A Probabilistic Evaluation of Earthquake Detection and Location Capability for Illinois, Indiana, Kentucky, Ohio, and West Virginia

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Prepared for
U.S. Nuclear Regulatory
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ABSTRACT

Probabilistic estimations of earthquake detection and location capabilities for the states of Illinois, Indiana, Kentucky, Ohio and West Virginia are presented in this document. The algorithm used in these epicentrality and minimum-magnitude estimations is a version of the program NETWORTH by Wirth, Blandford, and Husted (DARPA Order No. 2551, 1978) which was modified for local array evaluation at the University of Michigan Seismological Observatory. Estimations of earthquake detection capability for the years 1970 and 1980 are presented in four regional minimum m_b magnitude contour maps. Regional 90% confidence error ellipsoids are included for m_b magnitude events from 2.0 through 5.0 at 0.5 m_b unit increments. The close agreement between these predicted epicentral 90% confidence estimates and the calculated error ellipses associated with actual earthquakes within the studied region suggest that these error determinations can be used to estimate the reliability of epicenter location.

SUMMARY

Probabilistic estimations of earthquake detection and location capabilities for the states of Illinois, Indiana, Kentucky, Ohio and West Virginia are presented in this document. The algorithm used in these epicentrality and minimum magnitude estimations is a version of the program NETWORTH by Wirth, Blandford, and Husted (DARPA Order No. 2551, 1978). Estimations of earthquake detection capability for the years 1970 and 1980 are presented in four regional minimum m_b magnitude contour maps. The network for 1970 consists of 33 known active seismograph stations in eastern North America; for 1980, 157 of the 276 known active stations are used. All near regional stations are used, regardless of their performance record, to insure that the coverage is representative. The attenuation function used is derived from Richter (1936) and Evernden (1967) for the eastern United States. The travel-time data used are from Herrin (1968), Evernden (1967), and Arnold (1968). The required signal to noise ratio is set at 1.5. Regional 90% confidence error ellipsoids are included for m_b magnitude events from 2.0 through 5.0 at 0.5 m_b unit increments. The minimum station detectability criterion is set at 10 for events with magnitudes greater than 2.5 and 5 for events with magnitudes less than 2.5. The close agreement between these predicted epicentral 90% confidence estimates and the calculated error ellipses associated with actual earthquakes within the studied region suggest that these error determinations can be used to estimate the the performance of a seismograph station network in the absence of abundant earthquakes.

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INTRODUCTION

During the past decade, both the U. S. Nuclear Regulatory Commission and the U. S. Geological Survey have been involved actively in programs to improve the evaluation of earthquake hazard and risk in the United States east of the Rocky Mountains. With few exceptions, the historic seismic data base for the eastern United States is not adequate to locate accurately the hypocenters of many moderately large earthquakes nor to provide significant estimations of possible recurrence rates. One method of attacking this problem has been to increase the number of seismograph stations in the eastern United States; particularly emphasizing regions known to have experienced damaging earthquakes historically. In the north-central region of the United States, for example, there were twenty-three active regional seismic observatories in 1970. By 1980, this number had grown to over 100. The intent of this observatory proliferation is twofold: first to enhance significantly the hypocenter location capabilities, ultimately defining seismically active geological structures, and secondly to depress the earthquake magnitude detection threshold, thereby providing a broader data base for rational evaluation of recurrence rates. The actual effectiveness of the four-fold increase in the number of observatories in the north-central region of the United States has not been examined, however. In fact, prior to 1970, little attention was paid to the eastern United States earthquake detection capabilities other than a few preliminary investigations during the LRSM program of the VELA Uniform Project of the early 1960's. This report is a probabilistic evaluation of earthquake detection and location capabilities for the north-central region of the United States, particularly the states of Illinois, Indiana, Kentucky, Ohio, and West Virginia.

The basic algorithm used in this report to evaluate the capabilities of a network of seismograph stations was written by Wirth, Blandford and Husted (1978, DARPA Order No. 2551). Alterations of the algorithm to accommodate a larger number of stations, more refined station input parameters and buffering to interactive graphics routines were done at the University of Michigan Seismological Observatory in 1980. A copy of the code is included as an appendix to this report.

Estimates of both minimum magnitude detection probability and epicenterality precision are computed from the same input data. Three types of information are required in these evaluations; epicenter parameters, transfer functions, and station parameters. The epicenter parameters are the coordinates of the locations to be evaluated either at fixed m_b magnitudes or at a minimum magnitude determined by the distribution and performance of the stations. The transfer functions are the regional travel-time and attenuation curves. The station parameters include locations and instrumental performance characteristics.

A station is assumed to detect an event provided that the ratio of signal to noise amplitude is greater than some fixed value, r . We have assumed the value of r to be 1.5 in the evaluations included in this report. Signal and noise are assumed to be log-normally distributed. If the log of the noise amplitude has expectation μ_n and variance σ_n^2 and the log of the signal amplitude has expectation $\log A$ and variance σ_s^2 , then the probability that a station i will detect an event is given by:

$$P_i = P_i(\phi) \left(\frac{\log A - (\mu_n + \log r)}{\{\sigma_n^2 + \sigma_s^2\}^{1/2}} \right)_i$$

where P_i is an estimation of the reliability of operation of station i
 where $0 \leq P_i \leq 1.0$ and

$$\Phi(x) = \int_{-\infty}^x e^{-y^2/2} dy / \sqrt{2\pi}$$

is the normal cumulative probability function. The values for P_i , μ_n , and σ_n^2 for each station are empirically derived from examination of seismograms from each station. The value of $\log A$ is derived from

$$\log_{10} A_i = m_b + b_\Delta$$

where m_b is the P-wave magnitude and b_Δ is the attenuation coefficient for distance Δ . The attenuation coefficient table will be discussed later in this report.

Given N independent events with probability P_i , the probability of at least α of the events is given by (Booker, 1964) as:

$$P(\geq \alpha) = \sum_{k=\alpha}^N p(k)$$

where

$$p(k) = E_k(p) - \binom{k+1}{k} E_{k+1}(p) + \binom{k+2}{k} E_{k+2}(p) - \dots \pm \binom{N}{k} E_N(p)$$

is the probability of exactly k events, and

$$E_1(p) = \sum_{i=1}^N P_i; E_2(p) = \sum_{i>j}^N P_i P_j; E_3(p) = \sum_{i>j>k}^N P_i P_j P_k;$$

etc.

The value of α used in our calculations is usually 10 unless otherwise stated and the minimum acceptable probability of detection is 0.9. In

other words, we define our minimum detection acceptability as 90% probability of detection by at least ten stations.

The determination of hypocentral parameters, latitude longitude depth and origin time, from arrival times is a non-linear problem which generally is addressed by utilizing a linearization and least squares iterative reduction of arrival time residuals as defined by Geiger (1910). The exactness of this solution is dependent on the precision with which the arrival times at the stations can be picked, the precision and variance of the empirically derived regional travel time curves, and the distribution of seismograph stations about the location of interest. The confidence regions constructed in the linearized problem become exact asymptotically as the number of stations utilized becomes large and are approximately ellipsoidal in the neighborhood of the mean estimated location provided that they have semimajor axes with lengths not exceeding 20 kilometers (Flinn, 1964). Confidence regions determined with small numbers of stations which are poorly distributed or having semimajor axes lengths exceeding 20 kilometers may deviate significantly from ellipsoidal shape and may not accurately represent hypocentral uncertainty.

Although the NETWORTH algorithm has the capability of using several regional variations of both travel-time data and attenuation characteristics, we have assumed uniform travel-time and attenuation functions throughout the region. Thus the absolute accuracy of detection capabilities within the Mississippi Embayment, for example, where the attenuation function is acknowledged to differ from that for the remainder of the eastern United States, may be marginally different than indicated in this report.

THE TRANSFER FUNCTIONS

The two transfer functions required to evaluate seismograph network performance are the distance dependent P-wave attenuation coefficients and the P-wave travel-times. Since we are interested in the ground displacements at given distances, the geometrical spreading and anelastic attenuation effects are combined in a table of logarithmic decrements to the m_b magnitude as a function of distance (See table 1). These attenuation coefficients are derived from a variety of sources and form a piece-wise continuous attenuation function. The coefficients for the distance range 0 through 200 kilometers (1.8°) are assumed to be due purely to geometrical spreading and the function is constrained to pass through the 100 kilometer distance ground amplitude value as defined by Richter (1937). This distance range is the most difficult to define accurately since it includes the most pronounced perturbations due to local structure and non-linear finite displacement effects. For these reasons, the absolute accuracy of the computed displacements at near-field distances is questionable and likely underestimation of the actual ground displacements. Fortunately, however, these near-field inaccuracies play a relatively insignificant role in the evaluation of regional network performance since the observational thresholds for the majority of the stations will be outside this distance range. It is important to recognize, however, that m_b magnitudes calculated for epicentral distances less than 60 kilometers are overestimated due to the extrapolated positive values of the attenuation function in this distance range, regardless of near-field non-linear finite displacement effects.

The attenuation coefficients for the distance range 200 kilometers through 1400 kilometers are derived from the Evernden (1967) eastern United States $P_{8.5}$ attenuation curve. There is a transition from the $P_{8.5}$ to the $P_{10.5}$ curve of Evernden in the distance range 1400 through 1600 kilometers. This transition is along the 'shot report' curve and serves to connect these disjoint segments of the attenuation function in a smooth manner. The attenuation function from 1600 kilometers to 45° is a combination of the Evernden $P_{10.5}$ and 'shot report' curves. The tabulated logarithmic decrements to the m_b magnitudes as a function of distance used in this study are given in table 1. In addition, the ground displacements, in nanometers, as a function of distance for a range of m_b magnitudes are illustrated in figure 1.

The other transfer function utilized in network evaluation is the P-wave travel time data. The mean distance-dependent P-wave travel times are from Herrin (1968) for surface focus events. The distance increment is 0.1° from 0 to 11° and 0.5° beyond 11° . The travel times are for P_g from 0 to 1.1° , P^* from 1.1 to 1.8° , P_n from 1.8 to 11° , and P beyond 11° . These travel times are given in table 2.

The standard deviations about the mean travel times as a function of distance are given in table 3. The coefficients in the distance range from 0 through 25° were obtained from the data scatter for three explosions and three earthquakes in the eastern United States given by Evernden (1967). Standard deviations of the travel time curve beyond 25° are from Arnold (1968). These data are used in the construction of the hypocentral error ellipsoids.

Table 1.

Attenuation coefficients as m_b magnitude decrements as a function of distance

KM	DEG	B	KM	DEG	B
0.0	0.0	2.15	390.00	3.507	-1.90
5.00	0.045	2.15	400.00	3.597	-1.92
10.00	0.090	1.55	420.00	3.777	-1.96
20.00	0.180	0.94	430.00	3.867	-1.98
40.00	0.360	0.34	460.00	4.137	-2.05
60.00	0.540	-0.01	470.00	4.227	-2.07
70.00	0.630	-0.14	500.00	4.497	-2.14
80.00	0.719	-0.25	600.00	5.396	-2.30
90.00	0.809	-0.35	700.00	6.295	-2.44
100.00	0.899	-0.45	800.00	7.195	-2.57
110.00	0.989	-0.78	900.00	8.094	-2.68
120.00	1.079	-0.84	1000.00	8.993	-2.77
130.00	1.169	-0.92	1100.00	9.893	-2.85
140.00	1.259	-1.00	1200.00	10.792	-2.92
150.00	1.349	-1.06	1300.00	11.691	-2.98
160.00	1.439	-1.10	1400.00	12.590	-3.02
170.00	1.529	-1.15	1500.00	13.490	-2.77
180.00	1.619	-1.21	1600.00	14.389	-2.55
190.00	1.709	-1.27	1800.00	16.188	-2.64
200.00	1.799	-1.35	2000.00	17.986	-2.73
210.00	1.889	-1.40	2250.00	20.235	-3.05
230.00	2.068	-1.46	2500.00	22.483	-3.24
240.00	2.158	-1.49	2750.00	24.731	-3.40
250.00	2.248	-1.52	3000.00	26.980	-3.55
260.00	2.338	-1.55	3113.46	28.000	-3.72
270.00	2.428	-1.59	4447.80	40.000	-3.62
280.00	2.518	-1.61	8895.60	80.000	-3.85
290.00	2.608	-1.64	10007.55	90.000	-4.06
300.00	2.698	-1.67	11119.50	100.000	-4.76
310.00	2.788	-1.70	12231.45	110.000	-5.76
320.00	2.878	-1.72	14455.35	130.000	-4.36
330.00	2.968	-1.76	15567.30	140.000	-4.76
340.00	3.058	-1.78	16123.27	145.000	-3.45
350.00	3.148	-1.81	17791.20	160.000	-4.36
370.00	3.327	-1.85	20015.10	180.000	-4.36
380.00	3.417	-1.89			

Figure 1.
P-Wave Attenuation

Table 2.
HERRIN68
TRAVEL-TIME TABLE

DEG	SEC	DEG	SEC	DEG	SEC	DEG	SEC
-0.2	-3.71	4.4	67.77	9.0	130.60	24.0	314.91
-0.1	-1.85	4.5	69.14	9.1	131.96	24.5	319.68
0.0	0.0	4.6	70.51	9.2	133.32	25.0	324.39
0.1	1.85	4.7	71.88	9.3	134.68	25.5	329.03
0.2	3.71	4.8	73.25	9.4	136.04	26.0	333.63
0.3	5.56	4.9	74.62	9.5	137.40	26.5	338.18
0.4	7.14	5.0	75.99	9.6	138.76	27.0	342.71
0.5	9.27	5.1	77.36	9.7	140.12	27.5	347.20
0.6	11.12	5.2	78.73	9.8	141.47	28.0	351.68
0.7	12.97	5.3	80.09	9.9	142.83	28.5	356.15
0.8	14.83	5.4	81.46	10.0	144.19	29.0	360.60
0.9	16.68	5.5	88.83	10.1	145.55	29.5	365.06
1.0	18.53	5.6	84.20	10.2	146.90	30.0	369.51
1.1	20.38	5.7	85.57	10.3	148.26	30.5	373.95
1.2	22.02	5.8	86.94	10.4	149.62	31.0	378.38
1.3	23.67	5.9	88.30	10.5	150.98	31.5	382.79
1.4	25.31	6.0	89.67	10.6	152.33	32.0	387.19
1.5	26.95	6.1	91.04	10.7	153.69	32.5	391.58
1.6	28.60	6.2	92.41	10.8	155.04	33.0	395.96
1.7	30.24	6.3	93.77	10.9	156.40	33.5	400.33
1.8	31.88	6.4	95.14	11.0	157.75	34.0	404.68
1.9	33.49	6.5	96.51	11.5	164.52	34.5	409.02
2.0	34.86	6.6	97.87	12.0	171.28	35.0	413.34
2.1	36.24	6.7	99.24	12.5	178.03	35.5	417.65
2.2	37.61	6.8	100.60	13.0	184.77	36.0	421.95
2.3	38.98	6.9	101.97	13.5	191.50	36.5	426.23
2.4	40.35	7.0	103.34	14.0	198.19	37.0	430.49
2.5	41.72	7.1	104.70	14.5	204.86	37.5	434.73
2.6	43.10	7.2	106.06	15.0	211.48	38.0	438.96
2.7	44.47	7.3	107.43	15.5	218.04	38.5	443.17
2.8	45.84	7.4	108.80	16.0	224.55	39.0	447.37
2.9	47.21	7.5	110.16	16.5	230.98	39.5	451.54
3.0	48.58	7.6	111.52	17.0	237.34	40.0	455.70
3.1	49.95	7.7	112.89	17.5	243.61	40.5	459.84
3.2	51.32	7.8	114.25	18.0	249.78	41.0	463.97
3.3	52.70	7.9	115.62	18.5	255.84	41.5	468.08
3.4	54.07	8.0	116.98	19.0	261.79	42.0	472.17
3.5	55.44	8.1	118.34	19.5	267.61	42.5	476.25
3.6	56.81	8.2	119.70	20.0	273.32	43.0	480.31
3.7	58.18	8.3	121.07	20.5	278.90	43.5	484.35
3.8	59.55	8.4	122.43	21.0	284.37	44.0	488.37
3.9	60.92	8.5	123.79	21.5	289.72	44.5	492.37
4.0	62.29	8.6	125.15	22.0	294.95	45.0	496.36
4.1	63.66	8.7	126.51	22.5	300.08	45.5	500.33
4.2	65.03	8.8	127.88	23.0	305.11	46.0	504.28
4.3	66.40	8.9	129.24	23.5	310.05	46.5	508.21

Table 3.
TRAVEL-TIME
STD.DEV. VS. DISTANCE

DEG	SEC	DEG	SEC	DEG	SEC	DEG	SEC
0.	0.00	13.	1.30	26.	1.25	39.	1.27
1.	0.80	14.	1.50	27.	1.22	40.	1.07
2.	1.20	15.	1.30	28.	1.14	41.	1.21
3.	0.75	16.	2.50	29.	1.06	42.	1.21
4.	1.00	17.	3.00	30.	1.11	43.	1.20
5.	1.25	18.	3.00	31.	1.16	44.	1.30
6.	1.75	19.	3.00	32.	1.08	45.	1.16
7.	2.00	20.	1.80	33.	1.10	46.	1.18
8.	2.00	21.	1.19	34.	1.29	47.	1.11
9.	1.50	22.	1.26	35.	1.09	48.	1.06
10.	2.50	23.	1.12	36.	1.07	49.	1.20
11.	2.30	24.	1.12	37.	1.18		
12.	1.50	25.	1.25	38.	1.15		

THE STATION NETWORK

The distribution of operational seismograph stations in eastern North America which were used in the evaluation of event detection and location capabilities for the north-central region of the United States is illustrated in figure 2. These stations are a subset of the total number of active observatories in eastern North America which are catalogued in appendix Ia. Although it would be desirable to use the entire catalog of active stations in 1980, it is neither practical nor reasonable to do so.

The network includes all near regional stations to insure that the coverage within the area of interest is accurately represented; particularly for small magnitude events. In addition, a well-distributed large number of far regional stations is included to prevent unrealistic edge effects and to insure that coverage of larger magnitude events is reasonably accurate. The network stations are indicated in appendix Ia by an asterix following their respective code letters. Other station parameters included in appendix Ia are: latitude, longitude, elevation above mean sea level in meters, state, a code indicating the organization responsible for station operation (See also appendix Ib), the peak magnification of the short-period vertical instrument and the center frequency, a characteristic rms background noise value in nanometers and code indicating how the noise value was assigned (See also appendix Ic), a station reliability estimation and code indicating assignment procedure, and an average travel-time and m_b magnitude bias estimation for the station, if it is known.

The two most important parameters defining event detection by a given

station are the characteristic background noise level and the station reliability. Both of these parameters proved to be quite difficult to obtain in a standardized manner and a series of criteria were established for both parameters. The letter codes in Appendix Ia which follow the rms noise value and the reliability correspond to the method of assigning each of these parameters given in Appendix Ic. An assignment of 0 gain at 0 frequency in the table indicates that the parameters for that station could not be obtained.

