MMA Memo No. 250

National Radio Astronomy Observatory

Seismicity and Seismic Hazard at MMA site, Antofagasta, Chile

SERGIO E. BARRIENTOS

Departamento de Geofisica
Universidad de Chile

June, 1996

Seismicity and Seismic Hazard at
MMA site, Antofagasta

Introduction

Chile, because of its location along the convergent margin between Nazca and South American plates, presents not only high rates of earthquake activity but also has been the site of the largest earthquakes worldwide. This makes seismicity one of the most important factors contributing to general natural hazards in this region.

Ideally, to estimate future ground motion at any given place it would be optimum to have records of the ground motion at the same site in the past, and have certainty on the recurrence periods of the earthquakes that give rise to those accelerations.

Unfortunately, in most cases there are only estimations of recurrence of large earthquakes based on one or two intervals. An exceptional case occurs in central and southern Chile because these regions have been inhabited for longer times therefore up to four intervals between large earthquakes can be determined. The other major disadvantage is the lack of records of ground motion at all places within Chile. At most, there are records only at few selected sites.

The lack of proper records at the desired site forces us to use a probabilistic approach, which is based on earthquake rates and laws of attenuation of ground motion calculated for generic zones, instead for the particular region of interest. It is necessary to make use of methods and techniques which allow estimation of ground motion based on records at other sites and magnitude-frequency distributions of earthquake production occurring within the region of interest.

Method

The general technique used in this work is the same as that proposed by Cornell (1972) and Algermissen and Perkins (1976) which later Barrientos (1980) and Martin (1990) adapted for Chile. In the probabilistic approach, the estimation of maximum acceleration at a given site within a certain time period involves three steps:

1.- Delineation of source areas,
2.- Analysis of statistical characteristics of historical earthquakes in each seismic source area, and
3.- Calculation of the extreme cumulative probability $F_{max,t}$ (a) of acceleration for some time *t*.

Seismogenetic areas

The first step is to determine the size and location of the area containing epicenters of earthquakes that could affect MMA installations. A region of 250 km of radius centered at the MMA site was selected. Earthquake catalogs were collected and those events with epicenters located between latitudes 21°-25.5°S and longitudes 65°-73°W (Figure 1, Appendix I) were selected. Based on this figure, two major conclusions can be drawn: a) seismicity is mainly constrained to the Wadati-Benioff zone (inclined plane dipping east from the trench) b) no shallow activity is present near the MMA site (solid star)

According to these observations, the characterization of seismicity will include only one region: the Wadati-Benioff zone.

Large earthquakes in the area

Along the subduction zone on which Chile is located, the largest earthquakes take place along the boundary between the oceanic Nazca plate and the overriding South America plate. The coupling region between these two plates is constrained to the shallowest 50 km (Tichelaar and Ruff, 1992). This region includes roughly the area between the trench and the coast. One example of these type of earthquakes is the July 30, 1995, M w =8.1 earthquake. The rupture extension associated with this earthquake is roughly 180 km long by 60-70 km wide with an average displacement of approximately 5 m.

On Dec. 1950, a large Mw=8.0 event took place downdip along the plate subduction (Kausel and Campos, 1992). This event has been interpreted as rupturing completely the subducting lithosphere and probably, along with the large thrust earthquakes along the coast, represent the major threat to MMA installations in the area. This event produced an intensity VII-VIII in Modified Mercalli scale (IV in the old Chilean intensity scale) as shown in Appendix II. Kausel (1991) suggests that normal faults in Chile produce relatively larger intensities than those associated with equivalent thrust events.

Seismicity from catalogs

Fig. 2a shows the number of events, independent of magnitude, as a function of time. First reports of seismicity began on 1910, corresponding to an earthquake M=7.3 at 120 km depth. Since then, only the largest earthquakes were reported until mid- 1 920's when the threshold in magnitude was lowered due to the expansion in number and quality of seismological observatories around the world. The most significant change came in the early 60's, when the U.S. Geological Survey deployed more than 100 seismological stations around the world under a program named World Wide Standardized Seismographic Network (WWSSN). These stations, consisting of 3-component instruments of both short and long period bands, allowed the detection of even lower magnitude events around the world. Errors in epicenter locations easily reach one degree (about 110 km) for the older events but this number decreases to about 20 km in longitude and no more than 10 km in latitude in the latter part of the catalog.

The highest peak in the number of events, occurring in 1995, is due to aftershocks of the Mw=8.1 1 earthquake of July 30. Previous relative higher peaks also coincide with a large Ms=7.0 event in March, 1987.

Because recurrence times of large earthquakes are longer than those for smaller events, different time periods are needed to establish their regular rate of occurrence. This is evident, on one end, when magnitude 5 earthquakes are considered; these events have been detected regularly only during the last few years, due to increased capabilities of seismological observatories, therefore only the last few years should be considered to establish the rate of earthquake production. If the interval is long enough, periods with no reports of earthquakes for this magnitude range will be included, making the rate decrease artificially. On the other end, at extreme of large earthquakes, a longer interval is needed to include those events reported at the beginning of the catalogs, which have longer recurrence times.

$$Log\ N = a - bM \qquad (1)$$

in which the N is the cumulative number of events with magnitude greater or equal magnitude M. In this case, a = 4.03:~:0.34, b = 0.83~0.5, with a regression coefficient of 0.98; note that the coefficient a has been normalized by unit area (one degree of latitude by one degree of longitude) and represents the number of earthquakes with magnitudes greater or equal to 0 per year in an area of one degree by one degree; in this case, according to the least squares estimation, there are more than 10700 earthquakes with magnitude greater or equal than 0 per degree square.

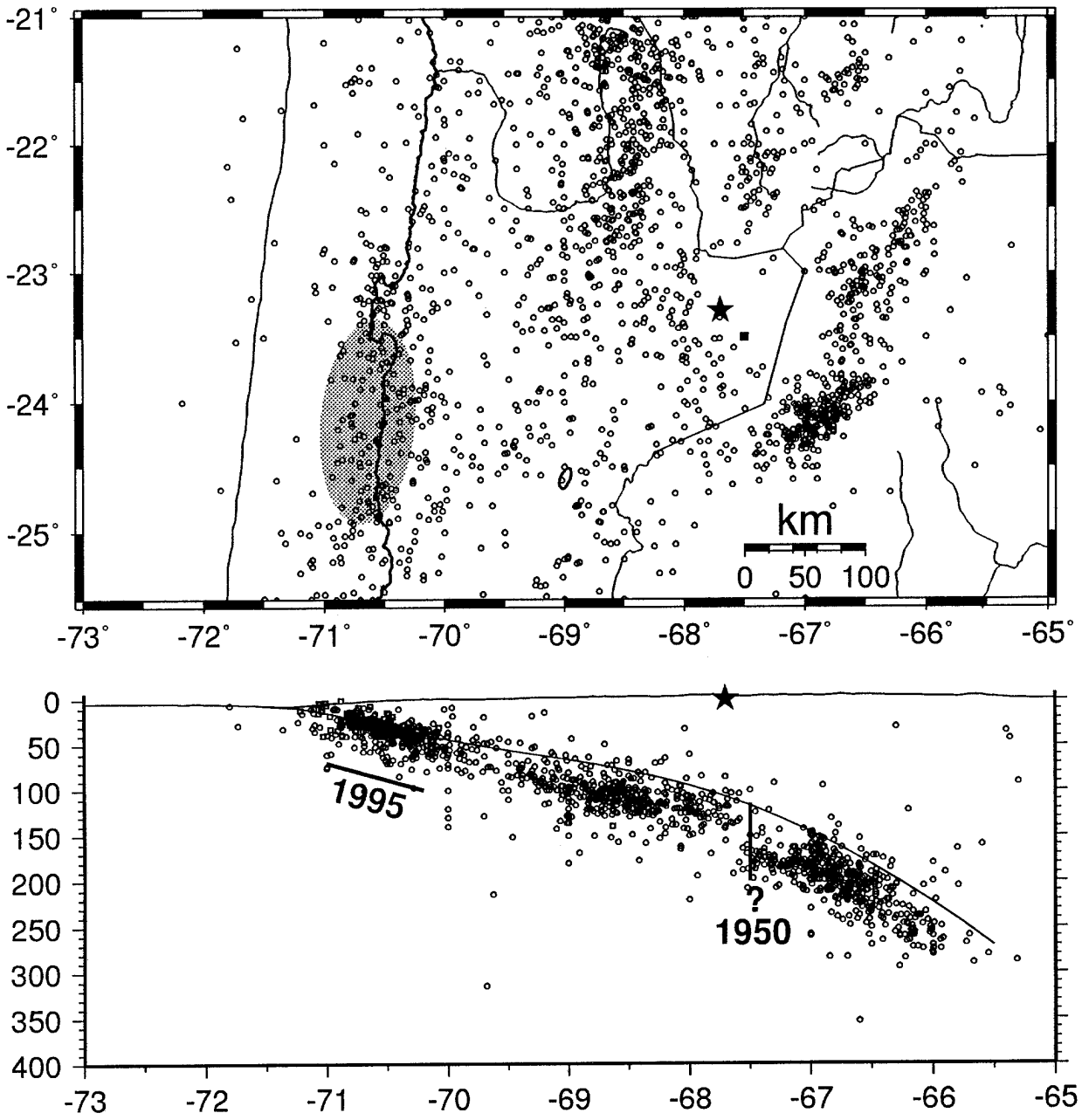

Fig 1. Map (above) and cross-section (bottom) view of the selemicity of the area of Interest. The NRAO site Is represented by a solid star. The Wadatl-Benloff (plate Interface) plane Is represented by the solid line. The two largest events In the region are the 1950 (epicenter is the solid square) and 1995 (ellipse shows the approximate rupture region) earthquakes.

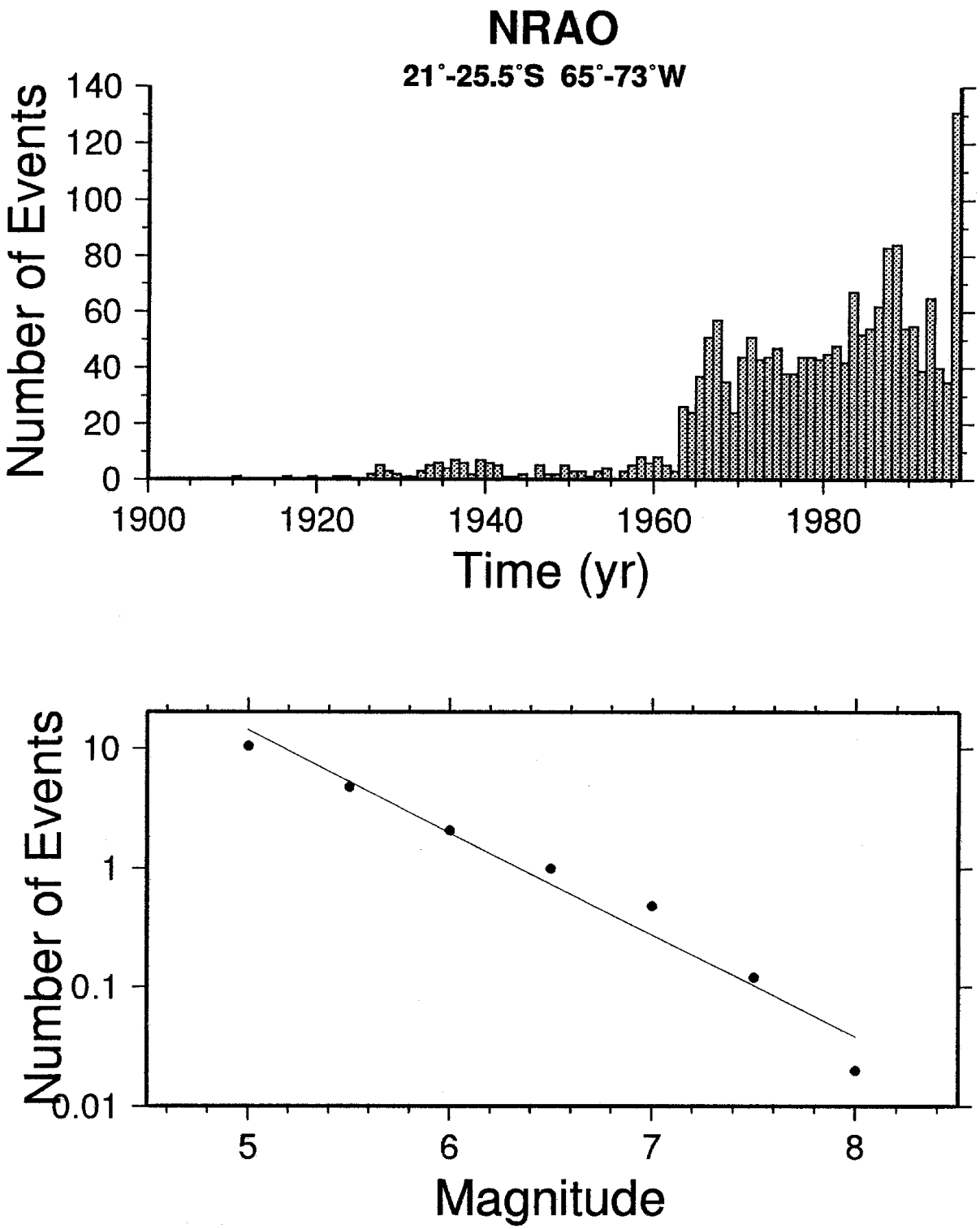

Fig. 2. Time distribution (above) of earthquakes within the region of interest. There Is a significant Improvement In capabilities of earthquake location In 1964 due to the deployment of the WWSSN stations. The cumulative magnitude distribution (bottom) Is best represented by Lo' N = 4.03 -0.83 M.

We have used Ms (calculated magnitude from surface waves) in all calculations and, when not available, we have transformed it from mb (calculated magnitude from body waves) using the relationship

$$M_s = (m_b - 3.29) / 0.4 \quad (2)$$

found by Martin (1990) based on all earthquakes, which occurred in Chile, showing both types of magnitude.

Attenuation of ground motion with distance

To determine the contribution of each of the sources to the seismic hazard it is essential to estimate how the parameter (peak acceleration or Mercalli intensity) decreases with distance. Horizontal peak acceleration decays as a function of distance according to:

$$a = \frac{71.3e^{0.83Ms}}{(R+60)^{1.03}} \quad (3)$$

in which Ms is earthquake magnitude and R is the hypocentral distance (Martin, 1 990).

This attenuation relationship has the same form but the coefficients are slightly different to those proposed by Saragoni and Schasd (1989), calculated considering the total number of peak accelerations generated by the 1985 Central Chile earthquake and represents the decay of acceleration for medium soils (basement or consolidated sediments). Fig. 3 shows the decay for several magnitudes of interest.

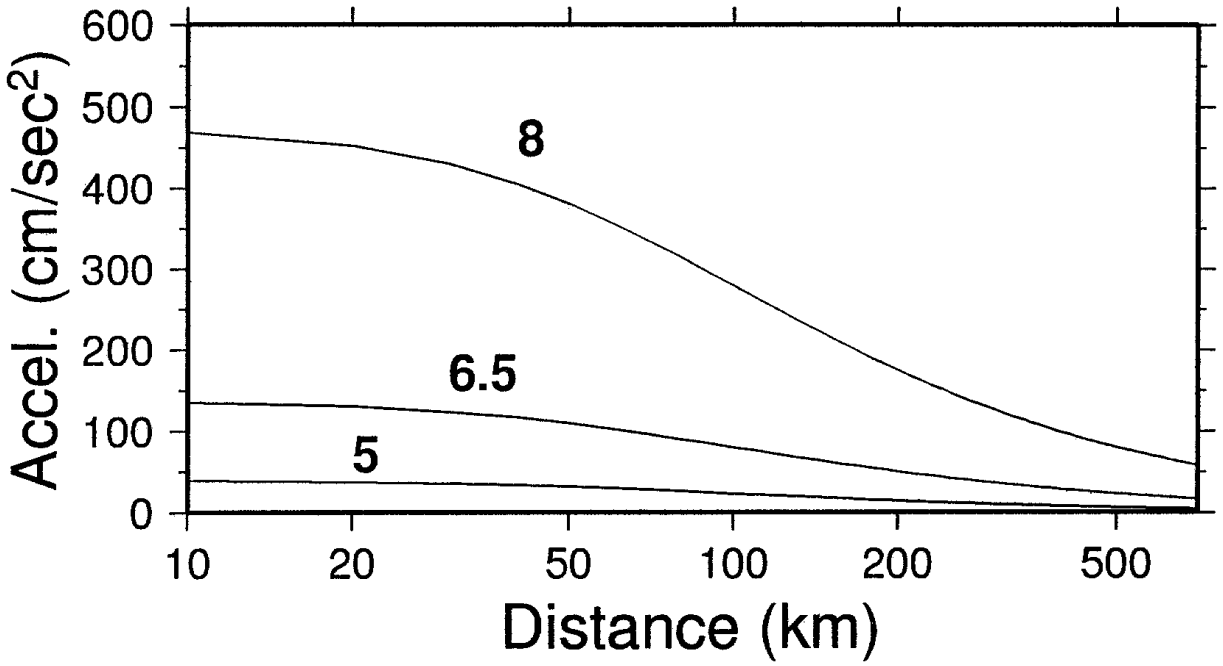

Fig. 3. Horizontal strong ground motion (acceleration) attenuation for three sources with different maganitudes based on eq. (2). Their depths have been set at 40 km.

Probabilistic Estimate

Accelerations

Once the source characteristics (seismic productivity and location) and the attenuation relationship are known, it is possible to estimate the probability of exceedence of a certain level of any given acceleration. For this, the seismogenetic region is divided into several subregions (in our case, we used 25 km long (or quarter of a degree) by 25 km long sources. Since on each of the cells the frequency-magnitude distribution, given by eq. (1), is the same, we determine the number of events within that cell which do not produce accelerations greater or equal the acceleration of interest according to:

$$f(a) = \frac{\text{Expected \# of occurrences with} A \leq a \text{ and } M \leq M_{min}}{\text{Total \# of occurrences with } M \geq M_{min}} \quad (4)$$

This calculation is performed over a minimum magnitude Mmin of interest for each cell, defined in this study as 5.0

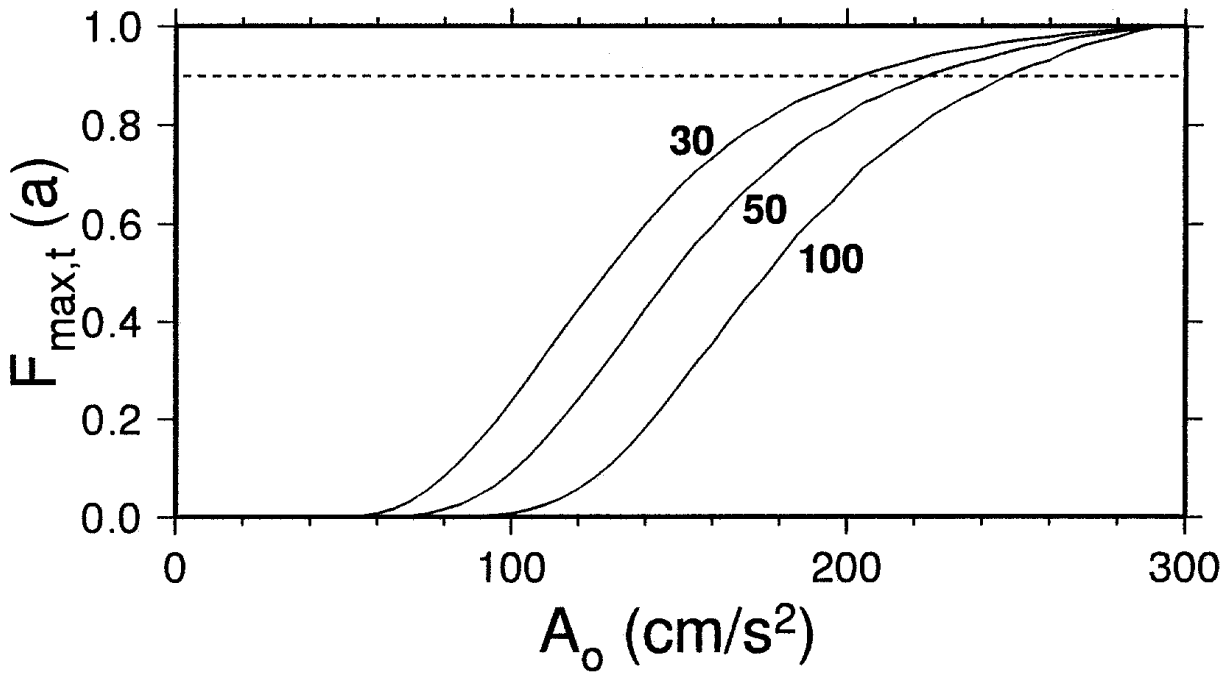

Fig. 4. $F_{max,t}$ (a) represents the probability that a given acceleration A_o will not be exceeded in 30, 50, or 100 years.

