行政院原子能委員會
委託研究計畫研究報告

核四廠結構系統組件審查技術研究
影響台灣地區地震歷史紀錄及震源確定分析

Analysis of earthquake catalog and earthquake source zoning in the Taiwan region

計畫編號：942001INER20

受委託機關（構）：清雲科技大學

計畫主持人：葉永田

報告日期：94 年 12 月

目　　錄

中文摘要……I

英文摘要……II

一、計畫目的…… 1

二、計畫源起…… 2

三、執行方法與進度說明…… 3

四、結論與建議…… 20

參考文獻…… 21

影響台灣地區地震歷史紀錄及震源確定分析

中文摘要

為配合核能安全與管制的施政目標，本計畫預定對台灣地區長期的地震紀錄(earthquake data)及活動斷層（active fault）做地毯式之整理，並建置成一個 GIS 地震資料庫，以作為核電設施機率式地震危險度評估（probabilistic seismic hazard assesment）的基本輸入資料。本計畫的主要工作包括：地震規模一致性之探討、分析與確立，震源位置的再確認，餘震系列的判斷，活動斷層(active fault)及其錯動機制(faulting mechanism) 的估判，震源區的劃分(earthquake source zoning)等。工作進行的順序是：可能影響核四廠者為首要，再依核核一、二、核三順序進行。

本年度計畫完成工作項目：一、建立規模轉換經驗式與程序；二、針對 1959 年恆春地震與其餘震進行重定位與規模評估；三、餘震系列的判斷並建立 1900-2004 年地震目錄。

關鍵字：地震風險分析

Analysis of earthquake catalog and earthquake source zoning in the Taiwan region

Abstract

For probabilistic seismic hazard assessment of nuclear power plant and its related facilities, an unified earthquake catalog is basically important. So that, the first job of this project is to re-examine available catalogs of the earthquakes occurred in the Taiwan region and in the different observational periods. The works will be done are to analyze the magnitude scales and convert all of them to $M_{L,}$ the Local magnitude scale, to check the hypocenter location(s) listed in different catalogs, and to identify the aftershock sequences. Besides, the location of active faults and their possible faulting mechanisms will be discussed. Earthquake source zoning schemes of Taiwan will be determined too. The final earthquake catalog will be established in a GIS based database.

The finish item of the first year: 1. Establishment of the formula and the procedure of magnitude transformation. 2. Relocation and re-evaluation the magnitude for the 1959 Henchung earthquake sequence. 3. Establishment the 1900-2004 earthquake catalog without aftershock sequence.

KEYWORDS: Seismic hazard analysis

一、計畫目的

台灣位處於環太平洋地震帶上，受到歐亞大陸板塊與菲律賓海板塊間的碰撞、擠壓作用，自古以來即常發生大地震，造成嚴重災害(徐明同, 1983；鄭世楠和葉永田, 1989, 2004；鄭世楠等, 1999)。1999 年 921 集集地震及其餘震造成了超過 2,444 人的死亡及 8,700 多人的輕重傷、超過 10,000 間房子的全倒或半倒，使得十萬多人無家可歸，並且有許多棟公共建築物損毀，再度引起社會大眾及相關單位高度重視。

雖然地震是人類所面臨的最大天然災害之一，但是迄今為止，科學家仍無法有效地預測地震發生的時間、位置和其大小，因此，依據現有的地震時空活動（seismicity）記載以及相關的地質資料，從事地震危險度評估（seismic hazard assessment），可能是現階段最好的地震防災策略與手段。一個完整且易於使用的地震資料庫是地震危險度評估工作最基本的要件。由於地震及地質資料具有時空分佈的特性，地理資訊系統(Geographic Information Systems; GIS)成為建置相關資料庫的最佳工具。

為配合核能安全與管制的施政目標，本計畫預定對台灣地區長期的地震紀錄(earthquake data)及活動斷層（active fault）做地毯式之整理，並建置成一個 GIS 地震資料庫，以作為核電設施機率式地震危險度評估（probabilistic seismic hazard assesment）的基本輸入資料。

二、計畫緣起

為配合核能安全與管制的施政目標，本計畫預定對台灣地區長期的地震紀錄(earthquake data)及活動斷層（active fault）做地毯式之整理，並建置成一個GIS地震資料庫，以作為核電設施機率式地震危險度評估（probabilistic seismic hazard assesment）的基本輸入資料。

本計畫第一年度工作將著重於台灣地區歷史地震紀錄(earthquake catalog)的重新整理，工作項目包括：

1. 台灣地區地震規模紀錄轉換為一致的規模尺度(近震規模；M_L)：各時期地震資料所採用不同地震規模之近震規模轉換經驗式已建立完成。
2. 台灣地區地震發生位置的再確認，尤其是震源深度，所得結果將建置於GIS：已建立重定位程序，尤其是針對1973年以前各測震站時間系統不一致的資料，應用S-P時間差採用蒙第卡羅數位逆推法推求震源參數，亦建立地震規模重新評估方式，採用觀測之最大振幅與震度等資料來評估地震規模。
3. 台灣地區地震餘震紀錄的識別：由1.與2.項建立的地震資料，採用Gutenberg and Richter(1936)地震次數與規模之關係，建立不同時期之a、b值，以做為餘震篩選的依據。

本計畫第二年度工作將著重於活動斷層的估判與地震區域的劃分，工作項目包括：

1. 台灣地區活動斷層的估判(包括長度、最大規模、錯動機制等)
2. 台灣地區地震區域的劃分

三、執行方法與進度說明

本計畫第一年度工作將著重於台灣地區歷史地震紀錄(earthquake catalog)的重新整理，工作項目包括：

1.台灣地區地震規模紀錄轉換為一致的規模尺度(近震規模；M_L)：

目前台灣地區的諸多地震目錄中，由於時代背景與測震儀器不同，用來描述地震大小的規模尺度也不盡相同，常造成使用者的不便(圖1)。為了使用的更方便，本計畫選定最常為區域性地震觀測網使用的近震規模(Local Magnitude；M_L)做為統一的規模尺度，選擇辛在勤(Shin, 1993)所推導的M_L為基準。主要考慮的原因有二：一是辛在勤(Shin, 1993)由CWBSN所收錄的資料重新建立台灣地區標準衰減函數$\log A_0(\Delta)$，同時考慮了震源深度的因子，使得其推導的近震規模尺度($M_{L(S)}$)更符合台灣地區地震的特性；二是考慮連貫性，由於目前中央氣象局管理CWBSN且自1994年1月起即採用$M_{L(S)}$做為描述地震大小的尺度，今後只要直接加入其結果而不必再經任何轉換即可使用。

選定M_L做為描述地震大小的統一尺度後，接著而來的工作是要進行各種不同規模尺度間的比對與轉換工作。我們先利用不同規模尺度同時並存的時段(如圖1所示)評估比對各種不同尺度間的關係性，以進行不同規模尺度間之比對，並將各種不同的規模尺度轉換成同一標準的近震規模(M_L)。同時收集世界各地有關台灣地區地震的研究、報告與目錄，以及近年來台灣地區完成的研究成果或地震目錄，詳加研究比對，期能建立一個較為完整的地震紀錄。

辛在勤(Shin, 1993)推導出近震規模與總振動時間規模間關係：

$$M_{L(S)} = 0.03 + 1.12\ M_{D(D)} \pm 0.23 \qquad (1)$$

TTSN在1987年6月12日將舊有的類比式記錄系統更改為數位式記錄系統，更新後系統評估的地震規模$M_{D(D)}$與原有的$M_{D(A)}$有些差異，其間的關係為：

$$M_{D(D)} = -0.346 + 0.996\ M_{D(A)} \pm 0.156 \qquad (1.8 \le M_D \le 5.5)$$

$$M_{D(A)} = \quad 0.347 + 1.004\ M_{D(D)} \pm 0.157 \qquad (2)$$

台灣地區1972年以前的地震資料主要以徐明同(1980,1989) 所整理的地震目錄為主，該目錄以徐氏規模M_H做為描述地震大小的尺度(圖1)，$M_{D(A)}$ - M_H的關係為：

$$M_H = -0.231 + 1.128M_{D(A)} \pm 0.360 \qquad (M_H{:}4.0\text{-}7.2,\ M_{D(A)}{:}3.7\text{-}6.3)$$

$$M_{D(A)} = 0.205 + 0.886\ M_H \pm 0.319 \qquad (3)$$

全球觀測網PDE/NEIC所採用的體波地震規模資料則採用(4)經驗式轉換為近震規模

$$M_{L(S)} = 0.791 + 0.900m_b \pm 0.270 \qquad (4)$$

對於 1945 年以前欠缺地震規模描述的地震，或僅採用有感半徑的地震資料則採用(5)與(6)經驗式轉換為近震規模，其中(5)經驗式為震源深度小於或等於 35 公里的地震；(6)經驗式則針對震源深度大於 35 公里的地震。

$$M_{L(S)} = 2.113\ \log(R) + 0.997 \pm 0.562 (0<h\le 35\ \text{km})； \qquad (5)$$

$$M_{L(S)} = 1.698\ \log(R) + 1.658 \pm 0.475 (h>35\text{km}) \qquad (6)$$

應用(1)-(6)經驗式的轉換，即可將台灣地區地震規模紀錄轉換為一致的規模尺度(近震規模；M_L)。

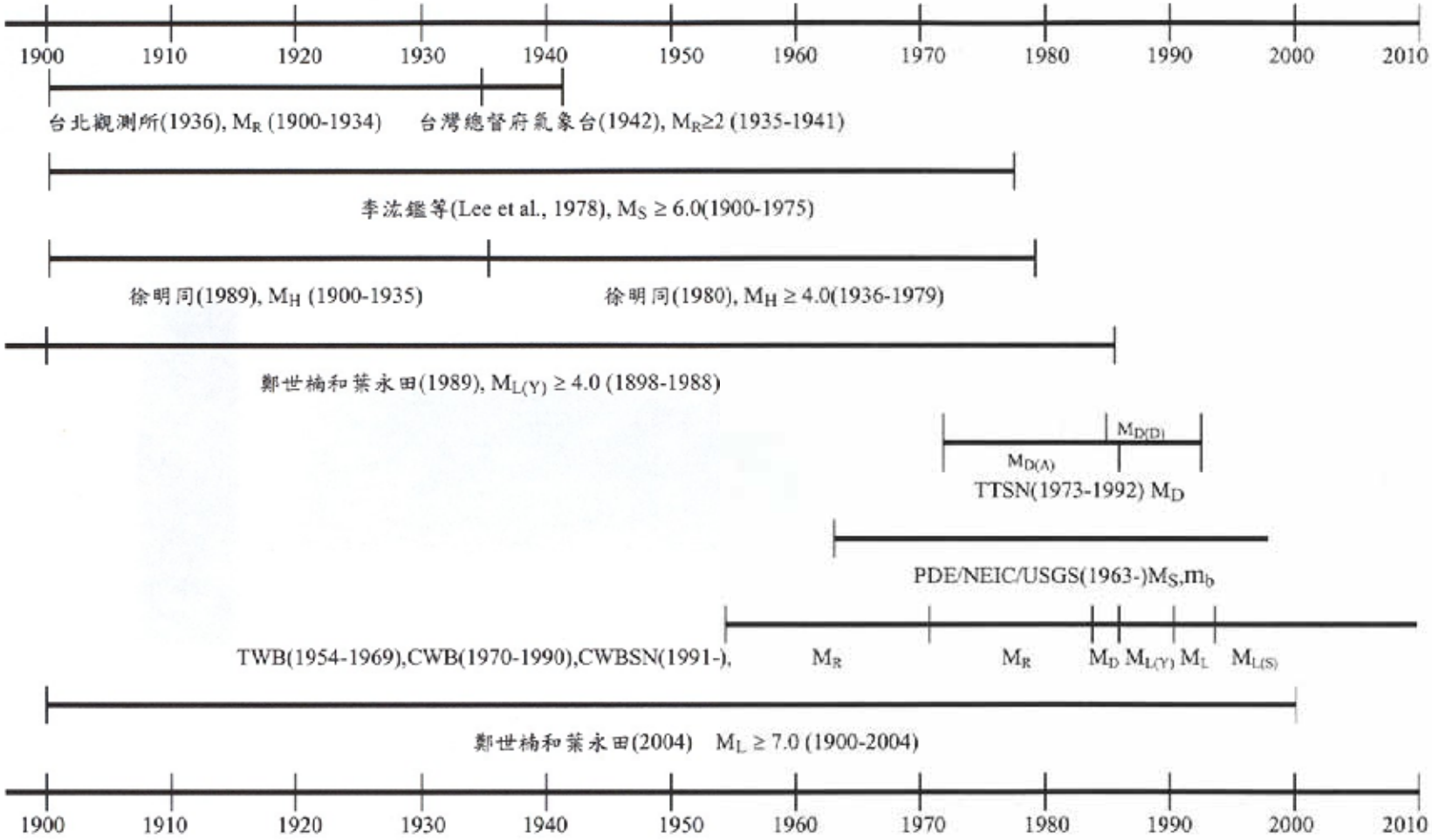

圖 1、1898 年至 2004 年間台灣地區主要地震目錄及其涵蓋時間示意圖

2.台灣地區地震發生位置的再確認：

1959年恆春地震重定位

1959年8月15日16時57分，恆春東南東方約70公里海底發生強烈的災害地震，台灣全島及澎湖均有感，為南台灣的屏東縣帶來了空前未有的損害，其中又以滿州鄉、恆春鎮、車城鄉、佳冬鄉造成的損害較為嚴重。因震央位於恆春東南東方海底，故陸地未發現斷層跡象，但山崩、地裂、井水異常、噴砂與噴水等現象皆有觀測。此次地震共造成17人死亡、33人重傷、35人輕傷，房屋全倒1,214棟、半倒1,375棟、大破392棟、破損739棟(包括8月18日餘震的災害，8人受傷，房屋全倒129棟、半倒63棟)。單就屏東縣的統計數字顯示：民房建築物的損害金額為24,111,920元、學校建物的損失金額為6,127,000元，即高達三千萬元(當時幣值)。

自台灣設置地震儀以來，恆春地區甚少發生重大災害地震，1959年恆春地震是恆春半島過去100年來所發生之最嚴重的災害地震，故此地震對於恆春地區有重大的意義，再加上此地震所造成的死傷人數較少(以房屋倒塌與死傷人數的比值而言)，有重新探討的必要性。

地震發生後將近一年，台灣省氣象所(中央氣象局的前身)將地震觀測資料彙整發行「恆春地方烈震調查報告」，此外，中央氣象局自1954年將台灣地區地震觀測結果彙整，每三個月發行「地震季報」，詳細列載地震儀觀測記錄資料。呂新民(1960)登錄震源參數為：21°45’N,121°20’E,震源深度20公里；徐明同(1980)登錄為：21.7^{o}N, 121.3^{o}E, 震源深度20公里, M_H =6.8；中央氣象局地震測報中心地震資料庫登錄為：21.75^{o}N, 121.33^{o}E, 震源深度20公里, M_L=7.1；遠場觀測結果為：22.1^{o}N, 120.9^{o}E, 震源深度0公里, M_S=7.1 (Abe, 1981, 1982, 1984)。

依據呂新民(1960)與地震季報所登錄各測站的觀測資料，先行建置成原始觀測資料庫，表1為1959年恆春地震各測站儀器觀測資料，根據建置完成的基本資料再進行震源參數的重定位與地震規模探討的工作。台灣地區地震觀測網在1959年間，有14個測候所裝設地震儀進行地震活動的監測(表1)。

由於各測站的時間系統並不一致，本研究僅利用呂新民(1960)與地震季報所登錄各測站的S-P時間，參考Cheng et al.(1996)應用蒙地卡羅法數值法重新定位的方法。定位程序中欲推求的參數為震源的經度(Lon.)、緯度(Lat.)與深度(Dep.)。根據呂新民(1960)、徐明同(1980)、鄭世楠和葉永田(1989)與地震季報登錄的震源參數與等震度圖等資料來設定參數的可能分佈範圍：

$$\begin{aligned} 21.0^{o} &\leq \text{Lat.} \leq 23.0^{o}\text{N} \\ 120.0^{o} &\leq \text{Lon.} \leq 122.0^{o}\text{E} \\ 0.0 &\leq \text{Dep.} \leq 80.0\ \text{km} \end{aligned} \qquad (7)$$

在計算程序中，水平向(經度與緯度)的單元距設定為0.025度，垂直向(深度)為1公里，則每一個地震共有531,441個單元進行測試，採用Yeh and Tsai(1981)之地殼模型計算每一個單元至各測震站的S-P時間($\mathbf{d}_{cal}$)，並與觀測之S-P時間($\mathbf{d}_{obs}$)進行比對。由計算與觀測之S-P時間殘差的均方根(root-mean-square error, RMS)做為蒙地卡羅逆推法的誤差涵數(misfit function)，並藉由RMS的極小化推求得最佳的震源參數：

$$\text{RMS}_i = \sqrt{\frac{\sum (d_{cal(i,j)} - d_{obs(i,j)})^2}{N}} \qquad (8)$$

上式中$\mathbf{d}_{cal(i,j)}$與$\mathbf{d}_{obs(i,j)}$分別表示第i個單元至第j個測站之計算與觀測的S-P時間；$\mathbf{RMS}_i$ 是第i單元之S-P時間殘差均方根；**N**表示所使用的測震站個數。

1959年恆春地震重定位結果顯示：震央位於21°51’N, 121°18’E, 震源深度相當淺，收斂在0公里處，地震規模M_L= 7.0，S-P時間殘差的均方根為1.36秒。圖2為1959年恆春地震系列重新定位的結果，涵蓋時間為1959年8月15日至11月底，共87個地震。

根據呂新民(1960)列載的地震災害資料，依照行政區建置於GIS資料庫中，圖3顯示1959年恆春地震震災資料建置於GIS資料庫的結果，震災資料包括人員傷亡、全倒與半倒、災民數與損失金額等資料。其中災情較嚴重之滿州鄉、恆春鎮的災害情形，以村里為計算單位，圖中顯示以滿州鄉港口村房屋全倒率(46.2%)最高，其次為滿州鄉滿州村(30.4%)。

1959年恆春地震主震發生在下午4時57分，時近傍晚，居民大多活動於戶外，因天色尚未入晚，老弱婦孺亦易於逃避，故死傷人數較少(以房屋倒塌與死傷人數的比值而言)。

利用呂新民(1960)與地震季報所登錄各測站的S-P時間，應用數值法重新定位1959年恆春地震系列共87個地震，主震重新定位結果：震央位於21°51’N, 121°18’E, 震源深度相當淺，收斂在0公里處，地震規模M_L= 7.0，S-P時間殘差的均方根為1.36秒。由重定位的餘震分佈顯示，餘震呈圓形分佈，半徑約為85公里。

1959年恆春地震災害資料已建置成GIS資料庫，其中以滿州鄉港口村房屋全倒率(46.2%)最高，其次為滿州鄉滿州村(30.4%)。此次地震震災就人員死亡與房屋全倒的比例僅為1.4 %，是相當低的數值，與台灣過去重大災害地震的統計數字比較(表2)，人員傷亡與房

屋全倒比例的數字和地震發生的時間有密切的關係。地震發生在居民清醒時，此數字的比例即大為降低在7 %以下；若是地震發生在人們熟睡時間時，人員死亡與房屋全倒的比例即提昇為7 %以上，甚至高達20 %以上。

表1、1959年恆春地震各測站儀器觀測資料一覽表

測　站	P波到時 時 分 秒	震度	初動 方向	S-P時間 (秒)	最大振幅	備註
恆春　HEN	16:57 08.8	Ⅴ-Ⅵ	-	7.5	出格(N), >24000(E)	
大武　TAW	16:57 11.3	Ⅳ			出格	
台東　TTN	16:57 17.4	Ⅳ	+	12.4	出格	
高雄　KAU	16:57 21.7	Ⅲ			>2000(N), >2000(E)	
新港　HIS	16:57 22.8	Ⅲ	+	17.2	>1600(N), >1400(E)	
台南　TAI	16:57 25.7	Ⅲ	+	21.2	>11700(N), >26000(E)	
阿里山　ALS	16:57 28.6	Ⅲ	+	23.5	4417(N), 12230(E)	
玉山　YUS	16:57 29.5	Ⅲ		20.5		
花蓮　HWA	16:57 36.2	Ⅱ	+	29.4	5819(N), 5150(E)	
澎湖　PNG	16:57 39.0	Ⅰ		31.1	2025(N), 2200(E)	
台中　TCU	16:57 39.1	Ⅰ	+	32.0	9250(N), 5250(E)	
宜蘭　ILA	16:57 47.5	Ⅲ	+	38.4	3315(N), 2723(E)	
新竹　HSN	16:57 48.3	Ⅲ		40.0	890(N), 1140(E)	
台北　TAP	16:57 51.2	Ⅱ	+	44.2	7575(N), 3940(E)	

表2、台灣地區重大災害地震發生時間與災害損失比率一覽表

地震發生時間 (120°E)	地震名稱	地震 規模	深度 (KM)	地震災害			死/全倒 (%)	死傷/全倒 (%)	備註
				死	傷	全倒			
1736年1月30日丑時	台南地震	6.5		266	120	556	47.8	69.4	
1792年8月9日申時	嘉義地震	7.1		717	781	24190	3.0	6.2	
1839年6月27日辰時	嘉義地震	6.5		117	534	7575	1.5	8.6	
1845年3月4日？時	台中地震	6.0		381		4220	9.0		
1848年2月12日辰時	彰化地震	7.2	10	1030		22664	4.5		
1904年11月6日04:25	斗六地震	6.1	7	145	158	661	21.9	45.8	
1906年3月17日06:42	梅山地震	7.1	6	1258	2385	6772	18.6	53.8	
1916年8月28日15:27	南投地震	6.8	45	16	159	628	2.5	27.9	
1935年4月21日06:02	新竹－台中地震	7.1	5	3276	12053	17907	18.3	85.6	
1941年12月17日03:19	中埔地震	7.1	15	358	733	4520	7.9	24.1	
1946年12月5日06:47	新化地震	6.1	5	74	482	1954	3.8	28.5	
1959年8月15日16:57	恆春地震	7.1	20	17	68	1214	1.4	6.2	
1964年1月18日20:04	白河地震	6.1	18	106	650	10520	1.0	7.2	
1999年9月21日01:47	集集地震	7.3	8	2245	8735	11000	20.4	99.8	