In actuality, the ratio of the signal amplitude and the average amplitude of the noise at the same frequency is the event observational limitation for any given station. Without spectral amplitude functions of the noise at all of the stations, however, this refined evaluation of detection capability is not currently possible. Alternatively, we have required a uniform signal to noise ratio of 1.5 for all stations, and defined the standard noise characteristic as the observational limitation regardless of the frequency. The standard deviation of the noise has been set at a value of $\pm 0.25 m_b$ units.

Figure 2

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ANALYSIS OF EARTHQUAKE DETECTION AND LOCATION CAPABILITIES FOR ILLINOIS, INDIANA, KENTUCKY, OHIO, AND WEST VIRGINIA FOR 1970 AND 1980

Essentially two types of information are of interest in a detection capability study. First, what minimum magnitude earthquake is detectable at a given location by a specific station network. Second, what dimensions and orientations are associated with the location error ellipsoids surrounding specific hypocenters of given magnitude events. Both of these aspects are discussed in this report. Two levels of coverage are considered. The first is a five station minimum 90% detection probability threshold. This was considered to be a basic requirement since five stations barely overdetermine the hypocenter parameter matrix in the inverse problem. In addition, the error ellipsoids associated with such low level coverage are usually large. Thus, although five station coverage yields an estimation of the minimum magnitude event observable, the absolute hypocenter parameters in the inverse problem are not very reliable. Figures 3 and 4 illustrate the five station minimum 90% probability earthquake detection capability for the north central region of the United States in 1970 and 1980 respectively. The maps are contoured at 0.1 m_b magnitude unit intervals and are based on 294 equally spaced (0.5°) grid points across the region. The improvement in regional detection capability from 1970 to 1980 is demonstrated by comparing the two contour maps. The regional earthquake detection threshold has been depressed by approximately one m_b magnitude unit. The improvement in coverage of the three specific regional seismic zones is even more dramatic. The minimum m_b magnitude earthquake observable in the Wabash Valley in 1970 was 3.8 as compared with 2.1 in

1980. Similarly, the Anna, Ohio region had a minimum five station detection capability of m_b 3.7 in 1970 as compared with m_b 1.1 in 1980. The West Virginia-Virginia border also had an improvement in detectability from m_b 3.8 to m_b 1.8.

The majority of information presented in this document is for 10 station minimum detection. This threshold level more conservatively estimates the minimum magnitude earthquake observable, but simultaneously provides a more realistic evaluation of error ellipsoid parameters. Two minimum magnitude contour maps based on ten station minimum 90% probable detection are included as figures 5 and 6 for 1970 and 1980 respectively. By placing a 10 station limit on the 90% probability of detection, arrays such as the ones in the Wabash Valley and Anna, Ohio are statistically overpowered since neither contains the minimum number of stations. This raises the minimum magnitude event contour for both regions to 2.7 and to 2.4 for the West Virginia-Virginia border. In addition, because of the three stations, AAM UTO and BGO, the contour for magnitude 2.6 events is centered north of the Anna, Ohio region rather than surrounding it.

The second aspect of the regional coverage to be considered is the absolute location accuracy for events of specified magnitude. Error ellipse information has been computed for events with magnitudes 5.0, 4.5, 4.0, 3.5, 3.0, and 2.5 having a 10 station minimum coverage threshold. In addition, error ellipse information for magnitude 2.5 and 2.0 events having a five station minimum coverage threshold are also included. The computed hypocenter precision parameters are tabulated in appendix II and graphically illustrated in figures 7 through 14.

Data in Appendix II include the coordinates of the error ellipse center, the event magnitude, the number of stations included in the computation of the error ellipse, the largest open angle of station coverage, the dimensions of the error ellipse semimajor and semiminor axes, the angle of clockwise rotation of the semimajor axis from north, the area of the error ellipse, and the 95% confidence dimension of the depth determination. If the joint detection probability for the minimum station coverage (5 or 10) is less than 0.9 then the error ellipse parameters are set to zero and the maximum joint probability of observation by the station network is listed in place of the magnitude.

The error ellipses are plotted to scale at each grid point on figures 7 through 14. If the error ellipse at any grid point has a semimajor axis length which exceeds 50 kilometers, only the center of the ellipse is plotted. Locations where the probability of detection criterion is not met remain blank on the figures.

Location accuracy is reasonably good for earthquakes with m_b magnitudes 5.0 through 3.5 (Figures 7-10, Appendix IIa-IIId). Semiaxes lengths rarely exceed 7 kilometers and are typically 2 or 3 kilometers. Resolution of m_b 3.0 event epicenters (Figure 11, Appendix IIe) is significantly less accurate however. The majority of the north central United States region has nearly circular error ellipses with semiaxes lengths generally 5 to 7 kilometers. Central Indiana and western Illinois, on the other hand are characterized by high eccentricity error ellipses with semimajor axes lengths frequently exceeding 15 kilometers and oriented in a northwest-southeast direction.

Two computations of m_b 2.5 error ellipses have been included.

Five station detection threshold 1970

Figure 3

Figure 4

Five station detection threshold 1980

Figure 5

Ten station detection threshold 1980

Figure 6

Figure 7

Figure 8

Figure 9

Figure 10

Figure 11

Figure 11 and Appendix II f are those for a ten station minimum detection threshold; figure 12 and Appendix II g are for a five station minimum detection threshold. The ground displacement for m_b 2.5 earthquakes in the distance range 100 to 200 kilometers is 65 to 15 nanometers (See figure 1). This is also the range of the average background noise characteristic for most stations in Appendix Ia. Thus m_b 2.5 events are at the fringe of interarray location capabilities for the north central region of the United States. In addition, since most of the eastern United States arrays consist of less than 10 elements, the five station detection threshold becomes more realistic for events less than or equal to m_b 2.5.

Error ellipses for magnitude 2.5 events in the north-central region of the United States are highly eccentric and frequently have semimajor axes exceeding 35⁰ kilometers in length. Curiously, the distribution of stations constrains the trends of the semimajor axes of the error ellipses in strongly preferred northeast and northwest trends (See figure 12). This is also the case for m_b 3.0 events but to a less pronounced degree. The orientations of the semimajor axes of the error ellipses at the threshold magnitudes in 1970 also show this tendency but the eccentricity of these ellipses is much less pronounced. These analyses suggest the possibility that the hypothesized northeast and northwest trends of seismicity in this region may not be geologically controlled, but may in fact be an artifact caused by the non-random distribution of seismograph stations. Thus a great deal of caution should be exercised in defining seismicity trends in these directions.

The final analysis presented is for error ellipses associated with

Figure 12

90 % Confidence ellipses for m_b magnitude 2.5 earthquakes, minimum station coverage - 5

Figure 13

Figure 14

m_b 2.0 events (figure 14, Appendix IIh). These earthquakes are small enough that they cannot be located accurately except within the dimensions of high density arrays. This is clearly demonstrated in figure 14 where ellipses are drawn within the Wabash Valley Array, the Anna, Ohio Array and the West Virginia-Virginia border array. Location capability drops to zero very quickly outside the dimensions of the local network.

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APPENDIX Ia
EASTERN NORTH AMERICA SEISMOGRAPH STATIONS

CODE	LAT (N)	LONG (W)	ELEV (M)	STATE	OPER	GAIN (K)	FREQ (HZ)	RMS NOISE (NM)	REL	TT COR (SEC)	AMP COR (MB)
SHAV	* 30.69	88.14	61	AL	SHC	6	1.0	80.0 C	0.88C	0.0	0.0
PGA	* 30.06	90.62	122	AR	SLU	238	10.0	1.5 C	0.88C	0.0	0.0
POW	* 36.15	91.18	156	AR	SLU	570	10.0	5.0 C	0.88C	0.0	0.0
WLA	* 35.19	90.72	115	AR	SLU	73	1.0	50.0 D	0.88C	0.0	0.0
BCT	41.49	73.38	69	CT	WES	100	1.0	30.0 C	0.88C	0.0	0.0
ECT	41.84	73.41	342	CT	WES	150	1.0	18.0 C	0.88C	0.0	0.0
HDM	41.49	72.52	24	CT	WES	100	1.0	30.0 C	0.88C	0.0	0.0
MD1	41.55	72.47	113	CT	WES	100	1.0	30.0 C	0.88C	0.0	0.0
NSC	41.48	71.85	110	CT	WES	100	1.0	30.0 C	0.88C	0.0	0.0
UCT	* 41.83	72.25	149	CT	WES	100	1.0	30.0 C	0.88C	0.0	0.0
BED	* 39.35	75.68	18	DE	DGS	45	1.0	70.0 B	0.88C	0.0	0.0
GTD	* 38.74	75.41	15	DE	DGS	45	1.0	70.0 B	0.88C	0.0	0.0
NEDV	* 39.70	75.71	47	DE	DGS	15	1.0	180.0 C	0.88C	0.0	0.0
GEOV	* 38.9C	77.07	29	DC	GEU	25	1.0	102.0 B	0.98B	0.0	0.0
GAI	* 29.65	82.34	51	FL	UFL	4	1.0	785.0 C	0.88C	0.0	0.0
AMG	* 32.06	84.22	106	GA	GSW	20	0.8	157.0 C	0.88C	0.0	0.0
ATLV	* 33.43	84.34	272	GA	GIT	50	1.0	60.0 C	0.88C	0.0	0.0
CDG	* 34.61	84.67	333	GA	GIT	15	1.0	180.0 C	0.88C	0.0	0.0
CH5	* 33.73	82.31	114	GA	GIT	200	1.0	16.0 C	0.88C	0.0	0.0
CH6	33.89	82.53	146	GA	GIT	200	1.0	16.0 C	0.88C	0.0	0.0
RF1	33.89	82.61	151	GA	GIT	200	1.0	16.0 C	0.88C	0.0	0.0
GEOG	33.95	82.61	137	GA	GIT	1	1.0	50.0 D	0.88C	0.0	0.0
ETG	* 33.29	83.35	137	GA	GIT	63	1.0	50.0 C	0.88C	0.0	0.0
REG	33.44	83.34	178	GA	GIT	2	1.0	50.0 D	0.88C	0.0	0.0
GBG	* 33.50	83.21	174	GA	GIT	2	1.0	50.0 D	0.88C	0.0	0.0
WDG	33.34	83.18	177	GA	GIT	1	1.0	50.0 D	0.88C	0.0	0.0
RMG	* 34.34	85.32	337	GA	GIT	95	1.0	33.0 C	0.88C	0.0	0.0
TVG	34.38	85.30	323	GA	GIT	2	1.0	50.0 D	0.88C	0.0	0.0
CHIV	* 41.90	87.63	183	IL	LYA	57	1.0	55.0 C	0.88C	0.0	0.0
ELC	* 37.29	89.23	153	IL	SLU	88	1.0	2.0 C	0.88C	0.0	0.0
BPIL	* 38.20	88.59	133	IL	SLU	14	1.0	14.0 C	0.88C	0.0	0.0
CIRL	* 37.51	88.11	119	IL	SLU	3	1.0	45.0 C	0.88C	0.0	0.0
CSIL	* 37.63	88.79	168	IL	SLU	31	1.0	7.0 C	0.88C	0.0	0.0
WSIL	* 38.50	88.07	155	IL	SLU	7	1.0	22.0 C	0.88C	0.0	0.0
BLOV	* 39.17	86.52	230	IN	UIN	60	1.0	8.3 C	0.88C	0.0	0.0
SPIN	* 38.54	87.61	122	IN	SLU	3	1.0	47.0 C	0.88C	0.0	0.0
WDIN	* 38.09	87.72	164	IN	SLU	7	1.0	29.0 C	0.88C	0.0	0.0
LAWV	* 38.96	95.25	260	KS	UKS	10	1.0	50.0 D	0.88C	0.0	0.0

CODE	LAT (N)	LONG (W)	ELEV (M)	STATE	OPER	GAIN (K)	FREQ (HZ)	RMS NOISE (NM)	REL	TT COR (SEC)	AMP COR (MB)
CRU	* 36.60	89.02	127	KY	SLU	23	1.0	6.0 C	0.88C	0.0	0.0
PIV1	* 37.80	82.85	0	KY	ACE	15	1.0	210.0 C	0.88C	0.0	0.0
PIV2	* 37.90	82.87	0	KY	ACE	15	1.0	210.0 C	0.88C	0.0	0.0
WCK	36.93	88.87	137	KY	SLU	42	1.0	3.0 C	0.88C	0.0	0.0
AGM	* 47.08	69.02	240	ME	WES	50	1.0	63.0 C	0.88C	0.0	0.0
BPM	* 44.63	68.79	80	ME	WES	50	1.0	63.0 C	0.88C	0.0	0.0
CBM	▽ * 46.93	68.12	250	ME	WES	50	1.0	63.0 C	0.88C	0.0	0.0
D1A	* 47.06	69.10	304	ME	WES	50	1.0	63.0 C	0.88C	0.0	0.0
D2A	47.13	69.15	402	ME	WES	50	1.0	63.0 C	0.88C	0.0	0.0
D3A	47.08	69.17	259	ME	WES	50	1.0	63.0 C	0.88C	0.0	0.0
D4A	47.19	69.28	490	ME	WES	50	1.0	63.0 C	0.88C	0.0	0.0
D5A	47.01	69.26	365	ME	WES	50	1.0	63.0 C	0.88C	0.0	0.0
D6A	47.09	69.50	430	ME	WES	50	1.0	63.0 C	0.88C	0.0	0.0
EMM	▽ * 44.74	67.49	20	ME	WES	50	1.0	63.0 C	0.88C	0.0	0.0
HKM	* 44.66	69.64	79	ME	WES	50	1.0	63.0 C	0.88C	0.0	0.0
HNME	* 46.16	67.99	209	ME	WES	50	1.0	63.0 C	0.88C	0.0	0.0
JKM	* 45.66	70.25	378	ME	WES	50	1.0	63.0 C	0.88C	0.0	0.0
MIN	* 45.24	69.04	140	ME	WES	50	1.0	63.0 C	0.88C	0.0	0.0
PQ0	* 44.99	67.47	219	ME	WES	50	1.0	63.0 C	0.88C	0.0	0.0
PQ1	44.90	67.33	93	ME	WES	50	1.0	63.0 C	0.88C	0.0	0.0
TRM	* 44.26	70.26	113	ME	WES	50	1.0	63.0 C	0.88C	0.0	0.0
COD	41.69	70.13	-85	MA	MIT	50	1.0	50.0 D	0.88C	0.0	0.0
DUX	42.07	70.77	27	MA	MIT	50	1.0	50.0 D	0.88C	0.0	0.0
FLR	41.72	71.12	52	MA	WES	50	1.0	63.0 C	0.88C	0.0	0.0
GLO	42.64	70.73	15	MA	MIT	50	1.0	63.0 E	0.88C	0.0	0.0
HRV	▽ 42.51	71.56	180	MA	MIT	50	1.0	63.0 E	0.88C	0.0	0.0
LNx	* 42.34	73.27	345	MA	WES	50	1.0	63.0 E	0.88C	0.0	0.0
QUA	42.46	72.37	201	MA	WES	150	1.0	18.0 C	0.88C	0.0	0.0
WES	▽ * 42.38	71.32	60	MA	WES	50	1.0	63.0 C	0.88C	0.0	0.0
WFM	42.61	71.49	87	MA	MIT	50	1.0	63.0 C	0.88C	0.0	0.0
ACM	* 42.65	85.85	268	MI	UMI	175	1.0	25.0 B	0.85A	0.0	0.0
AAM	▽ * 42.30	83.66	254	MI	UMI	12	1.0	60.0 B	0.90B	0.0	0.0
BLM	47.23	88.57	257	MI	MTU	0	0.0	50.0 D	0.88C	0.0	0.0
CM1	* 45.93	93.35	325	MN	UMN	50	1.0	63.0 C	0.88C	0.0	0.0
CM2	45.98	93.16	323	MN	UMN	50	1.0	63.0 C	0.88C	0.0	0.0
CM3	45.88	93.00	294	MN	UMN	50	1.0	63.0 C	0.88C	0.0	0.0
CM4	45.75	93.10	299	MN	UMN	50	1.0	63.0 C	0.88C	0.0	0.0
CM5	45.78	93.32	299	MN	UMN	50	1.0	63.0 C	0.88C	0.0	0.0

CODE	LAT (N)	LONG (W)	ELEV (M)	STATE	OPER	GAIN (K)	FREQ (HZ)	RMS NOISE (NM)	REL	TT COR (SEC)	AMP COR (MB)
CM6	45.86	93.20	311	MN	UMN	50	1.0	63.0 C	0.88C	0.0	0.0
MFM	* 44.91	93.19	226	MN	UMN	50	1.0	63.0 C	0.88C	0.0	0.0
MRM	* 45.88	95.81	359	MN	UMN	50	1.0	63.0 C	0.88C	0.0	0.0
CGM	▽* 37.32	89.53	134	MO	SLU	25	1.0	120.0 C	0.88C	0.0	0.0
DON	37.18	89.93	165	MO	SLU	74	1.0	43.0 C	0.87D	0.0	0.0
DWM	* 36.80	89.49	92	MO	SLU	5	1.0	630.0 C	0.87D	0.0	0.0
ECD	* 36.06	89.94	79	MO	SLU	12	1.0	265.0 C	0.87D	0.0	0.0
LST	* 36.52	39.73	83	MO	SLU	14	1.0	227.0 C	0.88C	0.0	0.0
NMMO	* 36.59	39.55	90	MO	SLU	14	1.0	227.0 C	0.88C	0.0	0.0
CCMO	* 38.72	90.47	152	MO	SLU	25	1.0	120.0 C	0.88C	0.0	0.0
RMB	* 36.89	90.28	147	MO	SLU	40	1.0	75.0 C	0.87D	0.0	0.0
TYS	* 38.51	90.57	195	MO	SLU	48	1.0	62.0 C	0.88C	0.0	0.0
FVM	* 37.98	90.43	334	MO	SLU	50	1.0	63.0 C	0.88C	0.0	0.0
MMM	* 38.13	91.04	-224	MO	SLU	50	10.0	6.3 C	0.88C	0.0	0.0
ROL	▽* 37.92	91.87	200	MO	UMO	50	1.0	63.0 C	0.88C	0.0	0.0
SLM	▽* 38.64	90.24	161	MO	SLU	25	1.0	120.0 C	0.88C	0.0	0.0
NNK	* 39.04	100.04	730	NB	KGS	100	10.0	50.0 D	0.88C	0.0	0.0
BNH	▽* 44.59	71.26	472	NH	WES	50	1.0	63.0 E	0.88C	0.0	0.0
DNH	* 43.12	70.90	24	NH	MIT	50	1.0	63.0 E	0.88C	0.0	0.0
HNH	43.71	72.29	180	NH	WES	50	1.0	63.0 E	0.88C	0.0	0.0
ONH	43.28	71.51	280	NH	MIT	50	1.0	63.0 E	0.88C	0.0	0.0
PNH	* 43.09	72.14	659	NH	MIT	50	1.0	63.0 E	0.88C	0.0	0.0
WNH	43.87	71.40	220	NH	MIT	50	1.0	63.0 E	0.88C	0.0	0.0
GMTN	40.88	74.18	165	NJ	LDO	4	1.0	640.0 C	0.88C	0.0	0.0
GPD	41.02	74.46	360	NJ	LDO	25	1.0	124.0 C	0.93B	0.0	0.0
LVNJ	40.81	74.76	201	NJ	LDO	50	1.0	62.0 C	0.88B	0.0	0.0
OGD	▽* 41.09	74.60	-363	NJ	LDO	50	1.0	63.0 C	0.84B	0.0	0.0
PRIN	40.37	74.72	110	NJ	LDO	25	1.0	124.0 C	0.88C	0.0	0.0
PQN	* 41.01	75.09	229	NJ	LDO	50	1.0	62.0 C	0.88C	0.0	0.0
RAMA	41.10	74.21	247	NJ	LDO	25	1.0	124.0 C	0.88C	0.0	0.0
ALX	* 44.32	75.93	122	NY	LDO	25	1.0	124.0 C	0.88C	0.0	0.0
BGR	44.83	74.38	329	NY	LDO	50	1.0	62.0 C	0.88C	0.0	0.0
BING	42.08	75.98	408	NY	LDO	4	1.0	640.0 C	0.88C	0.0	0.0
CANY	42.93	78.85	192	NY	LDO	9	1.0	330.0 C	0.88C	0.0	0.0
CLIN	41.88	73.85	168	NY	LDO	50	1.0	62.0 C	0.88C	0.0	0.0
CROG	43.90	75.41	244	NY	LDO	50	1.0	62.0 C	0.88C	0.0	0.0
DANY	44.76	73.84	507	NY	LDO	25	1.0	124.0 C	0.88C	0.0	0.0
AMNH	40.78	73.97	0	NY	LDO	50	1.0	62.0 C	0.88C	0.0	0.0