The temporal dependency is included by means of a mean rate of earthquake productivity 0 (number of earthquakes per year per unit area with magnitude greater than Mm i n):

$$F_{max,t}(a) = e^{-\varphi t[1-f(a)]} \quad (5)$$

which can be interpreted as the probability that a given acceleration a will not be exceeded in t years. Equivalently, the complement of $F_{maX,t}$ (a), calculated as [1-$F_{maX,t}$ (a),], will be understood as the probability that any given acceleration a will be exceeded in t years. Curves of $P_{maX,t}$ (a), for 30, 50 and 100 years are presented in Figure 4.

These results can be interpreted in the following manner: for a period of 30 years there is a 90% chance of not exceeding 200 cm/s^2 (20% of g). If that period is expanded to 50 and 100 years, there is a 90% probability level of not exceeding 220 cm/s^2 (22% g) and 250 cm/s^2 (25% g) respectively.

Intensities

An alternative, and complementary, method of estimating future ground motion at any given site, can be performed over another variable, Intensities. These are reported by observers all along Chile and their number is much greater than those observations for accelerations. The intensity attenuation (measured in the Modified Mercalli scale) as a function of distance and magnitude (Barrientos, 1980) is well represented by l(r) = 1.38M - 3.741Og(r) - 0.0006r + 3.85 (6) in which M is magnitude Me and r is the hypocentral distance.

Following the same procedure as the one performed in the previous section over accelerations, using the same seismic sources, it is possible to estimate probability levels of not exceeding a given intensity, Io. The results of this analysis, shown in Fig. 5, indicate that there is a 90% probability of not exceeding intensities between VI-VII and VII for 30, 50 and 100 years.

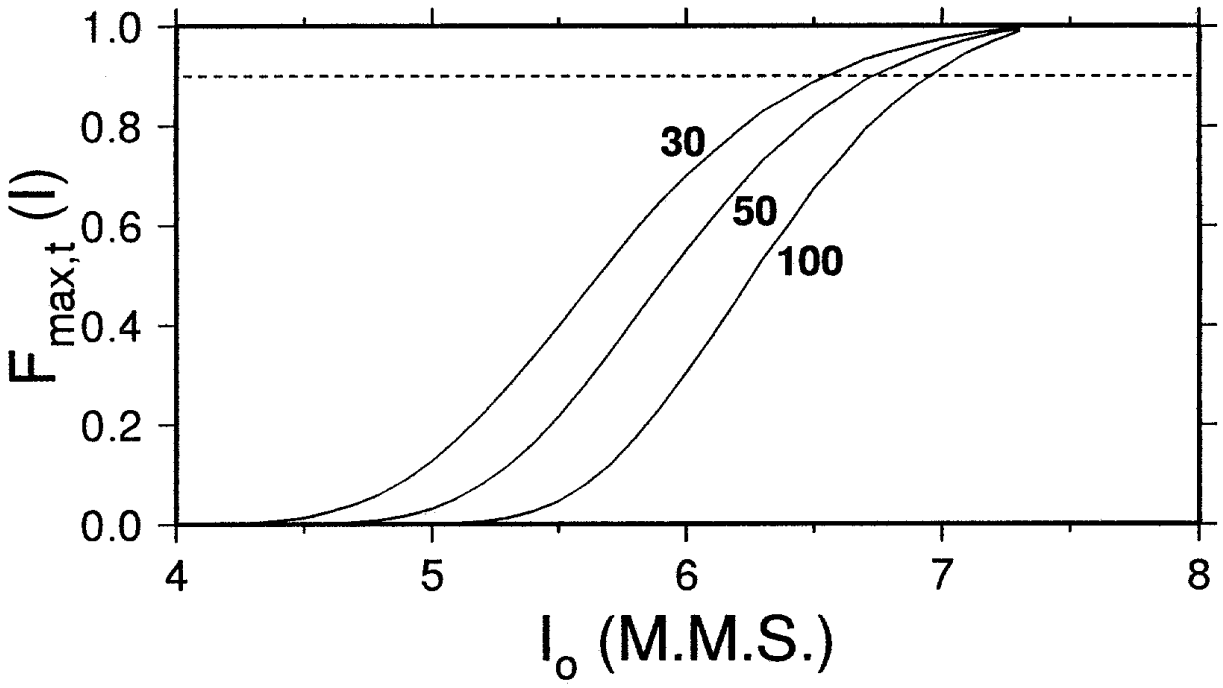

Fig. 5. $F_{max,\,t}$ (l) represents the probability that a given intensity l_o will not be exceeded in 30, 50, or 100 years.

Discussion

The MMA site near Antofagasta, Chile is exposed to mainly two types of seismic events, regarding the size of them. These are the regular thrust earthquakes, which take place along the contact of the Nazca and South American plates (usually with rupture areas located offshore, about 300 km away from the MMA site), and the tensional events which represent the fracturing of the Nazca plate itself, at nearly 100 km depth, just beneath the MMA site. While in the former the maximum magnitudes can reach values well over 8, in the latter they are expected to be around 8. Even though the associated maximum magnitudes are less than those corresponding to the thrust events, these tensional events produce higher hazard at the MMA site because of their relatively closeness. Fortunately, these events are not located close enough, they are at 100 km depth so attenuation plays an important role in decreasing wave amplitude. As the best example, one earthquake of these characteristics took place in 1950 producing the intensities shown in Appendix II. Intensity IV in the old Chilean scale corresponds to Mercalli intensity between VII and VIII. According to the relationship between acceleration and Mercalli intensity for Chilean earthquakes,

$$\text{Log } a = \frac{1}{2.9} - \frac{1}{4.5} \qquad (7)$$

(Saragoni et al., 1980), an intensity 7.5 (VII-VIII) corresponds to an acceleration of 231 cm/s^2 (23%g). Note that this is the type of earthquake that, due to its closeness to the site and its large magnitude, is expected to represent the major threat to the site. These are maximum expected accelerations which could be slightly modified according to the local geological conditions.

Large thrust events which could affect MMA installations are repetitions of the 1868 (southern Peru-northern Chile) and 1877 (northern Chile) events. At the MMA site, the corresponding intensities were V and VI-VII (Modified Mercalli scale). These maximum intensities correspond to accelerations between 27 and 155 cm/s^2 (2.7-16%g). Expected accelerations, associated with the last Antofagasta earthquake of July 30, 1995, are of the order of *70* cm/s^2 (7.1%g), based on the attenuation relationship (3).

According to the seismic productivity levels of the region, its location along the Wadati-Benioff zone, and the ground motion attenuation relationship with distance and magnitude, it is expected that 25%g will not be exceeded within 100 years at 90% probability levels.

Lower estimates are found when using Intensities instead of accelerations, 90% probability levels of not exceeding intensities between VI-VII and VII for 30, 50 and 100 years are found. When eq. *(7) is* used, intensity levels of VII (for 100 years) correspond to the order of 16% g.

References

Algermissen, S. T., and D. M. Perkins, A probabilistic estimate of maximum acceleration in rock in the contiguous United States, U. S. *Geolog. Surv. Op.-File Rep. 76-416,* 1976.

Barrientos, S., E., Regionalizacion SIsmica de Chile, M. Sc. Thesis, School of Engineering, University of Chile, 1980.

Comte, D. and M. Pardo, Reappraisal of great historical earthquakes in the northern Chile and southern Peru gaps, *Natural Hazarda, 4,* 23-44, 1991.

Cornell, C. A. Engineering seismic risk analysis, *Seism. Soc. Am. Bull., 58,* 15831606, 1968.

Kausel, E. The influence of large thrust and normal earthquakes in the assessment of the seismic hazard, *Workshop on New horizons in strong ground motion: Seismic studies and engineering practice,* Santiago, Chile, 1991.

Kausel, E. and J. Campos, The Ms=8 tensional earthquake of December 9, 1950, of northern Chile and its relation to the seismic potential of the region, *Phys. Earth Planet. Int. 72,* 220-235, 1992.

Martin, A., Hacia una nueva regionalizacidn s~smica de Chile, Engineering Thesis, School of Engineering, University of Chile, 1990.

Nishenko, S., Circum-pacific seismic potential: 1989-1999, *PAGEOPH, 135,* 160,259, 1991.

Ruegg, J. C., J. Campos, R. Armijo, S. Barrientos, P. Briole, R. Thiele, M. Arancibia, J. CaButa, T. Duquesnoy, M. Chang, D. Lazo, H. Lyon-Cen, L. Ortlieb, J. C. Rossignol and L. Serrurier, The Mw=8.1 Antofagasta (Northern Chile) Earthquake of July 30, 1995: First results from teleseismic and geodetic data, *Geophysical Research Letters, 23,* 917-920, 1996.

Saragoni, R. and Schaad, F6rmulas de atenuaci6n considerando el terremoto de

1985, V Jornadas Chilenas de Sismologla e Ingenieria Antisismica, Santiago, 1989.

Saragoni, R., J. Crempien and R. Araya, Caracterlsticas experimentales de los movimientos s~smicos fuertes Latinoamericanos, III Jornadas Chilenas de Sismologia e Ingenierfa Antistsmica, 1980.

Tichelaar, B. and L. Ruff, Variability in the depth of seismic coupling along the Chilean subduction zone, J. *Geophys. Res,* 96, 11997-12022, 1992.

Appendix I

Earthquake Catalog

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19101004	23:00:06	22.000	69.000	120		7.3
19160825	09:44:42	21.000	68.000	180		7.5
19191228	18:46:44	21.430	65.720		5.3	
19220328	03:57:54	21.000	68.000	90		7.2
19230119	10:24:	22.000	66.000		5.2	
19260428	11:13:50	24.000	69.000	180		7.0
19260812	22:17:48	23.000	70.000			6.8
19270522	01:45:10	21.000	67.000	140		6.3
19270801	11:28:36	24.000	66.500	200		6.5
19271003	23:55:52	21.000	68.000	100		6.5
19271117	20:54:47	24.000	66.500	200		5.5
19271126	12:53:58	24.500	67.000	180		6.8
19280417	18:23:	24.100	65.400		5.8	
19280526	08:28:56	23.500	69.000	130		6.3
19281120	20:35:07	22.500	70.500			7.1
19291019	10:12:52	23.000	69.000	100		7.5
19291019	20:20:42	23.000	69.000	100		6.0
19301224	06:02:50	24.700	66.300	30		6.0
19310718	05:27:05	22.500	69.000	150		6.8
19320227	08:49:40	22.500	70.000	120		5.5
19320426	07:54:48	25.000	69.500	70		6.5
19321101	10:38:54	24.000	70.000	100		6.0
19330210	08:46:01	23.000	68.000	110		5.8
19331010	03:34:12	22.500	69.500	110		5.5
19331012	07:12:50	23.000	69.500	100		6.3
19331025	23:28:16	23.000	66.700	220		7.0
19331103	04:14:43	22.000	70.500	70		5.5
19340324	22:52:46	23.000	66.000	270		5.8
19340624	05:59:34	22.000	68.600	100		6.9
19340721	10:37:	24.400	67.400		5.6	
19341128	05:48:50	22.500	69.000	80		5.8
19341216	16:31:10	24.000	68.000	150		6.0
19341223	09:52:28	21.000	68.000	100		6.5
19350213	17:22:01	25.500	69.000	100		6.5
19350228	07:10:25	23.000	67.000	200		6.3
19350508	20:57:	24.000	67.000		5.4	
19350928	04:00:30	23.000	68.500	100		5.3
19360131	15:14:15	22.000	67.000	160		5.5
19360622	10:28:06	22.000	68.000	100	5.7	6.0
19360713	11:12:15	24.500	70.000	60		7.3
19360726	07:36:53	24.000	70.000	40		6.8
19361107	05:07:30	24.000	66.000	200		5.8
19361107	06:32:47	23.000	67.000	200		6.0
19361129	14:55:10	22.500	67.000	230	5.8	6.0
19370224	18:45:45	23.000	67.000	260		5.3
19370314	11:55:48	24.500	69.500	60		6.5
19370924	19:09:52	22.500	70.000	130		6.0
19371012	20:50:55	25.000	68.500	110		6.5
19371101	08:35:05	25.000	70.000	75		6.0
19371212	14:03:45	25.000	70.000	60		6.0
19380424	14:10:58	23.500	66.000	180		6.0
19380804	08:54:51	24.000	68.000	220		6.8
19390118	12:40:11	21.500	70.000	70		5.8
19390513	00:43:35	22.000	66.000	210		5.5
19390513	00:43:35	22.000	66.000	210	5.4	5.5
19390704	18:26:12	21.000	66.000	290		6.8
19390812	19:41:04	24.000	68.500	70		5.8
19391005	04:55:50	22.000	67.000	240		6.0
19391101	19:11:45	21.500	68.000	240		5.7
19400324	11:48:39	23.000	66.000	280		5.8
19400807	02:55:57	22.000	68.500	110		6.3
19400918	15:09:03	23.000	68.000	110		6.5
19401003	04:56:08	21.000	70.000	110		6.3
19401004	07:54:42	22.000	71.000	75		7.3
19401006	15:38:20	22.000	71.000	60		6.8
19410403	14:55:16	22.500	66.000	260		6.5
19410403	15:21:39	22.500	66.000	260		7.2
19410810	19:17:51	23.500	66.500	220		5.5
19410814	01:43:40	23.000	66.750	180		6.0
19411110	09:44:50	22.000	67.000	200		6.3
19420708	06:55:45	24.000	70.000	140		7.0

