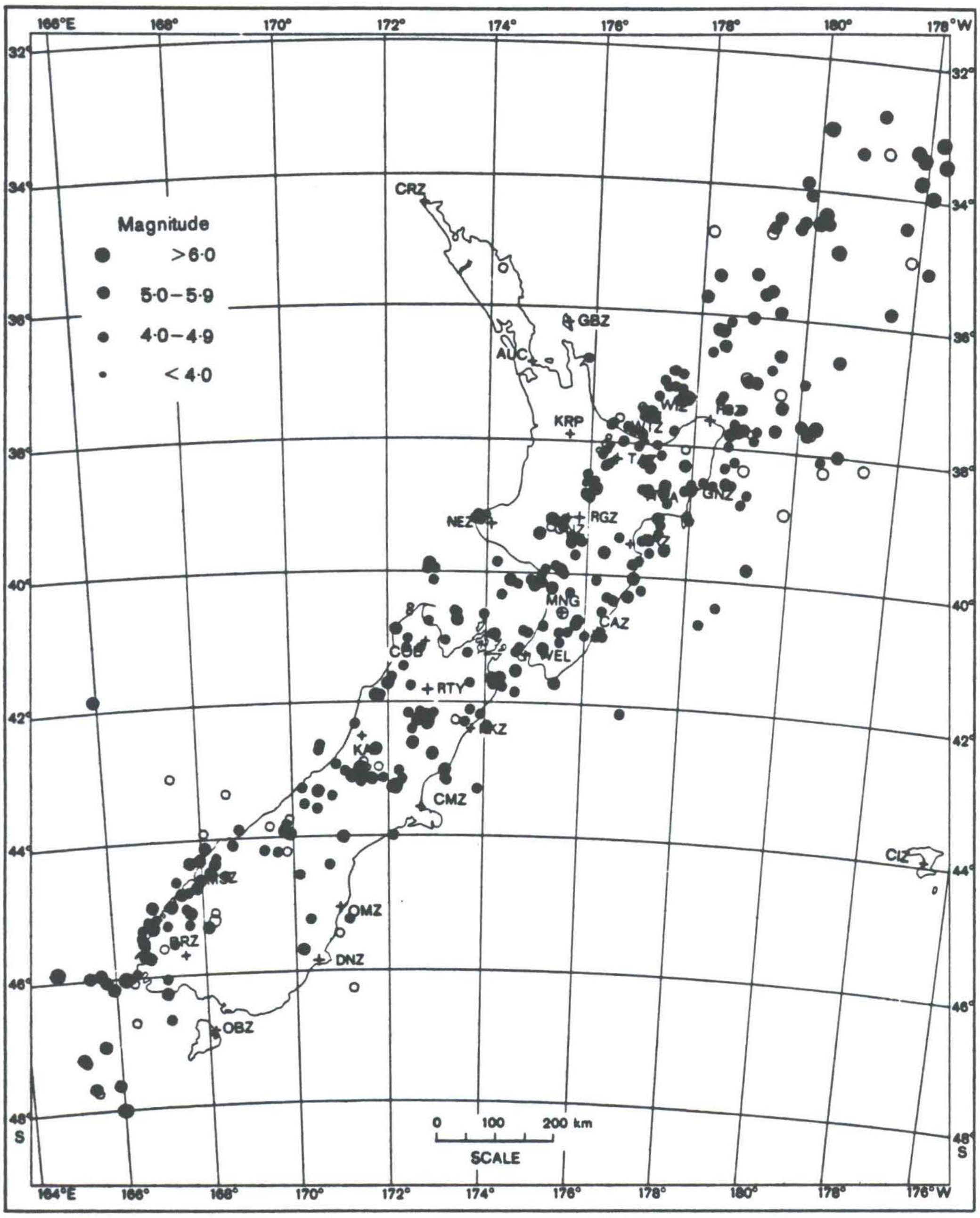


The Wellington Net, with central recording at the Observatory, has been used for seismological research in the local area and is also valuable for preliminary determination of epicentres of large regional earthquakes.