CODE	LAT (N)	LONG (W)	ELEV (M)	STATE	OPER	GAIN (K)	FREQ (HZ)	RMS NOISE (NM)	REL	TT COR (SEC)	AMP COR (MB)
MSNY *	45.00	74.86	55	NY	LDO	0	0.0	50.0 D	0.88C	0.0	0.0
MEDY *	43.18	78.39	187	NY	LDO	9	1.0	330.0 C	0.88C	0.0	0.0
PAL ▽	41.00	73.91	91	NY	LDO	100	1.0	31.0 C	0.88C	0.0	0.0
LDO	41.00	73.91	91	NY	LDO	9	1.0	330.0 C	0.88C	0.0	0.0
PNY	44.83	73.55	177	NY	LDO	9	1.0	330.0 C	0.88C	0.0	0.0
PTN	44.57	74.98	238	NY	LDO	50	1.0	62.0 C	0.88C	0.0	0.0
SANY *	43.15	78.88	172	NY	LDO	25	1.0	124.0 C	0.88C	0.0	0.0
TBR	41.14	74.22	261	NY	LDO	25	1.0	124.0 C	0.92B	0.0	0.0
WPR	41.26	73.59	152	NY	LDO	50	1.0	62.0 C	0.88C	0.0	0.0
WPNY	41.80	73.97	76	NY	LDO	50	1.0	62.0 C	0.88C	0.0	0.0
WVLY *	42.47	78.57	600	NY	LDO	25	1.0	124.0 C	0.88C	0.0	0.0
WNY	44.39	73.86	598	NY	LDO	50	1.0	62.0 C	0.93B	0.0	0.0
WND	42.34	74.15	602	NY	LDO	50	1.0	62.0 C	0.88C	0.0	0.0
APH	43.84	74.50	564	NY	LDO	101	1.0	30.0 C	0.88C	0.0	0.0
CTR	43.87	74.46	585	NY	LDO	101	1.0	30.0 C	0.88C	0.0	0.0
CLY	43.85	74.45	579	NY	LDO	50	1.0	62.0 C	0.88C	0.0	0.0
EGN	43.86	74.48	547	NY	LDO	25	1.0	124.0 C	0.88C	0.0	0.0
DCN	43.88	74.53	701	NY	LDO	202	1.0	16.0 C	0.88C	0.0	0.0
UWL *	43.84	74.54	561	NY	LDO	50	1.0	62.0 C	0.88C	0.0	0.0
ATT *	42.84	78.19	470	NY	LDO	25	1.0	124.0 C	0.88C	0.0	0.0
DNY	42.84	78.17	381	NY	LDO	13	1.0	234.0 C	0.88C	0.0	0.0
DHN	42.83	78.19	491	NY	LDO	50	1.0	63.0 E	0.88C	0.0	0.0
BLM *	41.33	73.96	134	NY	CON	0	0.0	50.0 D	0.88C	0.0	0.0
DBM	41.29	73.98	27	NY	CON	0	0.0	50.0 D	0.88C	0.0	0.0
DPL	41.25	73.91	67	NY	CON	0	0.0	50.0 D	0.88C	0.0	0.0
GOB	41.33	73.92	150	NY	CON	0	0.0	50.0 D	0.88C	0.0	0.0
IPS	41.27	73.95	0	NY	CON	0	0.0	50.0 D	0.88C	0.0	0.0
OSB	41.36	73.92	212	NY	CON	50	1.0	63.0 E	0.88C	0.0	0.0
SNP	41.24	73.97	30	NY	CON	0	0.0	50.0 D	0.88C	0.0	0.0
SPS	41.30	73.89	168	NY	CON	0	0.0	50.0 D	0.88C	0.0	0.0
SRM	41.23	74.01	165	NY	CON	0	0.0	10.0 E	0.88C	0.0	0.0
STL	41.19	74.00	125	NY	CON	0	0.0	50.0 D	0.88C	0.0	0.0
WGL	41.36	73.90	152	NY	CON	0	0.0	50.0 D	0.88C	0.0	0.0
BNY ▽ *	42.09	75.97	291	NY	UNY	75	0.0	6.7 C	0.88C	0.0	0.0
BUF ▽ *	42.93	78.85	195	NY	CCS	0	0.0	50.0 D	0.88C	0.0	0.0
INY *	42.44	76.48	238	NY	COR	85	1.0	5.9 C	0.88C	0.0	0.0
ROC ▽ *	43.13	77.59	155	NY	OSO	0	0.0	53.0 C	0.88C	0.0	0.0
TRY ▽ *	42.73	73.67	118	NY	FPI	3	22.0	63.0 E	0.88C	0.0	0.0

CODE	LAT (N)	LONG (W)	ELEV (M)	STATE	OPER	GAIN (K)	FREQ (HZ)	RMS NOISE (NM)	REL	TT COR (SEC)	AMP COR (MB)
CEH	* 35.89	79.09	152	NC	UNC	2	1.0	250.0 C	0.88C	0.0	0.0
RNC	* 35.63	78.98	85	NC	CPL	134	1.0	3.7 C	0.88C	0.0	0.0
AN1	* 40.48	84.13	306	OH	UMI	175	2.0	6.0 B	0.94A	0.0	0.0
AN3	* 40.55	83.81	326	OH	UMI	175	2.0	5.0 A	0.85A	0.0	0.0
AN4	* 40.22	83.81	346	OH	UMI	175	2.0	6.0 B	0.80A	0.0	0.0
AN7	* 40.82	83.86	281	OH	UMI	175	2.0	7.0 B	0.70A	0.0	0.0
AN8	* 40.24	84.29	302	OH	UMI	175	2.0	5.0 A	0.74A	0.0	0.0
AN9	* 40.71	84.50	255	OH	UMI	175	2.0	5.0 B	0.84A	0.0	0.0
AN10	* 40.47	84.47	275	OH	UMI	175	2.0	6.0 B	0.77A	0.0	0.0
AN11	* 40.55	84.68	273	OH	UMI	175	2.0	5.0 B	0.86A	0.0	0.0
AN12	* 40.92	84.18	226	OH	UMI	175	2.0	5.0 B	0.85A	0.0	0.0
CLE	▽* 41.49	81.53	328	OH	JCU	9	1.0	600.0 C	0.88C	0.0	0.0
UTO	* 41.66	83.57	0	OH	UTO	140	1.0	22.0 C	0.88C	0.0	0.0
BGO	▽* 41.38	83.66	212	OH	BGU	30	1.0	17.0 C	0.88C	0.0	0.0
MLF	▽* 39.14	84.28	238	OH	XAU	0	0.0	50.0 D	0.88C	0.0	0.0
OLO	* 36.46	95.71	196	OK	UOK	140	10.0	50.0 C	0.88C	0.0	0.0
SCP	▽* 40.79	77.87	352	PA	PSU	50	1.0	42.0 B	0.88C	0.0	0.0
BVR	* 40.70	80.33	0	PA	PSU	50	1.0	63.0 C	0.88C	0.0	0.0
ERP	* 42.13	79.98	0	PA	PSU	50	1.0	63.0 C	0.88C	0.0	0.0
MVL	* 39.99	76.37	91	PA	MSC	0	0.0	50.0 D	0.88C	0.0	0.0
KTZ	7 * 40.51	75.78	148	PA	KSC	4	1.0	785.0 C	0.88C	0.0	0.0
BCS	* 32.98	80.07	12	SC	SGS	26	2.0	60.0 C	0.88C	0.0	0.0
CCS	* 32.82	80.26	9	SC	SGS	54	2.0	29.0 C	0.88C	0.0	0.0
CHF	* 34.02	82.59	152	SC	SGS	26	2.0	60.0 C	0.88C	0.0	0.0
HBF	* 32.93	80.38	10	SC	SGS	124	2.0	12.4 C	0.88C	0.0	0.0
JSC	* 34.28	81.26	120	SC	SGS	240	2.0	6.2 C	0.88C	0.0	0.0
LHS	* 34.48	80.81	120	SC	SGS	124	2.0	12.4 C	0.88C	0.0	0.0
MGS	* 32.90	80.14	9	SC	SGS	13	2.0	112.0 C	0.88C	0.0	0.0
MTT	* 33.75	81.64	182	SC	SGS	62	2.0	25.0 C	0.88C	0.0	0.0
NHS	* 33.07	79.76	10	SC	SGS	62	2.0	25.0 C	0.88C	0.0	0.0
OSB	* 33.55	80.84	91	SC	SGS	31	2.0	50.0 C	0.88C	0.0	0.0
PBS	* 33.28	80.26	25	SC	SGS	31	2.0	50.0 C	0.88C	0.0	0.0
PRM	* 34.08	82.36	254	SC	SGS	240	2.0	6.2 C	0.88C	0.0	0.0
SGS	* 33.19	80.51	25	SC	SGS	124	2.0	12.4 C	0.88C	0.0	0.0
SVS	* 32.97	80.25	3	SC	SGS	54	2.0	50.0 C	0.88C	0.0	0.0
VSC	* 32.88	81.05	30	SC	SGS	31	2.0	50.0 C	0.88C	0.0	0.0
BOW	* 33.37	80.64	35	SC	SGS	31	2.0	50.0 E	0.88C	0.0	0.0
COW	* 33.38	80.70	33	SC	SGS	0	0.0	50.0 D	0.88C	0.0	0.0

CODE	LAT (N)	LONG (W)	ELEV (M)	STATE	OPER	GAIN (K)	FREQ (HZ)	RMS NOISE (NM)	REL	TT COR (SEC)	AMP COR (MB)
WMS	33.44	80.74	34	SC	SGS	0	0.0	50.0 D	0.88C	0.0	0.0
ROW	33.37	80.79	35	SC	SGS	0	0.0	50.0 D	0.88C	0.0	0.0
ZIN	33.11	80.16	30	SC	SGS	0	0.0	50.0 E	0.88C	0.0	0.0
MR01	34.33	81.30	131	SC	SCG	7	1.0	415.0 C	0.88C	0.0	0.0
MR02	34.19	81.23	84	SC	SCG	7	1.0	415.0 E	0.88C	0.0	0.0
MR03	34.35	81.46	125	SC	SCG	7	1.0	415.0 E	0.88C	0.0	0.0
MR04	34.43	81.46	125	SC	SCG	7	1.0	415.0 E	0.88C	0.0	0.0
MR05	34.43	81.22	145	SC	SCG	7	1.0	415.0 E	0.88C	0.0	0.0
MR06	34.35	81.20	137	SC	SCG	7	1.0	415.0 E	0.88C	0.0	0.0
MR07	34.37	81.32	134	SC	SCG	7	1.0	415.0 E	0.88C	0.0	0.0
MR08	34.41	81.41	112	SC	SCG	7	1.0	415.0 E	0.88C	0.0	0.0
MR09	34.30	81.40	122	SC	SCG	7	1.0	415.0 E	0.88C	0.0	0.0
SMT *	34.93	82.97	498	SC	USC	0	0.0	50.0 D	0.88C	0.0	0.0
SRPD *	33.15	81.71	31	SC	DUP	9	5.0	250.0 C	0.88C	0.0	0.0
SRPN	33.33	81.59	95	SC	DUP	9	5.0	250.0 C	0.88C	0.0	0.0
SRPW	33.20	81.58	77	SC	DUP	25	5.0	100.0 C	0.88C	0.0	0.0
GRT *	36.26	89.42	137	TN	SLU	23	1.0	7.0 B	0.88C	0.0	0.0
NKT *	35.85	89.54	153	TN	SLU	21	1.0	6.0 B	0.88C	0.0	0.0
OKG *	35.63	89.84	129	TN	SLU	25	1.0	5.0 B	0.88C	0.0	0.0
MPH *	35.12	89.93	94	TN	MSU	25	1.0	5.0 B	0.88C	0.0	0.0
TKL *	35.66	83.77	350	TN	TEC	15	1.0	210.0 C	0.88C	0.0	0.0
ORT ▽ *	35.91	84.30	370	TN	LCC	70	1.0	44.0 C	0.88C	0.0	0.0
MET	35.12	89.93	93	TN	MSU	1	30.0	50.0 D	0.88C	0.0	0.0
LGAR *	34.65	90.66	0	TN	MSU	73	1.0	50.0 D	0.88C	0.0	0.0
PGM *	34.46	90.11	105	TN	MSU	73	1.0	50.0 D	0.88C	0.0	0.0
DLY *	35.50	91.47	236	TN	MSU	504	1.0	50.0 D	0.88C	0.0	0.0
SFTN	35.36	90.02	23	TN	MSU	73	1.0	50.0 D	0.88C	0.0	0.0
CPO ▽	35.60	85.57	574	TN	TGS	400	1.0	9.7 C	0.88C	0.0	0.0
DAL ▽ *	32.85	96.78	187	TX	SMU	12	1.0	40.0 C	0.88C	0.0	0.0
COV *	44.58	73.15	85	VT	LDO	50	1.0	63.0 C	0.88C	0.0	0.0
FLET	44.72	72.95	366	VT	LDO	101	1.0	30.0 C	0.88C	0.0	0.0
MARL	42.38	72.80	580	VT	LDO	50	1.0	62.0 C	0.88C	0.0	0.0
MDV ▽	44.00	73.18	134	VT	LDO	101	1.0	30.0 C	0.88C	0.0	0.0
MGVT	44.91	72.63	262	VT	LDO	50	1.0	61.0 C	0.88C	0.0	0.0
MPVT	44.34	72.58	240	VT	LDO	50	1.0	62.0 C	0.88C	0.0	0.0
BVT	43.35	72.59	300	VT	WES	50	1.0	63.0 E	0.88C	0.0	0.0
DVT	44.96	72.17	370	VT	WES	50	1.0	63.0 E	0.88C	0.0	0.0
IVT *	43.52	73.05	295	VT	WES	50	1.0	63.0 E	0.88C	0.0	0.0

CODE		LAT (N)	LONG (W)	ELEV (M)	STATE	OPER	GAIN (K)	FREQ (HZ)	RMS NOISE (NM)	REL	TT COR. (SEC)	AMP COR (MB)
NAV	*	37.32	80.79	610	VA	VPI	65	1.0	47.0 E	0.96D	0.0	0.0
PBV	*	36.98	77.53	49	VA	VPI	32	1.0	95.0 B	0.88C	0.0	0.0
PUV	*	37.02	80.82	652	VA	VPI	75	1.0	41.0 B	0.97D	0.0	0.0
HBV	*	38.44	78.87	411	VA	JMU	100	0.8	38.0 C	0.88C	0.0	0.0
GSR	*	38.95	77.37	119	VA	OES	54	1.0	73.0 C	0.88C	0.0	0.0
CVV	*	37.98	78.46	167	VA	DMR	125	1.0	25.0 C	0.88C	0.0	0.0
CBN	*	38.21	77.37	70	VA	FOB	50	1.0	63.0 C	0.88C	0.0	0.0
BAV		37.22	80.43	622	VA	VPI	2	1.0	290.0 C	0.88C	0.0	0.0
BLA	▽*	37.21	80.42	634	VA	VPI	30	1.0	16.7 B	1.00D	0.0	0.0
BV1	*	37.18	79.66	768	VA	VPI	47	1.0	8.0 C	0.94D	0.0	0.0
BV2	*	38.14	79.92	610	VA	VPI	0	0.0	8.0 C	0.69D	0.0	0.0
BV3	*	38.24	79.77	750	VA	VPI	0	0.0	8.0 C	0.77C	0.0	0.0
CNV	*	38.21	77.37	70	VA	VPI	16	1.0	30.3 C	0.88C	0.0	0.0
CVL	*	37.98	78.46	167	VA	VPI	62	1.0	8.3 C	0.88C	0.0	0.0
FRV	*	37.20	78.36	216	VA	VPI	75	1.0	6.7 C	0.88C	0.0	0.0
GHV		37.79	78.11	107	VA	VPI	30	1.0	16.7 C	0.88C	0.0	0.0
LEX	*	37.79	79.44	311	VA	WAL	0	0.0	8.0 C	0.88C	0.0	0.0
NA11	*	37.98	77.68	84	VA	VPI	30	1.0	8.0 C	0.89D	0.0	0.0
NA12	*	37.98	77.88	125	VA	VPI	30	1.0	8.0 C	0.72D	0.0	0.0
NA2	*	38.13	77.75	82	VA	VPI	30	1.0	8.0 C	0.95D	0.0	0.0
NA5	*	37.99	77.75	76	VA	VPI	30	1.0	8.0 C	0.95D	0.0	0.0
GBV	*	38.43	79.85	802	WV	NSA	60	1.0	51.0 C	0.88C	0.0	0.0
HWV	*	37.59	80.84	521	WV	VPI	53	1.0	60.0 B	0.99D	0.0	0.0
PWV	*	37.34	81.05	820	WV	VPI	32	1.0	97.0 B	0.96D	0.0	0.0
MRG	▽*	39.63	79.95	281	WV	WVU	5	0.7	942.0 C	0.99D	0.0	0.0
BV4	*	38.36	79.83	814	WV	VPI	31	2.0	50.0 E	0.99D	0.0	0.0
UWM	*	43.08	87.88	204	WI	UWI	0	0.0	55.0 C	0.88C	0.0	0.0
AUW	*	45.73	88.13	355	WI	MTU	0	0.0	50.0 D	0.88C	0.0	0.0
FCC		58.76	94.09	39	MB	EPB	40	1.0	79.0 C	0.88C	0.0	0.0
FFC		54.73	101.98	338	MB	EPB	40	1.0	79.0 C	0.88C	0.0	0.0
PWM		50.19	96.04	273	MB	AEC	15	1.0	83.0 C	0.88C	0.0	0.0
UNB	*	45.95	66.63	56	NB	UNB	40	1.0	79.0 C	0.88C	0.0	0.0
OTT	*	45.39	75.72	77	ON	EPB	22	1.0	8.5 B	0.88C	0.0	0.0
LHC	*	48.42	89.27	196	ON	LHU	23	1.0	14.0 B	0.88C	0.0	0.0
SUD	*	46.47	80.97	267	ON	LRU	60	1.0	57.0 B	0.88C	0.0	0.0
DLA	*	42.86	81.57	227	ON	UWO	350	1.0	8.5 B	0.88C	0.0	0.0
ELF	*	43.19	81.32	320	ON	UWO	350	1.0	6.2 B	0.88C	0.0	0.0
LDN	*	43.04	81.32	320	ON	UWO	350	1.0	3.8 B	0.88C	0.0	0.0

