University of Nevada

Reno

Geophysical Investigations of the Northern Sierra Nevada-Basin and Range Boundary, West-Central Nevada and East-Central California

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Geophysics

by

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ABSTRACT

The seismicity, heat flow, and crustal thickness of the Sierra Nevada-Basin and Range transition were examined in the Reno-Carson City-Lake Tahoe region. From seismic reflection and refraction data the crustal structure exhibits crustal thinning from the Sierra Nevada (40 km) to the Basin and Range (29 to 33 km). Heat flow values in the Tahoe Basin are transitional between the high values of the Basin and Range province and the low values of the Sierra Nevada. The seismicity of the area for the years 1980-1987 was examined. The main result from the seismicity study is that the hypocentral depths shallow from the Sierra Nevada into the Basin and Range which is consistent with the changes in heat flow and crustal thickness. A significant transitional zone, 20 to 30 km wide exists in the crustal properties between these two provinces.

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To my parents, thanks for your patience, understanding and support. Happy belated birthday present Dad. To my husband, Craig dePolo, I couldn't have put this thesis on the shelf without you. You're my best friend, thanks for helping me believe in myself. Love ya!

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INTRODUCTION

The Reno-Carson City-Lake Tahoe region lies within the transition between the Sierra Nevada-Basin and Range provinces. Lateral variations in crustal thickness, extensive normal block faulting and an active earthquake belt define this extensional region. This discussion will address the crustal structure and seismicity of the Sierra Nevada-Basin and Range transition and includes a synthesis of the seismic reflection and refraction, heat flow and earthquake data. The focus of the study is the seismicity in the western Basin and Range and the northern Sierra Nevada provinces of western Nevada and eastern California. Within the study area, seismicity occurs across the boundary between the crustally distinct Basin and Range and the Sierra Nevada provinces. Many damaging earthquakes have occurred in the Reno-Carson City-Lake Tahoe area including two shocks in 1914 which damaged buildings in Reno, Virginia City and Fernley, the 1948 Verdi earthquake and the 1966 Truckee event which was centered near Boca, California and toppled chimneys in Boca, Sierraville, and Loyalton, California. Consequently, there is a high probability of having another moderate to strong earthquake in this fast-growing urban region. An average of 136 events per year were located in the study area from 1980-1987. Of these, an average of five events per year were reported as felt. Seismicity can be used to identify faults and fault zones as active, delineate undiscovered faults, and estimate the base of the seismogenic zone by examining the depth of the seismicity.

The University of Nevada-Reno Seismological Laboratory (UNRSL) has operated a seismic stations in the Reno-Carson City-Tahoe area since 1964. In 1973, stations were installed in the Truckee area to investigate possible reservoir-induced earthquakes (VanWormer and Ryall, 1980). The network gradually expanded and by 1987 included 16 stations within the study area. Many of the events located by the UNRSL network in the study area are near the edge of the network resulting in poor azimuthal coverage, location errors and poorly constrained focal mechanisms. In order to minimize these problems, arrival times from three additional arrays were combined and used in the earthquake location routine. The networks included the UNRSL, on the eastern side of Sierran crest, the U.S. Geological Survey (USGS), the University of California-Berkeley (UCB) and the California Department of Water Resources (CDWR) west of the Sierran crest. The combined phase data have been used to locate the events within the study area. The spatial and temporal distribution of the seismicity is discussed by sub-area in the Result section.

Location

The study area is a 1½° x 2° region in western Nevada and northeastern California between 38°45' and 40°25' N. latitude and 119°00' and 121°00' W. longitude (fig. 1). Several communities lie within the study area, including Reno, Carson City, Sparks, Fernley, Verdi and Yerington, Nevada and Truckee, Portola, Quincy, Sierraville, Vinton and Doyle California. Lake Tahoe and Pyramid Lake, two major lakes within the study area, are located in the south-central and northeastern part of the study area, respectively. Several of the valleys and mountain ranges in area are labeled in Figure 1.

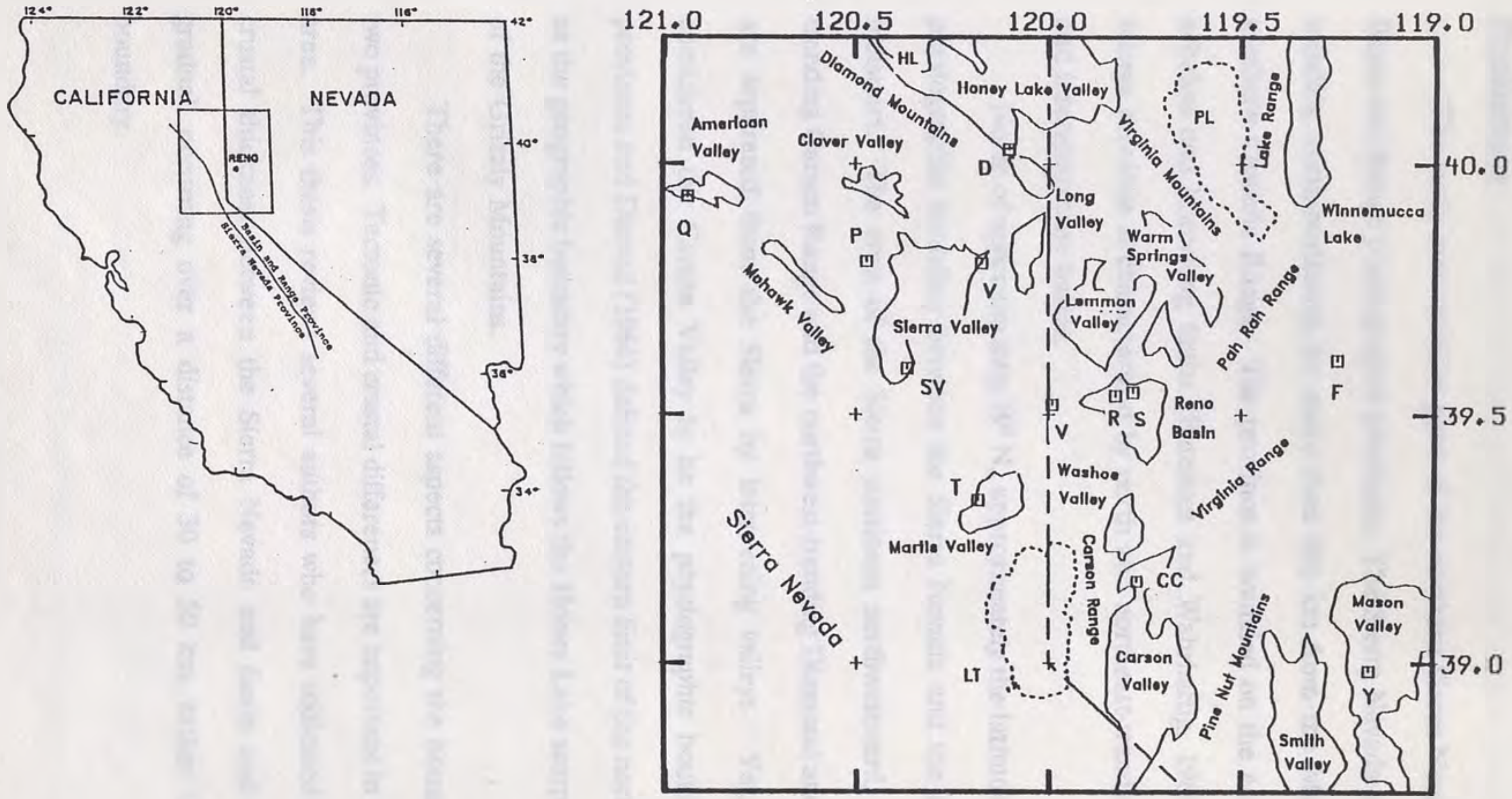

Figure 1. Generalized physiographic map of the study area. Cities are indicated by the open squares in Nevada R, Reno; S, Sparks; F, Fernley; CC, Carson City; Y, Yerington; V, Verdi; in California T, Truckee; SV, Sierraville; P, Portola; V, Vinton; D, Doyle; Q, Quincy. Dashed lines indicate the lakes in the study area, LT, Lake Tahoe; PL, Pyramid Lake; HL, Honey Lake.

Physiography

The study area includes parts of the northern Sierra Nevada and the western Basin and Range physiographic provinces. The Sierra Nevada is a west-tilted block trending north-northwest for more than 600 km from the Mojave Desert to the southern Cascade Range. The province is bounded on the east by a series of en echelon and branching faults (Bateman and Wahrhaftig, 1966). The Basin and Range province is characterized by north and northeast-trending mountain ranges and intermountane basins.

North of approximately 39° N., approximately the latitude of Carson City, the physiographic boundary between the Sierra Nevada and the Basin and Range is indistinct. The crest of the Sierra continues northwestward, whereas the north-trending Carson Range and the northwest-trending Diamond and Grizzly Mountains are separated from the Sierra by intervening valleys. Yet, Fenneman (1931) considered the Carson Valley to be the physiographic boundary between these provinces and Durrell (1966) defined the eastern limit of the northern Sierra Nevada as the geographic boundary which follows the Honey Lake scarp on the eastern side of the Grizzly Mountains.

There are several different aspects concerning the boundary between these two provinces. Tectonic and crustal differences are important in the seismicity of the area. This thesis reviews several authors who have indicated that the change in crustal thickness between the Sierra Nevada and Basin and Range province is gradual, occurring over a distance of 30 to 50 km, rather than being a sharp boundary.

The change between Basin and Range style tectonism and the Sierra Nevada block is, however, much more distinct (Fig. 4). The Lake Tahoe basin and several valleys including Martis, Sierra, Grizzly and Mohawk separate the Carson Range, Grizzly and Diamond Mountains from the Sierra and represent of Basin and Range structure (Birkeland, 1963; Durrell, 1966).

GEOLOGY AND STRUCTURE

Sierra Nevada

The rocks of the Sierra Nevada range in age from the lower Paleozoic through Holocene and record the history of several of the major orogenic events in this part of the western Cordillera.

Turner (1894,1896,1897) and Lindgren (1896,1897) originally studied the rocks and sediments in the northern Sierra and divided them into two groups. The older group (pre-Cenozoic) includes Paleozoic metasedimentary, metavolcanic and plutonic rocks, Mesozoic metasedimentary and metavolcanic rocks and widespread granitic rocks of the upper Mesozoic (dominantly Cretaceous) Sierra Nevada batholith. The second, younger group, consists primarily of Tertiary volcanic and volcanoclastic rocks and stream deposits, overlain in places by Quaternary basalts, alluvium, lacustrine and glacial deposits. Numerous unconformities exist between and within the two groups and all but the upper-Quaternary deposits are deformed to some degree.

Basin and Range Province

Pre-Cenozoic basement rocks are exposed over a relatively small percentage of the Basin and Range province within the study area. The Basin and Range province contains basement rocks similar to the Sierra Nevada that have been extended and covered with thick volcanic and sedimentary deposits during the Cenozoic. The volcanic history is generally similar to the Sierra Nevada, although the volcanic deposits of the Basin and Range are commonly much thicker. Thick piles of Oligocene and Miocene rhyolitic ash flow units make up entire mountain ranges in the western part of the province, such as the Pah Rah Range. Tertiary basin sediments attest to Tertiary extension and in the study area include the Truckee and Coal Valley Formations. Miocene andesitic units, such as the Kate Peak Formation, once covered the landscape in the Mount Rose and Virginia City areas and have since been broken up by tectonism which enhanced Washoe Valley and the Reno basin (the Truckee Meadows).

Pleistocene basaltic volcanic activity has occurred in the Virginia City area, Steamboat Hills, and near Truckee. A history of Late Cenozoic extension is indicated by Late Tertiary and Quternary alluvium that fill the intervening basins within the study area.

Faults

Major differences exist between the pattern of active faults in the Sierra Nevada and the Basin and Range provinces. The actively extending Basin and Range province has a relatively high density of faults that have moved during the Late Cenozoic. Many of the larger, range-bounding faults have undergone Holocene movement as well. The Sierra Nevada province, in contrast, has undergone relatively little Cenozoic disruption, with only scattered active faults. Most of the recent activity throughout the study area tends to reactivate pre-existing faults or structural weaknesses.

Figure 2a and 2b area fault maps of the study area. Major and selected faults, that exhibit Late Cenozoic activity and faults which represent the local structural

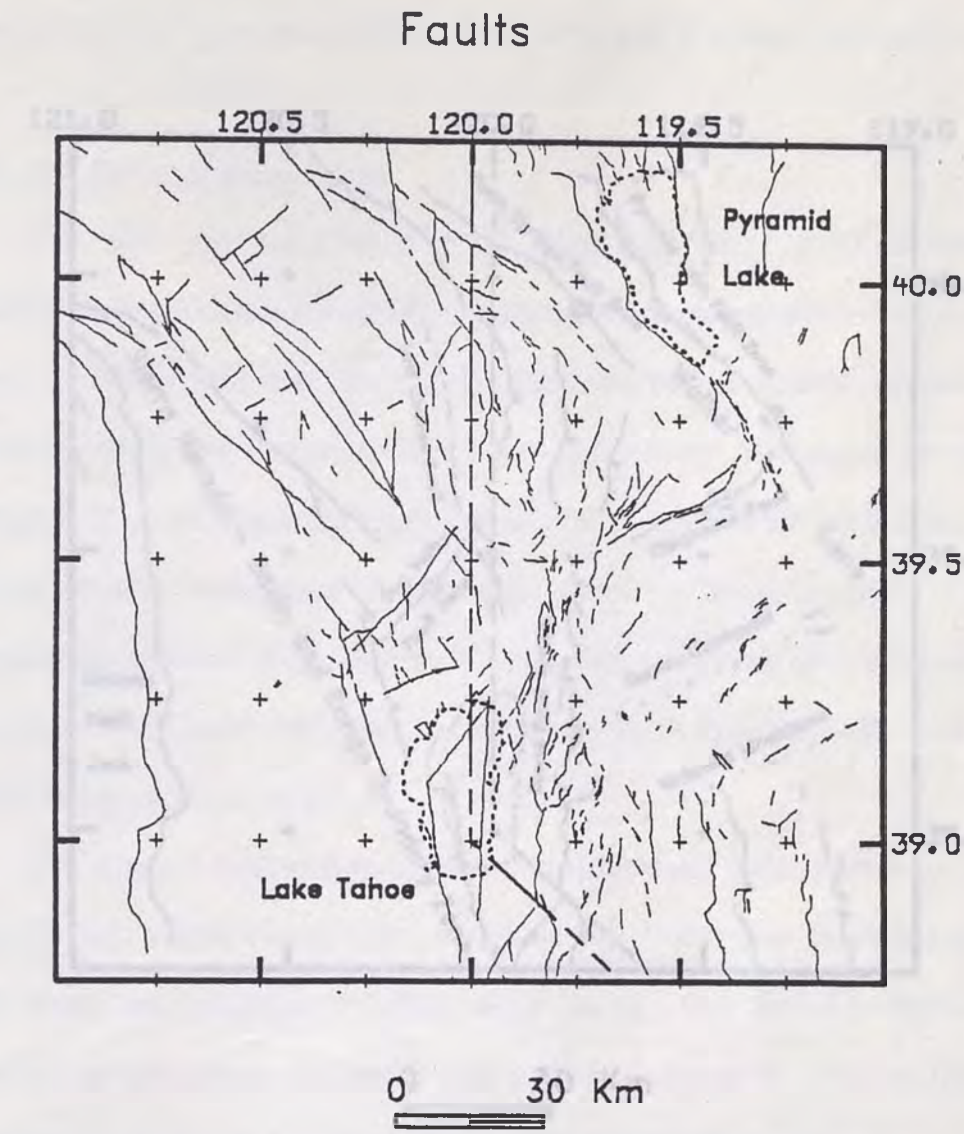

Figure 2a. Major and selected faults compiled from Bell (1984), Dohrenwend (1982), Hawkins and others (1986) and Jennings (1975).

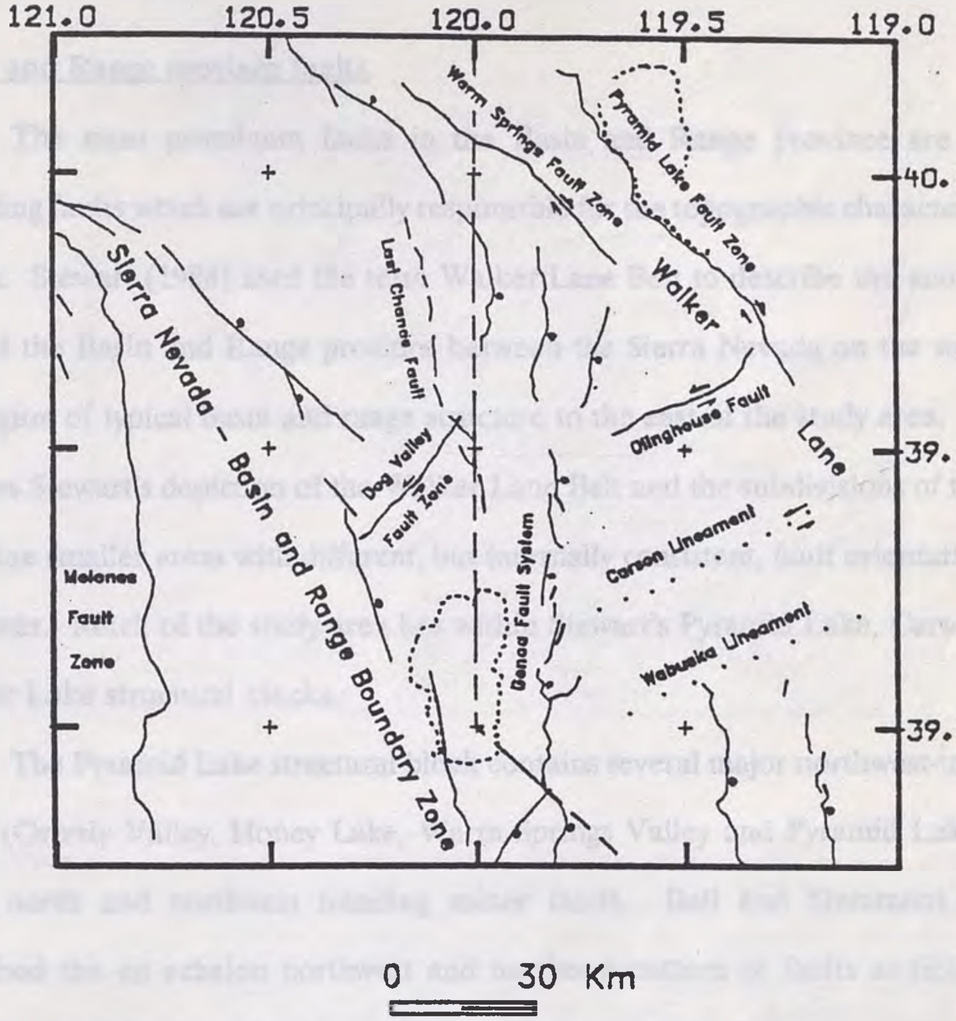

Figure 2b. Shows the Sierra Nevada-Basin and Range boundary zone, major faults and lineaments. Arrows indicate relative movement on strike-slip faults and balls indicate down-thrown blocks of normal faults.

grain are shown on the maps. Figure 2a is a compilation of faults presented by Jennings (1975), Dohrenwend (1982), Bell (1984) and Hawkins and others (1986).

Basin and Range province faults

The most prominent faults in the Basin and Range province are range-bounding faults which are principally responsible for the topographic character of the region. Stewart (1988) used the term Walker Lane Belt to describe the anomalous part of the Basin and Range province between the Sierra Nevada on the west and the region of typical basin and range structure to the east of the study area. Figure 3 shows Stewart's depiction of the Walker Lane Belt and the subdivisions of the belt into nine smaller areas with different, but internally consistent, fault orientation and character. Much of the study area lies within Stewart's Pyramid Lake, Carson, and Walker Lake structural blocks.

The Pyramid Lake structural block contains several major northwest-trending faults (Grizzly Valley, Honey Lake, Warm Springs Valley and Pyramid Lake) and many north and northwest trending minor faults. Bell and Slemmons (1979) described the en echelon northwest and northeast pattern of faults as riedel and conjugate riedel shears developed during right-lateral movement.

The Carson structural block is characterized by northeast-trending faults and lineaments with components of left-lateral displacement. The Carson section includes the Olinghouse fault zone (bounding the northern edge of the block), the Carson Lineament, and the Wabuska Lineament (bounding the southern edge of the block). The northeast trending Wabuska Lineament interrupts the north-northwest-trending faults approaching from the south (Stewart, 1988).

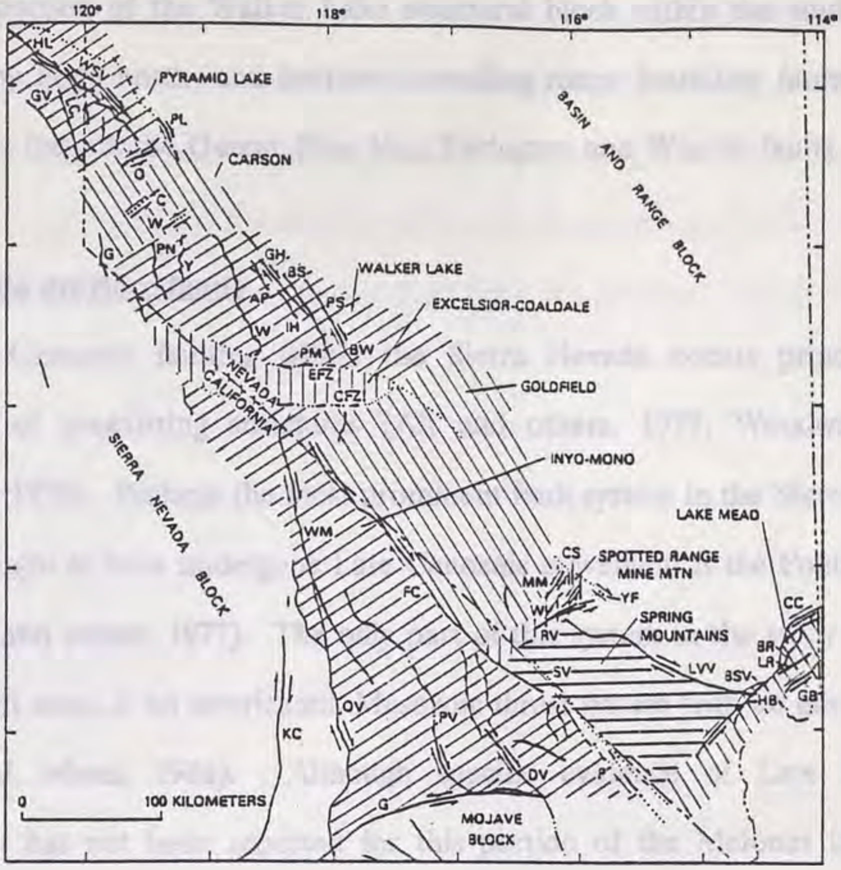

Figure 3. From Stewart (1988), regional structural blocks and major faults in Walker Lane belt. Arrows indicate relative movement on strike-slip faults. Major faults or fault zones listed by structural blocks: PYRAMID LAKE BLOCK: HL, Honey Lake; GV Grizzly Valley; LC, Last Chance; WSV, Warm Springs Valley; PL, Pyramid Lake. CARSON BLOCK: O, Olinghouse; C, Carson; W, Wabuska. WALKER LAKE BLOCK: G, Genoa, PN, Pine Nut; Y, Yerington; W, Wassuk; AP, Agai Pah Hills; GH, Gumdrop Hills; IH, Indian Head; BS, Benton Springs; PS, Petrifield Springs; PM, Pilot Mountains; BW, Bette Wells. EXCELSIOR-COALDALE BLOCK: EFZ, Excelsior; CFZ, Coaldale. INYO-MONO BLOCK: KC, Kern Canyon; I, Independence; WM, White Mountain; OV, Owens Valley; FC, Furnace Creek; PV, Panamint Valley; DV, Death Valley; G, Garlock; SV, Stewart Valley; P, Pahrump. SPOTTED RANGE-MINE MOUNTAIN BLOCK: MM, Mine Mountain; W, Wahmonie; RV, Rock Valley; CS, Cane Springs; YF, Yucca-Frenchman. SPRING MOUNTAINS BLOCK: LVV, Las Vegas Valley. LAKE MEAD BLOCK: BSV, Bitter Spring Valley; HB, Hamblin Bay; CC, Cabin Canyon; BR, Bitter Ridge; LR, Lime Ridge; GB, Gold Butte.

The portion of the Walker Lake structural block within the study area is dominated by large north- and northwest-trending range bounding faults. These normal faults include the Genoa, Pine Nut, Yerington and Wassuk faults.

Sierra Nevada province faults

Late Cenozoic faulting within the Sierra Nevada occurs principally as reactivation of preexisting structures (Alt and others, 1977; Woodward-Clyde Consultants, 1978). Perhaps the most prominent fault system in the Sierra Nevada which is thought to have undergone Late Cenozoic movement is the Foothills fault system (Alt and others, 1977). The only part of this system in the study area, the Melones fault zone, is an imbricated, Mesozoic thrust system with an eastward dip (Nelson and others, 1986). Although specific evidence of Late Cenozoic displacement has not been reported for this portion of the Melones fault, it is considered, by association with the rest of the system, to have undergone Late Cenozoic displacement. The Melones fault is a major structural feature in the northern Sierra Nevada province capable of reactivation (Nelson and others, 1976).

Other faults in the northern Sierra Nevada province exhibit Quaternary activity (e.g., Dogwood Peak and Bottle Brush faults) and may represent the active break up of the northern Sierra Nevada (Woodward-Clyde, 1978).

Sierra Nevada - Basin and Range Boundary System

The Sierra Nevada - Basin and Range boundary system (SNBRS) is the series of faults occurring along, or in proximity to, the boundary between the two provinces. Although the eastern edge of the Sierra Nevada province is somewhat ragged, and made up of en-echelon or parallel faults, the tectonic contrast across these features is rather abrupt. The Sierra Nevada block is relatively intact, whereas to the east of this boundary zone the crust has been extended. The principal faults comprising the SNBRS in the study area are the southern Genoa fault system, the Waterhouse Peak fault, the West Tahoe fault, the Donner Pass fault, the Mohawk Valley fault zone (fig. 4).

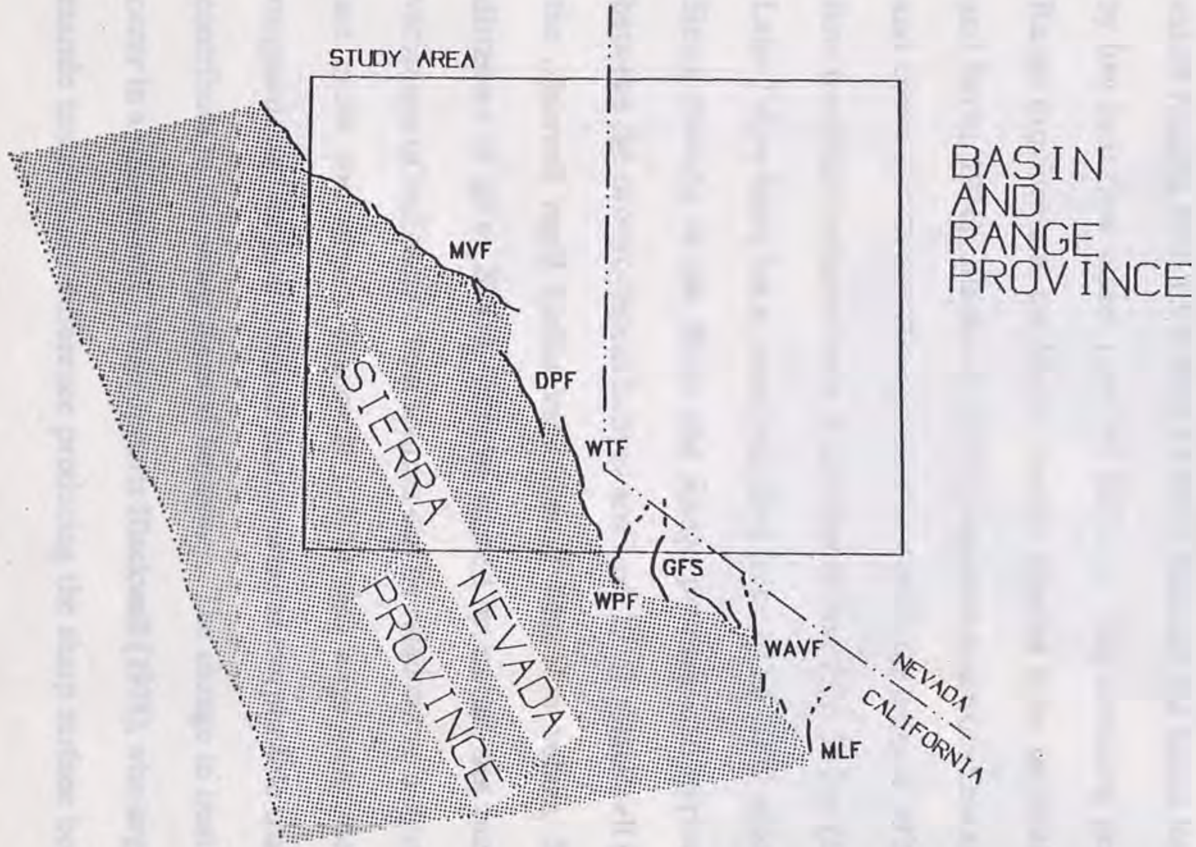

Figure 4. Sierra Nevada - Basin and Range Provincial Boundary. The Sierra Nevada province is stippled. The faults comprising the SNBRBZ are MVF, Mohawk Valley fault; DPF, Donner Pass fault; WTF, West Tahoe fault; WPF, Waterhouse Peak fault; GFS, Genoa fault system; WAVF, West Antelope Valley fault; MLF, Mono Lake fault.

GEOPHYSICAL CHARACTERISTICS

The Sierra Nevada and Basin and Range provinces can also be distinguished by geophysical characteristics including heat flow, crustal thickness, and P_n velocity.

Heat Flow

The Basin and Range province is a region of high heat flow (> 1.5 HFU) with values ranging from 1.5 to over 3.0 HFU whereas, the Sierra Nevada is characterized by low heat flow values (ave. 0.4 H.F.U.). The transition between the Basin and Range province and the Sierra Nevada appears to be relatively abrupt (Thompson and Burke, 1974). Blackwell (1978) presented data from Sass and others (1971), Roy and others (1972) and Henyey and Lee (1976) for latitude 39°N and found the heat flow transition occurred over a distance of less than 50 km (figs. 5a and 5b). The Lake Tahoe basin has a mean heat flow value of 1.6 HFU which is not typical of the Sierra Nevada or the Basin and Range province and appears to be transitional between the two provinces (Henyey and Lee, 1976). Blackwell (1978) concluded that the observed rapid spatial variations of heat flow values, 50% to 100% across distances of 10 to 20 km, must be caused by crustal, not mantle effects. Lateral variations of radioactive heat sources can be ruled out as a cause because the effects are much too large. Blackwell (1978) lists large-scale thermal refraction and magmatic and/or hydrothermal heat sources as two possible crustal effects that might contribute to the sharp thermal boundary. The change in heat flow values does not occur in a smooth way. This supports Blackwell (1978), who argues against an upper-mantle temperature difference producing the sharp surface boundary.

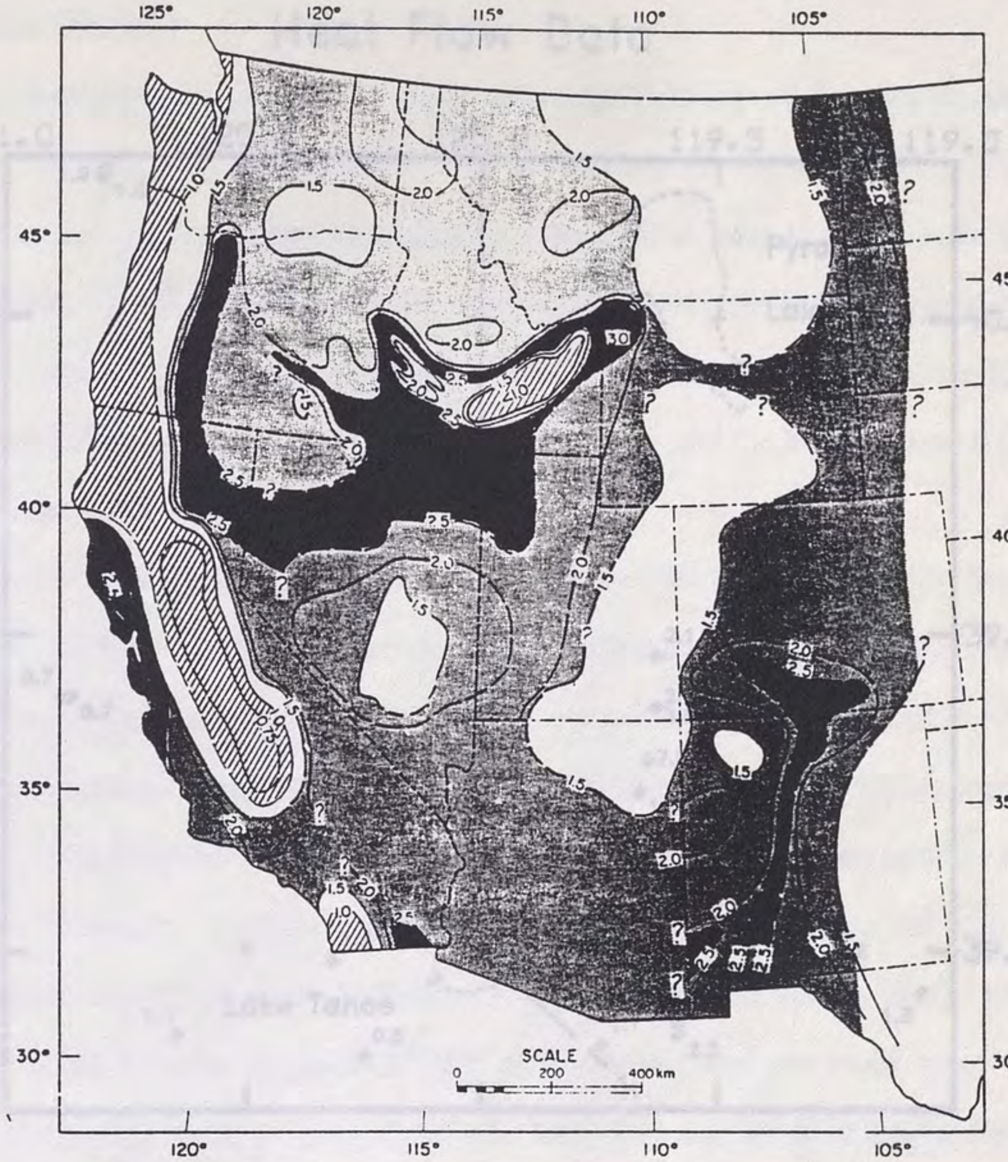

Figure 5a. From Blackwell (1978), revised heat-flow map of the western United States. Contours are in heat-flow units. 1 heat-flow unit (HFU) = 1×10^{-6} cal/(cm^2s) = 41.8 mW/m^2.

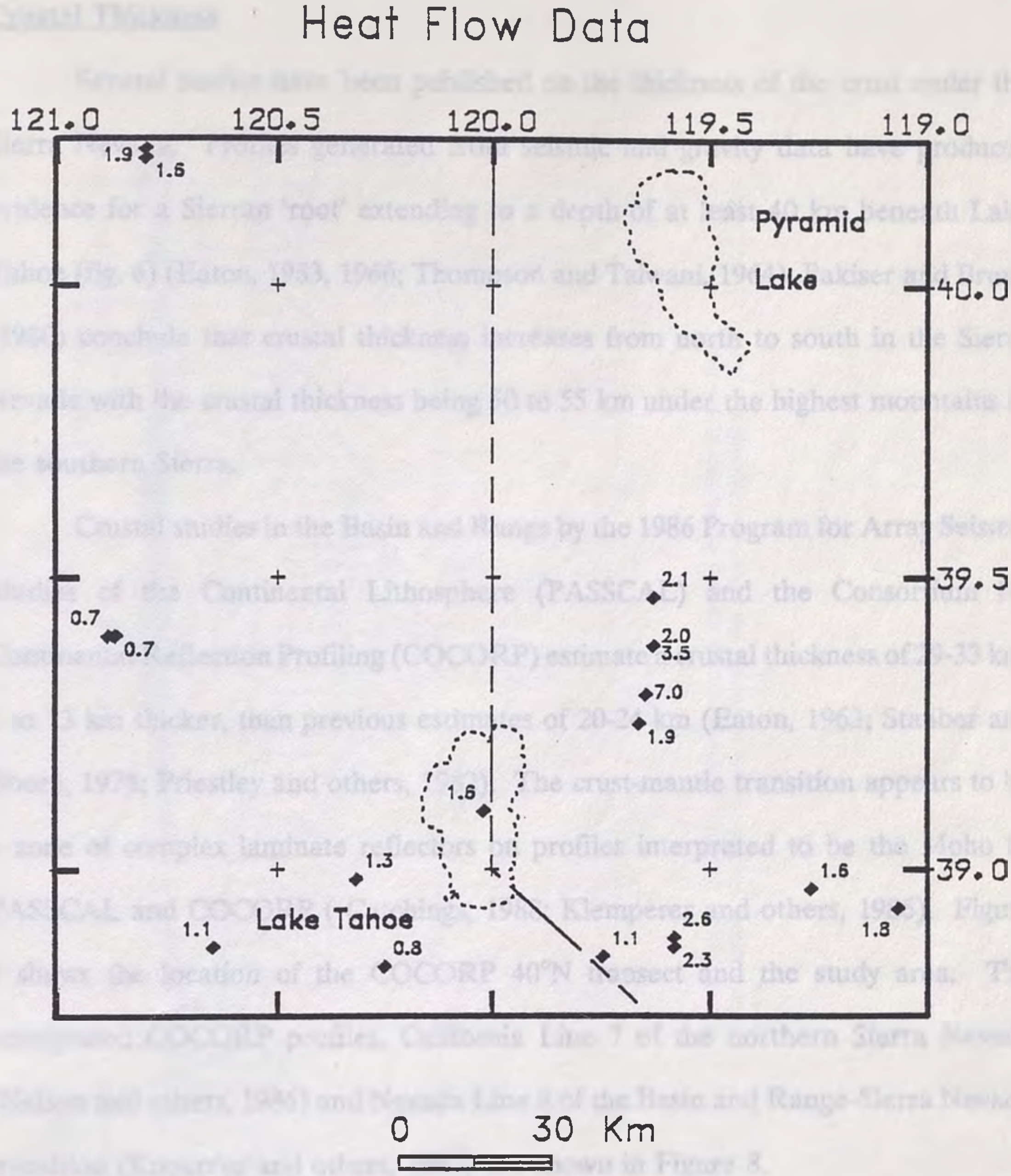

Figure 5b. Regional heat-flow values from Sass and Munroe, (1974) across the Sierra Nevada-Basin and Range transition.

Crustal Thickness

Several studies have been published on the thickness of the crust under the Sierra Nevada. Profiles generated from seismic and gravity data have produced evidence for a Sierran 'root' extending to a depth of at least 40 km beneath Lake Tahoe (fig. 6) (Eaton, 1963, 1966; Thompson and Talwani, 1964). Pakiser and Brune (1980) conclude that crustal thickness increases from north to south in the Sierra Nevada with the crustal thickness being 50 to 55 km under the highest mountains of the southern Sierra.

Crustal studies in the Basin and Range by the 1986 Program for Array Seismic Studies of the Continental Lithosphere (PASSCAL) and the Consortium for Continental Reflection Profiling (COCORP) estimate a crustal thickness of 29-33 km, 5 to 13 km thicker, than previous estimates of 20-24 km (Eaton, 1963; Stauber and Boore, 1978; Priestley and others, 1982). The crust-mantle transition appears to be a zone of complex laminate reflectors on profiles interpreted to be the Moho by PASSCAL and COCORP (Catchings, 1988; Klemperer and others, 1986). Figure 7 shows the location of the COCORP 40°N transect and the study area. The unmigrated COCORP profiles, California Line 7 of the northern Sierra Nevada (Nelson and others, 1986) and Nevada Line 8 of the Basin and Range-Sierra Nevada transition (Knuepfer and others, 1987) are shown in Figure 8.

The COCORP profile through the Sierra (California Line 7) generally has fewer reflections than other COCORP profiles. Nelson and others (1986) described several east-dipping zones of discontinuous reflections circled A,B,C,E in Figure 8. Projecting these features to the surface Nelson and others (1986) found that the reflectors marked E correspond to the Melones fault zone and that the projection of

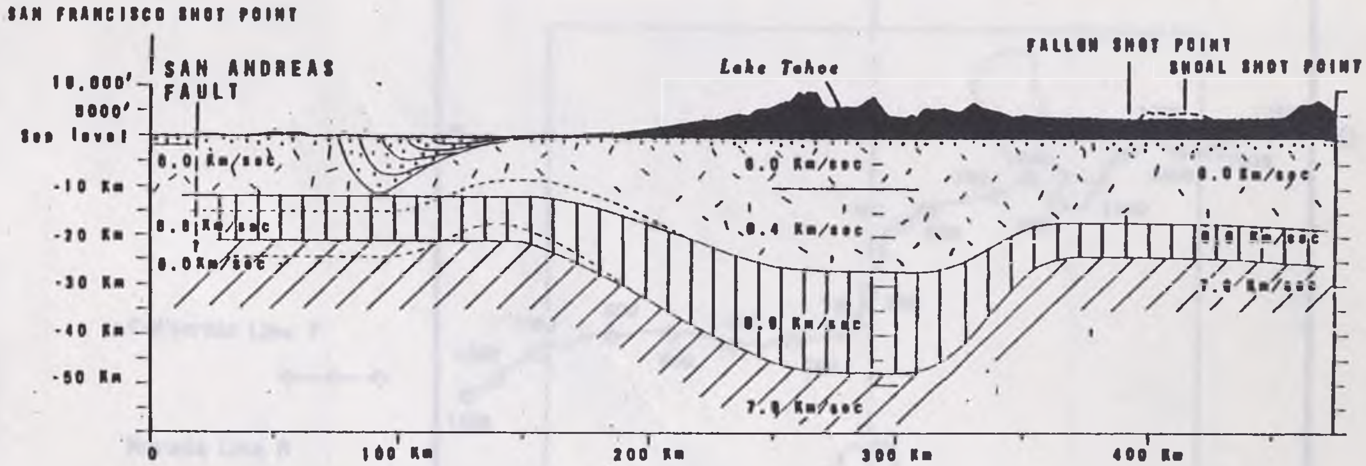

Figure 6. From Eaton (1966), Transverse cross section from San Francisco to Fallon based on seismic-refraction data.

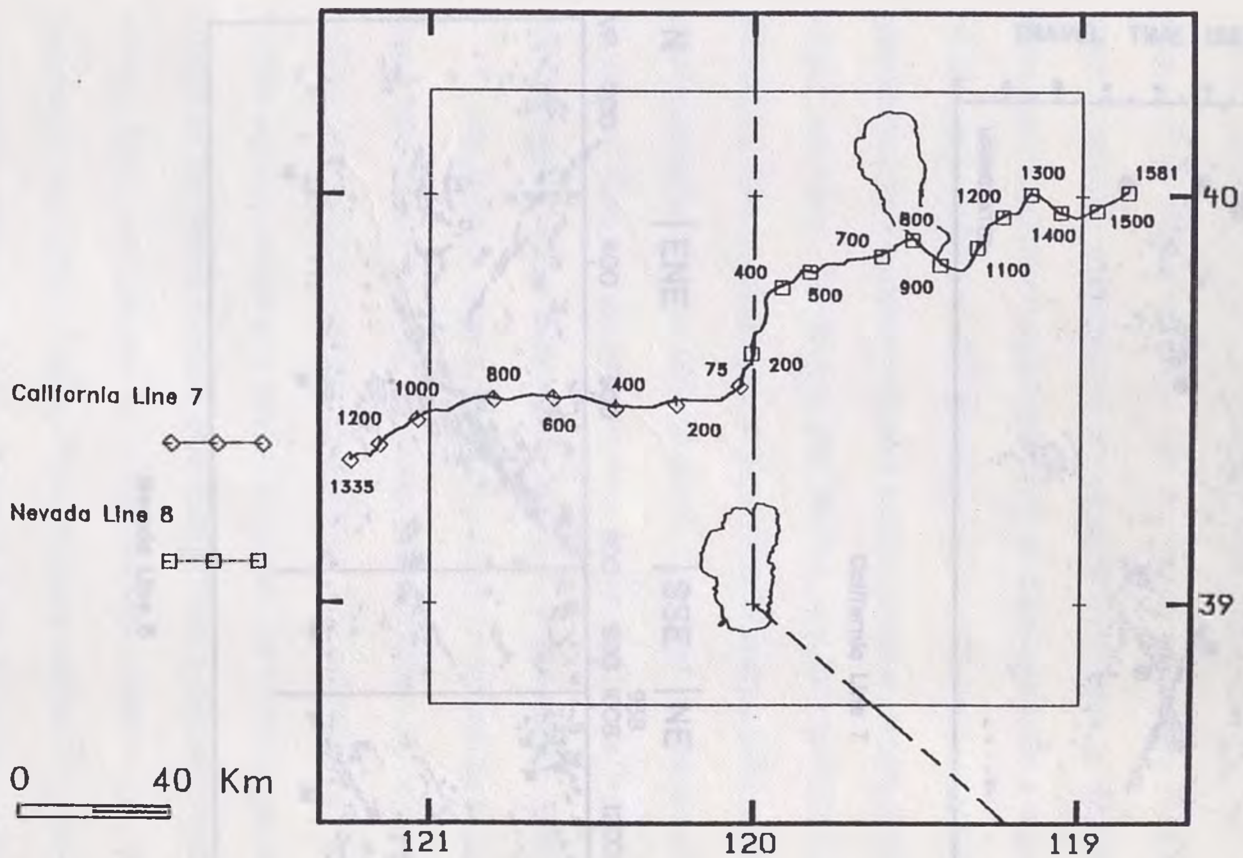

Figure 7. Location of COCORP California Line 7 (Nelson and others, 1986) and Nevada Line 8 (Knuepfer and others, 1987). Numbers represent VP in Figure 8.

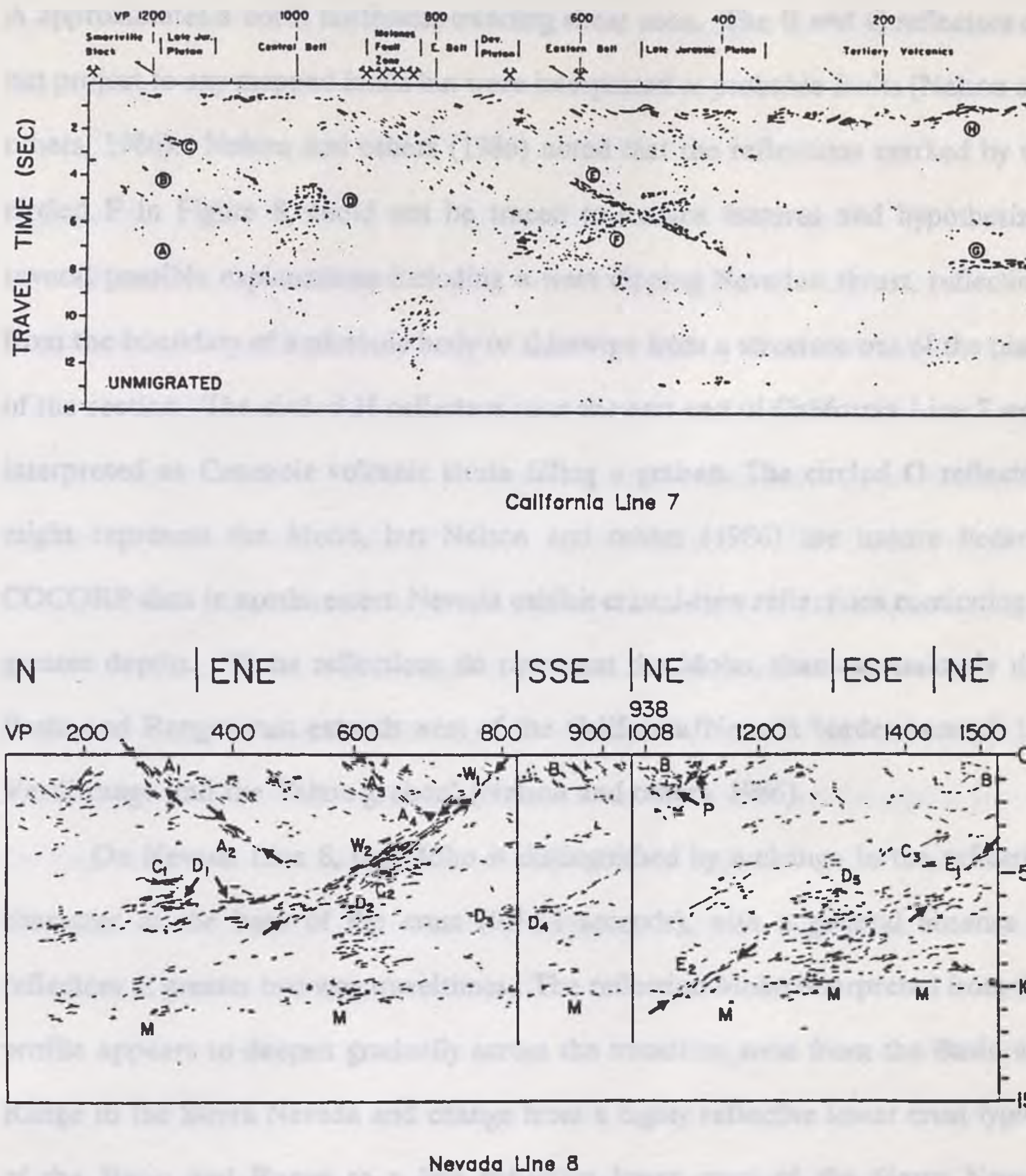

Figure 8. Line drawings from unmigrated data of COCORP California Line 7 (Nelson and others, 1986) and Nevada Line 8 (Knuepfer and others, 1987). Scale is 1:1 assuming an average crustal velocity of 6 km/s. Letters refer to features discussed in text.

A approximates a north northwest-trending shear zone. The B and C reflectors did not project to any mapped faults but were interpreted as probable faults (Nelson and others, 1986). Nelson and others (1986) noted that the reflections marked by the circled F in Figure 8, could not be traced to surface features and hypothesized several possible explanations including a west dipping Nevadan thrust, reflections from the boundary of a plutonic body or sideswipe from a structure out of the plane of the section. The circled H reflectors near the east end of California Line 7 were interpreted as Cenozoic volcanic strata filling a graben. The circled G reflectors might represent the Moho, but Nelson and others (1986) are unsure because COCORP data in northwestern Nevada exhibit crustal-type reflections continuing to greater depths. "If the reflections do represent the Moho, then anomalously thin Basin and Range crust extends west of the California/Nevada border beneath the Verdi range and the Tahoe graben" (Nelson and others, 1986).

On Nevada Line 8, the Moho is distinguished by a change in the reflective character at the base of the crust (9.5-11 seconds), with a general absence of reflectors at greater two-way traveltimes. The reflection Moho interpreted from this profile appears to deepen gradually across the transition zone from the Basin and Range to the Sierra Nevada and change from a highly reflective lower crust typical of the Basin and Range to a less reflective lower crust of the Sierra Nevada (Knuepfer and others, 1987). The reflectors marked W_1 and W_2 project upward to a northern extension of the Pyramid Lake fault (Knuepfer and others, 1987). Reflectors marked C and D in Figure 8 form an irregular upper limit between the moderately to highly reflective middle and lower crust. Knuepfer and others (1987), noted reflection packages beneath valleys. The northeast-dipping reflections, A_1 and

A_2, project to the Cold Spring Valley and the eastern margin of Peterson Mountain respectively.

P_n Velocities

Eaton (1966) estimated that P wave velocities in the upper mantle are somewhat less beneath the Sierra Nevada (7.9 km/sec) than beneath the Coast Ranges in California. P_n velocities measured in the northwestern Basin and Range province are estimated to have a low upper mantle velocity of approximately 7.8 km/sec (normal > 8.0 km/sec) (Priestley and others, 1982). The Sierra Nevada is an exception to the common inverse relationship between P_n velocities and high heat flow that characterize broad sections of the United States, including the Basin and Range province (Blackwell, 1971; Sass and others, 1971; Hill, 1978). Thompson and Talwani (1964) comment, "an anomalous upper mantle may be an essential part of the heat engine driving the tectonic activity of these regions." Heat flow, crustal thickness and P_n velocities are three geophysical ways to distinguish the Sierra Nevada and Basin and Range provinces.

SEISMICITY

Pre-1980 Seismicity

The UNRSL seismic network became sufficiently dense in the Sierra Nevada-Basin and Range transition zone by 1980 to accurately locate microearthquake hypocenters. The seismicity before 1980 will be briefly summarized, but emphasis will be on the post-1980 seismicity.

Appendix A is a compilation of the felt or damaging pre-1980 earthquake data from Townley and Allen (1939), Coffman and von Hake (1973), Slemmons and others (1965), Toppozada and others (1981), Real and others (1978) and UNRSL Bulletins. Intensities are evaluated in terms of the Modified Mercalli Intensity Scale of 1931. Where information was lacking no intensities are given. Historical accounts may be inaccurate, incomplete or subject to error in date or time but most are documented, moderate and large earthquakes. The times and dates listed in Appendix A are given in Greenwich Mean Time (GMT).