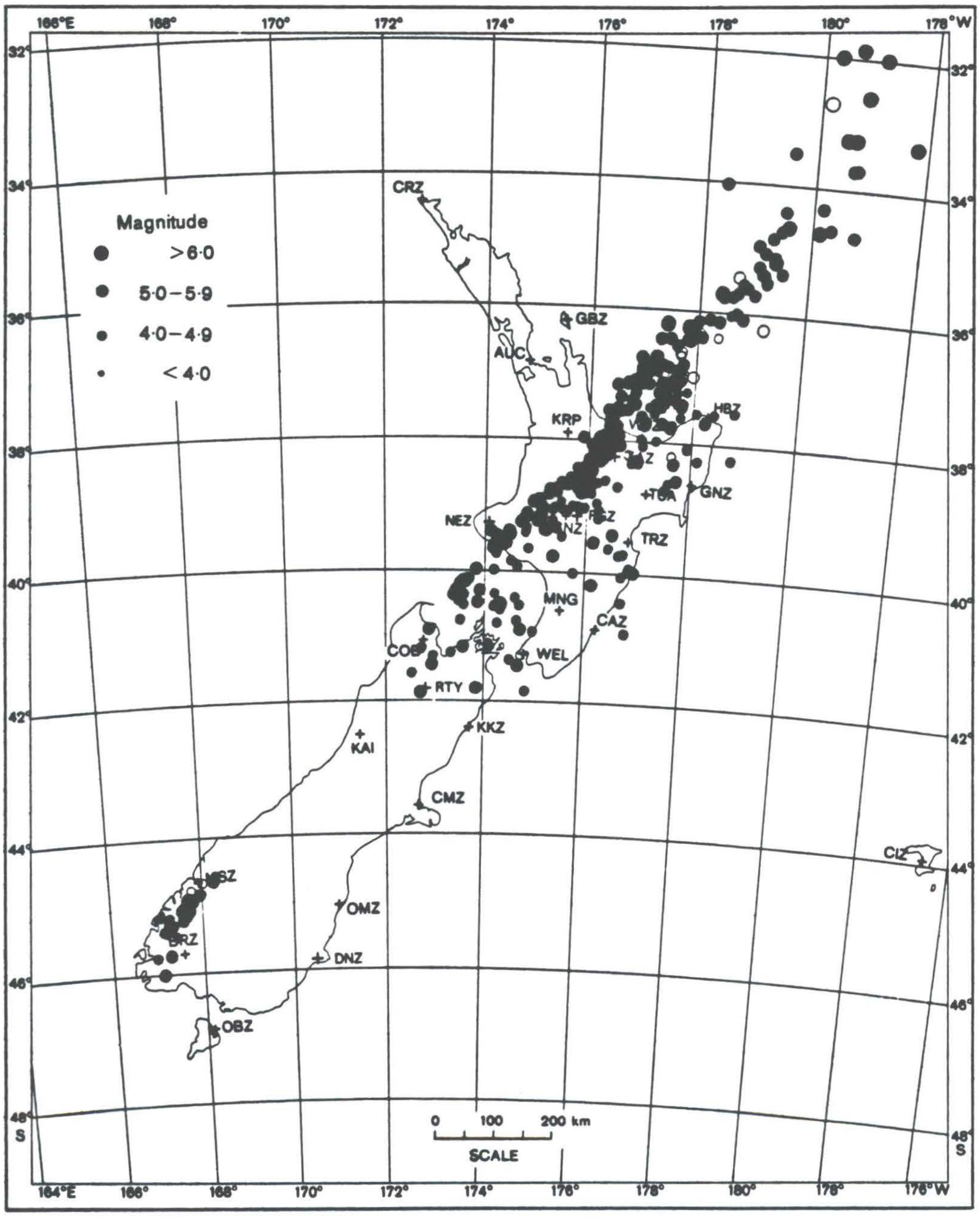
The centrally recorded Clyde Net has been set up to monitor seismicity in the vicinity of the Clyde dam, both before and following impounding.