CODE	LAT (N)	LONG (W)	ELEV (M)	STATE	OPER	GAIN (K)	FREQ (HZ)	RMS NOISE (NM)	REL	TT COR (SEC)	AMP COR (MB)
CFO	45.47	76.23	70	ON	OHC	15	1.0	42.0 C	0.88C	0.0	0.0
CHQ	46.89	71.30	145	QB	LUC	40	1.0	13.0 B	0.88C	0.0	0.0
LGQ	53.69	77.73	190	QB	JBC	98	1.0	32.0 C	0.88C	0.0	0.0
LMQ	* 47.55	70.33	419	QB	COQ	20	1.0	44.0 B	0.88C	0.0	0.0
MNT	* 45.50	73.62	112	QB	JBF	60	1.0	3.5 B	0.88C	0.0	0.0
PBQ	55.28	77.74	20	QB	LUC	40	1.0	33.0 C	0.88C	0.0	0.0
POC	47.36	70.04	61	QB	LUC	25	1.0	126.0 C	0.88C	0.0	0.0
QCQ	46.78	71.28	91	QB	LUC	9	1.0	330.0 C	0.88C	0.0	0.0
SCH	54.82	66.78	540	QB	MGU	40	1.0	46.0 B	0.88C	0.0	0.0
SIC	50.17	66.74	283	QB	ICC	70	1.0	75.0 C	0.88C	0.0	0.0

APPENDIX 1b

SEISMOGRAPH STATION OPERATION CODE AND TELEPHONE NUMBER

ACE	Army Corps. of Engineers	(304)	529-2281
AEC	Atomic Energy of Canada Ltd.	***	
BGU	Bowling Green University	(419)	372-2531
CCS	Canisius College Seismic Observatory	(716)	883-7000
CON	Consolidated Edison of New York	(201)	471-2000
COQ	Charlevoix Observatory of Quebec	***	
COR	Cornell University	(607)	256-5267
CPL	Carolina Power & Light Company	(919)	836-6146
DGS	Delaware Geologic Survey	(302)	738-2833
DMR	Division of Minerals, Virginia	(804)	293-5121
DUP	Dupont, Savannah River Laboratory	(803)	824-6331
EPB	Earth and Physics Branch of Canada	***	
FOB	Fredericksburg Observatory	(703)	373-7601
GEU	Georgetown University	(202)	625-4144
GIT	Georgia Institute of Technology	(404)	894-2860
GSW	Georgia Southwest College	(912)	928-1245
IOC	Iron Ore Corporation of Canada	***	
JBC	James Bay Corporation of Canada	***	
JBF	Jean-de-Breuf College, Canada	***	

JCU	John Carrol University	(216) 491-4361
JMU	James Madison University	(703) 433-6130
KGS	Kansas Geological Survey	(913) 864-4991
KSC	Kutztown State College	(215) 683-3511 ext. 368
LDO	Lamont - Doherty Geological Observatory	(914) 359-2900
LHU	Lakehead University Dept. of Geology, Canada	***
LRU	Laurentian University, Dept. of Physics, Canada	***
LUC	Laval University, Canada	***
LYA	Loyola University	(312) 274-3000
MGS	Minnesota Geological Survey	(612) 373-3372
MGU	McGill University, Quebec	***
MIT	Massachusetts Institute of Technology	(617) 253-7796
MSC	Millersville State College	(717) 872-5411 ext. 726
MSU	Memphis State University	(901) 454-2177
MTU	Michigan Institute of Technology	(906) 487-2088
NSA	Goddard Space Flight Center	(301) 982-5450
OES	Office of Earthquake Studies, USGS Virginia	(703) 860-6471

OHC	Ontario Hydro, Canada	***	
OSO	Odenbach Seismic Observatory McQuaid Jesuit H.S.	(716)	473-1130
PSU	Pennsylvania State University	(814)	865-2622
RPI	Rensselaer Polytechnical Institute	(518)	270-6476
SCG	USGS Earthquake Tectonic & Risk	(303)	234-4041
SGS	South Carolina USGS	(803)	777-6449
SHC	Spring Hill College	(205)	460-2315
SLU	Saint Louis University	(314)	535-3300
SMU	Southern Methodist University	(214)	692-2760
TEC	Tennessee Earthquake Information Center	(901)	454-2177
TGS	USGS, Denver	(303)	234-3994
UCC	Union Carbide Corporation - Nuclear Division	(615)	483-8611 ext.35865
UFL	University of Florida	(904)	392-6766
UIN	University of Indiana	(812)	337-1008
UKS	University of Kansas	(913)	864-3242
UMI	University of Michigan	(313)	763-4069
UMN	University of Minnesota	(612)	373-3177
UMO	University of Missouri	(314)	341-4364

UNB	University of New Brunswick, Canada	***
UNC	University of North Carolina	(919) 933-1212
UNY	State University of New York at Binghamton	(607) 798-2512
UOK	University of Oklahoma	(918) 366-4152
USC	University of South Carolina	(803) 777-6449
UTO	University of Toledo	(419) 537-2009
UWI	University of Wisconsin at Milwaukee	(414) 963-4561
UWO	University of Western Ontario, Canada	***
VPI	Virginia Polytechnical Institute	(703) 951-6729
WAL	Washington & Lee University	(703) 463-9111 ext. 269
WCL	Woodward - Clyde Consulting Company	(201) 471-2000
WES	Weston Observatory	(617) 899-0950
WVU	West Virginia University	(304) 293-5695
XAU	Xavier University	(513) 731-2341

*** Call R. J. Wetmiller - Energy, Mines and Resources Earth Physics Branch (613) 995-5548

APPENDIX Ic

CRITERIA FOR ASSIGNING NOISE AND RELIABILITY ESTIMATES FOR
SEISMOGRAPH STATIONS

NOISE (Average rms background noise characteristics including both natural and cultural sources)

- A - Noise value determined by FFT of several characteristic digitized seismograms for the station
- B - Noise measured on several months of records by University of Michigan Seismological Observatory staff
- C - Noise estimated by assigning a peak to peak noise level of 1 millimeter on the records and reducing to the appropriate nanometer ground noise using the instrumental gain
- D - Noise default to an average background level of 50 nanometers
- E - Noise assigned as a local array average
- F - Noise determined by local operator

RELIABILITY (P_i)

- A - Percentage of useful records determined by averaging hourly estimations over several months
- B - Percentage of number of days the station is operational over several months
- C - Percentage assigned by averaging all available reliability estimates provided by criteria A,B, and D
- D - Reliability estimate provided by local operator
- * - Station used in network performance evaluations 1980
- ∇ - Station used in network performance evaluations 1970

NETWORK SUMMARY- ERROR ELLIPSES
(MAGNITUDES RANGE FROM, 5.00 TO 5.00 IN STEPS OF 0.0)

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
1	36.50N	80.00W	5.00	115	54.	2.54	2.10	62.3	16.7	4.73	12.
2	36.50N	80.50W	5.00	116	45.	2.66	2.40	134.2	20.0	4.55	12.
3	36.50N	81.00W	5.00	116	46.	3.31	2.32	126.5	24.2	4.79	12.
4	36.50N	81.50W	5.00	116	44.	2.83	2.09	129.4	18.6	5.26	12.
5	36.50N	82.00W	5.00	115	42.	3.23	2.47	136.1	25.0	5.50	12.
6	36.50N	82.50W	5.00	115	39.	2.91	2.32	163.1	21.2	5.63	12.
7	36.50N	83.00W	5.00	115	34.	2.83	2.31	163.0	20.5	5.80	10.
8	36.50N	83.50W	5.00	115	30.	2.72	1.91	164.1	16.4	5.80	10.
9	36.50N	84.00W	5.00	114	33.	2.68	2.48	174.0	20.9	5.76	10.
10	36.50N	84.50W	5.00	114	34.	2.82	1.95	12.6	17.3	5.39	10.
11	36.50N	85.00W	5.00	114	35.	2.98	1.97	178.8	18.5	5.58	10.
12	36.50N	85.50W	5.00	113	35.	3.41	2.36	9.9	25.3	6.19	10.
13	36.50N	86.00W	5.00	113	36.	2.72	2.19	15.9	18.7	6.16	10.
14	36.50N	86.50W	5.00	113	38.	3.00	2.44	19.1	23.0	5.98	10.
15	36.50N	87.00W	5.00	112	38.	3.20	2.23	23.1	22.4	6.44	10.
16	36.50N	87.50W	5.00	112	38.	3.68	2.01	2.3	23.3	5.68	10.
17	36.50N	88.00W	5.00	112	38.	2.82	1.99	32.3	17.6	5.76	10.
18	36.50N	88.50W	5.00	111	37.	2.49	2.01	173.0	15.7	5.37	10.
19	36.50N	89.00W	5.00	111	36.	2.41	1.90	129.0	14.4	4.53	10.
20	37.00N	80.00W	5.00	115	57.	2.57	2.24	148.3	18.1	4.28	12.
21	37.00N	80.50W	5.00	116	44.	2.79	2.14	146.7	18.8	3.80	12.
22	37.00N	81.00W	5.00	116	36.	2.64	1.87	169.0	15.5	4.06	12.
23	37.00N	81.50W	5.00	116	36.	2.66	2.00	148.6	16.7	5.06	12.
24	37.00N	82.00W	5.00	116	36.	2.48	1.99	167.3	15.5	5.28	12.
25	37.00N	82.50W	5.00	116	35.	2.76	2.31	123.1	20.0	5.28	12.
26	37.00N	83.00W	5.00	115	32.	2.78	2.05	165.8	17.8	5.32	12.
27	37.00N	83.50W	5.00	115	29.	2.73	2.02	166.8	17.3	5.40	11.
28	37.00N	84.00W	5.00	115	30.	2.81	2.21	4.7	19.6	5.53	10.
29	37.00N	84.50W	5.00	114	30.	2.39	1.71	6.2	12.8	5.52	10.
30	37.00N	85.00W	5.00	114	31.	3.24	2.35	3.0	23.9	6.08	10.
31	37.00N	85.50W	5.00	114	36.	2.62	1.87	166.7	15.3	6.01	10.
32	37.00N	86.00W	5.00	113	42.	3.40	2.41	178.6	25.7	6.17	10.
33	37.00N	86.50W	5.00	113	33.	3.43	1.83	173.2	19.7	5.76	10.
34	37.00N	87.00W	5.00	113	35.	3.02	2.08	24.2	19.8	5.75	10.
35	37.00N	87.50W	5.00	112	35.	3.37	2.38	4.6	25.1	5.91	10.
36	37.00N	88.00W	5.00	112	35.	2.96	2.13	7.6	19.9	5.59	10.

APPENDIX IIa

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
37	37.00N	88.50W	5.00	112	34.	2.91	2.13	153.7	19.4	5.25	10.
38	37.00N	89.00W	5.00	111	33.	2.32	1.92	138.0	13.9	3.48	10.
39	37.50N	80.00W	5.00	115	36.	2.46	1.88	123.3	14.5	4.55	12.
40	37.50N	80.50W	5.00	116	29.	2.36	1.77	133.9	13.1	4.12	12.
41	37.50N	81.00W	5.00	116	24.	2.52	1.96	125.7	15.5	4.13	12.
42	37.50N	81.50W	5.00	116	30.	2.57	2.21	156.4	17.9	5.20	12.
43	37.50N	82.00W	5.00	116	30.	2.93	2.34	4.5	21.5	5.14	12.
44	37.50N	82.50W	5.00	116	30.	2.66	2.21	3.2	18.5	4.82	12.
45	37.50N	83.00W	5.00	116	29.	2.46	2.13	138.8	16.4	4.71	12.
46	37.50N	83.50W	5.00	115	27.	1.99	1.69	167.8	10.6	5.11	11.
47	37.50N	84.00W	5.00	115	27.	2.56	2.11	161.5	17.0	5.30	11.
48	37.50N	84.50W	5.00	115	27.	2.34	2.04	10.8	15.0	5.33	10.
49	37.50N	85.00W	5.00	114	29.	2.47	2.00	16.6	15.5	5.43	10.
50	37.50N	85.50W	5.00	114	34.	3.21	2.32	171.8	23.4	5.67	10.
51	37.50N	86.00W	5.00	114	39.	3.26	2.16	163.0	22.1	5.72	10.
52	37.50N	86.50W	5.00	113	43.	3.39	2.09	176.0	22.2	5.55	10.
53	37.50N	87.00W	5.00	113	47.	2.94	2.19	164.6	20.3	5.70	10.
54	37.50N	87.50W	5.00	113	48.	3.13	2.26	169.1	22.2	5.51	10.
55	37.50N	88.00W	5.00	112	48.	2.87	1.91	165.7	17.2	4.92	10.
56	37.50N	88.50W	5.00	112	48.	2.71	1.95	140.3	16.6	4.03	10.
57	37.50N	89.00W	5.00	111	39.	3.11	1.90	139.3	18.6	3.77	10.
58	38.00N	80.00W	5.00	116	40.	2.74	1.82	125.5	15.6	4.86	12.
59	38.00N	80.50W	5.00	116	26.	2.86	1.96	125.7	17.6	5.30	12.
60	38.00N	81.00W	5.00	116	23.	2.59	2.15	133.5	17.4	5.31	12.
61	38.00N	81.50W	5.00	116	23.	2.48	2.26	150.7	17.6	5.19	12.
62	38.00N	82.00W	5.00	116	24.	2.31	2.20	11.9	15.9	5.11	12.
63	38.00N	82.50W	5.00	116	26.	2.37	2.17	37.0	16.2	4.68	12.
64	38.00N	83.00W	5.00	116	25.	2.47	1.92	9.0	14.9	4.61	12.
65	38.00N	83.50W	5.00	116	25.	2.35	2.04	9.2	15.0	5.22	12.
66	38.00N	84.00W	5.00	115	24.	2.77	2.22	160.6	19.3	5.57	11.
67	38.00N	84.50W	5.00	115	24.	3.21	2.41	175.3	24.3	5.56	11.
68	38.00N	85.00W	5.00	115	29.	3.26	2.14	173.6	21.9	5.68	10.
69	38.00N	85.50W	5.00	114	37.	3.38	2.34	166.9	24.9	5.93	10.
70	38.00N	86.00W	5.00	114	47.	2.98	2.20	177.7	20.7	5.65	10.
71	38.00N	86.50W	5.00	114	46.	2.75	1.81	173.2	15.6	5.24	10.
72	38.00N	87.00W	5.00	113	43.	2.62	2.02	10.6	16.6	5.32	10.

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
73	38.00N	87.50W	5.00	113	44.	2.83	1.96	172.8	17.4	4.98	10.
74	38.00N	88.00W	5.00	112	60.	2.56	1.71	142.0	13.8	3.86	10.
75	38.00N	88.50W	5.00	112	45.	2.34	2.11	140.1	15.5	3.81	10.
76	38.00N	89.00W	5.00	112	55.	3.14	2.30	136.0	22.7	4.44	10.
77	38.50N	80.00W	5.00	116	21.	2.10	1.94	139.7	12.8	4.80	12.
78	38.50N	80.50W	5.00	116	24.	2.45	2.13	112.1	16.4	5.61	12.
79	38.50N	81.00W	5.00	116	25.	2.62	2.21	144.4	18.2	5.50	12.
80	38.50N	81.50W	5.00	116	27.	2.54	1.92	126.7	15.3	5.35	12.
81	38.50N	82.00W	5.00	116	28.	2.42	2.06	175.7	15.7	5.44	12.
82	38.50N	82.50W	5.00	116	29.	2.74	1.92	156.0	16.6	5.49	12.
83	38.50N	83.00W	5.00	116	30.	2.51	2.23	109.1	17.6	5.47	12.
84	38.50N	83.50W	5.00	116	32.	2.77	1.92	171.8	16.7	5.68	12.
85	38.50N	84.00W	5.00	115	32.	2.66	1.96	175.8	16.4	5.70	11.
86	38.50N	84.50W	5.00	115	32.	3.32	2.40	171.9	25.1	5.67	11.
87	38.50N	85.00W	5.00	115	30.	2.91	1.79	165.3	16.4	5.78	10.
88	38.50N	85.50W	5.00	115	36.	2.48	2.09	35.3	16.3	5.90	10.
89	38.50N	86.00W	5.00	114	52.	2.79	2.33	168.0	20.4	5.71	10.
90	38.50N	86.50W	5.00	114	69.	2.81	2.18	164.0	19.2	5.07	10.
91	38.50N	87.00W	5.00	113	75.	2.82	2.06	154.9	18.3	5.14	10.
92	38.50N	87.50W	5.00	113	55.	2.57	1.74	177.1	14.1	4.35	10.
93	38.50N	88.00W	5.00	112	78.	3.03	1.77	163.6	16.9	3.83	10.
94	38.50N	88.50W	5.00	112	78.	3.61	2.30	138.6	26.1	4.39	10.
95	38.50N	89.00W	5.00	112	78.	3.31	2.51	150.4	26.1	5.00	10.
96	39.00N	80.00W	5.00	116	21.	2.75	2.42	94.3	20.9	5.25	12.
97	39.00N	80.50W	5.00	116	23.	2.41	2.17	72.8	16.4	5.46	12.
98	39.00N	81.00W	5.00	116	26.	2.84	2.53	3.7	22.6	5.49	12.
99	39.00N	81.50W	5.00	116	29.	2.88	2.31	171.9	20.9	5.48	12.
100	39.00N	82.00W	5.00	116	32.	2.86	2.12	157.4	19.0	5.73	12.
101	39.00N	82.50W	5.00	116	34.	2.97	2.32	163.9	21.6	5.83	12.
102	39.00N	83.00W	5.00	116	36.	2.23	2.11	137.8	14.8	5.75	12.
103	39.00N	83.50W	5.00	116	39.	2.41	1.93	151.4	14.6	5.53	12.
104	39.00N	84.00W	5.00	116	42.	2.42	1.91	177.0	14.5	5.43	11.
105	39.00N	84.50W	5.00	115	45.	2.90	1.90	163.4	17.3	5.58	11.
106	39.00N	85.00W	5.00	115	47.	3.27	2.17	164.6	22.3	5.70	10.
107	39.00N	85.50W	5.00	115	49.	2.83	2.43	162.2	21.6	5.90	10.
108	39.00N	86.00W	5.00	114	44.	3.28	2.15	151.5	22.2	5.74	10.