Pre-1900 events compiled by Toppozada and others (1981) and events from 1900 to 1974 compiled by Real and others (1978) are plotted in Figure 9. Several damaging earthquakes occurred in the Reno-Virginia City-Carson City-Truckee area prior to 1900. Toppozada and others (1981) compiled and contoured felt reports and located the epicenter in the middle of the highest mapped intensity. Real and others (1978) catalog is compilation of Townley and Allen (1939), Coffman and von Hake (9173) and the University of California-Berkeley network. Several clusters are apparent in Figure 9 including, the 1966 Truckee event and aftershocks and the 1948 Verdi earthquake and aftershocks. Many of the epicenters from the older catalogs,

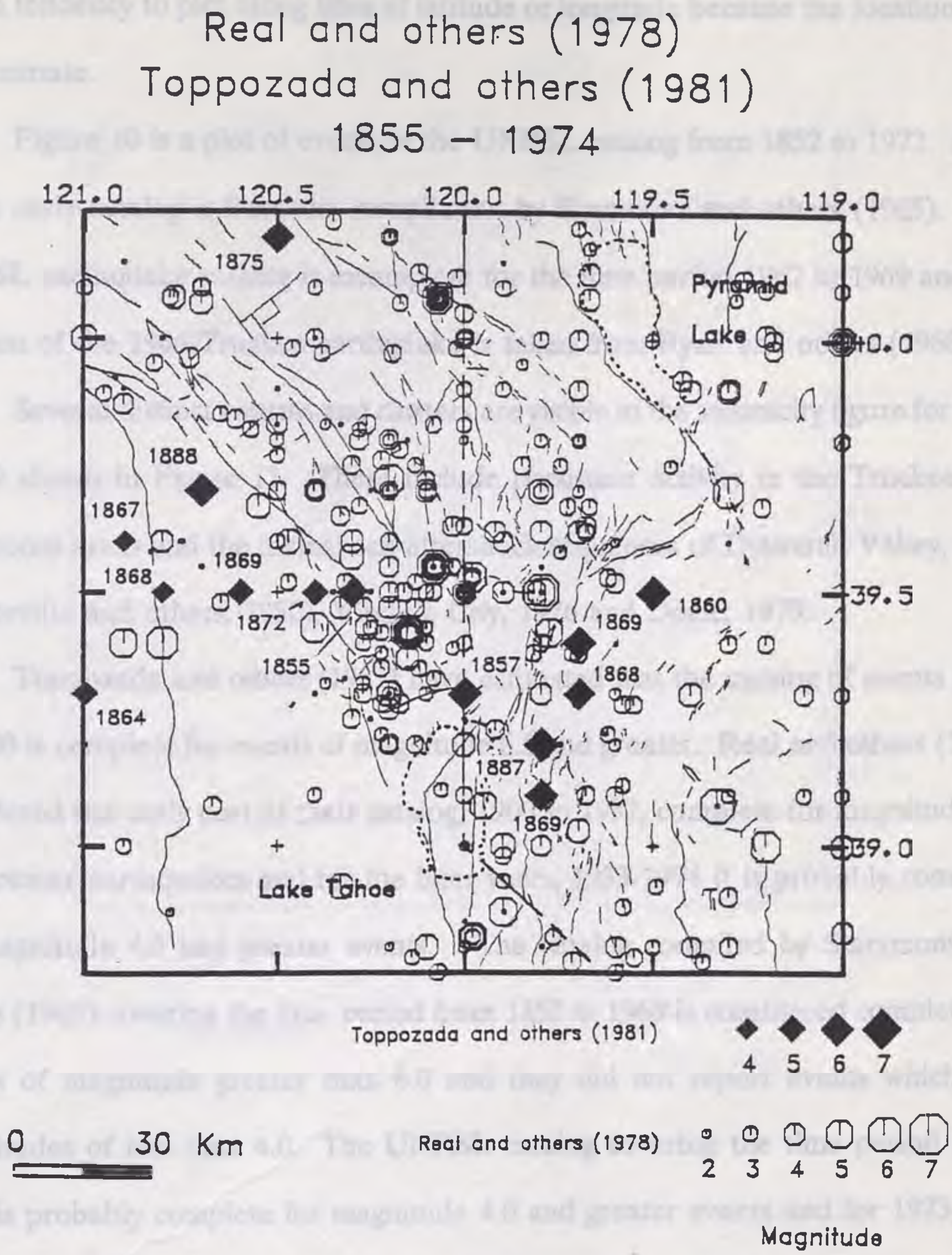

Figure 9. Earthquakes in the study area from Real and others (1978) and Toppozada and others (1981). Filled diamonds and dates are events from Toppozada and others (1981).

have a tendency to plot along lines of latitude or longitude because the locations are approximate.

Figure 10 is a plot of events in the UNRSL catalog from 1852 to 1972. Most of the early catalog is from the compilation by Slemmons and others (1965). The UNRSL earthquake catalog is incomplete for the time period 1962 to 1969 and the location of the 1966 Truckee earthquake is taken from Ryall and others (1968).

Several distinct swarms and clusters are visible in the seismicity figure for 1973 - 1979 shown in Figure 11. These include persistent activity in the Truckee and Steamboat areas and the mainshock-aftershock sequences of Diamond Valley, 1978 (Somerville and others, 1980), Virginia City, 1976 and Doyle, 1979.

Toppozada and others (1981) have estimated that the catalog of events prior to 1900 is complete for events of magnitude 6.5 and greater. Real and others (1978) considered the early part of their catalog, 1900 to 1932, complete for magnitude 6.0 and greater earthquakes and for the later years, 1933-1974 it is probably complete for magnitude 4.5 and greater events. The catalog compiled by Slemmons and others (1965) covering the time period from 1852 to 1960 is considered complete for events of magnitude greater than 6.0 and they did not report events which had magnitudes of less than 4.0. The UNRSL catalog covering the time period 1969-1972 is probably complete for magnitude 4.0 and greater events and for 1973-1979 it is thought to be complete for magnitude 3.5 and greater shocks.

Post-1980 Seismicity

Networks

The University of Nevada-Reno Seismology Laboratory (UNRSL) has operated seismographs in the Reno-Truckee area since 1964. The UNRSL seismic

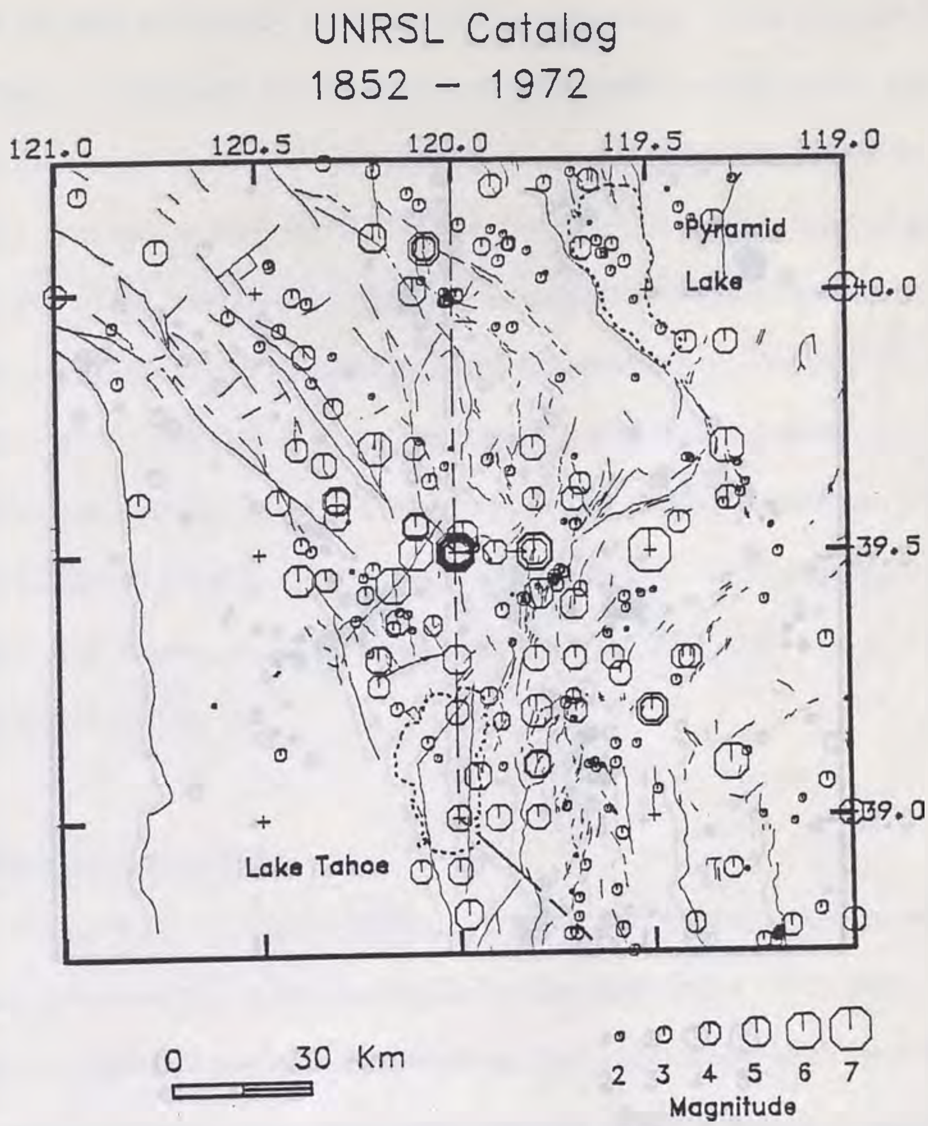

Figure 10. Events from UNRSL catalog, 1852-1972, mainly from Slemmons and others (1965).

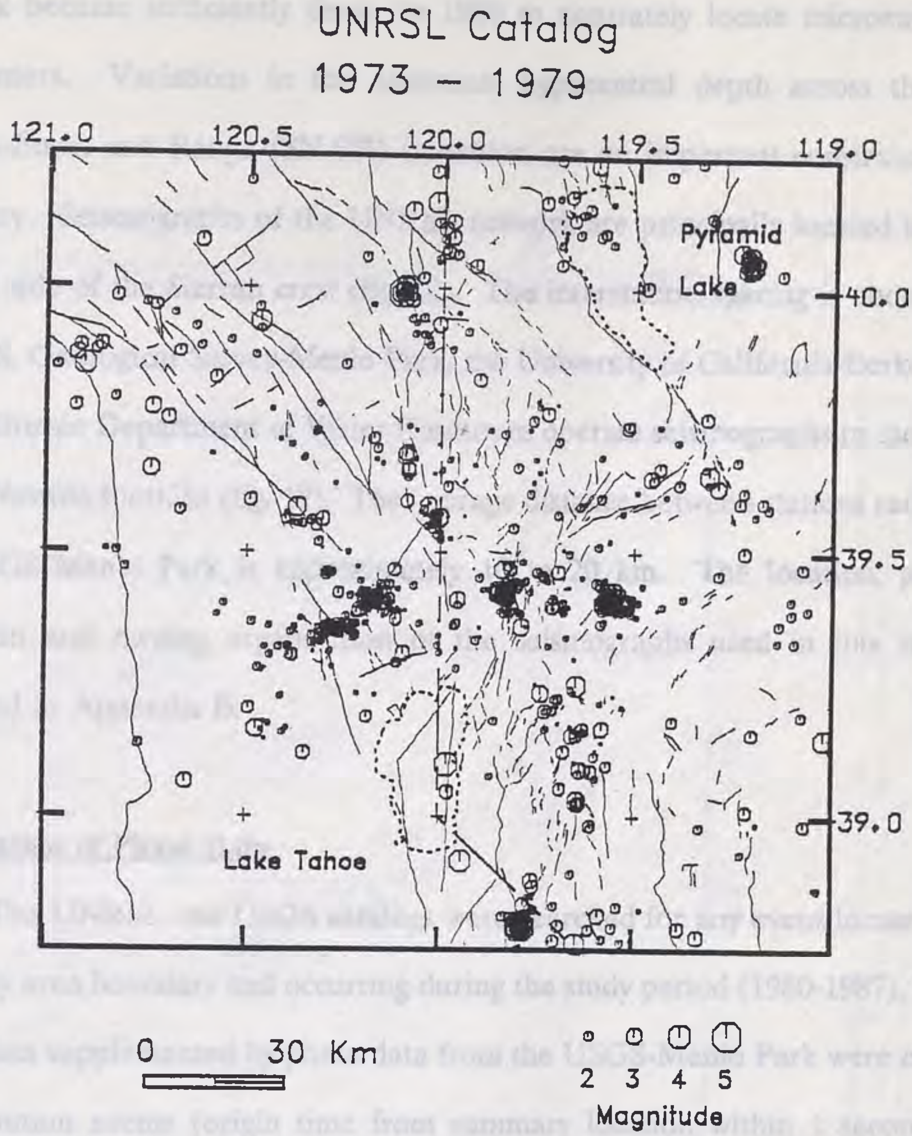

Figure 11. Events from UNRSL catalog, 1973-1979.

network became sufficiently dense by 1980 to accurately locate microearthquake hypocenters. Variations in the maximum hypocentral depth across the Sierra Nevada-Basin and Range (SN-BR) transition are an important constraint on the boundary. Seismographs of the UNRSL network are principally located along the eastern side of the Sierran crest (fig. 12). The interstation spacing is about 15 km. The U.S. Geological Survey-Menlo Park, the University of California-Berkeley, and the California Department of Water Resources operate seismographs in the western Sierra Nevada foothills (fig. 12). The average distance between stations recorded at the USGS-Menlo Park is approximately 10 to 20 km. The location, period of operation and owning organization of the seismographs used in this study are tabulated in Appendix B.

Compilation of Phase Data

The UNRSL and USGS catalogs were searched for any event located within the study area boundary and occurring during the study period (1980-1987). UNRSL phase data supplemented by phase data from the USGS-Menlo Park were compiled and common events (origin time from summary location within 1 second) were merged. This new data base was used to relocate events. Phase data which produced questionable locations (high residuals or large location errors) were reviewed to see if merging was done correctly. Merged phase files were inspected and duplicate readings were removed.

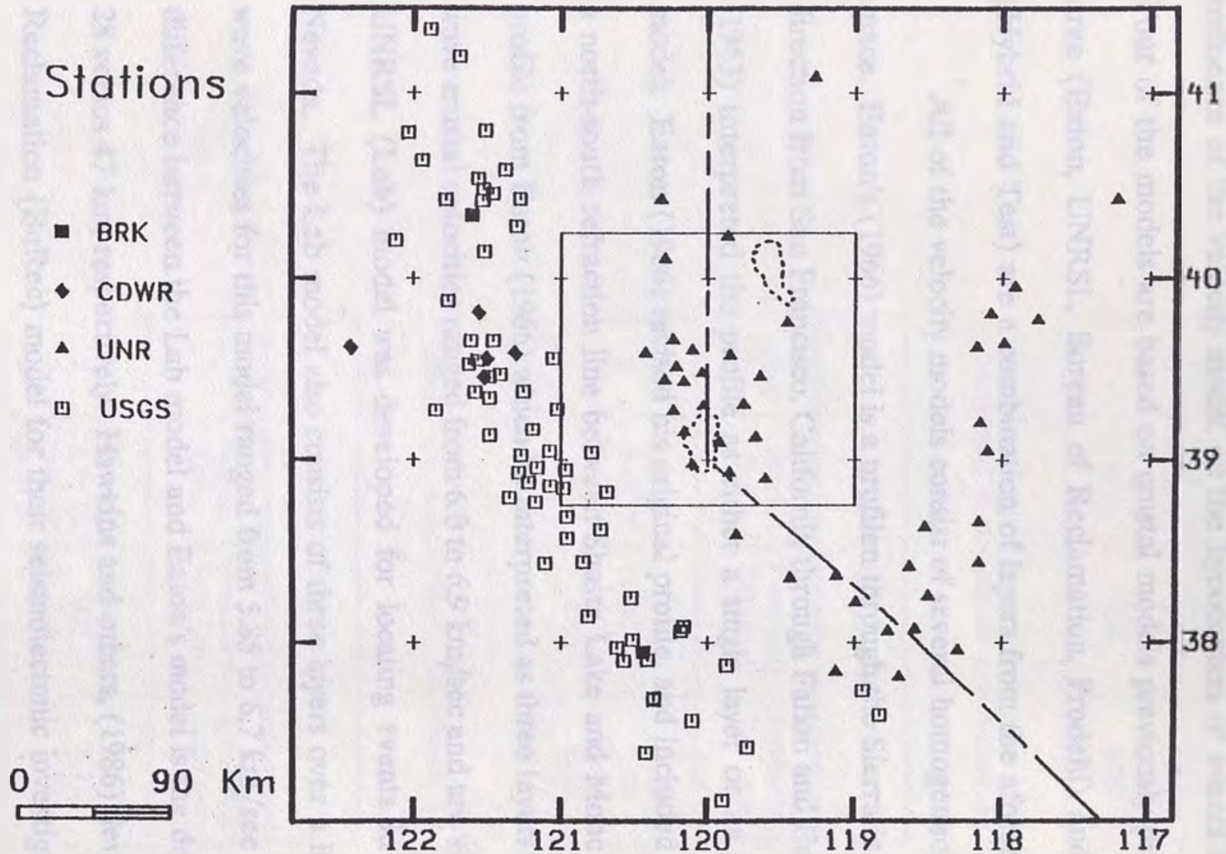

Figure 12. Seismographs used in study. Filled squares operated by BRK, University of California-Berkeley; filled diamond operated by CDWR, California Department of Water Resources; Filled triangles operated by UNRSL, University of Nevada Seismology Laboratory; open squares operated by U.S. Geological Survey-Menlo Park.

Location of Events

1090 events were located using the program "HYPOINVERSE" (Klein,1978). Six different velocity models (tables 1-6) for the region were used to test the influence of the velocity model on the hypocenters of events in specific sub-areas. Four of the models are based on crustal models previously proposed for the study area (Eaton, UNRSL, Bureau of Reclamation, Prodehl) and two of the models (Hybrid and Test) are a combination of layers from the aforementioned models.

All of the velocity models consist of several homogeneous layers over a half-space. Eaton's (1966) model is a profilen through the Sierra in roughly an east-west direction from San Francisco, California through Fallon and Eureka Nevada. Eaton (1963) interpreted the profile as either a single layer or an alternative two-layer model. Eaton (1966) revised his original profile, and included additional data from a north-south refraction line between Shasta Lake and Mono Lake. Figure 6 is a profile from Eaton (1966) which he interpreted as three layers over a half-space. P-wave crustal velocities ranged from 6.0 to 6.9 km/sec and are shown in Table 1. The UNRSL (Lab) model was developed for locating events in central and western Nevada. The Lab model also consists of three layers over a half-space. Crustal P-wave velocities for this model ranged from 5.85 to 6.7 km/sec (Table 2). The main difference between the Lab model and Eaton's model is the depth to the half-space, 28 versus 47 km, respectively. Hawkins and others, (1986) developed the Bureau of Reclamation (BuRec) model for their seismotectonic investigation of events in the Truckee area. The BuRec model consists of four layers over a half-space with P-wave crustal velocities ranging from 6.0 to 7.2 km/sec (Table 3). The BuRec model attempts to fit arrivals at stations in the Foothills on the western side of the Sierra

EATON'S MODEL (v1)			
Layer	Depth (km)	P-velocity (km/sec)	S-velocity (km/sec)
1	0 to 10	6.0	3.46
2	10 to 27	6.4	3.70
3	27 to 47	6.9	3.98
	47+	7.9	4.56

Table 1. Eaton's velocity model (v1). 3 layers over a half-space and a constant P/S ratio of 1.73.

UNRSL MODEL (v2)			
Layer	Depth (km)	P-velocity (km/sec)	S-velocity (km/sec)
1	0 to 2	5.85	3.38
2	2 to 22	6.0	3.46
3	22 to 28	6.7	3.87
	28+	7.85	4.53

Table 2. UNRSL velocity model (v2). 3 layers over a half-space and a constant P/S ratio of 1.73.

BUREC'S MODEL (v3)			
Layer	Depth (km)	P-velocity (km/sec)	S-velocity (km/sec)
1	0 to 1	6.0	3.46
2	1 to 15	6.2	3.58
3	15 to 30	6.9	3.98
4	30 to 44	7.2	4.15
	44+	8.0	4.62

Table 3. BuRec velocity model (v3). 4 layers over a half-space and a constant P/S ratio of 1.73.

HYBRID MODEL (v4)			
Layer	Depth (km)	P-velocity (km/sec)	S-velocity (km/sec)
1	0 to 20	6.0	3.46
2	20 to 30	6.7	3.87
3	30 to 35	7.2	4.15
	35+	7.85	4.53

Table 4. Hybrid velocity model (v4). 3 layers over a half-space and a constant P/S ration of 1.73.

PRODEHL'S MODEL (v5)			
Layer	Depth (km)	P-velocity (km/sec)	S-velocity (km/sec)
1	0 to 2.3	5.73	3.31
2	2.3 to 7.9	6.06	3.50
3	7.9 to 13.8	6.1	3.57
4	13.8 to 17.9	6.21	3.59
5	17.9 to 18.5	6.35	3.67
6	18.5 to 27.2	6.46	3.73
7	27.2 to 30.2	6.6	3.81
8	30.2 to 32.0	6.8	3.93
9	32.0 to 33.5	7.06	4.08
10	33.5 to 34.1	7.40	4.27
11	34.1 to 34.7	7.64	4.41
	34.7+	7.9	4.56

Table 5. Prodehl's velocity model (v5). 11 layers over a half-space and a constant P/S ratio of 1.73.

TEST MODEL (v6)			
Layer	Depth (km)	P-velocity (km/sec)	S-velocity (km/sec)
1	0 to 2	5.85	3.38
2	2 to 22	6.0	3.46
3	22 to 27	6.7	3.87
4	27 to 34	6.9	3.98
	34+	7.85	4.53

Table 6. Test velocity model (v6). 4 layers over a half-space and a constant P/S ratio of 1.73.

Nevada and arrivals at station WCN, located on the eastern side of the Sierra Nevada. The Hybrid model combines layers from the three models mentioned above and is the model that most closely resembles the seismic fabrics seen on COCORP profiles (see figure 6 in Allmendinger and others, 1987). The Hybrid model consists of three layers over a half-space with P-wave velocities ranging from 6.0 to 7.2 km/sec. Prodehl reinterpreted the profiles originally analyzed by Eaton. Prodehl's interpretation of the crustal structure between Fallon, Nevada and San Francisco, California (Prodehl, 1979) was modified slightly in the Prodehl model because the HYPOINVERSE program accepts a maximum of 11 layers in a velocity model. The table given in Prodehl (1979) consists of fifteen layers over a half-space. The Prodehl model used in this study contained 11 layers over a half-space with P-wave velocities ranging from 5.73 to 7.64 km/sec (Table 5). The Test model combined layers from Eaton's, UNRSL, and the Hybrid model. P-wave velocities for the Test model (Table 6) ranged from 5.85 to 6.9 km/sec for four layers over a half-space.

Seismicity maps of events located with the six velocity models are shown in Figures 13-18. The spatial distribution of the earthquakes changes very little between these plots. Based on the distribution of seismicity in the study area, eight sub-areas were delineated for further study and are shown in Figure 19. These divisions are subjective and based on clusters and trends of seismicity. The Soda Springs (SS) sub-area surrounds the 1980 ML 5.2 event, its aftershocks and more recent activity to the south. The seismicity trending northwest from Truckee to Lake Almanor is considered the Mohawk Valley (MO) sub-area. The persistent cluster in the Truckee area was separated from the surrounding sub-areas based upon the tightest spatial clustering of events. This is the area of the 1966 Truckee earthquake. A small

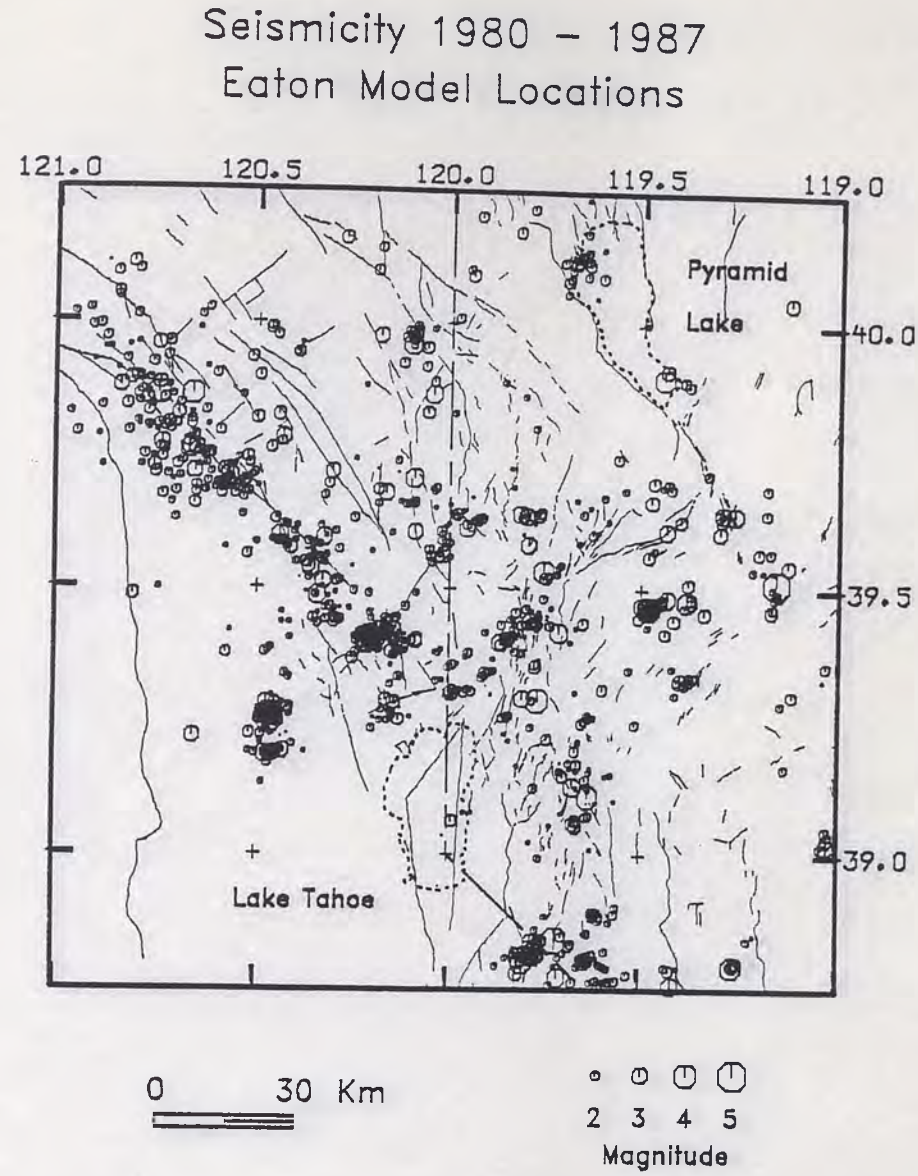

Figure 13. Seismicity in study area from 1980 - 1987 located with Eaton's velocity model.

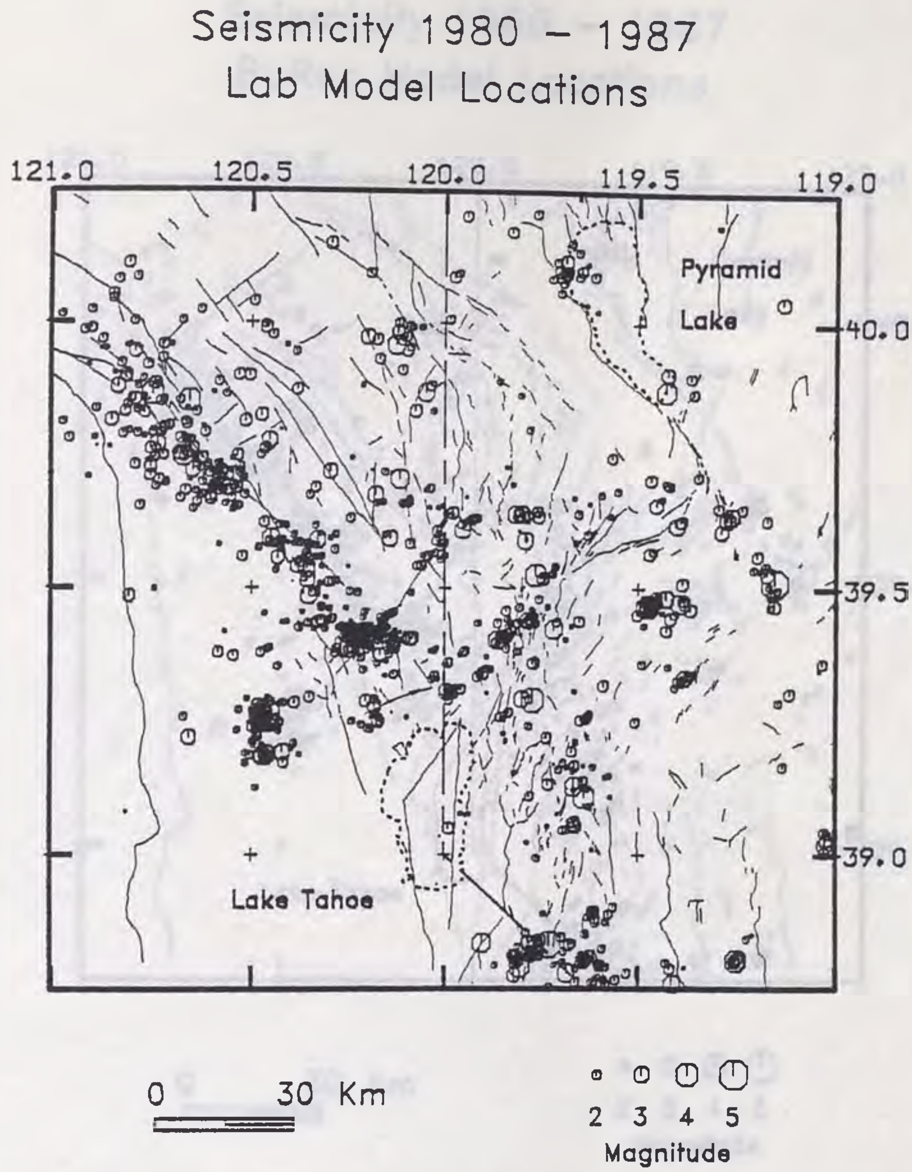

Figure 14. Seismicity in study area from 1980 - 1987 located with University of Nevada-Reno Seismology Laboratory (UNRSL, Lab) velocity model.

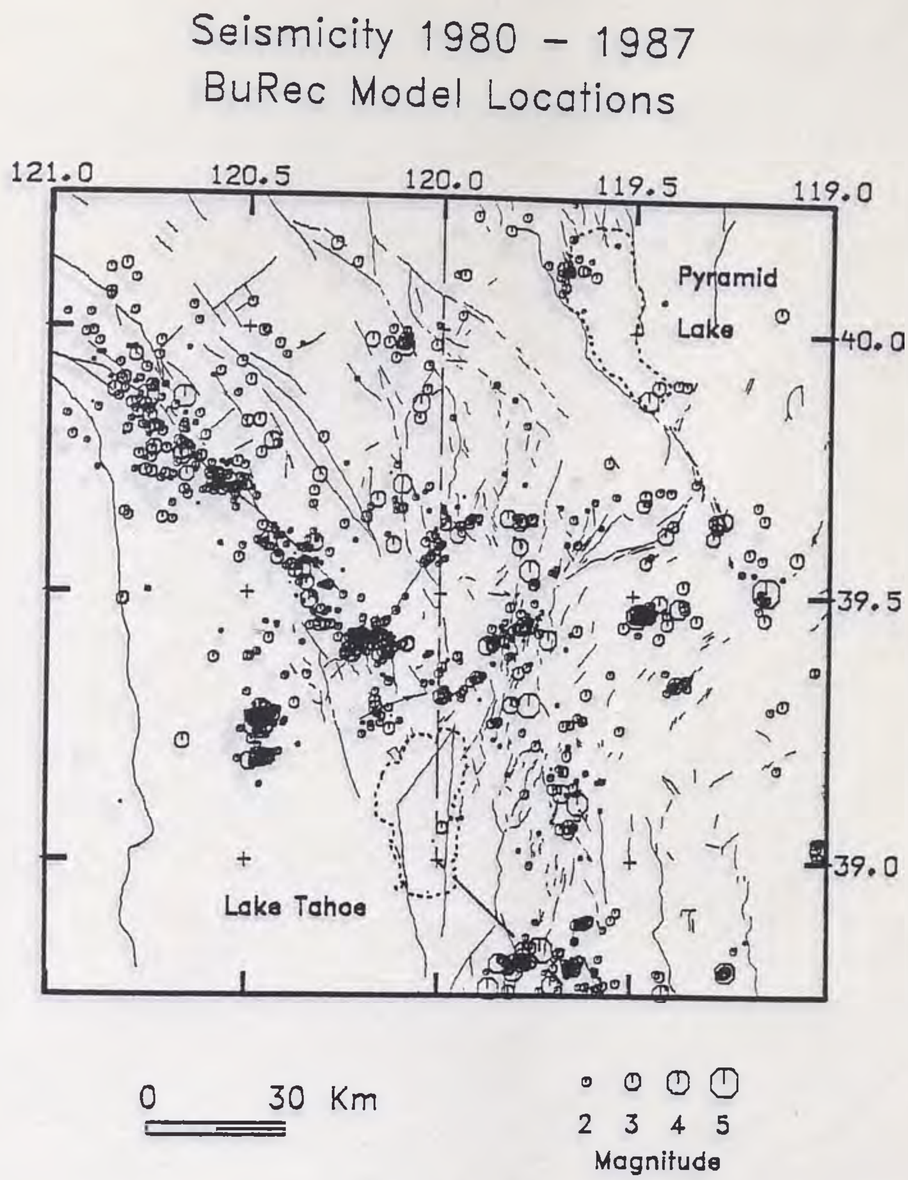

Figure 15. Seismicity in study area from 1980 - 1987 located with Bureau of Reclamation (BuRec) velocity model.

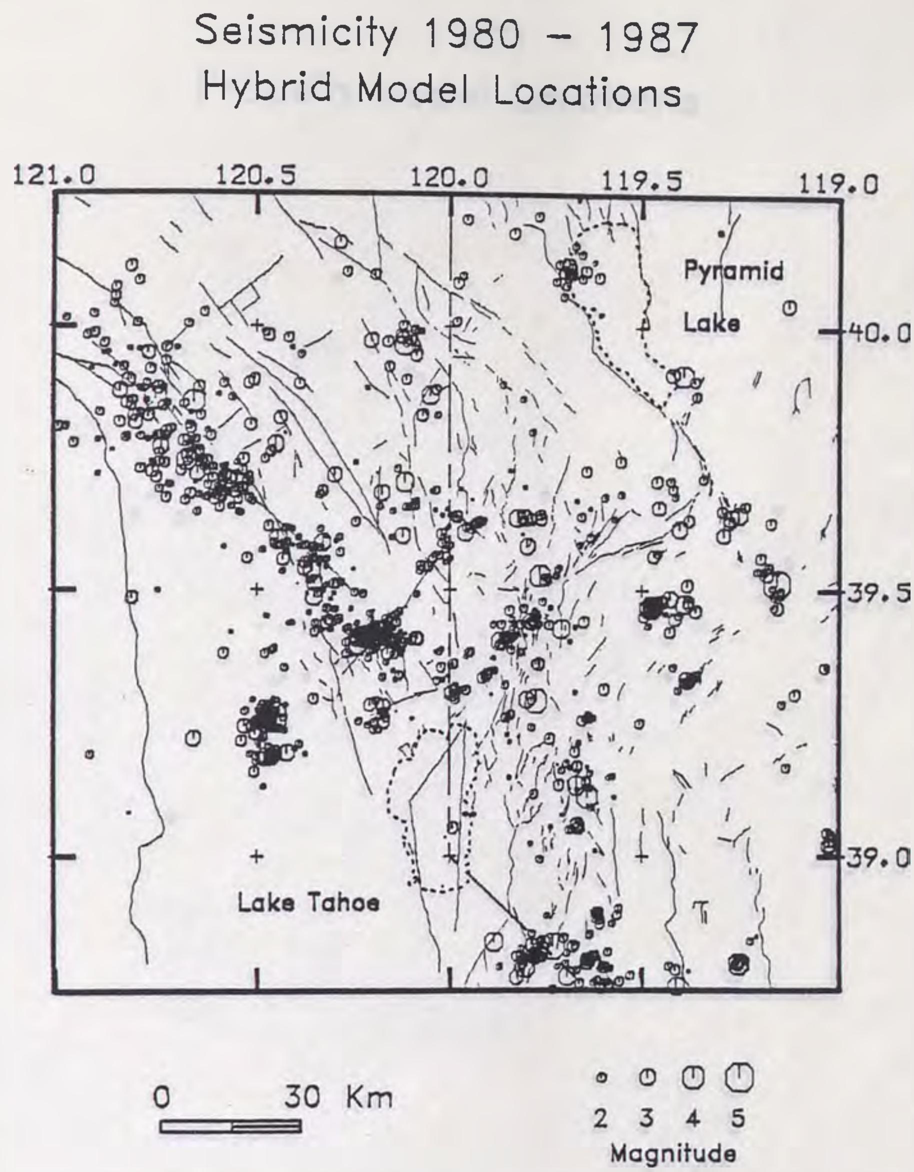

Figure 16. Seismicity in study area from 1980 - 1987 located with Hybrid velocity model.

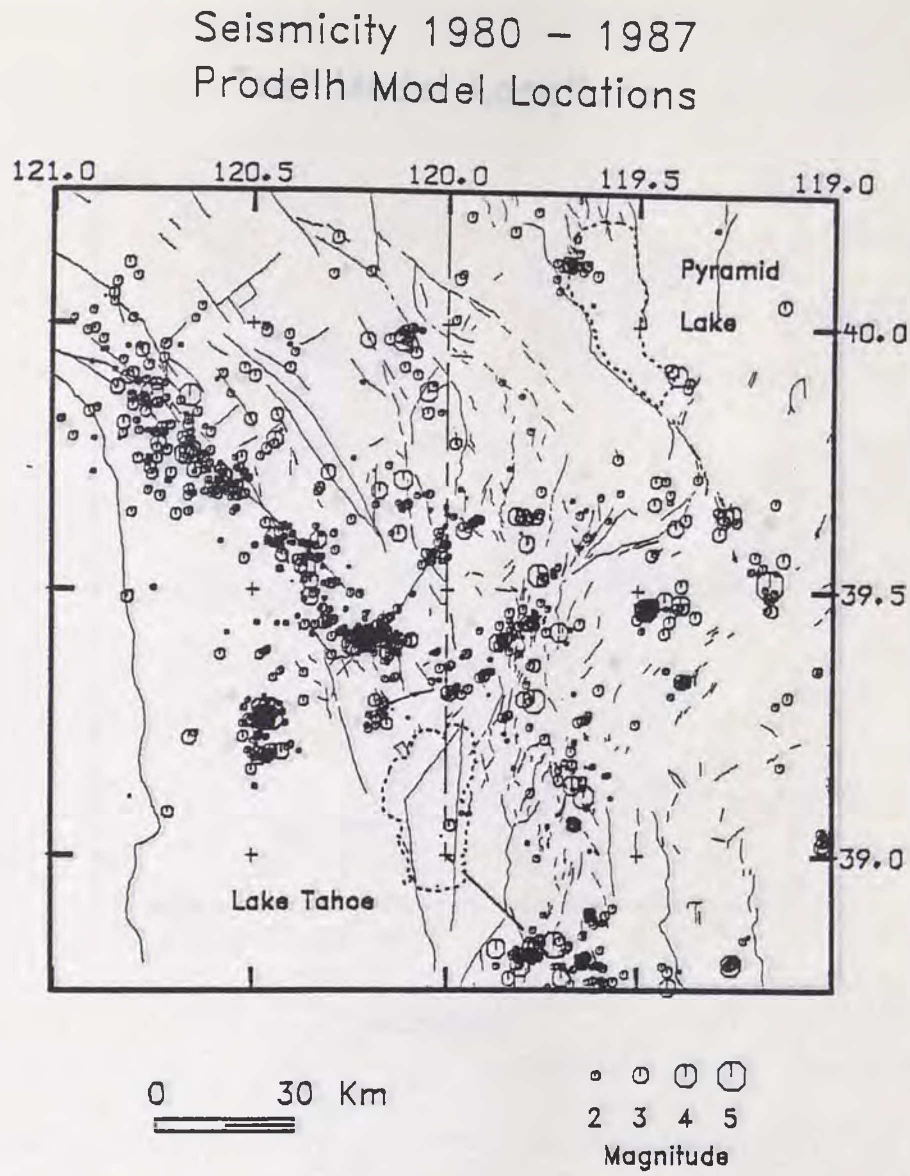

Figure 17. Seismicity in study area from 1980 - 1987 located with Prodehl's velocity model.

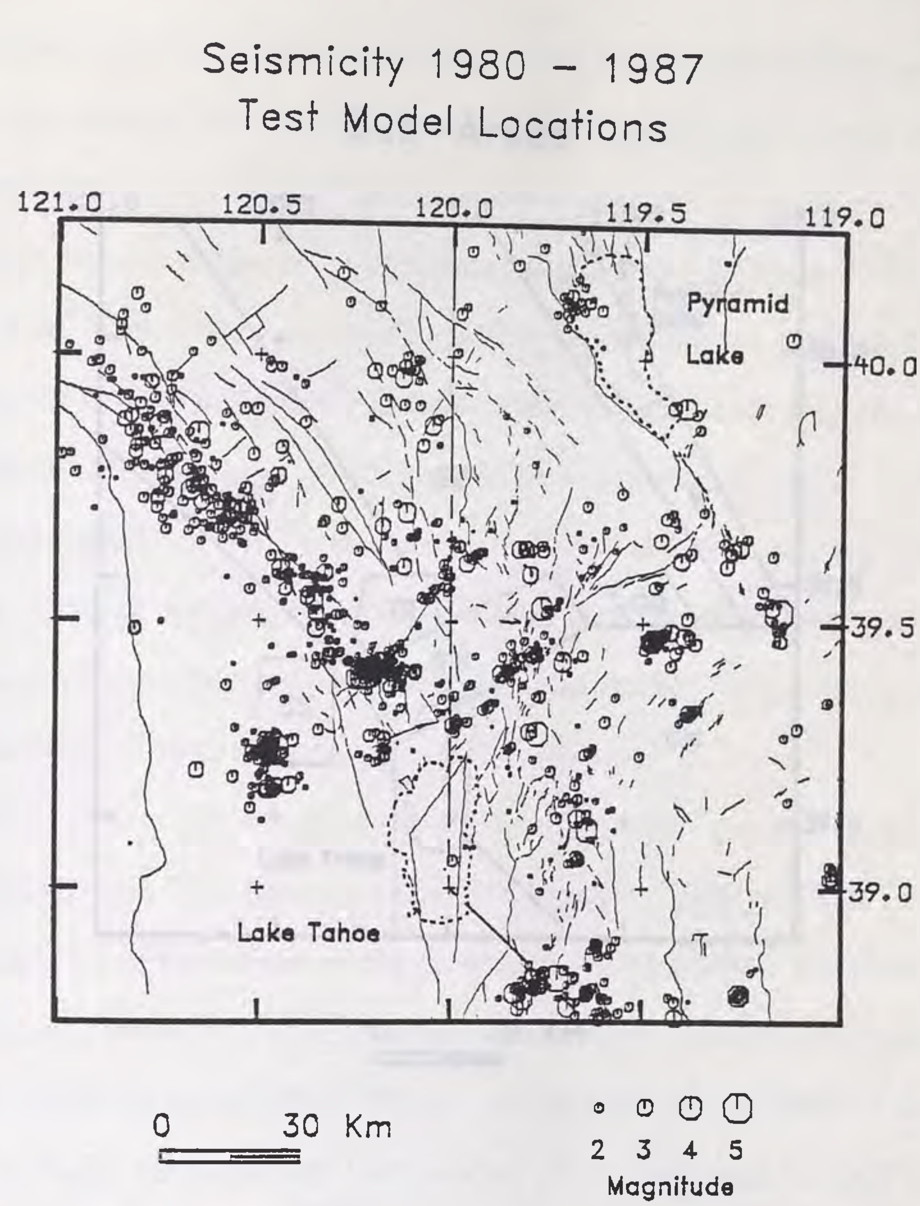

Figure 18. Seismicity in study area from 1980 - 1987 located with Test velocity model.

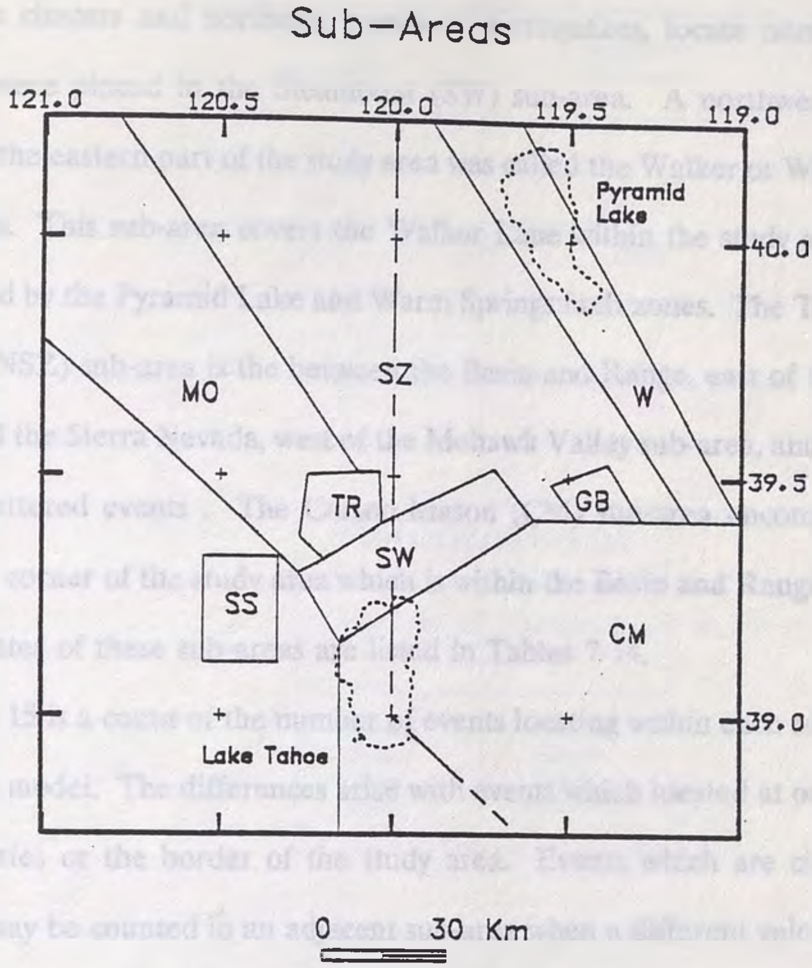

Figure 19. Outline of sub-areas. Abbreviations: SS, Soda Springs; MO, Mohawk Valley; TR, Truckee; SW, Steamboat; SZ, Transitional, Transz; GB, Gooseberry; W, Walker Lane; CM, Carson-Mason.

swarm which located east of Reno in 1985, is called the Gooseberry (GB) sub-area. Several tight clusters and northeast trends of earthquakes, locate north of Lake Tahoe and were placed in the Steamboat (SW) sub-area. A northwest trend of seismicity in the eastern part of the study area was called the Walker or Walker Lane (W) sub-area. This sub-area covers the Walker Lane within the study area, which is represented by the Pyramid Lake and Warm Springs fault zones. The Transitional (SZ or TRANSZ) sub-area is the between the Basin and Range, east of the Walker sub-area, and the Sierra Nevada, west of the Mohawk Valley sub-area, and is an area of widely scattered events . The Carson-Mason (CM) sub-area encompasses the southeastern corner of the study area which is within the Basin and Range province. The coordinates of these sub-areas are listed in Tables 7-14.

Table 15 is a count of the number of events locating within each sub-area for each velocity model. The differences arise with events which located at or near sub-area boundaries or the border of the study area. Events which are close to the boundaries may be counted in an adjacent sub-area when a different velocity model is used to locate the earthquakes. The last row of Table 15 is a count of the total number of events locating within the boundary of the study area for each velocity model.

CARSON/MASON VALLEY COORDINATES	
Latitude degrees N	Longitude degrees W
38.75	119.0
38.75	120.15
39.15	120.15
39.41	119.6
39.41	119.0

Table 7. Coordinates of Carson-Mason sub-area.

GOOSEBERRY COORDINATES	
Latitude degrees N	Longitude degrees W
39.485	119.55
39.53	119.39
39.41	119.29
39.41	119.475

Table 8. Coordinates of Gooseberry sub-area.

MOHAWK VALLEY COORDINATES	
Latitude degrees N	Longitude degrees W
39.298	120.275
39.783	121.0
40.25	121.0
40.25	120.7976
39.51	120.102
39.502	120.249
39.372	120.271
39.325	120.2

Table 9. Coordinates of Mohawk Valley sub-area.

SODA SPRINGS COORDINATES	
Latitude degrees N	Longitude degrees W
39.11	120.335
39.11	120.55
39.33	120.55
39.33	120.335

Table 10. Coordinates of Soda Springs sub-area.

STEAMBOAT COORDINATES	
Latitude degrees N	Longitude degrees W
39.15	120.15
39.298	120.275
39.325	120.2
39.4	120.033
39.518	119.715
39.41	119.6

Table 11. Coordinates of Steamboat sub-area.

TRANSZ COORDINATES	
Latitude degrees N	Longitude degrees W
39.41	119.14
39.41	119.29
39.53	119.39
39.485	119.55
39.41	119.475
39.41	119.6
39.518	119.715
39.4	120.033
39.51	120.04
39.51	120.102
40.25	120.7976
40.25	119.9048

Table 12. Coordinates of Transitional sub-area.

TRUCKEE COORDINATES	
Latitude degrees N	Longitude degrees W
39.325	120.2
39.372	120.271
39.502	120.249
39.51	120.04
39.4	120.033

Table 13. Coordinates of Truckee sub-area.

WALKER LANE COORDINATES	
Latitude degrees N	Longitude degrees W
39.41	119.0
39.41	119.147
40.25	119.9048
40.25	119.6428

Table 14. Coordinates of Walker Lane sub-area.

NUMBER OF EVENTS						
	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
CARSON/MASON	217	216	217	215	215	216
GOOSEBERRY	38	38	36	38	38	38
MOHAWK	249	255	249	255	253	253
SODA SPRINGS	92	91	92	91	90	90
STEAMBOAT	106	104	105	105	106	103
TRANSZ	127	128	129	129	128	130
TRUCKEE	199	192	197	194	192	195
WALKER	47	47	45	48	46	47
TOTAL	1088	1088	1089	1090	1088	1089

Table 15. Number of events located in each sub-area for the six velocity models.

Velocity Model Selection

The most stable velocity model for the study area was determined by reviewing a series of quality criteria (table 16) and depth distributions (figs. 20-25) for the over-all data set and for each sub-area. The quality criteria are restriction on the allowable errors of the final summary location for each event and include rms, root mean square; erh, horizontal errors; erz, depth errors. The quality criteria also include extreme values, for example, maximum number of iterations needed for the location program to converge on a solution; the maximum azimuthal gap between stations; and a minimum number of stations. Table 16 lists the number of events meeting the above criteria in each sub-area located with each velocity model.

Table 17 summarizes the depth above which 90% of the events located in each sub-area for each velocity model. The depth distributions are normalized to the number of events (N) in each sub-area. The BuRec velocity model generally locates events shallower than the other models (maximum depth for BuRec was 19 km, maximum depth for the other models ranged from 24-29 km). Considering all of the events, the largest percentage of shallow events were located with the BuRec model, 22 % of events had depths of $\leq$1 km. For the other models, the percentage of events with depths $\leq$1 km ranged from 7 to 11 %. The depth above which 90% of the events occurred was 13 km for the BuRec model, for the other models it ranged from 15 to 16 km.

Events in the Soda Springs sub-area were deeper (19-22 km) relative to the other sub-areas for all velocity models except the BuRec model. For all velocity models the largest percentage (43%-68%) of events fell between 11 and 16 km in the Truckee sub-area. All of the velocity models located a large percentage of the events

QUALITY CRITERIA

Events with :

iterations < 10
gap ≦ 270°
rms ≦ .15 sec
errh ≦ 3.0 km
errz ≦ 5.0 km
numsta > 5

	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
CARSON/MASON	98	103	43	82	93	104
GOOSEBERRY	13	6	0	4	4	5
MOHAWK	59	47	37	42	45	39
SODA SPRINGS	12	8	4	7	9	8
STEAMBOAT	56	51	41	51	52	51
TRANSZ	37	40	25	38	41	37
TRUCKEE	115	113	98	110	115	113
WALKER	11	6	9	10	11	9
TOTAL	401	374	257	344	370	366

Table 16. Number of events in each sub-area meeting the quality criteria at the top of the table for each velocity model.

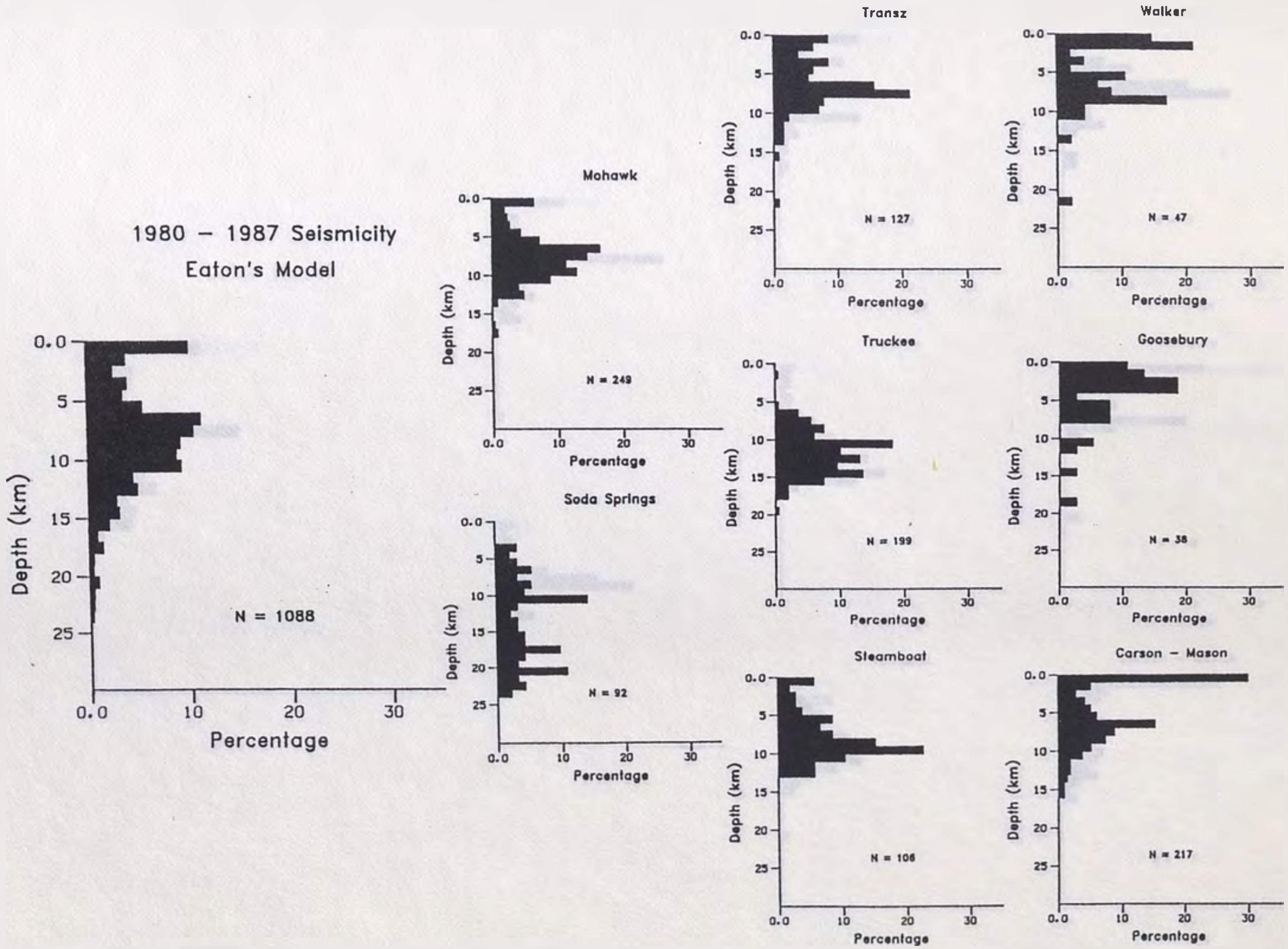

Figure 20. Earthquake depth distributions for events located with Eaton's velocity model, N = over-all sample size and the sample size in each sub-area.