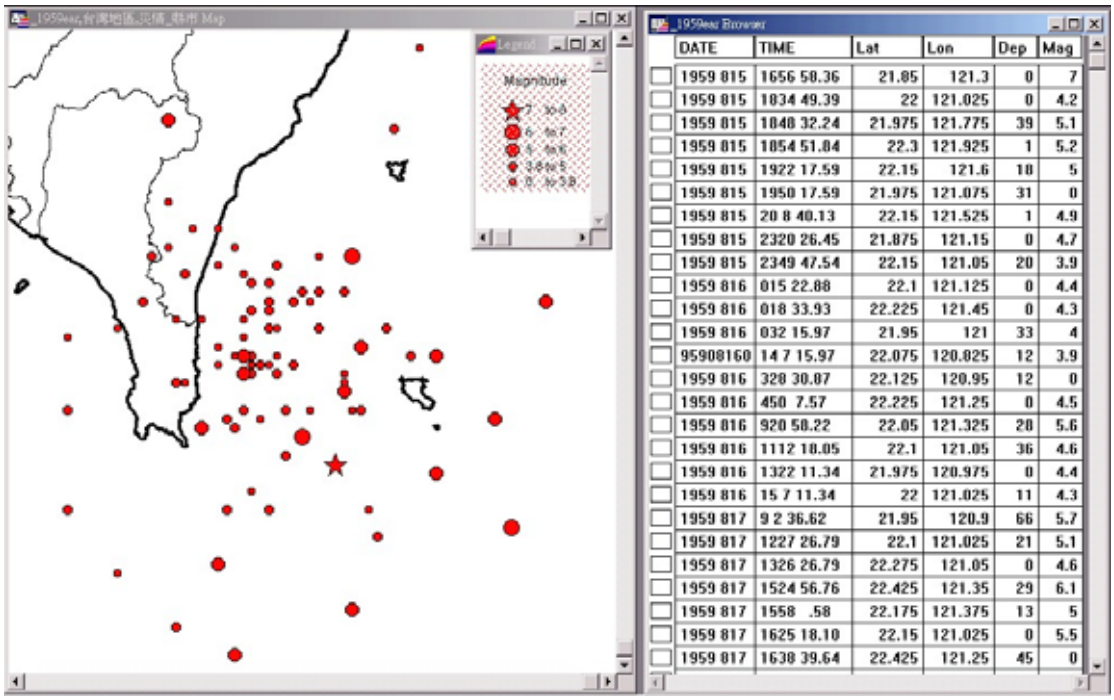

圖 2、1959 年恆春地震重新定位結果

鄉鎮	村里	總戶數	全倒	半倒	大破	小破	百分比	總人口	死亡	重傷	輕傷	全倒死亡	災民	損害估計
滿洲鄉	響林村	172	41	31		18	23.8	799					564	1438500.00
滿洲鄉	滿州村	358	109	39		57	30.4	1917		2			1240	2230600.00
滿洲鄉	港口村	292	135	48		8	46.2	1722	1	5		135	1211	1880600.00
滿洲鄉	里德村	167	28	34		12	16.7	772					420	487000.00
滿洲鄉	九棚村	146	11	18		53	7.5	736					246	233400.00
滿洲鄉	長樂村	229	20	21		5	8.7	1127		1			299	533500.00
滿洲鄉	港仔村													
滿洲鄉	永靖村	373	110	60		40	29.4	2110	1	7	2	110	1271	3017600.00

鄉鎮	村里	總戶數	全倒	半倒	大破	小破	百分比	總人戶	死亡	重傷	輕傷	全倒死亡	災民	損失估值
恆春鎮	蓮湖里	135	10	4	25	47	7.4	881			2		565	565000.00
恆春鎮	城北里	288	19	6	17	11	6.5	1576	1	5	4	19	327	698400.00
恆春鎮	山腳里	396	15	13	17	25	3.7	2059	2		5	7.5	458	824100.00
恆春鎮	城西里	233	2	2	12	9	0.8	1269			1		186	221000.00
恆春鎮	城南里	350	45	41	21	17	12.5	1805	5	3	8	9	751	1659000.00
恆春鎮	仁壽里	175	5	8	13	7	2.8	1000					183	249000.00
恆春鎮	網紗里	234	20	17	15	2	8.5	1319					293	732500.00
恆春鎮	德和里	130	2	1	5	14	1.4	891					147	43600.00
恆春鎮	頭溝里	181	3	16	27	7	1.6	1082					344	221600.00
恆春鎮	四溝里	193			1	4		1139					34	16000.00
恆春鎮	山海里	295	5	9	5	11	1.6	2032					231	187000.00
恆春鎮	鵝鑾里	216	18	30	14	4	8.3	1242		1			425	753200.00
恆春鎮	大光里	345	15	22	38	30	4.3	2261			2		736	467500.00
恆春鎮	龍水里	204	5	4	20	16	2.4	1210					221	188500.00
恆春鎮	南灣里	236	24	36	13	11	10.1	1428		1	1		631	952800.00

圖 3、1959 年恆春地震震災資料建置於 GIS 資料庫

3.台灣地區地震餘震紀錄的識別：

地震次數與規模之關係可由 Gutenberg and Richter(1936)的公式表示：

$$Log(N) = a - b M \quad (9)$$

式中 N 為某一地區在觀測時間內所發生規模大於或等於 M 的地震之個數，a 值與觀測的時間與地區有關，b 值與涵蓋的空間有關，a 值與 b 值亦是評估該地區地震活動度、地震回歸週期與地震風險曲線分析的重要參考指標之一。但大地震引發的一系列餘震往往會影響該地區 a 值與 b 值，而無法反應該地區長期的平均值，有鑑於此，歷史地震紀錄餘震的識別對於日後評估該地區地震活動度、地震回歸週期與地震風險曲線分析就顯得格外重要。本計畫擬由前二項工作建立的地震資料庫中先行建立長期觀測之 a 值與 b 值，藉由 a 值與 b 值評估餘震的時段，對於餘震較少的地震系列將採用人工篩選方式進行辨識，對於餘震個數較多的地震(如 1999 年集集地震)將應用隨機取樣由計算機篩選方式進行辨識。

圖 4 顯示台灣地區 1900 年至 2004 年去除餘震後之地震紀錄震央分佈情形，同時所得結果建置於地理資訊系統(GIS)。為方便查詢，表 3 列印所得之結果。

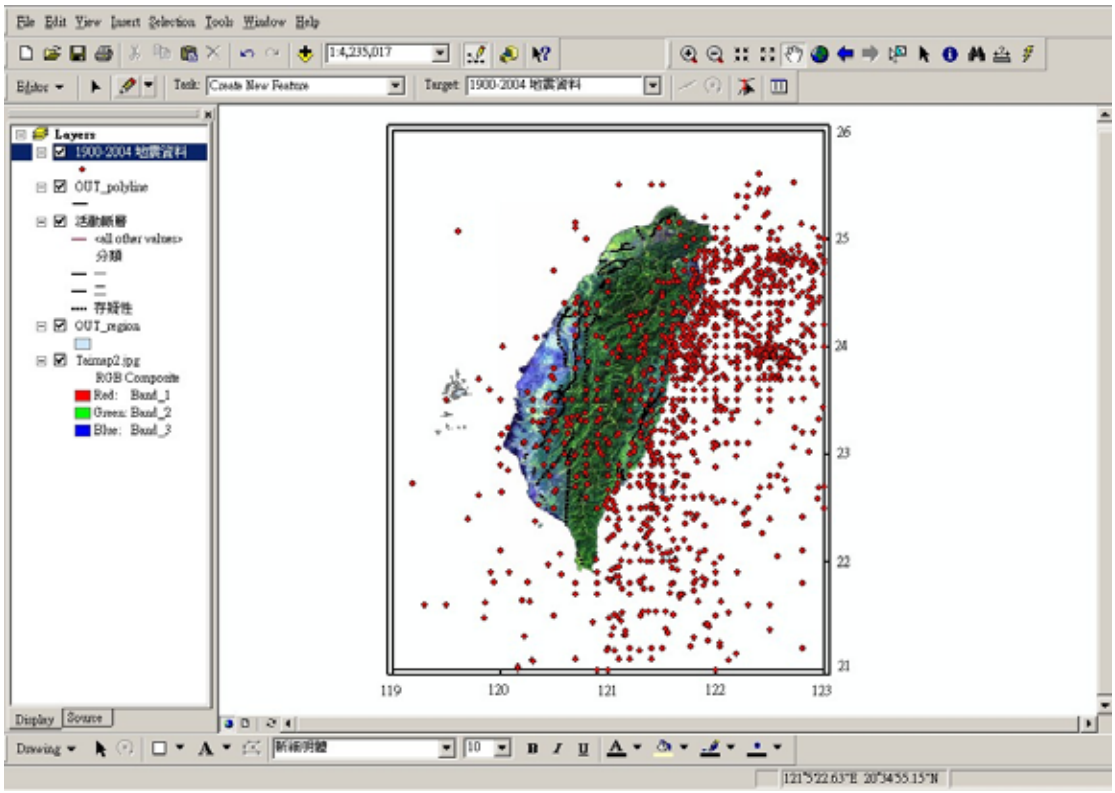

圖 4、台灣地區 1900 年至 2004 年去除餘震後之地震紀錄震央分佈圖

表 3、台灣地區 1900 年至 2004 年地震紀錄一覽表

origin time	lat.	lon.	dep.	ML	ML	ML	MH	MD	MG	mb	Ms	Ms	Mu	Mda	MF	Ref.
1900 5151210	2130.0012030.00		.0	7.0	*6.77.06.8						7.0		4			125C0
1901 6 7 0 5	2442.0012142.00		20.0	6.2	6.26.26.4						6.0		3	D		1257CL0
1901 913 029	25 .0012048.00		.0	5.8	5.8	6.0							3			20
1902 3 1 014	2448.00122 .00		.0	5.9	5.96.36.0						6.3		3			125C0
1902 320 159	23 .0012036.00		20.0	6.0	6.06.36.2						6.3		3			125C0
19021121 7 3	2148.0012042.00		10.0	6.5	6.56.86.0						6.86.87.0		3			125ACOU
190212 52112	23 .0012036.00		20.0	5.4	5.4	5.6							2			20
1903 529 436	24 .00122 .00		.0	5.7	5.7	5.9							3			20
1903 6 7 9 7	2448.0012142.00		20.0	6.1	6.16.06.3						6.0		3			1250U
1903 9 7 714	2242.0012124.00		.0	6.1	6.16.06.3						6.0		3			1257CL0
1903 910 416	2330.0011930.00		.0	5.1	5.1	5.5							2			20
190312 11421	2412.0012042.00		20.0	5.1	5.1	5.3							2			20
1904 3 5 459	2248.0012124.00		.0	5.6	5.6	5.8							3			20
1904 424 639	2322.5012028.50		2.0	6.2	6.26.36.3						6.3		3	D		12578CL0
1904 4271832	2512.0012154.00		.0	5.5	5.5	5.7							3			20
1904 5 2 912	2248.0012112.00		.0	5.7	5.7	5.9							3			20
1904 6151423	2148.0012054.00		.0	5.1	5.1	5.3							2			20
1904 9 7 450	2412.0012042.00		20.0	5.3	5.3	5.5							2			20
190411 52025	2334.5012015.00		7.0	6.1	6.16.56.3						6.3		3	D		12578CL0
190412 92327	2330.00120 .00		.0	5.0	5.0	5.2							2			20
190412112017	2242.0012118.00		.0	5.4	5.4	5.6							3			20
1905 1 21355	2254.0012136.00		.0	5.7	5.7	5.9							3			2
1905 41012 4	2248.0012118.00		.0	5.4	5.4	5.6							2			2
1905 826 551	24 .0012148.00		.0	5.3	5.3	5.5							2			270
1905 828 422	2412.0012142.00		.0	5.4	5.45.95.6						6.0		2	D		1257CL0
190511 213 1	24 .0012148.00		.0	5.2	5.2	5.4							2			2
190511212343	2430.0012154.00		.0	5.1	5.1	5.3							2			2
19051122 039	24 .0012148.00		.0	5.3	5.3	5.5							2			2
190512241923	2530.0012124.00		.0	5.3	5.3	5.5							2			2
1906 1161536	2248.0012118.00		.0	5.4	5.4	5.6							2			2
1906 3162242 30.	2333.0012027.00		6.0	7.1	*6.97.17.1						6.87.06.97.1		4	D		12578ABCL0U
1907 7 4 017	25 6.00122 6.00		.0	5.8	5.8	6.0							3			2
1907 81911 4	2430.0012130.00		.0	5.0	5.0	5.2							2			2
190712 22323	2448.0012154.00		.0	5.8	5.8	6.0							3			2
1908 111 335	2342.0012124.00		10.0	7.3	*7.17.37.3						6.87.36.77.3		3	D		1257ABCL0U
1908 4 71250	2430.0012148.00		.0	5.1	5.1	5.3							2			2
1908 4111459	2348.0012130.00		.0	5.0	5.0	5.2							2			2
19081125 445	2230.0012030.00		.0	5.1	5.1	5.3							2			2
19081222 242	24 .0012136.00		.0	5.2	5.2	5.4							2			2
1909 120 257	2242.0012118.00		.0	5.2	5.25.55.4						5.5		2			1257C0
1909 4141953 42.	25 6.0012128.50		72.0	7.3	*7.17.37.3				7.37.1		7.37.27.3		4	D		125678ABCGL0U
1909 5231044	24 4.5012057.00		5.0	5.9	5.95.96.3								2	D		12578O
1909 9291352	2530.00121 6.00		.0	5.1	5.1	5.3							2			27
19091121 736	2424.0012148.00		20.0	7.3	*7.17.37.3						7.37.07.3		3	D		12567BCL0U
1910 1 61955	24 .00123 .00		.0	5.8	5.86.2						6.2			5U		
1910 1201727	24 .0012136.00		.0	5.2	5.25.55.4						5.5		2	D		1257C0
1910 3251838	24 .00122 .00		.0	5.3	5.35.85.5						5.3		2	D		1257C0
1910 412 022 13.	25 6.0012254.00		200.0	7.8	*8.18.18.3				7.87.6		7.87.68.3		4	D		12567ABCGL0U
1910 617 528	21 .00121 .00		.0	7.0	*6.87.07.0						7.0		4	D		12567CL0
1910 9 1 045	2242.0012142.00		20.0	7.0	*6.16.55.8						7.06.5	7.1	3			12567ABCL0
1910 9 11421	24 6.0012224.00		20.0	7.1	7.16.57.3						6.86.5	7.3	3			1257ABCL0
19101114 734 31.	2412.00122 .00		20.0	6.1	6.16.55.2						6.56.3	7.0	2	D		1257BC0
1911 8 31536	24 .0012248.00		.0	5.2	5.2	5.4							2			2
1911103013 7	2530.0012130.00		.0	5.0	5.0	5.2							2			27
1912 3291831 57.	2148.0012118.00		.0	5.2	5.2	5.4							2			27
1912 7 81020 31.	2348.0012142.00		.0	5.5	5.5	5.7							3			27
1912 8182130 53.	24 .0012230.00		.0	6.4	6.4	6.6							4			27
191211 3 6 5 22.	2330.00122 .00		.0	6.2	6.26.06.4						6.0		4			1257CL
191211 521 2	2230.00121 .00		.0	5.8	5.8	6.0							3			27
1912122418 7 43.	24 .0012136.00		.0	6.4	6.46.06.6						6.0		3	D		1257CL0
1913 1 72250	24 .0012136.00		.0	6.2	6.26.56.4						6.5		3	D		1257CL
1913 1 9 255 30.	24 .0012136.00		.0	5.4	5.4	5.6							3			270
1913 110 735 1.	24 .0012136.00		.0	6.4	6.46.36.6						6.3		4			257C0
1913 4 41335 11.	23 .0012048.00		.0	5.5	5.56.35.7						6.3		3			1257C
1913 414 749 5.	23 .0012048.00		.0	5.4	5.46.05.6						6.0		3			1257C
1914 7 6 637 46.	2354.0012130.00		60.0	6.4	6.46.86.6				6.8		6.8		3			1257CGL
1915 8 2 716 49.	24 6.0012224.00		.0	5.0	5.0	5.2							2			27
1916 828 727 42.	24 .00120 1.50		45.0	6.8	6.86.54.4						6.07.2		3	D		12578CLU0
191611142231 58.	24 6.0012053.50		3.0	6.2	6.26.06.0						6.0		3	D		12578CL
1917 1 41650	24 .0012058.50		5.0	6.2	6.26.16.2						6.3		2	D		12578CL
1917 5 51219	2312.0012136.00		.0	5.6	5.6	5.8							3			27
1917 7 4 038 20.	25 .00123 .00		.0	7.7	*7.57.7						7.37.7	7.7		56ABCL		
1918 1151530	2354.0012218.00		.0	5.7	5.75.85.9						5.8		3			25C
1918 327 352 30.	2436.0012154.00		.0	6.0	6.06.46.2						6.0		3	D		1257CL
1918 4 110 9 5.	2254.0012130.00		.0	5.1	5.1	5.3							2			27
1918 41820 5	2336.0012118.00		.0	5.3	5.35.8						5.8		2			57C
1918 6 7 455 16.	2418.0012118.00		.0	5.5	5.56.0						6.0		3			157CL
1918 924 0 3 25.	2330.0012136.00		.0	5.5	5.56.0						6.0		3			157CL
191812181717 27.	23 .0012048.00		.0	5.5	5.56.05.7						6.0		3			1257CL
1919 71815 7	24 6.0012154.00		.0	5.5	5.56.05.7						6.0		3			1257CL
1919 8 7 652	2448.0012248.00		.0	5.3	5.35.8						5.8		2			57C
1919 8281836 17.	2348.0012148.00		.0	5.6	5.66.05.8						6.0		3			1257CL
191910151547	24 .0012218.00		.0	5.6	5.66.05.8						6.0		3			25C
1919103119 2	23 6.0012212.00		.0	6.1	6.16.06.3						6.0		3			1257CL
191912201934 0.	2248.0012142.00		20.0	6.1	6.16.36.3						6.37.1		3			1257CLU
191912202037 27.	2248.0012142.00		20.0	7.0	*6.87.07.0				7.0		7.07.07.37.0		3			12567ABCGLU
1920 120 410	24 .00122 .00		.0	5.6	5.6	5.8							3			27
1920 1222144 30.	2430.00122 6.00		.0	5.7	5.76.35.9						6.3		3			1257CL
1920 3131039	2354.00122 .00		.0	5.6	5.6	5.8							3			27
1920 5291223 1.	2424.0012242.00		.0	5.8	5.86.06.0						6.0		3			1257CL
1920 6 5 421 28.	24 .00122 .00		20.0	8.0	*8.18.18.3				8.07.88		08.07.88.3		4	D		12567ABCGLRU
192012 423 9	23 6.0012218.00		.0	5.9	5.96.3						6.3			57C		
1921 71817 3 0.	2336.0012048.00		20.0	5.3	5.36.05.5						6.0		3			257CL
1921 725 139	2412.0012224.00		.0	5.4	5.46.05.6						6.0		3			257C
1921 7251927 14.	2336.0012112.00		.0	5.3	5.36.05.5						6.0		3			257C
1921 72915 4	2218.0012124.00		.0	5.8	5.8	6.0							3			27
1921 82915 7	2424.0012048.00		.0	5.6	5.66.05.8						6.0		3			1257CL
192112 11751	2448.00123 .00		.0	5.9	5.9	6.1							3			27
1922 1101341 12.	2342.0012112.00		20.0	6.0	6.06.06.2						6.0		3			257C
1922 52218 5	2318.0012124.00		.0	6.1	6.16.06.3						6.0		3			1257CL
1922 7 21330	2348.0012218.00		.0	6.1	6.16.06.3						6.0		3			1257CL
1922 7191254 50.	2412.0012218.00		.0	5.8	5.86.06.0						6.0		3			257CL
1922 9 11916 6.	2436.0012212.00		20.0	7.6	*7.47.57.6				7.67.57		67.67.67.6		4	D		12567ABCGLU
1923 4 52210	2442.0012218.00		.0	5.6	5.66.05.8						6.0		3			1257CL
1923 5 41041	2318.0012018.00		20.0	5.5	5.56.05.7						6.0		3	D		1257CL
1923 7 2 232 24.	23 6.00122 .00		20.0	5.5	5.56.55.7						6.56.7		3			1257CLU
1923 8271115 17.	24 6.00122 6.00		.0	5.7	5.76.35.9						6.3		3			1257CL
1923 929 650 21.	2248.00121 6.00		.0	5.3	5.35.85.5						5.5		2	D		1257C
19231119 218	24 .0012230.00		.0	5.9	5.96.3						6.3			57C		
1923112517 3 57.	2348.0012254.00		20.0	5.8	5.86.06.0						6.06.4		3			1257CLU
1924 1151136	22 6.00120 .00		.0	5.8	5.86.06.0						6.0		3			125CL
1924 7221424	2348.0012218.00		20.0	5.7	5.76.35.9						6.36.8		3			1257CLU
192411 21125	23 .0012036.00		20.0	5.2	5.2	5.4							2			2
1925 3 11226	23 6.00122 6.00		.0	5.9	5.96.06.1						6.0		3			1257CL
1925 4 22247	24 6.0012154.00		.0	5.1	5.1	5.3							2			27
1925 5222122	24 .0012148.00		.0	5.4	5.4	5.6							2			2
1925 524 124	2354.0012154.00		.0	5.8	5.86.06.0						6.0		3			1257L
1925 614 014	2412.0012148.00		.0	5.7	5.7	5.9							3			27
1925 614 538	2354.0012154.00		20.0	6.1	6.15.96.3						5.7		4	D		1257C
1926 629 223	2442.0012218.00		.0	5.0	5.0	5.2							2			2
1926 822 854	2254.0012118.00		.0	5.0	5.0	5.2							2			2
1926 9121544	2242.0012230.00		.0	5.9	5.96.35.7						6.3		3			125CL
192611 12331	2454.0012242.00		.0	6.0	6.06.06.2						6.0		3			1257CL
1927 227 354	2324.0012130.00		.0	6.0	6.0	6.2							2			3
1927 82418 9	2318.0012030.00		20.0	6.5	6.56.66.7				6.8		6.8		4	D		1257CGL
1928 120 647	2412.0012148.00		.0	5.8	5.86.06.0						6.0		3			125CL