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
109	39.00N	86.50W	5.00	114	71.	3.03	2.26	137.0	21.5	4.92	10.
110	39.00N	87.00W	5.00	114	79.	3.51	1.84	155.1	20.2	4.76	10.
111	39.00N	87.50W	5.00	113	81.	2.88	2.08	150.6	18.8	4.73	10.
112	39.00N	88.00W	5.00	113	60.	4.01	2.35	131.8	29.6	4.82	10.
113	39.00N	88.50W	5.00	112	63.	3.84	2.55	135.0	30.7	5.15	10.
114	39.00N	89.00W	5.00	112	65.	3.58	2.63	139.6	29.6	5.59	10.
115	39.50N	80.00W	5.00	116	19.	2.51	2.18	88.0	17.1	4.67	12.
116	39.50N	80.50W	5.00	116	21.	2.76	2.52	171.2	21.8	5.30	12.
117	39.50N	81.00W	5.00	116	24.	2.84	2.27	178.4	20.2	5.30	12.
118	39.50N	81.50W	5.00	116	29.	2.50	2.07	132.3	16.3	5.61	12.
119	39.50N	82.00W	5.00	116	32.	2.54	2.18	115.0	17.4	5.59	12.
120	39.50N	82.50W	5.00	116	37.	2.27	2.09	86.4	14.9	5.61	12.
121	39.50N	83.00W	5.00	116	41.	2.52	1.94	106.4	15.4	5.54	12.
122	39.50N	83.50W	5.00	116	45.	2.40	2.10	47.0	15.9	5.33	12.
123	39.50N	84.00W	5.00	115	49.	2.69	2.09	164.8	17.7	5.28	11.
124	39.50N	84.50W	5.00	115	54.	2.66	1.82	160.8	15.2	5.45	11.
125	39.50N	85.00W	5.00	115	60.	3.38	2.17	144.0	23.0	5.71	11.
126	39.50N	85.50W	5.00	115	66.	3.68	2.42	149.6	27.9	5.96	10.
127	39.50N	86.00W	5.00	114	65.	3.22	2.07	168.6	21.0	5.36	10.
128	39.50N	86.50W	5.00	114	72.	4.02	2.41	145.1	30.5	5.08	10.
129	39.50N	87.00W	5.00	114	81.	3.28	2.30	158.3	23.7	4.94	10.
130	39.50N	87.50W	5.00	113	61.	3.23	2.32	134.7	23.6	5.01	10.
131	39.50N	88.00W	5.00	113	63.	4.09	2.49	131.8	32.0	5.06	10.
132	39.50N	88.50W	5.00	112	66.	4.44	2.60	134.0	36.3	5.41	10.
133	39.50N	89.00W	5.00	112	69.	4.91	2.68	133.4	41.4	5.74	10.
134	40.00N	80.00W	5.00	115	16.	2.50	2.17	126.5	17.1	4.50	12.
135	40.00N	80.50W	5.00	116	17.	2.47	2.03	112.8	15.7	4.68	12.
136	40.00N	81.00W	5.00	116	24.	2.67	2.62	38.9	21.9	5.00	12.
137	40.00N	81.50W	5.00	116	30.	2.79	2.69	157.2	23.5	5.30	12.
138	40.00N	82.00W	5.00	116	34.	2.87	2.37	167.9	21.3	5.46	12.
139	40.00N	82.50W	5.00	116	34.	2.87	2.10	162.7	18.9	5.35	12.
140	40.00N	83.00W	5.00	116	34.	2.77	2.31	171.1	20.1	5.12	12.
141	40.00N	83.50W	5.00	116	43.	2.30	1.92	158.5	13.9	5.17	12.
142	40.00N	84.00W	5.00	115	48.	2.14	1.93	25.2	13.0	4.81	11.
143	40.00N	84.50W	5.00	115	53.	2.87	1.95	147.0	17.6	5.18	11.
144	40.00N	85.00W	5.00	115	59.	2.77	1.69	152.7	14.7	5.23	11.

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
145	40.00N	85.50W	5.00	115	67.	2.88	2.22	125.6	20.1	5.32	10.
146	40.00N	86.00W	5.00	114	63.	3.27	2.39	138.2	24.5	5.53	10.
147	40.00N	86.50W	5.00	114	72.	3.21	2.19	164.0	22.1	5.40	10.
148	40.00N	87.00W	5.00	114	61.	4.10	2.58	142.2	33.2	5.44	10.
149	40.00N	87.50W	5.00	113	63.	4.35	2.56	141.3	35.0	5.10	10.
150	40.00N	88.00W	5.00	113	66.	4.83	2.58	136.2	39.2	5.07	10.
151	40.00N	88.50W	5.00	112	70.	5.32	2.71	131.7	45.3	5.32	10.
152	40.00N	89.00W	5.00	112	62.	4.75	2.80	131.0	41.8	5.50	10.
153	40.50N	80.00W	5.00	115	17.	2.61	2.43	49.5	19.9	4.37	12.
154	40.50N	80.50W	5.00	115	17.	2.61	2.06	122.2	16.9	4.55	12.
155	40.50N	81.00W	5.00	116	25.	2.74	2.05	161.1	17.7	4.86	12.
156	40.50N	81.50W	5.00	116	31.	2.68	2.19	179.5	18.4	5.24	12.
157	40.50N	82.00W	5.00	116	38.	2.56	2.35	161.6	18.9	5.33	12.
158	40.50N	82.50W	5.00	116	35.	2.94	2.61	0.6	24.0	5.25	12.
159	40.50N	83.00W	5.00	116	28.	2.90	2.20	167.7	20.1	5.00	12.
160	40.50N	83.50W	5.00	116	22.	2.99	1.96	4.9	18.4	4.74	12.
161	40.50N	84.00W	5.00	115	26.	2.39	1.50	173.5	11.2	3.42	11.
162	40.50N	84.50W	5.00	115	39.	2.45	2.03	178.2	15.6	3.79	11.
163	40.50N	85.00W	5.00	115	57.	3.73	1.64	147.9	19.2	4.26	10.
164	40.50N	85.50W	5.00	115	65.	3.47	2.27	162.4	24.8	4.92	10.
165	40.50N	86.00W	5.00	114	58.	2.67	2.04	134.5	17.1	5.36	10.
166	40.50N	86.50W	5.00	114	60.	3.32	2.54	163.5	26.5	5.65	10.
167	40.50N	87.00W	5.00	113	63.	4.58	2.36	138.9	34.0	5.63	10.
168	40.50N	87.50W	5.00	113	66.	4.46	2.41	148.5	33.7	5.24	10.
169	40.50N	88.00W	5.00	113	59.	3.58	2.65	129.5	29.8	5.04	10.
170	40.50N	88.50W	5.00	112	62.	4.11	2.27	135.6	29.4	4.85	10.
171	40.50N	89.00W	5.00	112	65.	3.00	2.54	133.4	24.0	5.15	10.
172	41.00N	80.00W	5.00	115	25.	2.58	2.16	121.8	17.5	4.57	12.
173	41.00N	80.50W	5.00	115	22.	2.39	2.07	60.4	15.6	4.71	12.
174	41.00N	81.00W	5.00	115	33.	2.65	2.38	85.1	19.9	5.10	12.
175	41.00N	81.50W	5.00	115	38.	2.80	2.30	102.4	20.2	5.12	12.
176	41.00N	82.00W	5.00	116	40.	3.09	2.55	155.4	24.8	5.28	12.
177	41.00N	82.50W	5.00	115	42.	2.96	2.08	168.3	19.3	5.21	12.
178	41.00N	83.00W	5.00	115	35.	3.27	2.51	164.4	25.8	5.14	12.
179	41.00N	83.50W	5.00	115	26.	2.47	1.74	174.8	13.5	4.66	11.
180	41.00N	84.00W	5.00	115	42.	2.86	1.87	156.8	16.8	3.95	11.

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
181	41.00N	84.50W	5.00	115	47.	2.49	2.17	143.7	16.9	4.09	11.
182	41.00N	85.00W	5.00	115	52.	3.18	2.00	155.7	20.0	4.52	10.
183	41.00N	85.50W	5.00	114	59.	3.11	2.38	152.3	23.3	5.09	10.
184	41.00N	86.00W	5.00	114	50.	2.89	2.10	160.6	19.0	5.38	10.
185	41.00N	86.50W	5.00	114	61.	4.05	2.86	148.7	36.4	5.81	10.
186	41.00N	87.00W	5.00	113	64.	4.12	2.50	131.4	32.3	5.64	10.
187	41.00N	87.50W	5.00	113	68.	4.09	2.58	149.7	33.1	4.90	10.
188	41.00N	88.00W	5.00	112	61.	3.15	2.18	133.2	21.6	4.76	10.
189	41.00N	88.50W	5.00	112	64.	3.38	2.27	134.7	24.1	4.86	10.
190	41.00N	89.00W	5.00	111	68.	4.89	2.65	120.1	40.7	5.07	10.
191	41.50N	80.00W	5.00	115	32.	2.84	2.26	153.5	20.1	4.99	12.
192	41.50N	80.50W	5.00	115	35.	2.93	2.08	150.6	19.2	4.96	12.
193	41.50N	81.00W	5.00	115	43.	2.97	2.28	152.0	21.2	4.94	12.
194	41.50N	81.50W	5.00	115	40.	2.50	1.91	154.5	15.0	3.21	12.
195	41.50N	82.00W	5.00	115	42.	3.35	2.51	159.0	26.4	5.15	12.
196	41.50N	82.50W	5.00	115	44.	3.34	2.29	173.5	24.0	5.36	12.
197	41.50N	83.00W	5.00	115	46.	2.73	2.03	3.2	17.4	5.13	11.
198	41.50N	83.50W	5.00	115	34.	2.70	2.25	74.4	19.0	4.36	11.
199	41.50N	84.00W	5.00	115	44.	2.90	2.15	116.5	19.6	4.42	11.
200	41.50N	84.50W	5.00	115	50.	3.55	2.66	129.6	29.7	4.70	10.
201	41.50N	85.00W	5.00	114	51.	3.16	1.94	146.0	19.2	4.97	10.
202	41.50N	85.50W	5.00	114	49.	3.12	2.49	161.1	24.3	5.25	10.
203	41.50N	86.00W	5.00	114	35.	3.62	2.36	145.4	26.8	5.45	10.
204	41.50N	86.50W	5.00	113	44.	4.07	2.09	134.5	26.8	5.65	10.
205	41.50N	87.00W	5.00	113	60.	3.86	2.65	128.0	32.1	5.57	10.
206	41.50N	87.50W	5.00	113	59.	3.08	2.44	127.6	23.6	4.83	10.
207	41.50N	88.00W	5.00	112	63.	3.54	2.80	126.4	31.1	4.59	10.
208	41.50N	88.50W	5.00	112	66.	4.80	2.87	136.2	43.3	4.72	10.
209	41.50N	89.00W	5.00	111	70.	3.17	2.41	122.1	24.0	4.79	10.
210	42.00N	80.00W	5.00	114	30.	2.82	2.25	110.4	19.9	4.86	12.
211	42.00N	80.50W	5.00	115	48.	3.26	2.43	156.7	24.9	5.15	12.
212	42.00N	81.00W	5.00	115	46.	3.20	2.33	160.8	23.4	5.25	12.
213	42.00N	81.50W	5.00	115	42.	3.19	2.40	148.2	24.1	5.20	12.
214	42.00N	82.00W	5.00	115	45.	3.05	2.48	174.7	23.7	5.36	12.
215	42.00N	82.50W	5.00	115	48.	2.74	2.02	28.5	17.5	5.35	12.
216	42.00N	83.00W	5.00	115	50.	2.88	2.12	14.1	19.2	5.04	11.

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
217	42.00N	83.50W	5.00	115	42.	3.09	2.18	138.3	21.2	4.40	11.
218	42.00N	84.00W	5.00	114	53.	2.83	2.41	139.1	21.5	4.55	11.
219	42.00N	84.50W	5.00	114	54.	3.03	2.50	135.3	23.9	5.02	10.
220	42.00N	85.00W	5.00	114	55.	2.84	2.42	162.6	21.6	5.13	10.
221	42.00N	85.50W	5.00	114	56.	3.68	2.67	157.1	30.8	5.26	10.
222	42.00N	86.00W	5.00	113	43.	3.96	2.35	135.3	29.2	5.52	10.
223	42.00N	86.50W	5.00	113	52.	4.45	3.12	146.8	43.6	5.48	10.
224	42.00N	87.00W	5.00	113	54.	4.26	2.96	152.1	39.6	5.27	10.
225	42.00N	87.50W	5.00	112	60.	3.17	2.52	157.8	25.1	4.22	10.
226	42.00N	88.00W	5.00	112	64.	3.97	2.44	119.0	30.4	4.26	10.
227	42.00N	88.50W	5.00	112	67.	3.52	2.18	131.5	24.1	4.78	10.
228	42.00N	89.00W	5.00	111	71.	4.60	2.54	112.0	36.7	5.10	10.

NETWORK SUMMARY- ERROR ELLIPSES
(MAGNITUDES RANGE FROM, 4.50 TO 4.50 IN STEPS OF 0.0)

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
1	36.50N	80.00W	4.50	100	54.	2.63	2.10	61.1	17.4	5.37	10.
2	36.50N	80.50W	4.50	100	45.	2.70	2.47	129.4	20.9	5.08	10.
3	36.50N	81.00W	4.50	101	46.	3.41	2.39	125.9	25.6	5.24	10.
4	36.50N	81.50W	4.50	101	44.	3.41	2.43	135.3	26.0	5.79	10.
5	36.50N	82.00W	4.50	101	42.	3.30	2.56	137.6	26.6	5.77	10.
6	36.50N	82.50W	4.50	100	39.	2.94	2.38	165.2	22.0	6.07	10.
7	36.50N	83.00W	4.50	100	34.	2.88	2.36	164.1	21.4	6.26	10.
8	36.50N	83.50W	4.50	99	30.	2.75	1.94	165.7	16.8	6.49	10.
9	36.50N	84.00W	4.50	99	33.	2.73	2.55	6.6	21.9	6.31	10.
10	36.50N	84.50W	4.50	98	34.	2.90	1.98	14.3	18.0	6.06	10.
11	36.50N	85.00W	4.50	98	35.	3.07	2.00	0.7	19.2	6.66	10.
12	36.50N	85.50W	4.50	97	39.	3.53	2.39	11.5	26.5	7.15	10.
13	36.50N	86.00W	4.50	97	47.	3.48	2.22	17.6	24.2	7.28	10.
14	36.50N	86.50W	4.50	96	53.	3.80	2.55	8.3	30.4	6.80	10.
15	36.50N	87.00W	4.50	96	55.	4.10	2.29	16.2	29.5	7.23	10.
16	36.50N	87.50W	4.50	95	55.	3.83	2.06	2.3	24.8	6.63	10.
17	36.50N	88.00W	4.50	94	56.	3.39	2.06	26.7	21.9	6.78	10.
18	36.50N	88.50W	4.50	94	56.	2.91	2.06	176.6	18.8	6.20	10.
19	36.50N	89.00W	4.50	93	56.	2.60	2.03	138.0	16.6	5.40	10.
20	37.00N	80.00W	4.50	101	57.	3.00	2.30	148.3	21.7	4.70	11.
21	37.00N	80.50W	4.50	101	44.	2.79	2.21	146.4	19.4	4.21	10.
22	37.00N	81.00W	4.50	101	36.	2.74	2.05	160.2	17.6	4.41	10.
23	37.00N	81.50W	4.50	102	36.	2.70	2.03	148.4	17.2	5.40	10.
24	37.00N	82.00W	4.50	101	36.	2.91	2.25	172.7	20.6	5.64	10.
25	37.00N	82.50W	4.50	101	35.	2.87	2.67	147.2	24.0	5.72	10.
26	37.00N	83.00W	4.50	101	32.	2.73	2.09	167.8	17.9	5.73	10.
27	37.00N	83.50W	4.50	100	30.	2.81	2.24	174.5	19.8	5.89	10.
28	37.00N	84.00W	4.50	100	30.	2.83	2.25	8.9	20.0	6.16	10.
29	37.00N	84.50W	4.50	99	30.	2.65	1.77	1.6	14.7	6.17	10.
30	37.00N	85.00W	4.50	99	31.	3.23	2.39	6.2	24.3	6.75	10.
31	37.00N	85.50W	4.50	98	36.	3.33	2.01	0.8	21.0	6.93	10.
32	37.00N	86.00W	4.50	97	42.	3.60	2.46	0.9	27.8	7.05	10.
33	37.00N	86.50W	4.50	97	48.	3.49	1.73	172.5	18.9	6.62	10.
34	37.00N	87.00W	4.50	96	50.	3.13	2.10	25.6	20.6	6.48	10.
35	37.00N	87.50W	4.50	95	51.	3.56	2.47	5.8	27.6	6.96	10.
36	37.00N	88.00W	4.50	95	52.	3.03	2.20	8.0	20.9	6.47	10.