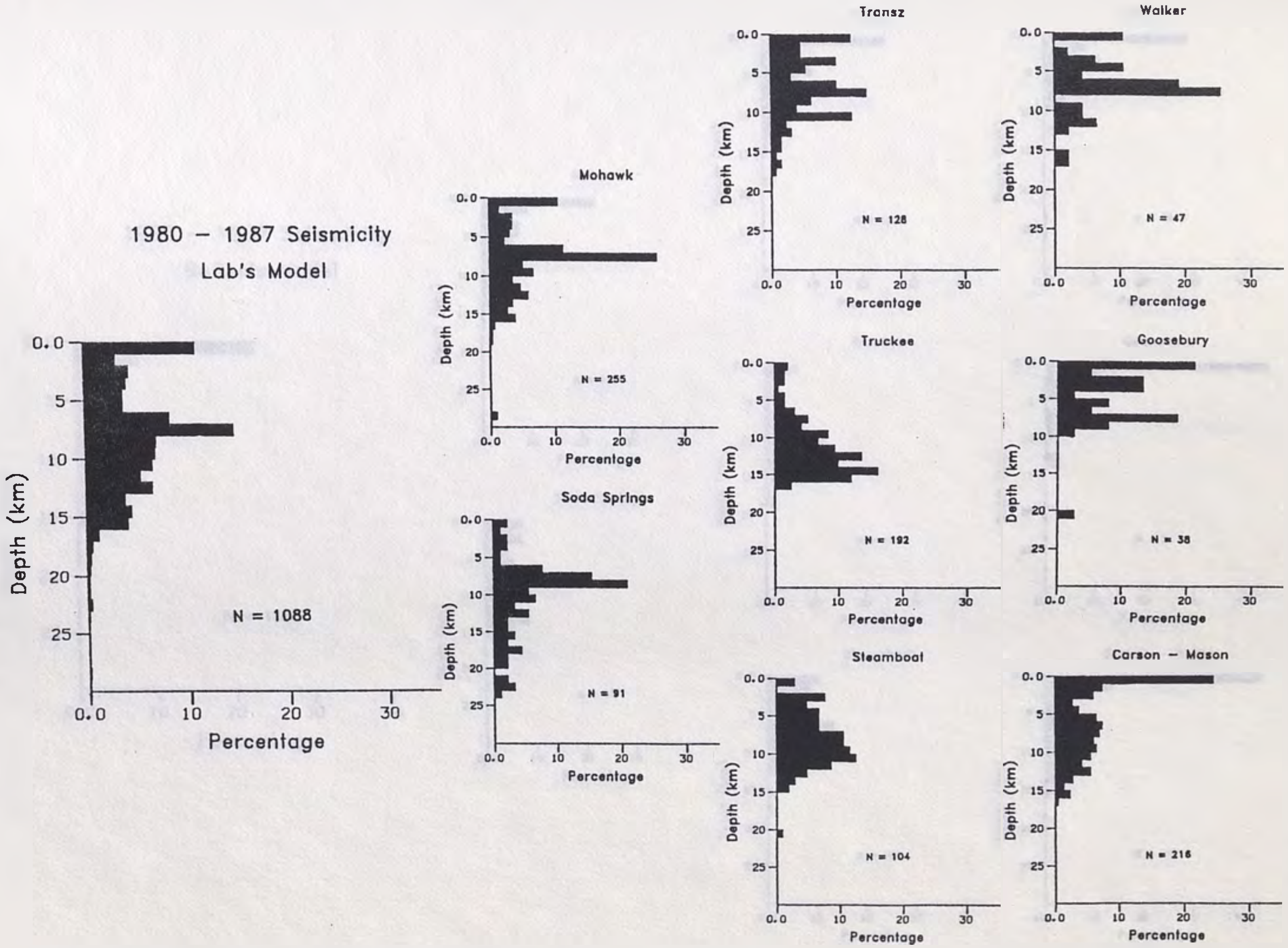

Figure 21. Earthquake depth distributions for events located with Lab's velocity model, N = over-all sample size and the sample size in each sub-area.

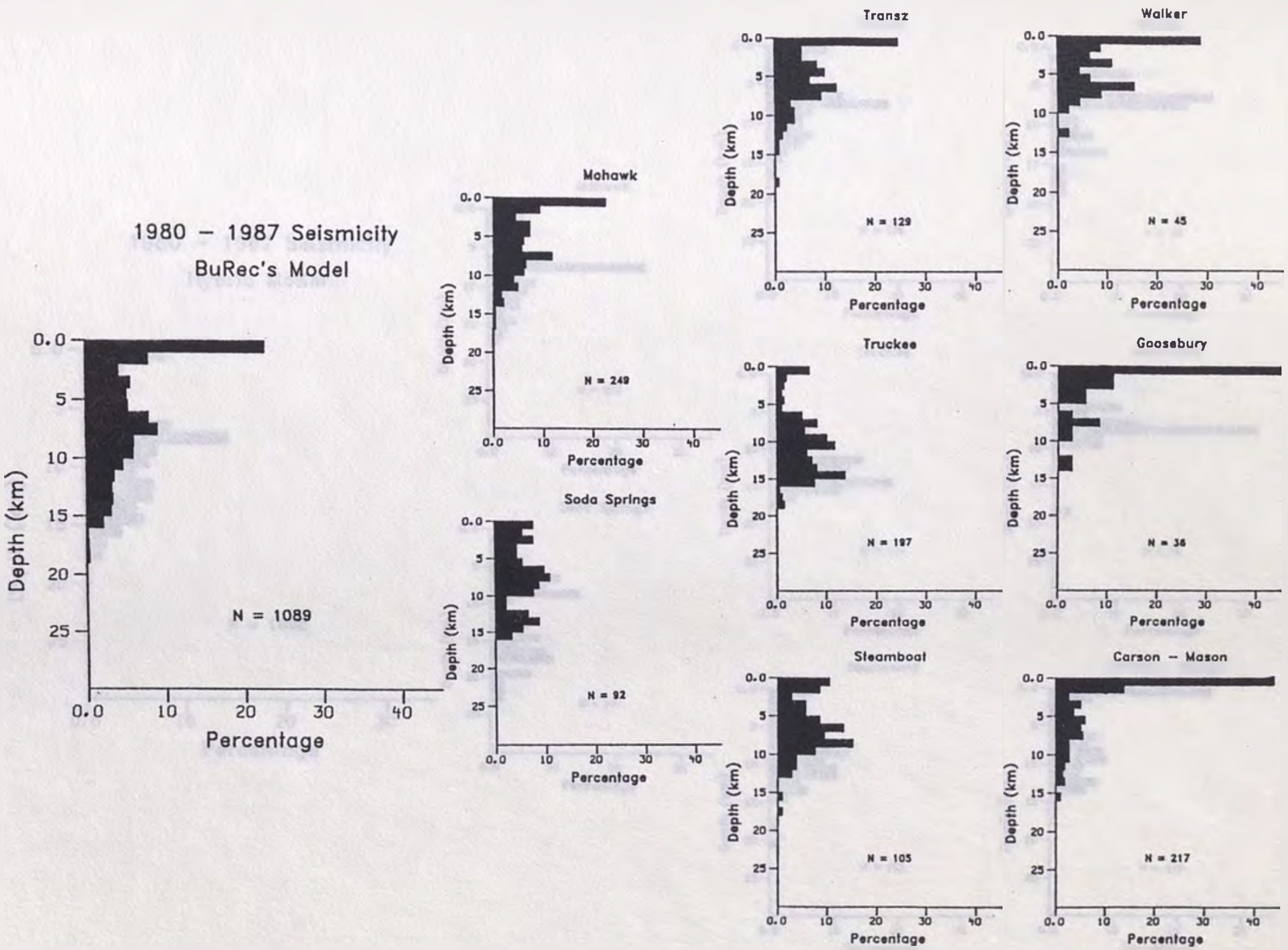

Figure 22. Earthquake depth distributions for events located with BuRec's velocity model, N = over-all sample size and the sample size in each sub-area.

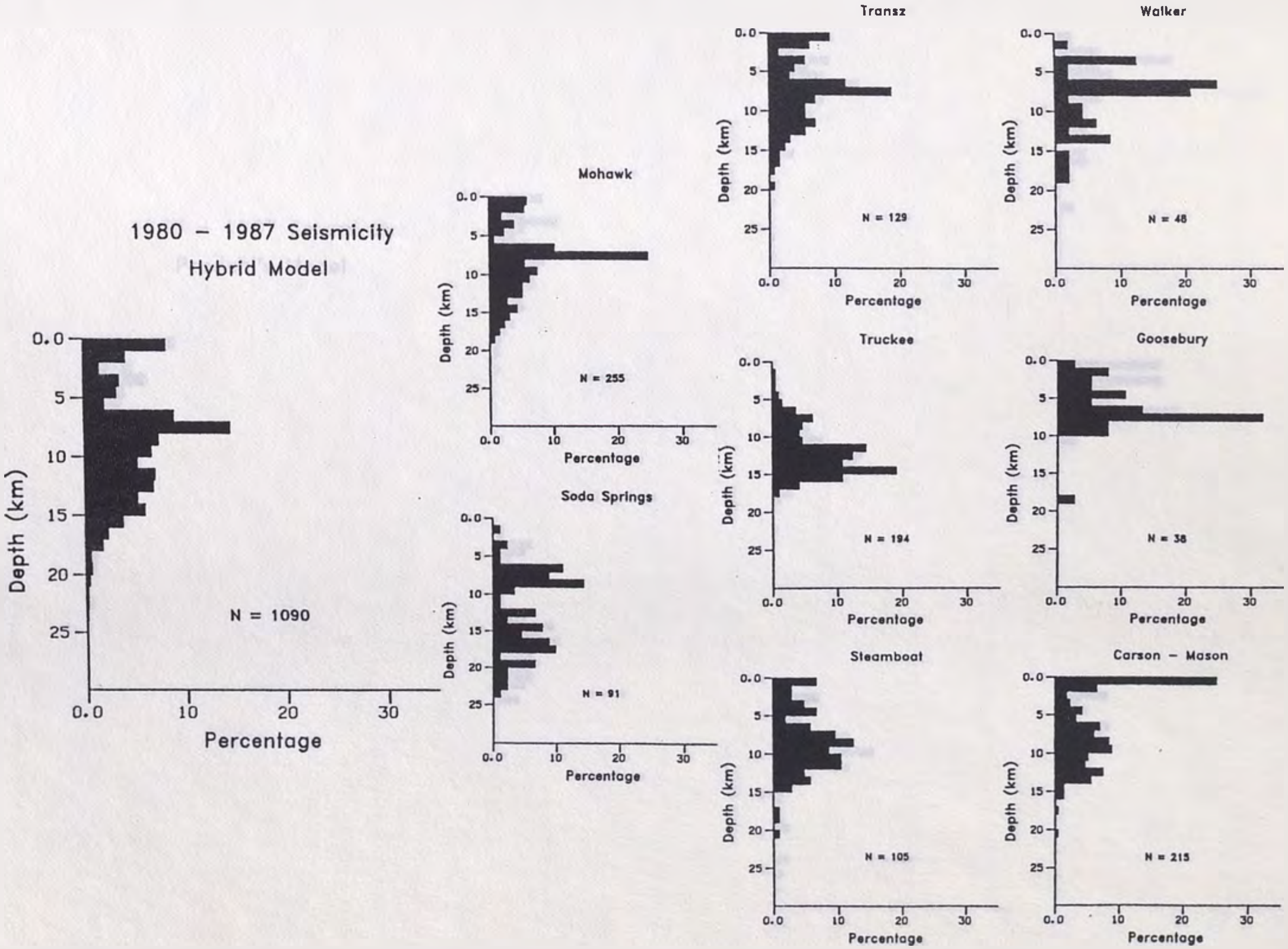

Figure 23. Earthquake depth distributions for events located with Hybrid velocity model, N = over-all sample size and the sample size in each sub-area.

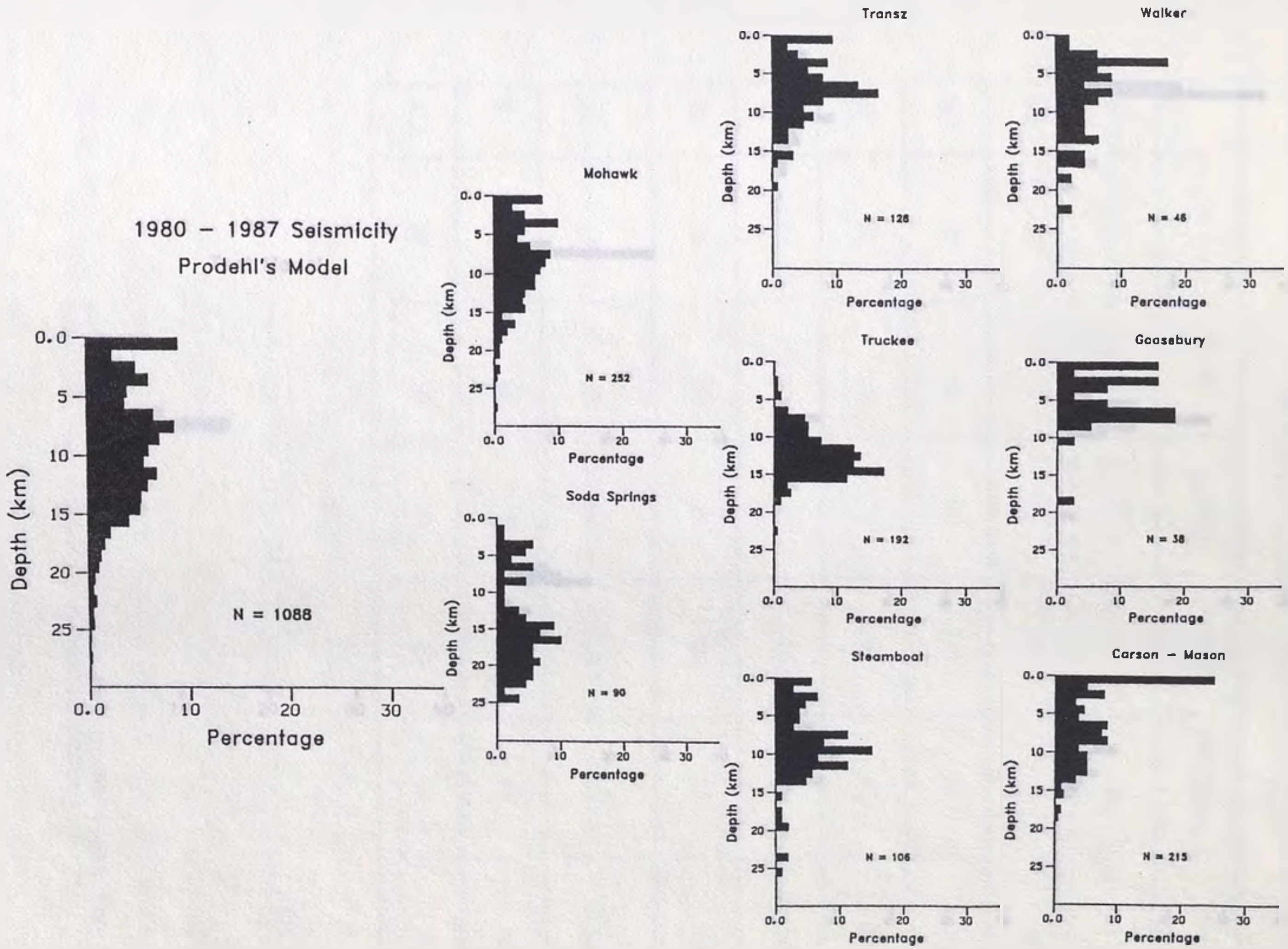

Figure 24. Earthquake depth distributions for events located with Prodehl's velocity model, N = over-all sample size and the sample size in each sub-area.

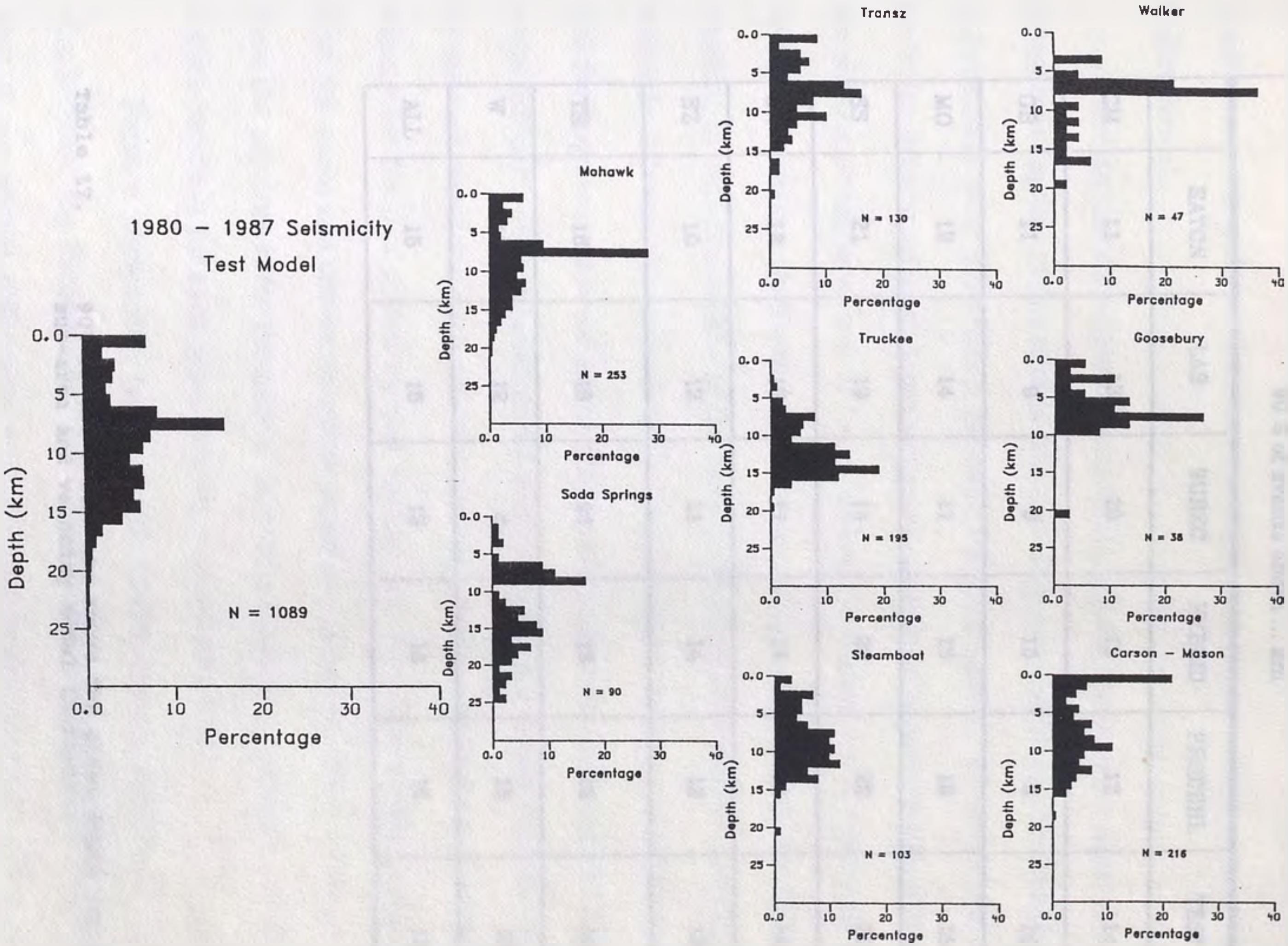

Figure 25. Earthquake depth distributions for events located with Test velocity model, N = over-all sample size and the sample size in each sub-area.

90 % of events above ... km						
	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
CM	11	13	10	13	13	14
GB	11	9	9	10	9	10
MO	12	14	11	15	16	15
SS	21	19	14	20	22	20
SW	12	13	11	14	14	14
SZ	10	12	11	14	12	13
TR	16	16	16	16	16	16
W	10	12	8	14	16	16
ALL	15	15	13	15	16	15

Table 17. 90% of the events are above the given depth for the sub-area and velocity model indicated.

in the Carson-Mason sub-area at shallow depths (≤ 1 km). In general, the depth distributions changed very little between the various models with the exception of the BuRec model.

Median station adjustments for each velocity model were determined from events meeting the quality criteria (see above) in each individual sub-area separately. Adjustments were determined for each sub-area because of the crustal changes occurring between the sub-areas across the study area in general and differences in the subsets of stations used to locate events. A "master event technique" (station residuals from one very-well located event used as adjustments for other events resulting in locations relative to the 'master event') was not used because the stations available to locate the events in the various sub-area was almost constantly changing and the large area involved in some of the sub-areas made choosing a representative event difficult. Station residuals for events meeting the quality criteria were sorted by residual times for each sub-area and the median residual was selected as the adjustment for that station for that specific sub-area. The median residual rather than the mean was chosen to reduce possibility of having one or two poor arrivals skew the adjustment for the station. Appendix C contains the median P and S wave station residuals for each sub-area using each velocity model.

From a comparison based on the quality criteria and spatial and depth distributions, the Eaton model was chosen as the best model for the study area. Few if any spatial differences were obvious in the seismicity plots, and depth distributions were similar for all except the BuRec model. Therefore, the number of events meeting the quality criteria was the deciding factor in the choice of the Eaton velocity model.

Events located with Eaton's velocity and the stations adjustments are presented in Figure 26. A comparison of the epicentral plots (figs. 13 and 26) using Eaton's model alone and Eaton's model with station adjustments reveals very little change in the spatial distribution of events. Figure 27 shows the depth distributions for all events within the various sub-areas located with Eaton's model and station adjustments. The only sub-area which showed a significant change was Soda Springs. In Figure 20, the Soda Springs depth distribution is bi-modal with one peak near 10 km and another from 17 to 20 km. The depth distribution shown in Figure 27 for locations with the station adjustment illustrates that the shallower mode is more significant than the deeper mode. The 90% and above depth value changed from 21 km using Eaton's model alone to 18 km using Eaton's model and station adjustments. Changes in others sub-areas were slight. The events in the Soda Springs sub-area were the deepest and the seismicity shallowed moving to the east across the study area.

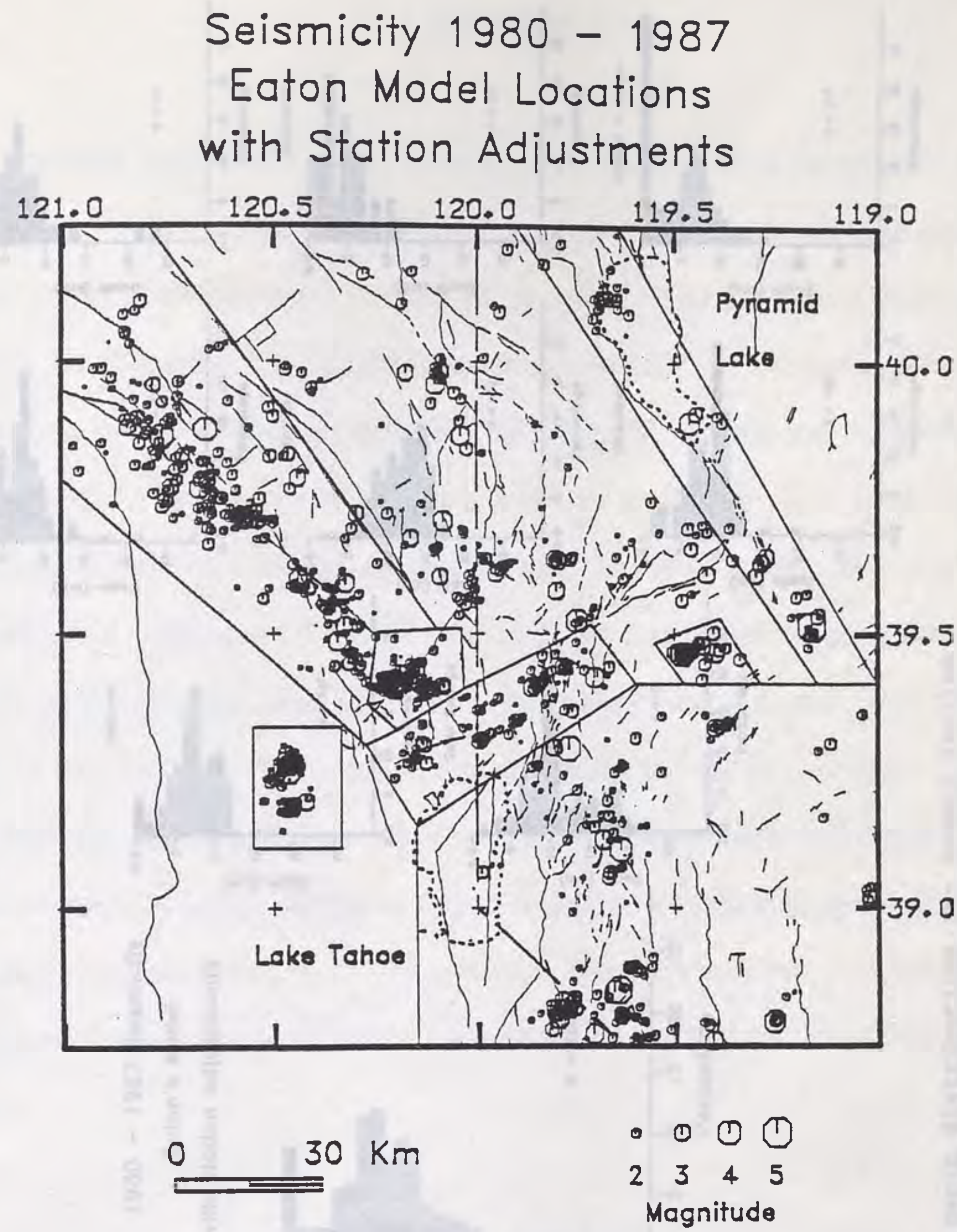

Figure 26. Seismicity from 1980 - 1987 located with Eaton's velocity model and station adjustments. Outlines of boundaries shown.

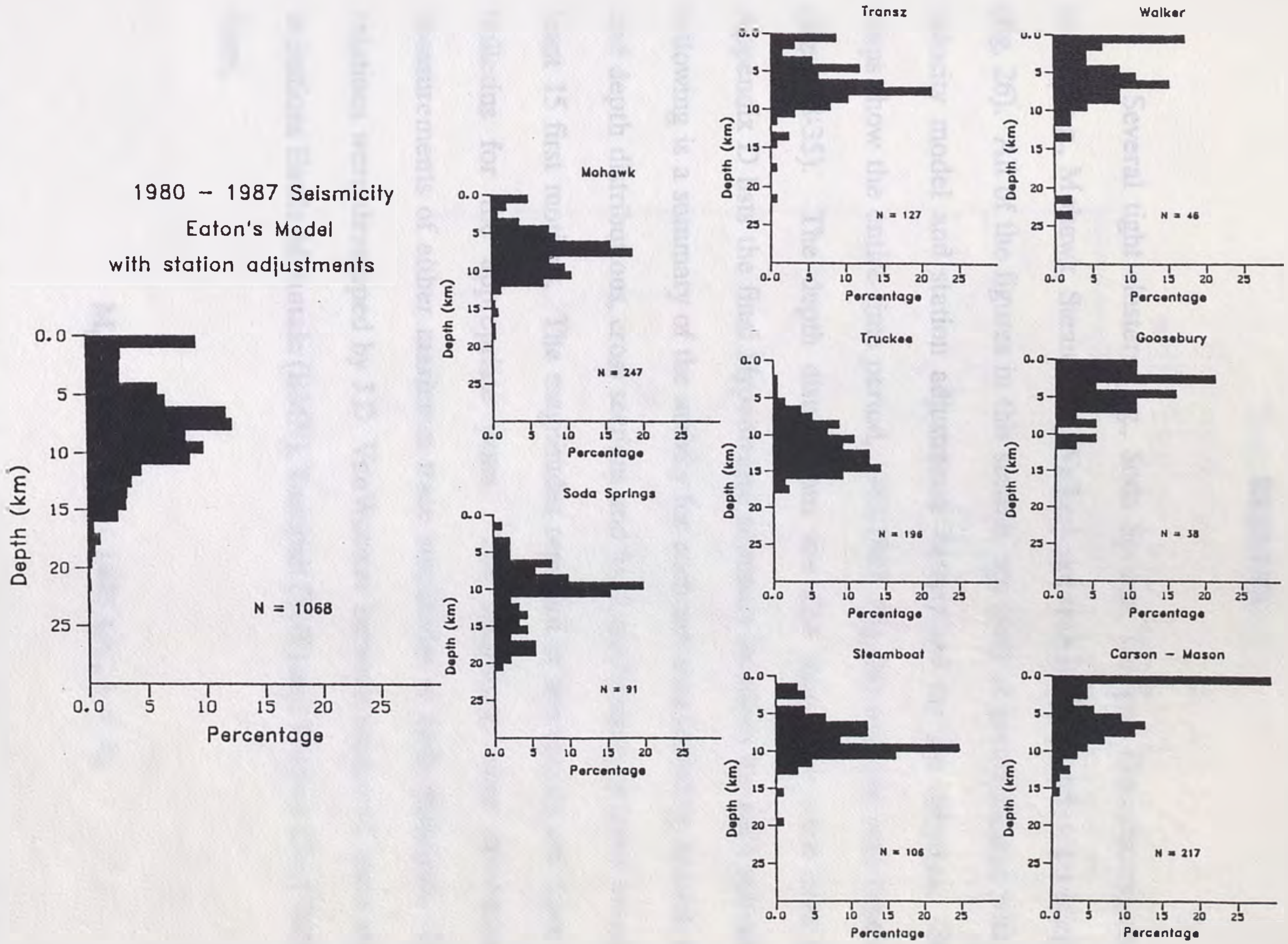

Figure 27. Earthquake depth distributions for events located with Eaton's velocity model and station adjustments, N = over-all sample size and the sample size in each sub-area.

RESULTS

Several tight clusters (e.g., Soda Springs, Truckee, Gooseberry) and linear trends (e.g., Mohawk, Steamboat, Walker) are seen in the distribution of epicenters (fig. 26). All of the figures in this section, are plots of events located with Eaton's velocity model and station adjustments determined for the sub-area. Seismicity maps show the entire time period, 1980-1987, (fig. 26) and one year time windows (figs. 28-35). The depth distributions are also shown for each area (fig 27). Appendix D lists the final Hypoinverse summary locations for each sub-area. The following is a summary of the activity for each sub-area including spatial, temporal and depth distributions, cross sections and focal mechanisms of some events with at least 15 first motions. The magnitudes reported in this section are from UNRSL bulletins for the appropriate years. The magnitude were determined from measurements of either maximum trace amplitudes or coda durations. Empirical relations were developed by J.D. VanWormer between measured trace amplitudes at stations Battle Mountain (BMN), Tonopah (TNP) and Washoe City (WCN) in the form,

$$M_L = C_1 + \log_{10} (1400\ A/C_2) + C_3 \qquad (1)$$

where, M_L is local magnitude, C_1 is a correction for distance, and C_2 and C_3 are station adjustments.

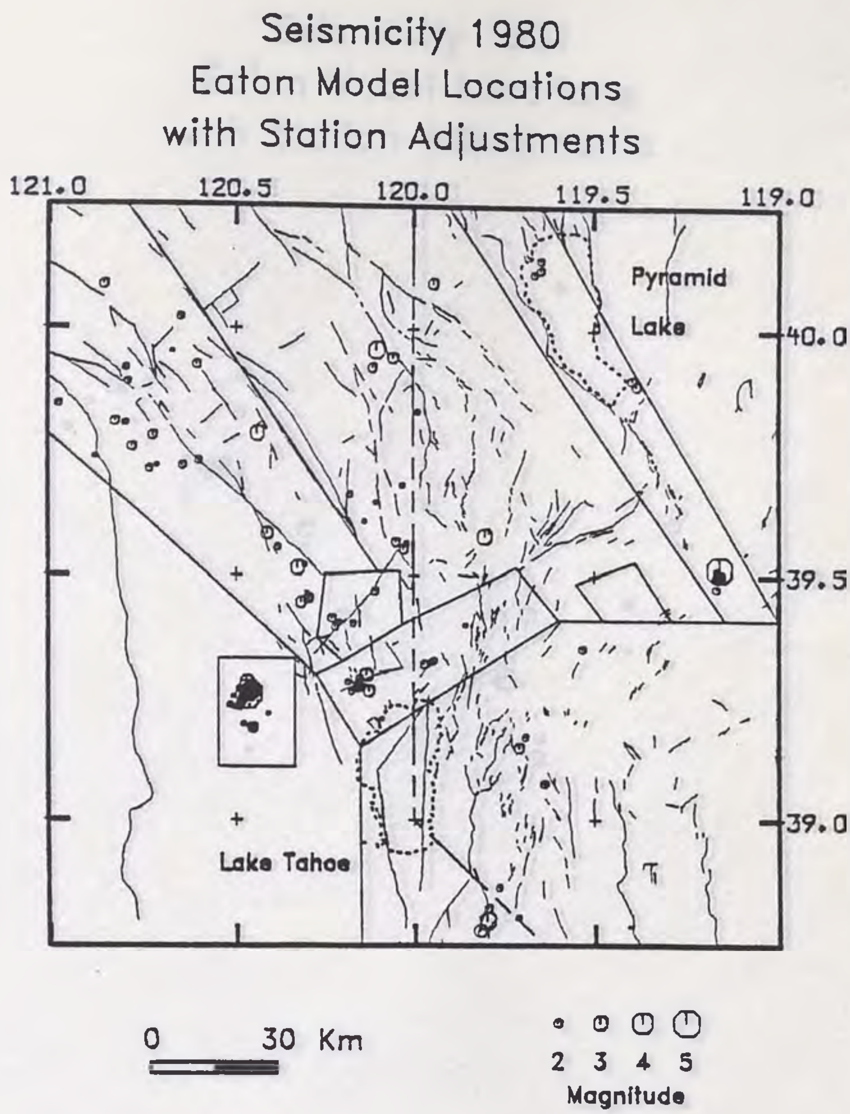

Figure 28. Seismicity from January 1, 1980 to December 31, 1980 located with Eaton's velocity model and station adjustments. Outlines of boundaries shown.

Seismicity 1981
Eaton Model Locations
with Station Adjustments

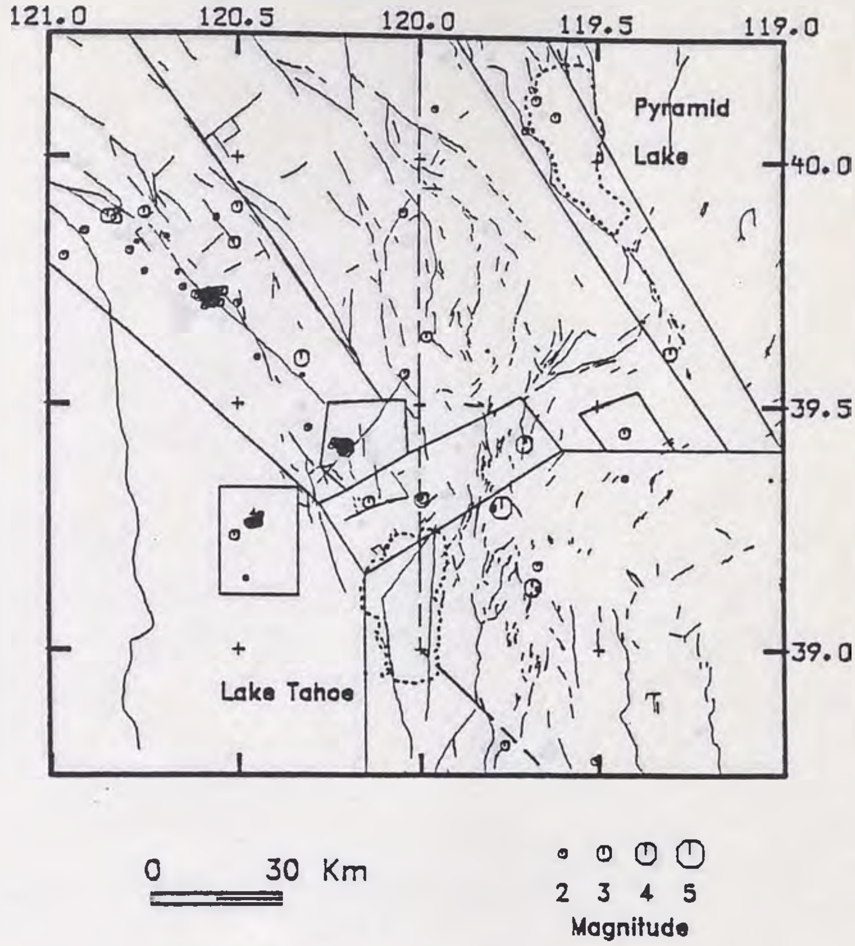

Figure 29. Seismicity from January 1, 1981 to December 31, 1981 located with Eaton's velocity model and station adjustments. Outlines of boundaries shown.

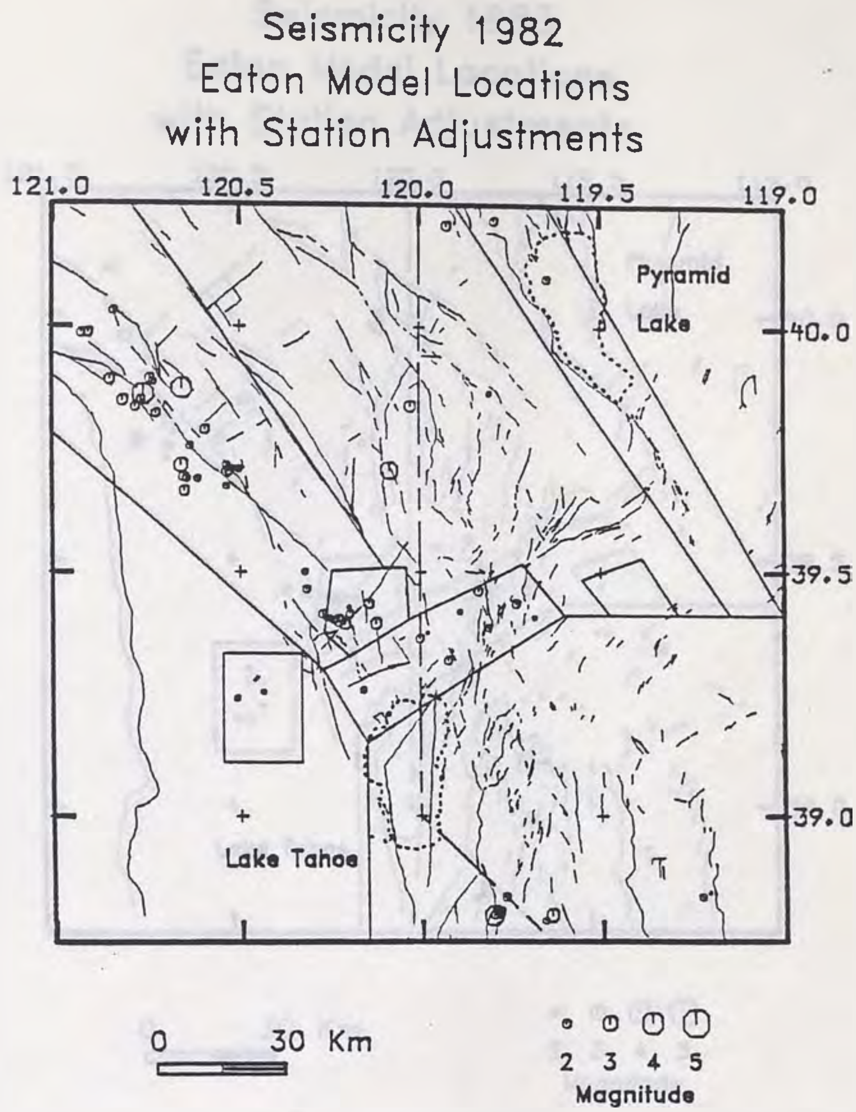

Figure 30. Seismicity from January 1, 1982 to December 31, 1982 located with Eaton's velocity model and station adjustments. Outlines of boundaries shown.

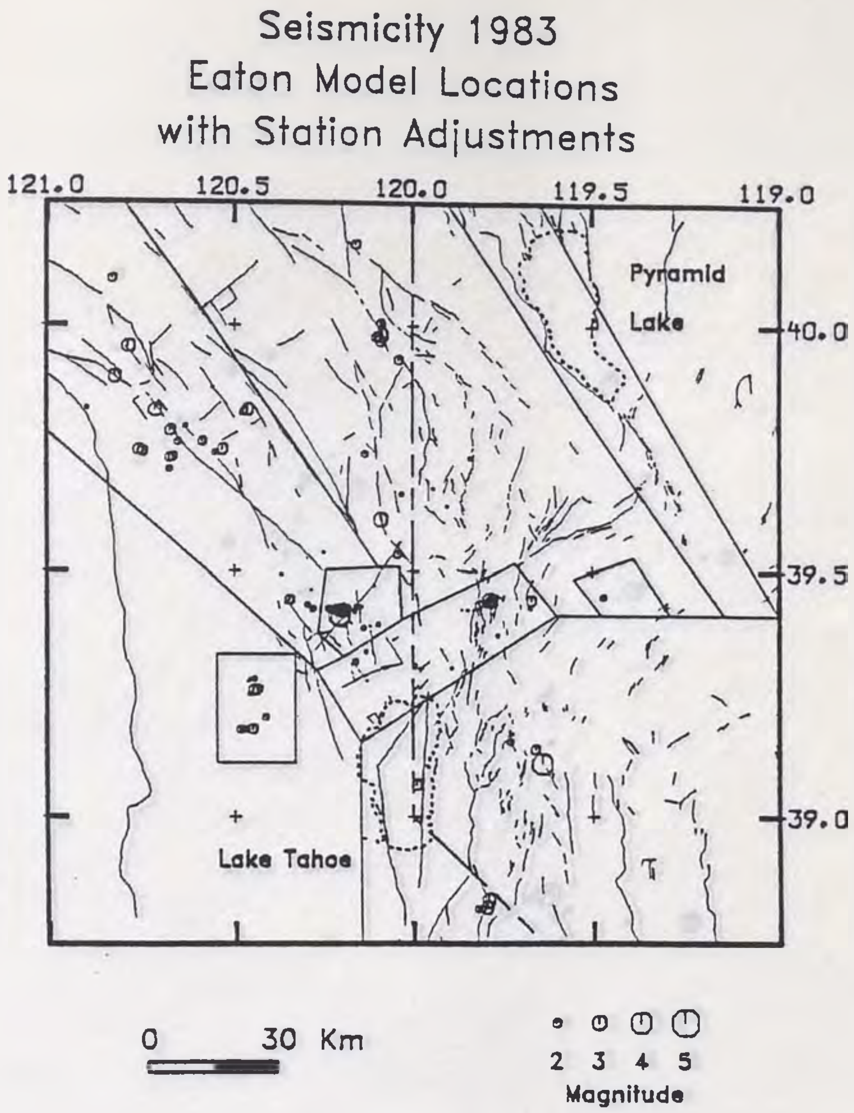

Figure 31. Seismicity from January 1, 1983 to December 31, 1983 located with Eaton's velocity model and station adjustments. Outlines of boundaries shown.

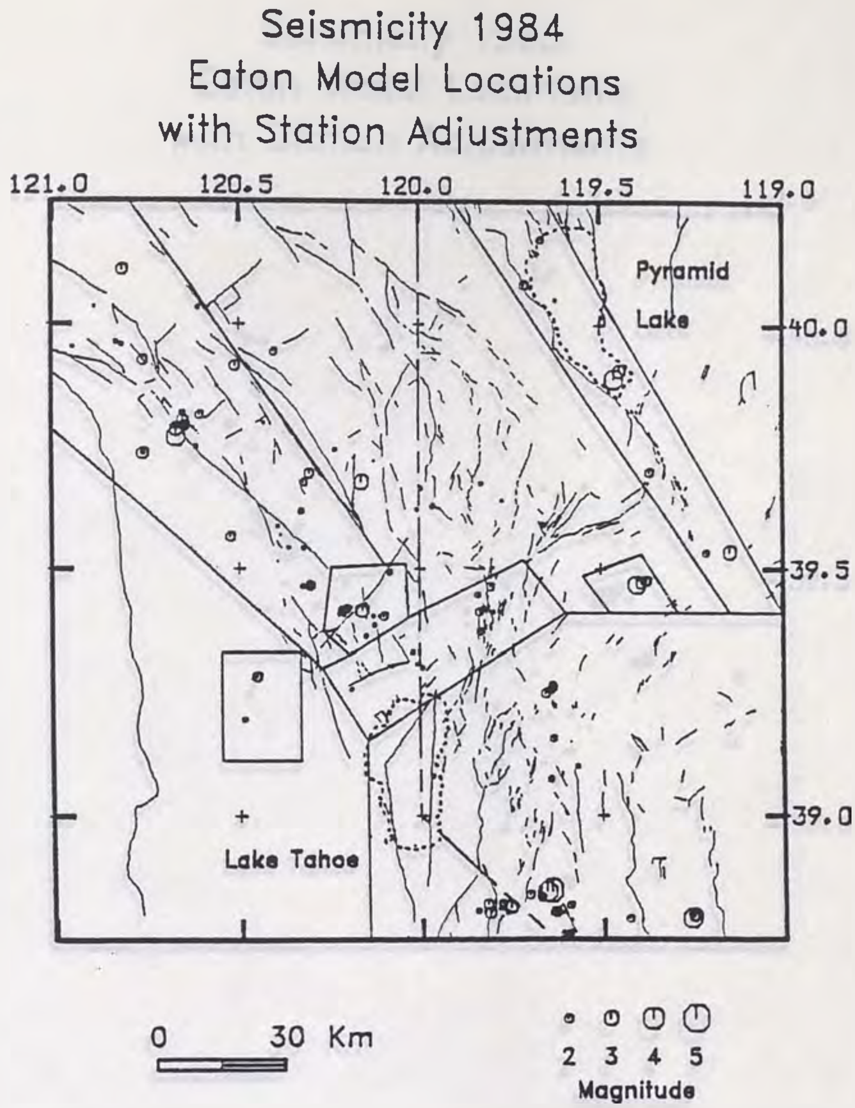

Figure 32. Seismicity from January 1, 1984 to December 31, 1984 located with Eaton's velocity model and station adjustments. Outlines of boundaries shown.

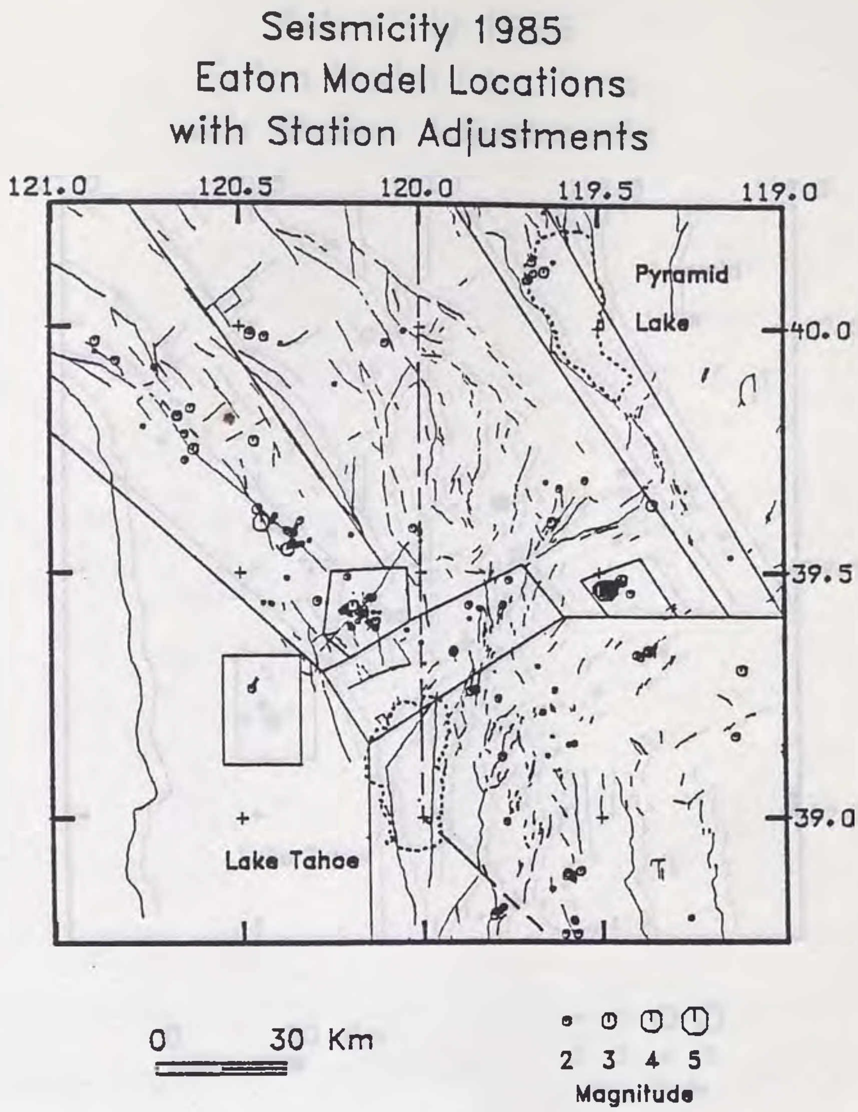

Figure 33. Seismicity from January 1, 1985 to December 31, 1985 located with Eaton's velocity model and station adjustments. Outlines of boundaries shown.

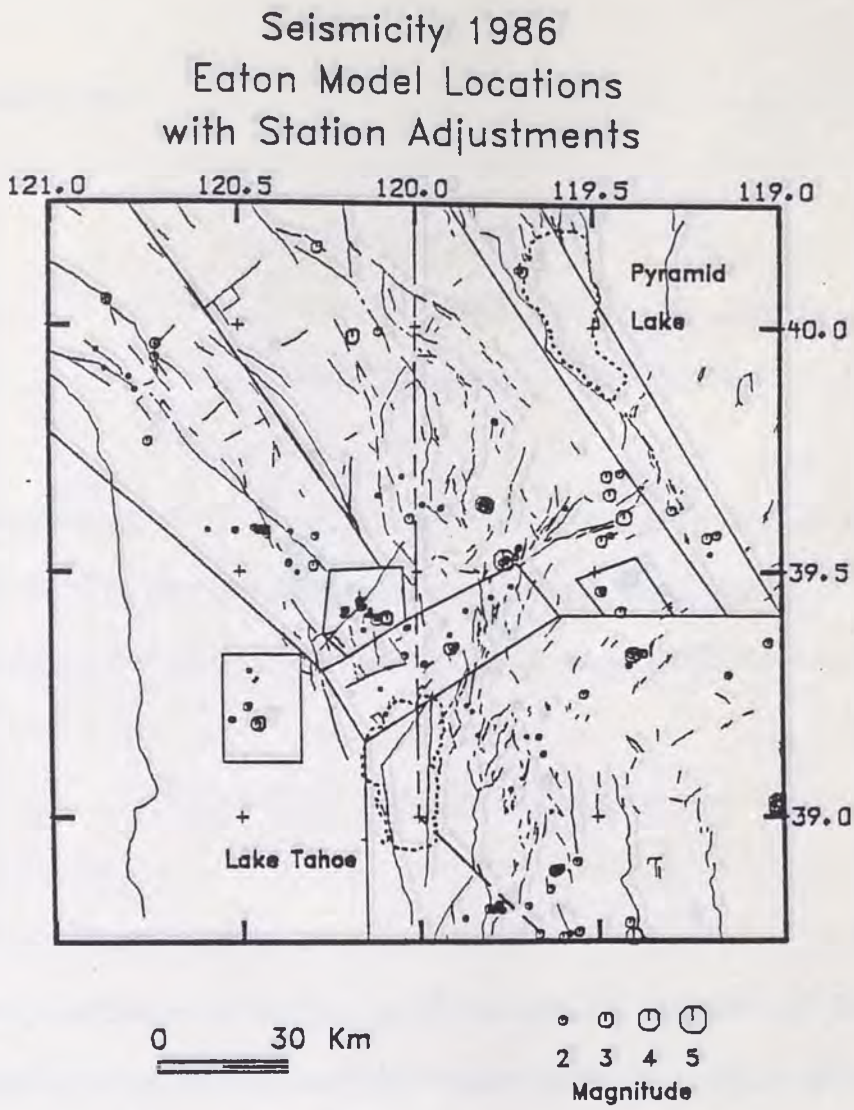

Figure 34. Seismicity from January 1, 1986 to December 31, 1986 located with Eaton's velocity model and station adjustments. Outlines of boundaries shown.

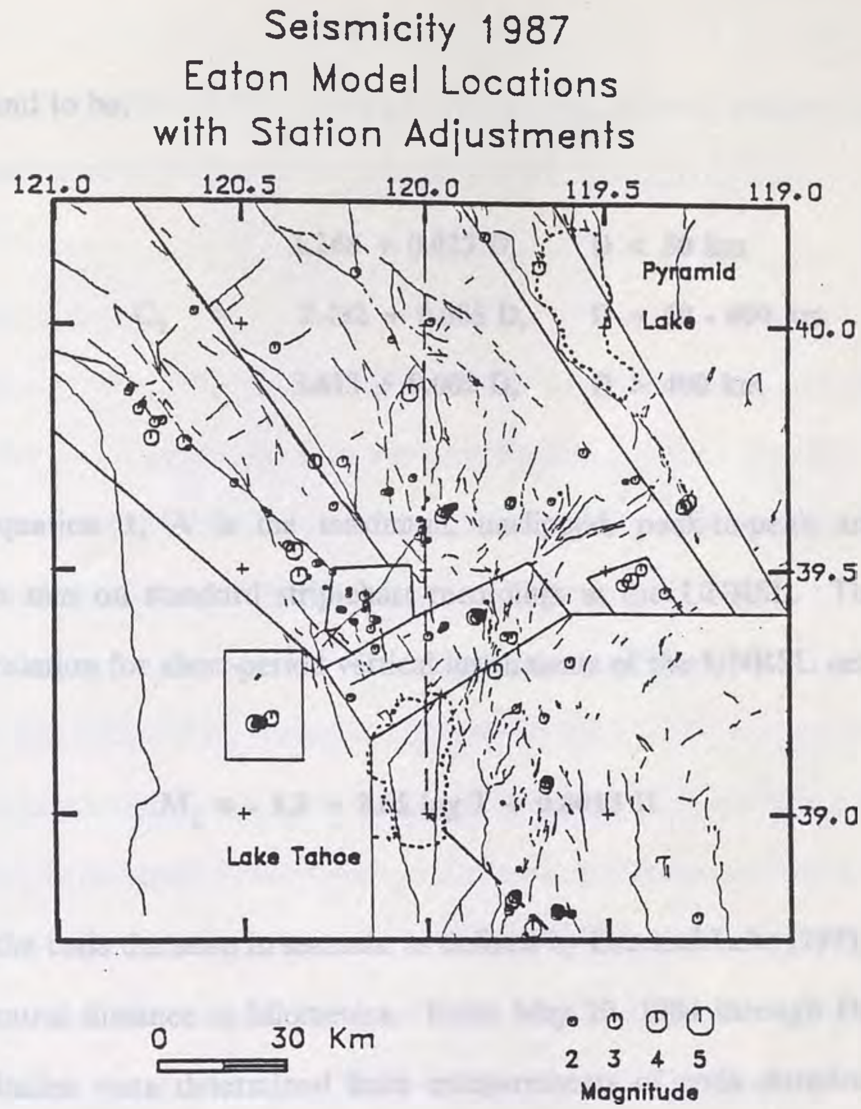

Figure 35. Seismicity from January 1, 1987 to December 31, 1987 located with Eaton's velocity model and station adjustments. Outlines of boundaries shown.