origin time	lat.	lon.	dep.	ML	ML	ML	MH	MD	MG	mb	Ms	Ms	Mu	Mda	MF	Ref.
1928 1272223	2248.00121 6.00		.0	6.1	6.16.06.3						6.0		3			1257L
1928 4241945	2430.0012124.00		.0	5.8	5.86.06.0						6.0		3			1257CL
1928 8181946	23 .0012042.00		.0	5.0	5.0	5.2							2			2
1928 8291716 3.	2318.0012030.00		.0	5.1	5.15.85.3						5.8		2			25C
1928 830 632	23 6.00121 .00		.0	5.4	5.45.85.6						5.8		2			25C
1929 2 8 741	2448.00122 6.00		.0	5.6	5.66.05.8						6.0		3			125CL
1929 819 243 5.	2412.0012230.00		20.0	6.4	6.46.86.6					6.8	6.86.8		3			125CGLU
1929 914 015 36.	2342.00122 .00		.0	5.4	5.45.55.6						5.5		2			25C
19291024 634	2224.0012230.00		.0	6.3	6.36.56.5						6.5		3			125CL
19291218 659	2436.0012242.00		.0	6.0	6.06.06.2						6.0		3			125CL
1930 51915 3 48.	2130.00122 .00		50.0	6.3	6.36.56.5					6.5	6.5		4			125CGL
1930 6201359	2412.0012136.00		.0	5.0	5.05.35.2								2			25
1930 8 72349	2318.0012118.00		.0	5.4	5.45.95.6						5.5		2	D		1257C
1930 8202054	2436.00122 .00		40.0	6.3	6.36.56.5						6.5		3			1257CL
1930 9 919 5	2442.0012236.00		20.0	5.9	5.96.06.1						6.0		3			1257CL
193010202254	2318.0012024.00		.0	5.1	5.15.35.3								2			257
19301111 830	25 .0012148.00		.0	5.6	5.66.05.8						6.0		3			1257CL
193012 8 810 5.	2318.0012024.00		20.0	6.3	6.36.66.5						6.56.2		4	D		1257CLU
193012141645	25 .00123 .00		.0	5.5	5.55.35.7								2			25
1931 1 12352 22.	2342.00122 6.00		20.0	6.1	6.16.36.3					6.3	6.36.3		3			1257CGLU
1931 1171538	2536.0012224.00		120.0	6.2	6.26.06.4								3			25
1931 213 040 45.	24 6.0012154.00		20.0	5.8	5.86.06.0					6.0	6.06.0		3			1257CGLU
1931 330 726	2412.0012236.00		.0	6.1	6.16.06.3								3			25
1931 9261114	2424.00122 6.00		.0	5.0	5.05.35.2								2			257
193110241236 39.	24 .0012212.00		.0	6.2	6.26.06.4					5.6	6.0		3			1257CGL
19311027 132 7.	24 6.0012230.00		.0	5.1	5.15.55.3						5.5		2			257C
19311031 7 3	2242.0012124.00		.0	5.0	5.05.35.2						5.3		2			257C
1932 212 2 5	24 .0012230.00		.0	5.9	5.96.06.1								3			257
1932 222 036	2412.0012148.00		.0	5.0	5.05.35.2								2			257
1932 821 415 35.	24 .0012212.00		20.0	6.3	6.36.56.5					6.5	6.56.3		3			257CGLU
193210 91249 49.	2412.0012218.00		130.0	5.8	5.86.06.0					6.0	6.06.0		2			257CGLU
193210232127 48.	24 .0012218.00		20.0	6.0	6.06.36.2					6.3	6.36.3		3			257CGLU
193212151933 38.	21 .00121 .00		.0	5.5	5.56.0					6.0	6.0			5CGL		
1933 12320 7	2248.00121 6.00		.0	5.4	5.45.35.6								2			257
1933 219 426 11.	2430.0012248.00		120.0	5.6	5.66.05.8					5.8	6.0		3			125CGL
1933 419 644 36.	2418.0012130.00		20.0	6.3	6.36.56.5					6.5	6.5		3			125CGL
1933 5301353 54.	2412.0012230.00		.0	5.5	5.54.85.7						4.8		2			25C
1933 8141433	2424.0012054.00		40.0	5.2	5.25.35.4								2			25
1933 826 3 7	2136.0012218.00		.0	5.8	5.86.06.0								3			25
1934 3 42152 53.	2430.00122 6.00		.0	5.2	5.25.05.4						5.0		2			25C
1934 416 539	2148.0012112.00		.0	5.8	5.8	6.0							3			2
1934 811 818 21.	2450.0012150.00		20.0	6.3	6.36.66.5					6.5	6.56.3		3	D		125CGLU
193411111317	2424.0012136.00		.0	5.3	5.35.05.5						5.0		2			25C
193412161926	24 6.0012130.00		10.0	5.4	5.45.05.6						5.0		2			25C
1935 2 91919 37.	2454.00122 6.00		60.0	6.1	6.16.56.3					6.3	6.3		3	D		125CGL
1935 222 855 28.	24 6.0012148.00		10.0	5.6	5.66.05.8						6.0		2			125CL
1935 2232052	2412.0012136.00		10.0	5.3	5.35.35.5								2			125
1935 3241427	2230.00123 .00		10.0	5.1	5.15.05.3						5.0		2			125C
1935 326 0 7	2418.0012136.00		10.0	5.0	5.05.35.2								2			125
1935 42022 1 54.	2421.0012049.20		5.0	7.1	*6.97.17.1				7.16.87.17.1			7.1	3	D		1256ABCGIL
1935 8 62043	2154.0012212.00		20.0	5.3	5.36.05.5								3			125
1935 8 91649	2242.0012042.00		10.0	5.2	5.25.35.4						5.3		2			125C
1935 9 4 137 41.	2230.0012133.00		20.0	7.2	*7.07.27.2				7.27.17.27.2			7.2	3	D		1256ABCGL
1936 2211512	2230.0012112.00		.0	5.1	5.15.65.2						5.0		2			125C
1936 3 8 028	2342.0012124.00		.0	5.4	5.45.95.6						5.1		2			125C
1936 4201051	2424.0012048.00		5.0	5.1	5.15.65.2						4.8		2			125C
1936 5281228	2142.0012042.00		30.0	5.4	5.45.95.6						6.0		3			125CL
1936 7202354	2424.0012048.00		.0	5.5	5.56.05.7						5.4		3			125C
1936 822 651 35.	0022 .0012112.00		30.0	7.3	*6.97.17.1				7.27.17.37.27.2				4	D		125ABCGXLU
1936 9121759 6.	002418.0012048.00		.0	5.7	5.76.15.9						5.6		2			125C
193610 7 4 2	2312.0012124.00		.0	5.2	5.25.75.3						4.9		2			125C
1937 1251238	2254.0012030.00		.0	5.1	5.15.65.2						4.8		1			125C
1937 129 4 7	2348.0012212.00		40.0	5.3	5.35.85.5						5.2		2			125C
1937 3301138 2.	002430.00121 .00		.0	5.3	5.35.05.5						5.0		2			125C
1937 4 31120	2330.0012054.00		.0	5.4	5.45.95.6						5.4		2			125C
1937 4 31150	2318.0012048.00		.0	5.2	5.25.75.4						5.1		1			125C
1937 4 914 5	2318.0012018.00		.0	5.4	5.45.95.6						5.3		2			125C
1937 4112043	2342.0012112.00		.0	5.1	5.15.65.2						4.9		1			125C
1937 41415 5	2412.00123 .00		20.0	5.2	5.25.75.4						5.1		3			125C
1937 426 7 9	2436.00121 .00		.0	5.1	5.15.65.2						4.8		2			125C
1937 825 833	2354.0012148.00		.0	5.1	5.15.65.2						4.8		1			125C
1937101820 8	2354.0012236.00		60.0	5.2	5.25.75.3						4.9		2			125C
1937111 9 625	2436.0012136.00		.0	5.2	5.25.75.3						5.0		2			125C
1937112 5 534	2348.0012124.00		.0	5.5	5.56.05.7						5.4		2			125C
193711261045 14.	002412.00123 .00		50.0	5.8	5.86.26.0					6.0	6.06.4		4			125CGLU
193712 8 832 11.	0023 6.0012124.00		20.0	7.0	*6.87.07.0				7.07.07.07.07.0				4	D		125ABGLUX
1938 2 81313	2448.00122 6.00		40.0	6.0	6.06.46.2						6.06.1		3			125CLU
1938 3 4 138	2312.0012124.00		.0	5.3	5.35.85.5						5.2		2			125C
1938 4142237	2436.0012212.00		.0	5.2	5.25.75.3						4.9		3			125C
1938 6162250	2330.0012230.00		60.0	5.4	5.45.95.6						5.4		2			125C
1938 81012 8	2330.00121 6.00		.0	5.3	5.35.85.5						5.2		2			125C
1938 8182217	2412.0012136.00		.0	5.3	5.35.85.5						5.1		2			125C
1938 828 035	2136.0012230.00		40.0	5.8	5.86.26.0						6.0		4			125CL
1938 9 1 254	2342.0012224.00		.0	5.8	5.86.26.0						6.0		2			125CL
1938 9 7 4 3 18.	002348.0012148.00		.0	7.0	*6.87.07.0				7.06.67.07.0			7.0	3	D		125ABCGLX
1938 914 850	2424.0012036.00		.0	5.3	5.35.85.5						5.3		2			125C
193810131526	24 .00121 6.00		20.0	6.0	6.06.46.2						6.36.4		4			125CLU
1938101919 9	2342.0012154.00		.0	5.1	5.15.65.2						4.8		2			125C
1938111 9 349	2442.0012236.00		40.0	5.2	5.25.75.3						4.9		2			125C
1938111 9 228	2430.0012124.00		.0	5.2	5.25.75.4						5.4		1			125C
19381121 640	24 6.0012112.00		20.0	5.9	5.96.36.1						6.06.2		3	D		125CLU
193812 623 0 53.	002254.0012136.00		20.0	7.0	*6.87.07.0				7.07.17.07.07.0				3			125ABCGLUX
193812221657	24 .0012236.00		.0	6.0	6.06.46.2						6.06.1		3			125CUL
1939 516 720	2336.00122 .00		20.0	6.4	6.46.76.6						6.36.4		3			125CLU
1939 618 352	2312.0012136.00		20.0	5.5	5.56.05.7						5.4		2			125C
1939 620 551	2330.0012130.00		10.0	5.2	5.25.75.3						4.9		2			125C
193911 7 353	2424.0012048.00		10.0	5.6	5.66.15.8						6.0		2	D		125CL
193912191828	2418.0012042.00		10.0	5.2	5.25.75.4						5.1		2			125C
1940 1 2 5 1	24 3.0012230.00		60.0	5.3	5.35.85.5						5.2		2			125C
1940 2141152	24 5.0012230.00		40.0	5.2	5.25.75.3						4.9		2			125C
1940 5132240	24 .0012146.00		.0	5.3	5.35.85.5						5.2		2			125C
1940 521 723	2348.0012030.00		.0	5.3	5.35.85.5						5.2		2			125C
1940 8 52129	2424.0012230.00		.0	5.9	5.96.36.1						6.0		3			125CL
1940 8 71542	2154.0012054.00		.0	5.1	5.15.65.2								1			125
1940 811 520	2354.0012148.00		.0	5.1	5.15.65.2								1			125
1940 831 027	2418.0012142.00		.0	5.6	5.66.15.8			

origin time	lat.	lon.	dep.	ML	ML ML MH MD MG mb Ms Ms Mu Mda MF	Ref.
1942 7 81935	2132.00122	7.00	40.0	5.2	5.25.75.4 5.1 2	125C
1942 71713 6	2418.00122	.00	20.0	5.2	5.25.75.3 4.9 1	125C
1942 7201256	2424.0012219.00		20.0	5.1	5.15.65.2 4.8 2	125C
1942 726 653	2424.00122	.00	40.0	5.3	5.35.85.5 5.2 1	125C
1942 7301833	2421.0012145.00		.0	5.1	5.15.65.2 4.8 2	125C
1942 924 339	24 2.0012151.00		10.0	5.8	5.86.26.0 6.56.2 2	125CLU
194211 62125	2436.0012128.00		.0	5.6	5.66.15.8 5.7 3	125C
194211 71146	24 .0012212.00		40.0	5.2	5.25.75.4 5.1 2	125C
194211 71156	24 .0012214.00		30.0	5.7	5.76.15.9 5.8 2	125C
194212 9 610	2418.0012136.00		.0	5.2	5.25.75.4 5.1 2	125C
1943 5 61425	2448.00122	6.00	.0	5.1	5.15.65.2 4.8 2	125C
1943 7 2 648	2424.0012042.00		.0	5.3	5.35.85.5 5.2 2	125C
1943 7161543	2418.0012154.00		.0	5.4	5.45.95.6 5.4 2	125C
1943 719 029	2336.0012124.00		.0	5.4	5.45.95.6 5.4 2	125C
1943 725 149	2418.00122	6.00	.0	5.1	5.15.65.2 4.8 2	125C
1943 7251344	2412.0012212.00		20.0	5.1	5.15.65.2 4.8 2	125C
1943 8291020	2442.0012030.00		.0	5.2	5.25.75.4 5.1 2	125C
1943 9 81718	2248.0012118.00		60.0	5.5	5.56.05.7 5.5 2	125C
1943 92712 0	2254.0012118.00		.0	5.2	5.25.75.3 4.9 1	125C
194310 2 757	2524.0012212.00		60.0	5.6	5.66.15.8 5.8 3	125C
1943102216 1	15.002348.0012130.00		5.0	6.0	6.06.46.2 6.3 3 D	125CL
194311 7 826	2136.0011918.00		60.0	5.7	5.76.15.9 6.0 4	125CL
194311241317	13.002236.0012130.00		20.0	6.1	6.16.56.3 6.9 6.96.9 3	125CGLU
194312 3 756	24 6.0012136.00		.0	5.5	5.56.05.7 5.5 2	125C
194312 3 8 6	24 6.0012136.00		.0	5.4	5.45.95.6 5.4 2	125C
1944 2 51720	2348.0012124.00		5.0	6.2	6.26.56.4 6.5 3 D	125CL
1944 32913 2	2212.00121	.00	.0	5.3	5.35.85.5 5.2 1	125C
1944 4 51547	2242.0012136.00		10.0	5.4	5.45.95.6 5.4 2	125C
1944 4 91815	2312.0012254.00		60.0	5.7	5.76.15.9 5.7 3	125C
1944 4 919 2	2312.0012248.00		60.0	5.7	5.76.15.9 5.8 3	125C
1944 5251418	2342.0012248.00		60.0	5.8	5.86.26.0 6.0 3	125C
1944 8 2 024	2236.0012048.00		.0	5.1	5.15.65.2 4.8 1	125C
1944 8 4 9 0	2324.00122	.00	20.0	5.2	5.25.75.4 5.1 1	125C
1944 918 3 9	2254.0012130.00		20.0	5.2	5.25.75.4 5.1 2	125C
194412 82156	24 6.0012254.00		40.0	5.5	5.56.05.7 5.5 3	125C
1945 1 91557	2248.0012124.00		20.0	5.1	5.15.65.2 4.8 1	125C
1945 21121 2	2330.0012130.00		.0	5.5	5.56.05.7 5.5 2	125C
1945 3221841	2412.0012118.00		20.0	5.2	5.25.75.3 4.9 2	125C
1945 4101517	2330.0012130.00		.0	5.2	5.25.75.3 6.0 1	125CL
1945 4101614	25 6.00122	.00	.0	5.4	5.45.95.6 5.4 2	125C
1945 5 123 0	2330.0012112.00		.0	5.2	5.25.75.4 5.1 2	125C
1945 8 12223	15.002354.0012142.00		.0	6.1	6.16.5 6.5	5CL
19451021 321	3.002342.0012030.00		.0	5.9	5.96.3 6.3	5CL
1946 1121928	2336.0012054.00		.0	5.3	5.35.85.5 5.2 2	125C
1946 3112035	2324.0012130.00		.0	5.3	5.35.85.5 5.2 2	125C
1946 3161131	2342.0012142.00		.0	5.6	5.66.15.8 6.0 2	125CL
1946 5162211	2354.0012136.00		.0	5.5	5.56.05.7 5.5 2	125C
1946 6 2 1 6	2348.0012224.00		.0	6.2	6.26.56.4 6.3 3	125CL
1946 6 51338	2436.0012254.00		.0	5.2	5.25.75.4 5.1 2	125C
1946 61210 4	2336.0012154.00		.0	5.2	5.25.75.3 4.9 1	125C
1946 618 2 3	2248.0012112.00		.0	5.2	5.25.75.4 5.1 2	125C
1946 7 72147	23 6.0012130.00		.0	5.4	5.45.95.6 5.4 1	125C
1946 810 126	2248.0012112.00		.0	5.1	5.15.65.2 4.8 1	125C
1946 812 334	2342.0012054.00		.0	5.1	5.15.65.2 4.8 1	125C
1946 8191956	2330.0012142.00		.0	5.7	5.76.15.9 5.8 2	125C
1946 9 1 713	2224.00121	6.00	.0	5.1	5.15.65.2 4.8 2	125C
1946 9 91035	2342.0012136.00		.0	6.2	6.26.56.4 6.0 3	125CL
1946 9271944	2224.00121	.00	.0	5.5	5.56.05.7 5.5 2	125C
194610 9 431	2330.0012048.00		.0	5.2	5.25.75.4 5.1 1	125C
194611301141	2248.0012112.00		.0	5.5	5.56.05.7 5.4 2	125C
194612 42247	23 4.2012019.80		5.0	6.1	6.16.56.3 6.8 2 D	25CL
19461219 257	19.002442.0012230.00		100.0	6.5	6.56.86.7 6.8 6.86.8 4	125CGLU
1947 3 8 0 2	2412.0012048.00		20.0	5.1	5.15.65.2 4.8 1	125C
1947 316 923	34.002324.0012230.00		20.0	5.6	5.66.15.8 6.0 2	125CL
1947 3171030	2224.0011942.00		.0	5.3	5.35.85.5 5.2 2	125C
1947 4 22046	2424.0012148.00		20.0	5.7	5.76.15.9 6.3 3	125CL
1947 4 4 1 7	2354.0012224.00		20.0	5.5	5.56.05.7 5.5 2	125C
1947 4 4 113	2412.0012218.00		.0	5.2	5.25.75.4 5.1 2	125C
1947 4 91413	2342.0012230.00		20.0	5.2	5.25.75.3 4.9 2	125C
1947 4231339	2354.0012230.00		20.0	5.2	5.25.75.4 5.1 2	125C
1947 430 746	2354.0012118.00		.0	5.2	5.25.75.4 5.1 2	125C
1947 52523 0	2354.0012212.00		.0	5.5	5.56.05.7 5.6 2	125C
1947 630 855	2248.0012112.00		.0	5.2	5.25.75.4 5.3 2	125C
1947 8 41744	2242.00123	.00	20.0	5.2	5.25.75.4 5.5 3	125C
1947 817 914	40.0 2424.00122	6.00	40.0	5.6	5.66.15.8 6.0 2	125CL
1947 92616 1	57.002448.00123	.00	110.0	7.2	7.27.37.4 7.47.4 7.47.4 4	125ABCGUX
1947101621 3	2348.0012218.00		.0	5.3	5.35.85.5 5.2 2	125C
19471027 017	2424.0012224.00		40.0	5.1	5.15.65.2 4.8 2	125C
194711 11547	24 6.0012130.00		.0	5.3	5.35.85.5 5.2 2	125C
19471114 5 7	2330.00122	6.00	40.0	5.7	5.76.15.9 5.5 2	125C
19471116 142	2448.00123	.00	20.0	5.4	5.45.95.6 5.4 2	125C
194712272214	2418.0012224.00		.0	5.1	5.15.65.2 4.8 2	125C
1948 115 8 9	2424.0012224.00		.0	5.3	5.35.85.5 5.2 2	125C
1948 1221257	24 .00122	6.00	.0	5.4	5.45.95.6 5.4 2	125C
1948 2272246	2412.0012142.00		.0	5.1	5.15.65.2 4.8 1	125C
1948 328 6 2	2424.0012148.00		.0	5.3	5.35.85.5 5.2 2	125C
1948 412 623	2324.0012124.00		.0	5.5	5.56.05.7 5.5 2	125C
1948 4191610	2412.0012218.00		.0	5.1	5.15.65.2 4.8 1	125C
1948 42019 9	24 6.0012142.00		.0	5.3	5.35.85.5 5.2 2	125C
1948 4201911	2412.0012139.00		.0	5.3	5.35.85.5 5.2 2	125C
1948 421 057	2418.0012157.00		.0	5.2	5.25.75.4 2	125
1948 422 435	2412.0012142.00		.0	5.6	5.66.15.8 5.5 2	125C
1948 4221328	2424.0012154.00		.0	5.3	5.35.85.5 5.2 2	125C
1948 5 31813	2342.0012227.00		80.0	5.3	5.35.85.5 5.2 2	125C
1948 51714 8	2330.0012136.00		20.0	5.1	5.15.65.2 4.8 2	125C
1948 520 213	2418.0012148.00		20.0	5.1	5.15.65.2 4.8 2	125C
1948 6 5 8 3	2324.00122	3.00	20.0	5.2	5.25.75.3 4.9 2	25C
1948 7302118	2348.0012236.00		40.0	5.6	5.66.15.8 5.7 2	125C
1948 9242329	22 6.0012154.00		.0	5.6	5.66.15.8 6.0 2	125C
1948 930 832	2342.0011948.00		.0	5.4	5.45.95.6 5.4 1	125C
194810 1 3 2	2224.0012148.00		20.0	5.3	5.35.85.5 5.2 2	125C
194810 4 557	24 6.0012218.00		20.0	5.8	5.86.26.0 6.0 2	125CL
19481023 445	2354.0012154.00		20.0	5.6	5.66.35.8 6.3 2	125CL
194812 614 9	12.0023 6.0012136.00		20.0	5.6	5.66.15.8 6.0 2	125CL
19481219 520	2354.00122	6.00	20.0	5.2	5.25.75.3 4.9 2	125C
1948122023 7	24 .0012218.00		.0	5.7	5.76.15.9 6.0 2	125CL
1949 1191339	2336.0012224.00		20.0	5.6	5.66.15.8 3	125
1949 11915 0	2330.0012242.00		40.0	6.6	6.66.96.8 3	125
1949 2 2 915	2354.0012130.00		20.0	5.2	5.25.75.4 2	125
1949 3201248	24 1.2012152.20		20.0	5.2	5.25.75.3 2	125
1949 4261420	2342.0012224.00		20.0	5.6	5.66.15.8 2	125
1949 6111414	2412.0012154.00		20.0	5.6	5.66.15.8 2	125
1949 92923 4	2424.0012212.00		.0	5.2	5.25.75.3 2	125
194911111545	2242.0012118.00		20.0	5.8	5.86.26.0 6.0 3	125L
194912232134	2142.0012112.00		20.0	5.2	5.25.75.3 1	125
1950 2 223 0	2412.0012148.00		20.0	5.3	5.35.85.5 2	125
1950 32221 8	2248.0012130.00		20.0	5.5	5.56.05.7 2	125
1950 4 1 210	2424.00122	6.00	20.0	5.3	5.35.85.5 2	125
1950 4 1 223	2418.0012212.00		20.0	5.4	5.45.95.6 2	125
1950 4 1 3 4	2424.0012212.00		20.0	5.3	5.35.85.5 2	125
1950 4 1 313	2424.00122	6.00	20.0	5.1	5.15.65.2 2	125
1950 4141655	23 .0012048.00		.0	5.1	5.15.65.2 1	125
1950 6 22342	2354.0012118.00		20.0	5.2	5.25.75.4 1	125
1950 615 047	2348.0012142.00		20.0	5.3	5.35.85.5 2	125
1950 617 217	2318.0012142.00		20.0	5.2	5.25.75.3 2	125
1950 8 51132	2342.0012218.00		.0	5.6	5.66.15.8 2	125
1950 928 330	2318.0012030.00		20.0	5.6	5.66.15.8 2	125
19501020 013	2254.00121	6.00	.0	5.4	5.45.95.6 2	125
195011 2 7 7	2354.0012148.00		20.0	5.7	5.76.15.9 6.0 2	125L
195011182310	25 6.0012224.00		20.0	5.1	5.15.65.2 1	125
195011201129	2224.00121	6.00	.0	5.4	5.45.95.6 2	125
1951 1281326	2436.0012236.00		.0	5.7	5.76.15.9 6.0 3	125L
1951 2 6 133	2342.0012142.00		40.0	5.2	5.25.75.3 2	125