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19431201	10:34:46	21.000	69.000	100		7.0
19440723	16:13:39	24.000	66.500	250		6.0
19441222	22:31:47	25.000	70.000	120		6.5
19460227	06:05:39	23.000	66.500	270		6.0
19460510	23:32:09	24.500	69.000	100		5.8
19461009	20:25:49	25.500	67.000	33	5.9	
19461013	23:13:06	22.000	66.500	200	5.6	6.0
19461105	06:59:40	25.500	67.000	160	5.8	
19470121	20:06:40	25.000	70.000			7.0
19470611	02:26:12	23.700	65.700		5.1	
19480816	10:45:11	24.500	65.600	160	5.5	
19480922	07:17:52	24.500	65.600	160	6.1	
19490131	14:53:16	21.000	65.000	250	5.3	
19490313	18:43:	21.500	68.000	120	5.6	
19490508	21:24:21	21.500	69.000	100		6.8
19490530	01:32:44	22.000	69.000	100		7.0
19490701	03:26:53	22.000	68.000	100	5.5	
19501121	13:55:59	21.000	65.500	287	5.5	
19501204	21:34:51	21.000	67.500	64	5.2	
19501209	21:38:48	23.500	67.500	100		8.0
19510414	00:45:29	23.300	66.400	223		7.0
19510423	13:17:04	21.000	67.500	287	5.5	6.3
19511109	22:07:55	21.750	68.000	120	5.9	6.8
19520921	02:30:35	21.750	65.750	260	6.1	7.2
19530106	16:05:43	21.000	67.500	160	5.7	
19530809	05:53:29	22.100	68.700	128		6.3
19531207	02:05:24	22.100	68.700	128		7.1
19540414	07:54:21	23.900	69.200	96		5.5
19540621	01:48:43	23.200	68.300	128		6.6
19540724	08:54:30	22.500	67.500		5.1	
19541219	10:23:41	23.100	66.600	223		6.6
19560121	17:54:15	21.000	67.500	100	4.8	
19561124	01:56:06	22.500	67.000	150	5.4	
19561218	02:31:	25.500	68.500			7.0
19570131	00:47:	22.000	66.000	150	5.6	
19570331	02:22:33	22.000	67.750	100	5.5	
19570429	10:11:53	22.000	66.000	200	5.4	
19570729	17:15:14	23.500	71.500			7.0
19571129	22:19:38	21.000	66.000	200	7.0	7.8
19580406	16:57:31	22.000	67.000	200	4.6	
19580430	19:27:32	21.000	67.500	150	5.4	6.0
19580508	12:40:49	24.230	67.160	178		6.4
19580516	15:15:48	22.000	68.000	200	5.0	
19580519	17:31:30	22.000	68.000		5.5	
19580711	19:10:20	21.000	69.000			6.5
19580714	22:09:54	22.000	67.500		4.6	
19581011	14:37:42	23.500	65.000	200		6.0
19590707	05:42:45	21.500	66.500	150	4.8	
19590920	23:17:34	22.500	67.500	150	4.6	
19591121	16:39:	21.000	68.000		4.6	
19591222	: : 0	21.430	65.720		5.4	
19591225	10:18:52	25.440	68.710	111		6.6
19591228	10:03:08	22.500	67.500	100	5.6	
19600716	04:44:34	21.500	67.000	150	4.9	
19601030	12:14:36.1	23.400	70.300	76		6.8
19601030	21:32:47.7	22.900	68.000	60		6.8
19601109	01:17:36.8	21.600	67.500	131	5.2	
19601109	20:06:16.2	23.400	70.600	52		5.6
19601202	09:10:39.1	24.600	69.700	19		6.8
19601202	09:37:36.1	24.400	69.500	46		6.8
19601206	08:56:09.4	21.400	69.200	28		5.4
19610328	21:01:56.2	22.100	68.000	125	5.7	6.0
19610428	08:42:55.9	21.900	68.000	123	4.8	
19610508	19:23:35.4	24.500	69.700	48		5.3
19611109	04:19:42	22.900	67.900	84		6.3
19611109	04:19:42	22.900	67.900	84	5.4	
19620124	03:01:19.2	21.600	66.700	219	5.2	
19620803	08:56:17.1	23.300	68.100	107		7.1
19621204	07:23:04.2	21.800	65.600	300	5.0	
19630415	05:40:43.4	23.800	69.000	112	5.0	
19630430	23:50:26.9	22.200	66.900	95	4.7	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19630504	07:38:53.3	24.700	66.600	153	4.6	
19630505	15:17:02.1	24.800	69.600	53	5.4	
19630507	16:23:11.8	22.100	68.700	112	5.7	
19630525	00:14:38.1	21.000	69.100	113	4.5	
19630525	07:56:58.8	24.200	66.800	185	5.1	
19630607	00:20:51.8	24.100	67.000	180	5.2	
19630621	12:18:24.4	23.800	66.600	203	5.2	
19630718	11:15:11.3	22.500	67.000	258	4.6	
19630814	14:32:36.7	22.300	68.700	120	5.1	
19630824	01:41:40.5	22.400	68.500	66	4.7	
19630830	00:43:19	23.300	66.300	239	4.6	
19630912	02:28:53.2	22.000	67.600	160	4.5	
19630920	07:25:11.8	21.500	68.300	125	4.7	
19630920	14:41:22.6	21.500	68.000	155	4.8	
19631006	15:01:42.1	22.000	69.400	33	4.6	
19631019	04:59:31.1	21.200	71.000	33	4.6	
19631020	01:54:12.5	23.400	68.400	118	4.5	
19631029	15:49:10.3	24.800	68.600	67	5.0	
19631102	21:35:29.8	24.300	68.100	106	4.8	
19631122	18:57:02.5	21.000	67.900	87	4.8	
19631127	07:41:01.3	23.300	65.800	164	4.5	
19631201	16:06:14.8	21.200	68.400	61	4.5	
19631203	23:03:41.6	22.400	69.300	18	6.1	
19631214	19:13:53.3	22.800	70.500	48	4.5	
19640102	06:32:58.9	21.600	68.200	110	5.1	
19640205	21:13:19	23.700	68.800	90	4.6	
19640219	15:25:58.9	21.400	70.700	80	5.2	
19640331	15:20:28.9	22.800	66.800	219	4.5	
19640409	19:43:15.9	22.100	69.800	54	4.5	
19640420	10:51:13.3	22.900	69.200	78	4.6	
19640508	20:36:54.1	24.200	69.300	78	4.9	
19640524	18:01:34.8	23.200	71.600	33	4.5	
19640619	15:06:07	24.400	68.700	49	4.6	
19640630	11:28:57.5	23.300	66.600	353	4.5	
19640706	14:06:32.6	24.200	69.700	128	4.5	
19640712	16:48:21.7	24.500	66.900	164	5.1	
19640817	08:42:47.5	22.000	67.000	192	4.7	
19640905	02:09:21.4	24.400	68.200	64	4.9	
19640906	16:13:23.2	21.500	66.800	233	4.7	
19640911	04:23:56	23.900	66.600	195	5.3	
19640922	09:05:06.4	23.900	70.700	33	4.7	
19640927	22:58:29.3	21.400	68.700	132	5.4	
19641002	16:52:06.4	21.700	67.700	49	5.0	
19641008	14:38:01.8	22.600	69.400	33	4.7	
19641204	09:21:14.2	21.300	67.400	60	4.7	
19641220	15:45:25.3	22.200	69.100	100	4.5	
19641225	09:51:02.2	22.500	67.300	92	4.6	
19641225	17:56:40.1	25.300	68.100	101	5.0	
19650131	12:57:29.1	21.200	67.800	71	5.6	5.0
19650131	14:57:24.9	21.100	67.800	71	5.1	
19650207	04:37:34.6	21.600	66.000	110	4.8	
19650211	14:16:11.5	23.800	67.700	101	4.6	
19650213	22:30:33.2	22.800	68.200	33	5.2	
19650221	14:09:19.1	22.600	69.000	109	4.9	
19650226	14:26:55.9	22.800	65.300	91	4.5	
19650305	21:25:53.1	21.000	68.400	83	4.8	
19650308	23:11:31.7	24.600	67.100	168	5.4	
19650322	03:05:33.3	23.800	66.700	176	5.5	
19650322	20:46:16.2	22.400	68.100	110	5.0	
19650331	20:22:55.7	23.900	70.600	33	4.5	
19650416	12:51:48.7	21.700	68.100	127	5.0	
19650503	16:09:09	24.200	67.800	114	5.6	
19650503	19:17:30.7	22.100	68.800	33	4.5	
19650506	02:25:12	25.000	68.400	90	5.1	
19650507	23:56:11.6	22.200	68.500	84	5.5	
19650512	19:35:41.6	21.900	65.900	283	5.1	
19650518	16:36:25.9	22.600	70.100	35	4.6	
19650527	12:18:52	24.200	65.900	190	4.5	
19650606	06:10:31.5	23.700	66.200	122	4.7	
19650618	10:48:33.2	23.800	67.400	148	4.7	
19650623	00:28:04.4	24.000	65.900	33	4.5	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19650630	11:12:43.4	21.200	66.100	170	5.1	4.8
19650701	04:54:51.4	23.300	67.700	85	5.1	4.5
19650720	13:38:49	22.100	68.400	123	4.5	
19650730	18:58:58.7	24.400	67.700	140	5.3	
19650812	03:57:54.6	22.200	69.100	70	4.8	
19650817	20:45:33.6	21.100	69.100	110	4.8	
19650914	14:27:16.8	22.700	66.700	283	4.5	
19650924	06:59:33.2	21.300	68.800	125	4.5	
19650925	20:59:18.8	24.500	68.600	102	4.8	
19650926	00:20:37.3	24.300	69.200	115	4.5	
19651022	18:35:54.6	25.000	71.200	15	5.1	
19651026	12:15:07.5	24.500	70.200	52	5.5	
19651031	13:47:56.7	24.800	68.900	108	5.4	
19651216	22:46:28.5	22.500	68.500	104	5.4	
19660104	06:29:23.7	22.200	70.000	27	4.5	
19660104	14:51:46.6	24.500	67.400	33	4.5	
19660105	00:25:41.9	23.300	70.100	33	4.6	
19660109	04:06:29.8	21.500	69.700	57	5.4	
19660203	00:47:19.2	21.700	68.400	117	5.3	4.7
19660207	14:59:49.1	24.800	68.800	102	4.5	
19660208	14:54:30.5	24.200	67.300	173	4.9	
19660220	10:03:16.6	21.400	66.600	227	4.9	
19660222	13:07:18.9	24.200	68.300	33	5.0	
19660301	12:21:51.7	23.400	68.100	120	4.9	
19660305	13:49:15.1	24.700	67.800	33	4.6	
19660307	21:44:52	21.600	69.200	112	4.7	
19660311	09:30:44.3	23.600	69.400	76	5.4	
19660321	13:26:10.9	21.100	68.700	128	5.2	
19660327	14:53:33.2	23.700	66.700	194	4.9	
19660410	05:55:49.5	22.000	68.400	112	4.5	
19660425	02:10:15.2	22.000	68.500	115	4.5	
19660426	21:07:32	22.800	70.300	54	5.0	
19660608	15:02:01.9	23.000	66.300	226	4.6	
19660616	20:32:25.2	21.900	67.200	190	5.5	
19660712	08:01:36.2	21.300	68.800	94	4.9	
19660714	01:49:36.4	23.200	70.300	42	4.7	
19660719	07:25:28.2	23.200	66.800	187	4.7	
19660727	04:48:59.8	24.100	70.300	35	5.5	5.6
19660822	17:00:57.5	22.500	70.300	62	4.8	
19660825	22:20:34.5	22.600	68.600	113	4.5	
19660825	23:18:51	22.400	68.600	112	5.3	
19660908	08:28:54.3	23.500	66.600	219	5.2	
19661005	17:53:24.8	21.800	68.700	114	4.6	
19661005	23:38:21.5	23.400	69.400	47	4.7	
19661103	09:02:13	21.500	68.900	104	4.7	
19661106	08:36:05.3	24.200	67.000	184	4.5	
19661107	12:49:58.5	22.500	68.600	103	4.6	
19661112	11:50:30.6	23.900	67.700	118	5.6	
19661129	12:10:23.4	21.400	68.900	119	4.5	
19661130	14:59:16.9	23.500	68.900	85	4.8	
19661202	23:01:18.2	22.500	69.300	33	4.6	
19661210	10:38:39.6	24.200	68.000	124	5.3	
19661217	17:41:20.3	22.700	68.800	105	5.2	
19661228	10:09:36.8	25.000	70.700	57	4.6	
19661228	11:29:27.9	25.100	70.900	48	4.6	
19661228	14:38:57.8	25.400	70.600	33	4.8	
19661228	21:03:16.2	25.500	70.700	33	4.7	
19661229	00:20:01.1	25.500	70.900	33	4.7	
19661229	01:48:27.6	25.500	70.600	22	5.4	
19661229	09:29:26.7	25.400	69.200	14	4.6	
19661230	02:20:31.6	25.500	70.900	33	4.8	
19661230	09:53:36.9	24.800	70.600	45	5.2	
19661230	11:55:52.7	25.500	70.700	34	4.9	
19661230	12:30:25.6	25.000	70.700	34	4.6	
19661230	17:09:59	24.300	67.100	175	4.5	
19661231	16:42:08.7	25.300	71.200	33	4.8	
19670101	13:13:39	25.182	70.610	17	4.5	
19670102	06:53:18.2	25.034	70.928	37	5.1	
19670102	10:57:53.7	25.119	70.362	33	4.5	
19670106	19:04:40.6	25.321	70.314	51	4.5	
19670109	04:47:04.5	24.808	70.859	33	4.5	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19670110	04:58:04.7	25.180	70.872	38	4.5	
19670110	22:24:26.1	25.445	70.758	33	4.8	
19670112	19:14:09	25.466	70.842	40	4.5	
19670113	13:03:19.9	25.254	71.100	33	4.6	
19670113	19:24:35.2	25.135	70.290	65	4.5	
19670116	07:11:12.2	24.167	66.823	188	5.4	
19670201	23:46:06	22.383	67.228	179	4.7	5.6
19670203	23:25:47.2	21.438	67.257	190	5.1	5.6
19670211	19:48:02.7	21.912	70.720	29	4.9	
19670212	14:08:13.8	21.704	70.247	27	5.5	
19670217	07:58:19	25.496	71.109	14	4.8	
19670221	07:28:03.2	25.492	71.499	33	5.1	
19670308	21:03:35.2	22.180	67.516	187	4.5	
19670309	11:43:13.4	23.847	66.440	206	4.7	
19670312	18:56:48.5	24.870	68.857	94	4.5	
19670313	20:08:26.9	24.048	70.400	84	4.5	
19670316	13:26:33.9	25.461	71.064	33	4.7	
19670325	12:18:24.8	23.049	66.529	204	4.9	
19670408	09:30:18	21.830	68.592	123	4.9	
19670411	10:40:21	23.214	68.865	92	5.0	
19670429	16:55:03.8	24.893	70.388	70	4.8	
19670430	07:23:58	23.969	70.481	35	5.2	
19670520	12:52:06.9	23.346	69.257	101	4.5	
19670526	07:41:45.7	24.656	70.645	57	4.5	
19670621	20:09:28.4	25.200	70.500	23	5.7	
19670626	17:36:09.6	22.600	69.600	78	4.5	
19670703	12:43:56.6	22.800	69.000	97	4.8	
19670717	10:15:24.2	25.500	70.900	33	4.5	
19670719	09:11:04.5	21.300	66.600	234	4.8	
19670802	22:41:12.2	22.300	68.700	107	4.5	
19670806	12:13:19.3	25.200	71.100	27	4.5	
19670817	23:20:02.7	22.800	68.900	90	4.7	
19670820	15:03:36.2	25.200	69.000	109	5.6	
19670824	01:18:51	24.600	66.900	172	4.5	
19670902	12:17:12.1	24.600	71.400	33	4.8	
19670908	08:59:59.3	23.400	70.700	33	5.5	
19670911	19:17:23.1	25.200	70.300	33	4.7	
19670912	11:48:45.4	24.700	71.100	35	4.6	
19670914	20:32:39.3	23.500	70.200	38	4.8	
19670918	18:41:39.6	24.100	70.300	49	5.1	
19671018	06:38:55.3	22.000	69.200	92	4.7	
19671022	00:52:10.9	22.300	65.700	259	5.2	
19671023	10:51:56.4	23.900	66.600	192	4.5	
19671117	07:49:03.1	24.500	68.500	119	4.6	
19671117	18:31:14.1	21.600	68.200	129	4.7	
19671211	07:07:57	25.500	71.400	33	4.5	
19671214	03:20:47.8	24.000	69.300	53	5.1	
19671221	02:25:21.6	21.800	70.000	33	6.3	
19671225	10:41:31.6	21.500	70.400	53	5.8	
19671227	09:17:55.7	21.200	68.300	135	6.4	
19671227	09:54:02.3	21.300	68.400	115	4.7	
19680102	22:45:08.5	22.600	66.600	237	5.3	
19680104	14:48:30.3	21.500	70.700	44	4.9	
19680113	04:36:14.1	21.400	70.600	66	4.6	
19680113	16:07:04.2	24.200	66.900	192	5.7	
19680113	21:29:26.4	24.300	67.000	177	4.8	
19680128	15:19:48.8	23.900	65.400	34	4.7	
19680130	20:12:41.7	22.000	68.500	118	5.3	
19680206	05:31:03.3	25.200	68.500	97	4.5	
19680208	10:10:07.1	21.800	68.500	119	4.8	
19680226	22:57:27.2	23.600	66.300	204	5.3	
19680309	17:26:15.7	24.200	66.800	148	4.6	
19680317	09:56:34.5	21.200	68.100	122	5.1	
19680322	04:15:52	22.300	67.900	146	4.7	
19680404	22:06:57.3	22.700	68.400	110	5.1	
19680411	17:13:40.5	21.200	66.600	225	5.2	
19680421	09:24:35.5	23.400	70.500	41	5.5	
19680503	00:18:09.4	22.948	68.028	114	4.6	
19680507	16:14:42.6	22.992	68.571	114	4.6	
19680516	22:45:19.2	22.767	68.646	104	5.0	
19680611	11:38:50	21.199	69.609	22	4.7	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19680615	21:33:22.3	21.189	65.704	283	4.9	
19680728	21:18:59.5	22.676	69.433	70	5.1	
19680812	02:15:57.9	21.135	68.721	130	4.7	
19680824	13:36:03.6	22.379	68.411	122	4.6	
19680824	19:28:57.9	23.883	67.678	118	4.8	
19680907	07:23:07.8	22.376	67.419	173	4.7	
19680922	21:52:59.2	24.131	66.912	194	5.5	
19680929	22:14:52.6	24.106	66.867	209	4.6	
19681008	14:53:38.5	23.349	66.542	221	5.6	
19681011	07:50:30.7	22.163	69.755	55	4.8	
19681028	02:53:26.8	24.387	66.890	163	5.1	
19681109	06:17:24	22.397	67.258	185	4.6	
19681211	03:40:48	25.219	70.375	50	5.0	
19681211	12:56:15.9	21.637	68.364	120	4.7	
19681229	16:29:31.1	23.975	66.673	205	5.2	
19690106	00:42:57	21.651	69.520	77	4.5	
19690122	23:14:51.6	22.741	68.607	124	4.5	
19690316	04:40:43.9	22.412	67.478	176	4.7	
19690414	23:17:35.9	21.592	70.760	33	4.6	
19690425	07:12:09.9	21.316	68.374	122	4.5	