C_1 was found to be,

$$C_1 = \begin{cases} 1.268 + 0.027\,D, & D < 50 \text{ km} \\ 2.492 + 0.005\,D, & D = 50 - 400 \text{ km} \\ 3.613 + 0.002\,D, & D > 400 \text{ km} \end{cases}$$

In equation 1, A is the maximum, unclipped, peak-to-peak amplitude measured in mm on standard strip-chart recordings at the UNRSL. The coda-magnitude relation for short-period vertical instruments of the UNRSL network is,

$$M_C = -1.2 + 2.65 \log T + 0.0013\,D \qquad (2)$$

where T is the coda duration in seconds, as defined by Lee and Lahr (1975), and D is the epicentral distance in kilometers. From May 10, 1984 through December 1987 magnitudes were determined from measurements of coda duration in the "Fasthypo" program written by Bob Hermann at the University of St. Louis. The formula used for coda duration used between May 10 and August 11, 1984 is,

$$M_D = -2.46 + 2.82 \log_{10} (T_M) \qquad (3)$$

The formula used after August 11, 1984 is,

$$M_D = -1.70 + 2.65 \log_{10} (T_M) \qquad (4)$$

Where T_M is the mean of the durations determined at each stations from the compressional wave arrival until the coda falls to the background level.

Soda Springs Sub-area

From January 1980 to December 1987, 93 earthquakes, ranging from magnitude 0.4 to 5.2 were located in the Soda Springs sub-area (fig. 36). Depths for these events ranged from shallow (less than one km) to 21 km (fig. 27, Soda Springs) with 90% of the events occurring above 18 km.

Most of the events in this area were associated with a magnitude 5.2 earthquake that occurred on November 28, 1980 at 1821 GMT, southwest of Soda Springs, California near Devils Peak, within the Sierran block (figs. 36 and 28). This event was felt in Sacramento and Quincy, California, and Reno and Verdi, Nevada. Approximately an hour before the main shock, two foreshocks of magnitude 3.1 and 1.8 were recorded. The largest aftershock was a magnitude 3.1 and occurred about 15 minutes after the mainshock. Before the end of 1980, 39 events had been recorded. Activity continued into 1981 with 17 events locating within a 5 km epicentral distance of the M_L 5.2 event. Since 1982, the activity has moved slightly south (locating near the Forest Hill Divide), shallowed and decreased, thirty events in the six years, 1982-1987 (figs. 34 and 35).

For events with depth errors of less than 5 km, an average depth was calculated. For the Soda Springs area the average depth is 12 km. As stated in first paragraph, events since 1982 have shallowed and moved south. Splitting the data set and calculating an average depth for events before and after 1982 shows that the

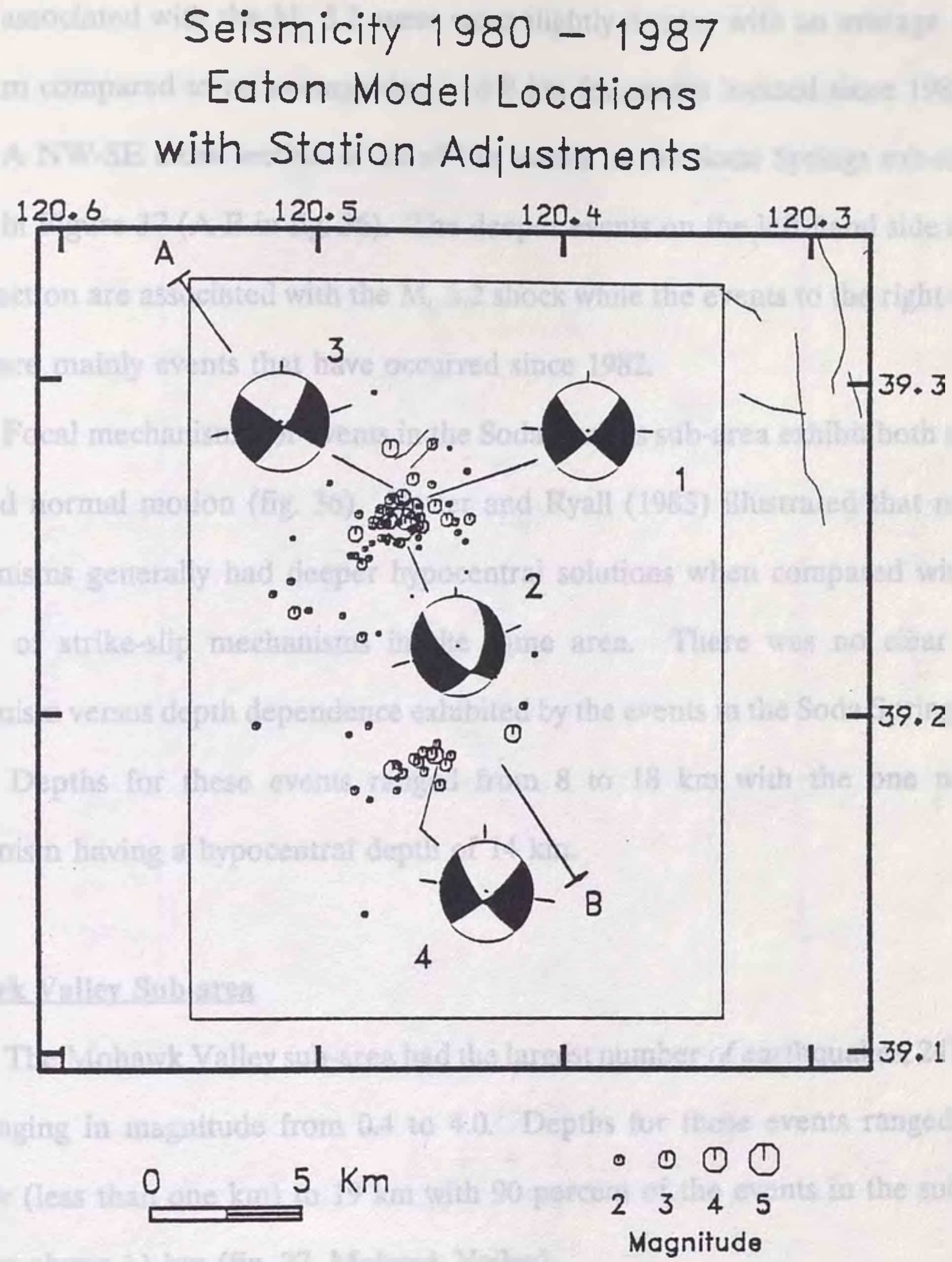

Figure 36. Epicentral distribution of events in the Soda Springs sub-area. Compressional quadrants shaded and T-axis of focal mechanisms shown. Year, month, day and GMT of mechanisms are 1, 801128 1711; 2, 801128 1821; 3, 801128 1842; 4, 86116 2051. AB is the projection plane for the cross section in Figure 37.

events associated with the M_L 5.2 event were slightly deeper with an average depth of 13 km compared to an average depth of 8 km for events located since 1982.

A NW-SE cross section of all of the events in the Soda Springs sub-area is shown in Figure 37 (A-B in fig. 36). The deeper events on the left-hand side of the cross section are associated with the M_L 5.2 shock while the events to the right of the figure are mainly events that have occurred since 1982.

Focal mechanisms for events in the Soda Springs sub-area exhibit both strike-slip and normal motion (fig. 36). Vetter and Ryall (1983) illustrated that normal mechanisms generally had deeper hypocentral solutions when compared with the depths of strike-slip mechanisms in the same area. There was no clear focal mechanism versus depth dependence exhibited by the events in the Soda Springs sub-area. Depths for these events ranged from 8 to 18 km with the one normal mechanism having a hypocentral depth of 14 km.

Mohawk Valley Sub-area

The Mohawk Valley sub-area had the largest number of earthquakes, 247, (fig. 38) ranging in magnitude from 0.4 to 4.0. Depths for these events ranged from shallow (less than one km) to 19 km with 90 percent of the events in the sub-area locating above 11 km (fig. 27, Mohawk Valley).

Yearly plots of events in the Mohawk Valley sub-area reveal several tight spatial/temporal clusters (figs. 29, 32, 33 and 34). When a longer time period is plotted, for example the eight-year window of this study (fig. 26), a northwest trend of epicenters extends from the Truckee area northwest along Mohawk Valley to Lake Almanor. Several authors have noted this trend including VanWormer and Ryall

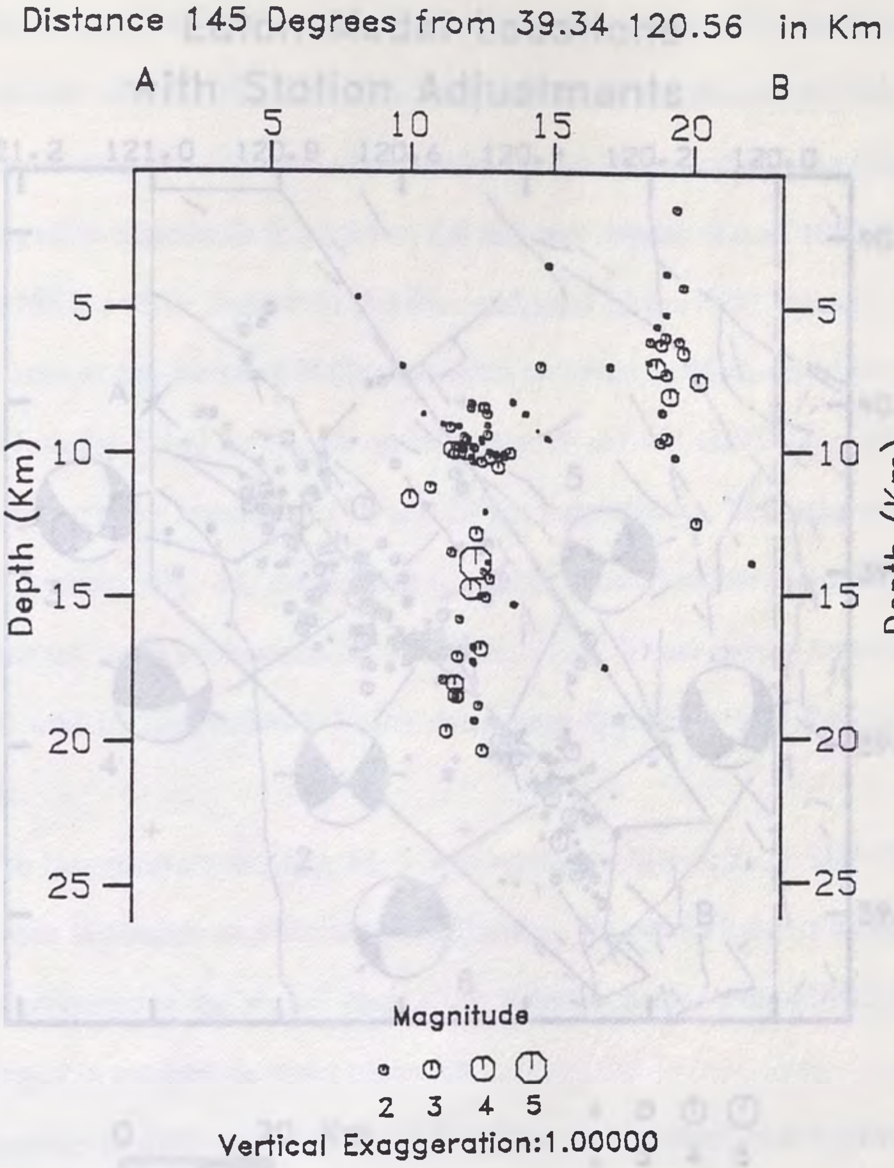

Figure 37. Cross section (scale 1:1) of hypocenters of the Soda Springs sub-area. See Figure 35 for map view of earthquakes and orientation of projection plane.

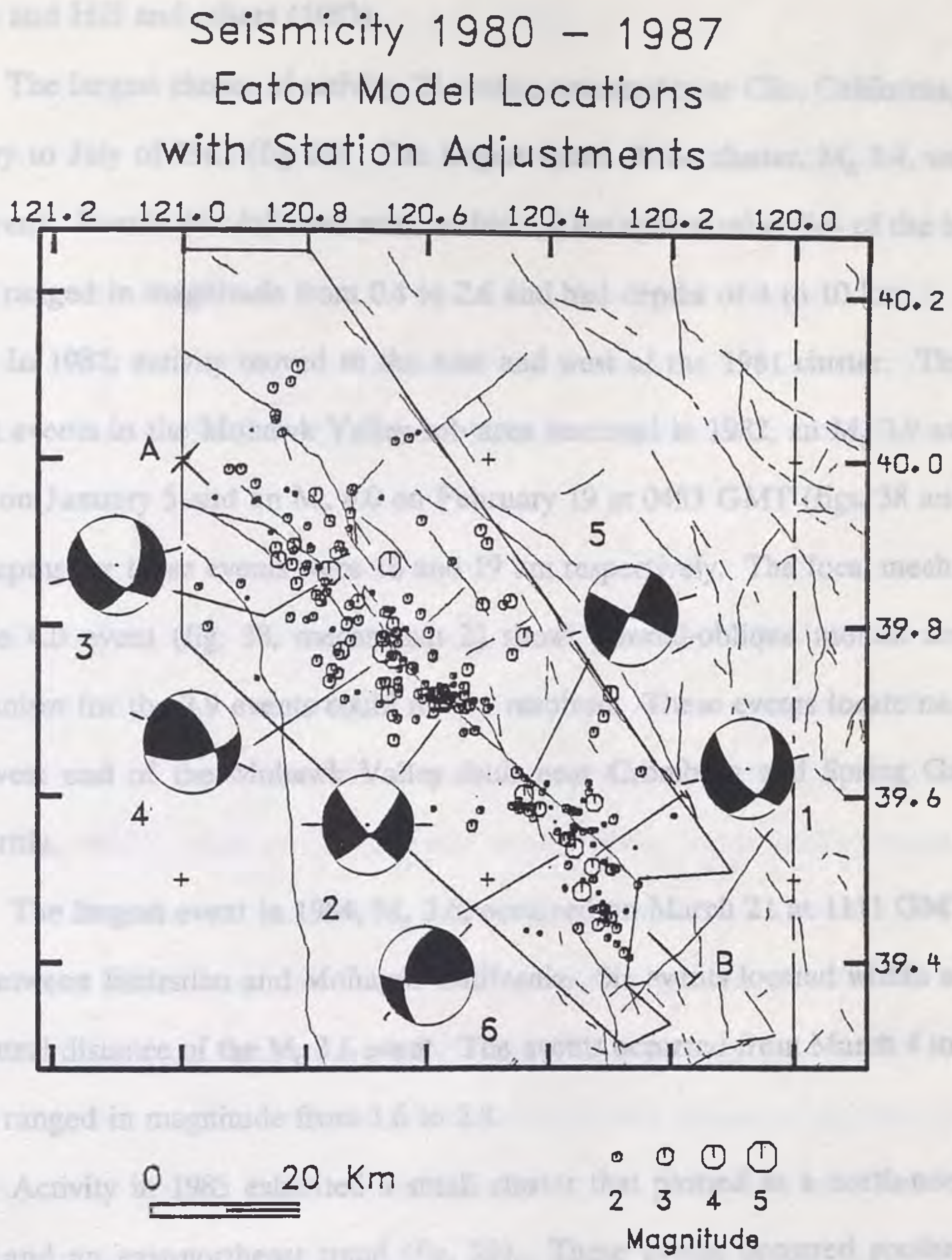

Figure 38. Epicentral distribution of events in the Mohawk Valley sub-area. Compressional quadrants shaded and T-axis of focal mechanisms shown. Year, month, day and GMT of mechanism are 1, 800515 0425; 2, 810102 1812; 3, 820219 0453; 4, 840321 1111; 5, 850522 0342; 6, 871003 0347. AB is the projection plane for the cross section in Figure 39.

(1980) and Hill and others (1983).

The largest cluster of activity, 28 events, occurred near Clio, California, from January to July of 1981 (fig 29). The largest event of the cluster, M_c 3.4, was the first event. Events that followed were within a 6 km epicentral radius of the M_c 3.4 event, ranged in magnitude from 0.4 to 2.6 and had depths of 4 to 10 km.

In 1982, activity moved to the east and west of the 1981 cluster. The two largest events in the Mohawk Valley sub-area occurred in 1982, an M_c 3.9 at 0326 GMT on January 5 and an M_c 4.0 on February 19 at 0453 GMT (figs. 38 and 30). The depths for these events were 18 and 19 km respectively. The focal mechanism for the 4.0 event (fig. 38, mechanism 3) shows normal-oblique motion and the mechanism for the 3.9 events could not be resolved. These events locate near the northwest end of the Mohawk Valley fault near Cromberg and Spring Garden, California.

The largest event in 1984, M_c 3.6, occurred on March 21 at 1111 GMT (fig. 32), between Blairsden and Mohawk, California. Six events located within a 5 km epicentral distance of the M_c 3.6 event. The events occurred from March 4 to April 7 and ranged in magnitude from 1.6 to 2.8.

Activity in 1985 exhibited a small cluster that plotted as a north-northeast trend and an east-northeast trend (fig. 33). These events occurred southeast of Sierraville, California, from October 19 to November 4 and ranged from magnitude 0.4 to 2.8. The largest event of this group, M_D 2.8 occurred first and depths for these events ranged from 2.0 to 12 km.

A small tight cluster occurred in 1986, southwest of Sierra Valley, beginning October 15 and continuing to October 21 (fig. 34). Magnitudes for this cluster ranged from 1.5 to 1.8 and depths from 7 to 10 km.

Events in 1987 show the most pronounced northwest linear trend for any single year (fig. 35). Several magnitude 3+ events occurred during 1987 and one focal mechanism for a magnitude 3.3 event exhibited mostly strike-slip motion with a slight reverse component (fig. 35, mechanism 6). Figure 39 is a NW-SE cross section of all of the events in the Mohawk Valley sub-area. The cross section shows that most of the activity is above 12 km and the two largest events were the deepest.

Truckee Sub-area

During the study period, 196 events, ranging from magnitude 0.4 to 4.3 were located in the Truckee sub-area (fig. 40). Depths for these events ranged from 3 to 18 km with ninety percent of the events locating above 16 km (fig. 27, Truckee).

The 1966 Truckee earthquake and its aftershocks locate in the Truckee sub-area. Aftershocks of this event, described by Ryall and others (1968) and Greensfelder (1968), formed a 10 km long, northeast-southwest trending linear zone along the Dog Valley lineament. Tsai and Aki (1970) presented a focal mechanism for the 1966 event which exhibited left-lateral strike-slip motion along the northeast trending nodal plane. Persistent activity in the Truckee sub-area occurs at the intersection of the northwest-trending Mohawk Valley fault and the northeast-trending Dog Valley lineament.

In 1981, all of the activity for this sub-area, sixteen events, occurred within 4 km of the two largest events, M_c 3.3 and 3.1 (fig. 29). Most of the activity (14 events) occurred from March 28 to April 8, 1984. Depths for these events were 6 to 11 km and magnitudes ranged from 1.8 to 3.3. Ten of the events occurred within a

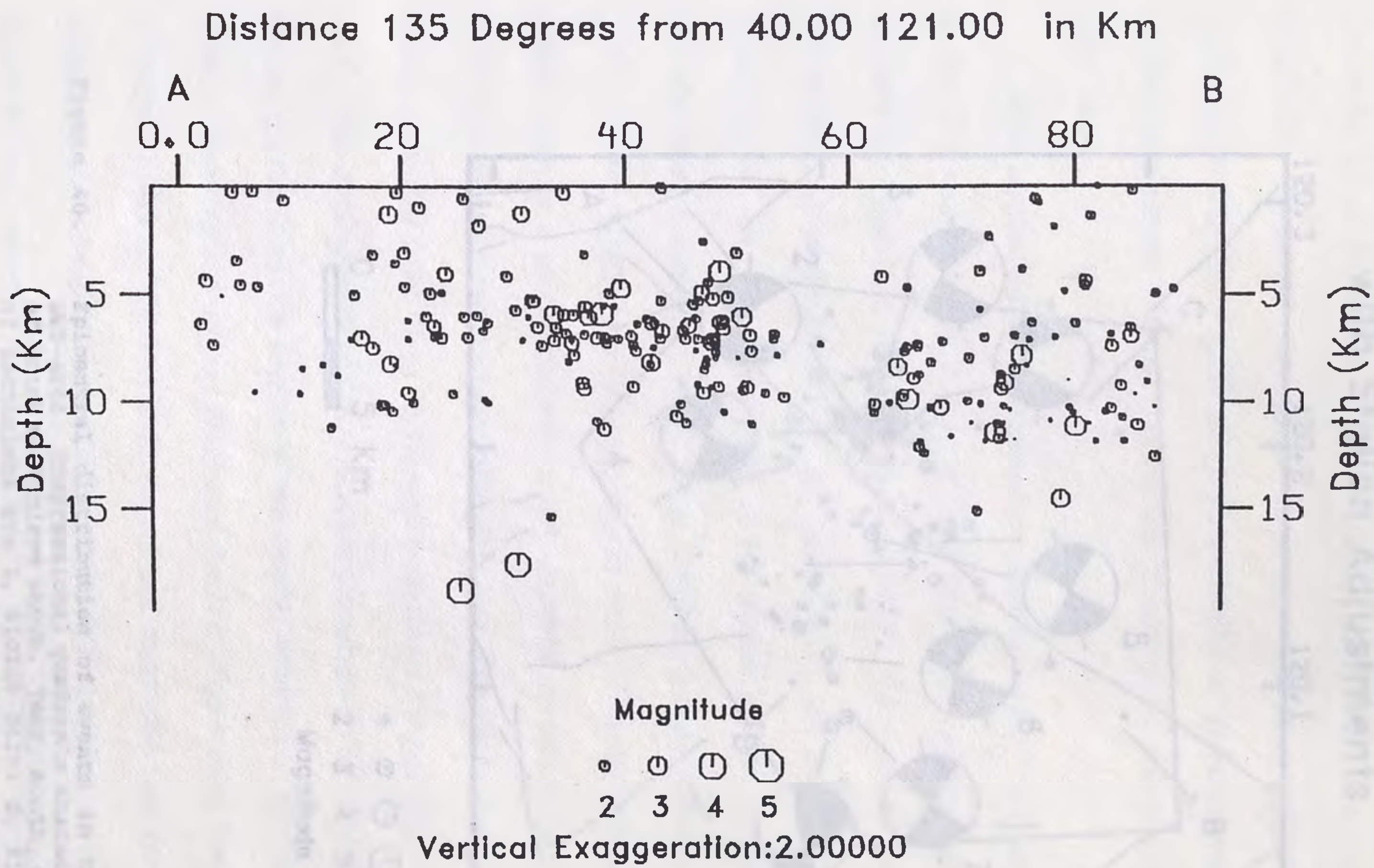

Figure 39. Cross section (scale 1:2) of hypocenters of the Mohawk Valley sub-area. See Figure 38 for map view of earthquakes and orientation of projection plane.

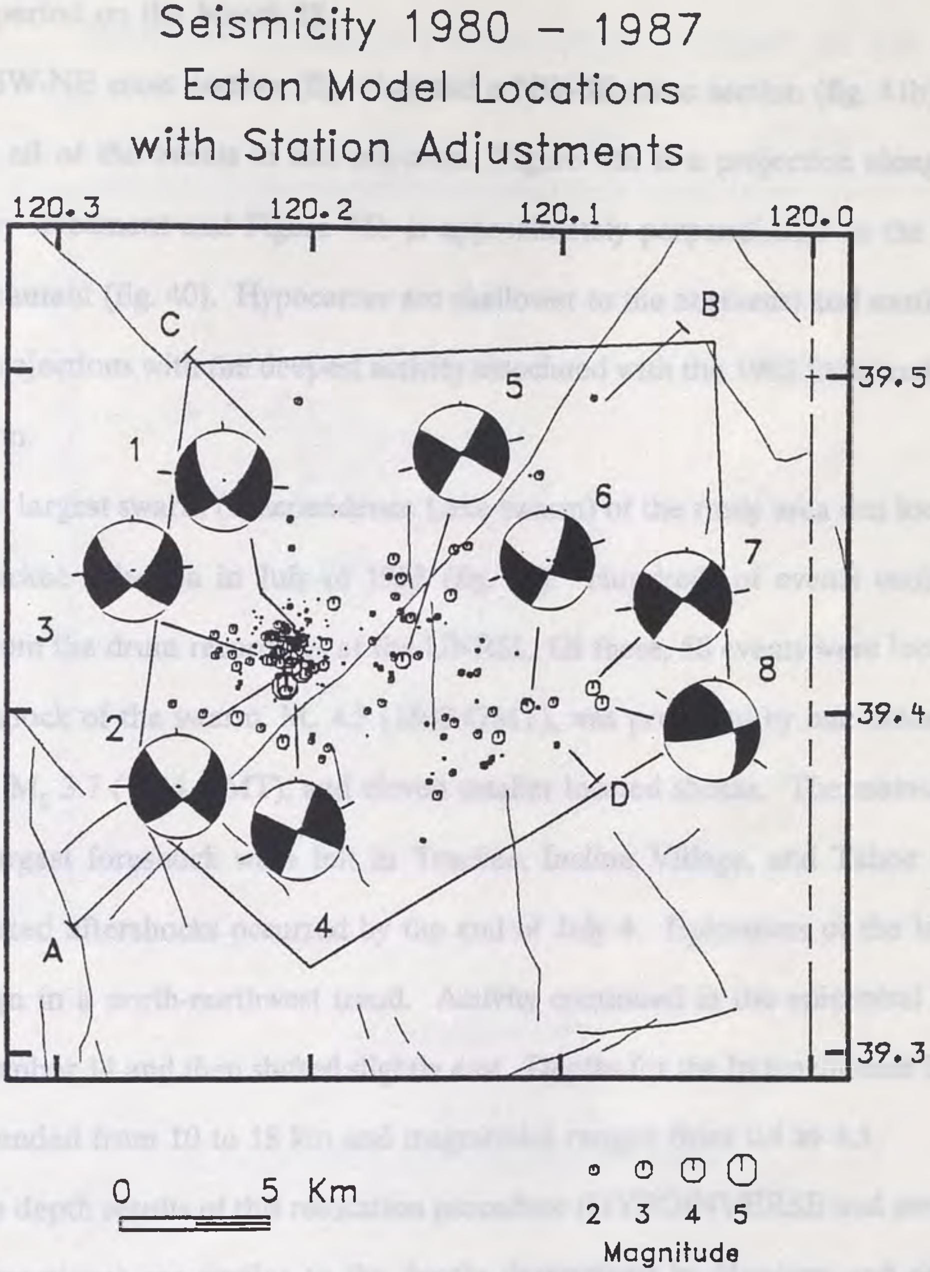

Figure 40. Epicentral distribution of events in the Truckee sub-area. Compressional quadrants shaded and T-axis of focal mechanisms shown. Year, month, day and GMT of mechanisms are 1, 810328 0439; 2, 810328 0504; 3, 810403 0806; 4, 830703 1508; 5, 840905 0804; 6, 860522 0819; 7, 861203 2356; 8, 861213 1230. AB and CD are projection planes for cross sections in Figures 41a and 41b respectively.

one hour period on the March 28.

A SW-NE cross section (fig. 41a) and a NW-SE cross section (fig. 41b) are shown for all of the events in this sub-area. Figure 41a is a projection along the Dog Valley lineament and Figure 41b is approximately perpendicular to the Dog Valley lineament (fig. 40). Hypocenter are shallower to the northeast and southeast on these projections with the deepest activity associated with the 1983 Independence Lake swarm.

The largest swarm (Independence Lake swarm) of the study area was located in the Truckee sub-area in July of 1983 (fig. 31). Hundreds of events could be counted from the drum recordings at the UNRSL. Of these, 58 events were located. The mainshock of the swarm, M_C 4.3 (1508 GMT), was preceded by one moderate foreshock, M_C 3.7 (1244 GMT), and eleven smaller located shocks. The mainshock and the largest foreshock were felt in Truckee, Incline Village, and Tahoe City. Thirty located aftershocks occurred by the end of July 4. Epicenters of the larger shocks align in a north-northwest trend. Activity continued in the epicentral area until September 14 and then shifted slightly east. Depths for the Independence Lake swarm extended from 10 to 18 km and magnitudes ranged from 0.4 to 4.3.

The depth results of this relocation procedure (HYPOINVERSE and median station corrections) are similar to the depths determined by Hawkins and others (1986). Hawkins and others (1986) used the Joint Hypocenter Determination (JHD) technique to locate the July 1983 swarm and concluded that the great majority of seismic energy release recorded in this localized area had occurred in a zone directly below the area affected by the 1966 rupture. Aftershocks of the 1966 Truckee event, M_L 6.0 (BRK), ranged from near the surface to about 12 km, with the mainshock

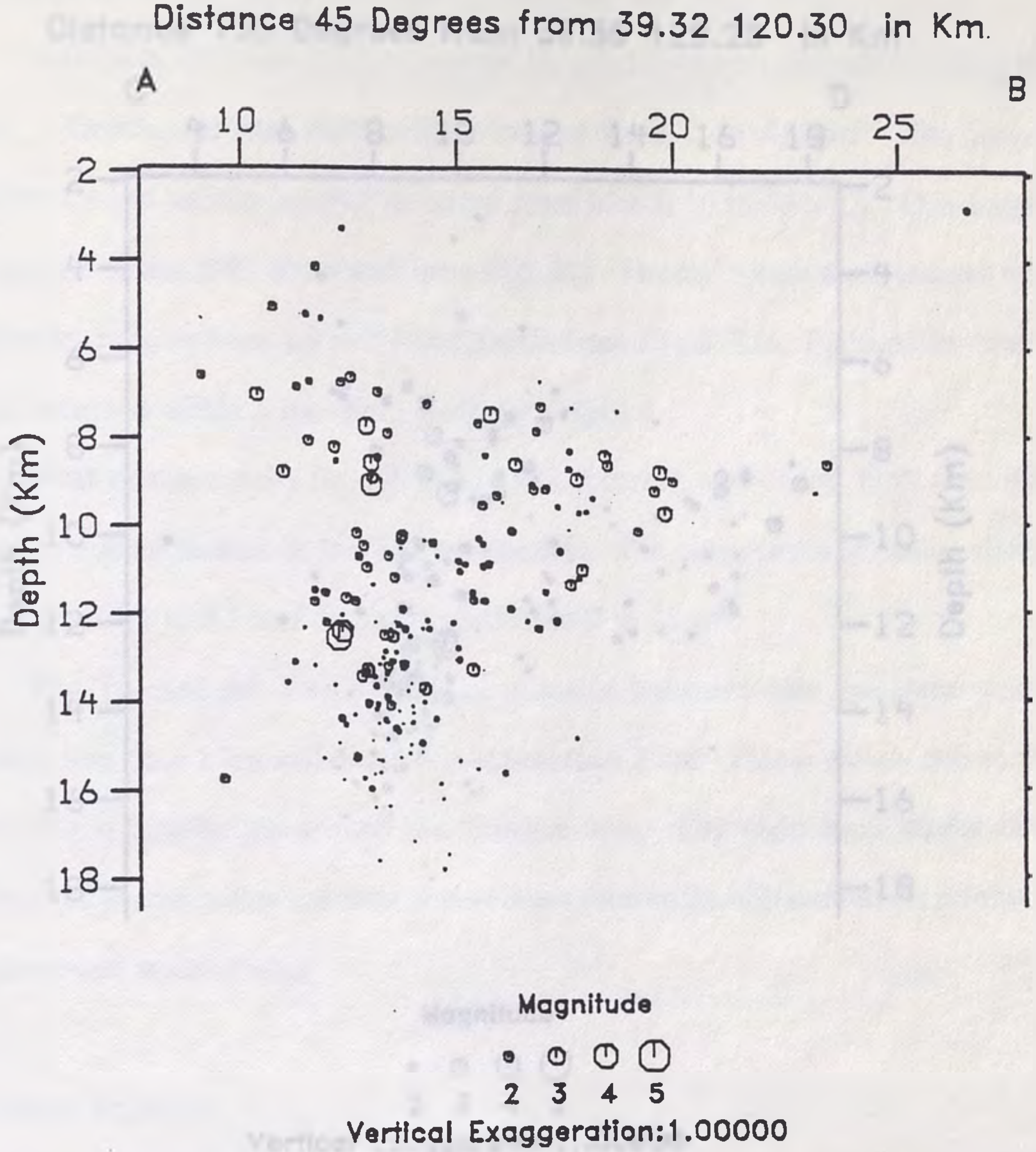

Figure 41a. Cross section (scale 1:1) of hypocenters of the Truckee sub-area. See Figure 40 for map view of earthquakes and orientation of projection plane.

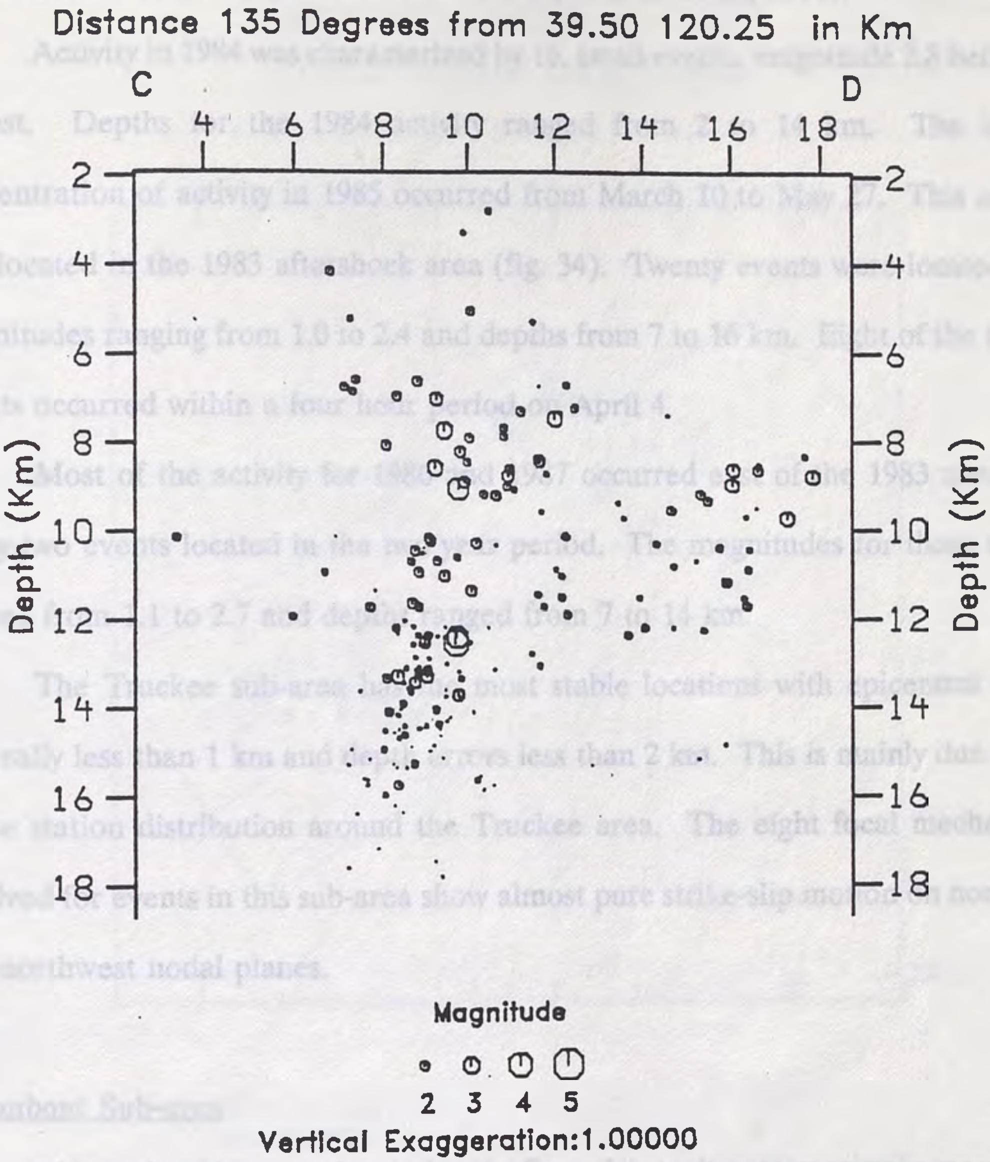

Figure 41b. Cross section (scale 1:1) of hypocenters of the Truckee sub-area. See Figure 40 for map view of earthquakes and orientation of projection plane.

depth fixed at 10 km (Ryall and others, 1968; Tsai and Aki, 1970).

Activity in 1984 was characterized by 16, small events, magnitude 2.8 being the largest. Depths for the 1984 activity ranged from 2 to 14 km. The largest concentration of activity in 1985 occurred from March 10 to May 27. This activity was located in the 1983 aftershock area (fig. 34). Twenty events were located with magnitudes ranging from 1.0 to 2.4 and depths from 7 to 16 km. Eight of the twenty events occurred within a four hour period on April 4.

Most of the activity for 1986 and 1987 occurred east of the 1983 zone with thirty-two events located in the two year period. The magnitudes for these shocks ranged from 1.1 to 2.7 and depths ranged from 7 to 14 km.

The Truckee sub-area has the most stable locations with epicentral errors generally less than 1 km and depth errors less than 2 km. This is mainly due to the dense station distribution around the Truckee area. The eight focal mechanisms resolved for events in this sub-area show almost pure strike-slip motion on northeast and northwest nodal planes.

Steamboat Sub-area

106 earthquakes were located in the Steamboat sub-area ranging in magnitude from 0.4 to 3.5 (fig. 42). Depth for these events ranged from 1 to 19 km with 90% locating above 11 km (fig. 27, Steamboat).

From July 21 to October 13, 1980, eight events occurred in Martis Valley, northwest of Lake Tahoe (fig. 28). These events ranged from magnitude 1.6 to 2.7 with depths from 6 to 15 km. The focal mechanism for the M_c 2.7 is shown in Figure 42 and exhibits a reverse component.

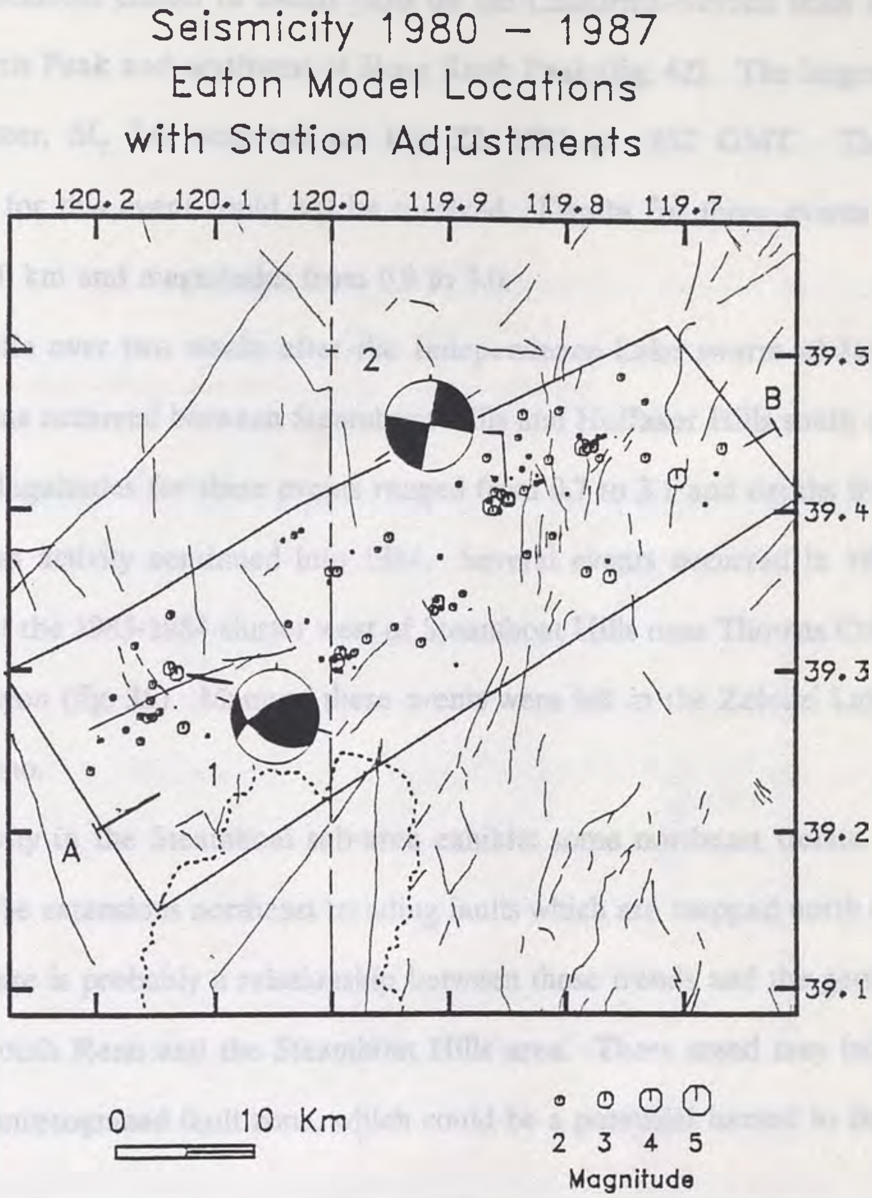

Figure 42. Epicentral distribution of events in the Steamboat sub-area. Compressional quadrants shaded and T-axis of focal mechanisms shown. Year, month, day and GMT of mechanisms are 1, 800721 1012; 2, 870528 0219. AB is projection plane for cross section in Figure 43.

A persistent cluster of events plots on the California-Nevada state line just east of Martis Peak and northwest of Rose Knob Peak (fig. 42). The largest event of this cluster, M_c 3.0, occurred on July 22, 1981 at 1852 GMT. The focal mechanism for this event could not be resolved. Depths for these events ranged from 4 to 10 km and magnitudes from 0.9 to 3.0.

A little over two weeks after the Independence Lake swarm of July 1983, several events occurred between Steamboat Hills and Huffaker Hills south of Reno (fig. 31). Magnitudes for these events ranged from 0.7 to 3.1 and depths from 7 to 10 km. This activity continued into 1984. Several events occurred in 1987, just southwest of the 1983-1984 cluster west of Steamboat Hills near Thomas Creek and Whites Canyon (fig. 35). Many of these events were felt in the Zolezzi Lane area, south of Reno.

Activity in the Steamboat sub-area exhibits some northeast trends. These trends may be extensions northeast trending faults which are mapped north of Lake Tahoe. There is probably a relationship between these trends and the geothermal activity in south Reno and the Steamboat Hills area. These trend may indicate a previously unrecognized fault zone, which could be a potential hazard to the Reno area.

Figure 43 is a SW-NE cross section of the Steamboat sub-area (fig. 42, A-B). Most of the seismicity occurs between 4 and 11 km with events to the west being slightly deeper than events to the east.

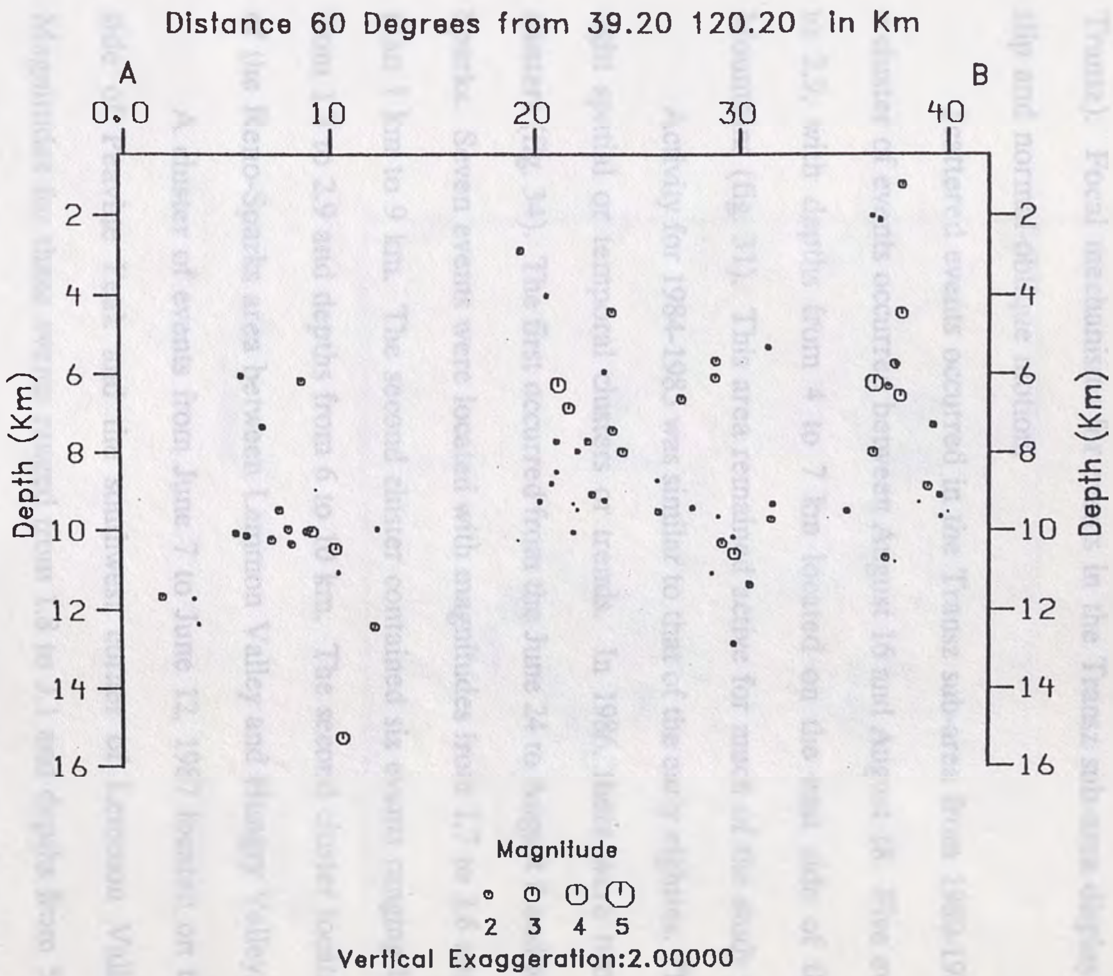

Figure 43. Cross section (scale 1:2) of hypocenters of the Steamboat sub-area. See Figure 42 for map view of earthquakes and orientation of projection plane.

Transitional Sub-area

From January 1980 to December 1987, 127 earthquakes, ranging from 0.9 to 3.9 were located in the Transz sub-area (fig. 44). Depths for these events ranged from shallow (less than 1 km) to 22 km with 90% locating above 10 km (fig. 27, Transz). Focal mechanisms for events in the Transz sub-area display both strike-slip and normal-oblique motion.

Scattered events occurred in the Transz sub-area from 1980-1982. In 1983, a cluster of events occurred between August 16 and August 18. Five events, M_c 1.8 to 2.9, with depths from 4 to 7 km located on the east side of the Diamond Mountains (fig. 31). This area remained active for much of the study period.

Activity for 1984-1985 was similar to that of the early eighties. There were no tight spatial or temporal clusters or trends. In 1986, there were two earthquake clusters (fig. 34). The first occurred from the June 24 to August 8 and located under Sparks. Seven events were located with magnitudes from 1.7 to 3.6 and depths less than 1 km to 9 km. The second cluster contained six events ranging in magnitude from 1.7 to 2.9 and depths from 6 to 10 km. The second cluster located just north of the Reno-Sparks area between Lemmon Valley and Hungry Valley.

A cluster of events from June 7 to June 12, 1987 located on the northeast side of Peavine Peak and the southwest corner of Lemmon Valley (fig. 35). Magnitudes for these events ranged from 1.8 to 3.1 and depths from 5 to 8 km. A second spatial cluster occurs on the California-Nevada border (fig. 35). These events locate near the northeast extension of the Dog Valley fault and the southeast extension of the Last Chance and the Long Valley fault in the vicinity of the 1948 Verdi earthquake (ML 6.0, Bell and others, 1976).

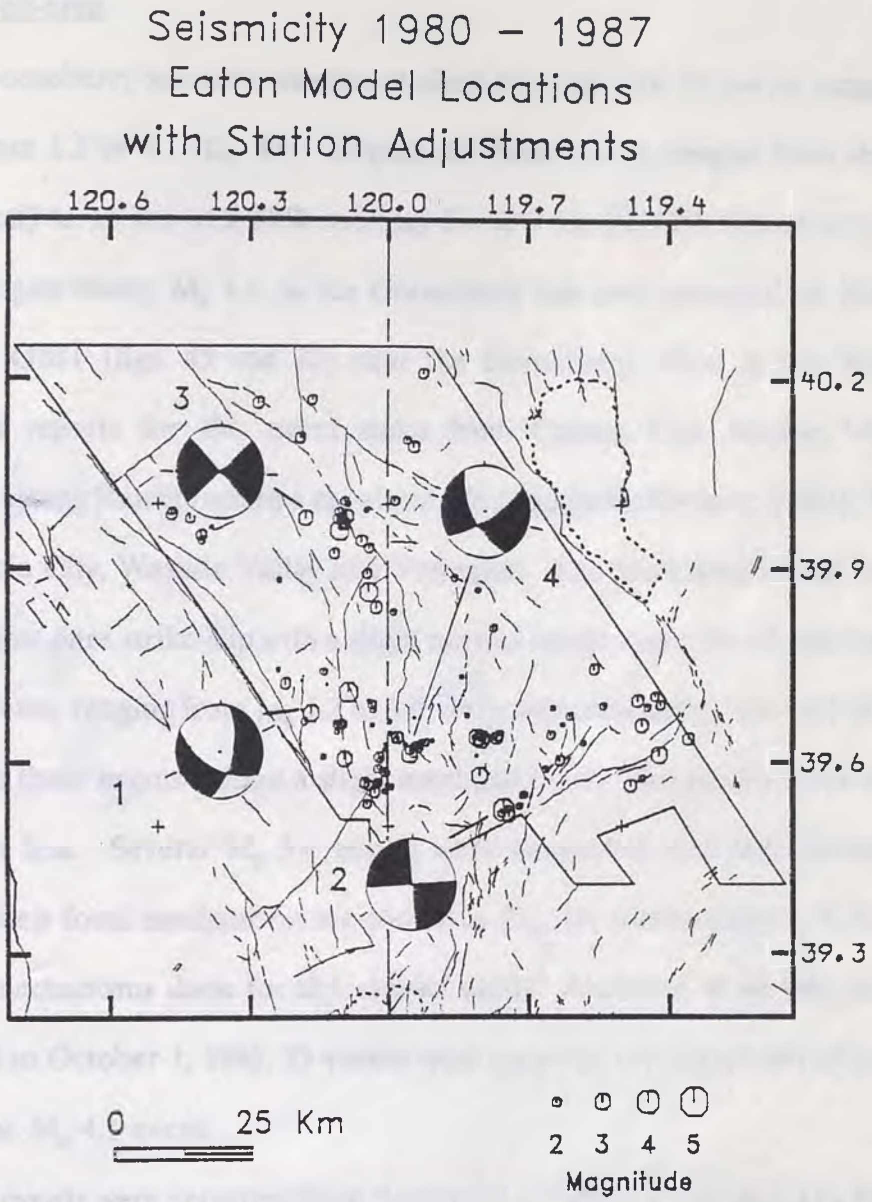

Figure 44. Earthquake distribution of events in the Transitional sub-area. Compressional quadrants shaded and T-axis of focal mechanisms shown. Year, month, day and GMT of mechanisms are 1, 841014 1353; 2, 860628 0206; 3, 861007 0417; 4, 870607 2113.

<u>Gooseberry Sub-area</u>

The Gooseberry sub-area was the smallest data set with 38 events ranging in magnitude from 1.2 to 4.1 (fig. 45). Depths for these events ranged from shallow (less than 1 km) to 11 km with 90% locating above 9 km (fig. 27, Gooseberry).

The largest event, M_D 4.1, in the Gooseberry sub-area occurred on May 28, 1985 at 0756 GMT (figs. 45 and 33) near the Gooseberry Mine in the Virginia Range. Felt reports for this event came from Carson City, Incline Village, Lockwood, Mustang Ranch (where a car alarm was triggered), Pleasant Valley, Reno, Sparks, Virginia City, Washoe Valley and Yerington. The focal mechanism for this event was almost pure strike-slip with a slight normal component (fig. 45, mechanism 2). Eleven events, ranging from M_D 1.2 to 3.6, were recorded before the end of May. Epicenters for these events exhibit a slight northeast trend. Depths for these events were 6 km or less. Several M_D 3+ events were associated with this cluster and examples of their focal mechanisms are shown in (fig. 45, mechanisms 3, 4, 5). All of the focal mechanisms done for this cluster exhibit dominant strike-slip motion. From May 28 to October 1, 1985, 23 events were recorded within a 4 km epicentral distance of the M_D 4.1 event.

Three events were recorded from August 16-17, 1985, the largest was M_D 3.5. The two remaining events were M_D 2.2 and depths for these 3 events ranged from 4 to 10 km.

Figure 46 is a NW-SE cross section plotting all events of the Gooseberry sub-area. The section runs from A to B in Figure 45 and all events in this sub-area plot above 11 km.