origin time	lat.	lon.	dep.	ML	ML ML MH MD MG mb Ms Ms Mu Mda MF	Ref.
1951 4 6 8 9	2336.0012054.00		.0	5.1	5.15.65.2 1	125
1951 5 4 1 5	2436.0012218.00		20.0	5.2	5.25.75.3 2	125
1951 5221742	24 .0012212.00		20.0	5.5	5.56.05.7 2	125
1951 529 252	23 6.0012036.00		20.0	5.3	5.35.85.5 2	125
1951 6 31830	2348.0012224.00		20.0	5.5	5.56.05.7 2	125
1951 6 5 733	2342.0012230.00		40.0	5.4	5.45.95.6 2	125
1951 6 81335	2430.0012224.00		20.0	5.5	5.56.05.7 3	125
1951 6202150	2354.0012112.00		.0	5.5	5.56.05.7 2	125
1951 625 337	2342.0012236.00		60.0	5.4	5.45.95.6 3	125
1951 9 5 133	2318.0012136.00		.0	5.1	5.15.65.2 1	125
1951 914 8 5	2348.0012136.00		.0	5.2	5.25.75.4 2	125
19511014 943	2212.0012136.00		40.0	5.2	5.25.75.3 1	125
195110212134	14. 2352.5012143.50		4.0	7.3	*7.17.37.3 7.37.27.47.37.37.3 4 D	125BABCGLUX
195111241847	22. 23 6.0012113.50		16.0	6.5	6.56.87.3 6.8 4 D	125BLC
195111241850	30. 2316.5012121.00		36.0	7.3	*7.17.36.2 7.37.17.37.3 7.3 3 D	125BLACGX
1951122922 5	2136.0011930.00		20.0	5.1	5.15.65.2 1	125
1952 11110 1	24 6.0012142.00		20.0	5.2	5.25.75.3 2	125
1952 1281519	2354.00122	6.00	20.0	5.4	5.45.95.6 2	125
1952 4 4 749	2324.0012130.00		.0	5.5	5.56.05.7 2	125
1952 430 711	2330.0012148.00		.0	5.1	5.15.65.2 2	125
1952 52516 1	2112.0012130.00		20.0	5.4	5.45.95.6 2	125
1952 530 117	2212.0012142.00		40.0	5.6	5.66.15.8 2	125
1952 620 546	2412.0012136.00		.0	5.8	5.86.26.0 6.5 3	125L
1952 62312 3	2430.0012154.00		.0	6.0	6.06.46.2 6.0 3	125L
1952 8 6 710	2354.0012136.00		10.0	5.2	5.25.75.3 2	125
1952 8101819	2330.0012124.00		.0	5.2	5.25.75.3 2	125
1952 8231723	2354.0012136.00		10.0	5.2	5.25.75.4 2	125
1952 9 5 152	2254.0012130.00		40.0	5.1	5.15.65.2 2	125
19521015 246	2348.0012224.00		.0	5.5	5.56.05.7 2	125
195210151326	2354.00122	.00	30.0	5.1	5.15.65.2 2	125
195211 8 3 7	2348.0012042.00		.0	5.4	5.45.95.6 2	125
1952111223 7	24 .0012148.00		40.0	5.2	5.25.75.3 2	125
195212 1 6 8	2218.00121	6.00	.0	5.1	5.15.65.2 2	125
195212 4 7 7	2424.0012236.00		.0	5.6	5.66.15.8 2	125
1952122210 5	2448.0012148.00		.0	5.2	5.25.75.4 3	125
19521229 919	2336.0012130.00		.0	5.7	5.76.15.9 2	125
1953 1161555	2412.0012136.00		.0	5.5	5.56.05.7 2	125
1953 2152159	2236.0012136.00		.0	5.2	5.25.75.3 2	125
1953 3 41446	2354.0012130.00		.0	5.5	5.56.05.7 2	125
1953 4 51016	2354.0012218.00		20.0	5.7	5.76.15.9 2	125
1953 6 3 221	2248.00121	.00	.0	5.4	5.45.95.6 2	125
1953 7152232	2424.0012218.00		20.0	5.4	5.45.95.6 2	125
1953 8211953	2330.0012124.00		10.0	5.2	5.25.75.4 2	125
195311 11817	2242.0012124.00		.0	5.4	5.45.95.6 3	125
1954 1151913	2430.0012154.00		20.0	5.1	5.15.65.2 2	235
1954 2222217	2254.0012048.00		10.0	5.2	5.25.75.3 1	235
1954 4122059	24 6.0012212.00		10.0	5.2	5.25.75.4 1	235
1954 7 1 524	2330.0012212.00		40.0	5.2	5.25.75.4 2	235
1954 8152357	2448.0012212.00		60.0	5.4	5.45.95.6 3	235
1954 9 4 853	22 6.0012248.00		60.0	5.5	5.56.05.7 3	235
1954 917 733	2412.0012154.00		20.0	6.2	6.26.56.4 6.0 3	235L
195410 3 954	2148.00122	.00	80.0	5.2	5.25.75.4 3	235
195410 4 133	2454.0012154.00		5.0	5.6	5.66.15.8 3	235
195410 81335	2354.00121	6.00	10.0	5.1	5.15.65.2 1	235
195410201355	2348.0012042.00		5.0	5.4	5.45.95.6 2	235
195410251250	2154.00122	.00	20.0	5.1	5.15.65.2 3	235
1955 2121815	24 .0012142.00		10.0	5.1	5.15.65.2 2	235
1955 2221448	2354.0012236.00		20.0	5.2	5.25.75.4 2	235
1955 2251754	24 .0012230.00		40.0	5.2	5.25.75.4 2	235
1955 3 9 920	2354.0012218.00		26.0	5.4	5.45.95.6 2	235
1955 3162013	2418.00122	6.00	10.0	5.5	5.56.05.7 2	235
1955 321 453	23 .0012148.00		10.0	5.3	5.35.85.5 3	235
1955 4 41111	23. 2148.0012054.00		5.0	6.5	6.56.86.7 6.5 2	235L
1955 4131140	2236.0012142.00		20.0	5.2	5.25.75.3 2	235
1955 5231632	2348.0012148.00		5.0	5.2	5.25.75.4 2	235
1955 6 5 612	2412.0012154.00		20.0	5.7	5.76.15.9 6.0 2	235L
1955 6 5 619	2418.0012136.00		5.0	5.1	5.15.65.2 2	235
1955 6131918	2354.00122	6.00	20.0	5.1	5.15.65.2 2	235
1955 617 8 7	2230.0012124.00		5.0	5.7	5.76.15.9 3	235
1955 61816 8	2318.0012112.00		5.0	5.5	5.56.05.7 2	235
1955 7172238	21 6.00121	6.00	60.0	5.4	5.45.95.6 3	235
1955 7241620	4. 2318.0012148.00		40.0	6.1	6.16.56.3 6.0 3	235L
1955 922 325	7. 24 .0012218.00		10.0	6.3	6.36.66.5 6.8 3	235L
1955 9241021	28. 2224.0012124.00		10.0	5.8	5.86.26.0 6.3 3	235L
1955 928 423	2224.0012124.00		10.0	5.1	5.15.65.2 1	235
195510131750	2348.0012142.00		20.0	5.4	5.45.95.6 2	235
19551123 835	2348.0012254.00		60.0	5.2	5.25.75.4 3	235
195512 52015	2336.0012230.00		20.0	5.2	5.25.75.4 2	235
1956 1292221	21 6.0012124.00		40.0	5.2	5.25.75.3 1	235
1956 2 613 7	2348.0012212.00		5.0	5.4	5.45.95.6 2	235
1956 6271857	2312.0012024.00		5.0	5.2	5.25.75.4 3	235
1956 629 221	52. 2354.0012212.00		20.0	5.6	5.66.15.8 6.0 3	235L
1956 9 31457	2312.0012030.00		.0	5.2	5.25.75.4 2	235
195610 81722	2324.0012112.00		5.0	5.1	5.15.65.2 2	235
195610231032	2312.0012118.00		5.0	5.1	5.15.65.2 2	235
195610311729	2354.0012242.00		60.0	5.2	5.25.75.4 2	235
1957 2 8 539	2418.0012224.00		40.0	5.4	5.45.95.6 1	235
1957 218 720	2342.0012142.00		40.0	5.1	5.15.65.2 2	235
1957 22311 6	2348.0012254.00		10.0	5.1	5.15.65.2 2	235
1957 2232026	15.9 2348.0012148.00		30.0	7.1	*7.17.37.3 7.07.17.27.37.3 4 D	235ABLUX
1957 71913 2	17. 2430.0012236.00		20.0	5.8	5.86.26.0 6.1 3	235L
1957 8131551	2324.0012124.00		.0	5.1	5.15.65.2 2	235
1957 8231142	24 6.0012130.00		.0	5.5	5.56.05.7 2	235
1957 9201745	24 .0012142.00		.0	5.2	5.25.75.4 1	235
19571017 151	2318.0012124.00		20.0	5.3	5.35.85.5 1	235
195710181720	2324.0012030.00		10.0	5.1	5.15.65.2 2	235
195710191828	59.7 2342.0012130.00		10.0	6.4	6.46.76.6 6.8 4 D	235L
19571025 142	2148.0012248.00		120.0	5.2	5.25.75.3 3	235
19571025 619	2154.0012212.00		60.0	5.4	5.45.95.6 3	235
195712 62254	2330.0012142.00		30.0	5.4	5.45.95.6 2	235
1958 117 431	2430.00122	6.00	.0	5.1	5.15.65.2 1	235
1958 119 911	2418.0012236.00		40.0	5.1	5.15.65.2 2	235
1958 1221829	3.3 2336.0012118.00		5.0	5.8	5.86.26.0 6.1 3	235L
1958 2 6 142	24 6.0012254.00		40.0	5.1	5.15.65.2 2	235
1958 3 3 722	2312.0012148.00		10.0	5.3	5.35.85.5 2	235
1958 315 024	2. 2236.0012148.00		10.0	5.6	5.66.15.8 6.0 3	235L
1958 421 532	24 .0012130.00		10.0	5.2	5.25.75.4 2	235
1958 5301612	25 .00122	6.00	80.0	5.6	5.66.15.8 2	235
1958 7 61950	2342.0012224.00		40.0	5.3	5.35.85.5 2	235
1958 820 846	2354.0012218.00		10.0	5.2	5.25.75.4 2	235
1958102013 7	24 6.00122	6.00	20.0	5.2	5.25.75.3 2	235
195810312339	2430.0012248.00		60.0	5.7	5.76.15.9 3	235
195811201411	24 6.0012148.00		10.0	5.1	5.15.65.2 2	235
195812 7 1 9	2118.0012148.00		40.0	5.2	5.25.75.4 2	235
195812 92343	2318.0012142.00		40.0	5.1	5.15.65.2 1	235
1959 4 3 548	2418.00122	6.00	5.0	5.2	5.25.75.4 2	235
1959 4121059	2354.0012230.00		50.0	5.4	5.45.95.6 2	235
1959 4262040	37.7 25 .0012230.00		150.0	7.5	*7.57.67.7 7.5 7.57.57.7 4 D	235ABLUX
1959 6 2 542	34. 21 .00122	.00	50.0	5.6	5.66.15.8 6.0 2	235L
1959 6 21913	2354.0012148.00		40.0	5.2	5.25.75.3 1	235
1959 815 857	7.8 2145.0012120.00		20.0	7.1	*6.66.96.8 7.27.17.06.9 4 D	1235LAU
1959112321 5	2436.0012254.00		60.0	5.5	5.56.05.7 4	235
1960 112 152	2330.00122	6.00	30.0	5.1	5.15.65.2 2	235
1960 1251138	2342.0012154.00		30.0	5.1	5.15.65.2 2	235
1960 223 810	2324.0012142.00		40.0	5.5	5.56.05.7 2	235
1960 226 1 9	2348.0012230.00		60.0	5.2	5.25.75.3 2	235
1960 4 917 3	2418.0012142.00		10.0	5.1	5.15.65.2 1	235
1960 5151330	2354.0012148.00		20.0	5.4	5.45.95.6 2	235
1960 9 21841	2412.00122	6.00	20.0	5.1	5.15.65.2 2	235
1960 91614 2	25 6.0012042.00		40.0	5.1	5.15.65.2 1	235
1961 2 419 9	21.5 2330.0012224.00		75.0	5.6	5.66.15.8 6.2 3	235CL
1961 31820 7	2342.0012236.00		40.0	5.1	5.15.65.2 4.8 1	235C
1961 4 91535	12.3 2348.0012218.00		55.5	6.3	6.36.66.5 6.56.0 3	235CLU

```
  origin time      lat.   lon.   dep.  ML   ML ML MH MD MG mb Ms Ms Mu Mda MF  Ref.
1961 5131919 37.8 2527.6012224.60246.0 5.5  5.56.0              6.0       3   35CL
1961 7132144      2248.0012230.00 50.0 5.4  5.45.95.6           5.4       2   235C
1961 813 6 1      2424.0012154.00  5.0 5.2  5.25.75.4           5.6       2   235C
1961 917 841 57.4 2342.0012212.00 45.0 5.7  5.76.15.9           6.3       3   235CL
196110 52235      24  .0012154.00 25.0 5.5  5.56.05.7           5.6       3   235C
19611114 1 6      2354.0012218.00 45.0 5.1  5.15.65.2           4.9       2   235C
196111182210      2348.0012154.00 30.0 5.6  5.66.15.8           5.5       3   235C
196112 3 840 30.6 2455.8012257.00156.0 5.9  5.96.3              6.3       3   35CL
196112191730      2348.0012224.00 20.0 5.4  5.45.95.6           5.0       2   235C
1962 1 4 124      2430.0012154.00  5.0 5.1  5.15.65.2           5.0       2   235C
1962 1241540      2454.00122 6.00 60.0 5.3  5.35.85.5           5.5       3   235C
1962 310 844      2312.0012030.00  5.0 5.3  5.35.85.5           5.4       3   235C
1962 4121621      2436.0012224.00 20.0 5.1  5.15.65.2           4.9       2   235C
1962 6251110 26.5 2330.0012224.00 39.0 5.9  5.96.36.1           6.5       3   235CL
1962 72317 3      24 6.0012154.00 10.0 5.1  5.15.65.2           4.9       2   235C
1962 821 428      24 6.0012142.00  5.0 5.2  5.25.75.3           5.0       2   235C
1962 8231529      2254.0012024.00 20.0 5.3  5.35.85.5           5.4       2   235C
1962 9112155      2330.0012118.00 20.0 5.1  5.15.65.2           4.9       1   235C
196210 82156 23.9 24 6.0012154.00 30.0 5.9  5.96.36.1           6.0       3   235CL
19621127 653  1.4 25 1.2012257.00186.0 5.5  5.56.0              6.0       4   35CL
1963 213 850  5.1 2424.00122 6.00 47.0 7.4 *7.07.27.2     7.27.47.0   7.3 4 D 235ABCLNX
1963 6 91734      2336.0012212.00 10.0 5.4  5.45.95.6                         25
1963 7 4 655 16.8 24  .0012224.00  6.3 5.1  5.15.65.2     4.6                 235N
1963 7 91734 33.2 2412.0012224.00 33.0 5.4  5.45.95.6     4.8               2 235N
1963 7241132 19.5 2436.00122  .00 37.0 5.4  5.45.95.6     5.3   6.2         3 235LN
1963 8141618 18.0 24 6.0012224.00 28.0 5.4  5.45.95.6     5.3                 235N
1963 914 214 41.2 22 6.0012124.00 25.0 5.2  5.25.75.3     5.0               2 235N
196311 4 949      2354.0012154.00  5.0 5.1  5.15.65.2                         235
196311291622      2324.0012230.00 20.0 5.4  5.45.95.6                         235
1964 11812 4 13.9 2316.0012036.70 18.0 6.1  6.16.56.3     6.5   7.06.9    4 D 12345LSUYX
1964 2 2 854 48.3 2412.0012236.00 28.0 5.2  5.25.75.4     5.0               2 235N
1964 312 355 14.0 2324.0012136.00 33.0 5.6  5.66.15.8     5.2               3 235N
1964 327 757      24 6.00122 6.00 20.0 5.1  5.15.65.2                         235
1964 528 156 58.9 2430.00122  .00 41.0 5.9  5.96.36.1     5.9               2 235N
1964 6191034 33.6 2236.00121  .00 33.0 5.2  5.25.75.4     5.2               3 235N
1964 711 829 12.9 2224.0012124.00118.0 5.2  5.25.75.3     4.9               2 235N
1964 8 3 744 44.3 2230.0012054.00 33.0 5.5  5.56.05.7     5.4               3 235N
1964 8281817  3.2 2330.0012036.00 10.0 5.4  5.45.95.6     5.2               2 235N
1964 8282134      2330.0012018.00  5.0 5.1  5.15.65.2                         235
1964 9202043 10.9 24  .0012148.00 37.0 5.3  5.35.85.5     5.1               2 235N
196410 51020      2254.0012236.00 60.0 5.1  5.15.65.2                         235
19641024 846 25.0 2430.00122 6.00 63.0 5.4  5.45.95.6     5.3               2 235N
196411151552 21.5 24  .0012212.00 42.0 5.5  5.56.05.7     5.4               3 235N
196411211327 34.0 2412.0012224.00 60.0 5.1  5.15.65.2     4.8               2 235N
196411261021  4.4 2454.00122  .00 11.0 5.2  5.25.75.4     5.4   6.3         4 235LN
196411261419 47.6 2454.00122  .00 33.0 5.4  5.45.95.6     5.2               1 235N
196412161928 50.0 2448.0012224.00 61.0 5.1  5.15.65.2     4.8               2 235N
1965 1 11246 43.4 2330.0012112.00 33.0 5.3  5.35.85.5     5.2               2 235N
1965 1151834  7.6 2336.0012142.00 33.0 5.6  5.66.15.8     5.6               2 235N
1965 211 353      24  .0012230.00 38.0 5.4  5.45.95.6                         25
1965 3 1 818 56.4 21 6.0012112.00 42.0 5.4  5.45.95.6     5.2               2 235N
1965 3 11320 56.7 2112.0012112.00 42.0 5.5  5.56.05.7     5.5               4 235N
1965 415 5 9 51.1 2454.0012236.00190.0 5.5  5.56.05.7     5.4               3 235N
1965 4262215 37.4 21 6.0012042.00 33.0 5.9  5.96.36.1     5.9   6.0         4 235LN
1965 5171719 31.1 2230.0012118.00 21.0 6.1  6.16.56.3     6.2   6.67.0    4 D 235LNUX
1965 528 516 36.3 21  .0012054.00 38.0 5.2  5.25.75.4     5.0               2 235N
1965 6 61121 17.7 2248.0012142.00 48.0 5.1  5.15.65.2     4.8               2 235N
1965 6271136 11.8 2348.0012130.00 24.0 5.6  5.66.15.8     5.6   6.0         2 235LN
1965 6281544 56.0 2354.0012136.00 33.0 5.7  5.76.15.9     5.6               2 235N
1965 8131158  2.2 2348.0012212.00 74.0 5.2  5.25.75.4     5.0               2 235N
1965 82022 9 25.2 2354.0012154.00 58.0 5.2  5.25.75.3     4.9               2 235N
1965 9 523 1 54.2 2142.0012054.00 14.0 5.2  5.2            4.9               2 3N
1965 9 6 256 16.7 2112.00121  .00 25.0 5.1  5.15.65.2     4.7                 235N
1965 9 6 318 40.0 2112.0012124.00 33.0 5.4  5.45.95.6     5.1               2 235N
196511192231 22.8 2336.0012148.00 10.0 5.4  5.45.95.6     5.3               2 235N
196512 51630 56.7 2354.0012142.00 52.0 5.4  5.45.95.6     5.3               2 235N
1966 1202337  2.8 2254.0012112.00 64.0 5.2  5.25.75.3     5.1               2 235N
1966 2 31711 19.4 24  .0012148.00 24.0 5.4  5.45.95.6     5.2               2 235N
1966 2 31721  8.5 2424.0012142.00 55.0 5.2  5.25.75.3     5.2               2 235N
1966 2 31757 38.9 24 6.00122  .00 38.0 5.1  5.15.65.2     4.9               2 235N
1966 3121631 21.4 2414.4012240.20 42.0 7.8 *7.37.47.5     7.67.87.57.88.0 4 D 235ABLJUX
1966 3212037 37.0 2148.00121 6.00 53.0 5.1  5.15.65.2     4.8               1 235N
1966 6 7 918 58.7 2530.0012218.00241.0 5.3  5.35.85.5     4.8                 235N
1966 6 71144 51.712424.0012233.60 39.0 5.7  5.76.15.9     5.3               2 235NJ
1966 6 81046  7.0 23 6.0012054.00 33.0 5.2  5.25.75.4     4.9               1 235N
1966 611 3 1  5.4 2336.0011954.00 33.0 5.4  5.45.95.6     5.2               3 235N
1966 6282257  1.5 2442.0012136.00 20.0 5.1  5.1            4.8               1 3N
1966 6292251 22.502424.6012237.20 24.4 5.4  5.45.95.6     5.0               2 235NJ
1966 6301545 25.142425.20122 9.60 31.4 5.5  5.56.05.7     5.3               3 235NJ
1966 7 1 550 38.8 2448.0012230.00109.0 6.1  6.16.56.3     6.2   6.16.1    4 235LNU
1966 8131658 40.8 2412.0012248.00 53.0 5.1  5.15.65.2     4.6                 235N
1966 8222353  5.8 24  .0012236.00 57.0 5.1  5.15.65.2     4.8               2 235N
1966 9151710 46.9 2248.0012124.00 47.0 5.5  5.56.05.7     5.4   6.0         3 235LN
1966 9151724 45.8 2254.0012118.00 40.0 5.1  5.15.65.2     4.8               1 235N
1966 916 2 1 59.3 2242.0012112.00 33.0 5.2  5.25.75.4     5.0               1 235N
1966 9181944 28.5 23  .0012112.00 53.0 5.1  5.15.65.2     4.9               2 235N
196611202241 12.9 2430.0012236.00 95.0 5.2  5.25.75.4     4.8               2 235N
196612131 9       2342.0012112.00 15.0 5.2  5.25.75.3                         2 235
1967 1 9 939 40.0 2410.6812233.42 60.0 5.5  5.56.05.7     5.2               1 235N
1967 12223 8 17.3 2148.0012148.00 63.0 5.2  5.25.75.3     4.9               1 235N
1967 12610 5  3.2 2412.0012142.00 46.0 5.2  5.25.75.3     4.9               2 235N
1967 128 140 27.9 2448.0012148.00 90.0 5.4  5.45.95.6     5.1               2 235N
1967 12915 8 40.9 2248.0012124.00 31.0 5.4  5.45.95.6     5.2               2 235N
1967 1312058 15.8 24  .0012136.00 22.0 5.2  5.25.75.3     4.8               2 235N
1967 213 6 2 12.0 2412.00122 6.00 60.0 5.2  5.25.75.3     4.7               2 235N
1967 2231425 45.9 2412.0012230.00 48.0 5.5  5.56.05.7     5.4               3 235N
1967 3 4 112 31.9 2448.0012148.00 68.0 5.1  5.15.65.2     4.8               2 235N
1967 3 4 5 9 23.9 2124.0012156.00134.0 5.5  5.56.05.7     5.5   6.1         4 235LN
1967 324 1 8  6.0 2412.0012130.00 47.0 5.2  5.25.75.4     4.9               2 235N
1967 41711 7 12.4 2454.0012212.00 31.0 5.2  5.25.75.4     4.9               2 235N
1967 5101740  8.3 2336.0012148.00 44.0 5.3  5.35.85.5     5.0               3 235N
1967 517 950  3.4 2424.00122 6.00 50.0 5.2  5.25.75.3     5.1               2 235N
1967 519 920 14.2 2350.58122 7.98 59.0 5.1  5.1            4.8                 N
1967 9 3 018  3.1 2424.0012154.00 54.0 5.2  5.25.75.3     4.9               2 235N
1967 9152357 30.1 24 6.0012042.00 50.0 5.2  5.25.75.4     5.0               3 235N
1967 920 131 40.3 2430.0012212.00104.0 5.1  5.15.65.2     4.8               2 235N
19671018 3 7 11.9 2342.0012254.00 35.0 5.3  5.35.85.5     5.1               1 235N
19671025 059 22.6 2430.0012212.00 65.0 5.9  5.96.36.1     6.86.66.5   7.0 4 D 235ABLNS
1968 113 7 3 39.2 24 6.0012212.00  8.0 5.9  5.96.36.1     5.7   6.2         2 235LN
1968 2261050 15.0 2242.0012130.00 24.0 7.1 *6.87.07.0     6.87.16.8   7.2 3 235ABLX
1968 317 223 40.6 2348.00122  .00  2.0 5.2  5.25.75.3     4.9               1 235N
1968 423 518 15.0 2424.00122 6.00 33.0 5.2  5.25.75.3     4.9               2 235N
1968 5 2 925 58.6 2424.0012142.00 30.0 5.2  5.25.75.3     4.9               3 235N
1968 5 521 4 40.5 24  .0012254.00 21.0 5.1  5.15.65.2     4.9               1 235N
1968 510 923 31.5 2415.0612151.00 21.0 5.1  5.15.65.2     4.8               3 235N
1968 51015 9 20.6 2416.9212154.18 26.0 5.1  5.15.65.2     4.8               3 235N
1968 5102033 13.2 2419.9812157.78 20.0 5.2  5.25.75.3     4.9               2 235N
1968 6 11225 41.0 2442.0012154.00 81.0 5.2  5.25.75.3     4.9               2 235N
1968 6 22031 42.0 2336.0012224.00 33.0 5.3  5.35.85.5     5.1               2 235N
1968 6 41715  9.8 2230.0012124.00 47.0 5.4  5.45.95.6     5.2               2 235N
1968 617 426 31.9 2224.0012124.00 39.0 5.3  5.35.85.5     5.1               2 235N
1968 7 61533 33.0 24 6.0012230.00 50.0 5.2  5.25.75.4     5.0                 25N
1968 8261538      2324.0012018.00 20.0 5.1  5.15.65.2                         235
1968 9112147 21.9 24  .0012218.00 42.0 5.2  5.25.75.4     5.0               2 235N
196810 4 545 35.2 2454.0012236.00 27.0 5.4  5.45.95.6     5.2               1 235N
196810102356 56.4 2412.0012212.00 78.0 5.3  5.35.85.5     5.1               1 235N
196810141732 37.7 24 6.0012136.00 43.0 5.2  5.25.75.3     4.9               2 235N
19681018 554  5.7 2454.0012218.00 44.0 5.3  5.35.85.5     5.1               1 235N
19681020 7 8 17.1 25  .0012230.00 15.0 5.5  5.56.05.7     5.4   6.1         3 235LN
19681220 725 49.6 2412.0012230.00 50.0 5.2  5.25.75.4     5.0               1 235N
1969 1261539 58.5 25 6.0012236.00146.0 5.3  5.35.85.5     5.1               2 235N
1969 1291122 42.1 2436.0012148.00 77.0 5.2  5.25.75.3     4.9               2 235N
1969 219 838 27.4 2354.0012212.00 61.0 5.3  5.35.85.5     5.1               2 235N
```

```
  origin time      lat.   lon.   dep.  ML   ML ML MH MD MG mb Ms Ms Mu Mda MF  Ref.
1969 310 535 15.1 2248.00121  .00 37.0 5.1  5.15.65.2     4.8               3 235N
1969 4 41356  3.2 2254.00120  .00 46.0 5.4  5.45.95.6     5.2               3 235N
1969 422 551 36.9 2418.0012230.00 30.0 5.3  5.35.85.5     5.1               1 235N
1969 6 9 154 56.532339.7212111.56  1.9 5.2  5.25.75.44.6  5.0               1 2359N
1969 6121859  8.1 24  .0012224.00 33.0 5.4  5.45.95.6     5.3               2 235N
1969 7272226 54.2 2454.0012230.00105.0 5.5  5.56.05.7     5.4               3 235N
1969 9 51142 14.0 2242.0012142.00 33.0 5.6  5.66.15.8     5.65.1            3 235N
196912231620 35.8 2442.0012236.00 19.0 5.1  5.15.65.2     4.8               2 235N
1970 1 5 121  1.072332.1512159.66 26.5 5.1  5.15.65.24.3  4.8               1 2359N
1970 1 71534 56.9 2450.9412235.22118.0 5.0  5.0            4.7                 N
1970 110 317 59.3 2359.8812227.72 33.0 5.2  5.2            4.9                 3N
1970 114 223 14.5 2424.0012242.00 60.0 5.2  5.25.75.3     4.9               2 235N
1970 1271820 54.0 2430.0012230.00 40.0 5.2  5.25.75.4     5.0               3 235N
1970 2 81337 37.8 2418.18122 8.22107.0 5.0  5.0            4.7                 3N
1970 2131215 15.9 2130.0012118.00 40.0 5.1  5.15.65.2     4.8               1 235N
1970 2251020 59.4 2424.0012254.00 40.0 5.3  5.35.85.5     5.25.3            2 235N
1970 331 012      24 6.0012248.00 20.0 5.2  5.2   5.4                         3 235
1970 4301610  8.7 24 6.0012154.00 50.0 5.2  5.25.75.4     5.1               2 235N
1970 6191244  6.2 2512.0012212.00 45.0 5.6  5.66.15.8     5.3               3 235N
1970 630 345 37.3 2218.0012118.00 75.0 5.2  5.25.75.3     4.9               3 235N
1970 9 5 342 14.662357.68121 7.34  1.5 5.1  5.15.65.24.8  4.8               2 235N9
1970 916 3 5  5.4 2212.0012136.00 60.0 5.2  5.25.75.4     5.0               4 235N
19701O 917 9 59.5 2354.0012212.00 20.0 5.2  5.25.75.4     5.1               2 235N
19701017 310 54.8 2354.0012218.00 20.0 5.1  5.15.65.2     4.8               2 235N
19701114 758 19.8 2254.0012124.00 20.0 6.0  6.06.46.2     5.7   6.56.1      4 235LNU
19701127 940 23.2 2424.0012212.00 40.0 5.9  5.96.36.1     5.9   6.0         4 235LN
19701O2 31058 28.8 2341.8812233.06 33.0 5.1  5.1            4.8                 3N
1971 11119 6 50.602341.1112142.74 23.6 5.2  5.25.75.45.1  5.4               2 2359N
1971 212 825 38.0 25  .0012154.00 65.0 5.3  5.35.85.5     4.9               2 235N
1971 2161426  9.1 2348.0012212.00 45.0 5.5  5.56.05.7     5.85.4            2 235N
1971 3201636  2.8 2359.8212248.60 49.0 5.5  5.5            5.2                 3N
1971 4231040 20.5 2224.0012148.00 20.0 5.1  5.15.65.2     5.1               2 235N
1971 511 0 9 35.0 2218.00121 6.00 20.0 6.3  6.36.66.5     5.4               4 235N
1971 6112242 31.3 2358.2012228.98 46.0 5.4  5.4            5.1                 3N
1971 7191659  9.3 24  .0012224.00 35.0 5.3  5.35.85.5     5.4               2 235N
1971 8151215 29.3 2154.0012148.00 20.0 5.2  5.25.75.3     4.8               3 235N
1971 816 526 41.5 2143.9212147.88 33.0 5.1  5.15.65.2     4.9               2 235N
1971 819 828 53.1 24 6.0012212.00 40.0 6.1  6.16.56.3     5.45.6            3 235N
1971 8191111 40.7 2148.0012136.00 20.0 5.1  5.15.65.2     4.8               2 235N
197110 91316 36.4 2454.0012212.00 60.0 6.3  6.36.66.5     5.7               4 235N
197110O 841 19.0 22  .0012130.00 60.0 6.5  6.56.86.7     5.5               4 235N
197110302048 49.0623 2.8312122.10 12.8 5.6  5.66.15.85.4  5.35.56.0         3 2359LN
197111 7 059 34.2 2514.2812228.92136.0 5.2  5.2            4.9                 3N
1972 1 4 316 54.5 2230.0012218.00 55.0 6.5  6.56.86.7     6.16.97.26.97.6 4 235BLNU
1972 1 8 535 34.8 2118.5412013.44 33.0 5.4  5.4            5.1               4 3N
1972 125 2 6 23.3 2227.3012215.66 33.0 7.5 *7.17.37.3     6.37.47.57.48.5 4 D 235ABLNXU
1972 221 942 39.1 2430.0012154.00 50.0 5.2  5.25.75.4     5.1               2 235N
1972 4171050 42.7 2354.0012230.00 50.0 6.1  6.16.56.3     5.8   6.1         3 235LN
1972 424 957 20.012330.7112131.95 15.4 6.7  6.76.96.96.4  6.06.97.36.97.7 4 D 12359BLNUX
1972 6 81017 43.5 21  .4812010.02 33.0 5.2  5.2            4.9                 3N
1972 626 8 8 24.8 21 5.1612017.40 33.0 5.3  5.3            5.0                 3N
1972 6301857 43.4 2412.0012130.00 10.0 5.2  5.25.75.3     4.9               2 235N
1972 73016 0  2.8 2110.3812117.28 33.0 5.2  5.2            4.9                 3N
1972 73117 4 47.2 2330.0012154.00 25.0 5.1  5.15.65.2     4.6               2 235N
1972 9 2 2 7 43.8 2436.0012242.00 40.0 5.2  5.25.75.3     5.5               3 235N
1972 9221957 27.4 2230.0012054.00 15.0 6.3  6.36.66.5     5.76.26.6         4 235LN
1972 923 214 26.8 22  .0012124.00 45.0 6.4  6.46.76.6     5.46.16.4         4 235LN
197211 7 640 35.8 2248.0012048.00 30.0 5.2  5.25.75.3     5.4               3 235N
197211 81425 43.3 2348.0012130.00  2.0 5.5  5.56.05.7     5.55.2            2 235N
197211 91841 14.5 24  .0012118.00 10.0 6.3  6.36.66.5     5.76.16.36.1      3 235LNU
1972122 1 4 56.3 2318.2012031.20  9.0 5.1  5.15.75.44.9  4.9               3 2345N
1973 214 049 16.202221.6012142.60 30.0 6.0  6.06.46.2     5.95.1            1 235N
1973 3111453  7.4021 1.68120 9.66 32.0 5.1  5.1            4.8                 3N
1973 326 237 46.502410.10122  .90 24.0 5.0  5.05.6   4.8                     4 345
1973 4231329 12.702355.3012147.30  1.5 5.1  5.15.65.64.9  5.2               2 2345N
1973 6 7 622  2.802241.40121 4.60 15.6 5.4  5.45.95.65.2  4.4               3 2345N
1973 6301743 30.3023 3.9012114.90 20.0 5.2  5.25.75.65.0  5.2               2 2345N
1973 7231434  5.002149.5612117.58 73.0 5.3  5.35.65.2     5.0               2 235N
1973 7281753 32.3022 7.8612128.50 33.0 5.7  5.76.05.7     5.45.6            3 235N
1973 8252150 42.512228.11121 4.04 10.0 5.0  5.05.6   4.8                     345
1973 9112319 28.602435.3212130.89 20.0 5.1  5.15.6   4.8                     4 345
197310 2 259 42.202354.0012137.68 49.0 5.4  5.45.75.3     5.14.8            2 235N
197312 51135 32.502259.0412139.18 67.0 5.3  5.34.64.0     5.0               1 235N
1974 116 456      2330.0012124.00 10.0 5.4  5.45.95.6                         25
1974 2 61017 56.402234.3212059.52 60.0 5.1  5.15.65.2     4.8                 25N
1974 21616 9 38.102132.6412132.16115.0 5.0  5.0            4.7                 N
1974 31218 7 58.412313.7012154.88 60.0 5.0  5.05.6   4.8                       45
1974 4102259 49.382256.5312128.94  9.5 5.2  5.25.75.35.0  4.9                 245N
1974 5 5 557 35.762226.8412127.73  9.9 5.1  5.15.65.54.9  5.5                 245N
1974 5 7 144 53.3024 2.2812245.36 36.0 5.3  5.35.65.2     5.0                 25N
1974 8 81916 45.902434.1212232.41  5.0 5.7  5.76.16.15.4  5.46.06.36.1      25L4NU
197410111411 54.692312.5412131.89 13.8 5.0  5.05.56.04.8  5.3                 245N
197410111411 56.1023 9.1212122.02 44.0 5.6  5.6            5.3                 N
197410241421 54.002351.1812211.16 53.0 5.2  5.25.75.4     4.9                 25N
1974111818 3      2112.0012248.00 20.0 5.2  5.25.75.4                         25
1975 323 732 39.182245.3512238.21 80.0 5.9  5.96.36.15.6  6.2   6.66.57.0   245BLNQU
1975 4281039 30.6224  .6812216.68 14.1 5.0  5.05.55.34.8  5.0                 245N