19690531	23:54:17.1	22.849	66.417	236	4.6	
19690606	22:25:37.3	22.551	68.418	125	5.0	
19690707	02:41:07.7	24.241	66.930	168	4.5	
19690710	08:42:28.5	23.642	69.670	48	5.4	4.7
19690808	05:12:01.6	21.202	68.559	74	5.4	
19690811	03:43:49.8	23.553	68.437	105	4.7	
19690816	18:27:53.7	22.716	68.541	102	5.0	
19690830	02:14:57.4	21.868	68.164	96	4.5	
19690913	10:52:58	22.883	68.367	106	5.4	
19690919	05:00:17.2	24.672	69.986	55	4.7	
19690921	02:00:54.3	23.552	68.080	120	5.5	
19690922	09:14:31.4	21.655	66.812	208	4.8	
19691005	15:22:46.4	22.535	68.194	105	4.6	
19691011	23:53:24.5	24.328	67.120	171	4.6	
19691107	03:58:30.9	24.063	66.864	211	4.9	
19691111	06:55:32.6	24.874	70.564	39	5.1	
19691112	21:16:16.7	21.372	68.763	124	4.6	
19691114	11:46:54.6	21.601	68.403	114	4.5	
19691211	16:56:25.2	21.179	68.502	119	4.7	
19700106	16:49:54.5	21.243	71.720	28	4.5	
19700126	12:14:52.2	22.690	68.824	110	4.6	
19700203	21:23:09.9	24.413	67.834	111	4.7	
19700212	23:24:13.5	21.265	68.613	146	4.6	
19700215	03:12:57.7	23.361	70.168	56	5.4	
19700216	23:24:00.8	24.933	70.762	34	5.1	
19700228	01:54:32.4	22.247	68.753	107	4.7	
19700309	18:27:26.2	21.327	68.437	129	4.5	
19700313	10:22:39	24.797	68.884	97	4.8	
19700313	17:44:11.8	23.826	67.841	132	4.6	
19700329	11:41:06.7	21.867	69.421	95	4.6	
19700330	05:24:40.6	21.155	68.758	121	5.2	
19700409	07:10:35.5	23.611	68.551	99	4.5	
19700502	18:55:07.4	21.575	68.339	130	5.1	
19700507	09:05:56.9	24.982	70.766	40	4.5	
19700510	19:34:57.4	24.035	66.737	178	5.0	
19700611	06:02:54.9	24.527	68.499	112	6.3	6.8
19700619	10:56:14.8	22.193	70.515	52	6.2	6.4
19700625	02:53:47.3	24.107	66.908	153	4.6	
19700627	21:06:10.3	23.660	67.985	115	4.9	
19700712	08:06:21.2	23.390	68.338	101	5.5	
19700807	09:18:26.9	24.259	66.990	169	5.1	
19700815	05:12:57.9	21.413	68.530	136	4.7	
19700816	16:22:52.9	23.271	68.842	100	4.8	
19700831	09:37:27.3	21.905	68.487	65	4.6	
19700904	19:17:07.2	22.658	68.859	76	4.5	
19700916	14:11:12.8	23.997	70.284	36	4.5	
19700925	23:21:31.6	24.926	68.701	99	5.0	
19700926	14:00:26.8	25.076	68.667	98	4.5	
19701003	18:49:22.1	25.225	71.116	31	5.0	
19701010	21:06:11.1	21.653	68.152	72	4.8	
19701013	01:37:01.5	23.572	70.261	33	4.5	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19701013	04:39:28.4	23.743	70.538	25	5.1	5.2
19701013	08:52:33	22.204	68.668	113	4.7	
19701103	12:36:05.4	23.984	66.841	186	4.6	
19701110	22:12:04.6	22.935	66.161	233	4.6	
19701113	00:08:59.9	22.125	69.999	36	5.6	5.1
19701115	22:18:24.7	21.931	68.314	134	5.2	
19701120	12:05:22.6	22.593	68.734	110	4.8	
19701202	05:12:23.6	22.130	68.724	124	4.7	
19701204	17:08:48.7	23.132	70.114	36	5.9	6.7
19701210	04:19:23.2	22.102	69.062	110	4.6	
19701216	22:55:56.5	22.128	68.524	118	4.7	
19701230	06:08:39.4	24.003	69.304	82	5.5	
19710109	11:58:00.2	21.020	69.354	104	4.6	
19710121	13:19:23.7	24.406	70.279	58	4.9	
19710124	13:04:24.2	22.052	67.093	149	5.3	
19710129	07:05:40.3	24.247	68.616	77	4.7	
19710221	10:35:20.1	23.845	67.159	169	6.3	6.8
19710306	22:13:21.4	21.294	68.273	71	5.4	
19710410	22:38:49.7	23.238	66.323	208	4.6	
19710411	10:40:44.7	23.115	68.750	102	4.6	
19710415	00:00:18.1	21.336	68.545	128	5.3	
19710420	14:12:46.8	21.764	68.955	93	5.7	6.0
19710430	17:34:08.8	24.274	66.934	161	4.9	
19710506	12:45:35.9	24.233	66.920	170	4.5	
19710513	11:03:50.4	24.875	70.212	57	5.0	
19710528	13:27:37.1	22.814	69.760	41	5.1	
19710608	22:44:39.9	23.457	66.708	211	4.8	
19710616	13:54:10	24.153	70.373	47	5.4	
19710617	21:00:40.9	25.478	69.153	93	6.3	7.0
19710618	03:38:02	23.643	68.224	115	5.2	
19710619	16:26:27.4	24.074	66.868	208	5.1	
19710624	15:15:03.6	21.170	68.234	130	4.6	
19710629	06:01:23.1	24.135	68.578	82	5.5	
19710703	15:40:59.7	23.877	66.580	197	4.7	
19710703	23:44:50.6	24.129	68.932	103	5.4	
19710717	20:10:21.5	21.527	68.238	123	5.4	
19710721	13:06:29	21.507	70.774	40	5.2	
19710727	20:17:34.1	22.505	68.023	87	4.5	
19710801	11:43:36.6	21.757	68.799	91	4.7	
19710804	13:56:49.6	21.823	68.370	116	5.1	
19710814	15:00:25.1	21.775	67.230	189	5.7	
19710821	12:47:44.9	21.774	70.211	17	5.8	
19710831	10:21:48.8	23.707	66.789	198	4.5	
19710913	01:55:43.1	24.441	70.158	33	5.0	
19710915	00:29:41.7	24.121	67.035	181	4.5	
19710920	09:57:01.6	25.392	69.159	100	4.7	
19711004	10:53:36.5	24.036	70.100	58	4.9	
19711013	22:36:01.8	21.670	68.179	92	5.8	5.4
19711014	14:31:59.8	21.581	68.176	142	5.4	
19711024	05:36:54.5	25.181	68.970	113	5.1	
19711106	02:16:24	24.185	69.178	69	4.8	
19711110	02:19:12.9	23.537	66.372	198	5.4	
19711117	05:01:21.4	21.746	66.385	221	4.5	
19711121	08:51:11.9	23.205	70.726	40	4.9	
19711203	11:43:00.5	24.845	68.678	72	4.7	
19711203	14:46:01.3	22.789	70.611	37	5.1	
19711204	01:38:47.2	23.174	66.609	206	4.5	
19711208	16:05:23.2	22.912	70.757	18	5.6	5.6
19711209	09:11:05.6	22.908	70.914	21	4.6	
19711211	13:31:45.5	22.911	70.510	33	5.0	
19711211	21:27:10.4	23.018	70.604	38	5.2	4.9
19711218	09:07:41.9	22.806	70.479	30	4.6	
19711221	23:00:32.5	23.115	70.636	24	4.8	
19720105	01:14:37.4	24.353	69.422	83	4.6	
19720112	20:09:45.1	21.465	68.379	126	4.7	
19720113	04:42:40.5	22.604	70.266	55	4.5	
19720119	08:51:04.2	22.975	66.409	265	4.7	
19720125	00:46:49.5	23.074	67.918	113	4.9	
19720203	14:14:14.3	22.502	67.523	161	4.6	
19720204	13:29:12.3	22.928	68.789	94	5.4	
19720213	03:10:17.8	21.146	68.485	138	5.1	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19720216	12:11:29.4	22.228	67.398	142	4.9	
19720220	04:00:25	21.018	70.709	31	5.0	
19720301	21:39:44.1	24.785	70.040	61	5.5	
19720331	12:19:56.3	21.482	70.745	49	4.7	
19720506	11:40:30.5	23.222	66.163	215	4.5	
19720518	15:52:44.1	23.426	66.582	209	4.5	
19720518	17:37:20.6	23.203	66.696	195	4.8	
19720520	05:27:46.2	21.402	68.707	121	4.5	
19720521	07:51:48.4	21.532	68.242	128	4.7	
19720523	16:42:30	23.350	68.804	106	4.7	
19720525	14:12:14.7	24.317	69.665	74	4.8	
19720527	11:45:37.4	22.804	67.758	118	4.8	
19720608	17:57:38.6	22.581	66.170	259	5.4	5.2
19720614	05:10:42.5	25.353	69.234	89	4.5	
19720618	14:04:15.2	24.170	66.985	146	5.3	
19720619	01:44:40.2	22.192	67.333	181	5.0	
19720624	10:36:26.4	21.489	69.136	106	4.6	
19720627	18:27:11.2	21.430	66.553	234	4.9	
19720711	19:56:59.7	22.771	69.823	68	4.7	
19720804	12:24:42.2	25.442	70.501	62	4.5	
19720808	08:22:40.9	24.217	68.687	103	4.6	
19720825	15:47:25.4	21.576	68.428	127	4.5	
19720904	04:33:06.4	25.225	68.875	107	5.3	
19720905	11:15:01.5	25.114	69.697	62	4.7	
19721002	23:54:59.4	24.050	67.146	176	4.8	
19721008	14:38:51.7	25.232	68.894	73	4.7	
19721110	07:05:22.7	22.231	68.552	93	4.6	
19721113	23:06:36.4	21.178	68.530	131	4.8	
19721115	04:37:10.6	24.135	66.879	193	4.7	
19721115	04:52:22.3	21.451	66.635	191	4.7	
19721129	19:11:01.7	25.222	70.860	33	4.6	
19721205	22:28:57.5	23.585	67.588	104	4.8	
19721217	10:23:07.7	25.215	69.053	105	4.5	
19721225	10:21:24.8	22.812	70.534	63	5.2	
19721229	07:05:24.8	21.105	67.504	188	4.8	
19730101	09:28:57.2	22.161	65.792	205	4.8	
19730106	06:18:52.3	22.354	69.310	83	4.9	
19730119	10:33:50.4	22.721	66.123	272	4.6	
19730201	05:14:20.6	22.655	66.195	229	6.1	6.7
19730202	04:51:19.4	21.482	68.502	122	4.6	
19730226	18:52:45.4	22.153	69.015	67	5.1	
19730311	09:29:58	23.877	66.605	184	4.6	
19730313	17:46:46	25.309	68.209	103	4.8	
19730318	04:39:47.4	22.362	68.634	121	4.8	
19730320	16:17:30.7	23.175	66.293	203	5.6	
19730324	12:10:45.3	23.315	67.985	121	4.6	
19730407	07:16:22.2	21.399	66.536	198	5.1	
19730409	02:13:01.5	21.103	68.360	125	4.5	
19730524	08:33:06.5	22.266	67.611	112	4.5	
19730526	02:05:30.2	22.341	69.854	78	4.5	
19730529	13:25:17.7	22.266	68.582	111	4.8	
19730531	07:14:37.7	22.338	65.917	263	4.6	
19730531	09:05:38.3	24.192	66.999	180	4.5	
19730606	07:42:20.3	22.481	70.163	59	4.6	
19730621	13:39:29.6	25.467	67.244	33	4.7	
19730628	15:26:40.2	23.863	68.830	94	4.7	
19730713	23:19:08.1	22.901	70.597	40	4.6	
19730715	17:26:52.7	24.227	65.063	33	4.7	
19730723	11:16:50.3	23.439	68.262	102	5.0	
19730728	05:59:46.3	21.431	67.874	159	4.6	
19730801	18:09:12.1	21.480	68.037	89	4.8	
19730802	22:11:25.2	22.419	67.250	184	4.7	
19730805	00:49:58.3	22.812	70.222	43	5.5	
19730816	05:12:43.5	21.415	69.880	82	4.9	
19730826	16:52:28.4	22.939	66.611	215	4.7	
19730828	00:31:19.8	21.233	68.522	113	4.8	
19730830	00:17:52.7	23.036	67.940	125	5.1	
19730918	10:39:13.5	23.358	66.330	215	4.5	
19730920	13:22:26.3	21.578	68.701	120	4.7	
19731003	23:33:39.9	21.221	67.614	173	4.7	
19731028	08:14:29.1	21.690	67.451	210	4.9	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19731104	21:55:04.3	23.264	66.551	178	5.0	
19731121	03:23:09.1	23.596	67.970	108	4.6	
19731127	16:53:19.4	24.251	67.143	180	4.5	
19731130	05:26:09.9	23.240	66.645	201	4.9	
19731208	00:43:44.8	21.900	69.106	193	4.5	
19731216	20:32:04.1	23.520	68.435	106	4.7	
19731222	16:13:39.3	25.209	68.656	114	5.4	
19731229	07:19:25.8	23.223	68.335	124	5.5	
19740102	10:42:29.9	22.538	68.397	105	6.4	6.8
19740102	13:33:49.6	22.640	68.369	99	5.3	
19740103	03:35:20.5	22.544	68.365	102	4.9	
19740107	08:48:26.7	22.361	67.378	175	4.9	
19740109	09:04:42.2	22.868	68.008	113	4.5	
19740112	09:41:18.2	22.527	68.358	102	4.7	
19740112	23:46:44.2	22.561	68.547	91	4.9	
19740121	12:04:31.4	24.213	66.961	190	4.6	
19740124	08:21:30.8	21.934	68.319	118	4.7	
19740204	15:40:19.1	22.140	68.433	118	4.6	
19740216	01:26:59.8	21.349	69.865	74	5.3	
19740225	09:14:40	24.776	70.633	31	4.6	
19740324	16:42:56.8	23.972	66.809	156	4.6	
19740409	08:07:58.3	22.834	68.631	96	4.9	
19740411	15:05:02.8	24.367	66.993	158	4.7	
19740426	06:12:20	24.535	68.860	97	5.5	
19740504	10:46:39.3	23.705	67.981	109	4.7	
19740516	13:07:	25.123	70.634	39	4.8	
19740518	02:35:45.9	24.167	66.828	209	4.5	
19740521	14:07:43.7	23.918	69.213	86	4.7	
19740606	11:27:26.2	21.440	68.461	116	5.1	
19740608	14:52:24.2	22.684	68.561	106	5.0	
19740613	18:11:40.2	24.629	68.832	63	4.5	
19740626	04:23:43.7	21.191	68.424	71	4.8	
19740627	12:40:26.7	24.008	66.834	131	4.6	
19740629	10:37:36	23.973	67.132	196	4.5	
19740708	00:44:14.9	23.037	67.950	127	4.5	
19740710	17:50:58.8	23.348	68.122	121	5.0	
19740720	04:56:20.5	23.954	66.561	205	4.5	
19740724	16:58:58.2	23.789	66.701	222	4.7	
19740804	21:08:52.9	24.421	69.767	68	5.2	
19740824	04:16:27.1	22.580	68.750	109	5.4	
19740825	01:30:51.5	22.754	69.005	33	4.7	
19740828	09:53:42.5	23.178	70.298	22	4.8	
19740902	08:45:16.3	24.357	67.145	163	5.4	
19740906	14:05:32.6	23.394	68.009	106	5.1	
19740916	00:38:15.3	23.935	65.547	280	5.6	
19740917	03:25:20.1	22.555	67.320	176	4.5	
19740920	10:59:53.1	21.927	68.540	108	4.7	
19740921	17:05:15.4	23.257	68.530	106	5.3	
19740921	21:00:46.6	23.234	67.947	127	4.6	
19740927	00:05:28	23.480	66.799	218	4.9	
19740929	10:13:04.9	23.288	70.504	25	4.5	
19741114	17:57:35.8	22.389	68.347	110	4.7	
19741202	11:04:02.1	23.685	66.692	192	4.7	
19741204	10:55:11.6	22.562	70.126	53	5.1	
19741214	14:07:18.7	21.065	68.846	114	4.8	
19750106	13:45:43.2	21.231	68.051	156	4.7	
19750115	06:39:45.9	22.419	68.522	113	4.5	
19750116	06:50:03.4	22.011	68.202	115	4.8	
19750119	03:16:27	23.116	66.381	209	4.8	
19750130	12:12:03.1	23.083	69.792	44	4.5	
19750223	03:53:35.9	21.727	71.356	33	5.6	4.9
19750315	22:38:39.3	21.681	69.584	57	5.1	
19750325	02:21:45.9	21.716	68.519	80	5.1	
19750328	22:30:07.1	22.041	68.250	123	4.9	
19750329	18:30:33.3	23.713	69.647	33	4.8	
19750330	21:37:15.8	22.334	68.652	103	4.7	
19750426	04:46:03.4	24.709	68.078	95	5.3	
19750501	02:31:15.9	24.879	70.692	46	4.7	
19750519	20:35:33.3	23.514	67.751	121	4.9	
19750520	07:11:27.2	24.736	70.571	33	4.6	
19750523	17:12:02.3	22.329	68.280	125	4.7	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19750528	00:26:25.6	21.553	70.042	48	4.7	3.7
19750604	03:33:49	22.857	69.642	46	4.5	
19750610	06:34:13.7	23.402	70.301	29	4.6	
19750615	10:45:06.4	22.480	68.401	83	5.0	
19750622	22:53:04.3	22.396	68.377	124	5.3	
19750702	23:12:56.9	22.630	66.348	208	4.7	
19750703	22:13:59.4	23.936	66.652	191	4.7	
19750810	10:25:43.3	22.648	66.589	166	6.2	
19750813	08:29:54.7	21.431	68.172	176	4.7	
19750821	05:03:37.2	21.979	66.938	186	5.1	
19750826	00:34:02	21.092	68.755	79	5.1	
19750905	19:10:08.9	24.134	66.653	193	5.1	
19751010	13:13:09.4	25.092	68.073	96	5.5	
19751020	03:34:07.3	21.165	68.671	132	5.0	
19751028	06:54:22.4	22.862	70.508	38	5.9	6.3
19751028	07:26:39.3	22.620	69.964	8	5.4	
19751109	15:30:05.9	21.085	68.420	77	5.1	
19751113	16:06:33.8	24.230	66.945	160	5.2	
19751115	10:53:48.8	22.414	66.056	233	4.5	
19751206	22:47:30.4	23.824	68.823	82	5.4	
19751218	22:46:31.3	24.154	66.796	169	4.7	
19751221	22:19:49.5	23.256	66.408	175	4.9	
19760126	20:32:42.2	23.049	66.360	227	4.7	
19760127	16:28:21.6	21.410	68.234	33	4.9	
19760204	01:31:36.6	23.004	67.346	122	4.6	
19760205	09:53:11.7	21.702	68.222	98	5.8	
19760215	16:22:45	23.904	66.555	196	4.9	
19760218	18:03:22.7	22.514	68.613	111	5.4	
19760222	22:26:02.5	22.647	68.237	113	4.7	
19760308	04:26:13.9	21.247	68.607	146	4.5	
19760405	17:56:52.2	22.754	68.650	97	4.7	
19760409	04:16:09	21.675	68.903	103	4.6	
19760501	14:46:52.4	23.888	66.480	202	4.9	
19760505	16:37:09.1	21.725	68.163	73	5.6	
19760507	17:35:43.1	24.109	66.728	183	4.8	
19760604	23:39:36	23.101	68.542	101	5.4	
19760704	00:11:05	22.137	67.447	151	4.8	
19760726	13:30:34.2	22.726	66.131	238	4.7	