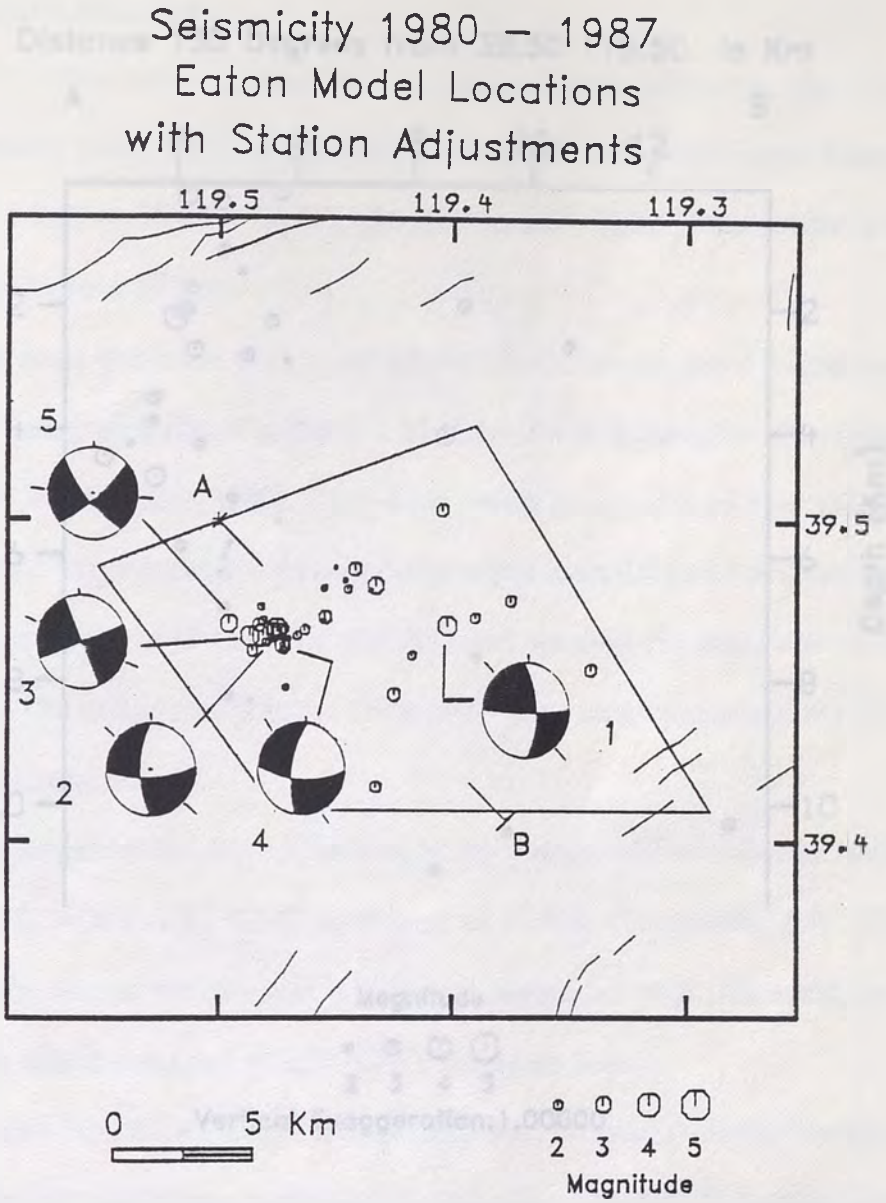

Figure 45. Earthquake distribution of events in the Gooseberry sub-area. Compressional quadrants shaded and T-axis of focal mechanisms shown. Year, month, day and GMT of mechanisms are 1, 840816 0932; 2, 850528 0756; 3, 850528 0822; 4, 850528 1347; 5, 850903 2220. AB is projection plane for cross section in Figure 46.

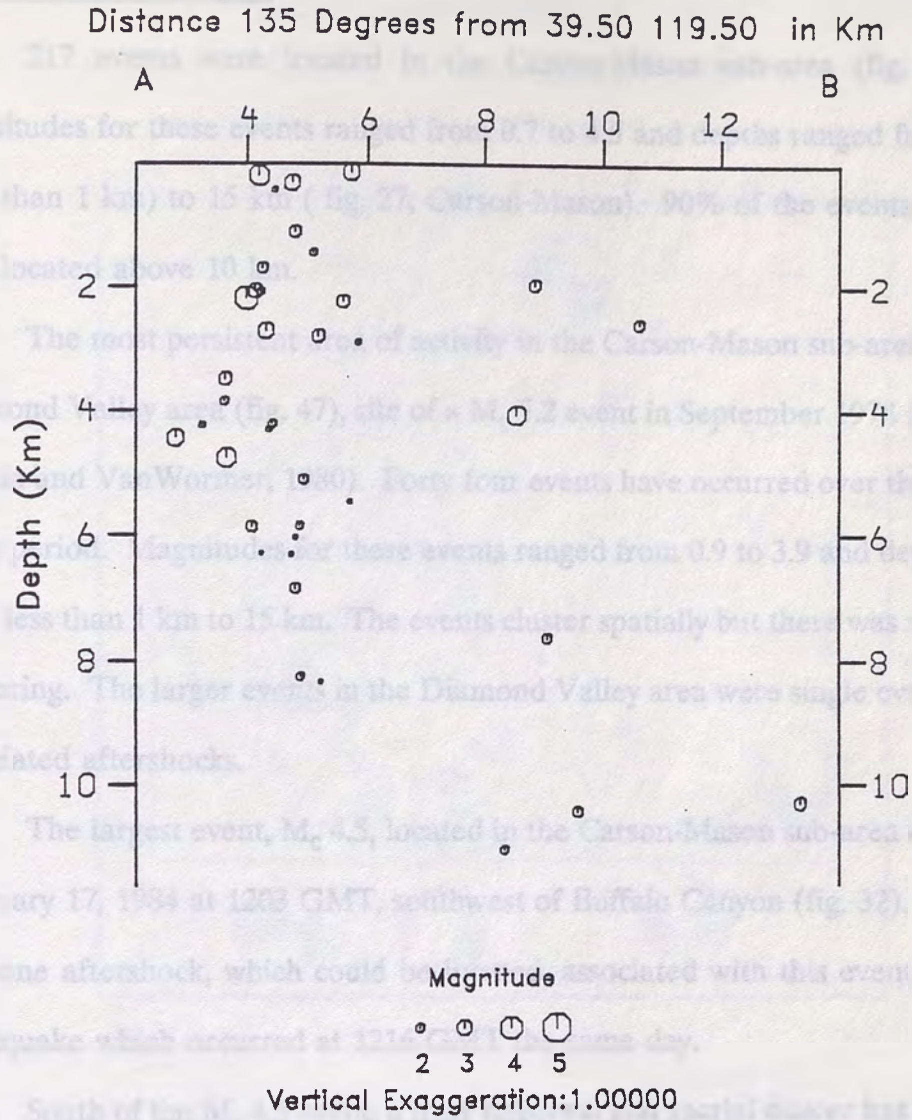

Figure 46. Cross section (scale 1:1) of hypocenters of the Gooseberry sub-area. See Figure 45 for map view of earthquakes and orientation of projection planes.

Carson-Mason Sub area

217 events were located in the Carson-Mason sub-area (fig. 47). The magnitudes for these events ranged from 0.7 to 4.5 and depths ranged from shallow (less than 1 km) to 15 km (fig. 27, Carson-Mason). 90% of the events in the sub-area located above 10 km.

The most persistent area of activity in the Carson-Mason sub-area was in the Diamond Valley area (fig. 47), site of a M_L 5.2 event in September 1978 (Somerville, Peppin and VanWormer, 1980). Forty-four events have occurred over the eight year study period. Magnitudes for these events ranged from 0.9 to 3.9 and depths ranged from less than 1 km to 15 km. The events cluster spatially but there was no temporal clustering. The larger events in the Diamond Valley area were single events with no associated aftershocks.

The largest event, M_C 4.5, located in the Carson-Mason sub-area occurred on February 17, 1984 at 1203 GMT, southwest of Buffalo Canyon (fig. 32). There was only one aftershock, which could be located, associated with this event, an M_C 3.9 earthquake which occurred at 1216 GMT the same day.

South of the M_C 4.5 event, a tight temporal and spatial cluster has been active twice during the eight year study period (fig. 47). The first time from May 23 to June 1, 1984, 15 events ranging in magnitude from 0.9 to 1.9 and depths from less than 1 to 6 km (fig. 32). The second time, from August 2 to 9, 1987, 21 events ranging in magnitude from 1.8 to 3.0 and depths from less than 1 to 8 km (fig. 35). Over 75% of the events in this cluster locate with depths of less than 1 km. These events locate in the Double Spring Flat area, west of the Pine Nut Mountains, northwest of Topaz Lake.

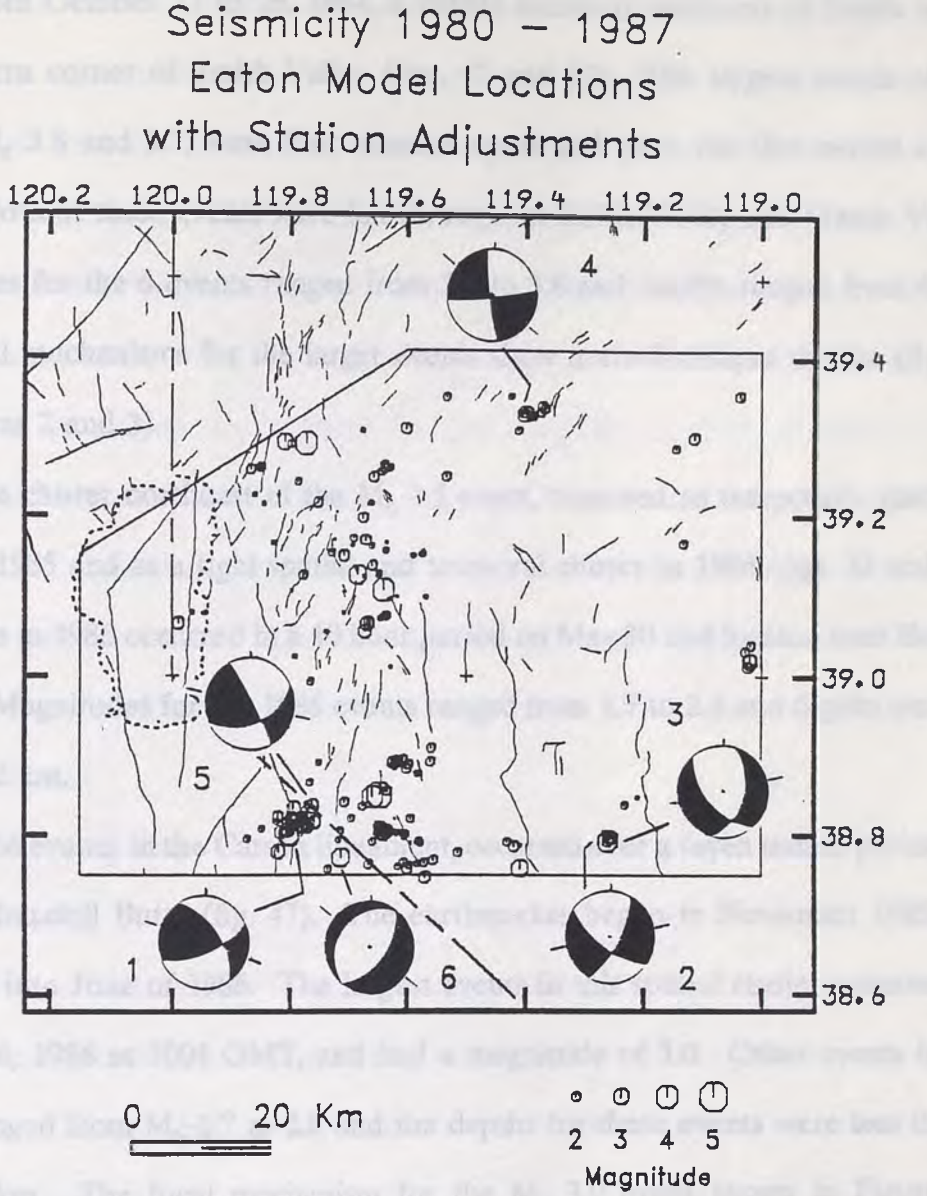

Figure 47. Earthquake distribution of events in the Carson-Mason sub-area. Compressional quadrants shaded and T-axis of focal mechanisms shown. Year, month, day and GMT of mechanisms are 1, 820605 0954; 2, 841021 1451; 3, 841021 1455; 4, 860206 1004; 5, 870419 0452; 6, 871217 0435.

From October 21 to 26, 1984, 6 events occurred southeast of Smith in the southeastern corner of Smith Valley (figs. 47 and 32). The largest events of this cluster, M_D 3.8 and 3.7, were four minutes apart and were the first events of the cluster. Both of these events were felt throughout Smith Valley and Mason Valley. Magnitudes for the 6 events ranged from 2.3 to 3.8 and depths ranged from 4 to 5 km. Focal mechanisms for the larger events show normal-oblique motion (fig. 47, mechanisms 2 and 3).

The cluster northeast of the M_C 4.5 event, occurred as temporally scattered events in 1985 and as a tight spatial and temporal cluster in 1986 (figs. 33 and 34). The events in 1986 occurred in a 10 hour period on May 30 and located near Buffalo Canyon. Magnitudes for the 1986 events ranged from 1.7 to 2.3 and depths were all less than 2 km.

Nine events, in the Carson lineament, occurred over a seven month period just west of Churchill Butte (fig. 47). The earthquakes began in November 1985 and continued into June of 1986. The largest events in this spatial cluster occurred on February 6, 1986 at 1004 GMT, and had a magnitude of 3.0. Other events in the cluster ranged from M_D 1.7 to 2.0 and the depths for these events were less than 1 km to 7 km. The focal mechanism for the M_D 3.0 event shown in Figure 47, mechanism 4 exhibits almost pure strike-slip motion.

Scattered activity occurred over the study period in the northeast portion of Carson Valley. Some of the events occurred as tight spatial/temporal clusters while others were isolated in time and space.

Many of the events in the Carson-Mason sub-area have very shallow focal depths (less than 1 km). This result was consistent between the various velocity models. The UNRSL catalog was searched for events in the Carson-Mason sub-area for the time period 1976-1979. An epicenter map and depth distribution plot of the earlier data are shown in Figure 48a and 48b. This data set also shows a spike of shallow focal depths. From December 1988 to January 1989, there was a swarm of activity in the Virginia City area (within Carson-Mason sub-area). Routine UNRSL locations also had very shallow focal depths. Portable instruments were deployed in an attempt to constrain the focal depths. Analysis of these records revealed focal depths of 3 to 4 km. The high level of shallow seismicity in the Carson-Mason sub-area many be real, a function of station distribution or an inadequate velocity model. Blasting is unlikely because most clusters occur as tight temporal clusters (several events/day) and there aren't many clusters mainly scattered events.

Walker Sub-area

Between 1980 and 1987, 46 earthquakes were located in the Walker sub-area, ranging in magnitude from 1.2 to 4.9 (fig. 49). Depths for these events ranged from less than 1 to 23 km. 90% of the events in the Walker sub-area were above 9 km (fig. 27, Walker).

The largest event, M_c 4.9, in the Walker sub-area occurred on April 8, 1980 at 0013 GMT (figs. 49 and 28) and located northwest of Lahontan Reservoir. A focal mechanism for this event could not be constrained because only 10 first motions were picked. Activity continued from April 8 to April 13 with 7 events ranging from M_c 1.2 to 2.6. These events were within a 4 km epicentral distance of the M_c 4.9 event. Depths for these events ranged from 1 to 7 km.

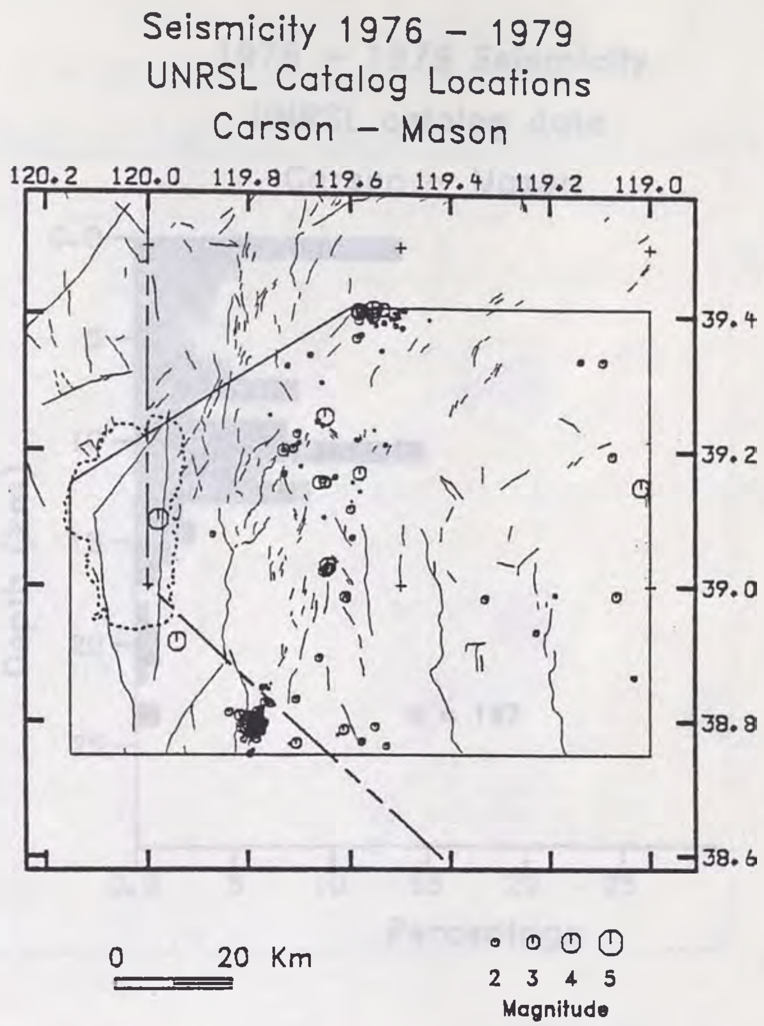

Figure 48a. Seismicity of Carson-Mason sub-area from 1976 to 1979. Locations from UNRSL catalog.

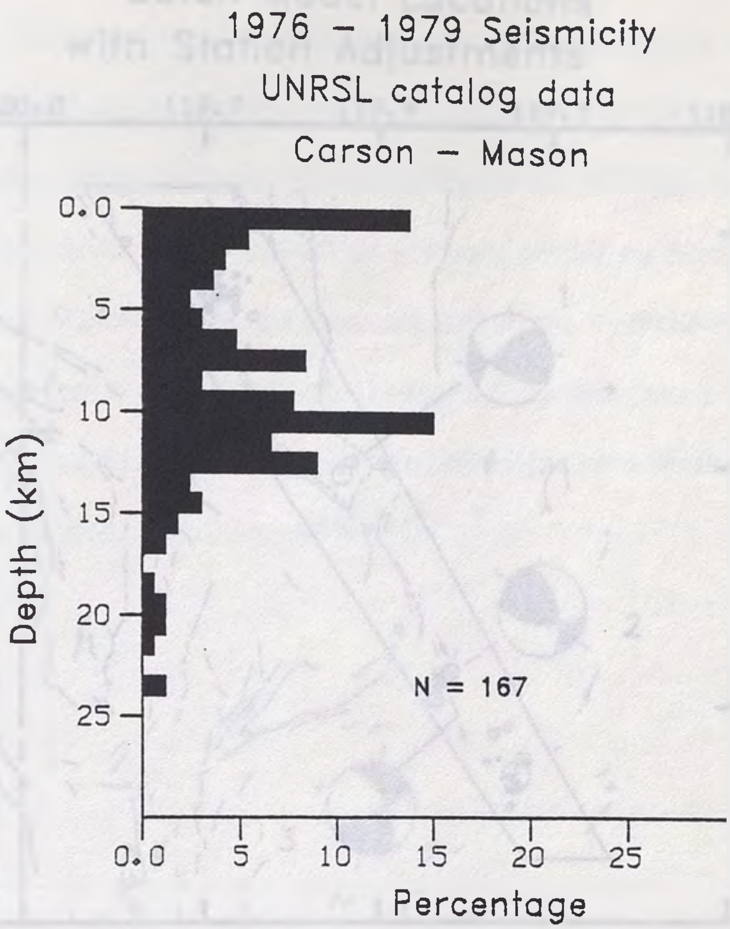

Figure 48b. Earthquake depth distribution for events from UNRSL catalog. N = over-all sample size for the Carson-Mason sub-area.

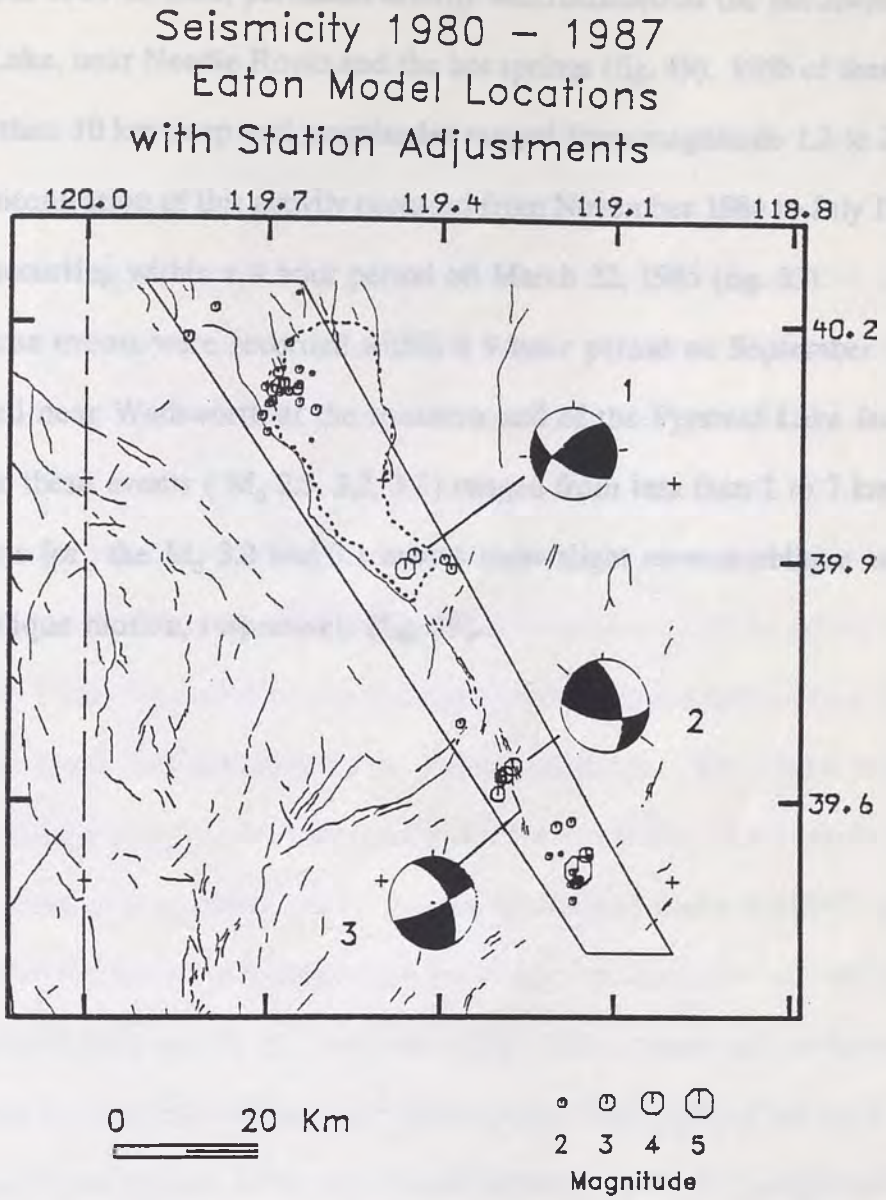

Figure 49. Earthquake distribution of events in the Walker sub-area. Compressional quadrants shaded and T-axis of focal mechanisms shown. Year, month, day and GMT of mechanisms are 1, 841022 1127; 2, 870915 0616; 3, 870915 1443.

From 1980 to 1987, persistent activity was recorded at the northwest end of Pyramid Lake, near Needle Rocks and the hot springs (fig. 49). 90% of these events were less than 10 km deep and magnitudes ranged from magnitude 1.2 to 2.8. The largest concentration of this activity occurred from November 1984 to July 1985 with 3 events occurring within a 4 hour period on March 22, 1985 (fig. 33).

Three events were recorded within a 9 hour period on September 15, 1987 and located near Wadsworth at the southern end of the Pyramid Lake fault zone. Depths for these events (M_D 2.5, 3.2, 3.1) ranged from less than 1 to 7 km. Focal mechanisms for the M_D 3.2 and 3.1 events show slight reverse-oblique and slight normal-oblique motion, respectively (fig. 49).

DISCUSSION AND CONCLUSIONS

The crustal structure of the Sierra Nevada-Basin and Range transition based on reflection and refraction data exhibits crustal thinning from the Sierra Nevada to the Basin and Range province. The depth of the microseismicity indicates that there are deeper events in the Sierran block, 90% above 18 km, and shallower depths in the Basin and Range with 90% of the events occurring above 10 km.

Six different velocity models were used to located the events within the study area. The resulting epicentral locations were very similar. The hypocentral locations were similar for all but the BuRec model which located many of the events at depths of less than 1 km. The other five models consistently located hypocenters deeper in the Sierran block and shallower in the Basin and Range. The Eaton model was chosen as the best regional velocity model for the study area based on the number of events meeting a specified quality criteria, spatial and depth distributions.

Activity in the Soda Springs sub-area, within the Sierra Nevada crustal block, was associated with an M_L 5.2 event in 1980. The normal and strike-slip focal mechanisms for this area had no depth dependence. The depth of the activity in the Truckee sub-area appears to be transitional between the Soda Springs activity and the Basin and Range activity (90% of the events above 16 km). 90 % of the events in the remaining sub-areas, within the Basin and Range province, located above 9 to 11 km. Almost 30% of the events in the Carson-Mason sub-area locate with focal depths of less than 1 km. The shallow seismicity in the Carson-Mason sub-area may be real, a function of the station distribution or a systematic problem with the crustal velocity model failing to represent the conditions in the Carson basin. Figure 50 is

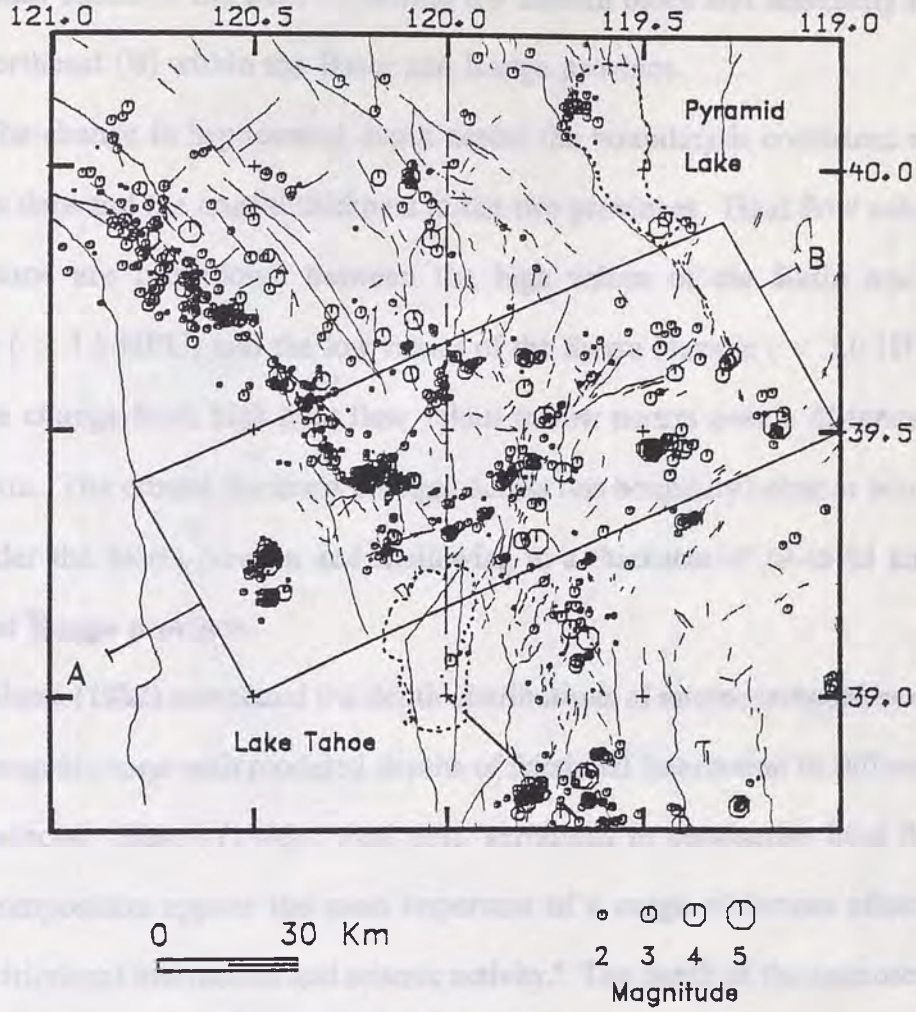

Figure 50. AB is a projection plane for events within box spanning transition between Sierra Nevada and the Basin and Range province.

a subset of events from several sub-areas, perpendicular to the strike of the Sierra Nevada. A SW-NE cross section of Figure 50 is shown in Figure 51. The deepest earthquakes occurs in the west (A) within the Sierran block and seismicity shallows to the northeast (B) within the Basin and Range province.

The change in hypocentral depth across the boundary is consistent with the heat flow data and the crustal thickness in the two provinces. Heat flow values near Lake Tahoe are transitional between the high values of the Basin and Range province (> 1.5 HFU) and the low values of the Sierra Nevada (< 1.0 HFU). At 39°N, the change from high heat flow values to low occurs over a distance of less than 50 km. The crustal thickness changes across this boundary being at least 40 km thick under the Sierra Nevada and shallowing to a thickness of 29 to 33 km in the Basin and Range province.

Sibson (1982) correlated the depth distributions of microearthquakes defining the seismogenic zone with modeled depths of frictional interaction in different heat flow provinces. Sibson (1986) found that "variations in conductive heat flow and crustal composition appear the most important of a range of factors affecting the depth of frictional interaction and seismic activity." The depth of the microseismicity in the study area supports Sibson's conclusion. The deeper events in the study area nucleated in the cooler Sierran crust.

Stewart divided the Walker Lane Belt into nine structural blocks and much of the study area lies within three of these blocks (Pyramid Lake, Carson, and Walker Lake). Focal mechanisms in the Carson-Mason sub-area, support normal motion on the north- and northwest-trending range bounding faults of Stewart's Walker Lake structural block and left-lateral motion within the northeast-trending

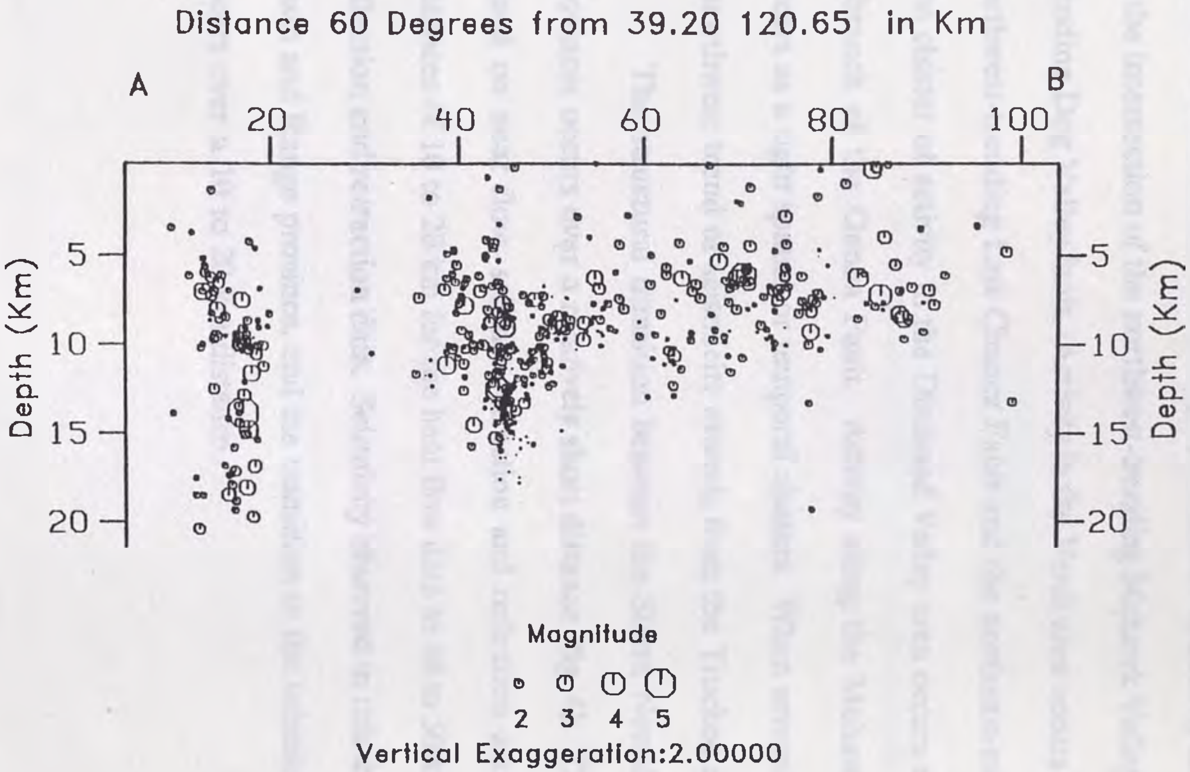

Figure 51. Cross section (scale 1:2) of hypocenters within the box shown in Figure 50. See Figure 50 for map view of earthquakes and orientation of projection plane.

Carson lineament of Stewart's Carson structural block.

Patterns in the seismicity of Figure 26 indicate that activity clusters at the intersection of faults, near the ends of some mapped faults and also defines the trends of some faults. For example, the cluster of activity in the Truckee area occurs at the intersection of the northwest-trending Mohawk Valley fault and the northeast-trending Dog Valley fault. Activity in the Verdi area occurs at the intersection of the northwest-trending Last Chance Fault and the northeast-trending Dog Valley fault. The cluster of activity in the Diamond Valley area occurs near the southern end of a branch of the Genoa Fault. Activity along the Mohawk Valley fault generally occurs as a tight spatial or temporal clusters. When several years of data is plotted, a northwest trend of seismicity extends from the Truckee area to Lake Almanor.

The structural transition between the Sierra Nevada and Basin and Range provinces occurs over a relatively short distance (fig. 4). The geophysical transition based on heat flow, seismic refraction and reflection and P_n studies varies from distances of 10 to 20 km for the heat flow data to 40 to 50 kilometers for the seismic reflection and refraction data. Seismicity observed in this thesis occurs mainly in the Basin and Range province, and the transition to the seismically quiet Sierra Nevada occurs over a 10 to 20 km distance.

Appendix A.

Historical Earthquake Accounts

Appendix A.

1855 Jan 25, 06:00	Buildings in Downieville were severely shaken by an earthquake lasting several seconds. A pinnacle of rock was thrown down from the Downieville Buttes.
1857 Sep 03, 03:05	Objects were shaken from shelves in Last Chance and Michigan Bluffs,Sierra County. There were no reports of aftershocks and the effects were similar to later western Nevada earthquakes. The epicenter was probably located to the east in the largely unsettled California-Nevada border region. (MMI V to VI)
1860 Mar 15, 19:00	In Carson City, Nevada goods were shaken from shelves and a general panic prevailed. Rock slides were reported between Pyramid Lake and Carson City. The event was widely felt in California, from Yreka to San Francisco. (MMI VII) Approximately seven aftershocks were reported in the Pyramid Lake area.
1867 Dec 02, 07:21	A strong shock felt in the Nevada City area and people were awakened in La Porte, Plumas County and Downieville, Sierra County. (MMI V)
1868 May 30, 05:10	Bricks were shaken down, buildings were cracked, and plaster fell in Virginia City. Two foreshocks were reported at Virginia City at 4:56 and 5:05 GMT. Numerous aftershocks were felt in the Virginia City area. (MMI VII)
1869 Dec 27, 01:55	Masonry walls were damaged in Washoe City and Virginia City, Nevada. There were also reports of damage in Oroville, California. Possibly these were separate shocks little information about times was available. An epicenter near Steamboat Springs is consistent with the numerous aftershocks and damage distribution. (MMI VI)
1869 Dec 27, 10:00	Slight damage was attributed to this quake and a second pair of quakes which struck the Carson City-Virginia City area.
1872 Mar 28, 13:00	Glassware was broken in stores in Sierra Valley, Sierra County. (MMI VI)

Appendix A. (cont.)

1875 Jan 24, 12:00	Stone walls were cracked in Susanville and a chimney was thrown down in Janesville. Accounts describe the earthquake as a heavy shock. The exact location of the earthquake unknown. Some authors locate the event in Mohawk Valley while others place the event in the Honey Lake area. (MMI VII)
1885 Jan 31, 05:45	The Honey Lake Valley communities of Susanville and Buntingville sustained moderate damaged to chimneys and some glass was shattered. The shocks were most severe at Janesville. Numerous aftershocks continued through February. (MMI VI)
1885 Feb 26,	Earthquakes continued in the vicinity of Susanville. One shock reportedly knocked down the curbing of a well.
1887 Jun 03, 10:48	In Genoa, Nevada houses were shifted from their foundations and bricks were thrown down by a severe shock lasting several seconds. A noise like thunder preceded the quake. Chimneys and brick/stone walls in Carson City were badly damaged. Fissures and cracks opened in the area. Several weeks before the earthquake the water level at Shaw's Hot Springs dropped and after the earthquake the water dried up completely. (MMI VIII)
1888 Apr 29, 04:48	Three shocks were felt in three seconds and strong shaking continued for approximately ten seconds. The third shock was described as the most severe. In Cromberg, at the north end of Mohawk Valley, chimneys were toppled and rock slides were reported in the Downieville area. The walls of the court house were cracked in Nevada City. (MMI VIII)
1889 Jun 20, 06:00	Chimneys were thrown down at Susanville and Willow Creek. Dishes and glasses were thrown in all directions and people rushed into the streets in Susanville. Motion was described as a side to side rocking. Numerous aftershocks were reported. In the first two hours following the mainshock, 28 aftershocks were felt. (MMI VII)

Appendix A. (cont.)

1894 Nov 18, 10:49	Over 100 quakes were felt in the Virginia City and Carson City area from Nov 14-22. The largest broke some windows and damaged walls in Virginia City. In Carson City, there was no reported damage, but there were reports of people feeling nauseated and unable to sleep because of the almost constant ground motion. (MMI VI)
1896 Jan 27, 21:01	In Carson City, several small quakes felt from Jan 25-27 the largest occurring on the Jan 27. Plaster fell in the county building and the side of the government building cracked. (MMI VI)
1897 May 15, 19:04	In Carson City, a shock lasting three seconds cracked plaster in many buildings. (MMI V)
1908 Jan 27, 02:00	Chimneys toppled in the Honey Lake communities of Milford and Amadee, Lassen County, California. (MMI VI)
1909 Jun 23, 07:24	Lumber flumes, chimneys, plaster and dishes were damaged in Nevada, Sierra and Plumas Counties, California. Numerous aftershocks occurred over the next two weeks. Most were strong enough to rattle dishes and awaken people at night. (MMI VII)
1914 Feb 18, 18:17	Two distinct shocks were felt in the Truckee Meadows area lasting from six to thirty seconds. Bricks were thrown down from chimneys and plaster cracked in Reno and Virginia City. Windows were broken in Sparks. The quake was felt as far south as Tonopah and as far north as Downieville, California. (MMI VI to VII)
1914 Apr 24, 08:34	Many chimneys toppled in Reno, four chimneys toppled in buildings at the University of Nevada campus. The shock was reported as severe at Hazen, Nevada. The shock probably was located northeast of Reno, towards Fernley or Wadsworth. (MMI VII to VIII)
1915 Feb 22, 00:00	Highly localized shock near Whitmore, northwest of Lassen Peak. Localized ground dislocation was reported.
1918 Mar 12, 10:30	Chimneys were damaged in Downieville, Sierra County, California.

Appendix A. (cont.)

1919 Jan 04, 23:00	Chimneys were damaged and dishes were broken in the Clover Creek area between Whitmore and Fern. Ground cracks were also reported.
1920 Jul 21, 03:55	Quake was felt throughout eastern Shasta County, California. Chimneys were destroyed, dishes were shaken from shelves, and windows were broken in Hot Springs. (MMI VII)
1921 Jul 21, 20:17	People had difficulty standing and objects were knocked over at Eagle Lake, Lassen County. The second shock was the mainshock. (MMI VI to VII)
1930 Apr 09, 22:00	Chimneys were damaged at the southeast end of Lake Tahoe. Plaster cracked at Tahoe. (MMI VI)
1930 Apr 12, 12:57	Chimneys cracked and dishes were broken in Fernley. In Fallon, plaster cracked and objects were thrown from shelves. (MMI VI)
1939 Jan 11, 22:00	Slight damage at Coleville, California and Gardnerville, Nevada.
1942 Dec 03, 09:44	Plaster was cracked in Reno and small objects fell in Reno, Fernley and Fallon. Felt by and awakened many in Minden. (MMI VI)
1942 Dec 17, 15:07	A series of shocks near Markleeville and Topaz, California.
1948 Dec 29, 12:53	This strong earthquake located near Verdi, Nevada. Many were awakened and frightened. Windows at the power plant were broken, the school house and an old wall in a store were damaged. Some pendulum clocks in Reno stopped. Building on the University of Nevada campus were damaged. A boulder crashed through a through a telephone line in the Truckee Canyon disrupting service. The mainshock was preceded by a series of approximately fifty foreshocks recorded in Reno. There were reports of subterranean rumbles heard in Reno, Verdi and the surrounding vicinity prior to the Verdi earthquake. During the three weeks following the Verdi earthquake over 200 events were recorded in Reno. (MMI VII)

Appendix A. (cont.)

1950 Mar 20, 15:22	Dishes rattled and windows were broken in the Lassen Peak area. The event was felt in Reno and Yerington, Nevada. (MMI V)
1950 Dec 14, 13:24	Some structural damage occurred and numerous cracks appeared in buildings in Herlong and Doyle, California. Many chimneys and windows were cracked. A fault scarp, 5 to 8 inches high, along the west side of the Fort Sage Mountains was mapped by Gianella (1957) in January 1951. (MMI VII)
1952 May 09, 15:31	Slight damage was reported in Virginia City and Carson City. The event was probably located in the Steamboat Springs area. (MMI VI)
1953 Sep 26, 03:34	In Reno, plaster was cracked, two chimneys toppled and canned goods were shaken from shelves. Slight damage was reported in Floriston. (MMI VI)
1958 Oct 01, 21:42	Chimneys cracked in Hallelujah Junction and a few dishes broke in Reno. Located southeast of Sierraville (MMI VI)
1959 Apr 01, 18:18	Quake was centered northeast of Loyalton, California. Several chimneys toppled, windows, walls and plaster were cracked and canned goods were knocked from the shelves in Loyalton. Near Vinton an old stone building collapsed. In Sacramento, a crack appeared in Sacramento City Hall. (MMI VII)
1959 Jun 14, 01:26	Goods fell from shelves in Portola. The location was probably closer to Sierra Buttes. (MMI V)
1966 Sep 12, 16:41	Main shock of a series centered near Boca, California. Chimneys fell in Boca, Sierraville and Loyalton. Plaster and masonry walls cracked in Verdi, Truckee, Vinton and Floriston. Windows were broken and merchandise was knocked from shelves. Numerous rock slides, landslides and ground cracks occurred in the area. Both Boca and Prosser, earth-filled dams, sustained ground cracks. Railroad lines were distorted by falling boulders. Bridges along Interstate 80, between Donner Lake and Floriston, sustained minor damage. (MMI VII)

Appendix A. (cont.)

1976 Jun 20, 10:15	The first shock of a series near Susanville, California. Reported minor damage in Susanville. (MMI V)
1979 Feb 22, 15:57	The mainshock occurred near Doyle, California in the southeast portion of Honey Lake Valley. Minor damage was reported in the epicentral area. Furniture moved and lamps swayed but no windows were broken. A dry wall cracked in Doyle and people reported hearing the earthquake which sounded like a sonic boom. (MMI V)

Appendix B.

Station Information

Appendix B.

STA	Location Latitude	Longitude	Elev. (m)	Name	Operation begin-end date Organization
AAR	39 16.57	121 01.53	930	Airport Road Site	760720-999999 USGS
AAS	38 25.80	121 06.51	65	Arroyo Seco	841207-999999 USGS
ABJ	39 09.92	121 11.47	457	Bob Jauregui Site	760727-999999 USGS
ABR	39 08.11	121 29.21	24	Brophy Road Site	770214-999999 USGS
ADW	38 26.35	120 50.89	251	Drytown Water Dist.	760721-999999 USGS
AFD	38 56.69	120 58.10	524	Forest Hills Divide	760129-830516 USGS
AFD	38 56.88	120 58.34	549	Forest Hills Divide	830516-999999 USGS
AFH	39 02.51	120 47.48	1064	Forest Hills Site	760720-999999 USGS
AFR	38 47.54	121 20.91	31	Fiddyment Ranch	761202-999999 USGS
AGI	38 50.68	120 58.88	305	Gold Rush Inn	760130-999999 USGS
AHD	39 02.90	121 04.59	483	Hacienda Drive	761028-999999 USGS
AHR	38 51.26	121 04.23	354	Howard F. Ross	760130-999999 USGS
ALA	38 34.00	120 57.37	293	Latrobe	770721-999999 USGS
ALN	38 55.78	121 17.27	54	Lincoln	761202-999999 USGS
ANT	37 55.07	118 33.84	2040	Antelope Mountain	830725-841105 UNR
AOD	38 36.89	120 43.71	520	Outingdale	761019-999999 USGS
AOH	39 22.52	121 15.36	457	Oregon House	770214-999999 USGS
APN	40 13.80	119 51.99	1471	Astor Pass	750813-830603 UNR
APR	38 52.65	121 13.03	133	Poppy Hill Road	760715-999999 USGS
ARJ	38 41.19	120 57.38	460	Robert W. Jensen	761123-999999 USGS
ARR	38 45.92	121 10.31	127	Rickey Ranch	761202-999999 USGS
ARW	38 57.38	121 09.73	320	Richard P. Wilkes	760129-999999 USGS
ASM	38 49.40	120 41.00	1214	Slate Mountain	841204-999999 USGS

Appendix B. (cont.)

AVR	39	01.47	121	16.25	114	Valley Road Site	760715-999999	USGS
BAB	39	36.08	120	06.24	2664	Babbit Peak	8211 -999999	UNR
BDE	38	13.19	118	59.83	2659	Bodie	840118-850506	UNR
BFC	38	53.64	119	36.46	1734	Buffalo Canyon	7802 -999999	UNR
BIS	39	07.43	119	40.50	1786	Bismark Peak	7803 -851222	UNR
BMN	40	25.88	117	13.30	1499	Battle Mountain	690902-8704	UNR
BMR	40	06.52	120	17.46	2345	Black Mountain	780518-999999	UNR
BON	37	57.31	118	18.10	2582	Boundary Peak	7407 -999999	UNR
BOX	39	36.92	118	10.58	1283	Box Canyon	8001 -811111	UNR
BYX	39	57.25	117	55.07	1128	Boyer Ranch	8001 -800821	UNR
CLK	37	35.44	118	49.45	2630	Crowley Lake	7911 -999999	USGS
DIX	39	48.13	118	04.92	1143	Dixie Hot Srpings	8001 -999999	UNR
DNY	41	04.88	119	16.60	2012	Donnelly Peak	851206-999999	UNR
EBP	38	34.97	119	48.38	2432	Ebbetts Pass	801216-999999	UNR
EMB	38	58.48	120	06.16	2122	Emerald Bay	841101-999999	UNR
FPN	39	12.32	118	09.26	2256	Fairview Peak	800401-999999	UNR
GBK	39	05.77	119	55.22	2268	Glenbrook	841012-8609	UNR
GFR	39	37.02	122	25.67	236	Fruta	800601-86	CDWR
GNO	38	55.75	119	51.17	1800	Genoa	7802 -999999	UNR
GRX	39	38.13	117	59.34	1390	Grover Canyon	8001 -811111	UNR
GVR	38	39.44	118	09.58	2550	Gabbs Valley Range	831018-999999	UNR
HBT	39	25.60	120	09.80	1804	Hobart Mills	7304 -81	UNR
HCK	38	04.53	118	35.53	1890	Huntoon Creek	8009 -999999	UNR
HYX	39	46.37	117	45.80	1661	Hoyt Mine	8001 -999999	UNR
IND	39	56.80	120	17.50	2146	Independence	7711 -999999	UNR

Appendix B. (cont.)

JAS	37	56.80	120	26.30	457	Jamestown	640828-8407	BRK
JAS	37	55.60	120	25.20	427	Jamestown	8407 -861106	BRK
KBF	39	30.41	120	12.71	2079	Kyburz Flat	7306 -999999	UNR
KPK	39	35.01	121	18.32	897	Kanaka Peak	7506 -999999	CDWR
KVN	39	03.06	118	06.00	1829	Kaiserville	720113-999999	UNR
LBF	41	20.82	121	53.42	1982	Black Fox Mountain	760119-999999	USGS
LCF	40	29.18	121	31.44	2438	Cresent Cliff	761112-999999	USGS
LCM	40	08.79	121	31.26	1829	Colby Mountain	801105-999999	USGS
LDB	40	25.90	121	47.08	1225	Digger Butte	8103 -999999	USGS
LHC	40	48.30	121	30.84	1020	Hat Creek	810204-999999	USGS
LHK	40	26.12	121	16.67	2060	Mount Harkness	770927-999999	USGS
LHV	38	15.07	118	30.27	2225	Little Huntoon Val.	800917-999999	UNR
LIT	40	25.85	120	19.25	1646	Litchfield	780518-83	UNR
LMC	37	43.73	118	56.79	2530	Lookout Mountain	7911 -999999	USGS
LMZ	40	32.73	121	33.84	1792	Manzanita Lake	761112-999999	USGS
LOY	39	39.52	120	14.15	1582	Loyalton	8211 -999999	UNR
LPD	41	11.72	121	41.76	1231	Pondosa	790403-999999	USGS
LRD	40	27.78	121	27.85	2292	Reading Peak	850719-999999	USGS
LSH	40	47.59	122	02.29	762	Sage Hen Hill	830211-999999	USGS
LSL	40	25.64	121	32.05	2048	South Lassen	761112-999999	USGS
LSM	40	17.00	121	18.09	1829	Stover Mountain	840427-999999	USGS
LTC	40	12.50	122	07.45	257	Tuscan Springs	790319-999999	USGS
LWH	40	38.66	121	56.70	555	Whitmore	830302-999999	USGS
LWP	40	35.65	121	22.73	2122	West Prospect Peak	810204-8310	USGS
MAT	37	52.40	119	52.00	1353	Mather	820512-999999	USGS

Appendix B. (cont.)

MBF	37	40.71	120	21.80	309	Blanchard Fire Sta.	761103-810520 USGS
MBO	37	41.35	120	21.86	279	Bonds Flat	810327-999999 USGS
MCH	38	01.12	120	30.57	475	Carson Hill	720419-999999 USGS
MCU	37	58.36	120	37.02	336	Copperopolis	720419-999999 USGS
MGL	39	48.71	121	33.42	1010	Magalia	7506 -999999 CDWR
MGN	37	48.80	118	41.73	2522	Mcgee Canyon	801121-999999 USGS
MHD	37	07.18	119	54.97	146	Hidden Dam	810428-830507 USGS
MHD	37	07.36	119	53.60	177	Hidden Dam	830507-999999 USGS
MIN	40	20.70	121	36.30	1495	Mineral	480206-999999 BRK
MLR	38	05.44	120	09.84	1387	Lyons Reservoir	840927-999999 USGS
MMC	38	21.65	119	07.70	2548	Masonic Mountain	801121-999999 UNR
MMW	38	03.83	120	10.89	1411	Miwuk Village	760701-830428 USGS
MNA	38	25.97	118	09.40	1524	Mina	72 -999999 UNR
MNH	38	08.75	120	48.82	219	New Hogan Resevoir	761103-999999 USGS
MNP	37	24.82	119	43.51	975	Nipinnawassee	810526-830505 USGS
MNP	37	24.90	119	43.70	1000	Nipinnawassee	830505-999999 USGS
MON	38	03.65	118	46.55	2179	Mono Valley	7402 -999999 UNR
MOY	37	54.00	120	34.04	176	Obyrne Ferry	720419-999999 USGS
MPK	39	17.74	120	01.81	2484	Martis Peak	7304 -999999 UNR
MRF	38	14.72	120	31.24	799	Railroad Flat Road	760702-999999 USGS
MST	37	54.27	120	24.29	366	Stent	720419-999999 USGS
MTG	37	33.68	120	06.26	634	Trabucco Gardens	810311-999999 USGS
MYL	37	23.02	120	25.16	84	Yosemite Lake	830507-999999 USGS
NRR	39	34.33	119	50.96	1634	North Reno	73 -82 UNR
OBH	39	39.10	121	27.70	916	Bloomer Hill	750805-830801 USGS

Appendix B. (cont.)

OBH	39 39.22	121 27.64	896	Bloomer Hill	830801-999999	USGS
OCH	39 52.55	121 45.90	530	Cohasset Ridge	761220-999999	USGS
OCM	39 31.43	121 37.40	98	Campbell Hills	830718-999999	USGS
OGO	39 39.22	121 36.72	158	Van Goodin Ranch	761229-999999	USGS
OHC	39 20.18	121 29.05	76	Honcut Creek	750805-999999	USGS
ORA	39 28.13	121 24.80	585	Rattlesnake Point	750806-999999	USGS
ORD	39 33.33	121 30.00	262	Oroville Dam	821021-999999	USGS
ORV	39 33.23	121 30.02	362	Oroville	63 -999999	CDWR
OST	39 22.22	121 35.11	36	Stimpson Road	830520-999999	USGS
OSU	39 16.23	121 51.10	67	Sutter Buttes	750808-999999	USGS
OTB	39 32.75	121 33.65	223	Table Mountain	750806-999999	USGS
OWY	39 27.19	121 29.20	177	Wyandotte	750806-999999	USGS
PAM	39 26.94	121 31.19	131	Palermo	760406-999999	CDWR
POW	38 24.57	118 37.91	1890	Powell Mountain	8010 -999999	UNR
RYN	38 37.69	118 31.38	1585	Ryan	7409 -999999	UNR
SIE	39 35.15	120 25.28	1744	Sierraville	830112-840925	UNR
SJC	38 20.95	119 26.35	2256	Sonora Junction	801216-999999	UNR
SLK	37 50.04	119 07.72	2316	Silver Lake	830828-999999	UNR
TAH	39 09.00	120 09.78	2097	Tahoe City	8306 -999999	UNR
TNK	39 16.05	120 14.15	2438	Tinkers Knob	7305 -999999	UNR
VIP	39 45.24	119 27.65	2499	Virginia Peak	780426-999999	UNR
VPK	39 28.48	120 02.24	2469	Verdi Peak	7307 -999999	UNR
WCN	39 18.10	119 45.38	1704	Washoe City	7208 -999999	UNR
WSH	39 27.23	119 38.68	1762	Washington Hill	7803 -840216	UNR

Appendix C.

Median P and S Wave Station Residuals

TABLE C1.

MEDIAN STATION RESIDUALS (CARSON MASON)						
	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
AAR	0.14		0.19	-0.10	-0.09	-0.11
ABJ	-0.32		-0.21	-0.16	-0.18	-0.17
ADW	-0.16		-0.02		0.04	
			-0.52		-0.51	
AFD	0.11	-0.20	0.22	-0.34	-0.10	-0.30
	-1.42		-1.82		-1.83	
AFH	0.15	-0.07	0.05	-0.06	0.09	-0.07
AFR	0.24		0.48		0.08	
AGI	-0.20		0.05		0.03	
			-0.09		-0.09	
AHR	-0.08		0.09		-0.10	
ALA	-0.09		0.03		0.01	
	0.05		0.03		0.14	
ALN	0.19		0.35		-0.11	
ANT	-0.11	-0.07	-0.08	0.00	0.08	-0.06
					0.60	
AOD	-0.16		-0.21		0.11	
	-0.16		0.05		0.20	
AOH	0.01		0.41	0.33	0.31	0.32
APR	-0.01				-0.18	
ARJ	0.03		0.02	0.24	0.14	0.23
ARR	-0.13		-0.09		-0.19	
	0.04		-0.03		-0.24	
ARW	-0.03		-0.05		-0.33	
ASM	-0.19	-0.33	-0.07	-0.32	-0.26	-0.33
AVR	-0.07		-0.25		-0.38	
	-0.02		-3.88		-0.38	
BAB	0.00	-0.04	0.04	-0.03	-0.02	-0.04
	0.06	-0.05		0.01	0.04	-0.02
BDE	0.06	0.06	0.07	0.09	0.09	0.07
BFC	-0.03	-0.04	-0.07	-0.04	-0.04	-0.04
	0.09	0.04	0.18	0.06	0.07	0.06

TABLE C1. (cont.)