1975 4301453 33.562358.4312135.82  .6 5.1  5.15.65.34.8  4.8                 245N
1975 5231543 59.182258.9312211.09  .2 5.6  5.66.05.35.3  5.4                 245N
1975 52316 1 53.802241.0112224.50 34.2 5.3  5.35.86.15.1  5.9   6.26.57.0   245BLNU
1975 5301336 56.302241.5812257.42 33.0 5.2  5.2            4.9                 N
1975 5301414 43.082247.8812234.43 50.0 5.3  5.35.85.25.1  5.2                 245N
1975 610 330 52.602240.0212239.54 19.0 5.5  5.5   5.3      5.2                 2N
1975 610 341 59.902235.4012256.34100.0 5.2  5.25.7   5.0  4.1                 45N
1975 6242328 44.9023 3.5312243.33 20.0 5.5  5.56.05.05.2  5.5                 245N
1975 6261525 31.312348.4912149.75 34.4 5.3  5.35.85.45.1  5.14.6              245N
1975 7 1 924  8.332437.7912222.23 80.0 5.1  5.15.65.24.9  4.9                 245N
1975 7 71750  .1023 2.7611958.68 23.0 5.1  5.1   4.7      4.8                 2N
1975 7201538 23.6724  .1312143.62 14.4 5.2  5.25.85.65.0  5.2                 245N
1975 8 817 7 42.502236.7212223.46 15.0 5.3  5.35.75.4     5.0                 25 N
1975 8222248 48.292320.8612139.63 23.4 5.1  5.15.64.84.9  4.7                 245N
197511131625  3.302419.9812137.62 66.0 5.5  5.5   5.6      5.2                 2N
1976 216 933 49.3924 2.6812221.74  1.6 5.0  5.05.6   4.8  5.04.4              45N
1976 223 9 2 27.582255.5412149.29  1.4 5.7  5.76.15.95.4  5.55.86.0          245LN
1976 320 1 7  0.792419.2312140.47 13.2 5.8  5.86.25.75.5  5.55.7              245N
1976 41414 0 46.332320.7812040.11  7.7 5.5  5.55.95.75.2  5.5                 245NZ
1976 6 92240 58.712247.4112042.70 16.8 5.1  5.15.65.14.9  5.1                 245N
1976 7111617      2324.0012212.00 30.0 5.2  5.2   5.4                         2
1976 712 618 43.9923 4.85122 1.07 10.0 5.1  5.15.75.14.9  4.6                 245N
1976 71817 2 29.602243.2012048.30 50.0 5.0  5.0   4.7      4.7                 2N
1976 82916 4 49.872454.3612221.76130.0 5.2  5.25.85.25.0  5.0                 245N
1976 9 4 210 14.342455.1012222.36  .6 5.1  5.15.65.04.9  5.1                 245N
1976 9 9 939 39.012422.9812144.71  5.0 5.0  5.05.65.34.8  5.3                 245N
197610 71027 57.022436.31122 1.19 89.5 5.1  5.15.64.94.9  5.0                 245N
1977 1 71936 52.652148.8612014.91  5.0 5.8  5.86.24.55.5  5.75.1              245N
1977 121 220  5.072344.00122 4.07 10.0 5.2  5.25.75.44.9  5.35.2              245N
1977 2 6 5 7 29.3521 4.5612018.27 30.0 5.6  5.66.15.05.3                      245
1977 321 222 53.902420.8812253.84 30.0 5.2  5.25.7   4.9                       45
1977 5251512 39.352421.6012157.86 57.8 5.0  5.05.54.74.8  4.9                 245N
1977 6141030 57.6022 7.6112145.39  7.8 5.4  5.45.9   5.1  4.9                 45N
1977 715 212 51.522357.4512223.05  .6 5.4  5.45.95.75.2  5.55.7              245N
1977 8141551 58.092341.9412138.69 31.2 5.0  5.05.55.04.8  4.8                 245N
197710171830 22.162248.2112027.10 10.0 5.0  5.05.64.94.8  4.7                 245N
197710192239 32.412234.5712132.84141.5 5.3  5.35.85.45.1  5.5                 245N
197710281316 59.812229.8412125.84 20.6 5.3  5.35.8   5.0  5.1                 45N
197711282317 29.342126.1912051.56  2.0 5.0  5.05.55.74.8  4.6                 245N
19771 2 619  0.4523 9.2612138.80 18.8 5.2  5.25.7   5.0  4.9                 45N
19771212 244  0.992259.5312134.46  .9 5.4  5.45.95.65.2  5.1                 245N
197712252233 48.072413.1212146.71 30.0 5.3  5.35.85.55.1  5.24.7              245N
1978 2 8 015 36.512355.2212241.82  5.0 6.0  6.06.45.55.7  5.55.7              245N
1978 4 81026  7.802233.95121 2.55 10.0 5.8  5.86.35.65.6  5.75.0              245N
1978 4141312 14.302348.4012148.68 35.9 5.1  5.15.64.94.9  4.5                 245N
1978 4291925 21.662438.8512246.25 14.0 5.9  5.96.36.35.6  5.45.8              245N
```

```
  origin time      lat.   lon.   dep.  ML   ML ML MH MD MG mb Ms Ms Mu Mda MF  Ref.
1978 5271344  9.152352.5912152.94  7.8 5.2  5.25.75.15.0  4.9                 245N
1978 53015 9  6.112425.0412149.57   .2 5.4  5.45.95.15.1  5.0                 245N
1978 6 5 2 2 43.962349.4012239.86 16.4 5.2  5.25.7  5.0  4.54.1                45N
1978 6 7 729 47.8422 9.06121 9.32  7.2 5.1  5.15.64.84.9  4.54.5              245N
1978 7231442 38.182221.1112119.72  6.1 7.4 *6.36.77.26.0  6.57.4  7.1      D 2584NXQU
1978 731 020 40.532423.7812157.73  5.6 5.3  5.35.85.25.1  4.94.9              245N
1978 8 91835  3.562330.2112130.05 13.0 5.3  5.35.85.75.1  5.25.5              245N
1978 8 91936  8.1625 9.0512041.59 25.9 5.3  5.35.85.55.1  5.05.3              245N
1978 8141650 11.592427.2112148.06  5.6 5.2  5.25.74.95.0  4.2                 245N
1978 9 2 157 35.702446.5912158.98 86.5 5.8  5.86.26.35.5  6.1      6.5      D 245NQU
1978 9 515 3 48.232355.6612145.39  3.1 5.0  5.05.5  4.8  4.2                  45N
1978 9 81219  5.5124 4.9012143.59 13.1 5.0  5.05.55.04.8  5.04.8              245N
1978 9101550 34.7424 6.7212145.91 14.4 5.3  5.35.85.55.0  5.14.2              245N
1978 9101610 53.0224 7.1912146.71  6.0 5.1  5.15.65.14.9  5.04.8              245N
1978 9101634  1.4324 2.6912145.73  3.1 5.3  5.35.8  5.1  5.45.1                45N
1978 911 622  7.492213.3612120.70  9.4 5.0  5.05.6  4.8                       45
1978 9112225 36.5724 3.2912145.07 10.0 5.4  5.45.95.45.2  5.24.8              245N
197811 718 2  0.512355.6012226.51 14.1 5.1  5.15.65.24.9  .1 .4                245N
19781110 9 6  4.082131.69121 7.96 16.6 5.1  5.15.6  4.9                       45
19781112 227  9.652223.9312122.18  5.2 5.0  5.05.6  4.8  4.6                  45N
197812121347 29.772224.7212248.14 13.6 6.1  6.16.5  5.8                       45
197812231123 11.672317.82122  .28  4.1 7.0 *6.77.06.96.3  6.67.0  6.9      D 245NXQU
1979 1 3 639  4.5223 2.8112054.29 10.0 5.3  5.35.85.05.1  5.14.9              245N
1979 212 847 34.702110.5612059.58 33.0 5.1  5.1                4.8                N
1979 6 2 0 8 59.302229.9712127.19 23.2 5.2  5.25.75.04.9  5.14.9              245N
1979 627 140 41.702441.7612252.14 33.0 5.2  5.2                4.9                N
1979 7201512 31.222314.6812138.38 24.1 5.0  5.05.6  4.8  5.14.7                45N
1979 7241520 28.4224 4.7012140.47 32.7 5.0  5.05.6  4.8  4.2                    45N
1979 91118 6 58.422237.2611948.24 35.0 5.0  5.05.6  4.8                       45
1979 9132054 50.972239.16120  .89 32.8 5.4  5.45.9  5.2  5.2                    45N
197910 8 5 3  9.982353.5012147.60 15.8 5.0  5.05.5  4.8  5.0                    45N
197912 2 525 17.572257.5412124.88 19.0 5.4  5.45.9  5.2  5.55.7                 45N
197912 219 9 44.4423 1.2212123.38 22.6 5.2  5.25.7  5.0  4.8                    45N
19791223 946 30.1723 1.0112147.34 10.0 5.1  5.15.6  4.9  5.15.1                 45N
1980 321 859 44.9323  .5412127.27 14.3 5.5  5.56.0  5.3  5.2                    45N
1980 5161535 59.292142.0312141.55 23.6 5.1  5.15.6  4.9  4.64.3                45N
1980 5291541 47.512432.5912223.25  6.9 5.1  5.15.6  4.9  4.94.6                45N
1980 6 62150 52.742314.7812243.95 13.7 5.0  5.05.5  4.8  4.3                    45N
1980 6 71214 43.872119.27121 8.73 18.0 5.5  5.56.0  5.2  4.84.7                 45N
1980 6171420 51.392433.7512235.49 18.3 5.0  5.05.6  4.8  4.7                    45N
1980 618 932 26.492223.6012113.50 28.2 6.0  6.06.4  5.7  5.8                    45N
1980 91621 0 24.482130.5212136.23 10.0 5.0  5.05.6  4.8                       45
1980 9251056 51.062321.4612043.18 15.0 5.3  5.35.8  5.1  5.04.8                45N
19801018 0 8 22.982415.5812153.41 10.0 5.6  5.66.1  5.3  5.05.5                45N
19801 71236 51.222357.5112218.22 24.3 5.5  5.56.0  5.3  5.45.4                 45N
198011141337  3.512434.2612148.17 64.8 5.5  5.55.9  5.2  5.2                    45N
198011141338 15.822434.4312147.08 59.5 5.1  5.15.6  4.9                       45
1980112216 0 58.8622 7.9112115.90  3.9 5.1  5.15.6  4.9                       45
198012 12148 29.702339.4012151.23 19.1 5.0  5.05.5  4.8  4.94.9                45N
1981 1241410 31.402352.4512144.00 45.8 5.0  5.05.6  4.8  4.8                    45N
1981 129 451 36.212425.2312154.40 12.8 5.9  5.96.3  5.6  5.65.5              D 45N
1981 22020 9 10.992254.8812125.98 21.3 5.5  5.56.0  5.3  5.45.7                 45N
1981 3 21213 46.612256.7812125.74 14.3 5.8  5.86.2  5.5  5.55.9                 45N
1981 3 5 524 49.632156.70121 4.02  8.0 5.0  5.05.6  4.8                       45
1981 3272241  1.842258.4912136.01 20.0 5.3  5.35.8  5.1  4.64.6                45N
1981 3302222 47.6223 3.3112026.21 16.0 5.3  5.35.8  5.1  4.84.1                45N
1981 514 927 34.842450.5412159.74  8.6 5.1  5.15.6  4.8  4.5                    45N
1981 5142122 51.682311.3412037.75  7.2 5.1  5.15.7  4.9  4.2                    45N
1981 6 11153 44.152422.7512152.50  1.5 5.0  5.05.6  4.8                       45
1981 6 4 822  7.1922 4.2012130.40  3.0 5.5  5.56.0  5.3                       45
1981 625 630 20.032119.29121 9.75 79.6 5.4  5.45.9  5.1                       45
1981 628 8 1 51.102147.2712134.74 91.3 5.4  5.45.9  5.2  5.3                    45N
1981 7161530 15.5022 5.7212134.92 10.8 5.0  5.05.5  4.8  4.2                    45N
1981 8 3 745 50.452449.7812249.96160.0 5.1  5.15.6  4.9                       45
198110152047  7.6522 1.6412053.13 40.0 5.2  5.25.8  5.0                       45
198111 21521 47.172322.2512143.52 42.0 5.1  5.15.6  4.9  4.6                    45N
198111221328 36.762215.8312225.69 27.5 5.0  5.05.5  4.8  4.5                    45N
19811212 456 39.202326.6512137.50 29.8 5.4  5.45.9  5.1                       45
1982 1141952 10.4522 4.3512033.62 23.1 5.0  5.05.6  4.8  4.2                    45N
1982 121 922  4.142128.99121  .53 51.1 5.7  5.76.1  5.4  5.04.6                45N
1982 1231410 39.842354.8512137.58  3.3 5.8  5.86.2  5.5  5.65.9              D 45N
1982 2171653 53.712341.8012140.76 14.3 5.1  5.15.7  4.9  5.04.7                45N
1982 3 2 352 34.932122.4812131.79 66.2 5.0  5.05.5  4.8  4.6                    45N
1982 429 5 0 41.342443.43122 8.40 10.1 5.0  5.05.5  4.8  4.5                    45N
1982 5 6 315 51.382445.9712223.19 78.7 5.2  5.25.7  5.0  4.8                    45N
1982 6192025 43.052248.1912144.05  .4 5.0  5.05.6  4.8  5.1                    45N
1982 710 253  3.012330.7312249.07 17.2 5.0  5.05.6  4.8                       45
1982 9 52353 13.922356.2512241.03 14.2 5.2  5.25.7  4.9  5.25.3                45N
1982102020 1 54.562345.9612157.38  3.1 6.0  6.06.4  5.7  5.45.9                45N
198210311956 15.822446.1712211.22  9.8 5.2  5.25.7  5.0  4.7                    45N
198211 4 3 8 34.112244.6012137.87117.7 5.2  5.25.7  5.0  5.0                    45N
19821217 243  1.542422.8412252.44 29.2 6.0  6.06.4  5.7  6.1                    45NQ
198212281357 47.192110.32121 3.28 63.2 5.4  5.45.9  5.2                       45
1983 113 619 32.842449.8812159.49  8.3 5.0  5.05.5  4.8  4.9                    45N
1983 131 0 1 44.1222 1.1312137.39 14.5 5.7  5.76.1  5.4  5.0                    45N
1983 131 047 42.942159.8812134.60 16.7 5.0  5.05.6  4.8  4.2                    45N
1983 226 2 5 36.342228.02121 4.74  6.3 5.3  5.35.8  5.1  5.14.5                45N
1983 4261526 38.402433.3812254.06 97.4 6.2  6.26.6  5.9  5.7                    45N
1983 4261815 36.1624 6.8812148.61 62.3 5.1  5.15.7  4.9  5.0                    45N
1983 5 72358  2.062428.9912130.30  3.1 5.1  5.15.7  4.9  4.7                    45N
1983 510 015  3.772427.4912130.44  1.2 6.0  6.06.4  5.7  5.65.4              D 45NV
1983 5151113 49.322317.6112223.32  7.4 5.1  5.15.6  4.9  4.7                    45N
1983 6211038 48.082356.9312226.09 23.7 5.1  5.15.6  4.9  4.7                    45N
1983 6211431 48.772353.2712237.68 16.3 5.9  5.96.3  5.6  5.24.7                45N
1983 6211448  3.472354.0612234.24 14.8 6.3  6.36.6  5.9  5.86.3                45N
1983 624 9 6 42.952358.8912236.80 25.0 6.6  6.66.9  6.2  6.16.7                45NQ
1983 7 31552 58.5723 6.2412158.88 18.7 5.1  5.15.6  4.8  4.9                    45N
1983 7 32024 35.9424 9.4512250.66 14.2 5.5  5.55.9  5.2  5.1                    45N
1983 7 62057 34.102359.6812236.65  5.2 5.8  5.86.2  5.5  4.5                    45N
1983 7151039  6.8023 1.2012114.71 13.6 5.8  5.86.3  5.6  4.9                    45N
1983 8141124 25.762137.92122 2.81  1.3 5.8  5.86.2  5.5  4.1                    45N
1983 9 72311 56.472353.9212229.27 21.7 6.4  6.46.7  6.1  5.55.7                45N
1983 9211920 40.732356.2912219.00 18.0 6.5  6.56.8  6.2  6.06.4                45N
198312221437 25.772213.47121  .87  4.5 5.2  5.25.8  5.0                       45
1984 1191112 34.4124 2.2312229.55 21.6 5.3  5.35.8  5.0  5.05.2                45N
1984 213 449 10.2425  .4412159.57168.4 5.5  5.56.0  5.2  5.5                    45N
1984 215 555 52.112359.0212232.38 22.9 5.0  5.05.5  4.8  4.4                    45N
1984 315 810 14.272351.2212224.96 12.9 5.0  5.05.5  4.8  4.8                    45N
1984 325 748 13.002151.91121 3.98 18.0 5.2  5.25.7  4.9                       45
1984 328 911 15.562352.9712246.51 10.3 5.9  5.96.3  5.6  5.45.9                45N
1984 4111351  9.612130.54121 3.68 47.7 5.0  5.05.6  4.8  4.4                    45N
1984 416 941 55.882416.84122 8.29 24.8 5.1  5.15.6  4.9  4.8                    45N
1984 418 134 18.262447.7412214.03  5.9 5.5  5.55.9  5.2  5.13.6                45N
1984 4191728 59.212449.3812214.31  6.1 5.4  5.45.9  5.1  5.05.0                45N
1984 4232235  4.032447.31122 5.34  8.7 5.6  5.66.0  5.3                       45
1984 4251512 56.232341.8112241.62 35.0 5.0  5.05.6  4.8                       45
1984 5 31141 59.4922 9.42121 9.43 25.1 5.0  5.05.5  4.8  4.8                    45N
1984 5201247 40.112454.6712216.73  4.6 5.2  5.25.7  5.0  4.9                    45N
1984 5201824 32.322414.9812149.29  .9 5.6  5.66.1  5.4  4.74.3                45N
1984 5212345 45.7422 2.83122 2.90  7.4 5.3  5.35.8  5.0  4.3                    45N
1984 6 21139  0.662340.9912236.10  5.4 5.0  5.05.6  4.8  4.5                    45N
1984 6 3 222 46.622242.5812125.76 27.9 5.3  5.35.8  5.0  4.6                    45N
1984 6 91638 59.702418.7912152.15 11.6 5.1  5.15.7  4.9                       45
1984 6232253  0.912232.7212210.39  8.0 5.7  5.76.2  5.5  5.05.0                45N
1984 7 5 034 56.882238.91121 3.57   .2 5.1  5.15.6  4.8                       45
1984 711 6 0 25.122356.7612217.21  7.0 5.2  5.25.7  5.0  4.8                    45N
1984 8201844 24.632255.2012037.64 12.0 5.1  5.15.7  4.9  4.84.0                45N
1984 8291412  8.342440.3612259.87131.3 5.4  5.45.9  5.1  5.1                    45N
1984 919 216 42.1522  .64121 7.22 20.5 5.0  5.05.5  4.8  4.9                    45N
1984 921 722 35.102358.3212223.40  3.5 5.3  5.35.8  5.0  4.5                    45N
1984 921 740 39.292355.4112227.14 21.3 5.0  5.05.5  4.8  4.74.9                45N
1984 9241624  6.0424 6.5412216.21  9.6 5.0  5.05.5  4.8  4.4                    45N
198410131150 47.432157.23121 6.04 57.5 5.4  5.45.9  5.2  4.9                    45N
```

```
  origin time      lat.   lon.   dep.  ML   ML ML MH MD MG mb Ms Ms Mu Mda MF  Ref.
19841029 926 10.452420.0612234.11 12.7 5.0  5.05.5  4.8                       45
19841 42231 33.802356.2512224.41 10.1 5.6  5.66.1  5.3  4.94.8                45N
19841 51637  5.222257.6212129.65 31.4 5.2  5.25.7  5.0  4.7                    45N
198411141914  4.502155.06121 1.68 19.0 5.0  5.05.5  4.8  4.84.7                45N
198411301019 21.262418.8912250.98 28.6 5.5  5.56.0  5.2  5.2                    45N
19841281827 46.152121.72121 9.90 16.8 5.0  5.05.6  4.8                       45
19841223 835 25.462449.6912223.63  9.3 5.1  5.15.6  4.9                       45
19841229 1 7  2.732447.75122 1.27 60.7 5.9  5.96.3  5.6  5.4                    45N
1985 1132151 24.8424  .4712212.96 44.2 5.7  5.76.2  5.5                       45
1985 1201236 19.212350.2912158.64 29.6 5.3  5.35.8  5.1                       45
1985 2 52347 38.7324 2.1212241.18 25.3 5.4  5.45.9  5.2                       45
1985 2181941  3.072326.1912259.92 10.3 5.9  5.96.3  5.6                       45
1985 3 91951  0.482445.5912213.95  4.1 5.5  5.56.0  5.2                       45
1985 51223 0  7.392424.10122 4.59 23.1 5.1  5.15.6  4.8                       45
1985 6121323 13.302435.4112213.93  5.3 5.5  5.56.0  5.3                       45
1985 6121722 50.842434.3812211.68  3.3 6.1  6.16.5  5.8                       45
1985 6221032 56.852243.6112116.77 20.9 5.1  5.15.6  4.9                       45
1985 629 2 5  7.782132.3112126.65 34.2 5.2  5.25.7  4.9                       45
1985 629 255 37.332120.2812133.18 69.0 6.2  6.26.6  5.9                       45
1985 7 41640  2.172230.5012121.02 17.7 5.2  5.25.7  5.0                       45
1985 71017 6 20.262411.3712143.50 32.3 5.1  5.15.7  4.9                       45
1985 8 513 0 38.592422.9512152.97  1.3 5.4  5.45.9  5.1                       45
1985 8 513 2 36.492427.6512146.46   .8 5.3  5.35.8  5.1                       45
1985 812 021 33.262442.7112147.10  8.0 5.2  5.25.7  5.0                       45
1985 820 3 2  9.902343.1312144.41 23.6 5.2  5.25.7  5.0                       45
1985 8291440 38.872413.6412215.08  3.5 5.2  5.25.7  5.0                       45
1985 83015 9 51.492425.1512154.65 12.6 5.0  5.05.6  4.8                       45
1985 9131834 19.702350.3412234.86 11.7 5.2  5.25.7  5.0                       45
1985 92015 1 24.032431.9712211.87  6.1 5.9  5.96.3  5.6                       45
19851017 412 15.0822 5.2212132.80  5.6 5.4  5.45.9  5.1                       45
19851025 618 52.162414.6712154.78  1.0 5.0  5.05.5  4.8                       45
198511 72116 17.792418.07122 7.54  1.0 5.0  5.05.5  4.8                       45
19851111817 1 47.872353.9612228.73  3.3 5.1  5.15.6  4.9                       45
19851112010 9 38.832349.4112223.20  9.4 5.0  5.05.6  4.8                       45
198511222229 59.652232.98122  .17 15.5 5.4  5.45.9  5.2                       45
19851124 036 32.662359.9512230.13 13.1 5.1  5.15.6  4.9                       45
19851126 027  4.812235.9212152.31 29.8 5.1  5.15.6  4.9                       45
19851112718 9 25.532451.0312229.73  7.4 5.3  5.35.8  5.0                       45
198512 51135  5.3122  .8212137.68113.4 5.1  5.15.7  4.9                       45
198512241442 45.932343.9812227.29  2.3 5.4  5.45.9  5.1                       45
1986 113 842 27.982449.9812243.35 15.2 5.2  5.25.7  5.0  5.0                    45N
1986 1141157 46.732446.0512253.55  2.1 5.1  5.15.6  4.9                       45
1986 1141856 29.552447.9212253.63 24.0 5.2  5.25.7  5.0  5.1                    45N
1986 11419 5  8.502449.7512240.83 15.9 5.3  5.35.8  5.0  5.1                    45N
1986 115 443 41.422447.6012234.16 30.6 5.1  5.15.6  4.9                       45
1986 1151730 32.522439.7112232.34 18.1 5.1  5.15.6  4.9  4.94.4                45N
1986 11613 4 31.972445.7712157.67 10.2 6.1  6.16.5  5.8  5.55.8              D 54N
1986 128 619 21.212322.7112025.74 12.0 5.1  5.15.6  4.9  4.5                    45N
1986 2 32050 36.252448.4612237.98123.5 5.1  5.15.6  4.9                       45
1986 212 3 8 18.082347.6012134.10 24.5 5.0  5.05.5  4.8  4.3                    45N
1986 227 623  9.102354.6412228.04  7.2 5.6  5.66.1  5.3  5.85.5                45N
1986 227 736 53.982353.1512226.54  8.2 5.1  5.15.6  4.9  5.14.8                45N
1986 3111823 43.912356.5212229.63 21.0 5.2  5.25.7  5.0  4.6                    45N
1986 317 712 16.432448.0412244.18 21.9 5.1  5.15.6  4.9  4.7                    45N
1986 318 913 34.902448.3512233.33 14.4 5.0  5.05.5  4.8                       45
1986 319 3 0 21.942448.5612235.80 15.6 5.2  5.25.7  4.9  5.04.7                45N
1986 3192135 21.612448.2212237.01 15.7 5.0  5.05.5  4.8  4.7                    45N
1986 322 445 31.592321.3512144.19 28.5 5.9  5.96.3  5.6  5.65.5                45N
1986 3221031  7.382445.1812255.26 33.0 5.6  5.6            5.35.7                N
1986 32214 0 55.812441.8812253.58 33.0 5.0  5.0            4.7                   N
1986 3222353 50.762448.7812245.30 13.2 5.2  5.25.7  5.0                       45
1986 323 522 12.182446.2512236.70 29.6 5.1  5.15.7  4.9                       45
1986 32314 9  5.402450.8312212.85 16.3 5.1  5.15.7  4.9                       45
1986 324 233 58.522452.7612237.85 14.0 5.5  5.56.0  5.2  5.1                    45N
1986 324 731  3.222449.4112212.32  2.0 5.1  5.15.6  4.9                       45
1986 3241536 34.772442.3812238.10 16.4 5.0  5.05.6  4.8                       45
1986 3242210 51.652448.6912228.53  9.0 5.2  5.25.7  5.0  4.8                    45N
1986 3251017 44.662449.5412231.98 13.4 5.0  5.05.5  4.8  5.0                    45N
1986 3251213 51.542445.8212239.84  5.9 5.4  5.45.9  5.2                       45
1986 326 743 46.782445.4512248.04  1.0 5.0  5.05.6  4.8                       45
1986 3261720 35.602447.7012242.00 16.8 5.3  5.35.8  5.1  5.04.7                45N
1986 330 356 15.532448.3212237.41 10.1 5.1  5.15.6  4.9  5.0                    45N
1986 4 5 238 53.492446.8912242.83 12.1 5.3  5.35.8  5.1                       45
1986 422 450 35.232433.6912219.20  3.4 5.0  5.05.6  4.8  4.3                    45N
1986 5 8 859  7.882357.92121 5.77 12.6 5.1  5.15.6  4.9  5.0                    45N
1986 5181933 36.742447.6612229.82  9.4 5.2  5.25.7  5.0                       45
1986 520 525 49.5824 4.9012135.49 15.8 6.1 #6.26.5  5.9  6.16.4              D 54NVQ
1986 6 6 047 54.382220.10121 4.62 11.7 5.1  5.15.7  4.9  5.0                    45N
1986 6251341  6.172450.4612232.94 12.8 5.0  5.05.5  4.8                       45
1986 7 623 4 53.642450.6912257.77  4.2 5.3  5.35.8  5.1  5.0                    45N
1986 7271647 58.282344.0412235.12   .7 5.0  5.05.6  4.8  4.2                    45N
1986 7301131 47.532437.7312147.65  1.5 5.8  5.86.2  5.5  5.65.6              D 54N
1986 7311136 34.292450.0712239.79  6.5 5.7  5.76.2  5.5  5.15.2                45N
1986 811 8 5 58.762223.9112131.80112.6 5.8  5.86.2  5.5  5.5                    45N
1986 927 936 35.382231.82121 3.50   .6 5.4  5.45.9  5.1  4.4                    45N
1986 928 0 2 55.742141.8112139.63  1.0 5.0  5.05.6  4.8                       45
19861014 2 8 41.562359.1812233.54  9.9 5.1  5.15.6  4.9  4.8                    45N
198610151316 59.362118.86121 1.99 11.7 5.1  5.15.6  4.8                       45
198610282025 28.422442.0212238.10  3.1 5.0  5.05.6  4.8                       45
198611 61611  6.552439.1912225.71   .5 5.3  5.35.8  5.1  4.9                    45N
198611142120  4.522359.5112149.99 15.0 6.8 #6.56.8  6.1  6.37.8              D 54NYXQ
198611292250  3.392229.13121 2.90  5.9 5.2  5.25.7  4.9  4.94.2                45N
198612 411 0 18.012454.9312219.78  5.3 5.0  5.0       4.8  4.8                    4N
198612102355 22.1925 1.8012140.58 98.6 5.2  5.2       5.0  5.2                    4N
19861221 242 51.762512.4712227.04243.7 5.0  5.0       4.8  5.1                    4N
19861222 4 4  1.822417.88122 8.48 11.9 5.1  5.1       4.9  4.84.6                 4N
198612292224 47.702433.2112230.85  1.4 5.1  5.1       4.9  4.8                    4N
198612292324 48.862433.6812226.79  5.4 5.4  5.4       5.1                         4
1987 1 6 5 7 48.592354.8512150.43 28.6 5.7  5.7       5.5  5.85.5                 4N
1987 1151941 42.522251.21120 4.42 28.9 5.1  5.1       4.9  4.94.3                 4N
1987 2 1 9 8 11.852357.8212240.21 10.8 5.4  5.4       5.2  5.24.7                 4N
1987 2 41215 23.592426.4112153.83 69.2 5.2  5.2       4.9  5.0                    4N
1987 4111717 45.512345.6812135.58 11.2 5.0  5.0       4.8  4.2                    4N
1987 4111813 23.892351.3512212.38  7.5 5.5  5.5       5.2  5.6                    4N
1987 417 510 54.032422.2412159.75 23.4 5.1  5.1       4.8  4.7                    4N
1987 4181249 37.592357.4812150.92 28.6 5.3  5.3       5.1  5.0                    4N
1987 4201717 15.712153.2012034.23 54.7 5.0  5.0       4.8  4.1                    4N
1987 4251218  9.162151.92121 5.69 25.1 6.3  6.3       6.0                         4
1987 612 951  1.572517.1212216.78258.8 5.0  5.05.2  4.4  5.4                    45N
1987 627 738 55.672419.4112137.86   .5 5.1  5.15.3  4.6  5.24.9                 45N
1987 7122018 10.922240.13121  .08  1.9 5.2  5.25.4  4.6  4.5                    45N
1987 7191048 40.642222.3912019.70 51.3 5.1  5.15.3  4.5  5.14.5                 45N
1987 8 313 7 51.262154.2511954.65 79.6 5.3  5.35.4  4.7  4.2                    45N
1987 9 52046 20.722243.7111911.09 23.1 5.5  5.55.6  4.9                       45
1987 9 721 9 35.312137.4611951.84 71.4 5.3  5.35.4  4.7  4.4                    45N
19871014 737 34.782142.8512134.59 82.1 5.4  5.45.5  4.8  5.2                    45N
19871218 553 40.852323.0812046.96  1.9 5.2  5.25.3  4.6  5.05.3                 45N
1988 2121915 35.212348.7712224.16  7.1 5.4  5.45.6  4.8  5.65.3                 45N
1988 2141450 56.292349.1212240.99 13.8 5.1  5.15.3  4.6  4.94.2                 45N
1988 2141554 55.272353.2312232.09  7.8 5.2  5.25.4  4.7  5.0                    45N
1988 21416 3 11.212352.2912238.53 12.6 5.2  5.25.4  4.7  5.1                    45N
1988 3 3 321 19.762349.1512146.06  9.8 5.0  5.05.3  4.5  4.94.9                 45N
1988 4 7 3 5  7.212358.7712137.66  1.4 5.7  5.75.8  5.0  5.34.5                 45N
1988 4 7 324 35.412355.2012140.58  1.3 5.1  5.15.3  4.5  4.9                    45N
1988 4112235 15.932313.2012125.79 20.5 5.1  5.15.3  4.5  5.0                    45N
1988 42420 3 27.272327.10122  .76 18.4 5.4  5.45.6  4.8  5.55.5                 45N
1988 5 81750 21.442129.38121 5.16 28.1 5.1  5.15.3  4.5                       45
1988 7 3 520 39.2425 9.4612134.08  5.3 5.1  5.15.3  4.5  4.7                    45N
1988 717 340 11.032123.08121 2.69 44.0 5.0  5.05.2  4.4                       45
1988 7181446 32.282220.3112153.59 12.3 5.2  5.25.4  4.7                       45
1988 7181449 27.602237.1012151.72  4.2 5.3  5.35.5  4.7                       45
1988 7202315 34.922354.6512143.55 32.3 5.8  5.85.9  5.2  5.85.7              D 54N
1988 7211839 28.422226.4812143.37 21.1 5.2  5.25.4  4.7  4.9                    45N
```