19760731	07:27:08.3	24.772	68.283	70	5.2	
19760804	04:17:26.4	25.197	68.976	88	4.9	
19760809	10:10:31.4	23.932	69.122	85	4.9	
19760824	21:26:12.2	25.326	70.694	8	5.6	5.0
19760906	23:58:02.2	21.327	66.301	188	5.5	
19760907	06:00:46.1	23.274	68.201	92	4.9	
19760908	15:42:20.1	24.568	70.454	45	5.3	4.3
19760912	03:51:23.9	24.120	66.766	173	5.6	
19760912	14:18:37.7	23.841	66.467	193	4.6	
19760915	23:51:55.9	23.332	66.679	248	4.9	
19760919	22:17:39.2	24.325	67.295	177	4.9	
19760930	08:04:26.5	24.000	67.908	131	5.3	
19761008	13:47:33.5	22.386	65.977	220	5.1	
19761021	04:24:23.2	22.099	69.902	64	5.1	
19761123	12:46:25.9	21.923	69.281	52	4.8	
19761124	11:26:16.2	22.152	68.422	80	4.9	
19761125	22:36:31.6	21.504	67.166	266	5.1	
19761130	21:12:40	21.079	68.781	119	4.6	
19761203	23:10:32.6	22.577	68.664	93	5.0	
19761204	07:10:44	23.180	68.060	109	4.8	
19761221	03:03:10.2	22.674	66.215	266	4.6	
19761228	13:51:56.9	21.144	68.588	89	5.8	6.3
19770117	21:27:12.6	24.848	68.674	33	6.3	6.5
19770125	06:11:00.7	23.598	70.119	26	4.7	
19770320	05:43:07.4	21.027	68.679	140	5.0	
19770321	06:17:27.8	25.120	70.599	15	5.0	
19770403	14:17:23.9	21.981	70.314	50	4.8	
19770415	23:35:35.6	23.101	68.706	99	5.4	
19770509	12:19:08.3	22.031	68.364	80	5.0	
19770520	21:08:07.4	24.210	66.931	178	5.0	
19770522	09:01:53.1	21.495	67.859	33	4.6	
19770522	19:55:09.3	25.249	69.067	134	4.6	
19770531	14:21:21.9	23.833	66.557	205	4.6	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19770605	02:46:05.9	23.865	70.155	32	5.6	5.1
19770605	06:37:56.9	24.221	66.967	188	4.6	
19770606	13:05:20.1	22.041	68.696	97	4.8	
19770608	13:25:15.6	22.062	67.256	144	5.4	
19770609	02:53:20.3	23.998	66.949	212	4.7	
19770613	08:02:11.9	22.592	68.471	149	4.7	
19770621	23:28:01.6	24.331	68.642	101	4.7	
19770628	00:52:20.6	21.476	68.138	101	4.8	
19770629	05:03:01.5	24.339	66.954	180	4.9	
19770716	12:39:59.9	23.867	66.488	172	4.7	
19770718	08:08:18.1	21.975	68.190	78	4.8	
19770725	18:39:31.2	24.544	68.817	73	4.8	
19770801	16:30:28.5	22.225	68.447	97	4.9	
19770804	10:53:19.3	24.612	67.383	183	4.9	
19770813	05:54:15.2	22.776	67.695	130	4.7	
19770816	00:53:42.7	21.033	68.636	100	4.6	
19770819	03:26:28.8	22.003	68.138	138	5.1	
19770823	03:12:51.9	21.317	68.226	99	5.2	
19770825	16:54:35.3	23.829	66.740	216	4.8	
19770913	05:36:03.7	23.075	66.573	207	4.9	
19770913	20:12:29	22.450	68.352	111	4.8	
19770920	16:23:13.3	23.354	68.328	114	5.3	
19771019	20:29:18.6	24.295	67.146	191	4.9	
19771021	04:55:17	24.006	66.545	173	5.0	
19771025	10:00:15.5	23.369	68.835	114	4.6	
19771029	10:40:57.8	22.006	65.930	263	4.6	
19771108	13:25:55.4	21.116	67.173	152	4.8	
19771116	10:31:05.8	22.589	68.594	125	5.2	
19771123	01:54:21.5	24.243	67.170	181	5.0	
19771127	22:50:40.2	21.495	68.331	98	4.9	
19771204	16:56:43.6	22.545	68.455	112	5.0	
19771224	05:19:24.2	22.818	66.441	194	4.9	
19771224	16:41:14.4	25.270	70.310	40	5.2	
19780103	20:16:51.7	24.101	66.850	195	5.0	
19780104	09:25:46.3	23.654	66.819	192	4.5	
19780114	01:54:07	23.252	68.357	158	5.2	
19780118	04:15:12.9	24.289	66.821	190	4.8	
19780119	20:49:28.4	21.869	68.198	153	4.8	
19780122	10:21:51.6	21.484	66.818	215	4.6	
19780127	18:01:18	23.505	66.852	207	4.5	
19780202	12:34:04.8	22.573	68.341	127	4.6	
19780211	14:43:50.7	21.485	66.708	200	4.9	
19780220	07:11:12.8	24.808	68.908	169	4.6	
19780220	20:48:12.7	24.197	67.739	129	5.1	
19780302	09:07:05.6	21.043	69.207	124	4.6	
19780305	03:27:55.6	24.197	66.983	187	4.6	
19780308	20:37:35.8	22.882	68.589	157	4.9	
19780417	00:27:55.3	24.085	66.776	226	4.5	
19780508	01:52:06.1	22.149	68.515	110	4.8	
19780527	06:28:10.2	21.135	68.505	133	4.7	
19780527	23:21:05.3	23.934	67.585	132	4.5	
19780529	00:05:34.1	24.147	66.814	175	4.7	
19780529	19:07:07.5	22.400	68.601	113	4.7	
19780531	14:01:56.9	23.924	67.065	209	4.7	
19780604	02:27:22.6	21.550	69.165	102	5.0	
19780604	16:30:43.3	23.132	66.599	218	4.7	
19780607	14:08:46.5	23.639	67.797	114	5.3	
19780617	17:01:56.6	24.418	68.230	115	5.0	
19780623	12:43:20.9	22.737	69.276	88	5.0	
19780626	16:15:11.3	21.610	66.837	221	4.9	
19780629	12:37:13	21.159	68.522	127	4.9	
19780713	06:34:26	21.951	69.789	30	5.2	
19780722	07:50:54.2	24.266	66.823	181	4.9	
19780726	02:04:58.1	21.690	68.190	86	5.2	
19780731	11:34:34.5	21.861	68.291	69	5.3	
19780806	11:03:35.5	24.391	67.954	119	5.0	
19780816	06:03:44.4	24.071	67.153	194	4.5	
19780822	01:34:05.1	24.562	69.323	82	4.7	
19780905	04:24:18.4	21.282	69.184	119	5.2	
19780911	11:19:57.1	22.269	67.458	187	4.8	
19781008	16:09:00.5	24.311	68.030	120	4.7	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19781027	10:06:46.1	21.906	65.792	280	5.6	
19781108	07:18:02.6	21.022	68.387	80	5.2	
19781116	12:22:12.7	24.336	69.430	83	4.6	
19781123	01:56:41	23.695	66.536	203	4.7	
19781202	13:25:45.3	24.401	67.346	172	4.7	
19781226	01:40:33.3	23.941	65.370	43	4.7	
19790102	18:51:52.7	22.450	67.448	168	4.7	
19790113	08:39:10.4	24.307	67.803	103	5.3	
19790117	10:55:51.1	21.177	68.676	135	4.8	
19790124	00:00:08.4	21.427	68.651	121	4.7	
19790127	15:03:39.2	22.040	68.482	87	5.3	
19790224	00:30:02	21.265	68.975	121	4.8	
19790226	19:47:32.6	21.545	70.067	44	4.9	
19790228	14:05:26.2	23.244	68.951	97	5.2	
19790311	06:06:41	22.301	69.022	61	5.5	
19790324	17:01:13.4	22.133	68.659	118	4.5	
19790413	20:11:18.6	24.118	66.971	171	4.9	
19790415	10:07:52.2	24.196	66.766	186	4.5	
19790418	17:59:04.9	24.337	67.005	147	5.4	
19790422	12:27:55.4	23.790	66.775	220	4.6	
19790504	17:21:35.1	21.560	68.284	81	5.6	
19790508	17:51:41.8	24.494	67.320	182	4.8	
19790514	23:04:02.6	22.809	69.125	85	5.9	6.5
19790515	17:32:38.7	22.936	69.223	89	5.3	
19790517	23:06:45.7	22.916	66.891	222	4.6	
19790522	08:33:35.8	22.813	69.136	58	5.5	
19790524	00:55:13.7	23.806	66.906	182	4.5	
19790528	14:59:19.1	24.604	70.262	63	5.8	
19790601	17:43:10.1	21.287	68.805	134	5.0	
19790615	15:08:17.1	24.193	68.275	119	4.5	
19790624	01:11:30.7	23.705	68.904	91	4.9	
19790714	06:30:29.5	22.068	67.308	192	5.1	
19790721	02:38:02.5	22.882	68.976	43	5.3	
19790724	17:16:10.2	23.126	66.676	193	4.5	
19790802	09:04:50.5	21.447	69.463	33	4.6	
19790810	01:28:42	21.405	66.608	257	5.1	
19790815	04:27:42.1	24.208	66.939	176	4.5	
19790831	06:47:36	23.004	66.535	205	4.5	
19790919	07:37:26.7	23.113	66.604	196	4.7	
19790922	01:41:52.6	21.267	68.959	122	4.6	
19791004	11:18:30.9	23.327	70.234	28	5.1	
19791022	03:26:26.6	25.333	69.014	136	4.8	
19791031	08:59:00.5	23.276	69.120	61	5.2	
19791105	18:43:06.9	21.200	68.255	100	5.0	
19791121	06:51:16.1	24.337	70.868	33	4.9	
19791122	02:41:16.7	24.344	67.385	169	5.8	
19791128	07:10:48.4	23.433	69.061	95	4.8	
19791226	04:24:38.9	24.219	67.445	182	4.7	
19791228	13:46:18.3	24.415	69.379	83	5.3	
19800105	14:12:10.2	23.975	66.463	172	4.5	
19800127	10:17:47.4	23.387	69.001	101	4.6	
19800131	13:52:35.4	21.961	68.644	72	4.7	
19800210	19:28:43.6	22.540	66.101	238	4.5	
19800222	18:47:50.7	23.667	68.803	100	4.9	
19800224	13:17:15.2	21.390	68.655	33	5.3	
19800302	05:26:31.5	22.808	68.996	136	4.7	
19800313	08:38:19	21.270	68.681	121	5.0	
19800321	19:25:47.1	22.104	66.080	299	4.5	
19800325	08:54:12.6	25.078	68.564	93	4.9	
19800402	12:59:01.7	24.415	69.865	66	5.2	
19800406	04:05:17.1	21.098	68.409	125	4.8	
19800414	23:57:27.6	21.293	68.727	100	5.4	
19800430	09:04:05.8	22.815	70.996	73	4.8	
19800501	14:20:49.5	24.268	69.885	80	4.7	
19800502	19:09:07.8	24.132	66.943	163	5.4	
19800519	11:37:34	24.639	67.603	135	4.6	
19800530	16:56:22.2	23.110	70.929	33	5.3	5.3
19800601	14:49:39.7	22.288	67.477	185	4.7	
19800602	00:14:26.2	21.739	68.804	88	4.8	
19800607	06:10:53.5	23.533	71.732	28	4.9	
19800608	21:19:13.6	23.040	66.524	259	5.1	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19800616	05:45:06.9	22.029	68.459	87	5.5	
19800624	01:59:36	23.972	67.301	177	5.1	
19800704	17:28:41.7	21.397	68.732	112	4.7	
19800730	04:50:20.5	23.857	66.507	190	4.6	
19800801	11:22:17.5	23.837	66.692	209	4.6	
19800804	20:29:59.3	23.854	66.335	179	4.6	
19800824	19:26:36.7	23.038	69.088	75	4.8	
19800828	11:40:17.1	22.723	66.274	294	4.6	
19800829	21:25:55	22.892	66.425	240	4.6	
19800830	03:29:57.9	22.240	68.530	123	4.5	
19800904	09:53:18.7	24.302	69.410	76	4.9	
19800910	22:12:48.9	24.194	67.228	190	4.6	
19800925	05:44:39.2	24.093	67.064	206	4.5	
19801006	14:48:57.7	22.855	66.841	211	4.7	
19801024	07:47:05.2	22.974	66.592	186	4.5	
19801108	21:35:43.1	24.341	67.654	103	5.4	
19801122	01:58:48.5	22.493	69.043	105	4.8	
19801124	20:46:36.8	22.534	68.601	116	5.1	
19801126	11:51:00.6	23.862	68.764	110	5.0	
19801129	06:25:44.8	22.649	68.413	114	4.7	
19801211	18:15:03.5	21.272	68.153	80	6.1	6.5
19801213	13:14:01.1	24.552	69.555	91	4.7	
19801228	17:03:16.1	25.176	70.024	54	5.0	
19810103	23:58:13.1	24.561	67.798	124	4.7	
19810107	16:26:42.5	23.754	70.622	37	5.5	5.2
19810115	23:49:04	21.821	68.605	121	4.6	
19810120	20:35:48.3	22.804	68.441	117	5.1	
19810127	14:25:44.2	23.028	68.032	125	5.4	
19810206	08:14:46.4	24.313	67.869	110	4.6	
19810208	06:15:59.4	23.929	66.716	211	4.6	
19810302	21:19:56	22.635	65.990	246	5.1	
19810309	07:46:29.6	23.567	66.347	185	5.3	
19810310	10:39:52.6	22.552	66.191	265	4.8	
19810318	18:09:09.2	22.739	66.596	225	4.9	
19810330	08:38:36.7	21.124	69.169	132	4.6	
19810331	13:13:07.8	22.412	69.000	127	4.5	
19810401	23:58:08.3	24.208	66.810	201	4.8	
19810405	17:49:48.8	24.284	70.748	33	4.7	
19810414	00:39:22.7	23.446	70.320	24	4.5	
19810414	18:09:22.9	24.267	67.175	184	4.6	
19810511	01:50:59.4	21.687	71.083	33	4.6	
19810520	11:41:46.2	22.580	68.724	118	4.6	
19810524	02:41:59.6	22.843	67.896	105	4.7	
19810603	16:16:44.3	22.134	66.152	259	4.8	
19810616	05:41:49.1	21.486	68.337	76	5.4	
19810718	11:15:18.1	22.677	66.238	246	5.0	
19810721	00:41:39.4	22.228	69.018	103	4.6	
19810723	07:24:13.1	23.982	70.283	61	4.8	
19810804	18:24:17.7	21.491	68.318	101	4.8	
19810811	07:09:42.6	21.848	68.749	108	4.7	
19810813	12:11:01.1	22.638	68.651	103	4.7	
19810820	04:48:47.8	22.930	70.553	23	4.9	
19810828	01:28:34.1	24.520	67.344	175	4.6	
19810828	21:40:54.1	22.849	71.010	33	4.6	
19810915	09:52:17.7	22.227	68.555	97	4.5	
19810918	10:24:09.9	24.674	71.860	33	4.9	
19810920	10:48:20.3	23.080	66.632	234	5.1	
19810923	06:56:04.5	22.807	66.269	259	4.5	
19811011	06:39:57.3	21.503	68.902	201	5.2	
19811109	20:15:46.7	24.191	69.545	100	4.6	
19811112	23:37:19.2	22.428	67.660	136	4.6	
19811113	12:55:18.9	24.036	65.312	287	5.1	
19811124	04:08:08	22.200	65.728	268	4.7	
19811124	15:46:47.0	21.453	68.331	113	4.8	
19811202	02:33:47.2	23.351	67.704	85	4.7	
19811208	22:05:44.9	22.357	68.828	119	5.1	
19811216	14:25:33.6	22.202	67.934	194	4.5	
19811220	22:23:47.7	24.321	69.501	84	4.8	
19811226	11:16:03.5	24.017	66.463	188	5.0	
19811226	22:02:19.2	22.690	68.408	121	4.8	
19811227	17:54:09.6	23.825	69.465	151	4.8	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19820110	08:42:15.2	21.001	67.307	163	4.5	
19820112	08:18:58.1	24.211	66.988	169	4.5	
19820125	03:48:40.7	22.420	67.422	169	4.6	
19820203	11:06:54.0	21.760	67.033	166	5.0	
19820210	20:38:01.0	22.648	66.466	196	5.8	
19820211	05:31:47.0	22.891	66.847	283	4.8	
19820223	10:26:20.8	24.154	66.998	176	4.6	
19820326	20:31:09.2	24.191	66.809	186	4.9	
19820331	10:37:47.1	22.712	66.688	203	4.5	
19820402	03:00:49.0	23.065	69.002	96	5.0	
19820411	12:59:18.9	22.162	71.799	6	5.0	
19820413	19:57:21.8	22.164	70.104	62	4.8	
19820414	06:43:38.4	22.989	66.525	235	4.6	
19820419	11:54:27.5	22.604	66.020	250	5.3	
19820421	13:42:30.0	23.999	66.723	206	4.8	
19820503	07:26:02.5	23.467	68.814	107	5.5	
19820513	09:09:17.8	21.120	68.851	108	4.6	
19820528	12:18:34.0	22.928	66.618	191	4.8	
19820529	03:26:58.7	22.347	68.373	116	5.2	
19820529	17:22:24.4	24.988	70.246	47	5.1	
19820531	09:15:33.2	23.151	66.554	224	4.9	
19820610	07:42:33.7	21.468	67.422	194	4.7	
19820610	11:43:07.4	21.393	67.403	199	5.0	
19820618	18:18:38.2	22.395	68.812	121	4.9	
19820619	05:19:26.8	24.109	66.737	218	4.8	
19820719	23:52:55.2	23.949	66.738	206	5.2	
19820819	18:45:38.2	21.553	68.201	106	4.6	
19820903	20:14:30.3	23.859	66.605	182	5.5	
19820911	14:12:14.5	24.173	66.996	149	5.1	
19820911	14:27:29.6	24.185	66.985	151	5.0	
19820913	16:36:17.1	23.907	68.035	32	5.0	
19820919	02:28:22.8	24.284	66.868	195	4.7	
19821002	22:44:32.0	23.652	68.015	121	4.8	
19821021	22:08:51.3	22.049	68.431	105	4.6	
19821024	10:43:41.1	22.265	70.082	35	5.4	4.8
19821102	16:15:43.0	22.357	68.626	104	4.8	
19821125	13:01:33.9	21.445	66.665	214	4.9	
19821129	05:05:46.8	22.329	68.815	108	5.0	
19821202	14:08:26.0	21.254	68.251	115	4.9	
19821207	03:49:02.2	21.725	68.468	136	4.9	
19821208	21:00:16.1	21.295	68.097	108	5.3	
19821216	02:33:08.4	24.266	67.119	183	4.8	
19821231	01:35:35.2	21.386	68.046	130	5.3	
19830102	22:58:37.8	24.145	66.886	187	4.7	
19830110	09:17:34.7	22.006	68.470	121	5.6	
19830116	16:45:12.3	24.219	67.032	183	4.9	
19830121	03:03:39.0	24.291	67.138	180	4.7	
19830126	01:05:50.7	23.971	66.997	186	5.2	
19830127	19:01:35.3	24.105	66.960	188	5.6	
19830130	17:24:52.5	24.331	67.237	184	4.7	
19830201	04:22:51.1	23.030	68.796	102	5.2	
19830206	00:36:51.7	24.922	68.715	109	4.8	
19830206	14:37:29.7	21.132	69.281	94	5.3	
19830215	09:41:04.8	21.582	66.765	222	4.8	
19830215	23:21:06.9	22.966	66.501	201	5.0	