MEDIAN STATION RESIDUALS (CARSON MASON)						
	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
BIS	-0.03	-0.03	-0.06	-0.03	-0.05	-0.03
	0.14	0.12	0.19	0.12	0.12	0.11
BMR	-0.21	-0.31	-0.02	-0.40	-0.35	-0.35
BON	0.79	1.54		1.56	0.15	1.35
		0.19			0.68	
CLK	0.63	0.72		0.66	0.54	0.71
DIX	0.08	0.01		-0.02	-0.08	-0.02
		0.05			0.09	
DNY				1.83	1.86	1.42
EBP	-0.11	-0.12	-0.06	-0.10	-0.13	-0.12
	0.10	0.02	0.12	0.05	0.05	0.01
EMB	-0.02	-0.01	-0.01	-0.03	-0.01	-0.01
	0.19	0.14	-0.13	0.06	0.10	0.09
FPN	0.14	0.04	-0.06	0.13	0.05	0.04
GBK	-0.11	-0.09	-0.11	-0.09	-0.11	-0.08
	0.16	0.11	0.40	0.13	0.01	0.08
GNO	0.03	0.05	0.00	0.02	0.04	0.04
	0.16	0.06	0.10	0.06	0.07	0.08
GVR	0.03	0.06	-0.12	-0.04	-0.06	0.03
HCK	0.21	0.13	0.27	0.27	0.19	0.21
	0.23	0.21			0.07	
HYX	-0.14	0.38		0.78 0.18	0.49	
IND	0.02	-0.03	0.05	-0.02	-0.01	-0.03
	0.56	0.37		0.54	0.48	0.50
JAS	-0.14	-0.30	-0.02	-0.10	-0.47	-0.34
		-1.82			-1.30	-1.82
KBF	-0.05	-0.10	0.00	-0.08	-0.06	-0.09
	-0.01	-0.05	-0.03	0.00	-0.06	-0.09
KVN	-0.11	-0.17	0.08	-0.21	-0.18	-0.18
	0.07	-0.11		-0.13	-0.07	-0.10

TABLE C1. (cont.)

MEDIAN STATION RESIDUALS (CARSON MASON)						
	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
LHV	0.04	0.07	0.12	-0.06	0.10	-0.08
	0.17	-0.05		-0.06	0.10	-0.08
LMC	1.24	2.10 0.23	1.23	1.12	1.51	
LOY	-0.10	-0.20	-0.11	-0.19	-0.16	-0.19
LSM	0.95					
MAT	-0.03	0.50	-0.20	-0.01	-0.09	0.02
	-0.17				-0.31	-0.31
MBF	-0.06		0.18		-0.27	
MCH	-0.39		-0.25		0.10	
	0.18					
MCU	0.01	0.83	0.11	0.30	0.03	0.23
					-0.54	-0.33
MGL	-0.02					
MGN	0.18	-0.02		0.07	0.06	0.32
					0.82	
MHD	-0.02					
MMC	0.03	0.04	0.02	0.06	0.05	0.07
	0.30	0.38	0.28	0.27	0.45	0.51
MMW	0.00		0.11		0.18	
	-0.08		0.05		0.03	
MNA	0.10	0.01	0.32	-0.02	-0.01	-0.01
MNH	0.02		0.27		0.11	0.14
			0.33		0.23	
MNP	0.07		0.39			
MON	0.07	0.05	0.05	0.08	0.10	0.06
		-1.29		-1.28	-0.90	-1.30
MOY	0.10		0.10		0.11	0.38
	0.60					
MPK	-0.01	0.03	-0.01	0.02	0.00	0.02
	0.05	0.02	0.15	0.06	0.05	0.01
MRF	-0.19		-0.15		0.05	
	-0.47		-0.32		-0.22	

TABLE C1. (cont.)

MEDIAN STATION RESIDUALS (CARSON MASON)						
	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
MST	-0.17		-0.07	-0.02	-0.13	0.00
	-0.19		-0.26	0.06	-0.22	-0.11
MYL	0.34					
NRR	-0.02	-0.01	-0.02	0.00	-0.02	0.00
			0.17		-0.08	
OBH	-0.93					
OGO	-0.06					
OHC			0.24			
ORA	0.21		0.30	1.21	0.43	0.48
					-0.46	-0.28
ORV	-0.46	0.07		-0.10	-0.14	-0.08
POW POW	0.02	0.08	0.04	0.08	0.08	0.08
					0.75	
RYN	-0.10	-0.09	-0.14	-0.02	-0.09	-0.07
	0.07	0.04		-0.02	0.02	-0.04
SIE	-0.04	-0.06	0.05	-0.04	-0.02	-0.06
SJC	0.14	0.16	0.16	0.18	0.18	0.18
	0.22	0.21		0.24	0.23	0.21
SLK	-0.12	-0.19	-0.11	-0.02	-0.17	-0.14
TAH	0.01	0.06	0.07	0.04	0.05	0.05
	0.11	0.05		0.09	0.04	0.05
TNK	0.13	0.15	0.17	0.14	0.15	0.15
	0.13	0.11	0.24	0.14	0.14	0.12
VIP	0.01	0.	0.04	0.02	0.01	-0.01
					0.45	0.38
VPK	-0.04	-0.02	-0.02	-0.03	-0.04	-0.02
	0.02	-0.09	0.10	-0.03	0.01	-0.07
WCN	0.	0.03	0.00	0.02	0.03	0.02
	0.18	0.13	0.26	0.13	0.15	0.10
WSH	-0.09	-0.09	-0.13	-0.09	-0.09	-0.09
	0.21	0.20	0.26	0.21	0.18	0.20

TABLE C2.

MEDIAN STATION RESIDUALS (GOOSEBERRY)						
	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
AAR	0.03	-0.31		-0.21	-0.14	-0.28
ABJ	-0.28	-0.14		-0.24	-0.34	-0.28
AFD	0.15	-0.01		-0.05	-0.07	-0.14
AHR	-0.05	0.15		0.04	-0.06	0.00
AOD	0.54	0.46		0.36	0.29	0.31
AOH	-0.16	0.03		-0.07	-0.17	-0.10
ARJ	0.99	1.22		1.11	1.01	1.08
ASM	0.98	0.69		0.76	0.87	0.75
AVR	-0.04	0.41		0.30	0.21	0.27
BAB	0.08	0.07		0.09	0.10	0.10
BFC	-0.01	0.01		0.04	0.01	0.02
	0.34	0.30		0.29	0.35	0.27
BIS	-0.05	-0.02		-0.05	-0.08	-0.04
	0.31			0.44		0.42
BMR	-0.26	-0.33			-0.22	
	-0.02	-0.69			-0.31	
DIX	0.16	-0.01			0.05	
EBP	-0.06	-0.10		-0.08	-0.04	-0.09
	0.01	-0.26			-0.02	
EMB	-0.08	-0.11		-0.09	-0.02	-0.09
FPN	0.21	0.26		0.36		0.34
GBK	0.00	-0.02		0.01	-0.01	0.02
	0.28	0.17			0.20	
GNO	-0.02	-0.01		0.00	-0.02	-0.01
GVR	0.05					
HYX	0.12	0.10		-0.16		-0.17
IND	0.02	-0.01		0.00	0.04	0.06
KBF	-0.03	-0.05		0.01	-0.01	0.01
	0.01	-0.08		-0.05	0.24	-0.07
KVN	0.25	0.08		0.13	0.14	0.10
	0.38	0.08		0.13	0.14	0.10
LHV	0.40					
LOY	-0.21	-0.21		-0.20	-0.15	-0.16
	0.26	-0.21			0.18	
MMC	0.34	0.15		0.26	0.20	0.24

TABLE C2. (cont.)

MEDIAN STATION RESIDUALS (GOOSEBERRY)						
	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
MPK	0.16	0.16		0.17	0.15	0.20
	0.14	0.05			0.03	
POW		0.17				
RYN	0.02					
SIE	-2.91	-2.65				-2.88
SJC		0.18				
TAH	0.24	0.15			0.26	
					0.01	
TNK	0.27	0.29				
	0.05	-0.10				
VIP	0.01	0.00		-0.03	-0.05	-0.01
	-0.12	-0.39				-0.39
VPK	0.07	0.08		0.06	0.11	0.08
	0.00	-0.09				-0.09
WCN	-0.12	-0.11		-0.15	-0.17	-0.14
	0.08	0.05		0.05	-0.11	0.04

TABLE C3.

MEDIAN STATION RESIDUALS (MOHAWK)						
	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
AAR	0.26	0.32	0.25	0.30	0.34	0.35
	0.57		0.90		0.17	
ABJ	-0.09	-0.18	-0.12	-0.14	-0.13	-0.16
	-0.14		0.24			
ADW	-0.02		0.57			
AFD	0.15	0.02	-0.02	0.01	-0.04	-0.20
	-0.41	-0.79		-0.79	-0.54	
AFH	0.14	0.16	0.07	0.19	0.19	0.19
	-0.05	-0.24	-0.05	-0.26	-0.11	-0.33
AGI	-0.04		-0.04		-0.03	
	-0.30		0.05			
AHR	-0.30	-0.23	-0.05	-0.31	-0.38	-0.35
ALA	-0.33				-0.39	
ALN		0.49	0.32			
AOD	-0.10	0.25	0.22	0.04	-0.19	0.15
	-0.51		-0.21			
AOH	-0.04	0.01	-0.02	-0.03	0.00	0.02
	0.31	0.30	0.88		-0.12	0.30
APN	-0.25					
APR	-0.19	-0.24	0.01	-0.35	-0.28	-0.44
ARJ	0.23	0.30	0.54	0.13	0.10	0.19
ARW	-0.04	0.14	-0.14	0.21		
		0.04	0.23			
ASM	-0.06	-0.24	0.12	-0.20	-0.16	-0.15
AVR	-0.40	-0.31	-0.31	-0.32	-0.30	-0.38
	-0.75				-0.86	
BAB	0.02	0.05	0.01	0.05	0.05	0.05
	0.13	0.02	0.08	0.02	0.04	0.04
BFC	0.14	-0.04	0.14	-0.08	-0.05	-0.09
BIS	0.10	0.05	0.08	0.01	0.02	0.00
	0.18		0.25	-0.02	0.15	-0.09

TABLE C3. (cont.)

MEDIAN STATION RESIDUALS (MOHAWK)						
	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
BMR	-0.03	-0.03	-0.01	-0.04	-0.02	-0.04
	0.04	-0.07	0.12	-0.09	-0.05	0.02
DIX	-1.10	1.37	0.71	0.79	-0.69	-0.60
DNY	-1.03	1.00	-0.69	0.42	0.59	0.66
EBP	0.09	0.02	0.28	-0.04	-0.10	-0.27
EMB	-0.06	-0.16	-0.11	-0.13	-0.12	-0.13
	-0.08	-0.14	0.11	-0.11	-0.04	-0.14
FPN	-0.63	1.30	1.25	0.11	0.78	0.54
GBK	-0.01	-0.09	-0.06	-0.08	-0.04	-0.06
GNO	0.15	0.00	0.06	0.01	0.04	0.05
	0.27	-0.03		0.01	0.16	-0.01
IND	0.08	0.10	0.09	0.07	0.06	0.06
	0.08	0.14	0.06	0.10	0.08	0.14
KBF	-0.05	-0.07	-0.09	-0.08	-0.07	-0.07
	-0.01	-0.10	0.04	-0.08	-0.04	-0.15
KPK	-0.10	-0.19	-0.02	-0.33	-0.09	-0.32
	0.10	-0.12	0.14			
KVN	-0.21	0.95		0.55	1.22	0.58
LCM			1.09			
LDB		-0.80	-0.71			
LHK	0.15	0.08	0.09	0.16		0.14
LIT	-0.18					
LMZ	-0.22	-0.23		-0.17		-0.18
LOY	-0.03	-0.03	-0.05	-0.04	-0.04	-0.04
	0.01	-0.04	0.08	-0.04	-0.04	0.02
LRD	0.13	0.15	0.17	0.28		0.28
LSL	-0.01	-0.06	0.03	-0.06		-0.07
LSM	0.18	0.16		0.14		0.12
MGL	0.01	-0.11		-0.12	0.12	-0.13
MIN	-0.15	-0.15		-0.12		-0.14
MMC	0.82	2.52	1.03	1.30	0.56	0.55
MON	0.88	3.38		2.65	2.57	2.67
MPK	0.03	0.06	0.00	0.06	0.05	0.08
	0.14	0.13	0.12	0.15	0.16	0.15

TABLE C3. (cont.)

MEDIAN STATION RESIDUALS (MOHAWK)

	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
MRF	-0.28				0.34	
NRR	0.04	0.11	0.09	0.11	0.10	
OBH	0.03	0.18	0.81	0.17	0.36	0.04
	0.29					
OCH	0.56	0.10	0.64		0.87	
OGO	0.34	0.45	0.32	0.53	0.46	0.43
OHC	-0.04	0.21	0.37	0.18	0.00	0.00
	-0.16				-0.26	
ORA	-0.05	-0.11	0.01	-0.09	-0.05	-0.07
	0.19	-0.33	0.29		-0.13	-0.33
ORD	-0.21	-0.39		-0.41		-0.40
ORV	0.07	0.01	0.04	0.01	0.01	0.00
	0.19	0.26	0.59	0.08		0.06
OSU	0.40		0.84			
OWY	0.05					
RYN	0.27	2.10		1.38	1.28	1.40
SIE	0.01	0.03	0.00	0.04	0.00	0.03
	1.49	1.15		1.19	1.29	1.15
SLK	0.94	3.49		2.77	2.68	2.78
TAH	0.01	0.03	0.03	0.05	0.03	0.05
	-0.11	-0.19	0.00	-0.17	-0.11	-0.19
TNK	-0.06	-0.03	-0.05	-0.02	-0.03	-0.02
	0.41	0.01	0.10	0.01	0.12	0.12
VIP	0.17	0.09	0.21	0.15	0.16	0.16
	0.11	0.05			0.11	0.05
VPK	-0.10	-0.08	-0.10	-0.07	-0.07	-0.09
	-0.04	-0.07	0.05	-0.09	-0.03	-0.09
WCN	-0.08	-0.12	-0.09	-0.08	-0.08	-0.06
	-0.03	-0.07	0.03	-0.05	-0.04	-0.07
WSH	0.10	0.08	0.09	0.12	0.11	0.16
	-0.19	-0.37		-0.35		-0.30

TABLE C4.

MEDIAN STATION RESIDUALS (SODA SPRINGS)						
	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
AAR			-0.13			
ABJ			-0.52			
ADW	-0.13	-0.30		-0.26	-0.22	-0.25
AFD	0.10	0.23		0.21	0.18	0.22
AFH	0.22	0.26	0.02	0.19	0.17	0.22
	0.39	0.22		0.14	0.15	0.14
AGI	0.10		0.05			
AHR	-0.19	-0.11		-0.11	-0.12	-0.10
ALA	0.02	-0.06		-0.03	-0.01	-0.02
AOD	-0.16	-0.29	-0.11	-0.26	-0.15	-0.28
	-0.66	-0.98		-1.00	-0.81	-1.00
AOH	-0.07	-0.10	-0.10	-0.09	-0.08	-0.09
APR	0.20	0.27		0.26	0.25	0.28
ARJ	0.18	0.22		0.23	0.23	0.24
	0.04	-0.10		-0.11	0.00	-0.13
ARR	0.36	0.32		0.34	0.35	0.35
ASM	0.00	0.12		0.09	0.06	0.11
AVR	-0.10	-0.05		-0.06	-0.07	-0.04
BAB	-0.09	-0.07		0.02	-0.04	-0.05
	0.13	0.07		0.15	0.28	0.06
BFC	0.04	-0.04		-0.05	0.06	-0.07
BIS	0.14	0.15		0.16	0.17	0.15
BMR	-0.07	-0.28	-0.05	-0.34	-0.26	-0.37
	-0.28	-0.61		-0.85	-0.49	-0.89
EBP	-0.01	-0.13		-0.06	-0.04	-0.07
EMB	-0.08	-0.09		-0.09	-0.10	-0.08
	-0.17	-0.19		-0.20	-0.15	-0.23
FPN	0.27	3.05		1.93	1.47	1.95
GNO	0.07	0.12	0.05	0.12	0.11	0.11
	0.20	0.24		0.50	0.30	0.20
GVR	0.40	3.37		2.26	1.81	2.28
HCK	1.50	4.38		3.29	2.85	3.31
IND	0.09	0.07	0.08	0.06	0.06	0.06
	-0.09	-0.04	0.05	-0.02	-0.08	-0.04

TABLE C4. (cont.)

MEDIAN STATION RESIDUALS (SODA SPRINGS)						
	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
KBF	-0.02	-0.03	-0.05	-0.01	0.05	-0.02
	0.12	0.12		0.11	0.17	0.08
KVN	0.08	2.98		1.87	1.41	1.89
LHV	0.85	3.63		2.52	2.07	2.54
LOY	-0.18	-0.15		-0.07	-0.06	-0.13
	0.08	0.06		0.12	0.13	0.10
MGL	-0.22	-0.48		-0.47	-0.46	-0.62
MMC	0.77	1.04				0.22
MON	1.10	3.68		2.58	2.14	2.60
MPK	0.03	0.11	0.08	0.09	0.06	0.11
	0.01	-0.12		-0.11	-0.07	-0.13
MST	-0.48	0.01		-0.41	-0.49	-0.42
NRR	0.00	-0.05		-0.04	0.01	-0.05
	0.07				0.02	
OCH	0.39	0.66		0.28	0.18	0.22
OHC	-0.18		0.00			
ORA	-0.19	-0.34		-0.32	-0.28	-0.31
ORV	-0.12	0.01		0.05	-0.11	0.03
OSU	0.29	0.14		0.08	0.06	-0.12
POW	0.90	3.14		2.04	1.58	2.06
SIE	0.00		-0.05			
SJC	0.76	1.48		0.60	0.38	0.41
TAH	0.11	0.05	0.02	0.01	0.02	0.02
	-0.11	-0.23		-0.23	-0.28	-0.23
TNK	0.00	-0.06	-0.07	-0.04	-0.03	-0.06
	0.06	0.20		0.01	-0.13	0.01
VIP	0.56	0.66		0.32	0.31	0.31
VPK	-0.07	0.02	0.00	0.04	0.01	0.02
	-0.25	-0.15	0.03	-0.10	-0.06	-0.15
WCN	-0.04	0.03		0.04	-0.01	0.02
	-0.05	0.14		0.11	-0.03	0.09

TABLE C5.

MEDIAN STATION RESIDUALS (STEAMBOAT)						
	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
AAR	-0.01		-0.15		0.03	
ABJ	-0.29		-0.25		-0.44	
ABR	-0.23		0.07			
ADW	-0.24		0.00			
AFD	-0.04		-0.15			
AFH	0.16		0.01		0.25	
AGI	-0.04		-0.01		-0.03	
	-0.31		-0.19			
AHR	-0.07		0.01			
ALA	-0.35		-0.16			
AOD	-0.17		-0.11			
AOH	0.01		-0.04			
	-0.37		-0.15			
APR	-0.08		-0.04			
APR					0.01	
ARJ	-0.04		0.09			
ARR	-0.76		-0.56			
ARW	-0.14		-0.06			
ASM	-0.05		-0.13			
	-0.15					
AVR	-0.19		-0.03		-0.31	
BAB	0.04	0.04	0.04	0.05	0.04	0.03
	0.14	0.10	0.22	0.12	0.13	
BFC	0.01	-0.01	0.03	0.00	-0.01	-0.01
	0.09	-0.08	0.23	-0.02	0.08	-0.08
BIS	0.01	0.04	0.02	0.04	0.03	0.04
	0.06	0.04	0.11	0.06	0.04	0.04
BMR	-0.04	0.00	-0.15	0.03	-0.02	0.00
	-0.18		-0.13			
DIX	0.38	1.18		1.58	-0.30	0.58
EBP	0.04	-0.15	0.07	-0.13	-0.11	-0.15
	0.14					
EMB	-0.09	-0.10	-0.11	-0.10	-0.10	-0.10
	0.18	0.16	0.31	0.18	0.12	0.16

TABLE C5. (cont.)

MEDIAN STATION RESIDUALS (STEAMBOAT)						
	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
FPN	0.75	1.23		1.68	0.25	0.81
GBK	-0.08	-0.07	-0.09	-0.08	-0.08	-0.07
	0.18	0.09	0.18	0.10	0.11	0.09
GNO	-0.03	-0.03	-0.02	-0.01	-0.03	-0.03
	0.29	0.17	0.41	0.18	0.19	0.17
HYX	0.89	3.12		2.37		2.31
IND	0.00	-0.01	-0.01	0.00	0.00	0.00
	0.05	-0.02	0.12	-0.01	0.04	-0.02
KBF	-0.05	-0.05	-0.06	-0.05	-0.05	-0.05
	0.01	-0.01	0.07	0.00	-0.02	-0.01
KPK	0.18		0.28			
KVN	0.95	1.66	1.84	1.22	0.50	0.88
LHV	1.43	3.39		2.64		2.58
LOY	-0.09	-0.11	-0.06	-0.09	-0.10	-0.11
	0.03	-0.07	0.10	-0.04	-0.07	-0.07
MMC	0.79	0.79		0.45		0.37
MPK	-0.07	-0.06	-0.12	-0.08	-0.07	-0.06
	0.04	0.02	0.07	0.00	0.02	-0.01
MRF	-0.14		0.15			
OBH	0.39		0.67			
OCH	0.31		0.94			
OCM	-0.09		0.34			
OGO	0.14		0.52		-0.05	
OHC	-0.11		0.12			
ORA	-0.16		-0.05			
ORV	-0.09	-0.45	0.17	-0.81	-0.65	-0.82
OSU	0.38		1.01			
OWY	0.02		0.29			
POW	0.64	0.77		0.82	0.37	0.36
RYN	1.22	1.84		1.04	0.69	1.03
SIE	0.06	0.07		0.07	0.15	0.07
SJC	0.83	0.40	1.12	0.32	0.41	0.34
SLK	1.15	3.48		2.73		2.67
TAH	-0.03	-0.02	-0.08	-0.02	-0.03	-0.02
	0.02	0.01	0.02	0.02	-0.01	0.01

TABLE C5. (cont.)

MEDIAN STATION RESIDUALS (STEAMBOAT)						
	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
TNK	0.11	0.12	0.08	0.11	0.11	0.12
	0.15	0.22	0.31	0.23	0.16	0.22
VIP	0.17	0.13	0.18	0.16	0.25	0.13
	-0.01	0.01		-0.22	-0.01	0.11
VPK	-0.01	-0.03	-0.08	-0.03	-0.02	-0.03
	0.12	0.12	0.18	0.10	0.08	0.12
WCN	-0.04	0.00	-0.04	-0.01	-0.02	0.00
	0.07	0.03	0.07	0.05	0.06	0.03
WSH	0.10	0.09	0.12	0.10	0.11	0.09

TABLE C6.

MEDIAN STATION RESIDUALS (TRANSZ)						
	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
AAR	0.04			-0.14		
ABJ				-0.32		
AOH	-0.21			-0.32		
BAB	0.03	0.02	-0.03	0.03	0.03	0.03
	0.09	0.06	0.08	0.05	0.05	0.06
BFC	0.02	-0.03	0.00	-0.02	0.01	-0.04
		0.06		0.09		0.08
BIS	-0.17	-0.18	-0.16	-0.20	-0.17	-0.18
BMR	-0.05	-0.05	-0.01	-0.01	0.01	-0.02
	0.05	-0.16	0.21	-0.04	-0.02	-0.09
DIX	-0.14	-0.23		-0.15	0.05	-0.15
		0.09		0.09		0.08
DNY	-0.10	0.03	0.05	-0.04	-0.02	0.04
	0.15				-0.09	
EBP	0.14	0.05	-0.03	-0.10	-0.05	-0.09
		0.53		-0.17	0.51	-0.17
EMB	0.00	-0.03	0.13	0.00	-0.04	-0.03
	0.09	0.88		0.14	0.04	
FPN	0.19	0.17	1.00	0.22	0.23	0.21
GBK	-0.01	-0.01	0.09	0.01	-0.03	-0.01
	0.04	0.05		0.04	0.04	0.05
GNO	-0.03	-0.07	-0.06	-0.02	-0.03	-0.08
	0.07	-0.06	0.35	-0.03	0.18	-0.04
GVR	0.57	2.09	1.23	1.84	1.43	1.60
HCK	1.17	3.23	2.03	2.79	2.58	2.75
HYX	-0.06	0.00	0.00	-0.03	-0.01	-0.04
IND	0.02	0.02	0.01	0.02	0.03	0.02
	0.10	0.09	0.16	0.09	0.08	0.09
KBF	-0.11	-0.09	-0.15	-0.10	-0.10	-0.09
	-0.07	-0.08	-0.05	-0.09	-0.05	-0.12
KPK	-0.17			-0.29		

TABLE C6. (cont.)

MEDIAN STATION RESIDUALS (TRANSZ)						
	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
KVN	-0.05	0.46	0.89	0.09	0.38	0.96
	0.84	2.85	2.18	2.02	2.17	1.92
LHC				0.13		
LHK	0.08	-0.15	0.06	0.02	-0.28	
LOY	-0.02	-0.03	-0.02	-0.04	-0.03	-0.03
	0.02	-0.04	0.10	-0.01	0.00	-0.04
LRD				-0.06		
LSH				0.51		
LSM	0.29			0.14		
				0.61		
LWH				0.29		
MGL				-0.18		
MIN				-0.15		
MMC	0.77	1.39	1.09	0.93	0.71	0.88
	1.90	2.84	2.65	2.05	1.76	1.96
MNA	0.20	2.17	1.04	1.72	1.52	1.68
MPK	0.02	0.03	0.02	0.03	0.02	0.03
	0.07	0.07	0.12	0.08	0.06	0.07
NRR		-0.10			-0.01	-0.10
OBH	0.10	0.10	-0.10	0.06	-0.37	
OGO				0.31		
ORA	-0.33					
ORV	-0.08	-0.05	0.10	0.01	-0.37	-0.44
	0.04	-0.32	0.27	-0.52	0.46	1.07
POW		0.42		0.38		0.44
RYN	0.89	1.56	1.11	0.95	0.89	0.90
		0.14		0.27		0.14
SIE			0.12		0.14	
SJC	1.18	1.55	1.40	1.12	0.86	1.07
TAH	-0.02	0.01	-0.09	-0.02	0.03	-0.02
		0.03		0.10		0.07
TNK	0.09	0.12	0.13	0.12	0.13	0.13
	0.12	0.16	0.15	0.18	0.17	0.10

TABLE C6. (cont.)

MEDIAN STATION RESIDUALS (TRANSZ)						
	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
VIP	0.09	0.06	0.14	0.06	0.10	0.07
	0.11	-0.04	-0.04	0.03	0.05	0.03
VPK	-0.09	-0.07	-0.13	-0.05	-0.09	-0.07
	0.15	0.14	0.15	0.14	0.14	0.14
WCN	-0.08	-0.10	-0.02	-0.08	-0.09	-0.09
	0.06	-0.04	0.00	-0.11	0.03	-0.04
WSH		0.24	0.12		0.19	0.24

TABLE C7.

MEDIAN STATION RESIDUALS (TRUCKEE)						
	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
AAR	0.10	0.22	0.04	0.22	0.20	0.23
	0.60	0.37	0.26	0.39	0.57	0.39
AAS	0.04		3.43			
ABJ	-0.32	-0.26	-0.25	-0.24	-0.21	-0.24
	-0.26	-0.83	-0.06	-0.72	-0.42	-0.70
ADW	-0.22					
AFD	0.16	0.13	0.13	0.13	0.15	0.14
	0.24	-0.22		-0.18	0.08	-0.19
AFH	0.11	0.26	0.07	0.27	0.25	0.30
	-0.04	-0.25	-0.08	-0.23	0.07	-0.24
AFR	0.01					
AGI	-0.14					
	1.17					
AHR	-0.05	-0.06	0.05		-0.18	-0.09
ALA	-0.16	0.04	-0.01	-0.14	-0.28	-0.39
	-0.11	0.18		-0.38	-0.48	-0.82
ALN	-0.19		0.60			
AOD	-0.16	-0.37	-0.14	-0.32	-0.27	-0.33
	-0.62		-0.54			
AOH	0.01	-0.06	0.04	-0.04	0.01	0.00
APN	0.14				0.04	
	0.02				-0.05	
APR	-0.08	0.05	0.03	-0.09	-0.35	-0.29
ARJ	0.00	-3.33	0.15	-3.43	-0.25	-3.60
	-0.02	-0.39		-0.55	-0.49	-0.90
ARR	0.23		0.37			
ARW	-0.29					
ASM	-0.12	-0.21	-0.30	-0.20	-0.21	-0.21
AVR	-0.47	-0.33	-0.32	-0.36	-0.54	-0.52
BAB	0.05	0.06	0.03	0.06	0.05	0.06
	0.11	0.02	0.16	0.03	0.07	0.02
BFC	0.02	0.03	0.06	0.04	0.05	0.03

TABLE C7. (cont.)

MEDIAN STATION RESIDUALS (TRUCKEE)

	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
BIS	0.07	0.00	0.06	0.01	0.03	0.00
	0.19	0.05	0.30	0.07	0.17	0.05
BMR	-0.06	-0.11	-0.08	-0.10	-0.06	-0.11
	-0.27				-0.17	
EBP	0.17	-0.13	0.17	-0.20	-0.09	-0.16
EMB	-0.07	-0.08	-0.06	-0.09	-0.08	-0.08
	0.18	0.01	0.38	0.04	0.21	0.01
GBK	-0.09	-0.06	-0.08	-0.05	-0.07	-0.06
GNO	0.04	0.02	0.06	0.03	0.02	0.02
IND	-0.03	-0.03	-0.03	-0.05	-0.03	-0.03
	-0.05	-0.02	-0.02	-0.04	-0.06	-0.02
KBF	0.00	0.01	-0.02	0.00	0.00	0.01
	0.03	0.01	0.06	0.01	0.02	0.01
KPK	-0.05	-0.19	-0.06	-0.13	-0.24	-0.20
LOY	-0.02	-0.01	-0.01	-0.01	-0.01	-0.01
	0.09	0.03	0.15	0.01	0.07	0.03
LSM	4.02	4.94		4.18	4.02	4.18
MAT	0.14	2.19		1.43	1.30	1.45
MCU	-0.35	1.45		0.68	0.53	0.71
MGL	0.37	0.93	0.78	0.41	0.26	0.19
	1.10	1.85		0.96	0.83	0.52
MMC	0.90	2.10	1.49	1.40	1.18	1.32
	1.78	3.69		2.38	2.26	2.37
MOY	0.03		0.80			
MPK	-0.04	-0.03	-0.05	-0.03	-0.05	-0.04
	0.15	0.08	0.19	0.08	0.09	0.08
MRF	-0.22	0.41	0.10	-0.20	-0.35	-0.20
MST	-0.55	1.24	0.33	0.47	0.32	0.50
	-0.22	2.76		1.44	1.31	1.45
NRR	0.05				0.07	
OBH	0.39	0.47	0.76	0.23	0.19	0.00
	0.15					
OGO	0.17	0.88	0.55	0.39	0.25	0.16

TABLE C7. (cont.)

MEDIAN STATION RESIDUALS (TRUCKEE)						
	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
OHC	-0.01		0.33		-0.19	
ORA	-0.12	-0.12	0.07	-0.13	-0.15	-0.20
	0.01					
ORV	0.27					0.27
	-0.32					
OSU	0.50		0.88			
OWY	0.29		0.85		0.34	
SIE	0.10	0.09	0.10	0.08	0.08	0.09
	0.15	0.12		0.14	0.14	0.13
SJC	0.99	1.77	1.42		0.89	0.92
TAH	0.00	0.04	0.00	0.04	0.03	0.04
	-0.11	-0.18	-0.03	-0.17	-0.10	-0.18
TNK	0.02	0.03	0.02	0.03	0.03	0.03
	0.07	0.03	0.08	0.02	0.05	0.03
VIP	0.34	0.17	0.27	0.19	0.22	0.17
VPK	-0.05	-0.03	-0.06	-0.04	-0.04	-0.03
	-0.05	-0.09	-0.06	-0.09	-0.09	-0.09
WCN	-0.04	-0.02	-0.03	-0.01	-0.03	-0.02
	0.10	0.02	0.20	0.03	0.06	0.02
WSH	0.06				0.09	

TABLE C8.

MEDIAN STATION RESIDUALS (WALKER LANE)

	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
APN	-0.01	0.01	0.04	-0.02	-0.01	0.00
	0.03	0.11		-0.05	0.08	0.06
BAB		-0.01		0.06	0.06	0.04
		0.04			0.03	-0.03
BFC	-0.03	0.01	0.00	-0.07	-0.12	-0.07
	0.10				0.04	-0.07
BIS	0.02	-0.40	-0.06	-0.12	-0.19	-0.36
BMN		0.92		0.57	0.47	0.49
BMR	-0.05	-0.02	-0.04	-0.01	0.00	0.04
		0.37		0.19	0.00	0.17
BOX	-0.08		-0.01		-0.01	
BYX	0.02		0.10			
DIX	0.01	-0.17	-0.24	-0.04	0.07	-0.20
DNY		-0.03		-0.01	-0.04	-0.02
EBP	-0.04					
EMB	0.04			-0.17	-0.16	-0.16
FPN	0.09	0.51		0.46	0.05	0.49
GBK	-0.10					
GNO		0.05		-0.08	-0.07	-0.08
GVR				0.10	0.12	0.09
HCK				0.39	0.37	0.43
HYX		0.26		0.19		0.23
IND	0.10	0.01		-0.04	0.02	0.00
KBF	-0.12	-0.11		-0.06	-0.13	-0.08
		-0.21			-0.12	-0.24
KVN	0.08		0.14	-0.02	-0.04	-0.03
	-0.01		0.09			
LHV				-0.03	-0.07	0.00
LIT	0.00	-0.03	-0.03	-0.02	-0.02	-0.08
LOY		-0.15		-0.12	-0.12	-0.13
MPK	0.16	0.13	0.15	0.08	0.08	0.10
		0.08		0.04	0.10	0.03
NRR	0.21		0.10	0.33		
RYN				0.04	0.04	0.03

TABLE C8. (cont.)

MEDIAN STATION RESIDUALS (WALKER LANE)

	EATON	LAB	BUREC	HYBRID	PRODEHL	TEST
SIE		-0.81			-0.77	-0.79
		-1.62			-1.48	-1.68
TAH				0.08	0.09	0.08
TNK		0.15		0.20	0.18	0.20
VIP	-0.10	-0.05	0.01	-0.05	-0.15	-0.11
		0.15		0.12	0.16	0.05
VPK	0.09	-0.17		0.15	0.11	0.11
		-0.12		0.00	-0.02	-0.08
WCN	-0.10	-0.08	-0.15	-0.05	-0.08	-0.05
	-0.06	-0.09	0.04	-0.09	-0.03	-0.10
WSH	0.11			-0.02	0.21	

Appendix D.

Hypoinverse Summary Locations

TABLE D1. Carson-Mason sub-area

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
800313	1820	21.16	38 49.38	119 47.75	6.93	2.0	33	138	12.8	0.14	0.5	1.2
800320	1711	07.91	39 08.95	119 42.38	6.58	2.3	40	108	17.5	0.22	0.5	1.1
800322	1411	55.03	38 47.91	119 47.90	3.79	3.5	5	152	56.0	0.10	2.3	6.5
800409	0236	07.53	39 21.03	119 31.94	6.13	1.8	9	111	20.0	0.92	26.0	73.5
800703	2052	56.39	38 46.73	119 49.15	7.49	2.7	7	284	22.4	0.12	2.5	2.5
800811	1951	31.57	38 48.30	119 42.76	8.65	1.6	8	277	13.4	0.11	2.1	1.2
800816	0753	33.56	39 04.52	119 38.33	7.74	1.8	40	172	20.3	0.18	0.7	1.1
800816	0756	51.94	39 04.52	119 38.13	7.88	1.9	44	174	20.2	0.17	0.7	1.0
801026	2249	20.77	38 47.20	119 24.48	6.48	1.1	8	232	44.0	0.07	1.4	1.7
801223	1551	30.06	38 51.93	119 45.87	7.23	1.7	36	76	13.9	0.17	0.7	1.7
801228	1314	15.78	39 10.23	119 41.40	10.18	1.7	9	183	5.3	0.05	0.9	1.2
810215	0010	29.16	39 10.12	119 40.16	2.25	2.2	6	155	5.0	0.02	1.2	3.2
810218	0135	43.66	38 48.55	119 46.01	5.53	2.2	8	143	15.3	0.08	0.9	3.7
810429	1155	53.25	39 17.46	119 46.30	6.06	4.2	7	165	1.8	0.06	1.5	1.0
810502	0159	36.29	39 17.40	119 47.84	6.39	1.8	6	208	3.7	0.13	1.6	1.6
810726	2139	15.99	39 21.12	119 25.48	1.17	1.6	9	257	22.0	0.11	1.2	15.6
810919	1505	14.96	38 46.67	119 30.77	0.89	1.9	7	191	15.3	0.07	1.4	13.7
810930	0314	04.26	39 07.53	119 40.98	6.93	3.4	7	99	0.7	0.08	1.0	1.0
811003	0743	07.61	39 07.41	119 40.32	9.31	1.3	7	164	0.3	0.10	1.2	1.5
811111	0713	45.59	39 20.97	119 01.92	0.15	1.1	7	257	60.8	0.14	2.2	6.9
820126	1427	46.32	38 48.56	119 46.96	6.89	2.0	9	150	14.6	0.10	0.9	1.7
820605	0954	23.23	38 48.03	119 48.09	8.41	3.8	39	43	15.0	0.21	0.4	1.1
820610	0650	06.84	38 47.46	119 39.45	5.24	1.7	30	80	12.3	0.22	0.4	0.9
820610	2125	02.60	38 48.08	119 38.29	0.96	2.7	10	96	10.6	0.09	0.7	14.5
820627	1638	05.01	38 48.23	119 47.92	7.50	2.0	42	55	14.7	0.21	0.4	0.9
820707	0658	22.76	39 13.48	119 49.18	7.50	1.0	5	163	10.1	0.92	12.3	24.4
820827	1336	21.76	38 48.41	119 46.78	10.80	1.6	27	122	15.0	0.22	0.6	2.8
820904	1507	52.24	38 50.26	119 46.04	0.61	1.9	7	172	12.6	0.20	1.4	21.0
820914	0646	13.44	39 04.74	119 56.59	13.50	1.2	4	239	18.4	0.00	2.2	5.2
821104	0936	35.04	38 50.27	119 13.82	3.81	1.7	7	117	33.2	0.05	0.8	3.9
821106	1700	28.15	38 50.82	119 12.57	6.98	1.2	5	224	34.8	0.10	2.6	14.7
830109	1458	58.04	39 06.40	119 38.34	8.52	4.0	6	198	3.7	0.01	1.7	0.8
830323	1648	24.29	38 49.98	119 47.56	5.98	2.8	14	188	11.9	0.11	0.8	0.9
830325	0419	32.53	38 48.97	119 49.35	4.00	1.6	33	71	20.5	0.17	0.5	1.8
830403	1321	20.25	39 10.14	119 43.33	12.21	0.9	11	152	6.4	0.16	1.0	1.3
830503	0658	08.45	38 49.18	119 47.77	7.76	2.6	12	260	13.1	0.10	1.3	0.9
830915	0544	49.60	39 09.15	119 43.66	9.57	1.7	9	161	5.5	0.08	0.9	1.2
830920	1930	44.06	39 08.21	119 39.49	4.01	2.1	9	210	2.0	0.08	1.7	1.3
831028	1024	49.21	39 03.94	119 59.37	5.66	2.4	28	141	30.9	0.20	0.6	2.1
840123	1851	43.67	38 50.44	119 42.30	2.63	2.0	5	254	10.3	0.00	4.7	11.6
840201	2141	16.66	38 49.35	119 49.21	7.90	2.2	33	114	47.0	0.24	0.6	2.3
840217	1203	56.24	38 50.98	119 38.72	9.58	4.5	21	82	32.8	0.21	0.7	2.6
840217	1216	46.64	38 50.85	119 39.44	10.01	3.9	16	112	32.1	0.25	1.1	12.7
840303	0735	04.81	39 09.32	119 38.12	0.39	1.6	5	240	4.9	0.06	1.9	13.3
840307	0850	40.38	38 49.19	119 35.53	1.21	1.8	4	308	8.4	0.02	9.7	9.5
840409	0742	30.67	39 05.91	119 34.10	13.48	1.3	8	232	9.6	0.19	2.8	1.2
840523	0701	39.33	38 47.34	119 35.59	5.92	1.1	10	225	11.8	0.15	2.0	1.3
840523	0802	25.94	38 45.72	119 35.68	4.03	1.6	7	314	14.7	0.07	1.9	2.6
840523	0817	06.86	38 48.42	119 37.60	3.21	1.1	5	167	9.8	0.06	1.1	2.1
840523	1744	04.55	38 48.72	119 47.37	7.47	0.9	10	154	14.1	0.22	0.8	1.8

TABLE D1. (cont.)

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
840526	0422	51.08	38 49.18	119 37.16	0.84	0.9	5	134	8.3	0.29	2.3	26.9
840526	1244	04.87	38 47.90	119 38.10	2.55	1.3	18	96	10.9	0.15	0.5	1.3
840528	1327	21.32	38 48.07	119 37.71	0.05	1.5	11	94	10.5	0.10	0.5	14.8
840601	0515	18.77	38 48.17	119 37.44	0.11	1.2	8	144	10.3	0.15	1.3	17.8
840601	0516	52.53	38 48.25	119 36.75	0.53	1.0	6	165	10.0	0.20	1.6	20.9
840601	0537	00.03	38 48.21	119 38.29	0.83	1.4	10	146	10.4	0.15	1.1	4.2
840601	0549	32.02	38 48.12	119 37.51	0.00	1.2	12	144	10.4	0.20	1.2	3.3
840601	0621	50.07	38 48.24	119 38.39	0.14	1.9	21	97	10.4	0.15	0.6	1.9
840601	0646	11.56	38 48.27	119 37.93	0.08	1.2	11	105	10.2	0.17	0.7	3.5
840601	0650	58.22	38 48.25	119 38.51	5.21	1.1	18	85	10.4	0.20	0.5	1.3
840601	0722	10.56	38 48.30	119 37.33	0.84	1.1	6	143	10.0	0.15	1.3	17.4
840601	0734	33.32	38 48.76	119 38.60	4.04	1.1	9	145	9.6	0.22	1.4	2.7
840601	0740	55.52	38 47.89	119 37.94	0.99	0.9	7	147	10.9	0.20	1.7	20.6
840601	0907	14.54	38 48.31	119 37.97	0.09	2.3	8	145	10.1	0.11	1.0	6.1
840607	1831	42.74	39 8.95	119 35.12	6.85	0.7	12	237	8.2	0.12	1.6	1.0
840621	0520	46.35	38 47.46	119 25.84	5.69	1.8	27	103	19.1	0.10	0.4	0.8
840718	1323	19.46	38 48.43	119 50.86	7.08	1.6	8	187	62.0	0.12	1.5	2.3
840816	1609	44.90	38 49.96	119 40.81	1.70	0.9	17	93	9.3	0.14	0.5	1.7
840818	2331	21.59	38 48.95	119 45.42	5.92	2.6	12	127	15.1	0.07	0.6	1.0
840825	0956	57.03	38 50.14	119 40.46	2.75	1.9	12	101	8.7	0.07	0.6	1.9
840905	1653	58.53	38 48.85	119 46.93	7.65	1.3	5	150	14.2	0.08	1.0	2.3
840926	0327	06.11	39 04.35	119 38.62	10.52	1.6	5	216	20.0	0.04	2.6	12.7
840928	1139	45.56	38 45.64	119 36.84	0.02	1.6	7	93	14.8	0.13	0.8	8.1
841001	2007	33.81	38 48.19	119 48.87	6.85	2.5	25	55	14.4	0.15	0.4	0.8
841018	0727	41.57	38 48.29	119 46.11	9.72	1.4	7	145	15.6	0.10	1.0	0.9
841021	1451	34.10	38 47.59	119 15.51	5.81	3.8	37	101	32.2	0.15	0.4	0.9
841021	1455	12.53	38 47.51	119 15.50	5.64	3.7	29	101	32.3	0.11	0.4	1.0
841021	1655	15.63	38 47.83	119 15.31	4.00	2.3	16	105	32.4	0.06	0.5	1.3
841021	1708	10.56	38 47.85	119 15.13	4.45	2.3	9	110	32.6	0.07	1.0	3.0
841021	1956	19.46	38 47.82	119 15.07	5.03	2.3	13	140	32.7	0.07	0.6	1.4
841024	0603	39.23	39 04.74	119 58.04	8.33	1.3	7	131	4.4	0.02	0.9	1.0
841026	1855	23.69	38 47.75	119 15.27	4.16	2.3	16	143	32.5	0.04	0.6	1.2
841029	0340	59.82	38 49.45	119 46.78	6.59	1.8	9	133	13.3	0.08	0.7	1.6
841128	2344	05.42	39 15.82	119 38.25	0.49	1.9	9	216	11.0	0.14	2.3	17.0
841204	2342	20.96	39 15.34	119 38.49	0.07	1.9	12	199	11.1	0.12	1.2	3.8
841206	2338	09.58	39 15.61	119 38.20	0.70	2.0	8	222	11.3	0.11	2.1	15.3
841209	0927	19.55	38 56.50	120 01.28	15.11	0.8	6	200	7.9	0.07	1.7	1.4
841228	2337	38.66	39 14.88	119 39.29	0.02	2.2	19	76	10.5	0.20	0.6	3.3
850101	2331	18.12	39 12.92	119 39.46	7.01	1.1	8	214	10.2	0.09	1.3	1.0
850104	1401	44.32	39 05.80	119 37.91	10.57	0.8	9	199	4.8	0.15	1.8	0.7
850223	1738	06.81	38 52.59	119 34.88	0.11	1.6	8	227	3.0	0.10	1.5	15.1
850307	0456	12.22	39 09.11	119 34.37	7.57	1.5	14	179	9.3	0.09	1.0	0.7
850307	1115	38.25	39 08.97	119 35.32	7.57	1.4	14	195	8.0	0.12	1.2	0.6
850307	1208	18.24	39 09.38	119 34.29	7.70	0.9	7	231	9.6	0.07	1.5	1.0
850309	2352	46.06	39 14.52	119 47.15	0.08	1.7	17	124	7.1	0.05	0.4	3.3
850313	1355	15.53	38 47.56	119 34.74	8.51	1.7	19	144	11.6	0.09	0.5	0.7
850320	2108	09.53	38 48.58	119 47.88	8.10	1.9	22	70	14.1	0.12	0.3	0.7
850323	0423	04.55	38 47.82	119 15.70	6.04	1.6	10	165	31.8	0.05	0.9	2.5
850404	1402	59.79	38 48.80	119 47.15	7.57	1.5	10	119	14.1	0.08	0.6	1.8
850510	1308	03.93	38 51.34	119 38.40	9.13	1.5	11	108	5.1	0.08	0.6	0.7
850517	0232	44.78	39 02.16	120 00.71	8.73	0.8	9	85	10.3	0.03	0.5	0.9

TABLE D1. (cont.)

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
850621	1234	24.73	38 45.92	119 34.18	6.82	1.9	24	127	14.7	0.29	0.7	1.3
850717	1652	26.07	39 12.23	119 43.08	9.73	0.8	8	173	9.6	0.09	1.2	0.9
850720	0351	44.03	38 59.55	119 45.90	5.04	1.7	10	101	10.3	0.09	0.6	2.8
850721	1319	32.92	38 48.19	119 48.21	8.49	2.2	20	70	14.6	0.14	0.5	0.9
850721	1509	38.83	38 48.69	119 47.22	6.86	1.5	8	120	14.3	0.06	0.7	1.7
850724	1431	43.11	38 47.38	119 34.59	3.24	1.6	10	113	11.9	0.13	0.6	3.7
850811	0718	52.50	39 15.48	119 51.06	10.89	1.4	6	107	9.5	0.01	0.9	2.1
850811	1018	33.79	39 15.44	119 51.95	8.28	2.0	28	83	10.6	0.19	0.5	0.8
850811	1019	00.47	39 15.60	119 50.99	12.26	2.0	15	81	9.3	0.12	0.6	1.5
850811	1019	54.81	39 15.61	119 50.92	11.08	1.2	17	93	9.2	0.06	0.6	1.2
850816	0413	46.50	38 49.19	119 46.64	8.74	1.6	6	126	13.8	0.01	0.7	3.2
850816	0416	06.53	38 53.28	119 35.79	2.49	2.0	19	159	1.2	0.31	0.8	1.1
850901	0404	35.38	39 18.00	119 06.85	0.35	2.3	21	132	52.1	0.14	0.6	3.7
850903	0159	15.17	39 12.92	119 39.66	4.26	1.5	8	212	10.2	0.07	1.2	2.7
850913	0032	41.06	38 52.99	119 35.97	2.63	2.1	28	86	1.4	0.24	0.6	0.8
850913	0906	12.31	39 07.50	119 46.62	7.84	2.0	34	119	8.7	0.23	0.5	0.7
850913	1714	16.30	39 05.91	119 36.96	11.35	0.9	11	226	5.8	0.11	1.6	1.0
851010	0120	05.50	38 45.91	119 36.28	5.42	1.9	19	91	14.3	0.20	0.5	1.2
851010	2323	50.49	39 15.59	119 37.62	0.63	1.5	11	232	12.0	0.11	1.8	15.4
851015	0743	10.77	39 18.45	119 40.51	0.32	1.3	8	246	7.0	0.21	3.3	21.7
851019	0517	33.12	39 17.77	119 47.75	9.22	0.9	8	116	3.4	0.08	1.0	2.1
851029	0055	13.22	38 53.52	119 33.56	0.19	2.0	7	233	4.2	0.13	1.6	16.7
851116	1244	44.91	39 07.57	119 38.90	9.45	0.0	9	272	21.6	0.04	3.6	0.9
851127	0335	32.86	39 19.82	119 24.05	6.27	1.9	25	103	30.7	0.18	0.4	1.4
851209	1346	02.39	39 09.95	119 07.95	2.43	1.9	22	129	78.6	0.07	0.5	1.1
851212	1918	04.75	39 09.95	119 38.05	8.56	1.1	8	277	18.4	0.04	2.4	0.9
851221	1109	58.01	39 19.53	119 23.54	2.25	1.8	24	138	31.4	0.09	0.6	2.1
851225	1626	15.64	39 20.42	119 22.32	4.70	2.0	24	211	33.3	0.14	0.7	1.5
851225	1629	10.72	39 20.19	119 22.08	0.47	2.0	20	211	33.6	0.09	0.8	2.9
860110	2219	46.02	39 0.67	119 37.64	9.73	1.2	10	190	13.1	0.05	0.9	0.6
860114	0730	01.89	39 3.32	119 44.25	0.87	1.3	9	175	16.4	0.10	1.0	14.9
860114	1308	26.22	39 4.68	119 42.45	1.74	1.1	8	199	18.5	0.19	1.2	20.3
860118	1801	14.04	38 45.45	119 35.89	6.99	2.2	32	101	15.2	0.15	0.4	0.8
860118	1943	13.57	38 45.86	119 34.83	5.84	1.6	14	147	14.6	0.07	0.6	1.1
860206	1004	07.00	39 19.79	119 24.03	5.74	3.0	36	111	30.7	0.11	0.4	0.8
860220	2158	55.75	39 14.94	119 31.96	7.36	2.0	9	290	20.1	0.03	5.7	1.4
860222	0024	44.22	39 19.81	119 24.24	5.36	1.8	14	102	30.5	0.07	0.5	1.2
860225	1014	45.65	39 09.71	119 41.53	9.18	1.3	9	185	16.5	0.07	1.0	1.2
860306	0842	38.40	39 18.52	119 24.71	0.01	1.7	11	168	72.2	0.18	0.9	2.1
860311	1553	21.75	39 19.63	119 23.26	0.81	1.9	15	104	31.8	0.08	0.5	3.3
860323	0913	08.83	38 48.88	119 48.25	7.13	2.1	25	69	31.4	0.08	0.4	1.1
860328	1425	55.62	39 09.65	119 39.56	7.05	1.5	6	281	17.7	0.09	1.8	3.9
860410	0944	38.31	39 09.89	119 49.69	8.90	0.0	14	185	36.9	0.11	1.0	1.6
860530	0705	22.82	38 53.52	119 36.93	0.92	2.1	17	88	0.7	0.12	0.5	1.2
860530	0914	13.50	38 53.71	119 37.02	1.29	1.7	11	133	0.8	0.09	0.5	1.0
860530	1110	46.14	38 53.53	119 36.84	0.01	2.2	19	103	0.6	0.13	0.4	2.2
860530	1303	37.67	38 53.70	119 36.34	2.15	2.0	12	182	0.2	0.18	1.0	1.2
860530	1327	09.88	38 53.42	119 37.44	0.03	2.3	22	88	1.5	0.15	0.5	1.9
860530	1528	52.87	38 53.55	119 37.33	0.41	2.1	18	110	1.2	0.09	0.4	1.2
860530	1719	55.94	38 53.52	119 37.12	0.35	1.8	21	110	1.0	0.09	0.4	1.3
860606	0647	45.03	39 19.88	119 22.41	6.87	1.9	19	212	33.1	0.13	0.9	1.0

TABLE D1. (cont.)