origin	time	lat.	lon.	dep.	ML	ML	ML	MH	MD	MG	mb	Ms	Ms	Mu	Mda	MF	Ref.
1988	8 91651	35.1524	7.1812	229.10	29.9	5.4	5.45.6	4.8			5.34.5						45N
1988	811 341	1.4322	9.0712	116.36	19.6	5.8	5.85.8	5.1			5.44.9						45N
1988	8191810	8.652	435.0612	242.21	91.2	5.8	5.85.9	5.1			5.2						45N
1988	8281534	51.242	354.5712	232.63	17.5	5.1	5.15.3	4.6			5.25.2						45N
1988	9 81854	40.192	358.8412	228.51	6.8	5.0	5.05.2	4.4			4.4						45N
1988	9181538	25.922	428.7112	224.09	62.5	5.4	5.45.6	4.8			5.3						45N
1988	101612 9	26.7622	1.2412	149.90	.8	6.0	6.06.0	5.3			5.35.8						45N
1988	12 91824	52.962	525.0812	227.83	25.7	5.3	5.35.4	4.7			4.9						45N
1988	12 92311	11.742	132.6212	119.24	50.9	5.2	5.25.3	4.6									45
1988	12271851	50.7724	2.6512	241.49	5.9	5.4	5.45.6	4.8			5.14.4						45N
1988	12281636	39.142	156.6812	135.71	31.3	5.5	5.55.6	4.9			4.64.1						45N
1989	1 81741	40.3124	4.5612	020.06	30.9	5.2	5.2	4.6			4.6						4N
1989	119 143	49.712	226.8312	146.14	10.9	5.2	5.2	4.6			4.9						4N
1989	317 222	59.102	447.6612	250.88	106.0	5.1	5.1	4.5									4
1989	326 256	21.942	145.1012	1 8.07	28.0	5.1	5.1	4.5									4
1989	4171953	57.772	319.1512	257.08	7.0	5.1	5.1	4.5									4
1989	423 035	54.282	128.5911	951.10	91.7	5.4	5.4	4.8			4.1						4N
1989	51518 5	35.4724	1.6012	223.89	8.0	5.4	5.4	4.8			5.2						4N
1989	6 4 2 6	8.872	316.2512	135.99	23.9	5.0	5.0	4.4			4.54.1						4N
1989	6 81346	24.232	327.4312	120.38	1.0	5.0	5.0	4.4			5.04.0						4N
1989	7 316 6	42.072	353.8812	240.96	19.2	5.1	5.1	4.5			4.2						4N
1989	7 41014	6.822	353.9012	227.72	16.5	5.0	5.0	4.5			5.04.3						4N
1989	8 22126	30.652	338.9612	213.73	6.9	5.0	5.0	4.4									4
1989	8 31131	20.3023	4.6722	.59	5.6	6.4	6.4	5.7			5.96.4						4N
1989	8212312	40.122	357.7712	226.19	8.1	6.2	6.2	5.5			5.66.3						4N
1989	9 42136	49.522	148.6411	956.15	65.6	5.0	5.0	4.4			4.23.9						4N
1990	1151242	30.142	421.5812	155.92	20.1	5.2	5.2	4.6			5.1						4N
1990	716 712	23.612	411.9512	149.85	.8	5.0	5.0	4.5			5.0						4N
1990	7161914	51.952	411.0412	148.24	1.4	5.1	5.1	4.6			5.55.8						4N
1990	82116 0	58.542	235.8712	158.19	20.7	5.0	5.0	4.4			5.35.2						4N
1990	91114 9	3.962	448.8212	047.99	24.2	5.3	5.3	4.8			5.85.6						4N
1990	915 122	36.852	452.4112	6.55	1.5	5.0	5.0	4.4			4.5						4N
199011112359		6.4424	5.7112	144.13	34.3	5.4	5.4	4.8			5.45.2						4N
199012131950		19.232	345.9312	137.64	1.3	6.0	#6.0	5.3			5.96.3				D		4NY
19901218	148	22.122	127.0112	1 7.17	30.1	5.0	5.0	4.4									4
1991	3 2 456	38.4324	2.6212	145.01	25.8	5.0	5.0	4.0			4.4				2		34N
1991	3 21813	18.712	353.2812	144.44	.2	5.2	5.2	4.5			5.0				1		34N
1991	3 71340	25.342	440.9212	223.39	95.7	5.1	5.1	3.9							1		34
1991	312 6 4	6.142	314.7412	0 4.47	12.3	5.7	5.7	4.7			5.65.2				2	D	34N
1991	3161932	27.512	447.5512	143.62	90.0	5.3	5.3	4.0			4.6				1		34N
1991	317 437	5.742	310.7212	0 .66	9.7	5.2	5.2	4.2			4.3				1		34N
1991	326 358	23.712	140.4512	139.66	12.1	5.3	5.3	5.2			5.86.3				3		34N
1991	326 619	30.432	142.1512	140.48	16.6	5.2	5.2	4.8			5.25.1				1		34N
1991	3261024	20.352	125.3012	154.47	39.6	5.6	5.6	4.7			5.35.5				2		34N
1991	4 2 821	41.632	245.5412	122.06	15.6	5.1	5.1	4.3			4.4				2		34N
1991	426 024	9.072	353.1812	237.61	2.0	5.2	5.2	4.5			4.74.7				2		34N
1991	6 317 3	10.452	349.3912	152.40	20.5	5.1	5.1	4.1			4.8				2		34N
1991	6 71658	29.1123	6.7212	048.15	7.6	5.1	5.1								3		
1991	6241746	22.442	413.3012	214.25	8.7	5.1	5.1	4.1			4.4				1		34N
1991	6241843	46.372	416.3112	2 7.05	7.1	5.0	5.0	3.9			4.3				1		34N
1991	91813 5	43.632	431.3012	252.06	97.8	5.3	5.3	4.6			5.0				2		34N
1991	930 944	43.682	236.3012	125.60	18.8	5.9	5.9	4.5			5.55.2				2		34N
199110	11323	45.112	350.8412	148.77	19.6	5.0	5.0	4.0			4.3				1		34N
19911018	352	9.122	346.6412	145.26	11.5	5.0	5.0	4.0			4.7				1		34N
199110232037		22.752	158.9812	159.26	1.1	5.1	5.1	4.5									34
199110251440		37.632	338.5212	256.04	1.3	5.1	5.1	4.6			5.24.7						34N
199111 3 417		20.512	327.7012	135.84	35.3	5.0	5.0	3.9			4.3				2		34N
199111251029		11.3323	9.5612	140.97	33.6	5.0	5.0	3.8			4.2				2		34N
199112 2 614		15.722	310.8312	141.83	35.0	5.4	5.4	4.3			4.94.4				2		34N
199112 51548		23.132	240.6612	123.95	22.5	5.3	5.3	4.2			4.64.7				1		34N
199112 82223		32.212	354.3212	229.80	17.0	5.2	5.2	4.1			4.64.2						34N
19911210	730	16.132	354.5412	226.57	6.1	5.1	5.1	4.0			4.5						34N
19911215	4 3	4.1824	6.4912	248.51	31.3	5.1	5.1	4.2							2		34
1992	2101239	57.162	150.9912	152.58	39.4	5.1	5.1	4.6									4
1992	2181116	14.0325	3.9711	936.37	62.6	5.0	5.0	4.4			4.5						34N
1992	22121 7	44.092	319.7612	140.15	34.3	5.0	5.0	3.8			4.23.6				2		34N
1992	321 311	59.292	359.9112	136.54	26.8	5.1	5.1	4.1			4.7				2		34N
1992	4 2 139	42.7524	6.8412	142.45	24.3	5.0	5.0	4.3			4.74.5				2		34N
1992	4191832	20.752	350.4312	134.47	8.1	5.6	5.6	5.0			5.86.1				3	D	34N
1992	4201616	38.802	427.0512	042.86	8.8	5.2	5.2	4.5			4.8				2		34N
1992	4241149	13.332	348.6312	136.58	.8	5.2	5.2	4.3			4.7				2		34N
1992	5 1 431	8.072	345.5312	131.98	4.1	5.0	5.0	3.9			4.5				2		34N
1992	5 31925	5.862	350.7312	238.76	5.0	5.2	5.2	4.3			4.84.2						34N
1992	5282042	16.4323	9.6412	117.83	.6	5.0	5.0	4.1			4.8						34N
1992	5282319	35.4523	7.9312	121.05	13.7	5.4	5.4	4.4			5.45.2				2	D	34N
1992	6251829	10.472	359.5112	137.92	23.4	5.0	5.0	4.0			4.8				2		34N
1992	7 7 045	36.272	424.4712	143.75	27.9	5.2	5.2	4.1			4.54.1				2		34N
1992	724 526	55.8424	3.9612	151.06	27.4	5.1	5.1	4.3			4.6				2		34N
1992	8 62129	15.062	439.6012	227.41	.9	5.4	5.4	4.4			5.25.6				2		34N
1992	8 82316	42.692	356.8212	233.03	20.4	5.0	5.0	3.9			4.6				1		34N
1992	8141726	23.6124	1.9712	137.64	26.1	5.2	5.2	4.0			5.04.9				2		34N
1992	9 11641	14.762	341.9812	146.48	51.0	5.5	5.5	4.4			6.0				2		34N
1992	918 1 7	.592	354.7112	225.18	10.2	5.2	5.2	4.4			5.14.8				1		34N
1992	92814 6	2.852	352.9712	240.35	17.6	5.8	5.8	4.7			5.86.1				3		34N
199210	31356	40.612	237.7712	124.72	25.2	5.7	5.7	4.4			5.14.6				2		34N
199210111659		29.762	444.9312	255.07	112.8	5.5	5.5	4.4			4.7						34N
199212122140		38.722	434.0312	238.72	98.1	5.0	5.0	4.0			4.4				2		34N
19921228	523	25.342	351.8312	148.15	15.9	5.3	5.3	4.3			5.04.8				2		34N
199212291213		28.512	353.7912	243.57	5.0	5.4	5.4	4.5			4.6				2		34N
1993	123 859	26.3124	4.8412	144.57	28.5	5.6	5.6				5.45.4				3		3NS
1993	219 236	.352	345.7312	148.47	42.0	5.0	5.0				4.4				2		3N
1993	224 930	44.862	220.8612	216.14	16.9	5.2	5.2				4.6				1		3N
1993	3 5 657	4.722	214.6212	1 3.15	11.2	5.5	5.5				5.25.0				1		3NS
1993	327 545	47.812	440.5512	216.05	77.3	5.1	5.1				4.5				1		3NS
1993	5 61022	51.9425	8.5212	139.91	145.1	5.0	5.0										3
1993	624 259	57.862	432.6112	146.16	65.0	5.2	5.2				4.4				2		3NS
1993	7 419 8	6.822	452.9512	6.31	118.0	5.7	5.7				5.0				3		3N
1993	818 440	41.022	442.8012	2 5.50	66.3	5.3	5.3				4.6				2		3N
1993	9211632	.752	452.6612	246.31	127.6	5.1	5.1										3
199311121416		33.4222	4.9412	150.51	184.6	5.9	5.9				5.1				3		3N
19931122	9 4	17.932	353.2912	226.77	5.8	5.1	5.1				4.8				1		3N
199312	3 0 1	39.582	417.0712	149.45	64.7	5.3	5.3				4.7				2		3NS
199312	623 0	17.402	150.6912	059.69	20.8	5.3	5.3				5.25.0						3N
199312152149		43.102	312.8012	031.42	12.5	5.7	5.7				5.55.2				3	D	3NOPS
1994	117 719	43.982	446.40123	.00	110.2	5.9	5.9				5.1				4		3N
1994	120 550	15.5724	3.8912	151.14	49.5	5.6	5.6				5.45.3				3		3N
1994	12118 6	20.412	217.4112	133.05	35.0	5.6	5.6										3
1994	2 12244	27.662	444.8412	241.60	115.6	6.1	6.1				5.4				4		3N
1994	2 514 2	27.752	121.9712	229.90	6.5	5.1	5.1				4.1				2		3N
1994	2 91023	11.322	355.5912	231.81	2.9	5.3	5.3				4.74.7				1		3N
1994	3 61937	20.982	449.0512	2 1.19	97.5	5.5	5.5				4.7				2		3N
1994	3171128	.772	357.5912	224.94	.6	5.7	5.7				5.35.4				3		3N
1994	328 811	15.712	259.1212	041.21	14.4	5.4	5.4				4.9				2		3N
1994	4 6 112	11.092	331.9512	025.27	13.4	5.0	5.0				4.4				2		3N
1994	4181036	41.692	448.0312	2 1.73	94.9	5.1	5.1				4.3				2		3N
1994	430 914	17.122	421.2212	2 4.41	3.9	5.0	5.0				4.5				1		3N
1994	523 536	1.862	355.2912	241.30	7.2	5.8	5.8				5.76.0				3		3N
1994	5231516	58.752	351.7612	238.14	5.5	6.0	6.0				6.05.8				3		3N
1994	524 4 0	40.492	349.6012	236.20	4.4	6.6	6.6				6.26.7				3	D	3N
1994	6 5 1 9	30.092	427.7412	150.26	5.3	6.2	6.2				6.16.6				3	D	3N
1994	6 91417	10.402	318.1712	132.78	43.2	5.1	5.1				4.7				2		3N
1994	6171118	18.162	353.3512	134.29	21.2	5.0	5.0				4.5				1		3N
1994	6302345	18.572	356.2612	139.35	7.6	5.0	5.0				4.1				1		3N
1994	911 128	22.2424	8.1512	234.42	29.4	5.3	5.3				4.8				2		3N
1994	915 7 7	6.592	337.2912	212.26	15.8	5.3	5.3				5.14.5				2		3N
1994	9201947	59.4423	8.5412	058.94	11.1	5.0	5.0				4.7				1		3N
199410	5 113	24.4723	9.3812	143.22	31.3	5.8	5.8				5.5				3		3N
199410	9 741	55.502	414.5012	211.05	9.4	5.1	5.1				4.6				1		3N
199410	92136	9.642	457.5122	3.14	106.5	5.1	5.1				4.7				1		3N
19941012	9 8	22.132	448.3112	160.00	73.1	5.7	5.7				4.7				2		3N
199410141016		33.642	231.0712	134.35	124.4	5.7	5.7				5.1				3		3N
199410282351		10.482	438.1312	216.17	2.0	5.7	5.7				5.55.4				3		3N
199411142225		24.222	357.4912	225.67	11.9	5.1	5.1				4.8				1		3N