19830216	07:36:55.6	21.168	66.641	235	4.6	
19830219	01:18:17.5	21.427	68.674	132	5.0	
19830301	05:37:00.7	21.699	70.364	33	5.1	
19830302	14:53:29.3	23.956	67.686	110	5.0	
19830316	21:07:02.1	24.242	66.766	190	4.7	
19830318	12:25:39.7	21.420	68.451	130	5.1	
19830324	14:28:27.8	24.242	68.951	97	5.0	
19830331	17:33:00.3	21.389	68.711	123	5.1	
19830407	22:00:52.6	22.328	67.526	170	4.5	
19830408	10:48:13.8	21.397	68.320	130	4.7	
19830410	10:35:25.8	22.455	69.091	100	4.7	
19830417	00:49:05.2	21.687	66.647	250	4.6	
19830422	09:47:40.2	23.229	66.732	210	5.0	
19830425	19:09:09.0	24.278	71.235	24	5.1	4.3
19830426	05:32:23.2	21.069	69.041	138	4.7	
19830503	05:55:22.1	22.966	68.072	162	4.6	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19830531	04:04:45.2	23.866	66.833	235	4.5	
19830601	05:34:50.8	22.757	68.588	104	4.8	
19830606	16:22:31.2	24.379	66.929	157	5.3	
19830608	05:09:49.7	24.284	67.124	186	4.5	
19830609	12:50:51.8	21.250	68.582	110	4.5	
19830610	07:46:14.5	21.256	68.547	110	5.0	
19830617	20:38:31.8	23.014	66.458	223	4.5	
19830621	06:58:21.7	22.631	66.249	227	4.9	
19830629	21:21:34.6	21.463	68.381	132	5.0	
19830705	16:48:06.9	23.786	66.957	182	4.9	
19830719	04:33:23.8	22.095	68.492	129	4.8	
19830719	23:14:25.9	23.881	66.679	218	4.5	
19830720	05:40:52.4	22.826	68.849	126	4.8	
19830721	07:11:33.8	22.193	68.451	126	5.5	
19830730	02:59:06.0	21.555	68.380	129	4.5	
19830803	05:02:41.3	24.264	69.284	84	5.3	
19830805	00:20:48.2	24.007	69.234	92	5.0	
19830807	22:38:13.6	21.719	68.724	108	4.8	
19830814	07:40:52.2	21.752	68.528	126	4.8	
19830815	17:23:02.7	23.933	66.656	215	5.1	
19830824	19:14:24.6	23.571	66.628	224	4.7	
19830825	23:14:04.7	22.317	68.758	126	4.8	
19830913	16:06:55.1	24.903	70.133	57	5.2	
19830914	07:13:00.5	24.410	67.412	174	4.6	
19830916	09:45:00.1	21.408	68.204	95	4.5	
19830921	05:52:33.4	24.098	66.704	214	4.5	
19830922	13:52:27.1	22.770	68.416	177	4.9	
19830922	22:32:30.0	24.204	67.190	185	4.8	
19830929	08:17:09.8	22.770	66.228	260	4.6	
19831007	07:46:48.9	21.512	68.220	117	4.8	
19831016	09:59:46.5	23.681	70.129	65	5.7	
19831019	21:36:16.8	24.274	66.685	190	5.1	
19831119	12:00:28.7	21.788	71.670	33	4.7	
19831124	03:56:46.1	23.114	66.521	230	4.7	
19831128	09:41:13	23.781	70.425	37	5.1	
19831203	21:45:00.6	24.300	67.139	202	4.5	
19831204	02:09:22.0	24.039	66.760	203	5.2	
19831216	02:40:06.3	21.648	68.433	127	5.1	
19840101	22:08:14.1	22.810	66.160	272	5.1	
19840105	03:55:46.2	22.535	70.648	33	4.5	
19840106	15:01:36.0	23.686	68.543	101	5.4	
19840113	19:18:09.4	24.202	67.054	188	4.8	
19840213	16:08:40.1	24.248	66.922	190	4.8	
19840217	00:08:39.2	21.943	70.068	75	4.6	
19840221	09:23:29.0	21.680	67.415	191	4.5	
19840304	10:46:23.9	22.864	69.015	128	4.5	
19840318	06:46:50.1	24.078	66.744	213	4.5	
19840324	03:01:51.9	21.576	66.749	225	4.9	
19840331	19:15:44.7	24.226	66.767	203	5.0	
19840402	00:45:27.1	21.999	68.465	111	4.9	
19840405	06:28:12.8	23.261	66.705	217	4.7	
19840416	06:12:24.4	21.547	68.648	100	4.8	
19840424	18:27:35.2	24.500	67.103	170	5.2	
19840510	17:40:32.7	21.353	70.089	56	5.1	
19840513	06:55:24.7	22.949	66.270	261	4.8	
19840517	07:18:17.9	21.912	68.888	111	4.8	
19840606	10:54:01.9	24.130	66.753	200	5.0	
19840619	11:49:08.5	24.387	67.148	177	4.7	
19840620	19:56:46.6	24.101	66.965	195	5.5	
19840708	08:55:25.0	23.767	67.901	140	4.7	
19840715	00:11:33.1	21.518	70.625	35	4.9	
19840716	04:59:29.0	21.616	67.179	280	4.5	
19840803	00:38:19.5	24.252	67.429	172	4.9	
19840803	12:22:04.8	22.965	68.242	135	4.6	
19840811	17:31:41.2	23.655	68.195	141	4.5	
19840812	11:51:41.8	24.186	69.179	100	5.6	
19840821	09:50:08.5	21.794	68.703	104	5.0	
19840828	18:09:23.0	23.830	66.848	211	4.9	
19840830	03:04:57.3	23.079	66.364	236	4.8	
19840922	05:28:59.3	25.105	68.253	114	4.5	
19840929	05:44:38.5	22.421	71.772	33	5.0	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19841012	23:06:01.6	24.089	66.845	204	5.1	
19841020	17:59:17.0	24.072	66.832	192	6.0	
19841031	05:29:08.2	24.448	67.261	205	4.7	
19841104	10:42:41.4	21.442	69.023	148	5.3	
19841108	13:58:35.7	21.459	66.724	232	4.7	
19841109	09:23:10.3	24.139	66.751	184	4.8	
19841112	01:07:29.5	24.212	66.921	212	4.5	
19841116	08:56:02.3	21.423	66.649	237	4.7	
19841117	00:27:54.3	23.269	67.962	114	5.5	
19841128	11:22:08.4	24.078	66.873	195	4.8	
19841202	09:25:42.3	23.963	66.617	214	4.5	
19841211	07:47:25.8	21.353	68.381	121	4.9	
19841211	23:22:19.3	22.407	68.599	91	5.7	
19841213	04:22:15.0	21.543	68.828	120	4.5	
19841214	05:21:21.5	22.221	67.521	208	4.7	
19841216	02:01:43.8	21.480	68.118	113	5.0	
19841217	04:40:34.0	24.143	66.841	198	4.5	
19841220	15:25:56.2	22.376	68.208	116	4.9	
19841229	12:37:24.3	23.512	66.693	218	4.5	
19841231	13:00:32.1	22.986	66.877	174	5.6	
19850108	16:06:41.7	21.144	67.960	165	5.1	
19850113	16:00:10.4	22.843	68.594	103	5.0	
19850214	08:30:56.6	24.068	67.881	138	5.6	
19850220	02:00:36.1	24.181	66.808	189	4.7	
19850221	02:51:02.9	23.892	66.815	208	4.5	
19850305	17:19:38.7	21.493	68.438	139	4.8	
19850314	11:44:30.7	25.091	70.835	40	5.1	4.5
19850318	01:12:24.5	21.278	68.671	116	4.6	
19850329	02:42:46.2	23.171	66.498	228	4.7	
19850330	16:49:22.7	21.214	68.809	120	5.0	
19850412	20:58:41.1	22.466	66.849	199	5.0	
19850417	20:30:08.5	24.335	69.104	88	4.9	
19850417	21:02:56.6	21.061	66.589	218	4.9	
19850423	19:11:40.6	23.598	66.688	239	4.5	
19850507	19:23:42.3	22.077	68.313	86	4.6	
19850527	11:32:52.0	22.710	68.574	95	4.9	
19850527	17:15:43.9	22.679	66.006	253	4.6	
19850528	19:19:36.8	21.834	68.370	150	4.5	
19850530	12:45:02.1	24.303	67.011	181	5.0	
19850603	20:41:56.6	21.612	67.025	33	4.8	
19850610	00:32:46.3	21.627	69.142	164	4.6	
19850618	01:34:03	21.903	68.422	131	4.6	
19850622	05:54:54.2	22.735	68.617	99	4.9	
19850623	06:55:24.2	24.032	67.076	180	5.6	
19850623	07:07:39.3	24.056	67.068	180	5.0	
19850625	19:10:22.6	21.335	68.086	146	5.1	
19850701	10:58:49.0	23.048	66.391	249	4.7	
19850720	17:54:44.2	23.920	66.720	210	4.5	
19850722	16:45:01.1	24.032	66.998	193	4.5	
19850807	02:51:04.3	22.229	67.286	207	4.5	
19850811	14:04:36.8	22.263	69.810	84	4.9	
19850819	08:20:25.1	24.137	66.828	194	4.7	
19850823	16:35:10.2	24.080	66.830	194	5.5	
19850825	04:05:28.7	23.910	67.844	125	4.6	
19850827	10:44:34.5	21.465	67.498	196	5.4	
19850829	14:46:36.0	21.746	69.013	140	4.7	
19850906	08:11:05.5	21.462	66.858	233	4.7	
19850919	20:38:38.6	22.316	69.025	99	4.9	
19850928	17:24:29.8	24.187	66.973	192	4.5	
19850929	19:16:08.5	23.564	66.747	217	4.5	
19850930	00:37:08.2	24.952	67.919	126	5.0	
19851008	09:47:24.8	22.825	66.311	242	5.5	
19851021	08:09:46.1	22.980	69.919	76	4.5	
19851027	01:31:19.7	23.927	69.011	87	4.9	
19851029	16:30:28.6	23.456	69.345	86	5.0	
19851103	09:00:40.2	22.004	67.440	222	4.7	
19851104	06:39:39.6	23.854	66.670	206	4.7	
19851113	02:07:26.5	23.439	69.271	91	4.9	
19851117	20:04:29.9	22.528	66.227	284	4.5	
19851118	08:55:21.1	21.444	69.383	33	5.0	
19851125	02:46:37.8	23.044	68.786	150	4.9	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19851216	14:42:44.4	21.447	67.700	171	5.2	
19851225	15:43:56.2	23.982	66.711	187	5.5	
19860109	14:04:02.0	21.534	66.748	221	4.8	
19860114	23:14:37.8	23.418	66.704	218	4.8	
19860117	09:51:26.6	24.074	70.476	33	4.6	
19860125	01:00:32.3	23.996	72.177	33	4.9	
19860203	17:26:24.0	21.245	68.699	111	4.5	
19860211	14:44:49.2	23.883	67.061	210	4.6	
19860213	00:56:55.9	21.211	68.487	123	4.6	
19860220	09:16:02.5	21.122	70.116	33	5.7	5.0
19860222	01:24:48.2	21.321	67.191	188	4.9	
19860223	22:32:48.2	24.282	70.350	64	4.9	
19860305	02:15:09.5	22.504	66.150	256	4.6	
19860308	11:06:47.4	24.024	66.927	199	4.7	
19860312	22:04:19.8	24.112	66.803	206	5.3	
19860327	23:01:38.5	23.181	66.625	215	4.6	
19860331	23:57:01.1	21.113	69.221	117	4.6	
19860401	11:45:20.1	22.587	68.628	123	4.6	
19860403	03:55:30.7	21.415	67.180	204	4.5	
19860409	18:10:54.4	23.015	66.749	216	5.2	
19860411	22:33:09.1	23.361	69.043	85	4.6	
19860418	03:19:39.9	22.654	68.518	118	5.1	
19860421	00:31:44.4	22.765	71.410	33	4.5	
19860510	02:00:23.7	23.559	67.880	130	5.2	
19860519	18:30:05.4	24.043	66.679	205	4.7	
19860529	10:32:23.4	21.767	68.600	126	4.8	
19860605	03:42:52.6	23.193	68.979	102	4.8	
19860616	21:57:38.8	21.458	69.219	220	5.0	
19860617	03:53:31.9	23.045	69.119	96	5.2	
19860709	05:26:00.8	21.906	68.899	174	4.7	
19860721	17:18:55.3	23.904	66.609	213	4.6	
19860724	07:28:12.4	21.539	66.672	256	4.6	
19860728	22:50:35.7	21.008	68.671	134	4.7	
19860803	00:39:19.3	23.365	69.098	142	4.7	
19860814	22:10:55.0	21.724	70.050	50	4.6	
19860814	22:46:31.4	24.054	67.007	198	4.5	
19860815	23:31:28.5	23.447	69.165	114	4.5	
19860821	02:58:36.8	24.244	66.935	189	4.6	
19860909	03:19:48.9	23.125	66.507	208	5.0	
19860909	23:24:04.9	21.857	68.704	106	4.7	
19860912	10:39:40.6	22.510	70.176	79	5.1	
19860913	18:00:47.7	23.032	66.405	197	4.9	
19860914	01:03:28.3	23.036	68.773	111	4.7	
19860915	05:02:34.1	23.911	66.672	206	4.6	
19860915	19:43:07.9	21.377	67.339	189	4.5	
19860923	15:18:19.4	21.309	68.950	186	4.6	
19860930	16:07:35.9	21.812	68.330	126	4.7	
19861010	06:16:00.0	23.586	68.698	85	5.1	
19861013	20:07:21.8	23.396	68.516	116	5.2	
19861015	09:53:04.8	22.111	67.449	168	4.6	
19861021	13:17:01.6	24.489	67.820	170	4.5	
19861024	02:42:51.6	25.319	70.176	50	5.6	
19861028	15:54:54.4	23.556	68.447	100	5.0	
19861103	04:58:04.2	21.406	68.240	133	4.9	
19861103	15:11:22.3	24.215	67.053	193	4.5	
19861110	02:52:34.1	24.024	67.058	192	4.8	
19861127	10:29:32.0	21.680	69.451	52	4.8	
19861129	20:11:20.4	23.250	69.381	86	5.2	
19861206	15:42:05.8	22.699	70.690	50	4.8	
19861214	04:41:13.4	22.685	67.473	197	5.0	
19861227	00:45:32.4	21.792	68.951	101	4.7	
19861227	02:29:00.6	23.823	70.060	41	5.2	5.6
19861228	20:35:44.4	23.971	66.676	208	5.1	
19861230	08:46:31.9	24.168	66.841	201	4.6	
19870120	08:28:39.4	24.051	66.759	197	4.7	
19870124	23:51:12.0	21.403	66.493	243	4.8	
19870201	02:08:33.2	22.546	68.424	117	4.8	
19870202	19:34:59.2	24.440	68.667	88	5.3	
19870212	19:31:43.7	21.758	68.332	129	4.7	
19870216	18:32:52.8	24.246	70.375	52	4.9	
19870224	01:36:22.7	22.046	68.339	121	5.1	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19870227	22:18:10.6	24.111	68.069	126	4.6	
19870228	05:06:25.3	22.491	67.486	167	4.5	
19870303	12:59:18.2	23.990	66.869	192	4.6	
19870305	09:17:05.2	24.388	70.161	62	6.5	7.0
19870305	09:51:53.4	24.432	70.216	43	5.6	
19870305	09:56:08.5	24.463	70.466	48	5.6	
19870305	10:55:12.3	24.495	70.701	34	5.7	
19870305	13:06:25.3	24.568	70.631	33	4.6	
19870305	21:27:50.1	24.013	70.534	51	5.0	
19870306	04:56:29.0	24.480	68.738	33	4.7	
19870306	07:06:44.0	24.089	70.104	41	5.9	5.5
19870306	09:39:54.7	24.149	70.118	45	5.7	5.7
19870307	13:24:28.6	24.183	70.772	33	5.2	
19870307	21:45:44.2	24.462	70.631	33	4.6	
19870308	16:01:34	24.162	70.774	52	4.5	
19870308	19:33:16.7	24.340	70.626	30	4.9	4.6
19870309	06:05:26.4	24.299	70.419	38	4.8	
19870314	02:21:29.1	24.175	70.513	67	4.8	
19870315	06:03:02.2	24.285	70.557	23	5.0	5.2
19870315	06:17:51.0	23.925	70.379	47	4.9	
19870315	12:39:22.4	24.023	67.090	205	4.8	
19870321	09:00:10.1	22.795	68.792	123	4.5	
19870322	03:23:57.6	24.058	70.142	40	5.8	5.8
19870326	11:29:55.8	21.183	68.626	117	4.8	
19870329	05:17:45.1	22.522	66.922	209	4.9	
19870331	19:25:20.3	21.898	67.315	203	4.5	
19870401	01:48:08.5	22.767	66.205	248	6.1	
19870404	19:46:24.2	23.955	70.372	41	4.9	
19870404	20:05:32.2	21.326	68.714	194	5.1	
19870407	00:51:36.6	22.782	66.074	205	5.5	
19870411	08:02:24.5	24.565	69.199	66	4.6	
19870420	02:21:47.3	21.027	68.645	135	4.6	
19870421	10:35:20.8	21.347	69.944	66	4.7	
19870427	15:53:09.8	21.372	67.379	205	4.8	
19870505	13:44:05.8	21.382	67.074	261	4.6	
19870508	15:41:15.4	22.396	68.506	122	4.7	
19870510	21:39:20.1	24.282	70.548	58	5.0	
19870512	16:12:37.5	21.694	68.222	77	5.5	
19870515	21:34:48.6	24.758	70.711	15	5.2	4.0
19870529	19:37:51.8	23.917	66.628	205	5.0	
19870601	01:50:16.1	22.258	68.541	103	5.4	
19870618	08:33:06.9	21.809	68.175	33	4.6	
19870619	19:00:05.1	21.213	68.362	86	5.6	
19870626	06:25:49.6	24.099	67.042	186	4.5	
19870711	00:19:30.4	22.248	69.846	52	5.1	
19870712	19:06:56.1	25.063	70.253	48	5.1	
19870724	21:04:26.2	24.050	67.036	211	4.8	
19870804	19:06:05.2	24.663	70.446	47	4.9	
19870804	22:52:11.4	24.843	70.631	33	4.6	
19870815	09:34:47.4	23.136	68.574	101	5.1	
19870819	07:52:44.2	24.088	66.932	152	5.5	
19870820	23:01:39.8	22.108	68.845	121	4.7	
19870826	13:45:49.0	21.449	69.037	163	4.6	
19870829	14:44:52.4	22.627	66.178	258	4.8	
19870901	04:26:07.4	23.052	66.529	199	6.3	
19870904	11:23:46.1	23.957	66.777	202	4.8	
19870911	00:06:51.7	22.332	67.635	192	4.8	
19870911	00:34:52.1	22.329	68.384	129	5.4	
19870918	08:43:29.3	24.269	69.148	96	5.5	
19870926	00:24:18.6	21.529	70.819	45	5.1	5.3
19871001	10:01:40.3	22.164	67.374	199	4.7	
19871007	00:51:36.6	22.845	68.030	106	5.6	
19871009	18:04:04.4	22.951	66.678	210	4.8	
19871011	08:05:45.2	24.638	70.520	66	4.9	
19871016	06:53:13.6	21.663	69.290	101	4.9	
19871021	23:25:51.8	21.049	69.871	74	5.3	
19871023	18:13:04.5	23.089	66.499	229	5.0	
19871027	18:52:09.2	23.247	68.722	98	4.5	
19871102	21:43:34.9	22.636	68.829	111	5.0	
19871106	16:48:14.3	22.136	65.767	278	4.8	
19871109	17:46:18.8	22.123	69.573	43	5.4	4.8