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
37	37.00N	88.50W	4.50	94	52.	3.02	2.18	151.4	20.7	6.29	10.
38	37.00N	89.00W	4.50	94	42.	2.35	1.94	138.1	14.3	3.83	10.
39	37.50N	80.00W	4.50	101	36.	2.57	2.02	130.1	16.3	4.86	12.
40	37.50N	80.50W	4.50	102	29.	2.38	1.79	132.2	13.3	4.45	11.
41	37.50N	81.00W	4.50	102	25.	2.51	1.99	121.2	15.7	4.29	10.
42	37.50N	81.50W	4.50	102	30.	2.58	2.25	157.5	18.2	5.43	10.
43	37.50N	82.00W	4.50	102	30.	2.97	2.40	8.7	22.3	5.38	10.
44	37.50N	82.50W	4.50	102	30.	2.92	2.37	26.0	21.8	5.25	10.
45	37.50N	83.00W	4.50	102	35.	2.44	2.17	137.9	16.6	5.16	10.
46	37.50N	83.50W	4.50	101	35.	2.17	1.83	172.0	12.5	5.65	10.
47	37.50N	84.00W	4.50	101	34.	2.53	2.17	164.7	17.3	5.87	10.
48	37.50N	84.50W	4.50	100	32.	2.37	2.07	18.2	15.5	5.94	10.
49	37.50N	85.00W	4.50	99	29.	2.49	2.03	20.6	15.9	6.03	10.
50	37.50N	85.50W	4.50	99	34.	3.18	2.38	172.9	23.8	6.20	10.
51	37.50N	86.00W	4.50	98	39.	3.37	2.42	172.3	25.6	6.50	10.
52	37.50N	86.50W	4.50	97	43.	3.42	2.14	177.3	23.1	6.21	10.
53	37.50N	87.00W	4.50	97	47.	3.46	2.35	176.1	25.6	6.58	10.
54	37.50N	87.50W	4.50	96	48.	3.29	2.34	168.3	24.2	6.27	10.
55	37.50N	88.00W	4.50	95	48.	3.01	1.96	164.0	18.6	5.74	10.
56	37.50N	88.50W	4.50	94	48.	2.80	1.99	139.9	17.6	4.44	10.
57	37.50N	89.00W	4.50	94	53.	3.19	1.93	139.0	19.3	4.17	10.
58	38.00N	80.00W	4.50	102	40.	2.79	2.13	132.7	18.6	4.84	12.
59	38.00N	80.50W	4.50	102	26.	2.91	2.15	136.1	19.7	5.42	12.
60	38.00N	81.00W	4.50	103	25.	2.50	2.21	135.6	17.4	5.42	11.
61	38.00N	81.50W	4.50	103	29.	2.46	2.35	156.1	18.1	5.43	11.
62	38.00N	82.00W	4.50	103	32.	2.74	2.22	26.2	19.1	5.44	10.
63	38.00N	82.50W	4.50	102	35.	2.44	2.19	47.5	16.8	5.14	10.
64	38.00N	83.00W	4.50	102	39.	2.51	1.95	13.7	15.4	4.99	10.
65	38.00N	83.50W	4.50	102	42.	2.38	2.07	15.6	15.4	5.81	10.
66	38.00N	84.00W	4.50	101	42.	2.78	2.30	162.9	20.1	6.19	10.
67	38.00N	84.50W	4.50	101	24.	3.24	2.48	0.4	25.3	6.16	10.
68	38.00N	85.00W	4.50	100	29.	3.34	2.21	176.4	23.1	6.35	10.
69	38.00N	85.50W	4.50	99	37.	3.43	2.43	169.1	26.1	6.55	10.
70	38.00N	86.00W	4.50	98	47.	3.06	2.27	176.7	21.8	6.58	10.
71	38.00N	86.50W	4.50	98	46.	2.91	1.97	178.6	18.0	5.97	10.
72	38.00N	87.00W	4.50	97	43.	2.98	2.14	175.1	20.1	5.86	10.

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
73	38.00N	87.50W	4.50	96	44.	2.92	2.00	172.5	18.3	5.67	10.
74	38.00N	88.00W	4.50	95	60.	2.65	1.85	145.6	15.4	4.21	10.
75	38.00N	88.50W	4.50	95	45.	2.37	2.14	138.9	15.9	4.18	10.
76	38.00N	89.00W	4.50	94	66.	3.20	2.38	135.8	23.9	4.96	10.
77	38.50N	80.00W	4.50	102	21.	2.19	2.06	60.4	14.1	4.95	12.
78	38.50N	80.50W	4.50	103	23.	2.51	2.32	47.5	18.3	5.68	12.
79	38.50N	81.00W	4.50	103	26.	2.59	2.28	156.1	18.6	5.74	11.
80	38.50N	81.50W	4.50	103	28.	2.61	2.33	162.1	19.1	5.60	11.
81	38.50N	82.00W	4.50	103	33.	3.00	2.27	179.5	21.5	5.80	11.
82	38.50N	82.50W	4.50	103	38.	2.77	1.98	158.0	17.2	5.92	10.
83	38.50N	83.00W	4.50	103	43.	2.70	2.45	56.0	20.8	5.88	10.
84	38.50N	83.50W	4.50	102	32.	2.80	1.95	175.3	17.2	6.32	10.
85	38.50N	84.00W	4.50	102	32.	3.20	2.23	169.5	22.4	6.22	10.
86	38.50N	84.50W	4.50	101	32.	3.36	2.47	173.4	26.2	6.26	10.
87	38.50N	85.00W	4.50	100	30.	2.99	1.83	165.8	17.2	6.38	10.
88	38.50N	85.50W	4.50	100	36.	2.77	2.26	18.6	19.6	6.62	10.
89	38.50N	86.00W	4.50	99	54.	3.58	2.41	160.9	27.2	6.54	10.
90	38.50N	86.50W	4.50	98	71.	2.87	2.24	163.3	20.2	5.78	10.
91	38.50N	87.00W	4.50	97	76.	2.91	2.11	153.3	19.3	5.88	10.
92	38.50N	87.50W	4.50	97	59.	2.61	1.76	175.8	14.4	4.81	10.
93	38.50N	88.00W	4.50	96	84.	3.10	1.79	162.9	17.4	4.12	10.
94	38.50N	88.50W	4.50	95	87.	3.75	2.37	140.4	28.0	4.71	10.
95	38.50N	89.00W	4.50	94	89.	3.44	2.62	154.0	28.3	5.54	10.
96	39.00N	80.00W	4.50	102	22.	2.83	2.39	82.9	21.3	5.53	12.
97	39.00N	80.50W	4.50	103	23.	2.51	2.14	65.9	16.9	5.79	12.
98	39.00N	81.00W	4.50	103	26.	2.91	2.54	21.1	23.2	5.73	11.
99	39.00N	81.50W	4.50	103	29.	3.00	2.67	21.2	25.1	5.89	11.
100	39.00N	82.00W	4.50	103	33.	2.91	2.50	158.9	22.8	6.13	11.
101	39.00N	82.50W	4.50	103	39.	3.04	2.42	169.6	23.1	6.24	11.
102	39.00N	83.00W	4.50	103	36.	3.04	2.41	178.7	23.1	6.22	10.
103	39.00N	83.50W	4.50	102	39.	2.68	1.98	162.3	16.7	6.09	10.
104	39.00N	84.00W	4.50	102	42.	2.42	2.13	6.6	16.2	6.04	10.
105	39.00N	84.50W	4.50	101	45.	2.97	1.93	163.6	18.0	6.18	10.
106	39.00N	85.00W	4.50	101	47.	3.29	2.23	163.9	23.0	6.28	10.
107	39.00N	85.50W	4.50	100	49.	2.87	2.50	160.9	22.6	6.51	10.
108	39.00N	86.00W	4.50	99	44.	3.40	2.19	150.6	23.4	6.68	10.

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
109	39.00N	86.50W	4.50	98	78.	3.15	2.31	135.7	22.9	5.70	10.
110	39.00N	87.00W	4.50	98	86.	3.66	2.02	154.3	23.2	5.36	10.
111	39.00N	87.50W	4.50	97	92.	3.62	2.11	146.5	24.0	5.07	10.
112	39.00N	88.00W	4.50	96	92.	4.13	2.37	132.4	30.8	5.08	10.
113	39.00N	88.50W	4.50	95	85.	3.97	2.58	135.7	32.2	5.58	10.
114	39.00N	89.00W	4.50	94	87.	3.73	2.71	142.3	31.7	6.02	10.
115	39.50N	80.00W	4.50	102	25.	2.54	2.17	79.0	17.3	4.98	12.
116	39.50N	80.50W	4.50	103	26.	2.75	2.55	9.3	22.0	5.64	12.
117	39.50N	81.00W	4.50	103	28.	2.86	2.32	4.1	20.9	5.62	11.
118	39.50N	81.50W	4.50	103	29.	2.73	2.24	108.8	19.2	6.08	11.
119	39.50N	82.00W	4.50	103	32.	2.55	2.23	110.0	17.8	5.99	11.
120	39.50N	82.50W	4.50	103	37.	2.52	2.21	104.8	17.5	5.95	11.
121	39.50N	83.00W	4.50	103	41.	2.65	2.06	85.7	17.1	5.88	10.
122	39.50N	83.50W	4.50	102	45.	2.49	2.04	50.2	16.0	5.69	10.
123	39.50N	84.00W	4.50	102	49.	2.65	2.36	147.9	19.7	5.75	10.
124	39.50N	84.50W	4.50	101	54.	2.67	1.97	166.5	16.5	6.11	10.
125	39.50N	85.00W	4.50	101	60.	3.43	2.16	142.1	23.3	6.48	10.
126	39.50N	85.50W	4.50	100	66.	3.79	2.41	148.0	28.7	6.61	10.
127	39.50N	86.00W	4.50	99	74.	3.30	2.10	167.8	21.8	5.78	10.
128	39.50N	86.50W	4.50	98	84.	3.68	2.32	156.0	26.8	5.44	10.
129	39.50N	87.00W	4.50	98	94.	3.49	2.37	159.7	26.0	5.35	10.
130	39.50N	87.50W	4.50	97	100.	3.33	2.37	135.2	24.8	5.48	10.
131	39.50N	88.00W	4.50	96	106.	4.29	2.51	133.2	33.9	5.37	10.
132	39.50N	88.50W	4.50	95	90.	4.71	2.64	135.5	39.0	5.83	10.
133	39.50N	89.00W	4.50	94	93.	5.04	2.79	134.7	44.1	6.24	10.
134	40.00N	80.00W	4.50	102	27.	2.47	2.21	131.8	17.2	5.03	12.
135	40.00N	80.50W	4.50	103	30.	2.44	2.29	109.7	17.6	5.00	12.
136	40.00N	81.00W	4.50	103	32.	2.77	2.63	37.8	22.9	5.27	11.
137	40.00N	81.50W	4.50	103	34.	2.85	2.77	41.2	24.7	5.70	11.
138	40.00N	82.00W	4.50	103	34.	2.95	2.39	175.5	22.1	5.85	11.
139	40.00N	82.50W	4.50	103	34.	2.97	2.32	178.9	21.7	5.62	11.
140	40.00N	83.00W	4.50	103	32.	2.83	2.25	2.9	19.9	5.29	10.
141	40.00N	83.50W	4.50	102	43.	2.38	2.17	34.1	16.3	5.25	10.
142	40.00N	84.00W	4.50	102	48.	2.23	2.01	48.7	14.1	5.21	10.
143	40.00N	84.50W	4.50	101	53.	2.76	1.93	144.2	16.8	5.51	10.
144	40.00N	85.00W	4.50	101	59.	2.78	1.77	153.3	15.4	5.53	10.

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
145	40.00N	85.50W	4.50	100	67.	3.44	2.29	135.7	24.7	5.69	10.
146	40.00N	86.00W	4.50	99	76.	3.35	2.44	138.0	25.7	5.99	10.
147	40.00N	86.50W	4.50	98	87.	3.31	2.22	166.5	23.0	5.78	10.
148	40.00N	87.00W	4.50	98	100.	4.33	2.70	143.7	36.7	5.93	10.
149	40.00N	87.50W	4.50	97	110.	4.77	2.65	141.4	39.8	5.61	10.
150	40.00N	88.00W	4.50	96	117.	5.07	2.64	137.2	42.1	5.45	10.
151	40.00N	88.50W	4.50	95	124.	5.72	2.76	133.4	49.5	5.63	10.
152	40.00N	89.00W	4.50	94	99.	5.31	2.86	133.5	47.7	6.04	10.
153	40.50N	80.00W	4.50	102	23.	2.65	2.42	44.6	20.1	4.94	12.
154	40.50N	80.50W	4.50	103	26.	2.58	2.09	122.5	17.0	4.96	11.
155	40.50N	81.00W	4.50	103	30.	2.77	2.64	149.2	23.0	5.33	11.
156	40.50N	81.50W	4.50	103	40.	2.93	2.37	160.6	21.9	5.67	11.
157	40.50N	82.00W	4.50	103	42.	2.76	2.55	46.8	22.1	5.67	11.
158	40.50N	82.50W	4.50	103	42.	3.07	2.55	3.7	24.5	5.53	11.
159	40.50N	83.00W	4.50	103	39.	3.16	2.34	1.6	23.2	5.25	10.
160	40.50N	83.50W	4.50	102	35.	3.04	2.12	4.5	20.3	4.95	10.
161	40.50N	84.00W	4.50	102	26.	2.41	1.55	0.2	11.7	3.47	10.
162	40.50N	84.50W	4.50	101	39.	2.20	1.71	46.8	11.8	2.80	10.
163	40.50N	85.00W	4.50	100	57.	3.91	1.71	146.8	21.0	4.52	10.
164	40.50N	85.50W	4.50	100	65.	3.65	2.26	166.0	25.9	5.17	10.
165	40.50N	86.00W	4.50	99	75.	3.34	2.31	152.3	24.3	5.82	10.
166	40.50N	86.50W	4.50	98	88.	3.45	2.59	166.9	28.1	6.03	10.
167	40.50N	87.00W	4.50	97	104.	4.82	2.47	139.6	37.5	6.13	10.
168	40.50N	87.50W	4.50	96	117.	5.32	2.85	141.3	47.7	5.82	10.
169	40.50N	88.00W	4.50	96	123.	3.72	2.75	130.0	32.2	5.35	10.
170	40.50N	88.50W	4.50	95	130.	5.31	2.50	126.2	41.7	5.25	10.
171	40.50N	89.00W	4.50	94	104.	5.53	2.62	123.2	45.5	5.61	8.
172	41.00N	80.00W	4.50	102	32.	2.56	2.47	99.2	19.8	5.14	11.
173	41.00N	80.50W	4.50	102	35.	2.68	2.43	58.6	20.5	5.03	11.
174	41.00N	81.00W	4.50	103	40.	2.85	2.66	12.6	23.9	5.35	11.
175	41.00N	81.50W	4.50	103	48.	2.88	2.65	125.1	24.0	5.42	11.
176	41.00N	82.00W	4.50	103	42.	3.19	2.61	152.6	26.2	5.54	11.
177	41.00N	82.50W	4.50	103	53.	3.21	2.27	161.0	22.8	5.55	10.
178	41.00N	83.00W	4.50	102	50.	3.31	2.51	163.1	26.0	5.46	10.
179	41.00N	83.50W	4.50	102	41.	2.60	1.84	1.5	15.0	5.03	10.
180	41.00N	84.00W	4.50	101	42.	2.89	1.90	156.5	17.2	4.22	10.

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
181	41.00N	84.50W	4.50	101	49.	3.00	2.23	144.5	21.0	4.39	10.
182	41.00N	85.00W	4.50	100	58.	3.31	2.21	151.4	23.0	4.79	10.
183	41.00N	85.50W	4.50	99	59.	3.17	2.44	157.3	24.3	5.33	10.
184	41.00N	86.00W	4.50	99	69.	2.94	2.13	164.3	19.6	5.78	10.
185	41.00N	86.50W	4.50	98	82.	4.18	2.97	153.1	39.0	6.21	10.
186	41.00N	87.00W	4.50	97	100.	4.21	2.59	132.0	34.3	6.07	10.
187	41.00N	87.50W	4.50	96	122.	4.80	3.02	137.1	45.5	5.28	10.
188	41.00N	88.00W	4.50	95	128.	5.02	2.23	135.3	35.1	5.11	10.
189	41.00N	88.50W	4.50	94	135.	4.95	2.33	133.2	36.1	5.12	10.
190	41.00N	89.00W	4.50	94	110.	5.77	2.73	123.3	49.5	5.39	7.
191	41.50N	80.00W	4.50	101	32.	2.89	2.27	154.8	20.6	5.53	11.
192	41.50N	80.50W	4.50	101	51.	3.04	2.28	161.8	21.7	5.42	11.
193	41.50N	81.00W	4.50	102	51.	3.03	2.28	152.4	21.8	5.24	11.
194	41.50N	81.50W	4.50	102	40.	2.82	2.03	147.0	18.0	3.40	10.
195	41.50N	82.00W	4.50	102	47.	3.45	2.55	159.2	27.7	5.47	10.
196	41.50N	82.50W	4.50	102	59.	3.44	2.31	173.7	25.0	5.72	10.
197	41.50N	83.00W	4.50	102	66.	2.76	2.05	2.4	17.8	5.59	10.
198	41.50N	83.50W	4.50	101	51.	2.95	2.46	100.5	22.7	4.95	10.
199	41.50N	84.00W	4.50	101	44.	3.00	2.46	121.9	23.2	4.69	10.
200	41.50N	84.50W	4.50	100	62.	3.65	2.72	124.9	31.2	5.01	10.
201	41.50N	85.00W	4.50	99	73.	3.20	1.98	145.5	19.9	5.28	10.
202	41.50N	85.50W	4.50	99	71.	2.97	2.41	3.1	22.5	5.56	10.
203	41.50N	86.00W	4.50	98	55.	3.73	2.81	137.5	32.9	5.88	10.
204	41.50N	86.50W	4.50	97	65.	4.12	2.16	135.8	28.0	6.03	10.
205	41.50N	87.00W	4.50	96	82.	3.99	2.79	129.5	34.9	5.83	10.
206	41.50N	87.50W	4.50	95	121.	3.83	2.61	114.3	31.5	5.15	10.
207	41.50N	88.00W	4.50	95	132.	5.27	2.92	129.1	48.2	4.77	10.
208	41.50N	88.50W	4.50	94	139.	5.50	2.99	137.1	51.6	4.97	8.
209	41.50N	89.00W	4.50	93	146.	6.22	2.83	122.2	55.2	5.25	6.
210	42.00N	80.00W	4.50	100	30.	2.91	2.25	110.8	20.5	5.31	10.
211	42.00N	80.50W	4.50	101	48.	3.32	2.44	155.0	25.5	5.53	10.
212	42.00N	81.00W	4.50	101	46.	3.27	2.32	159.6	23.8	5.54	10.
213	42.00N	81.50W	4.50	101	42.	3.30	2.42	146.0	25.1	5.52	10.
214	42.00N	82.00W	4.50	101	56.	3.47	2.76	153.6	30.1	5.77	10.
215	42.00N	82.50W	4.50	101	48.	2.79	2.05	30.2	18.0	5.80	10.
216	42.00N	83.00W	4.50	101	78.	3.09	2.64	170.7	25.6	5.45	10.

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
217	42.00N	83.50W	4.50	100	74.	3.19	2.51	136.9	25.2	4.69	10.
218	42.00N	84.00W	4.50	100	69.	2.95	2.85	11.8	26.4	4.81	10.
219	42.00N	84.50W	4.50	99	85.	3.11	2.59	134.2	25.3	5.32	10.
220	42.00N	85.00W	4.50	99	84.	3.29	2.65	40.8	27.4	5.40	10.
221	42.00N	85.50W	4.50	98	82.	3.78	2.79	157.6	33.1	5.53	10.
222	42.00N	86.00W	4.50	97	53.	4.02	2.43	135.5	30.7	5.84	10.
223	42.00N	86.50W	4.50	96	54.	4.58	3.34	149.1	48.0	5.91	10.
224	42.00N	87.00W	4.50	96	71.	4.45	3.10	155.5	43.3	5.33	10.
225	42.00N	87.50W	4.50	95	121.	4.58	2.66	147.0	38.2	4.51	10.
226	42.00N	88.00W	4.50	94	135.	4.39	2.50	119.8	34.5	4.47	8.
227	42.00N	88.50W	4.50	93	142.	3.99	2.22	131.6	27.9	5.10	8.
228	42.00N	89.00W	4.50	93	114.	5.16	2.65	113.6	42.9	5.45	6.