origin	time	lat.	lon.	dep.	ML	ML	ML	MH	MD	MG	mb	Ms	Ms	Mu	Mda	MF	Ref.
199411261117		35.622	438.2212	213.49	3.8	5.5	5.5				5.34.8					2	3N
199412 4 449		16.262	456.3412	245.55	138.9	5.0	5.0									2	3
19941212 051		35.192	438.4312	230.88	93.1	5.0	5.0									1	3
19941213 050		52.062	355.8712	239.21	15.9	5.5	5.5				5.04.7					2	3N
199412131754		34.8325	8.1612	247.69	165.4	5.6	5.6				4.6						3N
1995 110 755		19.562	340.8112	125.92	3.8	5.1	5.1				5.14.8						3N
1995 210 221		59.692	345.6512	155.18	24.6	5.2	5.2										3
1995 223 519		2.782	412.2212	141.22	21.7	5.8	5.8				5.96.2						3N
1995 324 413		51.092	438.2812	151.64	76.0	5.6	5.6				5.0						3N
1995 4 1 912		22.462	455.8112	2 7.24	122.2	5.3	5.3				4.3						3N
1995 4 31154		40.082	356.1312	225.90	14.6	5.9	5.9				5.65.5						3N
1995 4 9 444		51.482	149.6312	1 1.82	15.7	5.3	5.3				5.25.0						3N
1995 410 951		13.362	149.9312	1 1.40	29.8	5.0	5.0				4.54.1						3N
1995 42410 4		.962	439.1012	137.33	63.1	5.3	5.3				4.5						3N
1995 425 829		2.962	238.7812	030.47	43.7	5.5	5.5				5.05.1						3N
1995 5 22248		20.542	349.9912	158.38	23.9	5.2	5.2				4.54.4						3N
1995 5151858		38.792	444.2812	221.78	79.4	5.4	5.4				4.7						3N
1995 5271811		11.1223	.491	227.88	19.7	5.3	5.3				5.25.6						3N
1995 6 62321		22.9923	.861	227.41	23.6	5.1	5.1				4.84.5						3N
1995 625 659		7.092	436.3712	140.11	39.9	6.1	6.1				5.85.6					D	3N
1995 6281414		53.732	213.5412	120.82	6.6	5.3	5.3				5.34.5						3N
1995 7 7 3 4		48.362	353.6121	5.40	13.1	5.3	5.3				5.14.7						3N
1995 7141652		46.482	419.2212	151.06	8.8	5.8	5.8				5.24.9					D	3N
1995 8151453		56.722	358.7312	225.51	9.7	5.0	5.0				4.54.4						3N
19951014 3 1		36.682	437.6612	231.86	14.3	5.0	5.0				4.7						3N
199510312227		6.942	317.4512	021.53	10.6	5.2	5.2				4.9						3N
199512 1 317		4.622	436.3612	138.56	45.1	5.7	5.7				5.0						3N
199512 81314		40.732	416.0912	221.27	50.0	5.3	5.3				4.3						3N
199512181617		54.5324	1.1012	141.52	22.1	5.8	5.8				5.1						3N
1996 1221922		57.532	455.7012	143.42	66.9	5.1	5.1										3
1996 3 51452		27.132	355.8112	221.69	6.0	6.4	6.4										3
1996 5282153		22.3524	3.2112	134.97	25.0	5.1	5.1										3
1996 7 6 127		5.472	240.0212	030.90	27.0	5.2	5.2										3
1996 717 926		56.572	353.7412	228.75	18.0	5.1	5.1										3
1996 7292020		53.532	429.3312	220.82	65.7	6.1	6.1										3
1996 810 623		5.692	353.1012	238.99	5.7	5.8	5.8										3
1996 9 52342		7.8822	.0712	122.00	14.8	7.1	7.1										3
19961114 139		11.242	325.0812	2 5.13	12.8	5.3	5.3										3
19961126 822		23.7124	9.8612	141.72	26.2	5.3	5.3										3
199612181120		23.242	249.2712	121.46	16.2	5.0	5.0										3
1996122116 5		20.742	443.2112	255.76	84.1	5.3	5.3										3
199612252152		16.6124	9.6912	220.31	19.6	5.2	5.2										3
1997 1 51034		16.852	437.3812	231.82	1.1	5.8	5.8										3
1997 1 51840		53.6223	1.5112	251.84	33.0	5.4	5.4										3
1997 116 1 7		20.4122	.7112	118.24	8.9	5.4	5.4										3
1997 1181713		47.762	355.9012	226.43	15.1	5.4	5.4										3
1997 310 733		37.1924	4.9812	220.58	8.5	5.1	5.1										3
1997 4131745		13.992	348.3212	142.86	45.5	5.6	5.6										3
1997 4272359		32.562	436.7412	157.73	60.6	5.2	5.2										3
1997 5 3 246		13.682	232.2012	124.15	3.6	5.3	5.3										3
1997 516 614		57.782	431.6112	242.92	81.8	5.1	5.1										3
1997 5231041		20.072	112.7512	2 .45	168.6	5.5	5.5										3
1997 618 2 3		30.612	357.5612	149.80	31.7	5.2	5.2										3
1997 622 936		4.1022	9.9712	122.80	1.8	5.4	5.4										3
1997 7 41837		30.5123	3.4112	047.41	5.2	5.2	5.2										3
1997 7 81626		27.272	355.4812	225.88	2.0	5.1	5.1										3
1997 71511 5		33.392	437.3012	230.95	86.6	6.1	6.1										3
1997 8241217		39.952	138.1612	012.27	41.5	5.3	5.3										3
1997 8241858		36.542	137.7712	016.33	45.6	5.3	5.3										3
1997 928 754		26.212	436.5512	146.98	68.6	5.0	5.0										3
199710111824		25.672	458.8512	234.53	146.4	6.1	6.1										3
199710221116		26.562	226.6712	127.76	10.2	5.3	5.3										3
1997 1112 0 9		35.852	145.2412	123.94	70.3	5.3	5.3										3
1997 1114 429		50.7724	9.6112	145.50	3.1	5.4	5.4										3
1998 1141754		45.032	146.9912	153.10	5.4	5.3	5.3										3
1998 1141757		13.562	149.7512	148.91	5.0	5.2	5.2										3
1998 1181956		51.712	243.5012	1 5.34	3.3	5.1	5.1										3
1998 1182240		.992	424.6312	257.25	55.5	5.6	5.6										3
1998 1202329		38.872	241.1812	1 4.79	3.8	5.1	5.1										3
1998 218 057		30.232	439.5512	238.45	97.2	5.2	5.2										3
1998 311 6 0		8.132	221.3712	218.11	25.3	5.2	5.2										3
1998 3111721		54.872	226.6912	215.53	4.1	5.3	5.3										3
1998 5 2 537		42.442	433.6412	233.48	86.1	5.6	5.6										3
1998 5 92053		39.012	449.4012	154.42	83.6	5.4	5.4										3
1998 530 622		38.282	416.1212	2 7.74	37.8	5.3	5.3										3
1998 717 451		14.962	330.1612	039.75	2.8	6.2	6.2									D	3
1998 7241844		3.032	137.9412	150.38	6.7	5.9	5.9										3
1998 731 923		26.342	445.6812	252.37	107.4	5.5	5.5										3
1998 9 41040		50.602	354.8412	134.59	11.0	5.0	5.0										3
1998 928 857		19.9221	5.3212	2 6.87	19.6	5.0	5.0										3
199810 91252		51.5422	7.2112	138.80	10.0	5.4	5.4										3
199811 3 7 6		37.4922	8.9012	1 8.71	24.7	5.4	5.4										3
199811172227		32.522	249.9312	047.42	16.5	5.5	5.5										3
199811191030		2.242	347.3212	146.29	42.3	5.0	5.0										3
199811262212		19.2925	3.6012	230.67	172.0	5.3	5.3										3
19981214 059		3.262	417.4912	9.35	38.7	5.2	5.2										3
19981222 149		6.952	414.8112	234.95	45.5	5.4	5.4										3
1999 2132147		57.392	353.6112	228.39	4.3	5.0	5.0										3
1999 220 253		45.662	150.0212	154.30	205.4	5.6	5.6										3
1999 2221348		58.052	358.5012	239.27	4.2	5.9	5.9										3
1999 3261434		9.472	444.1412	254.41	116.9	5.3	5.3										3
1999 4 4 459		2.622	453.0112	156.16	88.9	5.8	5.8										3
1999 5 61346		23.492	114.

```
 origin time      lat.   lon.   dep.  ML   ML ML MH MD MG mb Ms Ms Mu Mda MF  Ref.
199911131953 53.622353.2612232.48 16.3 5.0  5.0                             3
19991115 725 21.972329.8312030.39   7.0 5.1  5.1                             3
199911261012 30.872357.1012249.38   2.4 5.2  5.2                             3
199911282125 50.242319.9412055.84   2.5 5.1  5.1                             3
2000 1 3 220   8.102252.7912159.91 14.0 5.5  5.5                             3
2000 2102314   7.922531.1812243.15269.9 5.3  5.3                             3
2000 2152133 18.152318.9612044.42 14.7 5.6  5.6                             3
2000 3 9 5 8 44.502313.3012129.57 33.8 5.1  5.1                             3
2000 316 037 53.462244.0612137.31 24.4 5.0  5.0                             3
2000 3161310 55.202318.5312045.06 11.5 5.0  5.0                             3
2000 414 136 38.612413.1712230.50 48.3 5.2  5.2                             3
2000 5 61341 52.8424 1.4112133.62 27.0 5.1  5.1                             3
2000 5 71618   8.932231.3612021.50 39.8 5.0  5.0                             3
2000 6281135   1.712437.0912224.51 90.8 5.3  5.3                             3
2000 71322 1 10.322356.3812149.61   5.3 5.1  5.1                             3
2000 714 0 7 32.4624 2.9012143.70   7.2 5.7  5.7                             3
2000 71423 4 34.642356.8212148.19   5.9 5.1  5.1                             3
2000 717 650 39.3824 3.9912147.39 10.3 5.1  5.1                             3
2000 719 446 33.4224 7.1312145.61   3.7 5.0  5.0                             3
2000 7242210 36.372442.6712228.74110.1 5.7  5.7                             3
2000 7282028   7.722324.6612055.96   7.3 6.1  6.1                             3
2000 8 5 232 27.502410.5112230.62 28.4 5.0  5.0                             3
2000 823 049 16.582338.1612138.08 27.5 5.6  5.6                             3
2000 910 854 46.5324 5.1212135.03 17.7 6.2  6.2                             3
2000112911 0 33.002351.4412146.09 15.3 5.2  5.2                             3
2000121010 8 38.6223 6.3312012.49 15.6 5.0  5.0                             3
200012101930 44.4723 6.9612013.58 12.0 5.3  5.3                             3
200012122032 52.702358.0612240.57 19.4 5.3  5.3                             3
20001226 321   1.9221 8.5712211.18158.1 5.6  5.6                             3
20001228 9 1 26.342326.53122 2.66   9.2 5.3  5.3                             3
2000122918 3 28.592421.6412153.04   7.0 5.3  5.3                             3
20001230 943 28.2822 3.3512234.13 13.3 5.2  5.2                             3
200012301942 52.562411.6912254.03 64.1 5.2  5.2                             3
2001 1222327 18.272419.12122 8.02 13.1 5.2  5.2                             3
2001 2162313   9.082427.8512245.62 60.5 6.0  6.0                             3
2001 3 11637 50.192350.2612059.83 10.9 5.8  5.8                             3
2001 6131317 54.152422.8712236.39 64.4 6.3  6.3                             3
2001 614 235 25.782425.1312155.68 17.3 6.3  6.3                             3
2001 619 516 15.462310.60121 4.62   6.6 5.4  5.4                             3
2001 619 543 39.172311.81121 5.85 11.7 5.2  5.2                             3
2001 630 4 7 37.7324 3.3212132.56 23.4 5.0  5.0                             3
2001 7 91520 47.6324   .6612146.11 43.4 5.1  5.1                             3
2001 9172244 44.792316.5812039.25   6.8 5.0  5.0                             3
200110261042 39.762342.62122 1.29 22.0 5.1  5.1                             3
20011 4 845 35.082356.17121 2.61   7.5 5.0  5.0                             3
20011124 546 23.992523.3812217.48274.3 5.5  5.5                             3
20011216 1 4 55.972430.9212222.97 68.7 5.1  5.1                             3
20011218 4 3    .752352.0212239.12 12.0 6.7  6.7                             3
2002 1 817 0 39.252422.7312054.02    .9 5.0  5.0                             3
2002 1141634 16.592429.6312223.22 38.8 5.0  5.0                             3
2002 212 327 25.002344.4412143.36 30.0 6.2  6.2                             3
2002 331 652 49.9524 8.3912211.49 13.8 6.8  6.8                             3
2002 420 848    .022249.5512137.82 19.9 5.1  5.1                             3
2002 4281323 46.1524 8.0712252.38   9.2 5.5  5.5                             3
2002 510 417 12.922220.3912121.88 23.2 5.3  5.3                             3
2002 515 346   5.912439.0612152.31   8.5 6.2  6.2                             3
2002 5281645 14.972354.7812223.81 15.2 6.2  6.2                             3
2002 530 653 40.152452.3912156.97 87.0 5.6  5.6                             3
2002 6132040 27.832446.51122 7.95   8.1 5.0  5.0                             3
2002 614 722 23.292330.4012139.19 27.8 5.1  5.1                             3
2002 711 736 22.572356.1212224.88 14.2 5.8  5.8                             3
2002 7171914 41.902319.55122 8.94 22.0 5.1  5.1                             3
2002 718 452 31.522154.26120 4.93 42.3 5.1  5.1                             3
```

```
 origin time      lat.   lon.   dep.  ML   ML ML MH MD MG mb Ms Ms Mu Mda MF  Ref.
2002 8261532 10.5224 9.5312230.41 35.0 5.2  5.2                             3
2002 82817 5 34.062215.6512122.32 12.0 6.0  6.0                             3
2002 82920 5 53.002448.2212148.50 82.9 5.2  5.2                             3
2002 9 1 556 21.042355.4912225.80   8.8 5.5  5.5                             3
2002 9 1 7 7 35.472358.1212222.42 15.6 5.5  5.5                             3
2002 9 611 2   1.992353.3812043.72 28.8 5.3  5.3                             3
2002 9 72259 32.852426.8612141.32 41.4 5.3  5.3                             3
2002 910 838 14.942452.04122   .67103.5 5.4  5.4                             3
2002 915 1 6 53.422355.1912231.86 11.0 5.2  5.2                             3
2002 916 0 3 30.7425 6.0912223.25175.7 6.8  6.8                             3
2002 9172026 11.762427.2412258.02 66.9 5.0  5.0                             3
2002 9242243 22.892240.14121 4.54   9.7 5.2  5.2                             3
2002 930 835 13.532319.6812036.85   8.1 5.0  5.0                             3
200211110 0 7   4.982453.3612150.56110.3 5.4  5.4                             3
200211261529 42.792344.0212231.13   7.6 5.0  5.0                             3
200212 7 345 12.002125.2912155.79 18.4 5.0  5.0                             3
200212221 6 9 14.472132.0612122.05 12.3 5.0  5.0                             3
200212225 7 1 30.142427.8712149.68 55.8 5.2  5.2                             3
2003 4 219 8 42.272356.2912224.07 17.8 5.0  5.0                             3
2003 515 117 42.4225 3.5112231.19 17.6 5.2  5.2                             3
2003 6 9 152 50.572422.22122 1.40 23.2 5.7  5.7                             3
2003 610 840 32.052330.2212141.95 32.3 6.5  6.5                             3
2003 7 41148   2.842150.9112120.00 70.2 5.2  5.2                             3
2003 718 241 20.262435.1012150.21 74.4 5.1  5.1                             3
2003 725 310 30.512441.6712225.47 98.7 5.3  5.3                             3
2003 7301836 31.292355.4412227.78 12.3 5.2  5.2                             3
2003 8 31135 23.872412.7512139.12 57.7 5.3  5.3                             3
2003 8 41053 24.452158.3912026.76 43.7 5.2  5.2                             3
2003 8 61223   8.462358.5812134.49 10.3 5.1  5.1                             3
2003 8111630 13.812435.5512133.57 58.5 5.4  5.4                             3
2003 9102255   6.062242.5412123.96 85.4 5.8  5.8                             3
200310101251   9.9724   .4012233.31 37.6 5.1  5.1                             3
200311 61358 44.4223 7.4512027.05 17.6 5.0  5.0                             3
20031112 0 2 35.912427.2012157.18 21.3 5.4  5.4                             3
200312 6 634 57.7423 4.4912121.64 37.8 5.1  5.1                             3
20031210 438 13.5223 4.0012123.89 17.7 6.4  6.4                             3
200312291341 50.752435.7512157.86 68.2 5.2  5.2                             3
2004 1 1 315 18.142320.1312142.71 24.9 5.3  5.3                             3
2004 1281913 24.692259.5212057.14   6.7 5.2  5.2                             3
2004 1281934 49.7923   .3412055.52   2.5 5.0  5.0                             3
2004 2 4 323 59.422322.84122 8.98 17.4 5.6  5.6                             3
2004 313 5 3 51.842259.0412124.75 35.3 5.0  5.0                             3
2004 5 1 756 11.0924 4.5512131.69 21.5 5.3  5.3                             3
2004 5 8 8 2 46.972155.5512138.35   6.6 5.6  5.6                             3
2004 5 920 6 47.572434.1512145.98 69.2 5.5  5.5                             3
2004 515 5 7 50.472451.6012154.01 91.6 5.1  5.1                             3
2004 516 6 4   8.7023 3.0512158.77 12.9 5.7  5.7                             3
2004 519 7 4 12.942242.8112122.19 27.1 6.0  6.0                             3
2004 6 21656 29.752338.2412117.38 14.6 5.2  5.2                             3
2004 6 6 0 9   8.242231.8112058.34   7.5 5.0  5.0                             3
2004 7 6 732   2.772453.8312215.94   6.0 5.2  5.2                             3
2004 8 81312 26.162440.2112148.90 81.2 5.0  5.0                             3
2004 918 252 35.652426.3412253.62 32.8 5.1  5.1                             3
20041015 4 8 50.182427.7412251.10 91.0 7.1  7.1                             3
20041027 349 44.522116.2612155.36170.8 5.2  5.2                             3
200411 81554 55.862347.6912245.62 10.0 6.6  6.6                             3
20041111 216 44.502418.70122 9.48 27.3 6.1  6.1                             3
20041216 010    .312357.1712224.56   8.6 5.1  5.1                             3
```