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19871116	03:17:02.4	21.858	68.425	173	4.7	
19871203	11:04:38.6	21.380	68.215	117	5.5	
19871216	03:17:54.3	23.736	67.350	157	4.6	
19871224	19:02:15.7	21.315	68.402	113	4.7	
19871225	01:34:00.7	22.211	68.473	125	4.8	
19880103	10:28:34.7	24.794	70.087	54	4.9	
19880115	09:17:27.7	23.162	68.973	129	4.9	
19880116	05:16:12.0	25.088	68.616	91	4.7	
19880119	07:30:31.8	24.710	70.568	33	6.3	6.4
19880119	13:17:43.2	24.918	70.566	33	5.1	
19880119	19:46:06.0	24.641	70.532	33	4.9	
19880120	02:54:26	21.182	70.364	33	4.8	
19880120	15:01:29.6	24.690	70.521	32	5.3	5.1
19880128	20:44:34.6	22.661	68.952	88	4.7	
19880201	13:32:51.9	24.675	70.405	30	5.2	
19880205	14:01:02.7	24.753	70.433	36	6.2	6.6
19880205	18:49:31.8	24.893	70.554	30	6.0	5.9
19880206	07:09:39.9	25.027	70.776	33	4.7	
19880206	21:40:41.4	24.573	70.934	33	4.8	
19880206	23:03:51.4	25.017	71.127	10	4.8	
19880208	15:57:00.2	24.801	70.393	32	5.6	5.2
19880209	03:15:34.8	25.022	70.832	33	5.0	
19880209	04:32:30.6	24.916	70.783	33	5.1	
19880210	22:19:00.1	24.996	71.361	32	5.1	
19880212	01:19:17.7	24.942	71.054	29	4.5	
19880212	03:35:39.0	24.949	70.962	41	4.8	
19880213	03:15:35.5	22.326	68.333	127	5.1	
19880215	18:49:18.2	25.216	70.932	9	5.2	4.6
19880217	23:30:58.9	23.862	66.506	234	4.7	
19880218	13:52:36.0	23.513	67.706	142	5.7	
19880218	14:37:09.6	21.343	66.544	234	4.8	
19880220	04:45:23.4	24.051	66.975	199	4.7	
19880301	02:51:48.9	22.644	65.935	274	4.5	
19880304	00:31:08.1	22.111	68.795	109	4.5	
19880304	05:11:05.2	22.769	70.293	62	4.8	
19880306	15:00:58.5	23.678	68.017	143	4.8	
19880309	20:56:10.7	24.737	70.138	51	5.0	
19880314	09:34:14.3	23.639	68.322	142	4.8	
19880316	06:08:38.0	21.117	70.214	64	5.0	
19880316	22:55:24.2	21.183	68.535	116	5.1	
19880318	07:54:12.9	23.495	68.945	93	4.9	
19880319	01:19:01.1	23.741	66.357	220	4.9	
19880321	20:44:37.2	22.648	68.647	152	4.6	
19880324	15:30:09.3	21.905	68.357	124	5.1	
19880330	23:50:56.9	24.926	70.461	40	5.8	5.7
19880401	23:52:00.3	25.460	69.681	314	4.5	
19880501	18:43:04.9	23.821	70.942	10	4.9	
19880508	00:33:04.9	21.509	70.767	33	4.6	
19880510	17:59:22.7	24.246	67.131	180	4.7	
19880528	10:05:45.3	24.264	67.053	177	5.1	
19880531	06:48:09.6	21.540	66.563	227	4.7	
19880614	04:36:45.7	21.366	67.937	176	4.7	
19880616	23:39:09.5	21.746	69.875	87	5.2	
19880621	10:36:48.2	24.348	67.026	186	4.5	
19880621	19:55:12.2	22.052	66.042	293	4.5	
19880626	13:51:16.3	21.845	67.442	199	5.0	
19880630	14:58:57.2	23.766	67.457	124	5.2	
19880630	15:21:08.2	23.824	67.060	143	5.1	
19880718	02:30:29.3	22.068	69.961	18	5.3	4.8
19880718	20:00:02.5	21.609	68.287	124	4.8	
19880720	04:14:42.3	22.391	68.430	124	4.8	
19880728	17:12:33.3	22.062	65.716	279	5.9	
19880729	12:07:57.9	22.769	70.651	10	4.8	
19880730	06:54:40.2	22.542	70.201	34	4.5	
19880814	13:11:43.4	21.845	69.997	71	5.1	
19880820	16:02:22.6	22.687	66.145	241	4.7	
19880820	19:11:27.1	24.263	67.079	178	4.5	
19880821	19:40:29.3	23.523	66.465	216	4.7	
19880824	09:23:21.5	21.956	68.306	129	5.0	
19880826	03:41:35.1	21.699	67.569	240	4.5	
19880828	18:47:43.3	21.165	68.824	154	5.0	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19880914	21:22:59.8	21.553	68.784	172	4.8	
19880914	22:14:07.5	23.424	67.997	122	5.7	
19880923	04:37:53.7	22.010	68.110	138	4.7	
19880925	22:23:51.8	21.016	67.503	162	4.7	
19881002	06:18:08.1	22.774	66.261	238	4.9	
19881014	19:11:40.9	23.208	68.178	97	5.3	
19881017	20:33:25.2	24.023	69.405	75	5.3	
19881031	02:08:15.3	23.565	66.618	242	5.2	
19881101	01:05:49.9	22.879	66.543	246	4.7	
19881125	02:19:55.9	21.287	66.498	270	4.5	
19881125	20:37:55.4	23.175	66.781	239	4.5	
19881128	00:31:22.9	21.316	68.408	121	5.2	
19881205	14:37:51.5	24.269	67.076	182	4.6	
19881210	17:05:43.8	24.020	69.887	49	4.9	
19881216	05:05:46.8	24.122	66.920	169	5.1	
19881216	12:26:35.5	22.958	66.376	220	5.2	
19881218	08:58:53.4	25.395	69.244	95	4.9	
19881224	04:26:54.5	23.522	66.666	193	5.7	
19881230	22:31:37.6	22.835	66.408	242	5.0	
19881231	04:43:56.9	22.110	67.233	183	4.6	
19881231	15:12:20.4	21.324	68.675	124	5.0	
19890104	19:01:32.1	21.001	68.919	122	4.8	
19890107	07:26:11.4	23.258	68.410	121	5.5	
19890114	09:25:44.8	22.197	67.269	183	4.7	
19890201	03:34:15.8	24.382	67.588	180	4.7	
19890202	09:52:32.3	21.051	68.210	154	4.8	
19890203	13:43:16.4	24.024	66.882	190	4.8	
19890207	04:03:00.2	22.087	67.223	179	5.4	
19890209	22:49:02.1	22.611	66.086	247	5.2	
19890217	13:43:26.6	22.175	68.410	122	4.7	
19890224	01:59:54.5	24.057	66.558	204	4.8	
19890227	01:09:42.4	24.147	66.889	199	4.5	
19890228	06:07:30.8	23.217	70.628	33	4.7	
19890319	10:16:43.8	21.089	68.424	118	4.9	
19890331	09:31:56.0	24.115	66.672	197	4.6	
19890427	08:38:44.7	24.008	67.182	178	4.8	
19890428	03:54:31.8	23.523	68.008	121	4.8	
19890510	22:18:46.1	23.282	69.190	95	5.3	
19890517	08:24:24.1	22.872	66.306	256	4.5	
19890519	11:50:54.3	24.839	70.019	52	5.5	
19890529	22:22:30.7	23.897	70.337	32	5.5	4.9
19890601	20:56:00.2	23.887	70.267	43	5.2	
19890619	16:00:47.9	22.113	67.559	188	5.5	
19890708	22:50:44.2	22.279	68.296	118	4.7	
19890729	14:55:48.9	22.551	66.019	250	4.6	
19890806	08:19:56.1	23.157	68.321	114	5.3	
19890807	08:36:59.8	24.442	66.978	173	4.8	
19890808	23:44:04.4	22.723	68.478	102	5.3	
19890813	20:47:52.0	25.073	71.323	33	4.6	
19890820	06:21:45.8	23.372	70.967	59	4.7	
19890826	15:43:42.9	22.794	68.199	148	4.7	
19890826	20:10:36.1	21.960	68.423	114	5.1	
19890831	02:10:58.9	24.127	66.981	190	4.6	
19890909	22:47:49.5	23.023	66.019	254	4.6	
19890922	16:20:57.9	21.967	68.609	33	4.6	
19890927	23:46:06.7	23.194	66.631	220	4.6	
19890929	14:41:25.1	23.052	65.666	289	4.5	
19891003	21:33:34.7	24.103	66.891	154	5.4	
19891005	13:02:04.5	22.362	70.237	53	4.8	
19891022	11:59:21.5	22.254	70.453	66	4.8	
19891102	10:12:20.8	22.210	68.426	113	5.4	
19891105	23:22:49.5	22.417	69.623	214	4.7	
19891108	11:23:02.2	23.711	67.755	136	5.0	
19891109	10:39:45.7	22.509	70.691	100	4.5	
19891110	13:42:51.1	22.772	65.936	265	5.3	
19891112	10:20:45.7	21.866	68.576	148	4.7	
19891113	06:59:20.2	21.879	68.904	167	4.6	
19891120	18:42:14.2	24.220	67.099	190	4.6	
19891214	09:52:56.2	22.626	68.709	111	4.8	
19891225	21:25:07.5	21.328	67.340	235	4.6	
19891225	23:14:47.9	21.295	68.189	94	5.3	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19891230	00:22:48.1	24.132	68.958	88	4.7	
19900111	16:04:07.7	23.563	69.131	87	4.7	
19900112	18:21:34.6	22.228	69.916	42	5.0	
19900119	20:30:54.6	21.333	68.817	125	4.6	
19900121	07:49:41.9	24.090	66.830	210	4.5	
19900124	07:53:54.5	23.953	70.026	10	4.7	
19900203	23:52:31.4	24.255	67.110	180	4.7	
19900204	06:07:01.6	22.377	70.141	59	4.7	
19900204	20:26:13.1	22.374	68.423	101	5.3	
19900205	02:09:04.9	24.062	66.989	195	4.6	
19900213	13:30:58.2	23.077	66.211	238	4.5	
19900222	16:44:32.1	24.764	68.860	102	5.2	
19900228	02:01:45.7	21.257	68.743	137	4.9	
19900304	13:24:06.8	21.247	67.758	199	4.6	
19900308	03:59:35.2	24.625	70.263	59	4.5	
19900310	02:04:13.3	22.671	68.267	123	4.8	
19900315	09:07:01.1	21.143	68.748	120	4.6	
19900315	12:26:07.3	21.253	68.878	117	4.5	
19900319	04:59:43.5	25.027	68.730	122	5.0	
19900320	13:03:47.0	22.333	69.865	60	4.7	
19900322	16:33:13.1	23.090	66.172	249	4.5	
19900409	09:45:31.1	21.470	68.368	128	5.0	
19900421	23:20:20.9	22.524	70.269	46	5.1	
19900423	16:35:26.1	24.057	66.791	190	4.5	
19900504	23:44:52.6	23.016	68.798	104	4.7	
19900530	04:02:31	24.149	66.745	163	4.8	
19900610	03:17:44.5	24.191	66.912	158	4.7	
19900618	19:02:57.3	21.825	68.438	117	5.3	
19900624	23:06:23.6	21.537	68.669	131	4.5	
19900703	23:01:54.3	22.985	66.760	207	4.5	
19900723	23:08:32.3	22.735	69.305	85	4.8	
19900724	05:34:50.8	22.911	68.726	93	5.0	
19900724	20:37:16.3	22.186	69.392	93	4.6	
19900806	08:40:01.5	24.121	66.831	180	4.6	
19900824	17:48:58.4	22.874	66.506	231	4.5	
19900826	21:31:28.6	21.595	69.715	90	4.9	
19900830	12:36:06.7	21.710	68.390	151	4.9	
19900902	09:56:31.9	23.852	70.484	43	4.7	
19900907	16:09:19.6	24.260	66.957	161	5.5	
19900909	04:39:42.5	21.519	68.661	118	4.9	
19900914	17:59:26.5	22.123	68.644	108	4.6	
19900916	05:14:31.9	22.924	66.157	257	4.6	
19901007	22:36:30.9	23.620	66.578	229	4.7	
19901008	23:35:00.7	21.377	67.936	144	4.8	
19901009	18:04:36.4	22.144	70.914	10	4.9	
19901016	21:55:31.8	24.092	66.705	192	4.9	
19901018	07:14:18.2	24.120	66.669	202	4.7	
19901109	22:46:08.5	24.157	66.861	175	4.9	
19901120	16:28:26.9	22.691	69.884	58	5.1	
19901121	23:23:21.7	22.900	68.709	81	4.6	
19901126	18:50:40.4	21.349	68.723	124	4.5	
19901202	14:37:26.9	21.823	68.333	120	5.3	
19901214	02:53:18.9	25.461	70.995	33	4.7	
19901219	06:16:33.0	24.053	66.985	181	4.5	
19901227	16:08:34.6	22.725	70.006	63	5.1	
19901227	20:54:57.7	24.018	66.474	205	4.5	
19910104	15:21:36.1	23.367	66.595	205	5.0	
19910112	09:33:40.6	24.452	69.316	82	4.6	
19910113	06:52:27.4	22.476	68.072	165	4.6	
19910116	22:58:55.7	23.181	69.710	79	5.0	
19910118	09:03:38.3	24.450	67.639	137	4.8	
19910210	13:30:13.3	22.434	68.766	120	4.5	
19910225	11:44:10.2	23.238	70.476	37	4.7	
19910225	21:12:54.3	23.216	70.560	40	4.9	4.4
19910308	07:55:27.7	23.025	70.408	10	4.8	
19910308	12:05:24.6	24.541	69.901	55	5.5	
19910314	20:44:10.9	21.724	68.576	158	4.9	
19910320	01:55:10.3	21.342	68.638	144	4.6	
19910327	16:46:29.1	23.275	69.139	80	4.7	
19910329	17:55:02.2	22.441	68.766	33	4.5	
19910330	21:41:26.6	23.250	69.076	77	5.1	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19910511	08:04:43.9	22.061	67.180	193	5.4	
19910529	17:37:09.3	24.091	66.636	195	4.6	
19910530	09:06:22.2	23.531	67.907	119	5.3	
19910601	04:52:46.0	24.134	66.849	187	4.6	
19910626	15:18:34.7	21.056	69.561	114	4.7	
19910706	15:12:20.3	21.387	68.323	118	4.6	
19910706	23:32:34.2	21.442	69.394	34	5.2	4.2
19910709	19:39:13.7	24.247	66.809	172	4.5	
19910725	14:32:23.9	21.567	66.579	224	4.7	
19910803	18:31:58.6	22.552	66.164	255	4.7	
19910816	02:05:40.9	22.023	68.640	127	4.5	
19910817	07:04:11.1	23.896	66.542	211	4.5	
19910825	14:38:46.5	22.260	68.606	108	4.7	
19910827	11:58:22.1	21.657	68.506	115	5.1	
19910831	16:43:46.7	22.425	68.311	117	5.0	
19910903	06:59:43.2	23.952	66.857	182	5.0	
19911002	01:11:37.3	23.986	66.764	199	4.8	
19911011	08:10:27.6	22.775	67.558	164	4.7	
19911016	10:05:59.3	24.606	69.022	99	4.6	
19911027	16:17:31.0	22.086	67.400	178	5.4	
19911108	06:39:21.4	24.169	67.786	128	4.7	
19911120	22:42:17.1	22.489	66.039	243	4.8	
19911214	00:07:57.2	23.117	66.531	210	5.0	
19911224	11:23:01.5	24.072	66.713	198	4.7	
19920105	00:00:27.5	22.161	68.418	123	4.5	
19920118	18:35:00.0	24.042	66.851	186	4.8	
19920127	09:52:58.8	21.481	68.032	144	5.0	
19920205	02:32:04.6	23.223	66.613	200	4.7	
19920206	19:54:44.0	21.438	68.450	131	4.8	
19920211	23:56:09.6	22.625	67.459	179	4.8	
19920228	09:14:09.1	24.369	69.924	58	5.7	
19920229	21:19:57.7	24.305	66.996	167	4.5	
19920410	10:40:48.4	21.190	67.412	201	4.7	
19920414	23:52:18.4	21.518	68.408	122	4.7	
19920418	01:55:09.3	22.277	68.654	109	5.0	
19920427	17:10:13.3	22.440	66.023	257	4.6	
19920509	08:43:47.7	24.267	66.923	176	4.5	
19920513	03:22:48.6	21.129	68.373	127	4.9	
19920515	04:09:16.5	21.571	68.429	128	4.8	
19920517	20:42:43.0	21.870	68.763	104	5.3	
19920526	01:23:38.0	21.084	67.318	158	4.9	
19920605	17:07:11.9	21.470	68.399	130	4.9	
19920606	14:51:39.1	21.026	70.291	36	5.0	
19920612	11:50:19.6	23.887	68.193	118	5.2	
19920616	12:56:21.1	22.639	68.044	142	5.0	
19920621	19:23:03.9	24.027	66.809	166	4.8	
19920622	10:36:42.1	24.124	66.736	179	4.7	
19920629	02:54:03.3	24.930	68.187	113	5.0	
19920629	21:32:40.7	21.476	70.119	96	4.5	
19920703	12:31:55.4	21.160	68.547	119	4.5	
19920715	20:20:16.2	21.602	69.796	77	4.9	
19920722	22:19:21.1	21.779	68.632	108	4.6	
19920725	02:37:32.5	24.840	70.087	51	5.2	
19920801	17:14:54.1	21.331	68.016	139	4.9	
19920817	11:04:04.3	21.363	68.649	114	4.5	
19920817	13:52:39.8	24.199	66.964	189	4.6	
19920818	05:03:12.8	21.012	68.631	113	5.0	
19920819	13:02:04.9	24.628	70.494	38	5.3	
19920821	00:34:35.0	22.962	69.278	73	5.0	
19920825	12:32:53.8	22.725	66.166	253	4.7	
19920908	00:46:17.4	24.510	66.940	168	4.9	
19920911	13:17:35.9	21.243	68.394	130	4.9	
19920916	19:13:03.3	24.468	70.709	41	4.8	
19920918	07:34:15.3	22.810	66.178	254	4.5	
19920925	12:10:30.7	22.220	68.586	112	4.6	
19920928	10:26:07.7	21.489	66.567	223	4.7	
19921006	02:20:07.6	21.381	68.659	148	4.6	
19921008	17:35:41.2	24.353	67.108	178	4.8	
19921010	04:21:01.6	24.065	67.065	209	4.7	
19921023	20:31:56.4	21.933	68.276	134	4.7	
19921024	10:30:32.8	24.332	68.233	69	4.7	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19921026	22:44:13.7	21.469	67.872	146	5.0	
19921029	02:40:08.8	22.379	68.533	118	4.8	
19921103	15:41:28.4	23.981	70.221	31	5.2	4.3
19921108	10:22:52.9	23.626	70.380	33	5.5	5.0
19921108	10:41:23.3	23.590	70.369	28	5.3	4.6
19921108	11:12:37.4	23.675	70.283	28	5.0	
19921108	18:22:52.7	23.431	68.049	103	4.9	
19921118	02:18:48.1	21.185	68.066	147	4.7	
19921118	07:39:38.0	21.852	68.467	146	5.1	
19921119	19:07:39.1	22.102	70.006	40	5.0	
19921120	01:45:22.6	23.126	66.282	252	5.1	
19921123	23:37:31.8	22.483	68.649	98	4.9	
19921126	06:34:58.2	23.954	66.430	224	4.6	
19921128	17:20:44.9	23.819	70.762	24	5.0	
19921204	23:58:07.4	21.420	68.468	117	5.0	
19921207	04:06:47.3	23.896	66.688	209	5.1	
19921207	17:33:30.1	24.394	69.475	85	4.8	
19921214	23:21:32.5	23.510	68.736	100	4.7	
19930210	4:43:07.8	23.147	68.143	132	4.6	
19930216	21:39:12.5	23.018	69.305	84	5.0	
19930224	22:21:37.8	24.931	68.386	119	5.8	
19930302	21:43:15.9	24.295	67.080	178	5.1	
19930307	20:26:38.1	23.842	67.972	124	5.2	
19930311	6:24:21.0	21.090	68.876	105	4.8	
19930321	7:32:23.1	22.218	67.485	175	5.0	
19930325	20:20:08.4	23.693	70.475	70	4.5	
19930325	22:35:34.7	24.099	66.947	199	4.6	
19930326	12:48:17.6	24.260	67.319	188	4.8	
19930330	5:23:57.9	22.089	67.325	184	5.3	
19930410	21:01:26.5	22.571	68.940	116	5.1	
19930410	21:47:50.9	22.757	68.742	103	5.0	
19930422	16:08:07.6	24.261	67.303	174	4.7	
19930428	20:30:34.7	21.000	67.936	168	4.6	
19930429	5:19:12.4	23.138	68.243	153	4.6	
19930511	16:24:59.5	24.919	70.464	47	5.4	4.9
19930513	23:57:37.2	21.558	65.807	276	4.6	
19930524	23:51:20.8	23.238	66.631	221	6.2	
19930524	23:51:28.2	22.671	66.543	221	6.6	7.0
19930604	15:29:58.4	24.064	69.386	75	4.9	
19930613	22:44:44.8	24.248	67.056	163	4.8	
19930614	11:20:01.2	24.460	67.130	163	4.8	
19930618	7:46:04.7	22.446	66.115	238	4.5	
19930623	10:53:14.5	23.560	66.465	213	4.6	
19930626	22:08:07.1	24.066	68.594	106	5.2	
19930711	13:36:19.2	25.351	70.177	33	6.2	6.0
19930711	20:09:38.3	23.204	68.028	133	5.4	
19930803	7:17:04.9	24.192	66.999	176	5.2	
19930825	1:27:40.4	22.785	66.211	246	4.6	
19930915	15:29:43.1	23.090	68.545	90	4.8	
19930915	20:11:41.1	22.086	68.385	114	4.9	
19930925	21:06:33.7	22.894	70.750	10	4.5	
19931001	17:27:23.7	22.869	65.930	249	4.7	
19931016	:41:00.2	24.118	67.249	162	5.0	
19931019	4:02:22.4	22.386	66.004	278	5.8	
19931105	4:01:43.7	24.085	67.190	183	4.5	
19931114	1:59:19.9	22.657	68.620	110	5.8	
19931130	8:24:00.7	23.220	68.943	65	4.5	
19931201	13:23:56.9	23.151	71.068	33	5.1	5.0
19940201	16:29:37.8	21.452	70.060	52	5.1	
19940202	5:03:54.0	22.557	66.738	215	4.5	
19940202	9:02:21.9	24.812	66.770	139	4.6	
19940204	21:06:10.9	21.837	68.308	122	4.9	
19940217	4:37:28.3	23.166	66.576	223	5.3	
19940316	7:49:34.3	22.416	65.995	274	4.8	
19940317	3:21:00.8	24.220	67.036	164	4.5	
19940317	21:22:50.0	23.082	68.374	109	4.7	
19940418	2:30:05.3	24.058	67.499	150	4.7	
19940419	8:28:38.0	22.814	69.749	49	5.2	
19940420	3:32:45.9	21.109	65.974	266	4.8	
19940420	8:32:46.3	25.226	70.518	33	4.8	
19940522	2:57:15.5	24.260	66.908	192	5.4	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19940616	22:11:50.8	24.337	66.977	166	4.9	
19940709	7:49:32.4	22.654	66.443	230	4.5	
19940731	6:26:44.2	23.114	66.517	242	4.6	
19940731	12:12:50.8	23.018	66.524	230	4.6	
19940802	1:51:18.0	24.272	66.932	169	5.1	
19940816	2:38:31.1	24.038	66.769	182	4.6	
19940826	4:44:29.9	23.357	66.355	212	4.9	
19940831	14:31:16.3	21.385	68.727	108	4.7	
19940902	4:54:30.0	21.059	66.680	225	4.8	
19940923	19:08:56.8	23.156	66.433	200	4.8	
19941012	9:22:49.9	21.949	67.462	180	4.6	
19941020	13:26:04.6	21.433	68.258	123	5.1	
19941108	7:10:48.3	22.757	68.373	115	4.8	
19941117	5:35:33.2	22.375	66.078	274	5.1	
19941122	12:19:49.3	23.194	69.336	67	4.9	
19941123	13:57:58.8	22.465	67.383	165	4.6	
19941127	5:24:53.2	21.496	66.544	230	4.7	
19941129	18:26:43.3	24.085	66.678	182	4.5	
19941204	19:54:40.3	24.076	66.991	204	4.6	
19941207	3:37:55.5	23.458	66.736	243	5.6	
19941210	3:39:31.4	23.579	70.522	37	5.7	5.6
19941213	14:26:37.9	24.136	67.822	106	4.9	
19950101	4:04:55.8	24.491	69.769	69	4.8	
19950101	9:33:44.7	25.094	69.492	33	4.7	
19950103	21:13:07.2	23.038	70.283	97	4.9	
19950214	15:53:56.9	23.290	67.702	156	5.7	
19950308	7:10:35.5	22.144	68.369	114	4.9	
19950311	7:26:22.4	21.198	68.610	134	4.6	
19950321	9:10:35.7	22.799	68.506	103	5.0	
19950424	21:00:50.1	22.001	67.379	170	4.9	
19950426	4:21:36.7	22.791	69.381	71	5.0	
19950504	3:06:44.3	24.184	66.868	179	4.6	
19950504	18:47:48.6	24.056	69.701	33	5.0	
19950506	17:47:32.7	22.897	67.259	33	4.8	
19950519	9:31:46.0	23.811	66.496	230	5.0	
19950609	5:35:49.3	21.664	68.029	132	5.2	
19950609	12:01:56.1	24.035	66.972	179	4.8	
19950614	16:12:59.3	24.754	69.984	49	5.5	4.7
19950706	9:19:58.9	22.603	68.459	109	4.6	
19950709	23:42:06.8	24.317	66.942	180	4.7	
19950730	5:11:23.5	23.364	70.312	47	6.6	7.3
19950730	5:25:06.0	23.239	70.673	33	5.7	
19950730	5:34:28.3	25.301	70.050	33	4.8	
19950730	5:47:02.1	23.290	70.325	33	5.8	
19950730	5:50:03.3	23.233	69.970	33	5.4	
19950730	5:59:07.5	24.600	70.774	33	4.8	
19950730	6:00:08.5	24.299	70.568	33	5.3	
19950730	6:02:57.4	24.212	70.889	33	4.5	
19950730	6:08:12.2	23.663	70.597	33	4.7	
19950730	6:27:30.3	24.133	70.848	33	4.7	
19950730	6:39:28.7	24.293	70.571	33	5.1	
19950730	6:51:23.7	23.934	70.344	33	4.5	
19950730	7:04:16.4	24.389	70.362	33	4.7	
19950730	7:05:04.6	24.153	70.508	33	4.5	
19950730	7:06:55.7	24.680	70.699	33	4.6	
19950730	7:14:29.7	24.330	70.544	33	4.6	
19950730	7:22:06.4	24.249	70.711	33	4.6	
19950730	7:33:15.7	23.641	70.866	33	4.5	
19950730	7:34:18.1	23.468	70.341	33	5.0	
19950730	7:51:22.2	24.745	70.503	33	4.6	
19950730	8:02:24.8	23.618	70.587	33	4.6	
19950730	8:17:18.0	23.987	70.242	30	5.2	
19950730	8:58:01.6	23.523	70.524	33	4.6	
19950730	9:34:39.0	24.185	70.188	32	5.2	
19950730	9:49:01.7	23.905	70.209	33	4.5	
19950730	10:35:42.5	24.392	70.691	33	5.8	5.3
19950730	10:56:11.7	23.209	70.534	33	5.4	5.6
19950730	11:18:49.7	23.892	70.435	33	4.5	
19950730	11:38:29.9	23.521	70.693	33	4.8	
19950730	12:27:37.3	24.640	70.514	33	4.6	
19950730	12:44:05.1	24.264	70.673	33	4.5	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19950730	12:51:37.6	24.441	70.851	33	4.6	
19950730	13:27:19.8	24.143	70.274	33	4.6	
19950730	13:45:56.8	23.239	70.090	33	4.7	
19950730	14:09:02.6	24.718	70.479	33	4.6	
19950730	14:15:53.8	24.758	70.639	33	4.7	
19950730	14:44:45.9	24.114	69.989	33	4.8	
19950730	15:40:51.7	24.173	70.547	33	4.5	
19950730	16:16:16.2	23.627	70.700	33	4.6	
19950730	16:19:24.3	24.883	70.698	33	5.3	4.8
19950730	17:21:53.0	23.812	70.830	33	4.6	
19950730	17:59:53.4	23.889	70.155	33	4.6	
19950730	18:02:45.8	24.009	70.746	33	5.0	5.0
19950730	18:26:32.0	23.650	70.632	33	4.7	
19950730	19:14:03.3	24.443	70.781	33	4.5	
19950730	21:05:50.6	23.317	70.590	33	5.6	5.6
19950730	22:20:41.4	24.158	70.501	33	4.5	
19950730	22:27:55.0	23.270	70.058	33	4.9	
19950730	22:48:44.5	24.468	70.892	33	4.8	
19950730	23:06:44.0	23.612	70.512	33	4.7	
19950730	23:14:35.0	23.329	70.597	33	4.8	
19950731	:14:47.3	24.129	70.232	33	5.0	
19950731	2:07:12.6	23.108	70.431	33	4.8	4.8
19950731	6:08:35.0	23.649	70.420	33	4.6	
19950731	8:20:18.3	21.255	68.348	123	4.6	
19950731	9:25:32.7	23.768	70.136	44	4.8	
19950801	3:21:07.8	24.828	70.741	33	4.5	
19950801	4:29:20.6	24.050	66.649	199	4.8	
19950801	5:10:57.4	24.912	70.886	30	5.2	4.5
19950801	6:00:37.8	24.099	70.766	33	4.7	
19950801	12:37:19.7	23.960	70.500	23	4.8	
19950801	15:44:30.5	24.101	70.782	30	5.2	4.7
19950801	21:51:43.5	23.462	70.652	33	4.6	
19950802	:14:09.6	23.152	70.578	33	5.4	5.5
19950802	2:04:38.2	23.019	70.528	33	4.6	
19950802	5:22:22.6	23.098	71.077	33	4.8	
19950802	11:05:39.0	23.100	70.405	33	5.2	5.1
19950802	16:27:32.8	23.336	70.477	33	5.1	5.1
19950802	18:39:37.8	23.019	70.564	33	4.5	
19950802	20:20:13.6	22.957	70.568	33	5.1	4.5
19950803	1:57:21.7	23.132	70.602	33	5.4	5.9
19950803	4:43:04.5	23.156	70.477	34	4.7	
19950803	12:00:27.9	22.913	70.475	33	5.0	4.5
19950803	13:48:26.7	23.977	70.217	33	4.6	
19950803	14:03:05.8	23.065	70.520	33	4.6	
19950803	14:19:04.7	22.929	70.379	33	5.2	5.1
19950803	19:07:45.0	24.007	70.745	33	4.6	
19950803	19:50:36.3	23.699	70.520	33	5.0	4.3
19950803	23:07:12.4	23.317	70.700	33	4.5	
19950804	11:28:50.3	24.021	70.352	32	4.5	
19950805	:32:46.1	23.195	70.701	33	4.6	4.5
19950805	1:50:13.6	23.055	70.576	33	4.7	4.3
19950805	8:21:05.3	23.272	70.544	33	4.8	
19950806	22:38:32.9	23.600	70.839	33	4.6	
19950808	7:18:10.6	23.763	69.955	33	4.5	
19950809	7:20:37.4	24.461	70.147	34	4.9	4.2
19950809	8:23:01.1	23.121	70.181	35	5.3	4.7
19950810	12:48:45.5	23.668	67.693	117	4.5	
19950810	18:10:37.3	23.687	70.485	33	5.4	4.7
19950811	10:14:46.5	23.368	66.577	215	4.9	
19950817	18:54:32.7	23.215	70.520	33	4.9	
19950818	19:44:49.9	23.826	70.682	33	4.5	
19950820	3:09:05.1	23.226	70.446	33	4.5	
19950829	20:16:26.3	24.371	67.031	164	4.5	
19950831	22:15:04.9	23.944	70.168	33	4.5	
19950907	12:55:03.4	24.848	70.575	56	4.6	
19950909	16:33:43.9	23.165	70.306	33	4.5	
19950912	8:40:43.5	23.546	70.857	33	4.6	
19950919	3:31:53.6	21.228	68.740	110	5.7	
19950921	22:23:07.4	23.142	70.424	32	4.7	
19950924	13:59:00.2	23.176	67.888	127	4.8	
19951007	3:32:57.5	23.091	70.429	33	4.7	