NETWORK SUMMARY- ERROR ELLIPSES
(MAGNITUDES RANGE FROM, 4.00 TO 4.00 IN STEPS OF 0.0)

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZ IM	AREA	DEPTH	NO. NEAR STA DET
1	36.50N	80.00W	4.00	74	54.	2.97	2.12	59.8	19.8	6.50	10.
2	36.50N	80.50W	4.00	74	45.	2.82	2.64	99.4	23.4	6.37	10.
3	36.50N	81.00W	4.00	75	46.	3.67	2.54	121.2	29.3	6.84	10.
4	36.50N	81.50W	4.00	75	44.	3.77	2.59	128.8	30.7	7.79	10.
5	36.50N	82.00W	4.00	76	42.	3.58	2.67	130.0	30.1	7.65	10.
6	36.50N	82.50W	4.00	76	39.	3.03	2.51	161.5	23.9	8.45	10.
7	36.50N	83.00W	4.00	76	34.	3.28	2.76	125.6	28.4	8.81	10.
8	36.50N	83.50W	4.00	76	30.	2.87	2.22	168.8	20.0	9.43	10.
9	36.50N	84.00W	4.00	76	33.	2.91	2.83	96.2	25.9	8.89	10.
10	36.50N	84.50W	4.00	76	34.	3.04	2.06	16.5	19.7	8.30	8.
11	36.50N	85.00W	4.00	76	35.	3.28	2.09	1.8	21.5	8.92	8.
12	36.50N	85.50W	4.00	76	39.	3.88	2.55	14.0	31.1	9.17	8.
13	36.50N	86.00W	4.00	75	47.	3.83	2.35	19.7	28.2	9.27	6.
14	36.50N	86.50W	4.00	74	53.	4.17	2.83	7.8	37.1	8.54	5.
15	36.50N	87.00W	4.00	73	55.	4.51	2.49	17.5	35.3	9.58	5.
16	36.50N	87.50W	4.00	72	55.	4.09	2.19	0.8	28.2	8.04	4.
17	36.50N	88.00W	4.00	71	56.	3.60	2.48	29.5	28.1	7.89	2.
18	36.50N	88.50W	4.00	70	56.	2.98	2.24	172.6	20.9	6.97	2.
19	36.50N	89.00W	4.00	69	56.	2.86	2.08	130.5	18.6	5.88	1.
20	37.00N	80.00W	4.00	75	57.	3.04	2.53	150.5	24.2	5.64	10.
21	37.00N	80.50W	4.00	76	44.	2.86	2.40	145.8	21.6	4.95	10.
22	37.00N	81.00W	4.00	76	40.	3.06	2.37	149.1	22.8	5.41	10.
23	37.00N	81.50W	4.00	76	36.	2.81	2.15	151.7	19.0	6.89	10.
24	37.00N	82.00W	4.00	77	36.	3.08	2.37	175.7	23.0	7.17	10.
25	37.00N	82.50W	4.00	77	35.	2.98	2.90	160.0	27.1	7.57	10.
26	37.00N	83.00W	4.00	77	32.	2.91	2.48	161.8	22.7	7.64	10.
27	37.00N	83.50W	4.00	77	33.	2.95	2.43	173.9	22.5	7.81	10.
28	37.00N	84.00W	4.00	77	33.	3.07	2.38	13.6	23.0	8.70	10.
29	37.00N	84.50W	4.00	77	34.	2.78	1.83	2.6	16.0	8.68	8.
30	37.00N	85.00W	4.00	77	32.	3.47	2.54	10.8	27.7	9.19	8.
31	37.00N	85.50W	4.00	76	39.	3.57	2.10	1.9	23.6	9.23	8.
32	37.00N	86.00W	4.00	75	42.	3.93	2.66	179.7	32.9	9.16	7.
33	37.00N	86.50W	4.00	74	48.	3.84	1.78	172.0	21.5	8.30	5.
34	37.00N	87.00W	4.00	73	50.	3.39	2.26	28.9	24.1	8.09	5.
35	37.00N	87.50W	4.00	72	51.	3.76	2.76	6.2	32.6	8.54	4.
36	37.00N	88.00W	4.00	71	52.	3.13	2.39	10.9	23.4	7.56	2.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZ IM	AREA	DEPTH	NO. NEAR STA DET
37	37.00N	88.50W	4.00	70	52.	3.21	2.33	143.6	23.4	7.04	2.
38	37.00N	89.00W	4.00	69	45.	2.39	1.98	136.4	14.9	4.32	1.
39	37.50N	80.00W	4.00	76	36.	2.62	2.10	126.3	17.3	5.76	10.
40	37.50N	80.50W	4.00	77	31.	2.43	1.86	130.4	14.1	5.19	10.
41	37.50N	81.00W	4.00	77	28.	2.61	2.09	122.3	17.1	4.85	10.
42	37.50N	81.50W	4.00	77	30.	2.68	2.39	171.4	20.1	6.60	10.
43	37.50N	82.00W	4.00	78	30.	3.26	2.46	16.5	25.2	6.66	10.
44	37.50N	82.50W	4.00	78	30.	3.33	2.42	32.2	25.3	6.56	10.
45	37.50N	83.00W	4.00	78	35.	2.85	2.44	94.1	21.9	6.46	10.
46	37.50N	83.50W	4.00	78	38.	2.62	2.02	161.3	16.7	7.55	10.
47	37.50N	84.00W	4.00	78	39.	2.67	2.54	15.4	21.3	8.13	10.
48	37.50N	84.50W	4.00	78	40.	2.50	2.14	23.5	16.8	8.18	8.
49	37.50N	85.00W	4.00	77	40.	2.63	2.08	23.7	17.2	8.18	8.
50	37.50N	85.50W	4.00	77	37.	3.52	2.56	172.4	28.3	7.91	8.
51	37.50N	86.00W	4.00	76	39.	3.73	2.60	171.7	30.5	8.12	7.
52	37.50N	86.50W	4.00	75	43.	3.76	2.28	176.5	26.9	7.70	5.
53	37.50N	87.00W	4.00	74	47.	3.69	2.60	175.1	30.1	8.47	5.
54	37.50N	87.50W	4.00	72	48.	3.42	2.62	166.6	28.2	7.54	4.
55	37.50N	88.00W	4.00	71	48.	3.12	2.18	159.1	21.4	6.43	2.
56	37.50N	88.50W	4.00	70	48.	2.94	2.10	136.5	19.5	4.89	2.
57	37.50N	89.00W	4.00	69	65.	3.36	1.99	137.9	21.0	4.69	1.
58	38.00N	80.00W	4.00	78	40.	2.86	2.06	124.7	18.5	5.21	10.
59	38.00N	80.50W	4.00	78	32.	2.97	2.22	138.8	20.7	6.33	10.
60	38.00N	81.00W	4.00	78	32.	2.62	2.35	135.3	19.3	6.55	10.
61	38.00N	81.50W	4.00	78	32.	2.59	2.44	20.0	19.9	6.49	10.
62	38.00N	82.00W	4.00	79	32.	3.28	2.44	15.1	25.1	6.45	10.
63	38.00N	82.50W	4.00	79	35.	2.71	2.21	46.1	18.8	5.93	10.
64	38.00N	83.00W	4.00	79	39.	2.88	2.16	29.7	19.6	5.65	10.
65	38.00N	83.50W	4.00	79	43.	2.57	2.16	24.1	17.4	7.01	10.
66	38.00N	84.00W	4.00	78	47.	2.92	2.49	168.0	22.9	7.77	10.
67	38.00N	84.50W	4.00	78	50.	3.65	2.61	3.2	29.9	8.14	8.
68	38.00N	85.00W	4.00	78	51.	3.72	2.29	176.8	26.8	8.32	8.
69	38.00N	85.50W	4.00	77	48.	3.78	2.59	169.2	30.7	8.59	8.
70	38.00N	86.00W	4.00	76	47.	3.33	2.40	0.2	25.1	8.33	7.
71	38.00N	86.50W	4.00	75	57.	3.64	2.15	171.8	24.6	7.63	5.
72	38.00N	87.00W	4.00	74	59.	3.15	2.26	178.6	22.3	7.20	5.

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZ IM	AREA	DEPTH	NO. NEAR STA DET
73	38.00N	87.50W	4.00	72	44.	3.12	2.18	170.5	21.4	6.83	4.
74	38.00N	88.00W	4.00	71	60.	2.80	1.96	144.3	17.2	4.66	2.
75	38.00N	88.50W	4.00	70	53.	2.80	2.23	130.9	19.6	4.70	2.
76	38.00N	89.00W	4.00	69	102.	3.43	2.50	137.0	27.0	5.64	1.
77	38.50N	80.00W	4.00	79	36.	2.66	2.12	52.3	17.7	5.48	11.
78	38.50N	80.50W	4.00	79	37.	2.76	2.35	49.3	20.4	6.64	11.
79	38.50N	81.00W	4.00	79	37.	3.08	2.54	26.8	24.5	6.74	10.
80	38.50N	81.50W	4.00	79	37.	2.73	2.49	179.5	21.3	6.62	10.
81	38.50N	82.00W	4.00	79	33.	3.31	2.38	10.4	24.8	6.96	10.
82	38.50N	82.50W	4.00	79	38.	3.19	2.47	0.0	24.7	7.06	10.
83	38.50N	83.00W	4.00	79	43.	3.20	2.54	56.6	25.5	7.14	10.
84	38.50N	83.50W	4.00	79	49.	3.45	2.40	11.5	26.0	7.63	10.
85	38.50N	84.00W	4.00	79	52.	3.41	2.39	175.9	25.7	7.82	10.
86	38.50N	84.50W	4.00	78	53.	3.75	2.67	0.5	31.5	7.97	9.
87	38.50N	85.00W	4.00	78	51.	3.19	1.90	167.4	19.0	8.36	8.
88	38.50N	85.50W	4.00	77	46.	3.42	2.50	7.0	26.9	8.57	8.
89	38.50N	86.00W	4.00	76	54.	3.99	2.59	164.3	32.5	8.34	5.
90	38.50N	86.50W	4.00	75	83.	3.14	2.37	166.8	23.4	7.04	5.
91	38.50N	87.00W	4.00	73	96.	3.16	2.26	154.0	22.4	7.20	5.
92	38.50N	87.50W	4.00	72	79.	2.79	1.87	177.1	16.4	5.63	5.
93	38.50N	88.00W	4.00	71	104.	3.37	1.94	165.2	20.5	4.53	2.
94	38.50N	88.50W	4.00	70	106.	4.20	2.53	143.5	33.4	5.43	1.
95	38.50N	89.00W	4.00	68	127.	3.95	2.79	159.1	34.6	6.52	1.
96	39.00N	80.00W	4.00	79	41.	3.12	2.51	71.3	24.7	6.67	11.
97	39.00N	80.50W	4.00	80	42.	3.11	2.54	51.7	24.8	6.71	11.
98	39.00N	81.00W	4.00	80	29.	3.24	2.57	34.9	26.2	6.98	11.
99	39.00N	81.50W	4.00	80	29.	3.55	2.74	34.8	30.5	7.02	10.
100	39.00N	82.00W	4.00	80	32.	3.06	2.74	173.4	26.3	7.53	10.
101	39.00N	82.50W	4.00	80	38.	3.30	2.59	5.0	26.9	7.80	10.
102	39.00N	83.00W	4.00	79	46.	3.72	2.88	35.8	33.6	7.76	10.
103	39.00N	83.50W	4.00	79	55.	3.05	2.52	3.7	24.1	7.32	10.
104	39.00N	84.00W	4.00	79	64.	2.99	2.27	4.5	21.3	7.20	10.
105	39.00N	84.50W	4.00	78	68.	3.16	2.24	169.5	22.2	7.48	8.
106	39.00N	85.00W	4.00	78	71.	3.58	2.35	166.0	26.4	7.66	8.
107	39.00N	85.50W	4.00	77	73.	3.13	2.66	169.1	26.2	8.09	7.
108	39.00N	86.00W	4.00	76	69.	3.84	2.32	152.2	27.9	8.32	5.

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZ IM	AREA	DEPTH	NO. NEAR STA DET
109	39.00N	86.50W	4.00	75	78.	3.37	2.48	135.8	26.3	7.30	5.
110	39.00N	87.00W	4.00	73	86.	4.01	2.16	155.6	27.2	6.63	5.
111	39.00N	87.50W	4.00	72	94.	3.91	2.24	147.6	27.6	6.03	4.
112	39.00N	88.00W	4.00	71	103.	4.51	2.54	133.7	36.1	5.93	2.
113	39.00N	88.50W	4.00	69	112.	4.41	2.79	137.9	38.6	6.56	1.
114	39.00N	89.00W	4.00	68	123.	4.52	2.92	142.5	41.5	7.20	1.
115	39.50N	80.00W	4.00	80	46.	3.03	2.30	93.3	21.9	5.92	11.
116	39.50N	80.50W	4.00	80	33.	3.02	2.63	32.5	24.9	6.73	11.
117	39.50N	81.00W	4.00	80	34.	3.33	2.67	36.4	27.9	6.81	11.
118	39.50N	81.50W	4.00	80	35.	3.09	2.64	74.6	25.6	7.36	11.
119	39.50N	82.00W	4.00	80	29.	2.68	2.32	91.1	19.5	7.41	10.
120	39.50N	82.50W	4.00	80	34.	2.66	2.26	83.9	18.9	7.43	10.
121	39.50N	83.00W	4.00	80	43.	3.20	2.20	65.6	22.1	7.11	10.
122	39.50N	83.50W	4.00	79	56.	3.33	2.05	61.0	21.4	6.88	10.
123	39.50N	84.00W	4.00	79	70.	3.12	2.61	59.6	25.6	6.78	10.
124	39.50N	84.50W	4.00	78	80.	2.70	2.09	166.4	17.7	7.31	8.
125	39.50N	85.00W	4.00	77	60.	3.57	2.25	140.5	25.3	8.23	8.
126	39.50N	85.50W	4.00	77	66.	4.06	2.56	149.4	32.6	8.37	5.
127	39.50N	86.00W	4.00	75	74.	3.66	2.19	171.2	25.2	7.27	5.
128	39.50N	86.50W	4.00	74	84.	4.12	2.44	158.7	31.6	6.61	5.
129	39.50N	87.00W	4.00	73	94.	3.87	2.51	162.1	30.5	6.60	5.
130	39.50N	87.50W	4.00	71	105.	4.85	2.63	145.9	40.0	6.59	3.
131	39.50N	88.00W	4.00	70	118.	5.66	2.77	137.9	49.2	6.40	2.
132	39.50N	88.50W	4.00	69	131.	5.59	2.89	138.5	50.6	6.78	1.
133	39.50N	89.00W	4.00	67	147.	6.17	3.07	137.7	59.5	7.53	1.
134	40.00N	80.00W	4.00	80	35.	2.59	2.37	115.2	19.2	6.14	11.
135	40.00N	80.50W	4.00	80	38.	2.94	2.52	52.8	23.2	6.20	11.
136	40.00N	81.00W	4.00	81	32.	3.16	2.70	49.7	26.8	6.38	11.
137	40.00N	81.50W	4.00	81	34.	3.29	2.82	45.7	29.1	6.90	11.
138	40.00N	82.00W	4.00	80	34.	3.11	2.53	11.1	24.7	7.12	10.
139	40.00N	82.50W	4.00	80	34.	3.10	2.42	12.3	23.6	6.77	10.
140	40.00N	83.00W	4.00	79	32.	2.99	2.28	18.8	21.4	6.36	10.
141	40.00N	83.50W	4.00	79	35.	3.62	2.22	41.2	25.3	6.22	10.
142	40.00N	84.00W	4.00	78	60.	2.72	2.20	50.3	18.8	6.49	10.
143	40.00N	84.50W	4.00	78	53.	2.77	1.94	139.6	16.9	6.69	8.
144	40.00N	85.00W	4.00	77	59.	2.86	1.98	154.3	17.8	7.08	6.

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
145	40.00N	85.50W	4.00	76	67.	4.64	2.47	146.6	36.0	7.03	5.
146	40.00N	86.00W	4.00	75	76.	4.87	2.65	150.0	40.5	7.39	5.
147	40.00N	86.50W	4.00	73	87.	3.45	2.13	174.8	23.1	7.36	5.
148	40.00N	87.00W	4.00	72	100.	4.82	2.92	143.6	44.3	7.58	5.
149	40.00N	87.50W	4.00	71	113.	5.24	2.89	142.6	47.7	6.93	2.
150	40.00N	88.00W	4.00	69	125.	5.52	2.87	138.2	49.8	6.57	1.
151	40.00N	88.50W	4.00	68	136.	6.23	3.01	134.6	58.9	6.80	1.
152	40.00N	89.00W	4.00	67	147.	6.01	3.17	133.1	59.9	7.19	1.
153	40.50N	80.00W	4.00	80	25.	2.98	2.53	54.4	23.7	5.99	11.
154	40.50N	80.50W	4.00	80	33.	2.77	2.20	116.0	19.2	6.01	11.
155	40.50N	81.00W	4.00	80	37.	2.97	2.93	154.4	27.3	6.53	11.
156	40.50N	81.50W	4.00	80	40.	3.21	3.04	19.6	30.7	6.99	10.
157	40.50N	82.00W	4.00	80	42.	3.31	2.63	43.4	27.4	6.57	10.
158	40.50N	82.50W	4.00	80	42.	3.48	2.61	18.9	28.5	6.36	10.
159	40.50N	83.00W	4.00	79	39.	3.42	2.41	14.9	25.9	6.08	10.
160	40.50N	83.50W	4.00	78	35.	3.03	2.17	15.6	20.6	5.81	10.
161	40.50N	84.00W	4.00	78	28.	2.30	1.57	178.7	11.3	3.97	8.
162	40.50N	84.50W	4.00	77	39.	2.26	1.73	49.6	12.3	3.22	6.
163	40.50N	85.00W	4.00	76	57.	4.25	1.91	148.7	25.5	5.50	5.
164	40.50N	85.50W	4.00	75	65.	3.92	2.38	168.4	29.4	6.36	5.
165	40.50N	86.00W	4.00	74	75.	3.50	2.44	154.7	26.8	7.22	5.
166	40.50N	86.50W	4.00	73	88.	3.64	2.77	171.5	31.7	7.32	5.
167	40.50N	87.00W	4.00	71	104.	5.26	2.60	139.1	43.0	7.65	3.
168	40.50N	87.50W	4.00	70	120.	5.81	3.08	142.6	56.3	7.12	1.
169	40.50N	88.00W	4.00	68	131.	3.90	3.01	132.1	36.8	6.50	1.
170	40.50N	88.50W	4.00	67	144.	5.82	2.72	126.9	49.7	6.54	1.
171	40.50N	89.00W	4.00	66	156.	6.24	2.87	123.4	56.2	7.14	1.
172	41.00N	80.00W	4.00	79	32.	2.83	2.53	88.7	22.5	6.63	10.
173	41.00N	80.50W	4.00	80	35.	2.93	2.46	64.4	22.7	6.24	10.
174	41.00N	81.00W	4.00	80	40.	3.13	2.76	40.2	27.2	6.71	10.
175	41.00N	81.50W	4.00	80	48.	3.09	2.84	93.0	27.6	6.56	10.
176	41.00N	82.00W	4.00	79	53.	3.32	2.86	157.8	29.8	6.61	10.
177	41.00N	82.50W	4.00	79	53.	3.41	2.41	166.4	25.8	6.45	10.
178	41.00N	83.00W	4.00	78	50.	3.59	2.73	172.5	30.9	6.37	10.
179	41.00N	83.50W	4.00	77	52.	2.85	1.99	173.9	17.8	5.70	7.
180	41.00N	84.00W	4.00	76	51.	3.01	2.30	146.0	21.8	4.57	6.