參考資料說明

1 : Taipei Meteorological Observatory(1936) 1900-1935.7. MF
1 : Taiwan Meteorological Observatory(1942) 1935-1941 MF MF>=2
1 : Taiwan Weather Bureau(1952) 1951 MF
1 : Lu(1960) 1959 MF
1 : Hsu and Lu(1969) 1964 MF
1 : Lu et al.(1976) 1972 MF
2 : Hsu,M.T.(1961,1971,1980,1989) 1900-1935 MH
3 : TWB, CWB, CWBSN 1954-1997 MR,MD,ML
4 : TTSN, Lee and Yang(1973) 1972/12-1992 MD
5 : Cheng and Yeh(1989) 1604-1988 ML(Y)
6 : Wang and Kuo(1995) 1900-1994 Ms >= 7.0
7 : Cheng et al.(1997) 1904-1945 MR
8 : Cheng(1995), Cheng et al.(1996, 1997, 1998)
9 : Chang and Yeh(1981), Huang and Yeh(1992), Jam(1985), Tsai et al.(1983)
A : Abe and Kanamori(1979),Abe(1981,1984)
  Abe and Noguchi(1983a,b) 1897-1980 Ms mb
B : Bath and Duda(1979) 1897-1977
C : Shei and Tsai(1986,1987) 1900-1988 Ms
D : Duda(1992)
G : Gutenberg and Richter(1954)
O : Omori(1906,1907,1908) 1896-1906
L : Lee et al.(1978) 1900-1976 Ms
N : PDE/NEIC/USGS 1963- Ms mb
R : Robbert and Kanamori(1977) 1904-1952 Ms mb
U : Utsu(1979,1982) 1885-1980 Mu

ML(s)=0.988MH-0.129
ML(s)=1.187*ML(y)-1.592
MF ----- 1 : local earthquake
  2 : earthquake of limited felt area
  3 : moderate earthquake
  4 : remarkable earthquake

四、結論與建議

1. 台灣地區地震規模紀錄轉換為一致的規模尺度(近震規模；M_L)，各時期地震資料所採用不同地震規模之近震規模轉換公式已建立完成，並以一致的規模尺度(近震規模；M_L)建置1900年至2004年台灣地區地震規模紀錄。
2. 應用S-P時間差採用蒙第卡羅數位逆推法推求震源參數，完成1959年恆春地震及其餘震共87個地震的重定位與地震規模重新評估工作。
3. 已完成台灣地區地震餘震紀錄的識別工作，並將結果建置於地理資訊系統資料庫。
4. 台灣地區地震頻繁，地震資料相當豐富，整理地震資料是一項需要長期持續性且繁重的工作，由於地震對於核能安全有不可忽視的影響，此現象可從 1999 年 921 集集地震驗證，故建議將地震資料庫建置工作列入一長期性工作，隨時更新地震資料庫，以做為核能安全評估的基本資料。

參考文獻

林啟文、張徽正、盧詩丁、石同生、黃文正，2000，台灣活動斷層概論第二版－五十萬分之一台灣活動斷層分布圖說明書，中央地質調查所特刊，第 13 號，122 頁。

呂新民，1960，恆春地方烈震調查報告，台灣省氣象所，65 頁

徐明同，1983，明清時代破壞性大地震規模及震度之評估，氣象學報，第 21 卷，第 2 期，33-40。

鄭世楠和葉永田，1989，西元 1604 年至 1988 年台灣地區地震目錄，中央研究院地球科學研究所，IES-R-661，255 頁。

鄭世楠、葉永田、徐明同、辛在勤，1999，台灣十大災害地震圖集，中央氣象局與中央研究院地球科學研究所，290 頁。

鄭世楠和葉永田，2002，1848 年彰化地震與彰化斷層關係的初步研究，港灣報導，第 61 期，38-47。

鄭世楠、張建興、葉永田，2004，1954-1972 年台灣地區地震資料的建置與重定位，兩岸強地動觀測暨地震測報研討會論文集，台北，109-112。

鄭世楠和葉永田，2004，台灣百年來的大地震，科學發展，第 373 期，68-75。

鄭世楠和葉永田，2004，地震災害對台灣社會文化的衝擊，災難與重建－九二一震災與社會文化重建論文集，中央研究院台灣史研究所籌備處，131-162。

葉永田、鄭世楠、辛在勤、何美儀，1995，台灣地區數個地震目錄的地震定位與規模之評估(III)，中央氣象局地震技術報告彙編，第 12 卷，243-264。

Cheng,S.N., Y.T.Yeh and M.S.Yu, 1996. The 1951 Taitung earthquake in Taiwan. J. Geol. Soc. China, 39, 267-285.

Shin,T.C., 1993. The calculation of local magnitude from the simulated Wood-Anderson seismograms of the short-period seismograms in the Taiwan area. TAO, 4, 155-170.

Well,D.L. and K.J.Coppersmith, 1994. New empirical relationships among magnitude, rupture length, rupture width, rupture area, and surface displacement. Bull. Seism. Soc. Am., 84(4), 974-1002.