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
860608	0306	03.37	38 47.14	119 25.10	3.87	2.2	18	106	20.3	0.13	0.6	1.5
860608	2327	17.87	38 47.70	119 52.35	8.67	1.6	13	150	15.0	0.09	0.7	0.8
860615	1400	51.38	38 45.48	119 24.51	4.59	3.2	27	128	22.9	0.10	0.5	0.9
860630	2348	00.49	39 12.83	119 50.69	10.76	1.3	17	113	12.4	0.13	0.5	1.2
860710	1909	19.41	38 49.22	119 41.66	8.83	1.7	10	95	11.1	0.13	0.7	1.3
860722	1944	01.40	38 48.78	119 47.51	6.02	1.7	17	121	13.9	0.12	0.5	0.9
860728	1605	52.91	38 54.54	119 33.46	6.70	1.9	8	273	4.6	0.12	1.7	1.0
860814	0805	15.96	38 49.04	119 46.75	5.39	2.0	12	126	14.0	0.06	0.6	1.5
860818	1503	25.89	38 49.36	119 46.55	4.39	2.0	9	115	13.6	0.09	0.7	4.4
860822	2352	04.79	39 17.21	119 08.72	1.65	1.8	14	123	52.6	0.11	0.7	6.1
860824	0302	56.07	38 46.12	119 33.23	0.45	2.0	8	117	14.7	0.09	0.8	5.0
860825	1601	13.65	39 07.58	119 38.82	2.61	1.6	7	197	21.6	0.10	1.6	3.5
860825	1703	53.72	38 53.13	119 37.17	0.26	1.7	9	161	1.4	0.19	2.0	18.5
860905	1645	13.45	38 45.78	119 39.89	0.05	2.0	8	107	15.4	0.23	1.0	7.2
860910	0621	43.41	38 51.26	119 37.92	1.65	1.9	8	116	4.9	0.09	0.8	5.8
860917	0643	16.31	39 01.27	119 01.19	1.71	2.5	23	104	52.7	0.15	0.4	1.2
860918	1758	50.55	39 01.96	119 01.65	1.22	2.0	14	150	52.4	0.14	0.7	2.0
860918	2249	49.73	39 01.15	119 01.20	2.62	3.0	25	129	52.7	0.11	0.4	1.2
860920	0532	13.40	39 00.76	119 01.44	11.38	2.3	9	103	52.1	0.19	0.9	20.0
861016	0520	54.51	39 02.37	119 01.11	1.92	1.9	17	106	53.4	0.08	0.5	1.9
861101	1421	08.99	38 48.68	119 45.97	8.85	1.5	8	132	15.1	0.13	0.8	1.1
861127	0116	26.18	39 21.19	119 02.19	0.22	2.1	14	138	77.6	0.16	0.6	2.2
861217	0427	59.29	39 13.53	119 51.61	12.93	1.3	14	103	12.3	0.20	0.7	2.0
870118	1856	18.55	38 48.94	119 46.51	6.86	0.9	9	145	14.3	0.11	0.7	1.3
870217	0309	06.90	38 44.81	119 34.08	5.54	2.4	11	125	16.7	0.05	0.6	2.0
870308	2309	14.58	38 48.14	119 36.96	15.31	1.4	7	149	10.2	0.08	1.1	2.1
870408	1039	25.64	39 01.43	119 47.53	12.43	1.3	8	127	11.7	0.15	1.4	2.7
870419	0452	24.39	38 49.64	119 46.01	0.11	3.0	25	112	13.6	0.09	0.5	1.9
870602	0345	02.01	38 53.39	119 45.00	10.12	1.5	12	99	9.9	0.18	0.5	1.1
870605	2007	32.78	39 12.95	119 45.05	6.25	2.2	15	152	9.5	0.14	0.8	2.3
870619	2335	37.82	39 18.63	119 35.99	0.18	2.3	21	82	13.5	0.15	0.6	3.3
870630	1531	51.60	38 47.61	119 15.46	4.19	2.3	27	51	32.3	0.11	0.5	1.0
870802	1940	13.87	38 48.12	119 36.28	6.60	1.6	5	217	10.2	0.04	1.5	4.2
870802	2245	45.48	38 48.44	119 38.91	0.12	1.8	13	87	10.3	0.13	0.5	3.0
870803	0227	05.23	38 48.51	119 38.54	0.04	1.8	12	85	10.0	0.17	0.6	2.9
870803	0316	43.72	38 48.36	119 37.98	0.81	1.9	10	149	10.0	0.10	0.8	14.8
870803	0319	32.59	38 48.43	119 38.56	0.04	2.0	13	86	10.1	0.14	0.5	3.9
870803	0320	47.06	38 48.33	119 38.75	0.16	1.9	10	86	10.4	0.13	0.7	5.0
870803	0335	26.51	38 48.32	119 38.59	0.04	1.8	12	86	10.3	0.14	0.5	3.8
870803	0428	22.31	38 48.29	119 38.52	0.16	1.9	12	90	10.4	0.10	0.7	5.3
870803	1018	10.60	38 48.26	119 38.56	0.13	3.0	24	85	10.4	0.14	0.4	2.5
870803	1132	08.90	38 47.63	119 42.95	7.47	1.5	10	115	14.6	0.13	0.6	1.5
870803	1915	22.59	38 47.90	119 36.22	7.87	1.7	6	218	10.7	0.13	1.9	1.4
870804	1512	49.38	38 48.46	119 38.52	0.24	1.8	9	90	10.1	0.18	0.8	5.8
870804	1522	22.89	38 48.03	119 36.10	6.54	1.7	5	219	10.4	0.08	2.2	5.2
870804	2033	36.99	38 48.47	119 38.33	0.11	1.7	13	84	10.0	0.11	0.5	3.4
870804	2127	10.06	38 48.58	119 38.32	0.02	1.7	7	133	9.8	0.28	1.5	10.1
870804	2206	35.58	38 48.56	119 38.44	5.88	1.7	6	145	9.8	0.12	1.0	3.1
870804	2308	49.55	38 48.44	119 38.75	0.03	1.9	12	98	10.2	0.13	0.5	3.1
870806	1048	37.34	38 48.38	119 38.08	0.50	1.7	8	148	10.0	0.09	0.8	14.6
870807	0257	13.48	38 48.24	119 38.67	0.13	2.2	10	86	10.5	0.14	0.7	4.4

TABLE D1. (cont.)

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
870808	0422	30.23	38 48.37	119 38.84	0.09	2.0	12	86	10.4	0.16	0.5	3.3
870808	1135	26.31	38 48.31	119 38.54	0.07	2.4	14	85	10.3	0.12	0.5	2.8
870808	2205	25.83	38 48.60	119 38.85	0.05	2.2	20	98	10.0	0.10	0.4	2.4
870809	0708	30.76	38 48.63	119 38.47	0.76	1.8	7	96	9.7	0.09	0.7	14.5
870810	0351	34.67	39 03.91	119 40.02	0.19	2.7	17	148	19.6	0.09	0.5	14.5
870810	0409	58.57	39 03.32	119 40.27	7.85	2.6	17	146	18.7	0.12	0.6	1.4
870810	1713	02.24	39 03.92	119 40.27	0.09	2.3	22	114	19.8	0.12	0.4	2.5
870914	1841	44.81	38 48.50	119 46.63	9.45	2.2	11	130	14.9	0.10	0.7	0.7
871016	0126	57.56	39 17.56	119 48.53	5.31	3.1	18	66	4.6	0.17	0.6	1.4
871022	0239	22.29	38 50.14	119 45.63	0.09	2.7	19	163	13.1	0.07	0.7	3.1
871121	0013	19.90	38 48.80	119 46.75	6.52	1.6	12	172	14.4	0.05	0.9	0.7
871216	1822	00.82	38 45.43	119 44.03	14.8	1.8	13	109	18.7	0.15	0.7	2.0
871217	0435	44.94	38 46.27	119 42.68	6.40	3.4	28	98	21.4	0.11	0.5	0.8
871226	2104	13.40	39 11.79	119 40.42	6.22	2.2	18	154	13.7	0.13	0.6	3.1

TABLE D2. Gooseberry sub-area

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
810115	2218	16.59	39 26.75	119 25.47	1.97	2.5	9	200	18.9	0.10	1.1	15.1
830412	0218	55.93	39 26.88	119 28.27	2.90	1.6	8	277	29.4	0.08	1.8	14.0
840816	0932	34.78	39 28.03	119 24.12	4.06	3.5	27	202	32.3	0.12	0.5	1.0
840816	0935	54.45	39 28.50	119 22.49	10.42	2.2	8	211	31.9	0.10	0.9	15.0
840817	0311	35.57	39 28.18	119 23.41	7.64	2.2	8	207	32.2	0.04	1.1	1.6
850528	0756	46.91	39 27.85	119 28.84	2.19	4.1	17	109	29.8	0.07	0.7	3.3
850528	0813	00.32	39 27.91	119 28.49	1.70	2.2	19	74	30.2	0.07	0.5	2.2
850528	0822	13.23	39 27.97	119 28.48	0.21	3.6	25	70	30.3	0.09	0.5	3.0
850528	0843	00.12	39 28.70	119 26.65	1.45	1.8	14	266	33.2	0.07	1.1	3.2
850528	1052	21.25	39 28.71	119 27.27	0.43	1.5	12	185	32.5	0.10	0.9	9.3
850528	1226	08.41	39 29.10	119 26.97	6.28	1.2	7	279	33.3	0.10	3.2	14.8
850528	1347	11.22	39 27.66	119 28.34	0.32	3.0	19	71	30.1	0.09	0.5	3.5
850528	1603	40.08	39 29.07	119 26.47	1.11	2.5	10	270	33.8	0.10	1.3	3.4
850529	1533	15.70	39 27.93	119 28.59	2.07	2.8	14	109	30.1	0.06	0.7	2.7
850530	2313	38.05	39 28.11	119 28.86	3.84	2.0	12	101	30.0	0.10	0.7	2.8
850531	2130	34.53	39 27.91	119 28.44	2.72	3.0	22	190	30.3	0.04	0.5	1.1
850531	2144	03.29	39 27.83	119 29.19	4.76	3.5	30	144	29.4	0.18	0.6	1.3
850601	0843	35.18	39 27.95	119 28.29	4.21	1.9	8	196	30.5	0.11	1.1	3.0
850604	1019	16.33	39 27.84	119 27.96	8.25	1.9	10	191	30.8	0.07	0.8	1.0
850608	1000	25.25	39 28.37	119 28.90	4.23	1.6	10	101	30.3	0.15	0.8	3.0
850705	1821	33.76	39 27.78	119 28.56	4.30	1.5	8	189	30.0	0.09	1.0	3.2
850712	1155	28.31	39 28.11	119 27.28	8.34	1.3	10	192	31.7	0.07	0.8	1.0
850824	0821	04.51	39 28.86	119 26.73	6.03	0.0	8	244	65.8	0.27	1.8	4.3
850903	1929	14.05	39 28.68	119 26.08	5.47	1.3	9	269	33.9	0.08	2.6	14.1
850903	2220	43.47	39 28.06	119 29.73	4.44	3.2	70	72	29.0	0.30	0.5	1.1
850904	0708	35.51	39 27.65	119 28.29	6.84	2.2	11	190	32.6	0.03	0.7	1.6
850904	1244	02.55	39 27.78	119 28.19	6.30	0.0	9	190	32.3	0.03	0.9	12.7
850904	1822	33.56	39 27.56	119 28.34	5.85	1.8	9	190	32.8	0.03	0.8	12.8
850908	2209	52.90	39 27.48	119 25.02	11.03	1.9	12	201	33.1	0.32	2.2	29.1
851001	1815	12.68	39 28.03	119 28.95	3.48	2.5	38	101	29.9	0.15	0.4	1.0
851001	1836	12.35	39 27.95	119 27.77	5.11	2.1	28	166	31.1	0.16	0.7	1.1
860203	1001	42.38	39 27.56	119 29.12	5.86	2.3	10	296	29.1	0.06	6.6	1.8
860204	1111	10.40	39 27.72	119 28.77	2.08	1.7	15	102	29.7	0.10	0.5	2.3
860215	1337	41.54	39 25.04	119 25.93	2.60	2.3	20	126	30.7	0.09	0.4	1.2
870616	1302	11.86	39 30.19	119 24.24	2.24	2.5	7	315	54.4	0.07	1.9	13.7
870617	0734	56.97	39 27.23	119 20.43	10.29	2.5	9	271	34.9	0.15	1.6	17.5
870815	1938	02.45	39 28.18	119 27.24	2.80	2.6	12	117	53.2	0.14	0.8	2.6
870815	1940	39.73	39 28.77	119 25.94	0.15	3.1	23	76	30.6	0.21	0.6	3.6

TABLE D3. Mohawk Valley sub-area

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
800131	1115	07.50	39 45.47	120 46.96	6.51	2.1	25	213	57.4	0.21	0.9	1.2
800207	0106	09.85	39 26.73	120 19.01	6.93	2.5	43	69	11.3	0.23	0.5	1.1
800209	0626	41.55	39 50.72	120 58.45	11.20	1.7	23	257	46.9	0.23	1.3	23.2
800215	1240	07.50	39 27.24	120 17.70	11.07	2.2	49	119	9.2	0.21	0.5	1.9
800229	0845	24.83	39 26.84	120 18.13	8.25	1.5	42	159	41.2	0.20	0.8	2.4
800302	1115	28.29	39 42.84	120 44.20	7.27	1.8	17	279	54.6	0.20	0.9	1.0
800309	1156	25.83	39 46.88	120 43.64	7.15	2.1	29	264	61.7	0.21	0.9	1.0
800314	0910	20.47	39 55.14	120 47.94	10.08	1.7	18	281	63.9	0.29	1.2	27.2
800404	0430	58.37	39 31.27	120 18.43	10.26	1.4	44	80	39.6	0.21	0.4	21.3
800410	1023	08.11	39 43.29	120 43.00	5.53	1.3	12	284	56.1	0.29	1.8	2.2
800414	0427	32.84	39 43.24	120 38.82	5.27	1.8	18	287	59.1	0.26	1.3	1.8
800421	1811	10.28	40 05.12	120 51.35	6.38	2.1	6	186	59.4	0.15	5.7	13.7
800614	1503	21.62	39 53.47	120 47.60	10.02	1.7	17	279	63.0	0.28	2.8	26.6
800618	0206	13.40	39 55.56	120 36.55	4.14	2.0	19	294	78.9	0.20	1.4	1.4
800618	0215	59.91	39 57.17	120 40.57	6.89	1.3	5	337	81.1	0.16	6.7	17.1
800804	0752	48.98	39 44.27	120 52.90	10.02	1.4	16	272	40.1	0.12	1.1	16.1
800815	0425	34.56	39 30.93	120 19.60	14.54	3.0	44	55	9.9	0.23	0.4	1.4
800821	2339	11.33	39 48.53	120 49.62	0.57	2.0	12	272	48.0	0.13	1.3	16.6
800826	0050	10.53	39 27.83	120 18.09	11.83	1.4	42	127	9.0	0.16	0.4	1.7
800904	0205	39.43	40 01.30	120 39.21	10.41	1.8	21	250	70.1	0.25	1.6	24.0
801121	1302	05.07	39 47.20	120 26.42	6.01	3.1	53	96	36.7	0.25	0.7	2.1
801205	1332	54.31	39 48.37	120 48.00	6.68	1.6	12	302	59.1	0.12	1.6	1.1
801206	1831	30.39	39 43.85	120 36.24	10.07	1.7	15	296	62.1	0.18	1.3	19.2
801210	0439	23.37	39 35.05	120 24.81	10.25	2.6	43	165	19.3	0.21	0.6	4.3
801212	0505	09.24	39 33.45	120 23.08	6.99	1.6	8	308	67.1	0.08	5.2	13.4
810102	1812	46.55	39 42.62	120 34.36	3.91	3.4	59	116	38.3	0.27	0.5	1.1
810102	1814	06.09	39 41.91	120 35.35	9.25	2.0	12	308	67.5	0.20	7.4	19.6
810102	1830	58.81	39 43.47	120 34.60	8.46	1.6	9	322	62.9	0.06	4.9	12.5
810102	2304	53.49	39 42.47	120 34.23	6.57	2.3	25	274	61.8	0.26	1.3	1.9
810102	2336	58.08	39 43.15	120 33.95	7.32	1.6	14	275	63.0	0.16	1.5	3.5
810103	0409	04.04	39 42.30	120 29.69	7.79	1.3	7	317	65.9	0.27	9.2	24.0
810103	0423	23.81	39 43.14	120 33.27	10.45	1.4	15	299	63.7	0.18	1.1	19.6
810103	0541	48.66	39 42.88	120 33.74	6.18	2.2	25	275	62.9	0.20	0.9	1.1
810103	1139	05.93	39 43.86	120 33.40	9.28	1.4	10	300	64.6	0.15	6.3	16.5
810103	1423	26.34	39 43.31	120 34.59	7.99	1.4	13	267	64.2	0.16	4.6	13.0
810104	0214	46.05	39 42.19	120 30.07	6.82	1.8	15	301	65.4	0.38	3.7	8.1
810104	0742	26.34	39 42.66	120 34.26	6.28	2.5	55	123	38.2	0.20	0.4	1.1
810104	0843	56.95	39 43.09	120 35.68	7.04	1.8	11	297	61.5	0.12	1.8	1.4
810104	1436	17.36	39 43.08	120 34.09	7.66	1.7	12	299	62.8	0.10	5.1	14.0
810106	2033	44.91	39 43.76	120 34.80	9.18	1.5	12	274	63.2	0.10	4.3	11.6
810107	1156	32.05	39 42.72	120 34.59	7.91	1.4	6	320	61.9	0.06	4.8	12.5
810107	1157	25.59	39 43.37	120 35.48	7.58	1.3	9	297	62.0	0.05	5.1	12.2
810108	1536	41.31	39 43.65	120 32.33	5.10	2.2	19	293	65.2	0.32	1.8	1.9
810115	0623	05.29	39 43.62	120 34.21	7.09	1.7	15	275	64.9	0.13	0.8	2.0
810118	1621	56.66	39 42.79	120 35.18	4.43	1.7	14	273	61.4	0.09	0.8	1.1
810118	1622	27.67	39 43.19	120 36.90	6.69	2.0	10	272	60.6	0.06	1.8	1.4
810124	1021	29.28	39 45.92	120 39.80	7.02	1.4	9	295	66.7	0.52	16.0	42.6
810128	0908	21.42	39 43.14	120 35.25	4.90	2.6	10	150	39.9	0.09	0.7	1.4
810128	0912	16.58	39 43.17	120 34.38	7.20	2.6	9	118	38.9	0.05	0.7	1.1
810207	0139	02.55	39 53.36	120 49.29	3.52	1.7	7	246	68.2	0.49	3.2	42.4

TABLE D3. (cont.)

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
810207	0602	10.56	39 42.87	120 36.41	5.44	1.9	19	220	60.5	0.24	1.1	1.3
810216	0629	09.59	39 43.00	120 35.72	5.27	1.8	14	265	61.3	0.13	1.0	1.1
810216	1315	47.27	39 50.95	120 54.45	3.13	1.8	21	208	52.2	0.31	1.1	2.1
810218	0353	05.28	39 50.29	120 41.50	6.05	0.0	19	229	68.7	0.20	0.9	1.2
810219	1150	35.44	39 41.61	120 35.86	6.47	0.4	30	240	59.1	0.23	1.5	2.3
810219	1159	60.00	39 44.12	120 38.91	6.13	1.7	13	270	60.4	0.28	2.2	1.6
810219	1344	25.35	39 43.32	120 35.58	6.12	1.7	13	266	61.9	0.15	1.0	1.3
810219	1648	00.78	39 47.89	120 57.61	10.13	2.0	26	190	45.8	0.25	1.0	24.5
810224	0330	23.36	39 52.60	120 33.55	6.86	1.7	7	301	77.8	0.09	5.4	13.5
810303	1445	58.39	39 42.41	120 35.20	7.05	2.3	29	212	60.9	0.18	0.8	1.8
810322	1121	10.73	39 35.68	120 26.91	4.65	1.6	16	278	60.9	0.22	1.1	2.1
810325	1956	44.85	39 48.58	120 47.35	6.32	1.8	15	283	50.8	0.18	1.2	1.1
810421	1616	35.48	39 46.06	120 45.04	15.36	1.6	7	291	51.7	0.10	7.6	13.0
810606	1905	16.83	39 52.37	120 49.44	9.55	2.3	19	265	52.2	0.27	4.7	11.5
810611	1414	11.05	39 35.54	120 19.40	11.44	3.2	11	100	13.5	0.06	0.8	1.8
810721	0351	35.40	39 49.53	120 30.52	6.67	2.5	43	69	36.5	0.25	0.4	1.7
810722	0428	38.54	39 49.59	120 46.29	9.90	1.4	12	310	53.0	0.15	6.5	16.4
810726	1839	13.31	39 42.19	120 32.86	9.42	1.9	25	240	66.2	0.16	1.9	5.6
810829	1857	37.24	39 52.70	120 50.75	1.26	2.9	42	89	51.2	0.26	0.4	1.8
810915	0750	29.22	39 53.91	120 30.08	11.28	2.4	23	231	82.4	0.17	0.9	18.9
811107	2211	10.79	39 33.56	120 19.24	8.28	1.2	25	118	11.0	0.16	0.7	1.4
811120	0150	36.00	39 27.19	120 18.42	6.52	1.8	19	271	61.9	0.11	0.7	1.1
811221	1805	41.20	39 53.20	120 45.09	4.03	2.5	35	89	46.3	0.36	0.6	1.8
820105	0326	57.56	39 52.44	120 39.70	17.57	3.9	9	166	40.9	0.10	0.7	4.1
820106	1620	25.26	39 49.41	120 43.77	5.73	2.0	9	270	67.2	0.15	2.7	1.8
820128	0427	02.61	39 41.42	120 37.11	8.23	1.7	11	284	64.9	0.20	4.2	10.9
820202	0824	14.77	39 30.03	120 19.51	6.33	1.7	10	281	64.9	0.12	1.7	1.8
820208	0703	10.32	39 24.70	120 16.48	5.56	2.0	11	292	60.6	0.12	2.1	2.6
820211	1716	13.46	39 24.31	120 15.98	7.74	1.7	9	301	60.6	0.08	5.5	13.1
820219	0453	16.13	39 51.73	120 45.79	18.79	4.0	44	137	61.5	0.35	0.8	2.7
820219	0509	27.16	39 51.07	120 46.19	6.02	1.9	12	222	67.3	0.33	3.2	3.8
820219	0928	33.14	39 53.70	120 44.79	7.00	2.1	10	274	72.4	0.20	5.1	20.6
820328	2234	10.91	39 50.14	120 47.08	6.96	2.0	12	294	67.5	0.24	9.1	22.1
820406	2318	55.97	39 53.55	120 51.05	7.46	2.3	12	214	67.3	0.42	3.8	14.1
820428	0105	22.45	39 59.18	120 55.56	4.54	2.0	17	115	55.7	0.19	0.5	2.4
820501	0916	27.67	39 47.47	120 35.84	9.27	2.1	11	120	43.8	0.14	0.5	1.7
820528	0459	16.99	39 42.25	120 32.17	6.86	2.3	25	105	35.4	0.19	0.7	1.8
820529	0018	03.50	39 42.70	120 31.41	11.01	1.6	11	117	35.1	0.23	1.7	23.0
820529	0257	44.10	39 42.42	120 31.80	7.60	2.1	16	117	35.2	0.24	3.6	9.7
820530	0426	17.31	39 40.50	120 32.37	7.03	1.7	11	200	33.7	0.23	7.8	21.7
820531	1812	10.36	39 43.08	120 32.30	3.03	2.0	13	119	36.5	0.15	0.6	2.8
820612	0716	40.77	39 59.23	120 54.42	0.24	2.1	24	104	54.1	0.20	0.5	2.5
820710	0102	16.98	39 41.70	120 39.43	10.66	2.2	20	89	43.5	0.26	0.7	25.4
820714	0929	50.80	39 53.29	120 44.31	9.60	1.7	11	147	45.2	0.13	1.1	16.5
820731	1030	20.90	39 45.45	120 38.43	7.34	1.8	9	119	46.1	0.17	5.2	5.4
820802	1913	20.38	39 42.68	120 30.26	9.57	1.7	16	110	33.8	0.11	0.9	2.0
820805	2151	12.95	39 27.88	120 19.18	10.28	1.9	9	277	81.0	0.15	1.5	7.7
820807	1931	38.04	39 50.98	120 49.00	6.44	2.4	20	167	64.8	0.32	1.0	1.7
820923	1724	38.23	40 01.86	120 50.46	4.63	1.9	15	263	59.2	0.23	1.7	1.7
821022	0428	17.25	39 39.95	120 39.28	9.54	2.3	19	238	53.7	0.21	3.4	1.5
821024	2004	56.74	39 41.44	120 38.92	10.96	1.8	7	289	62.7	0.11	5.9	5.3

TABLE D3. (cont.)

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
821109	1112	06.51	39 43.15	120 39.84	8.14	2.9	42	149	63.5	0.19	0.4	3.7
830104	0217	25.92	39 49.92	120 53.78	8.24	1.1	6	307	59.4	0.06	4.9	2.7
830215	0134	18.27	39 25.31	120 17.18	4.72	1.6	8	301	60.6	0.09	2.4	2.9
830308	2010	13.11	39 25.78	120 18.11	4.93	1.6	7	302	60.3	0.18	3.5	6.4
830324	1355	55.27	39 26.44	120 21.04	7.39	2.2	14	253	58.3	0.11	3.3	1.4
830325	0521	34.83	39 27.66	120 17.41	9.62	0.9	20	75	2.7	0.14	0.4	0.5
830407	1137	29.71	39 44.86	120 45.52	0.33	2.3	11	263	59.4	0.16	1.5	18.1
830523	0838	29.14	39 42.51	120 40.70	8.23	1.6	8	285	61.8	0.04	4.6	13.0
830603	0918	12.79	39 49.68	120 42.91	1.26	2.7	19	191	71.9	0.61	3.1	6.5
830719	0803	51.39	39 45.79	120 39.34	7.05	1.7	6	311	67.1	0.27	9.1	24.3
830721	1722	35.88	39 47.74	120 38.14	5.53	1.4	6	331	37.4	0.02	2.0	12.5
830724	1705	46.23	39 53.74	120 49.24	8.20	2.7	30	170	56.5	0.22	0.7	22.0
830803	0359	14.79	39 29.55	120 22.32	10.87	1.0	6	184	9.2	0.11	1.2	2.7
830803	1211	01.20	39 49.49	120 28.50	7.03	2.0	6	319	83.5	0.10	5.7	13.8
830806	0517	03.04	39 44.00	120 40.11	61	2.0	9	282	64.2	0.16	7.1	18.4
830806	0648	49.03	39 45.90	120 35.42	7.03	1.9	7	299	71.6	0.29	13.8	26.9
830806	0652	34.79	39 45.81	120 35.44	0.11	2.0	7	298	71.5	0.16	8.9	3.9
830806	0802	09.82	39 43.91	120 40.63	6.93	2.1	10	218	63.5	0.16	1.7	1.8
830807	0303	19.79	39 31.57	120 18.09	8.96	0.7	30	77	10.0	0.14	0.5	1.0
830818	2250	49.74	39 32.30	120 15.39	11.00	1.1	7	96	11.6	0.04	0.7	2.4
830928	2329	58.94	39 44.48	120 33.41	2.53	1.5	7	243	20.8	0.07	2.0	13.7
831012	0725	55.35	39 44.64	120 44.87	5.95	2.1	30	73	44.8	0.30	0.6	1.6
831110	1817	43.19	39 44.91	120 32.00	5.18	2.4	10	215	20.5	0.37	4.6	13.9
831121	2044	29.30	39 57.36	120 47.11	7.02	2.7	21	204	67.7	0.25	1.9	24.1
831123	0211	50.14	40 05.57	120 49.65	7.34	2.0	12	259	53.9	0.16	2.9	1.7
831130	1307	13.05	39 47.19	120 40.51	5.57	2.3	30	142	31.1	0.30	0.7	2.1
831227	1716	43.60	39 49.76	120 27.81	6.42	2.6	29	184	41.8	0.32	1.6	6.9
840112	1821	31.47	39 54.90	120 30.70	9.11	2.3	16	268	37.4	0.06	0.9	0.8
840125	0545	42.74	39 57.14	120 56.90	9.54	1.2	9	292	65.7	0.34	11.3	29.2
840304	0403	32.81	39 47.32	120 40.42	3.13	1.6	30	146	31.2	0.31	0.7	1.9
840319	2013	21.76	39 49.06	120 39.51	8.13	1.5	20	202	32.8	0.13	1.1	1.1
840320	1728	58.39	39 48.12	120 39.40	9.38	2.4	23	198	31.4	0.29	1.3	2.3
840321	1111	12.55	39 46.10	120 40.44	5.88	3.6	40	136	29.6	0.26	0.8	1.2
840321	1114	32.71	39 47.50	120 39.05	7.01	2.2	16	260	69.5	0.31	5.0	29.0
840321	1115	16.57	39 48.79	120 36.66	7.00	2.0	10	276	73.6	0.19	5.0	19.8
840321	1128	02.59	39 47.04	120 40.42	6.04	2.8	20	159	50.1	0.24	1.4	2.0
840407	1104	26.51	39 47.51	120 39.03	10.92	1.7	12	214	49.1	0.22	1.8	22.4
840518	1347	40.32	39 30.88	120 23.78	11.74	0.7	14	192	8.2	0.11	0.9	1.7
840519	0352	15.60	39 32.51	120 19.55	0.76	1.4	10	136	9.5	0.18	1.1	19.7
840608	0731	01.42	40 02.04	120 53.43	5.06	0.9	8	261	69.7	1.43	17.5	19.0
840612	1228	07.70	39 35.15	120 23.72	11.61	1.1	25	98	2.2	0.15	0.5	0.9
840617	0550	49.08	39 28.34	120 18.61	6.83	0.0	15	294	81.5	0.10	5.4	14.0
840630	0835	22.50	39 47.81	120 25.99	7.92	1.0	12	202	22.8	0.12	1.0	1.4
840703	1809	10.96	39 27.88	120 18.37	9.22	2.0	29	90	3.3	0.07	0.3	0.3
840718	1734	25.21	39 27.84	120 19.70	10.45	1.5	7	223	4.3	0.15	1.6	1.4
840801	1824	59.31	39 32.55	120 21.99	10.36	1.1	9	165	6.7	0.05	0.7	1.6
840820	1714	55.42	39 34.13	120 23.33	10.96	0.9	6	255	16.4	0.05	2.3	2.6
840922	0704	41.02	40 06.63	120 48.95	4.34	2.4	18	182	53.2	0.29	1.2	2.4
841006	1929	19.67	39 44.91	120 37.27	7.44	0.0	11	305	61.4	0.08	2.0	1.4
841008	0626	03.57	39 57.42	120 49.16	8.74	0.0	14	243	58.7	0.11	1.9	7.8

TABLE D3. (cont.)

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
841013	1901	37.21	39 55.50	120 45.75	3.04	2.2	15	167	53.8	0.19	0.8	2.9
841101	1511	01.96	39 36.95	120 19.99	9.95	1.6	5	251	9.6	0.01	2.4	1.4
841106	0346	56.68	39 57.71	120 50.04	8.27	0.0	18	222	58.2	0.16	1.2	5.5
841106	1026	42.10	39 27.62	120 18.52	10.73	1.5	5	225	3.0	0.02	2.5	3.2
841110	0417	15.33	39 44.10	120 45.73	7.25	2.5	36	117	45.8	0.20	0.5	1.0
841111	2024	51.02	40 01.96	120 36.96	7.06	0.0	5	351	71.8	0.04	7.0	12.0
841112	2040	20.83	39 44.18	120 45.65	7.10	0.0	12	154	49.6	0.15	0.9	1.4
841117	2304	34.97	39 40.55	120 19.50	12.10	1.9	20	195	7.8	0.09	0.7	1.3
841204	0835	48.20	39 41.67	120 18.54	8.87	2.2	29	119	7.4	0.46	1.2	1.7
841216	0713	45.93	39 33.87	120 31.50	4.15	2.2	15	166	24.5	0.13	0.8	2.0
850106	0508	51.48	39 33.42	120 20.50	6.89	1.6	9	234	12.4	0.05	1.0	1.3
850106	1339	06.08	39 54.96	120 43.76	6.98	1.6	8	292	68.9	0.19	6.4	19.4
850113	0343	53.18	39 33.53	120 19.71	3.81	1.5	5	229	11.5	0.02	1.6	6.7
850125	1132	24.68	39 26.48	120 17.20	12.57	2.0	30	98	0.6	0.08	0.3	0.7
850305	1614	59.86	39 48.92	120 40.15	5.93	2.2	20	195	40.9	0.16	1.0	1.2
850306	1144	51.57	39 44.94	120 37.44	6.34	2.3	23	203	34.7	0.31	1.8	1.9
850309	1648	21.65	39 48.92	120 39.94	6.81	1.9	10	159	45.6	0.14	0.7	2.1
850310	2129	34.36	39 34.94	120 21.02	11.82	1.1	5	247	12.9	0.06	1.5	3.0
850408	1800	22.54	39 33.98	120 18.45	7.09	0.0	6	225	10.5	0.19	7.6	12.4
850502	0558	47.46	39 26.08	120 24.82	10.49	0.0	7	251	10.5	0.07	2.6	1.1
850502	0613	19.73	39 26.29	120 26.18	6.96	0.0	6	155	20.7	0.07	4.8	13.0
850510	1410	28.96	39 35.67	120 20.57	5.68	0.0	10	159	11.6	0.17	2.4	5.4
850522	0342	13.06	39 36.08	120 26.36	9.84	3.4	50	57	18.5	0.15	0.3	0.9
850524	2313	26.14	39 56.90	120 53.18	9.60	0.0	12	161	59.0	0.18	0.8	19.5
850614	2213	57.34	39 34.83	120 20.97	2.28	1.6	5	246	13.0	0.01	2.0	12.5
850614	2351	57.17	39 34.91	120 21.64	3.89	1.9	8	249	13.7	0.04	1.7	5.8
850617	0216	38.79	39 35.11	120 22.25	7.95	1.8	12	104	14.1	0.09	1.0	1.7
850705	1226	05.33	39 33.60	120 21.43	8.71	1.7	19	101	13.8	0.08	0.4	0.7
850722	0416	38.74	39 58.15	120 53.04	0.66	2.0	15	153	60.5	0.22	0.9	5.4
850810	2322	32.65	39 46.76	120 38.89	4.95	1.8	16	140	37.7	0.13	0.5	1.2
850823	0242	10.60	39 45.95	120 27.58	9.27	2.3	22	117	22.5	0.06	0.4	0.7
850828	0215	41.89	39 36.32	120 19.96	15.10	1.7	8	245	10.2	0.15	3.3	2.0
850828	1856	15.79	39 49.91	120 37.93	7.82	2.0	13	176	38.9	0.13	1.0	2.4
850830	0428	47.21	39 37.70	120 27.10	10.09	2.2	30	102	18.7	0.15	0.5	2.9
850903	1015	32.76	39 55.71	120 49.88	5.00	1.9	15	99	50.1	0.11	0.6	1.8
850924	0701	14.71	39 43.64	120 38.87	6.34	1.8	13	130	44.6	0.14	0.9	2.1
850925	1720	44.43	39 26.51	120 17.19	10.21	0.9	8	150	0.7	0.05	1.2	1.1
850926	0458	02.25	39 36.31	120 24.59	12.38	1.6	8	269	16.0	0.05	1.8	2.4
851019	0647	24.95	39 32.87	120 22.02	9.08	2.8	51	43	13.9	0.17	0.4	0.9
851019	0653	51.08	39 33.58	120 21.33	11.00	1.3	20	125	13.6	0.10	0.4	1.5
851019	0658	56.35	39 33.74	120 21.51	11.04	1.7	18	128	15.0	0.05	0.4	1.4
851019	0736	55.64	39 33.74	120 21.43	11.72	1.9	24	127	14.9	0.06	0.4	1.4
851024	0041	48.11	39 33.68	120 20.89	11.78	0.4	7	238	13.1	0.02	1.3	1.6
851024	0332	54.11	39 33.28	120 21.63	10.19	1.4	23	88	13.8	0.14	0.5	2.0
851104	0716	19.41	39 29.34	120 22.31	1.87	0.0	9	96	13.8	0.40	2.1	35.4
851210	1742	55.75	39 47.66	120 45.43	7.13	0.0	15	136	52.8	0.22	1.0	1.8
851211	0831	04.98	39 34.59	120 11.68	0.01	0.0	7	263	34.5	0.35	11.1	8.0
851225	2319	28.50	39 36.91	120 24.14	11.86	1.4	19	86	15.0	0.08	0.5	1.2
860101	2023	19.23	39 57.01	120 52.80	8.43	0.0	7	171	59.5	0.14	0.9	17.3
860127	1425	35.75	39 52.15	120 46.78	4.90	1.5	27	98	49.4	0.18	0.8	1.3

TABLE D3. (cont.)

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
860213	1619	13.42	39 45.89	120 44.76	6.53	2.0	26	83	45.2	0.15	0.6	1.1
860222	0643	04.63	39 53.72	120 47.68	6.19	0.0	20	105	49.0	0.26	0.7	1.8
860225	0115	12.88	39 34.97	120 30.71	10.47	1.6	10	278	24.9	0.04	1.3	4.1
860306	0745	59.94	39 34.81	120 21.63	10.08	1.4	11	248	13.8	0.05	1.7	1.3
860407	0343	09.40	39 54.67	120 51.53	7.07	0.0	15	113	53.0	0.13	0.6	1.4
860413	1053	54.83	39 35.07	120 35.32	7.27	0.0	8	188	33.4	0.08	1.3	1.9
860509	1126	56.05	39 29.95	120 20.58	4.83	0.0	8	102	11.2	0.05	0.7	2.0
860606	1848	34.80	39 34.34	120 17.48	0.59	1.9	8	205	9.9	0.04	1.2	12.9
860627	0354	52.38	40 03.14	120 51.15	0.28	2.2	29	122	45.9	0.10	0.4	1.4
860808	1714	58.55	39 57.73	120 43.50	0.30	2.2	13	190	40.3	0.08	0.8	2.4
860816	1825	57.54	39 56.08	120 43.67	0.95	2.1	10	184	41.9	0.05	0.7	2.8
861004	1746	00.87	39 31.04	120 22.03	6.29	1.7	10	236	11.0	0.07	1.8	2.3
861015	1519	13.77	39 34.43	120 25.47	7.18	1.7	12	213	18.7	0.08	1.0	1.6
861016	2106	36.07	39 34.81	120 25.97	8.14	1.7	10	265	19.0	0.06	1.1	2.1
861016	2150	23.08	39 35.26	120 26.35	8.71	1.6	12	269	19.1	0.10	1.1	1.8
861017	1430	58.53	39 35.10	120 26.72	7.28	1.7	11	269	19.7	0.09	1.6	1.5
861017	2355	53.61	39 35.20	120 25.48	10.24	1.5	9	268	18.0	0.10	1.5	2.9
861021	0710	11.68	39 35.31	120 27.62	7.62	1.7	11	272	20.7	0.09	1.5	1.6
861021	1256	18.78	39 35.25	120 27.49	7.43	1.8	13	272	20.6	0.04	1.0	1.6
861028	1736	09.98	39 35.00	120 26.90	7.38	1.9	11	269	20.0	0.04	1.2	1.6
861028	2158	07.59	40 02.83	120 51.10	3.44	1.9	29	120	46.3	0.38	0.7	3.5
861114	0344	00.46	39 30.74	120 17.73	4.36	2.2	24	109	7.2	0.13	0.4	1.1
870129	2307	54.09	39 37.80	120 14.78	8.46	2.0	12	165	3.3	0.08	0.9	0.6
870204	1934	35.49	39 29.04	120 18.99	11.84	1.3	9	217	5.6	0.07	0.9	1.0
870211	2027	04.63	39 36.87	120 25.70	9.75	1.7	12	214	17.2	0.03	1.5	0.6
870211	2028	01.57	39 37.29	120 26.34	10.00	1.4	9	281	17.8	0.05	1.4	2.9
870214	2015	49.05	39 46.19	120 44.59	5.92	3.0	13	155	45.1	0.07	0.5	1.3
870224	0640	30.60	39 50.34	120 45.98	5.98	1.8	7	264	49.6	0.06	1.7	3.3
870318	0435	14.82	39 44.90	120 38.76	6.37	1.5	11	246	36.4	0.10	1.3	1.8
870318	1202	41.22	39 27.72	120 16.28	9.03	1.4	12	154	3.3	0.14	1.1	0.6
870403	1246	57.06	39 49.75	120 46.63	1.80	2.3	15	265	50.0	0.08	0.9	1.7
870415	1225	25.88	39 30.75	120 17.79	4.56	1.9	17	183	7.3	0.08	0.6	1.5
870415	1225	56.51	39 30.80	120 17.25	1.37	1.7	8	192	6.5	0.04	0.8	5.6
870831	0842	25.41	39 40.61	120 31.29	9.74	1.9	13	227	24.5	0.06	1.3	0.6
870914	0210	01.53	39 32.85	120 22.38	9.38	2.3	12	244	14.1	0.07	1.2	0.7
870923	0518	53.32	39 29.16	120 20.63	11.15	3.3	16	116	7.0	0.05	0.6	1.0
870927	0419	50.45	39 52.28	120 47.99	5.99	1.9	7	332	53.7	0.12	4.2	4.0
871003	0347	26.13	39 32.24	120 21.37	7.82	3.3	19	111	12.4	0.10	0.4	0.6
871007	1258	29.72	39 51.88	120 48.16	4.93	2.0	12	327	53.6	0.17	2.6	2.8
871019	0110	46.36	39 45.60	120 39.37	4.70	3.0	15	145	37.6	0.09	0.7	1.4
871023	2046	28.22	40 01.54	120 37.79	4.63	1.9	11	274	30.2	0.05	1.4	2.0
871106	1543	33.52	39 43.25	120 17.84	8.32	2.9	16	181	8.7	0.14	0.6	0.9
871112	2202	25.92	39 48.01	120 44.01	5.29	2.2	16	262	45.3	0.11	0.8	1.3
871112	2203	42.25	39 48.33	120 42.85	7.37	2.0	12	261	44.0	0.10	0.9	2.2
871118	1729	44.45	39 48.11	120 44.00	5.30	2.4	16	159	45.4	0.09	0.6	1.2
871121	2139	38.23	39 29.66	120 15.09	0.20	1.8	9	155	3.6	0.07	0.8	13.9

TABLE D4. Soda Springs sub-area

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
800408	0326	40.38	39 13.07	120 24.71	6.89	0.0	5	323	38.1	0.21	15.0	15.5
800804	1522	12.82	39 11.79	120 28.77	7.04	1.6	7	299	69.7	0.04	4.8	11.9
800830	0209	58.08	39 11.30	120 27.20	9.54	2.3	45	61	20.7	0.19	0.3	1.0
800920	0131	45.21	39 11.47	120 27.09	8.63	1.7	15	274	50.3	0.15	1.5	2.3
801029	0717	48.53	39 11.33	120 27.42	9.69	2.0	34	85	20.9	0.13	0.4	1.1
801128	1711	39.66	39 15.67	120 27.65	14.79	3.5	50	66	19.3	0.22	0.4	2.0
801128	1715	26.36	39 15.14	120 30.61	8.66	1.2	17	267	33.7	0.20	1.4	1.2
801128	1821	12.97	39 15.40	120 27.93	13.88	5.2	51	81	36.8	0.24	0.6	2.7
801128	1826	17.48	39 14.73	120 28.95	9.55	1.3	14	274	34.9	0.14	1.1	0.9
801128	1830	42.94	39 14.10	120 27.69	9.30	0.9	9	320	35.6	0.08	1.0	0.8
801128	1834	42.61	39 13.84	120 30.23	10.01	1.5	11	272	51.1	0.12	1.4	16.2
801128	1836	51.50	39 15.22	120 29.07	18.47	2.7	45	155	35.4	0.22	0.8	2.2
801128	1839	16.32	39 15.57	120 28.21	9.88	1.5	48	74	20.2	0.20	0.3	1.1
801128	1842	42.36	39 15.87	120 27.91	18.06	3.0	49	75	19.7	0.21	0.4	1.5
801128	1853	20.68	39 16.21	120 27.65	19.71	2.4	55	74	19.3	0.22	0.4	1.2
801128	1904	21.68	39 15.72	120 27.12	16.85	2.6	50	75	18.6	0.21	0.4	1.7
801128	1910	45.33	39 14.54	120 26.36	9.82	0.4	6	325	37.6	0.06	2.4	1.6
801128	1916	22.58	39 15.33	120 27.57	9.41	1.8	42	75	19.3	0.26	0.5	1.2
801128	1923	06.97	39 15.45	120 28.23	10.00	2.9	44	74	20.2	0.19	0.3	8.2
801128	1928	16.34	39 14.95	120 28.84	17.36	1.4	19	275	35.3	0.14	0.9	2.5
801128	2025	20.24	39 15.59	120 28.49	10.07	2.0	25	235	36.5	0.16	0.9	18.1
801128	2031	43.01	39 14.78	120 28.75	14.19	1.6	10	275	35.2	0.07	1.3	3.8
801129	0012	08.51	39 15.06	120 28.67	17.27	1.5	11	276	35.6	0.20	1.4	6.5
801129	0414	04.01	39 15.76	120 26.78	9.07	1.5	16	287	38.6	0.14	1.0	0.7
801129	0447	44.58	39 15.66	120 28.48	13.50	1.9	27	241	36.6	0.19	1.1	5.1
801129	0844	00.15	39 14.13	120 31.08	18.51	1.6	11	271	31.9	0.14	1.5	2.7
801129	1005	37.11	39 15.42	120 28.02	10.35	1.5	20	277	36.8	0.17	1.0	19.1
801129	1809	27.91	39 14.67	120 28.91	8.47	2.1	25	249	34.9	0.22	0.9	1.2
801129	2131	19.49	39 13.75	120 29.40	8.28	1.5	10	314	33.3	0.19	1.8	1.6
801129	2306	28.05	39 15.43	120 27.85	12.87	2.6	43	75	19.7	0.22	0.5	2.9
801129	2342	16.54	39 15.51	120 27.48	10.36	2.0	31	273	37.5	0.25	1.0	24.4
801130	2131	19.88	39 15.39	120 28.44	9.50	1.9	45	96	20.5	0.19	0.4	0.9
801201	0139	13.48	39 14.82	120 29.09	16.81	1.6	18	274	34.9	0.15	1.2	3.0
801202	1831	08.27	39 16.77	120 28.20	11.62	3.1	6	186	20.2	0.05	1.8	2.7
801204	0257	13.01	39 15.30	120 27.72	12.11	1.3	26	110	19.5	0.18	0.6	2.6
801212	1913	46.04	39 15.56	120 27.70	9.86	1.7	11	303	37.3	0.15	6.2	16.7
801214	0100	27.37	39 15.16	120 27.52	10.13	1.5	20	272	37.1	0.16	0.9	18.3
801214	0425	05.74	39 16.12	120 29.71	6.99	1.4	9	300	35.9	0.14	1.9	2.3
801215	1540	29.52	39 15.43	120 28.63	17.12	2.2	32	259	36.1	0.17	0.8	3.3
801219	0846	41.65	39 15.56	120 28.99	17.91	1.8	32	255	35.9	0.18	0.9	3.3
801223	2138	09.23	39 15.77	120 27.94	9.11	1.3	13	277	37.3	0.22	1.0	1.0
801224	1048	08.58	39 15.31	120 27.69	15.08	2.0	59	95	19.4	0.16	0.3	1.7
801229	0605	27.18	39 15.81	120 28.18	9.91	2.9	9	149	20.1	0.05	0.7	0.9
801229	0811	10.80	39 14.82	120 29.20	8.47	1.6	21	282	34.8	0.21	1.0	0.9
810103	1059	15.85	39 15.06	120 27.97	14.44	2.0	45	227	36.4	0.18	0.8	4.3
810103	1316	18.06	39 15.04	120 28.06	13.88	1.4	19	276	36.3	0.19	1.4	4.7
810111	1033	34.79	39 15.63	120 28.24	9.79	1.7	41	101	20.2	0.20	0.5	1.2
810119	0140	14.95	39 15.15	120 28.44	19.34	1.6	16	276	36.0	0.27	1.6	5.7
810203	1340	16.02	39 15.45	120 26.63	10.17	1.7	27	249	38.3	0.17	0.8	18.7
810215	0810	41.47	39 15.37	120 27.51	8.68	1.9	37	236	37.3	0.15	0.6	0.7
810302	0339	57.07	39 15.06	120 28.29	9.67	1.3	10	271	36.1	0.10	1.1	1.0

TABLE D4. (cont.)

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
810303	1455	07.22	39 15.41	120 28.29	9.57	1.8	21	256	36.5	0.14	0.7	0.8
810315	0232	26.77	39 16.36	120 26.34	8.30	1.6	14	279	39.7	0.27	1.7	2.0
810320	1531	46.30	39 15.71	120 27.53	10.18	1.4	17	272	37.7	0.17	1.0	18.7
810417	0252	43.28	39 15.37	120 28.66	15.81	1.7	21	240	36.1	0.14	1.7	4.3
810506	0148	55.12	39 15.13	120 28.31	18.82	1.8	15	281	36.1	0.16	1.0	2.7
810605	1652	05.90	39 15.35	120 27.41	10.21	2.3	22	240	37.3	0.12	1.2	16.2
810701	1002	42.78	39 15.51	120 27.55	15.05	1.5	20	248	37.4	0.12	0.7	3.6
810717	0526	16.41	39 8.47	120 28.86	13.89	1.5	15	269	28.9	0.09	0.8	2.4
810831	1834	07.84	39 13.80	120 30.57	20.40	2.3	20	235	32.1	0.15	1.5	2.5
811106	0538	14.85	39 15.26	120 26.57	15.35	1.5	15	279	38.2	0.14	1.5	4.4
811223	0739	14.21	39 16.11	120 27.20	10.06	1.7	17	279	38.5	0.13	1.0	16.3
820227	0938	48.08	39 14.36	120 30.66	18.49	1.6	8	267	32.6	0.07	4.6	3.6
821004	1552	27.22	39 15.10	120 26.39	8.69	1.4	13	252	38.2	0.15	1.8	0.9
830104	1154	30.80	39 10.65	120 28.06	10.21	1.6	8	272	31.7	0.07	1.7	13.7
830113	1521	29.36	39 15.50	120 26.28	10.06	2.2	20	251	38.8	0.20	1.5	21.0
830129	1030	50.06	39 10.65	120 29.10	6.17	1.8	11	282	47.8	0.07	1.1	5.3
830215	1228	37.98	39 15.48	120 26.83	10.54	2.4	19	236	38.2	0.18	1.8	19.7
830224	2337	05.05	39 10.48	120 28.73	3.76	1.5	6	267	65.9	0.10	1.5	14.9
830416	0859	28.25	39 10.74	120 27.00	12.50	2.2	14	237	33.1	0.13	1.2	4.7
830908	1504	08.54	39 12.15	120 24.97	4.26	1.7	10	260	62.9	0.16	2.9	5.0
830930	1346	27.99	39 14.98	120 27.51	10.07	1.3	18	81	25.3	0.14	0.6	5.2
831026	1645	28.45	39 16.77	120 26.77	9.02	1.3	10	105	18.1	0.07	0.6	1.5
840311	0918	49.34	39 11.63	120 29.25	17.51	1.4	15	129	23.1	0.13	0.7	2.4
841018	1142	40.52	39 16.84	120 27.19	11.23	2.2	26	113	18.7	0.10	0.5	1.9
850705	0515	50.93	39 15.82	120 28.23	9.14	1.9	42	86	20.2	0.12	0.3	0.6
860318	1852	54.03	39 13.36	120 28.92	7.06	2.0	27	84	21.7	0.16	0.5	1.1
860318	2022	18.50	39 13.43	120 28.52	9.55	0.0	7	158	21.1	0.09	2.3	3.2
860320	1946	32.11	39 17.77	120 28.62	4.61	0.0	7	147	21.0	0.24	2.2	23.5
860819	0100	21.94	39 11.79	120 31.48	3.50	1.6	6	297	26.1	0.21	3.7	21.3
861116	2051	47.74	39 11.27	120 27.12	8.06	3.0	59	33	20.6	0.19	0.3	0.7
861128	2314	24.17	39 11.14	120 27.52	7.29	2.2	37	72	21.2	0.08	0.3	0.9
870111	0423	23.87	39 11.11	120 26.86	6.56	2.4	16	239	20.4	0.09	1.1	1.7
870406	0446	12.26	39 11.02	120 28.16	7.06	3.3	19	156	22.1	0.10	0.6	1.4
870406	0603	07.12	39 10.86	120 28.05	5.20	1.4	15	241	22.1	0.08	1.2	2.3
870704	1447	49.46	39 10.94	120 27.91	6.01	2.0	15	241	21.9	0.07	1.2	2.6
870716	0149	36.86	39 10.98	120 27.39	1.47	1.8	20	240	21.2	0.12	0.8	16.2
870716	1350	23.94	39 11.20	120 27.62	6.27	2.3	19	229	21.3	0.09	1.1	1.5
870806	2028	07.66	39 11.27	120 26.74	6.16	1.9	14	238	20.1	0.08	1.0	1.7
870814	1139	22.44	39 11.08	120 28.04	5.63	1.5	13	241	21.9	0.02	1.1	2.4
871019	1307	12.56	39 11.66	120 25.23	7.53	3.0	14	246	17.8	0.08	1.0	1.3

TABLE D5. Steamboat sub-area

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
800218	0659	19.57	39 15.84	120 07.61	10.03	2.4	23	289	62.4	0.18	1.1	19.6
800405	1043	06.48	39 23.94	119 51.44	2.12	1.4	29	140	13.9	0.12	0.5	1.5
800424	1504	17.93	39 16.96	120 11.12	6.04	1.6	16	296	58.7	0.16	0.9	1.3
800618	0340	19.12	39 19.11	119 58.18	7.44	2.0	21	304	77.2	0.20	7.5	19.2
800618	0911	57.01	39 19.56	119 56.76	9.53	1.7	31	129	16.5	0.15	0.9	2.2
800721	1012	22.00	39 17.85	120 07.95	15.27	2.7	54	91	8.8	0.20	0.5	1.8
800822	1309	40.35	39 16.24	120 09.15	9.49	1.8	51	59	7.2	0.23	0.4	0.9
800822	1311	26.31	39 16.20	120 09.43	10.24	1.9	25	259	60.3	0.16	0.9	18.2
800822	1417	08.10	39 16.43	120 08.83	10.35	1.7	42	58	7.7	0.21	0.4	1.3
800825	0237	29.32	39 16.86	120 09.27	9.98	1.8	44	81	7.1	0.19	0.4	0.7
800825	0312	23.91	39 16.27	120 09.81	7.34	1.6	13	284	85.0	0.21	4.1	9.4
800904	0902	06.24	39 15.78	120 10.49	10.08	1.6	13	296	58.5	0.16	1.8	18.2
801013	1235	52.12	39 17.45	120 09.17	6.17	1.8	23	283	61.6	0.18	1.0	1.3
810608	0256	42.33	39 18.03	120 08.33	10.46	2.5	23	258	63.1	0.18	1.1	19.5
810722	1852	06.36	39 18.28	119 59.71	6.28	3.0	8	100	3.2	0.07	0.7	1.5
811104	1147	18.49	39 25.26	119 42.35	6.22	3.5	11	87	6.4	0.17	0.6	1.1
811108	0629	45.65	39 18.59	119 59.53	6.85	2.5	8	101	3.6	0.05	0.6	1.3
820101	1215	10.38	39 24.27	119 40.91	7.70	1.3	5	181	6.3	0.08	2.2	3.4
820405	0258	49.99	39 23.04	119 48.69	7.30	1.7	8	129	10.3	0.10	0.8	1.8
820611	0526	12.34	39 24.95	119 53.49	9.52	1.6	9	259	29.3	0.08	4.6	1.0
820730	1520	17.96	39 20.14	119 54.85	9.65	1.1	7	158	10.9	0.05	1.3	0.9
820731	0151	26.25	39 18.99	119 55.43	6.63	2.0	49	144	9.4	0.27	0.5	0.8
820804	0625	44.78	39 15.36	120 09.76	10.15	1.7	20	151	28.2	0.21	0.9	21.7
820810	0125	45.07	39 26.03	119 43.96	1.08	2.0	5	338	14.8	0.07	3.3	13.8
820822	0640	53.75	39 22.38	119 58.90	8.72	1.1	23	201	20.9	0.16	2.0	4.0
820825	0702	30.18	39 21.67	120 00.11	4.41	2.0	31	149	22.1	0.18	0.5	1.5
820924	1306	33.67	39 27.64	119 50.28	6.13	2.1	6	336	19.0	0.10	4.3	7.3
830228	1041	42.27	39 25.92	119 48.93	4.36	2.0	12	215	15.3	0.30	1.9	9.4
830311	2016	47.18	39 22.10	119 45.87	5.76	1.2	8	228	7.4	0.11	1.2	3.1
830511	0043	01.77	39 20.06	120 08.19	9.98	1.3	25	87	10.1	0.19	0.6	0.7
830628	0628	42.43	39 25.26	119 51.85	10.81	0.8	8	221	16.0	0.14	1.8	2.8
830629	0031	13.15	39 18.14	119 53.63	11.08	1.1	11	168	11.7	0.08	0.7	1.2
830708	0016	28.88	39 25.43	119 40.36	7.67	1.3	10	242	31.8	0.07	1.3	7.2
830710	1430	40.14	39 18.35	119 59.84	7.72	1.5	11	136	3.0	0.11	0.6	0.8
830710	2129	56.07	39 18.06	119 58.82	9.48	1.0	9	275	4.3	0.08	1.3	0.8
830721	0448	55.23	39 26.40	119 46.57	7.13	2.0	14	129	22.7	0.13	0.5	5.2
830721	0449	16.01	39 26.41	119 47.15	9.27	3.1	10	126	21.9	0.04	0.5	1.0
830721	0450	06.90	39 26.39	119 46.92	7.44	2.1	12	127	22.2	0.12	0.7	4.0
830721	0450	35.76	39 26.31	119 47.03	8.13	2.3	13	127	22.1	0.08	0.6	1.6
830721	0500	38.32	39 26.82	119 45.47	7.35	0.7	6	295	24.2	0.02	2.1	5.5
830721	0515	54.40	39 26.82	119 46.36	7.35	1.4	15	224	22.9	0.06	0.7	1.6
830721	0517	43.46	39 26.64	119 46.51	10.26	1.5	12	224	22.7	0.07	0.9	3.0
830721	0637	19.92	39 26.87	119 46.03	9.53	1.2	6	303	23.4	0.05	2.3	1.0
830723	0758	33.92	39 26.81	119 46.13	9.47	1.0	6	303	23.2	0.03	1.7	0.7
830815	1040	24.03	39 25.37	119 49.84	9.54	0.7	7	210	18.6	0.06	0.9	1.3
830818	1734	32.82	39 25.20	119 50.86	9.29	0.9	4	298	17.4	0.01	6.1	1.8
830926	0822	50.68	39 16.59	120 08.01	8.96	0.8	14	90	8.9	0.08	0.6	0.5
831005	0346	06.25	39 14.17	119 58.27	10.27	0.7	4	194	8.3	0.00	1.8	3.0
831018	1420	37.41	39 25.32	119 49.51	9.79	0.4	5	285	19.1	0.00	5.8	0.8
831031	0732	57.58	39 26.39	119 40.06	5.54	2.3	7	306	31.9	0.12	9.0	16.2
831221	1206	01.65	39 18.86	120 10.06	10.04	1.7	12	265	7.8	0.14	1.6	1.7

TABLE D5. (cont.)