SHALLOW EARTHQUAKES 1986



This map shows the instrumentally determined epicentres of all earthquakes whose focal depths are less than 40 km. Shocks with a standard error greater than 2·0 sec., and those that have been recorded at only four or fewer stations are shown by open circles. The size of the circle is an indication of instrumental magnitude. When several shocks have the same epicentre, the largest is shown.

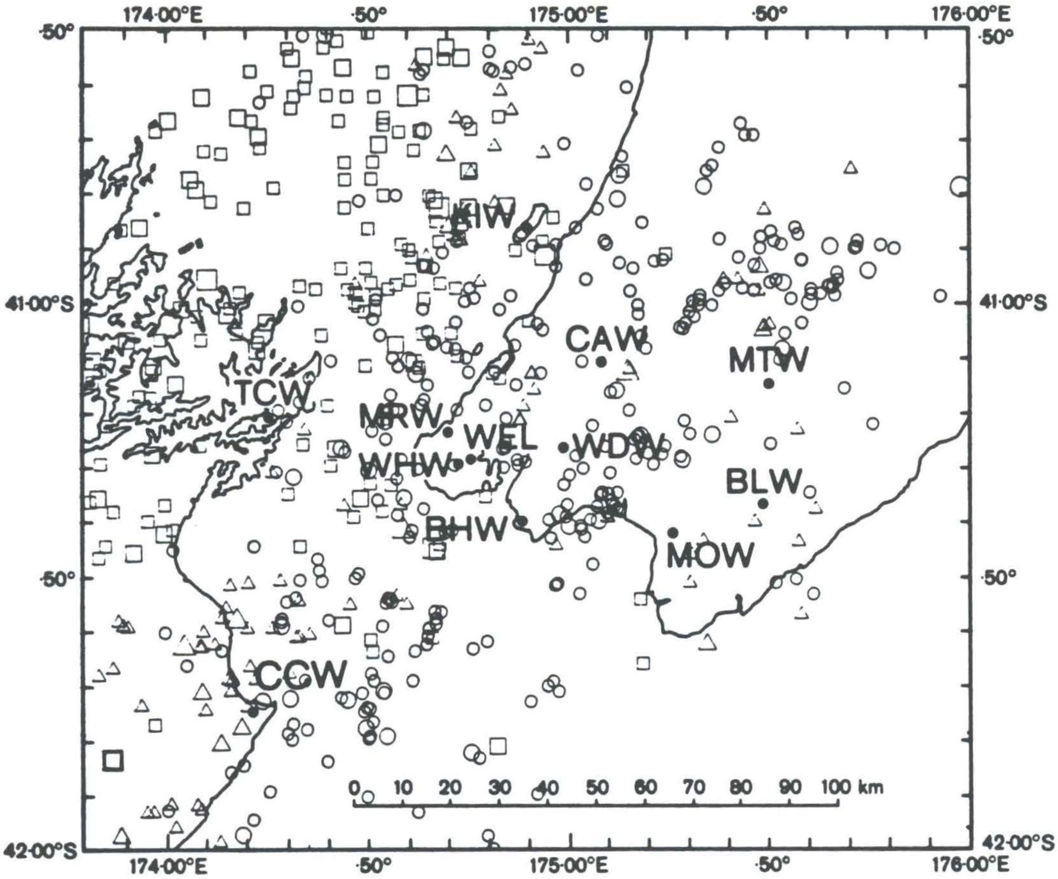
DEEP FOCUS EARTHQUAKES 1986



This map shows the instrumentally determined epicentres of all earthquakes having focal depths of 40 km or more. Shocks with a standard error greater than 2·0 sec., and those that have been recorded at only four or fewer stations are shown by open circles. The size of the circle is an indication of instrumental magnitude. When several shocks have the same epicentre, the largest is shown.

All epicentres as circles
Stations as +

WELLINGTON EPICENTRES 1986



This map shows the instrumentally determined epicentres of earthquakes recorded by the Wellington network. Shocks with depths <20 km are shown by triangles, those with depths of 20-40 km by circles and those with depths >40 km by squares.

Cross Section
plotted on computer by
Russell.