Depto. de Geofisica, Universidad de Chile

Date	Origin Time	Lat (S)	Long (W)	Depth	mb	Ms
19951012	2:35:31.4	22.527	66.188	241	4.6	
19951012	22:57:10.1	22.954	70.204	32	5.3	4.9
19951015	6:34:01.4	22.377	68.439	111	4.7	
19951016	16:36:19.5	23.235	70.434	28	5.4	5.2
19951016	16:44:20.2	23.369	70.666	30	5.1	5.1
19951016	17:05:31.3	23.287	70.557	33	4.7	
19951106	21:52:27.5	21.372	66.551	228	4.7	
19951113	15:11:46.2	21.720	67.065	199	4.5	
19951220	:24:48.0	21.911	68.105	100	4.8	
19951221	14:21:33.1	22.960	68.144	100	4.6	
19951223	2:42:52.3	22.451	66.877	168	4.8	
19960108	17:42:25.7	24.897	70.047	51	4.5	
19960116	12:17:22.4	24.003	66.816	199	4.5	
19960131	22:58:58.0	23.324	69.644	74	4.6	
19960229	19:39:55.6	24.053	66.758	186	4.8	
19960301	2:27:24.1	23.479	70.358	27	5.1	4.5
19960307	8:38:57.5	23.267	70.285	31	5.3	4.9
19960318	3:15:16.7	24.027	67.972	149	4.9	
19960329	15:35:47.8	24.796	69.793	33	4.5	
19960411	3:06:14.0	22.997	66.799	198	4.6	
19960419	:19:31.1	23.944	70.093	50	6.0	6.1
19960420	19:17:06.1	24.071	66.786	197	5.2	
19960502	13:12:47.4	21.378	68.596	121	4.5	

Appendix II

Isoseismals for Large Earthquakes

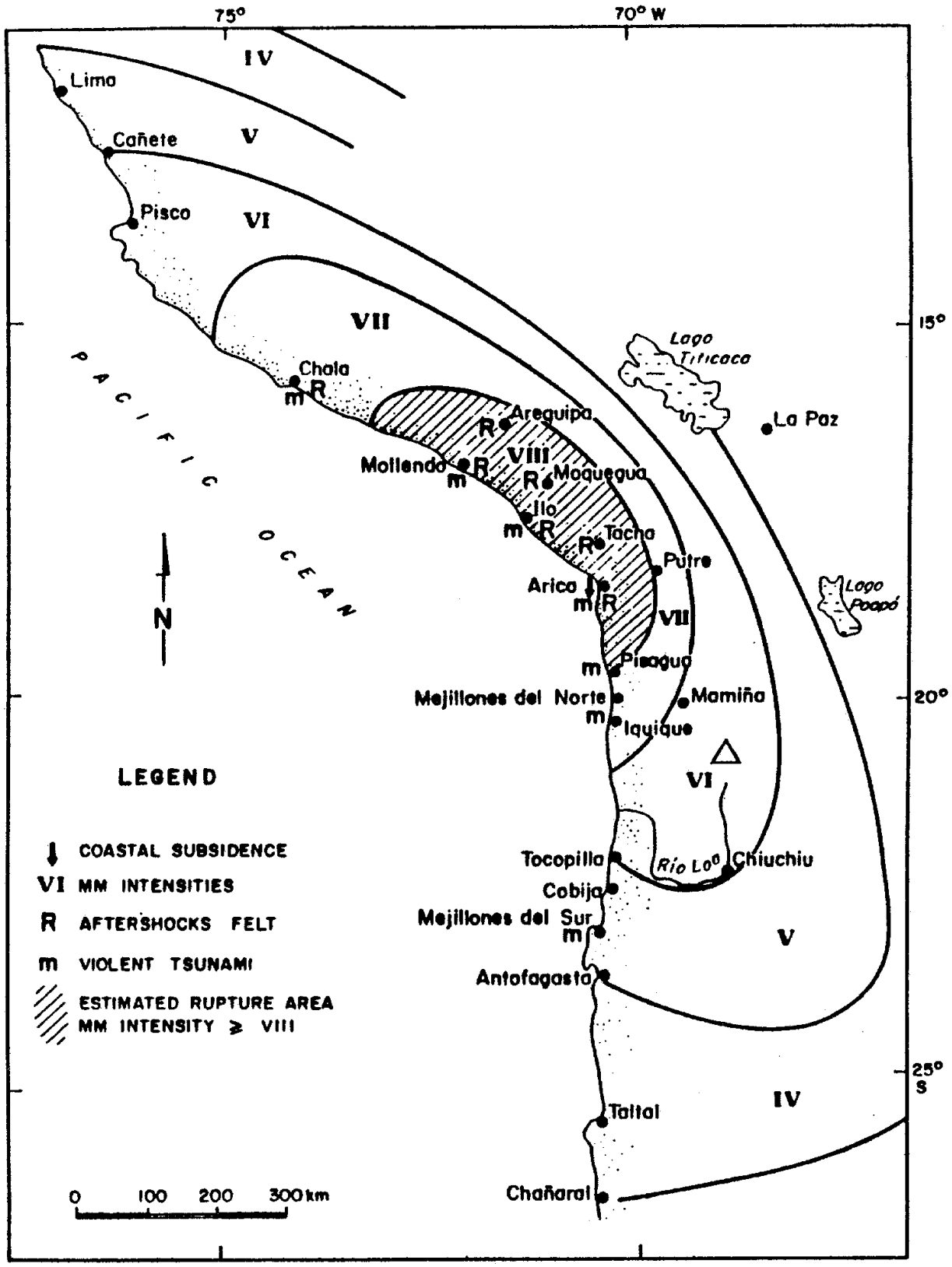

Fig. 1. Isoseismals and rupture area associated with the 1868 earthquake (southern Peru and northern Chile). The intensity at MMA site reached a value of V in the Modified Mercalli Intensity scale.

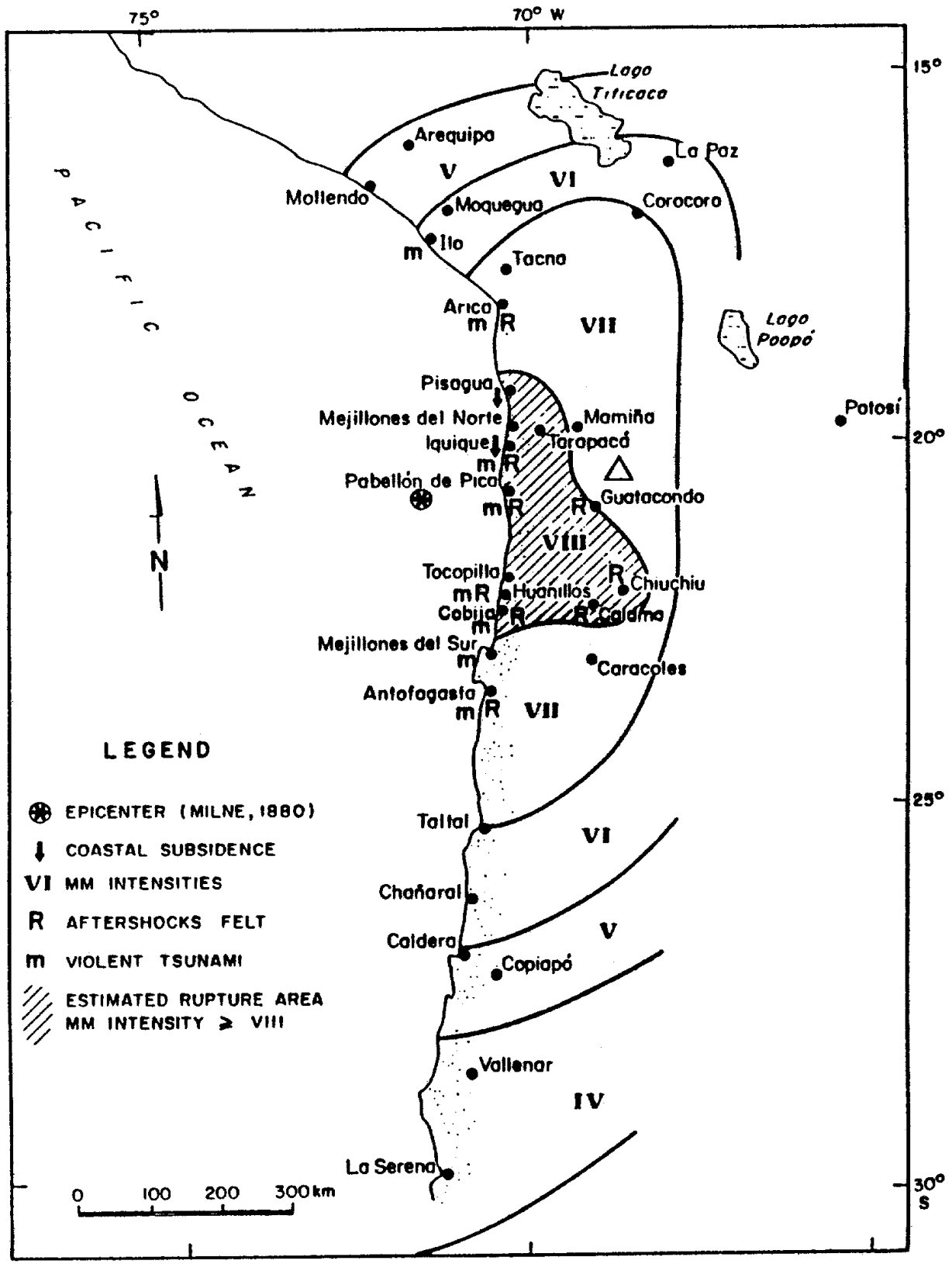

Fig. 2. Isoseismals and rupture area associated with the 1877 earthquake (northern Chile). The intensity at MMA site reached a value of VI-VII in the Modified Mercalli Intensity scale.

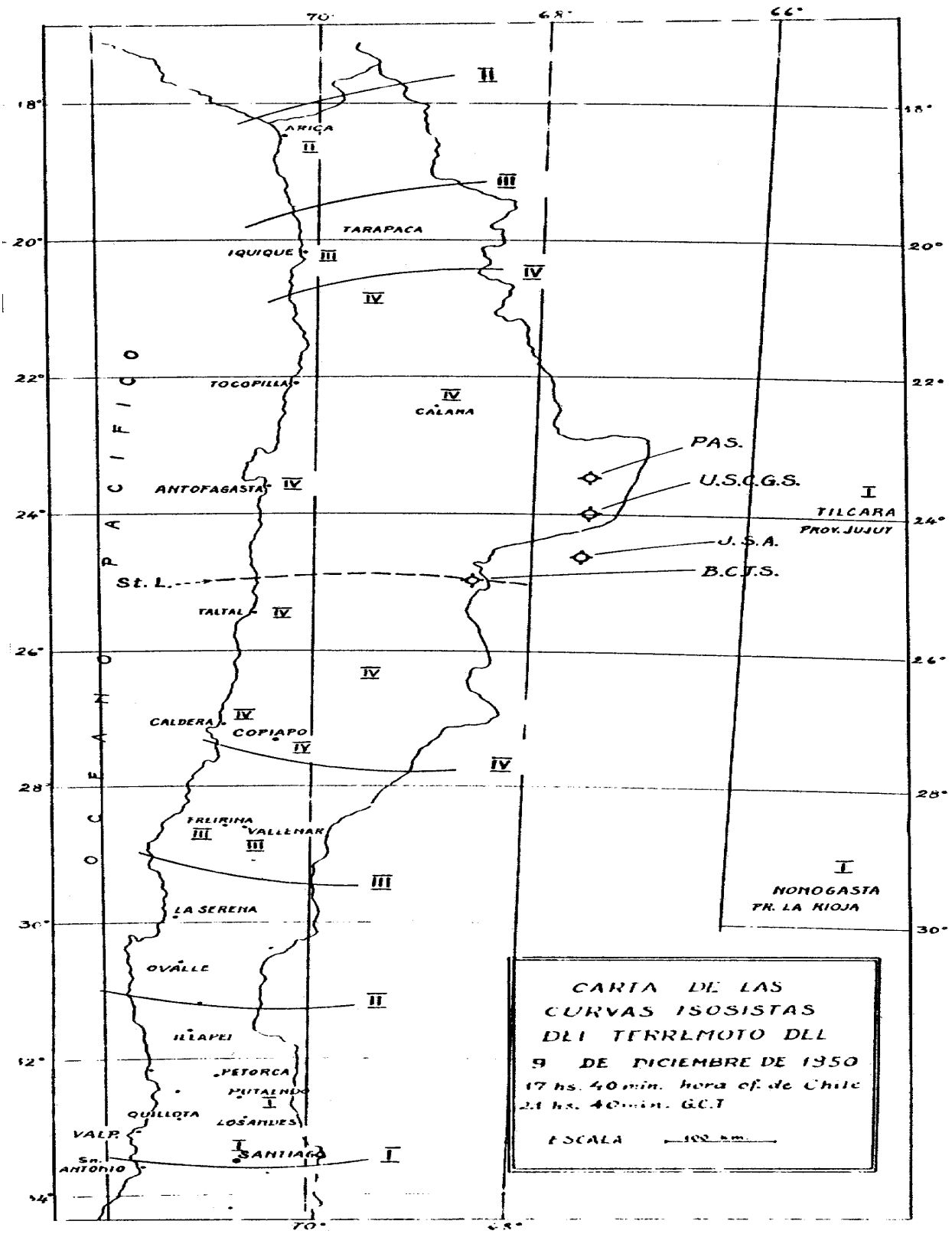

Fig. 3. Isoseismals produced by the 1950 earthquake (northern Chile). The intensity at MMA site reached a value of IV in teh old Chilean scale which corresponds to VII-VIII in the Modified Mercalli Intensity scale.