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
840108	2354	58.45	39 25.43	119 48.64	9.00	0.7	6	287	20.2	0.01	2.6	1.8
840214	1952	05.83	39 24.63	119 47.96	10.00	1.1	7	298	21.6	0.03	1.9	12.7
840320	1524	01.89	39 17.92	119 59.51	8.50	1.2	23	136	3.3	0.08	0.3	0.5
840320	1610	00.74	39 17.96	119 59.75	8.81	1.3	10	135	3.0	0.07	0.5	1.4
840320	1838	28.33	39 18.36	120 00.52	9.28	1.3	11	132	2.2	0.46	1.5	4.1
840714	0613	03.86	39 15.35	120 11.83	11.72	1.1	14	173	12.1	0.11	0.8	1.4
840716	1728	16.29	39 15.40	120 11.70	12.36	1.1	15	172	12.1	0.11	0.8	1.3
840815	0629	24.07	39 26.77	119 50.50	9.88	1.6	8	236	17.1	0.03	1.3	0.9
840907	0641	27.16	39 22.33	119 50.05	10.71	1.8	6	299	20.8	0.20	3.5	6.1
840909	2010	08.38	39 27.81	119 48.38	9.98	1.9	6	285	19.8	0.05	2.5	0.8
841015	0507	23.76	39 24.74	119 50.18	8.88	2.0	38	201	14.1	0.06	0.5	0.3
841129	0042	26.13	39 19.77	120 01.27	4.01	1.3	13	101	3.8	0.06	0.5	1.4
841218	1640	25.88	39 25.03	119 49.54	9.54	1.4	9	204	14.1	0.08	0.9	2.0
841218	1704	57.16	39 25.10	119 49.33	10.24	1.2	11	205	14.1	0.08	0.9	2.5
850101	1211	15.02	39 18.74	119 59.48	9.32	0.9	14	109	3.8	0.09	0.5	1.0
850127	0001	49.73	39 20.22	119 54.78	10.33	2.1	35	68	11.1	0.08	0.3	0.8
850219	2243	51.63	39 20.29	119 54.38	12.86	1.4	10	137	11.6	0.07	0.8	1.7
850326	0820	35.41	39 29.12	119 45.23	8.55	1.8	30	130	20.4	0.09	0.4	0.6
850418	1249	20.59	39 25.60	119 50.29	9.66	1.2	10	202	15.6	0.04	0.9	1.0
850419	1114	33.35	39 25.54	119 50.30	9.11	1.5	10	201	15.5	0.04	1.1	2.4
850621	1435	51.75	39 20.58	119 54.61	10.18	1.3	15	139	11.6	0.05	0.6	1.1
850717	2209	51.24	39 22.82	120 02.50	10.06	1.3	11	108	9.4	0.06	0.6	1.5
850823	0505	26.19	39 26.00	119 46.29	1.77	1.8	9	222	14.7	0.04	1.5	12.9
850902	1715	08.51	39 25.97	119 52.08	1.26	1.9	11	193	15.2	0.03	0.9	12.7
851126	0330	09.29	39 24.29	119 51.99	2.02	1.2	6	202	14.9	0.03	1.1	12.7
851210	1112	39.67	39 21.27	120 00.10	5.94	1.4	8	117	7.0	0.04	0.6	2.6
860209	0033	22.16	39 15.54	120 06.37	11.06	1.2	11	72	7.7	0.04	0.5	0.8
860322	1411	12.63	39 28.17	119 44.00	6.03	1.5	14	151	18.7	0.09	0.5	4.4
860411	1316	21.40	39 22.21	119 54.44	5.32	1.4	4	275	13.4	0.01	8.2	9.4
860522	2235	20.96	39 18.45	119 59.09	7.97	1.3	9	207	4.1	0.08	1.4	0.8
860616	0505	27.86	39 26.84	119 47.33	19.28	1.4	5	228	16.4	0.13	3.2	7.6
860620	0332	52.74	39 25.16	119 51.67	5.76	1.4	12	190	15.9	0.11	0.9	3.7
860704	1126	51.54	39 18.61	119 58.80	7.72	1.7	14	107	4.6	0.11	0.5	1.1
860821	1742	59.88	39 20.34	119 53.79	11.36	1.7	6	163	12.5	0.03	1.1	2.5
860824	0727	10.69	39 20.54	119 54.54	10.59	2.5	14	138	11.6	0.07	0.6	1.0
860824	1555	44.17	39 19.67	120 02.22	2.89	1.7	13	106	3.6	0.11	0.7	1.6
861007	0428	02.62	39 23.20	120 01.55	9.24	1.4	13	127	10.1	0.10	0.6	0.9
861007	0432	25.71	39 23.02	120 01.91	9.09	1.6	12	125	9.8	0.11	0.5	1.2
861011	2238	12.35	39 20.84	119 53.34	9.72	1.7	15	146	12.5	0.06	0.5	0.6
861021	1337	05.46	39 20.84	119 53.28	9.33	1.5	13	147	12.4	0.06	0.5	0.7
870322	0514	00.10	39 26.04	119 49.96	8.10	1.4	10	203	16.1	0.02	0.7	1.2
870411	0006	31.26	39 14.23	120 12.26	11.66	1.8	18	159	4.3	0.11	0.6	0.5
870421	1841	43.57	39 24.58	119 51.34	5.75	2.1	17	188	14.7	0.07	0.5	1.7
870503	0727	56.33	39 20.03	120 08.29	12.42	1.9	15	91	10.2	0.08	0.5	0.9
870528	0219	10.62	39 24.38	119 50.99	6.55	2.6	14	184	30.7	0.13	1.0	2.0
870528	0219	57.39	39 24.15	119 51.83	6.23	3.3	17	110	30.2	0.08	0.5	1.3
870624	1213	47.01	39 22.93	119 57.01	5.67	2.0	15	146	11.8	0.06	0.5	1.3
870624	1733	11.35	39 22.96	119 57.06	6.09	2.0	14	73	11.8	0.06	0.5	1.4
870713	2131	26.86	39 24.67	119 51.67	6.32	1.8	14	203	16.7	0.11	0.8	2.5
870721	1649	57.77	39 22.49	119 57.61	9.43	1.5	10	241	10.6	0.04	0.9	1.1
870807	1645	00.12	39 21.69	119 46.95	6.97	2.1	17	131	22.5	0.08	0.6	2.4

TABLE D5. (cont.)

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
870808	1540	46.50	39 21.54	119 45.76	2.82	2.5	21	58	6.4	0.10	0.4	1.5
870928	1106	35.86	39 23.96	119 51.74	8.00	2.1	17	200	17.2	0.12	1.1	2.1
871005	2050	41.89	39 24.45	119 50.97	4.45	2.4	17	119	17.7	0.12	0.5	1.9
871228	1524	38.45	39 21.66	119 59.69	7.99	2.1	16	123	7.9	0.09	0.4	1.0

TABLE D6. Transitional sub-area

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
800109	2014	29.59	39 56.54	120 03.36	6.98	2.4	19	305	111.2	0.27	9.6	24.1
800323	1146	10.54	39 38.87	120 06.48	6.85	1.5	9	322	89.4	0.11	5.7	14.2
800427	2036	00.37	40 05.46	119 56.69	4.53	2.4	36	146	16.8	0.23	0.6	1.6
800429	2355	14.85	39 36.51	120 08.35	4.98	1.5	22	112	25.1	0.23	3.5	9.4
800508	0927	58.63	39 40.92	120 01.91	17.09	1.6	27	114	19.8	0.29	0.9	3.0
800508	1351	38.85	39 39.84	120 10.78	5.81	1.7	6	245	30.0	0.16	4.3	17.7
800825	1558	38.04	39 57.51	120 06.18	7.37	3.5	45	112	23.1	0.29	0.7	1.9
800825	1634	53.85	39 55.37	120 06.88	1.41	2.2	21	292	106.1	0.24	5.7	15.5
801008	1013	15.63	39 34.75	119 48.16	0.37	3.1	9	236	4.1	0.11	1.9	15.3
801009	0807	31.25	39 49.92	119 59.31	6.40	1.6	40	144	31.2	0.23	0.8	1.8
801224	0116	31.39	39 34.05	120 02.97	6.99	2.1	15	310	86.5	0.24	8.7	21.8
801224	0221	27.55	39 33.16	120 01.65	7.38	2.1	37	157	15.4	0.25	0.7	1.3
801224	0321	37.81	39 33.89	120 01.22	8.30	1.5	34	162	14.6	0.22	0.7	1.1
810502	0049	20.62	39 33.78	120 02.47	6.60	2.1	7	174	16.4	0.10	1.5	3.0
810801	1902	35.13	39 53.49	120 02.67	9.89	2.1	10	123	32.0	0.16	1.8	3.6
811012	1103	20.74	40 06.11	119 57.58	7.25	1.8	6	130	16.2	3.16	43.5	89.0
811104	1803	33.52	39 36.61	119 48.62	8.04	1.1	7	176	22.4	0.13	1.5	4.7
811118	0010	14.42	39 38.30	119 58.77	7.47	2.4	6	151	24.7	3.98	20.3	98.7
820428	2043	14.83	40 12.45	119 55.47	3.43	2.2	27	116	5.5	0.24	0.5	1.1
820604	0312	49.99	39 42.51	120 05.05	8.26	3.5	39	67	25.0	0.23	0.4	1.2
820706	1655	22.10	39 51.96	119 48.44	5.90	1.5	6	183	40.7	0.03	1.3	12.8
820915	1926	08.17	39 50.33	120 01.51	1.75	2.5	14	266	117.3	0.34	5.7	18.2
830222	0850	54.87	39 32.06	120 02.64	4.30	1.9	15	294	84.4	0.27	1.8	3.0
830312	0623	52.48	39 55.88	120 02.42	13.76	2.1	11	295	118.0	0.29	2.7	27.1
830514	0934	39.01	39 44.39	120 08.30	21.90	1.7	18	232	26.7	0.21	1.3	1.2
830626	0655	32.88	39 38.05	119 54.34	5.56	1.1	8	292	21.0	0.18	2.9	9.2
830713	0132	06.70	39 40.14	119 56.62	4.70	1.0	7	283	25.0	0.07	2.0	13.7
830805	1152	15.10	39 43.94	119 50.50	8.74	1.3	9	188	26.7	0.07	1.1	1.3
830816	1316	23.16	40 00.08	120 05.08	7.02	1.5	6	265	40.2	0.12	4.5	15.8
830816	1329	56.30	40 00.33	120 05.50	4.31	1.9	7	265	40.5	0.05	2.8	13.3
830817	0321	51.27	39 58.16	120 05.53	6.36	2.4	25	177	36.6	0.23	1.2	1.6
830817	2122	55.53	39 58.73	120 05.95	4.63	2.1	7	261	37.5	0.11	3.1	15.3
830818	0554	37.01	39 58.84	120 05.29	4.55	2.8	25	160	22.4	0.28	0.9	2.0
830827	0457	34.15	40 09.94	120 09.73	7.00	2.1	7	318	115.5	0.25	22.2	22.5
831016	2039	18.62	39 36.33	120 05.56	6.26	3.0	42	162	1.0	0.30	1.0	0.8
831016	2120	58.02	39 58.61	120 06.29	5.87	2.3	26	221	21.6	0.29	2.5	1.7
831108	0137	31.42	39 39.48	120 02.00	0.80	1.3	8	270	8.7	0.09	1.2	14.4
840324	2013	39.05	39 38.27	119 46.47	7.65	1.1	7	318	28.5	0.08	3.0	10.1
840331	0154	43.95	39 43.59	120 11.20	9.25	0.9	9	280	8.3	0.04	1.9	0.9
840510	2125	39.99	39 44.60	120 14.31	0.17	0.0	7	176	9.4	0.12	1.9	15.9
840619	1202	00.87	39 39.80	119 59.83	10.48	0.0	7	281	11.4	0.09	1.7	2.7
840625	1708	36.92	39 37.20	120 00.54	7.99	1.2	10	149	8.4	0.12	0.6	1.5
840715	0320	54.76	39 37.19	120 00.35	6.58	1.0	10	149	8.6	0.11	0.6	2.4
840809	1809	28.55	39 37.52	119 57.90	6.97	0.0	16	286	98.9	0.25	7.9	22.9
840831	0636	02.12	39 56.62	120 24.35	7.59	1.8	8	218	20.7	0.07	2.2	2.5
841005	2239	18.59	39 40.38	119 49.85	7.01	0.0	9	324	108.3	0.27	8.9	24.0
841014	1353	54.85	39 40.59	120 09.84	9.07	3.1	31	190	6.4	0.21	1.1	0.6
841208	0042	49.95	39 43.22	120 07.81	10.17	0.9	5	297	11.3	0.02	2.6	1.7
841220	1130	29.45	39 35.31	119 39.73	3.39	1.5	9	130	25.2	0.13	0.6	2.7
850129	0945	31.59	39 38.24	119 21.43	7.19	2.4	22	188	15.7	0.13	0.7	0.9
850412	1234	49.11	39 41.05	119 38.78	6.79	0.0	4	293	40.2	0.09	10.4	10.2

TABLE D6. (cont.)

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
850531	0957	09.97	39 59.38	120 28.23	3.72	1.8	20	103	20.2	0.17	0.6	1.9
850531	0958	20.93	39 59.06	120 28.26	1.91	2.4	24	104	20.6	0.18	0.5	1.5
850702	1211	33.78	39 35.38	120 01.33	4.49	1.9	8	249	7.1	0.04	1.5	2.6
850717	1231	11.08	39 33.86	120 00.06	9.81	1.2	8	206	9.7	0.01	1.2	0.9
850805	1218	08.49	39 59.47	120 02.80	5.86	1.5	8	249	24.5	0.08	2.5	1.5
850810	1144	44.15	39 57.99	120 05.88	2.73	1.9	14	204	22.8	0.20	1.5	2.8
850821	0121	39.36	39 34.93	120 00.34	11.50	1.8	8	250	8.7	0.05	1.8	1.1
851013	1944	57.14	39 58.69	120 25.85	7.30	2.1	9	175	18.7	0.12	4.4	8.9
851024	1218	01.58	39 57.84	120 23.11	8.87	0.0	11	137	17.9	0.05	1.6	3.4
851105	2013	12.41	39 36.16	119 37.83	4.82	2.2	10	223	35.2	0.09	1.7	14.6
851209	0230	27.50	39 40.29	119 36.59	7.05	1.7	8	248	42.7	0.04	1.7	1.0
851217	1453	34.10	39 41.25	119 32.28	5.05	1.7	12	237	46.8	0.13	1.1	2.7
851227	1226	48.29	39 52.93	120 14.19	8.72	1.4	10	321	24.8	0.04	2.5	0.9
860112	0343	45.90	39 37.87	119 55.74	13.27	1.6	10	240	15.3	0.07	1.1	2.6
860112	0407	44.02	39 36.68	119 25.20	7.64	3.1	35	222	44.9	0.21	1.4	0.9
860124	1131	43.80	39 48.42	119 46.39	4.60	1.7	6	309	50.2	0.06	2.1	13.4
860127	1110	38.08	39 37.80	119 34.85	6.81	1.5	14	230	39.5	0.11	1.7	1.3
860209	0123	31.57	39 34.48	119 27.48	8.68	1.7	21	168	19.9	0.18	0.6	0.8
860308	1051	31.79	39 38.17	119 58.92	4.72	1.5	6	278	11.1	0.02	3.3	3.9
860318	0033	27.12	39 41.68	120 02.41	1.73	1.4	5	282	11.7	0.13	2.3	16.5
860318	2151	13.88	39 42.14	119 25.76	0.10	1.9	15	80	6.3	0.14	0.9	4.1
860417	1943	24.88	40 09.61	120 16.92	9.59	2.5	30	115	5.8	0.20	0.5	0.6
860624	2228	06.11	39 31.60	119 44.54	0.06	1.7	15	118	25.0	0.18	0.6	4.6
860628	0206	29.58	39 31.50	119 45.06	7.22	3.9	44	48	24.8	0.22	0.4	0.9
860628	1019	19.03	39 39.35	120 06.53	0.34	1.5	10	230	6.1	0.04	1.3	13.0
860628	1030	01.01	39 31.90	119 43.04	8.70	1.6	10	264	25.8	0.03	0.8	0.9
860628	1328	29.93	39 31.20	119 45.32	7.87	1.8	18	125	24.3	0.13	0.4	1.4
860628	2209	30.05	39 32.93	119 42.53	9.29	1.7	12	263	27.8	0.07	1.5	0.8
860701	0653	20.11	39 32.81	119 42.69	3.55	1.5	11	251	27.5	0.10	1.3	9.7
860808	1406	10.70	39 30.96	119 44.38	3.99	2.5	26	77	23.8	0.24	0.5	1.8
860818	1306	26.51	39 38.22	119 47.39	6.78	2.1	11	214	27.2	0.09	1.1	1.8
860818	1501	43.63	39 38.01	119 48.25	7.01	1.9	12	103	25.9	0.11	0.6	1.3
860819	1236	37.08	39 38.31	119 48.87	8.54	1.4	10	258	25.1	0.04	1.0	2.0
860825	1706	37.36	39 38.30	119 48.47	8.31	3.2	45	53	25.7	0.31	0.5	0.9
860825	1757	42.34	39 38.11	119 47.99	8.57	3.2	36	103	26.3	0.18	0.4	0.7
860917	1837	00.81	39 36.45	120 01.17	6.60	2.2	12	111	7.2	0.11	0.7	1.4
860918	0140	49.90	39 38.45	119 48.19	9.67	1.7	13	134	26.1	0.10	0.8	0.9
861007	0417	42.14	39 58.72	120 10.60	4.97	2.9	32	146	17.4	0.20	0.7	1.0
861020	0427	08.92	39 59.30	120 06.28	7.20	2.0	9	164	20.7	0.24	1.1	8.3
861022	0747	13.88	39 33.78	119 28.85	8.03	2.5	16	185	21.3	0.14	0.8	1.1
861216	2141	07.36	39 41.75	119 27.93	7.13	2.4	27	63	6.5	0.33	0.7	1.4
861219	0151	36.30	39 39.46	119 27.44	3.34	2.7	21	109	47.1	0.22	0.6	2.0
870127	1723	24.43	39 33.69	119 59.61	10.60	1.5	8	249	10.4	0.05	1.3	2.2
870202	2037	31.02	39 39.53	119 37.56	10.06	0.0	7	143	17.6	0.05	2.8	12.8
870306	2350	13.12	39 41.10	119 26.69	9.21	1.6	6	178	57.2	1.22	16.8	99.0
870601	0012	25.61	39 51.78	120 02.45	3.18	3.4	17	67	28.2	0.16	0.6	1.5
870607	1719	51.41	39 38.27	119 45.99	6.96	2.4	15	107	29.1	0.13	0.5	1.2
870607	2113	10.03	39 36.71	119 57.24	7.03	3.1	18	84	12.9	0.08	0.4	1.0
870607	2137	11.37	39 37.40	119 56.08	6.16	2.1	8	237	14.7	0.01	1.5	3.9
870608	0512	37.24	39 37.54	119 56.40	8.25	2.0	12	237	14.3	0.07	0.8	2.3
870608	1301	55.24	39 37.74	119 55.88	7.85	1.9	9	239	15.1	0.06	1.2	2.9

TABLE D6. (cont.)

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
870609	0212	05.57	39 37.61	119 56.18	7.54	1.8	11	238	14.6	0.05	1.0	2.5
870609	2214	14.86	39 36.81	119 56.78	6.73	1.8	15	97	13.6	0.10	0.5	1.7
870612	1202	37.40	39 37.14	119 57.24	5.67	2.0	10	270	13.0	0.04	1.3	4.6
870613	2336	37.03	39 39.57	120 05.97	0.28	1.8	13	161	6.4	0.11	0.7	15.7
870613	2340	16.22	39 39.57	120 06.64	0.25	1.7	12	169	6.5	0.18	0.9	19.4
870614	1304	11.99	39 39.57	120 05.90	0.43	2.1	15	161	6.5	0.09	0.6	14.6
870621	2319	58.29	39 37.87	119 55.16	7.65	1.8	11	278	16.1	0.08	1.1	2.6
870624	0057	11.32	39 34.11	120 01.22	9.69	1.8	7	243	8.0	0.02	1.9	0.8
870626	1417	09.62	39 38.54	119 39.01	13.23	1.9	16	125	20.4	0.10	0.5	2.8
870711	0801	57.99	39 38.51	119 45.73	7.77	2.2	16	106	28.6	0.09	0.4	0.9
870717	1305	15.04	39 38.71	119 59.77	6.71	1.4	12	270	10.4	0.09	1.2	2.2
870829	0012	09.81	40 06.32	120 11.25	4.16	2.2	9	295	49.8	0.08	1.8	1.4
870909	0154	24.57	39 41.33	119 25.07	7.09	2.0	12	217	8.1	0.17	1.6	1.3
870913	0659	40.98	39 35.14	120 00.61	6.83	1.8	8	251	8.2	0.05	1.8	1.3
870916	2237	47.33	39 44.62	119 33.44	5.59	2.2	11	139	8.3	0.07	0.8	1.3
870927	0301	29.14	39 33.26	120 00.43	9.17	1.5	9	241	9.2	0.03	1.3	2.3
871015	2017	14.24	39 43.31	120 13.30	14.76	2.3	8	276	7.1	1.09	20.2	14.8
871117	1309	02.13	40 00.38	119 59.10	4.86	2.0	6	259	28.4	0.15	2.8	17.4
871118	2217	34.26	39 41.37	120 02.02	0.82	1.9	13	280	11.5	0.10	1.1	14.9
871120	0956	52.51	39 53.12	119 51.43	0.75	1.6	8	169	36.8	0.11	1.1	15.4
871122	0158	59.42	39 58.16	120 05.44	2.58	1.8	9	336	36.7	0.05	2.0	2.6
871124	1823	16.32	39 37.64	120 00.28	7.75	1.3	10	264	9.0	0.06	1.6	1.1
871124	2145	42.14	39 36.23	120 00.97	6.70	1.6	10	255	7.5	0.07	1.2	0.9
871215	0750	32.04	39 57.08	120 24.42	4.97	2.3	7	336	46.7	0.15	17.2	2.3
871225	0049	43.59	39 34.96	120 00.50	7.61	1.8	10	220	8.4	0.07	0.8	1.7

TABLE D7. Truckee sub-area

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
800214	0820	50.93	39 24.14	120 10.28	7.24	1.7	14	300	66.7	0.11	5.6	12.0
800225	0402	22.25	39 23.70	120 13.22	5.05	1.8	15	298	62.9	0.14	1.2	0.9
800306	0914	47.58	39 24.77	120 13.81	8.07	2.0	18	298	63.5	0.20	5.3	13.6
800403	1829	49.88	39 24.37	120 12.51	3.30	1.3	14	300	64.5	0.21	1.0	2.3
800715	1225	42.03	39 28.19	120 06.54	8.60	1.9	31	127	6.2	0.23	0.7	0.9
810328	0439	59.33	39 24.76	120 12.45	7.73	3.0	40	47	35.4	0.21	0.4	2.0
810328	0447	55.38	39 25.01	120 12.76	10.93	2.1	29	259	64.9	0.14	0.8	17.2
810328	0452	56.77	39 25.00	120 12.94	10.69	1.7	20	258	64.7	0.11	0.9	15.6
810328	0456	28.34	39 25.03	120 12.29	10.67	1.8	17	259	65.5	0.16	1.5	18.3
810328	0458	48.47	39 24.79	120 11.69	10.28	2.1	17	266	73.0	0.25	1.4	24.2
810328	0502	44.82	39 25.21	120 12.21	10.22	2.1	24	255	65.8	0.21	1.2	21.7
810328	0504	37.30	39 24.68	120 12.23	9.04	3.7	41	47	35.2	0.21	0.4	2.0
810328	0514	21.58	39 24.87	120 12.96	6.62	2.1	25	254	64.6	0.24	1.3	2.1
810328	0536	20.46	39 24.96	120 14.32	6.85	1.7	10	259	63.2	0.11	1.1	1.6
810328	1517	50.12	39 24.64	120 12.15	8.89	2.2	43	44	35.2	0.26	0.5	2.1
810403	0806	22.49	39 24.89	120 12.50	8.57	2.9	40	47	35.4	0.19	0.4	2.1
810403	2310	33.95	39 25.30	120 12.89	6.96	1.9	20	268	65.1	0.09	1.3	1.1
810408	1812	23.01	39 24.33	120 12.64	8.21	2.2	25	224	64.3	0.18	1.9	7.0
810823	0108	09.19	39 25.42	120 13.90	6.74	1.8	20	265	64.2	0.16	1.2	1.7
811110	1217	40.76	39 24.66	120 12.06	8.44	1.6	16	285	65.4	0.17	4.1	10.9
820208	0935	59.78	39 23.94	120 14.81	15.73	1.8	11	285	61.6	0.11	3.1	15.2
820208	2029	48.77	39 24.11	120 15.34	6.58	1.7	7	306	61.0	0.04	2.7	4.4
820302	1132	41.67	39 24.73	120 11.92	7.90	1.9	15	267	65.6	0.08	2.4	14.2
820302	1134	05.35	39 23.46	120 12.68	8.76	2.4	27	236	63.2	0.18	2.0	19.7
820308	2301	01.37	39 23.87	120 13.79	7.02	2.5	21	243	86.6	0.22	2.5	21.8
820309	2301	01.13	39 25.57	120 12.06	12.36	1.3	6	203	9.0	0.08	1.6	3.1
820522	0850	02.33	39 23.55	120 07.50	8.62	2.5	25	153	14.7	0.19	0.6	1.5
820529	0243	51.25	39 26.03	120 08.66	8.42	2.3	20	190	10.0	0.09	1.2	1.4
830124	1540	50.31	39 25.59	120 09.17	9.58	1.2	11	76	10.2	0.11	0.7	1.3
830324	0158	43.48	39 25.26	120 12.22	13.16	1.8	34	72	7.7	0.14	0.3	0.9
830331	1038	56.88	39 25.32	120 14.34	4.16	1.8	12	283	63.6	0.18	1.4	2.7
830403	1030	45.73	39 25.23	120 12.48	12.36	1.0	29	111	7.4	0.13	0.4	0.9
830410	0143	57.60	39 24.98	120 10.03	8.41	1.3	25	108	11.0	0.24	0.5	0.9
830410	1018	38.43	39 25.26	120 12.56	12.57	1.2	28	111	7.3	0.15	0.5	1.1
830520	1529	41.41	39 23.42	120 06.10	8.32	1.4	25	113	10.9	0.21	0.5	0.8
830614	0510	11.85	39 24.13	120 12.15	15.75	0.7	10	106	8.6	0.22	1.1	1.9
830701	2022	10.33	39 25.35	120 12.82	15.33	0.8	7	97	6.9	0.09	1.2	2.0
830702	1549	57.86	39 24.70	120 12.70	12.39	0.9	9	105	7.4	0.18	1.0	1.9
830703	1244	42.29	39 24.44	120 12.58	12.40	3.7	35	61	7.7	0.23	0.5	1.5
830703	1248	44.66	39 25.63	120 13.34	16.37	0.6	5	181	8.9	0.01	2.0	2.7
830703	1248	59.49	39 25.00	120 12.85	13.42	2.2	34	65	7.0	0.18	0.4	1.2
830703	1249	23.05	39 24.96	120 12.92	15.25	1.6	9	103	6.9	0.11	1.0	2.4
830703	1251	13.36	39 24.46	120 11.84	12.20	0.5	6	161	11.1	0.03	0.8	1.9
830703	1252	10.49	39 25.21	120 12.98	13.29	2.5	32	70	6.7	0.14	0.4	0.9
830703	1253	49.42	39 25.00	120 11.80	13.75	0.8	9	128	8.4	0.07	0.7	1.3
830703	1254	53.65	39 25.62	120 13.20	15.58	0.8	9	96	6.2	0.09	0.9	1.2
830703	1256	13.98	39 25.15	120 12.35	13.09	1.3	31	69	7.6	0.13	0.4	0.9
830703	1310	42.79	39 24.90	120 12.23	13.01	1.0	26	68	7.9	0.13	0.4	0.9
830703	1337	28.69	39 25.06	120 12.33	14.84	0.8	9	98	7.7	0.08	0.9	1.4
830703	1411	44.07	39 25.73	120 13.40	17.58	0.5	6	95	5.9	0.01	1.6	2.2
830703	1508	19.25	39 24.42	120 12.64	12.54	4.3	34	63	7.7	0.24	0.6	1.6

TABLE D7. (cont.)

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
830703	1511	55.07	39 25.34	120 12.34	13.22	1.4	24	72	7.5	0.15	0.4	0.9
830703	1512	09.71	39 25.35	120 13.43	15.15	0.7	6	124	6.0	0.07	1.4	1.5
830703	1514	42.65	39 25.16	120 11.62	13.71	2.3	28	76	8.6	0.19	0.6	1.1
830703	1516	43.91	39 25.47	120 12.72	14.56	0.7	9	169	9.1	0.12	0.8	1.5
830703	1516	56.86	39 25.13	120 12.77	14.87	0.7	10	100	7.0	0.22	1.0	2.1
830703	1517	26.98	39 25.75	120 12.13	14.40	1.2	9	87	7.7	0.16	0.9	1.7
830703	1518	19.59	39 25.48	120 11.60	17.79	0.8	6	201	8.5	0.07	2.3	1.4
830703	1520	24.75	39 25.68	120 12.30	14.01	1.0	9	89	7.5	0.15	0.9	1.7
830703	1522	00.18	39 25.79	120 12.67	17.16	0.7	10	90	6.9	0.16	0.8	1.4
830703	1524	32.33	39 25.35	120 13.83	14.92	0.7	8	120	5.5	0.07	1.0	1.3
830703	1526	46.39	39 25.28	120 11.83	15.13	0.7	8	126	8.3	0.07	0.8	1.3
830703	1532	54.54	39 25.31	120 12.87	14.14	0.5	6	130	6.8	0.05	1.8	1.3
830703	1533	25.20	39 25.27	120 12.32	10.50	0.9	19	70	7.6	0.25	0.7	2.1
830703	1535	08.64	39 25.94	120 11.83	15.34	0.5	9	83	8.1	0.16	0.9	1.7
830703	1538	08.22	39 25.16	120 11.92	13.59	0.7	8	93	8.2	0.08	0.8	1.4
830703	1605	11.79	39 25.24	120 14.03	15.27	0.5	6	163	5.3	0.07	2.1	1.2
830703	1618	26.19	39 25.18	120 12.29	12.88	1.0	23	70	7.7	0.17	0.5	1.2
830703	1702	29.11	39 25.59	120 12.13	12.16	1.2	9	145	7.8	0.09	0.8	1.3
830703	1724	02.14	39 25.18	120 12.49	14.46	0.9	9	153	7.4	0.05	0.8	1.2
830703	1818	27.35	39 25.11	120 12.45	14.40	1.2	9	155	7.5	0.09	0.8	1.3
830703	1824	39.27	39 25.53	120 13.24	15.62	0.8	5	233	9.0	0.03	2.2	2.5
830703	2210	29.28	39 25.42	120 12.23	14.47	1.0	7	149	7.7	0.15	1.4	1.2
830704	0334	00.68	39 25.02	120 12.11	12.18	0.8	7	126	8.0	0.06	0.8	2.0
830704	0505	28.18	39 25.58	120 11.63	17.45	0.7	6	201	8.5	0.04	1.7	1.3
830704	0631	54.67	39 25.30	120 12.11	14.96	0.8	10	93	7.9	0.09	0.7	1.3
830704	0918	23.99	39 25.43	120 10.77	15.53	0.8	7	206	9.6	0.08	2.0	1.4
830704	0957	18.69	39 25.90	120 12.16	16.19	0.7	10	140	7.6	0.15	0.8	1.3
830704	0959	11.32	39 25.54	120 12.65	15.26	0.7	7	119	7.0	0.09	1.8	1.3
830704	1715	15.63	39 25.07	120 12.16	14.62	0.7	9	164	9.9	0.04	0.7	1.2
830704	1745	05.87	39 24.64	120 12.55	14.29	0.9	7	229	7.6	0.03	1.0	0.8
830707	2210	46.32	39 25.14	120 12.09	14.49	0.6	8	125	8.0	0.04	0.7	1.1
830708	0249	35.94	39 23.24	120 07.41	9.48	0.8	6	104	12.2	0.02	0.8	3.4
830709	1343	26.68	39 25.19	120 12.38	12.52	2.2	32	64	7.5	0.23	0.5	1.2
830709	1539	45.68	39 25.30	120 12.84	14.48	0.7	6	186	6.9	0.08	2.8	1.4
830709	1802	10.31	39 25.36	120 12.67	16.35	0.7	9	132	7.1	0.17	1.1	1.2
830712	1938	47.62	39 24.92	120 11.59	14.10	0.8	7	223	8.8	0.06	0.9	1.3
830713	2115	43.53	39 25.01	120 12.01	14.21	0.8	7	221	8.1	0.05	0.9	1.2
830714	1620	24.43	39 24.93	120 11.66	12.52	1.1	8	130	8.7	0.07	0.8	1.5
830718	0732	04.17	39 25.06	120 14.23	5.22	1.4	9	306	63.4	0.09	2.9	4.3
830718	0836	43.79	39 23.57	120 10.63	5.31	0.7	20	142	13.0	0.32	1.0	1.5
830718	1818	59.53	39 25.94	120 12.55	11.35	0.8	8	87	7.1	0.10	0.7	1.8
830724	1533	06.13	39 24.82	120 11.21	10.33	0.4	6	133	9.3	0.09	0.9	2.3
830724	1548	46.68	39 24.63	120 12.13	11.33	0.4	16	127	15.8	0.31	1.1	4.1
830801	0444	27.72	39 25.30	120 12.07	14.25	0.6	30	66	7.9	0.15	0.4	1.0
830829	1951	17.67	39 25.08	120 11.16	15.85	0.5	8	132	9.3	0.10	0.8	2.4
830909	0457	20.90	39 24.44	120 11.72	13.15	0.4	8	99	8.9	0.06	0.7	1.3
830910	0125	10.99	39 25.49	120 12.10	12.35	0.4	6	146	7.8	0.02	0.7	1.9
830914	0114	39.25	39 25.01	120 12.84	10.44	2.0	14	269	64.9	0.21	1.4	21.6
830923	1110	29.78	39 25.61	120 09.77	9.08	1.4	27	79	11.1	0.22	0.4	0.7
831029	2319	01.47	39 22.94	120 08.60	10.39	1.6	26	93	13.7	0.20	0.8	2.4
831213	2201	10.74	39 24.82	120 12.76	10.16	2.0	14	267	88.6	0.20	2.3	20.9

TABLE D7. (cont.)

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
831225	0355	38.82	39 25.54	120 08.78	7.34	0.5	6	131	10.8	0.03	0.7	3.8
831229	1711	38.39	39 28.18	120 06.77	9.24	0.9	8	98	6.5	0.11	0.8	3.0
840302	2327	41.18	39 24.17	120 08.03	12.20	1.1	6	97	11.5	0.01	0.8	4.4
840317	1559	41.18	39 24.16	120 06.89	14.85	0.4	6	176	10.4	0.04	1.2	2.5
840323	1711	47.98	39 21.75	120 09.28	8.52	1.3	6	182	13.0	0.15	1.6	8.9
840331	1807	08.41	39 24.16	120 06.19	8.64	2.0	12	95	9.8	0.10	0.6	1.0
840704	2238	29.70	39 24.18	120 12.88	13.18	0.4	8	238	7.6	0.05	1.1	1.3
840704	2257	48.36	39 24.64	120 13.72	12.32	0.4	9	173	6.1	0.10	1.0	1.5
840720	0854	19.50	39 23.08	120 07.88	11.54	1.4	11	106	12.8	0.04	0.7	1.6
840720	1942	37.58	39 25.26	120 11.79	13.74	0.4	5	217	8.3	0.03	1.4	2.1
840721	1109	49.86	39 25.46	120 09.40	6.74	0.5	7	135	10.3	0.05	0.7	1.8
840813	0813	40.44	39 24.91	120 12.89	11.72	1.8	7	120	7.0	0.04	0.8	1.7
840814	0418	04.28	39 24.88	120 13.07	11.64	2.1	10	122	6.8	0.08	0.9	1.2
840905	0804	54.92	39 24.88	120 09.78	7.48	2.8	23	81	11.0	0.06	0.3	0.6
840921	1859	44.35	39 24.48	120 13.73	13.10	1.3	7	175	6.3	0.06	1.1	1.1
840921	1907	17.82	39 24.40	120 13.78	13.56	1.2	6	178	6.3	0.04	1.4	1.1
841009	1629	30.29	39 25.11	120 12.48	12.49	1.9	9	115	7.4	0.06	0.8	1.7
841231	2239	56.42	39 29.58	120 05.21	2.81	1.5	6	132	10.8	0.09	0.9	10.7
850102	0725	05.28	39 23.99	120 07.65	9.18	1.9	25	66	11.3	0.11	0.4	0.6
850122	0420	41.37	39 23.18	120 08.80	10.68	1.0	11	97	13.6	0.03	0.6	1.8
850209	0316	38.89	39 25.24	120 13.78	13.61	0.9	7	139	5.6	0.05	1.7	1.1
850210	0958	50.93	39 25.24	120 12.62	3.50	0.9	10	97	7.2	0.03	0.7	1.7
850217	0307	30.72	39 23.78	120 09.21	12.23	1.2	11	97	12.7	0.06	0.6	1.4
850217	0319	45.44	39 23.89	120 08.78	10.30	1.5	19	98	13.2	0.08	0.4	0.9
850310	2234	39.82	39 24.81	120 12.02	13.34	1.4	9	98	8.2	0.07	1.2	2.1
850315	1453	45.43	39 24.74	120 10.31	13.07	1.4	18	94	10.6	0.09	0.4	0.9
850315	1616	43.11	39 24.55	120 10.06	11.04	1.5	24	54	11.1	0.10	0.3	0.9
850315	1830	44.78	39 24.80	120 10.42	12.80	1.2	12	107	10.4	0.07	0.7	1.2
850404	1452	12.83	39 25.44	120 13.36	15.72	1.0	13	100	6.1	0.13	1.0	1.1
850404	1549	48.14	39 25.28	120 12.87	14.17	1.1	10	98	6.8	0.06	0.9	1.2
850404	1551	22.10	39 25.22	120 10.51	7.68	1.7	12	94	10.1	0.15	0.7	1.3
850404	1553	10.96	39 25.40	120 12.58	14.60	1.5	17	85	7.2	0.15	0.5	0.8
850404	1601	50.68	39 25.22	120 12.83	13.43	1.1	10	99	6.9	0.04	0.8	1.4
850404	1608	54.70	39 25.21	120 12.58	12.86	1.2	10	97	7.3	0.03	0.8	1.7
850404	1622	25.93	39 25.12	120 13.38	14.51	1.2	9	106	6.2	0.05	0.9	1.4
850404	1835	34.48	39 25.35	120 13.08	15.95	1.3	11	99	6.5	0.12	1.2	1.6
850405	1908	39.00	39 25.49	120 12.82	14.08	1.8	24	74	6.8	0.10	0.4	0.7
850405	1922	38.55	39 25.70	120 10.50	15.63	1.3	7	217	9.2	0.04	2.2	2.2
850406	0141	34.36	39 25.25	120 12.44	13.09	1.2	15	85	7.4	0.05	0.4	0.9
850503	2011	35.50	39 25.47	120 12.62	14.67	1.3	12	94	7.1	0.10	0.8	0.8
850504	1556	37.47	39 25.87	120 11.45	13.29	2.4	21	81	8.6	0.09	0.9	1.9
850519	1027	05.64	39 25.81	120 12.52	14.93	1.4	13	89	7.1	0.09	0.8	1.3
850527	1522	21.52	39 25.34	120 12.70	13.90	1.6	9	97	7.0	0.06	0.8	1.4
850527	1655	15.60	39 25.17	120 12.74	13.64	1.5	10	99	7.1	0.06	0.7	1.5
850614	2344	46.94	39 24.97	120 09.42	10.14	1.7	8	132	11.1	0.02	0.8	1.6
850627	1335	05.20	39 24.65	120 10.06	10.89	1.3	6	94	11.0	0.02	1.0	3.8
850629	0435	47.33	39 23.19	120 07.66	10.88	1.5	11	76	12.5	0.05	0.6	1.6
850630	1624	03.01	39 23.07	120 07.84	11.71	1.7	12	78	12.8	0.03	0.6	1.6
850707	1559	17.81	39 25.01	120 07.07	7.40	1.0	9	67	9.4	0.06	0.5	2.2
850716	1220	20.40	39 27.51	120 11.39	10.11	0.7	6	167	5.7	0.07	1.9	1.0
850725	2242	23.42	39 24.00	120 10.63	11.91	1.6	9	94	10.6	0.03	0.7	1.8

TABLE D7. (cont.)

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
850826	2233	35.50	39 29.47	120 12.34	10.13	1.7	14	115	1.8	0.09	0.5	0.9
850927	0243	23.30	39 23.17	120 11.73	6.72	1.6	6	201	13.5	0.03	9.2	8.8
850927	0808	05.06	39 22.92	120 09.07	15.17	0.8	8	123	13.5	0.07	1.2	1.7
851002	0107	23.12	39 24.92	120 13.21	12.03	1.1	8	107	6.6	0.02	0.7	2.0
851003	0332	59.21	39 26.91	120 08.26	8.99	1.8	21	69	9.1	0.11	0.4	0.6
851003	0830	55.65	39 26.85	120 08.58	9.20	2.0	37	60	8.8	0.08	0.2	0.4
851027	1912	54.20	39 25.29	120 13.13	13.33	1.8	14	101	6.5	0.10	0.7	1.4
851119	2005	51.90	39 23.56	120 08.82	10.81	1.4	10	83	13.1	0.06	0.6	1.5
851205	0815	43.95	39 23.13	120 07.71	10.43	1.4	8	77	12.6	0.06	0.7	2.2
851207	1130	03.95	39 23.57	120 11.97	5.31	1.3	10	109	9.3	0.05	0.6	3.9
851229	1842	47.76	39 25.06	120 08.01	9.72	1.2	14	71	10.4	0.08	0.5	1.0
860114	2329	28.19	39 24.07	120 06.56	9.69	1.1	18	73	10.2	0.10	0.4	0.6
860226	0819	35.59	39 25.23	120 07.91	9.38	1.2	14	117	10.1	0.13	0.6	0.9
860228	1545	26.56	39 24.63	120 08.20	11.53	0.0	17	74	11.1	0.06	0.4	0.9
860228	1545	38.24	39 24.68	120 08.02	12.20	1.6	9	96	10.8	0.06	0.7	1.6
860228	1546	04.58	39 24.67	120 08.41	12.37	1.6	14	75	11.3	0.05	0.5	1.1
860402	0626	16.45	39 25.21	120 12.51	13.20	1.8	20	74	7.4	0.10	0.4	1.0
860522	0819	29.81	39 24.10	120 06.81	8.95	2.5	39	55	10.4	0.12	0.3	0.5
860622	0411	46.15	39 25.65	120 08.98	8.72	1.4	15	72	10.3	0.08	0.4	1.0
860625	2120	45.69	39 22.78	120 09.15	12.26	1.4	11	89	13.5	0.06	0.7	1.4
860805	2144	09.52	39 24.18	120 06.87	11.20	1.4	15	108	13.9	0.09	0.4	1.1
860814	1505	10.97	39 26.33	120 09.82	11.36	2.1	16	70	8.6	0.18	0.8	1.6
860912	1742	26.58	39 26.00	120 09.96	9.17	1.7	10	127	9.0	0.11	0.6	1.6
861003	1935	09.10	39 26.36	120 10.11	10.60	1.5	9	96	8.3	0.06	0.8	1.5
861028	2053	01.45	39 24.60	120 12.81	14.37	1.5	10	108	7.3	0.07	0.8	1.4
861109	2308	57.77	39 24.87	120 12.53	14.04	1.6	12	108	7.5	0.09	0.6	1.2
861202	1450	05.75	39 25.63	120 09.60	7.31	1.9	12	98	9.9	0.10	0.4	1.6
861203	2356	04.23	39 24.41	120 05.21	9.72	2.7	42	83	8.6	0.16	0.3	0.5
861213	1230	26.84	39 24.15	120 04.99	8.78	2.6	23	85	8.9	0.07	0.4	0.6
861222	0743	54.02	39 25.26	120 12.20	12.36	1.6	13	94	7.8	0.03	0.5	1.0
861222	0753	19.88	39 25.38	120 12.96	14.06	1.1	14	98	6.7	0.09	0.6	0.9
870109	1505	22.41	39 26.85	120 12.49	10.93	1.5	11	97	6.6	0.07	0.8	1.7
870109	1506	18.64	39 27.37	120 12.53	11.92	1.6	11	104	5.6	0.08	0.8	1.5
870212	2028	03.81	39 25.74	120 09.84	7.87	1.6	9	96	9.6	0.06	0.9	1.3
870424	1456	30.48	39 26.67	120 10.00	11.02	2.2	19	69	7.9	0.08	0.4	1.0
870507	0308	22.14	39 22.55	120 08.95	11.17	1.9	13	95	13.5	0.10	0.6	1.2
870715	1438	54.80	39 24.93	120 09.98	11.73	1.5	11	82	10.8	0.07	0.6	1.2
870815	1337	56.03	39 23.60	120 08.00	9.32	1.8	11	98	12.2	0.11	0.7	1.1
870815	1355	06.14	39 23.79	120 08.57	9.54	1.8	13	93	12.5	0.08	0.5	1.0
870927	2020	38.57	39 24.97	120 13.91	11.72	1.8	13	113	5.6	0.15	1.3	1.2
871030	0439	52.13	39 24.85	120 13.49	12.20	1.7	15	110	6.2	0.07	0.6	1.0
871123	0530	09.94	39 23.48	120 11.99	11.46	1.5	13	110	9.4	0.06	0.7	1.3
871211	1859	47.26	39 23.36	120 11.59	11.53	1.7	9	107	10.0	0.04	0.7	1.8

TABLE D8. Walker Lane sub-area

DATE	GMT	SEC	LATITUDE	LONGITUDE	DEPTH	MAG	STA	GAP	DMIN	RMS	ERH	ERZ
800401	0646	46.48	40 8.39	119 38.79	1.75	1.8	6	246	54.9	0.20	1.8	20.8
800408	0013	42.55	39 30.83	119 09.61	2.64	4.9	10	109	56.4	0.12	0.8	2.8
800408	0140	11.48	39 30.15	119 09.53	6.18	1.7	9	146	56.0	0.07	1.1	2.7
800408	0344	56.26	39 29.82	119 09.44	6.45	1.4	9	145	55.8	0.15	1.2	4.4
800408	0722	55.35	39 30.72	119 10.16	1.26	1.6	9	148	55.6	0.06	1.0	3.1
800408	0845	06.38	39 29.78	119 10.47	5.37	1.6	9	145	54.5	0.10	2.0	7.4
800408	0846	51.48	39 29.74	119 10.00	2.68	2.0	9	145	55.0	0.10	1.7	6.8
800411	1928	04.97	39 29.94	119 09.70	7.16	2.6	5	200	41.8	0.10	4.1	14.3
800413	0316	59.83	39 28.54	119 10.21	4.50	1.8	9	158	40.8	0.07	1.7	6.2
800425	1627	46.77	39 54.06	119 23.62	7.15	2.1	6	249	73.5	0.25	10.4	17.0
800426	2253	59.78	39 53.34	119 22.91	6.35	2.2	6	146	53.3	0.03	0.7	1.6
800513	1414	05.01	40 07.22	119 38.81	13.24	1.9	7	160	22.3	0.03	1.2	2.5
800520	0841	19.93	40 06.71	119 39.82	6.91	1.8	6	235	66.1	0.05	4.8	12.3
810422	1132	14.92	40 07.34	119 40.27	8.54	2.2	7	210	20.4	0.06	1.4	1.2
810718	1430	38.96	40 03.63	119 42.06	0.63	1.8	8	220	23.5	0.16	1.1	18.3
810807	2255	26.89	40 05.30	119 37.03	3.06	2.2	12	132	26.4	0.12	1.1	1.5
810920	1648	39.85	39 36.47	119 17.97	6.36	2.8	10	112	34.2	0.07	0.5	1.4
820603	1214	20.03	40 13.09	119 47.49	8.36	2.0	6	240	6.5	0.02	2.2	1.0
820805	1106	01.28	40 05.89	119 38.72	0.18	1.9	9	266	54.9	0.09	1.2	4.7
840304	0805	36.40	39 41.83	119 21.90	6.36	2.0	7	296	62.7	0.14	7.5	2.0
840531	2159	36.76	39 31.91	119 12.69	5.03	1.7	5	151	32.6	0.05	3.8	12.6
840612	1946	44.31	40 03.00	119 37.45	9.58	1.2	9	184	35.7	0.19	1.3	2.6
840630	2322	40.39	40 10.41	119 39.84	11.27	1.8	11	256	49.7	0.15	1.6	17.7
840812	0544	08.02	39 32.02	119 08.75	10.17	2.8	9	257	36.4	0.16	2.1	18.3
841022	0110	25.89	39 54.34	119 26.76	1.39	2.7	21	257	69.7	0.14	2.7	1.2
841022	1127	43.00	39 53.33	119 27.67	21.64	3.7	41	254	67.4	0.33	2.8	1.3
841108	0026	05.63	40 04.86	119 42.56	5.09	2.1	22	255	42.1	0.16	1.3	1.1
850211	1833	22.43	40 08.19	119 40.96	8.34	2.2	10	243	46.5	0.08	1.3	2.2
850322	0852	04.48	40 05.98	119 41.59	5.61	2.1	8	240	43.2	0.07	1.6	1.4
850322	1103	46.34	40 05.84	119 41.83	5.31	2.0	8	240	43.1	0.08	2.2	1.3
850322	1232	16.73	40 06.70	119 40.76	9.47	1.9	8	244	43.9	0.12	2.3	16.1
850420	1713	13.81	40 06.89	119 38.90	7.39	2.3	10	248	43.2	0.12	3.4	2.5
850727	1515	46.19	40 08.08	119 37.46	8.34	1.4	8	253	44.5	0.05	2.9	3.4
850822	2223	34.97	39 31.90	119 08.55	4.45	0.0	5	273	36.8	0.07	6.1	2.4
851206	0243	24.42	40 14.17	119 38.96	0.21	1.4	12	168	56.3	0.22	1.0	3.6
860205	0037	42.34	39 32.07	119 11.48	0.96	0.0	10	155	33.6	0.01	0.8	4.1
860401	2120	36.30	39 37.49	119 17.60	0.19	2.2	8	178	79.8	0.28	2.5	4.4
860626	2256	08.86	39 34.07	119 11.95	0.02	2.3	15	121	30.5	0.23	0.9	3.0
860925	1353	10.54	40 07.06	119 42.29	0.05	1.9	8	188	49.9	0.09	2.0	10.7
861105	2152	23.62	40 06.78	119 41.59	23.09	2.4	11	108	44.5	0.28	1.0	3.0
861120	2345	28.89	39 34.44	119 10.36	3.18	2.0	13	147	58.5	0.36	1.5	3.9
870623	1305	15.18	40 07.14	119 40.96	4.89	2.8	15	108	44.8	0.25	0.8	2.1
870915	0536	05.44	39 37.77	119 17.72	6.83	2.5	13	209	65.9	0.13	1.5	3.9
870915	0616	45.74	39 38.55	119 16.45	4.78	3.2	19	123	20.2	0.25	1.1	2.7
870915	1443	04.44	39 37.91	119 17.23	0.43	3.1	17	122	20.1	0.16	1.2	5.7
871102	0913	33.01	40 10.83	119 50.08	7.62	2.3	13	126	39.6	0.18	1.7	2.6

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