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
181	41.00N	84.50W	4.00	76	57.	3.18	2.32	147.4	23.2	5.38	5.
182	41.00N	85.00W	4.00	75	58.	3.38	2.31	155.2	24.6	5.82	5.
183	41.00N	85.50W	4.00	74	59.	3.83	2.82	6.9	33.9	6.33	5.
184	41.00N	86.00W	4.00	73	69.	2.97	2.07	177.7	19.3	6.86	5.
185	41.00N	86.50W	4.00	71	82.	4.64	3.28	157.5	47.8	7.36	4.
186	41.00N	87.00W	4.00	70	100.	4.75	3.26	143.6	48.6	7.38	1.
187	41.00N	87.50W	4.00	68	123.	5.34	3.23	139.3	54.2	6.46	1.
188	41.00N	88.00W	4.00	67	137.	5.60	2.35	136.7	41.4	6.39	1.
189	41.00N	88.50W	4.00	66	151.	5.42	2.49	135.4	42.3	6.43	1.
190	41.00N	89.00W	4.00	64	165.	6.77	3.04	124.1	64.6	6.89	1.
191	41.50N	80.00W	4.00	78	32.	3.00	2.41	149.6	22.8	6.93	9.
192	41.50N	80.50W	4.00	79	51.	3.10	2.41	161.0	23.5	6.72	9.
193	41.50N	81.00W	4.00	79	51.	3.14	2.40	149.9	23.7	6.49	9.
194	41.50N	81.50W	4.00	79	61.	2.93	2.10	145.1	19.3	4.03	8.
195	41.50N	82.00W	4.00	78	70.	3.73	2.79	161.3	32.7	6.69	8.
196	41.50N	82.50W	4.00	78	73.	3.97	2.80	163.8	34.9	6.74	8.
197	41.50N	83.00W	4.00	77	67.	3.11	2.37	173.3	23.1	6.59	7.
198	41.50N	83.50W	4.00	76	51.	3.34	2.51	92.1	26.3	5.48	5.
199	41.50N	84.00W	4.00	75	67.	3.12	2.62	107.9	25.7	5.37	5.
200	41.50N	84.50W	4.00	74	79.	3.84	2.99	117.0	36.1	5.83	5.
201	41.50N	85.00W	4.00	73	80.	3.62	2.48	139.8	28.2	6.40	5.
202	41.50N	85.50W	4.00	72	72.	3.17	2.30	19.3	22.9	6.80	5.
203	41.50N	86.00W	4.00	71	56.	4.09	3.07	141.5	39.5	6.98	4.
204	41.50N	86.50W	4.00	70	65.	4.68	2.56	143.5	37.7	7.12	2.
205	41.50N	87.00W	4.00	68	82.	4.44	3.63	152.2	50.7	6.92	1.
206	41.50N	87.50W	4.00	67	121.	4.04	2.78	115.0	35.2	6.44	1.
207	41.50N	88.00W	4.00	66	142.	6.04	3.13	131.8	59.5	6.05	1.
208	41.50N	88.50W	4.00	64	159.	7.10	3.34	144.8	74.6	6.27	1.
209	41.50N	89.00W	4.00	63	175.	9.00	3.78	137.9	107.0	6.45	1.
210	42.00N	80.00W	4.00	77	44.	3.10	2.35	110.0	22.9	6.57	8.
211	42.00N	80.50W	4.00	77	71.	3.57	2.60	155.4	29.1	6.72	8.
212	42.00N	81.00W	4.00	77	58.	3.48	2.42	159.3	26.5	6.90	8.
213	42.00N	81.50W	4.00	77	74.	3.53	2.52	145.1	28.0	6.74	8.
214	42.00N	82.00W	4.00	77	96.	3.75	2.98	148.6	35.2	7.06	7.
215	42.00N	82.50W	4.00	76	106.	3.12	2.36	26.4	23.1	7.17	6.
216	42.00N	83.00W	4.00	75	104.	3.26	2.97	165.4	30.4	6.38	5.

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
217	42.00N	83.50W	4.00	74	74.	3.59	2.70	130.5	30.4	5.39	5.
218	42.00N	84.00W	4.00	73	104.	3.23	3.00	46.3	30.5	5.61	5.
219	42.00N	84.50W	4.00	73	116.	3.31	2.82	133.6	29.4	6.26	5.
220	42.00N	85.00W	4.00	72	104.	3.78	2.42	42.1	28.8	6.58	4.
221	42.00N	85.50W	4.00	70	83.	4.13	3.84	147.9	49.8	6.68	3.
222	42.00N	86.00W	4.00	69	61.	4.56	2.60	134.8	37.3	7.24	2.
223	42.00N	86.50W	4.00	68	79.	5.32	3.71	155.4	62.1	7.03	1.
224	42.00N	87.00W	4.00	67	83.	5.19	3.35	161.4	54.6	6.28	1.
225	42.00N	87.50W	4.00	65	121.	5.42	2.83	151.4	48.3	5.20	1.
226	42.00N	88.00W	4.00	64	135.	4.96	2.68	123.2	41.8	5.74	1.
227	42.00N	88.50W	4.00	63	142.	5.17	2.54	143.8	41.3	6.40	1.
228	42.00N	89.00W	4.00	62	149.	7.01	4.12	139.4	90.8	6.77	1.

NETWORK SUMMARY- ERROR ELLIPSES
(MAGNITUDES RANGE FROM, 3.50 TO 3.50 IN STEPS OF 0.0)

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
1	36.50N	80.00W	3.50	47	54.	3.42	2.16	59.5	23.2	10.61	9.
2	36.50N	80.50W	3.50	47	47.	4.07	2.92	103.2	37.3	9.62	9.
3	36.50N	81.00W	3.50	48	46.	4.35	2.91	109.3	39.7	10.65	9.
4	36.50N	81.50W	3.50	49	44.	4.24	3.19	116.5	42.5	13.82	7.
5	36.50N	82.00W	3.50	49	42.	4.10	3.38	112.3	43.5	14.83	7.
6	36.50N	82.50W	3.50	50	39.	3.47	2.96	4.4	32.3	15.59	7.
7	36.50N	83.00W	3.50	50	46.	3.83	3.28	112.9	39.5	15.22	7.
8	36.50N	83.50W	3.50	51	34.	3.46	2.74	154.5	29.8	15.34	5.
9	36.50N	84.00W	3.50	50	36.	3.54	3.26	104.7	36.3	14.10	3.
10	36.50N	84.50W	3.50	50	34.	3.38	2.34	13.5	24.8	13.39	3.
11	36.50N	85.00W	3.50	49	41.	3.78	2.74	2.6	32.5	12.05	1.
12	36.50N	85.50W	3.50	48	46.	4.39	3.16	16.0	43.5	13.75	0.
13	36.50N	86.00W	3.50	48	47.	4.59	3.30	13.1	47.6	14.07	0.
14	36.50N	86.50W	3.50	47	54.	4.73	3.48	13.9	51.7	14.95	0.
15	36.50N	87.00W	3.50	46	59.	5.04	2.84	16.8	45.0	17.05	0.
16	36.50N	87.50W	3.50	46	64.	5.07	2.90	175.3	46.1	14.16	0.
17	36.50N	88.00W	3.50	45	65.	4.69	3.52	168.1	51.8	13.44	0.
18	36.50N	88.50W	3.50	44	65.	4.37	2.56	142.5	35.2	11.67	0.
19	36.50N	89.00W	3.50	42	80.	3.98	2.11	127.5	26.4	6.95	0.
20	37.00N	80.00W	3.50	47	59.	3.55	2.87	158.9	32.1	8.04	9.
21	37.00N	80.50W	3.50	48	48.	3.13	2.66	158.2	26.1	7.23	9.
22	37.00N	81.00W	3.50	49	40.	3.24	2.80	157.7	28.5	7.61	9.
23	37.00N	81.50W	3.50	50	40.	3.52	2.93	147.6	32.4	11.48	7.
24	37.00N	82.00W	3.50	50	45.	3.64	3.20	20.7	36.6	12.05	7.
25	37.00N	82.50W	3.50	51	47.	3.77	3.20	50.0	37.9	12.48	7.
26	37.00N	83.00W	3.50	51	48.	3.28	2.87	177.7	29.6	12.14	7.
27	37.00N	83.50W	3.50	51	33.	3.52	3.47	68.0	38.4	12.38	6.
28	37.00N	84.00W	3.50	51	35.	3.64	3.45	20.5	39.5	13.45	3.
29	37.00N	84.50W	3.50	51	35.	3.23	2.48	15.7	25.2	13.65	3.
30	37.00N	85.00W	3.50	50	42.	4.02	3.12	5.1	39.4	12.89	1.
31	37.00N	85.50W	3.50	49	48.	4.07	2.33	179.7	29.9	14.53	0.
32	37.00N	86.00W	3.50	49	52.	4.42	3.28	179.4	45.6	13.58	0.
33	37.00N	86.50W	3.50	48	55.	4.73	2.74	168.5	40.7	13.93	0.
34	37.00N	87.00W	3.50	47	57.	4.39	2.84	14.2	39.2	14.66	0.
35	37.00N	87.50W	3.50	46	58.	4.42	3.54	162.9	49.2	15.21	0.
36	37.00N	88.00W	3.50	45	59.	3.33	2.79	0.8	29.2	12.47	0.

	LAT.	LONG.	MAG	NST	LJA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
37	37.00N	88.50W	3.50	44	77.	4.32	2.45	133.0	33.2	9.06	0.
38	37.00N	89.00W	3.50	43	53.	2.48	2.04	132.2	15.9	6.36	0.
39	37.50N	80.00W	3.50	49	36.	3.11	2.39	140.0	23.3	7.81	9.
40	37.50N	80.50W	3.50	49	35.	2.81	2.28	146.4	20.1	7.31	9.
41	37.50N	81.00W	3.50	50	46.	2.82	2.26	115.1	20.0	6.41	9.
42	37.50N	81.50W	3.50	50	53.	3.71	2.68	20.3	31.2	10.29	9.
43	37.50N	82.00W	3.50	51	56.	3.99	2.66	27.3	33.3	10.62	7.
44	37.50N	82.50W	3.50	51	56.	4.23	2.56	37.6	34.1	10.95	8.
45	37.50N	83.00W	3.50	51	47.	3.72	3.04	60.3	35.5	11.23	8.
46	37.50N	83.50W	3.50	51	38.	3.63	2.68	170.3	30.6	12.57	7.
47	37.50N	84.00W	3.50	51	46.	3.92	3.20	14.9	39.4	13.18	5.
48	37.50N	84.50W	3.50	51	50.	3.93	3.03	6.3	37.4	13.59	4.
49	37.50N	85.00W	3.50	50	50.	4.04	3.07	177.0	39.0	13.00	2.
50	37.50N	85.50W	3.50	50	48.	4.22	3.03	167.4	40.2	12.25	1.
51	37.50N	86.00W	3.50	49	48.	4.48	3.12	164.2	43.8	12.97	1.
52	37.50N	86.50W	3.50	48	50.	4.69	3.19	161.6	47.0	12.88	0.
53	37.50N	87.00W	3.50	47	52.	4.54	3.10	159.7	44.2	14.04	0.
54	37.50N	87.50W	3.50	46	72.	4.32	2.95	148.9	40.0	11.24	0.
55	37.50N	88.00W	3.50	46	72.	3.82	2.43	145.1	29.2	8.07	0.
56	37.50N	88.50W	3.50	44	71.	3.19	2.20	131.3	22.1	6.64	0.
57	37.50N	89.00W	3.50	43	65.	3.60	2.06	136.1	23.3	6.89	0.
58	38.00N	80.00W	3.50	50	40.	3.06	2.23	119.9	21.5	6.97	9.
59	38.00N	80.50W	3.50	50	40.	3.26	2.45	144.9	25.1	9.33	9.
60	38.00N	81.00W	3.50	51	39.	3.12	2.75	47.3	26.9	10.16	9.
61	38.00N	81.50W	3.50	51	38.	3.82	2.60	32.3	31.2	10.40	10.
62	38.00N	82.00W	3.50	51	69.	4.04	2.62	23.3	33.2	10.51	8.
63	38.00N	82.50W	3.50	51	68.	3.13	2.31	49.0	22.8	8.97	8.
64	38.00N	83.00W	3.50	51	65.	4.41	2.48	49.7	34.3	7.10	8.
65	38.00N	83.50W	3.50	51	63.	3.49	2.99	45.9	32.8	10.35	6.
66	38.00N	84.00W	3.50	51	60.	3.26	3.17	157.2	32.5	11.58	5.
67	38.00N	84.50W	3.50	51	57.	4.30	3.10	4.7	41.8	12.71	4.
68	38.00N	85.00W	3.50	50	54.	4.42	3.13	175.8	43.4	12.81	2.
69	38.00N	85.50W	3.50	49	55.	4.57	3.02	163.6	43.4	13.76	1.
70	38.00N	86.00W	3.50	49	61.	3.77	2.74	178.3	32.5	13.76	1.
71	38.00N	86.50W	3.50	48	65.	4.42	2.45	167.2	34.0	12.52	1.
72	38.00N	87.00W	3.50	47	67.	3.41	2.62	171.4	28.1	12.03	1.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
73	38.00N	87.50W	3.50	46	67.	3.35	2.38	165.5	25.0	9.99	0.
74	38.00N	88.00W	3.50	45	61.	3.78	2.06	141.4	24.5	6.24	0.
75	38.00N	88.50W	3.50	44	53.	2.90	2.31	126.1	21.1	6.94	0.
76	38.00N	89.00W	3.50	43	103.	3.53	2.67	136.1	29.6	8.92	0.
77	38.50N	80.00W	3.50	51	36.	3.18	2.30	47.1	23.0	6.98	9.
78	38.50N	80.50W	3.50	51	44.	3.31	2.46	40.5	25.6	10.26	9.
79	38.50N	81.00W	3.50	51	43.	3.93	2.65	32.1	32.8	11.03	10.
80	38.50N	81.50W	3.50	51	41.	3.11	2.68	24.5	26.2	10.84	10.
81	38.50N	82.00W	3.50	51	46.	3.81	2.57	14.5	30.7	10.77	8.
82	38.50N	82.50W	3.50	51	43.	3.60	2.76	5.6	31.2	10.38	8.
83	38.50N	83.00W	3.50	51	74.	4.26	3.27	48.9	43.7	11.25	7.
84	38.50N	83.50W	3.50	51	70.	4.59	3.34	41.6	48.3	12.52	6.
85	38.50N	84.00W	3.50	50	66.	3.94	2.89	172.7	35.8	12.97	5.
86	38.50N	84.50W	3.50	50	63.	4.55	3.23	5.6	46.2	12.11	4.
87	38.50N	85.00W	3.50	49	67.	3.93	2.47	153.8	30.5	13.25	2.
88	38.50N	85.50W	3.50	49	67.	3.78	2.91	8.8	34.6	12.68	1.
89	38.50N	86.00W	3.50	48	57.	4.94	3.04	155.5	47.2	12.19	1.
90	38.50N	86.50W	3.50	47	83.	4.96	2.77	149.3	43.1	12.09	1.
91	38.50N	87.00W	3.50	46	113.	5.24	2.51	149.6	41.2	11.31	1.
92	38.50N	87.50W	3.50	45	106.	2.93	2.00	177.4	18.4	8.09	1.
93	38.50N	88.00W	3.50	44	129.	3.56	2.09	165.9	23.3	5.90	0.
94	38.50N	88.50W	3.50	43	129.	4.47	2.73	144.7	38.4	8.73	0.
95	38.50N	89.00W	3.50	42	128.	4.15	3.03	165.4	39.4	10.62	0.
96	39.00N	80.00W	3.50	52	41.	4.09	2.63	63.0	33.7	9.49	10.
97	39.00N	80.50W	3.50	52	42.	4.08	2.65	46.9	34.0	10.80	11.
98	39.00N	81.00W	3.50	52	43.	4.17	2.75	36.7	36.0	12.19	10.
99	39.00N	81.50W	3.50	52	43.	4.57	2.94	35.0	42.2	12.02	9.
100	39.00N	82.00W	3.50	51	47.	3.46	3.10	6.1	33.7	11.37	8.
101	39.00N	82.50W	3.50	51	43.	3.88	2.92	9.7	35.6	11.23	8.
102	39.00N	83.00W	3.50	51	46.	4.84	3.24	44.4	49.2	11.93	6.
103	39.00N	83.50W	3.50	50	76.	3.49	3.02	16.3	33.1	11.88	5.
104	39.00N	84.00W	3.50	50	71.	3.40	3.06	167.3	32.6	11.80	5.
105	39.00N	84.50W	3.50	49	78.	3.70	2.82	154.6	32.8	12.57	3.
106	39.00N	85.00W	3.50	49	90.	4.33	3.25	160.3	44.1	13.03	1.
107	39.00N	85.50W	3.50	48	99.	5.01	3.17	157.0	49.9	12.63	1.
108	39.00N	86.00W	3.50	47	100.	4.78	2.63	145.5	39.6	12.76	1.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
109	39.00N	86.50W	3.50	46	88.	4.41	2.71	129.1	37.5	11.97	1.
110	39.00N	87.00W	3.50	45	140.	6.99	2.49	146.8	54.7	10.08	1.
111	39.00N	87.50W	3.50	44	143.	4.47	2.44	150.4	34.3	9.34	1.
112	39.00N	88.00W	3.50	43	147.	5.20	2.85	135.7	46.5	10.04	1.
113	39.00N	88.50W	3.50	42	151.	5.09	3.19	142.8	50.9	12.06	0.
114	39.00N	89.00W	3.50	41	156.	5.36	3.36	152.3	56.6	13.09	0.
115	39.50N	80.00W	3.50	53	46.	3.59	2.44	84.5	27.6	8.86	10.
116	39.50N	80.50W	3.50	53	49.	3.70	2.78	37.3	32.4	11.30	11.
117	39.50N	81.00W	3.50	53	51.	4.15	2.87	38.6	37.5	11.32	11.
118	39.50N	81.50W	3.50	52	52.	3.72	2.92	60.3	34.2	13.71	8.
119	39.50N	82.00W	3.50	51	52.	4.06	2.98	63.1	38.0	11.84	5.
120	39.50N	82.50W	3.50	51	49.	3.10	2.80	61.0	27.3	10.95	5.
121	39.50N	83.00W	3.50	50	48.	4.39	2.56	56.8	35.3	11.29	5.
122	39.50N	83.50W	3.50	49	56.	4.56	2.14	63.0	30.6	11.04	5.
123	39.50N	84.00W	3.50	49	74.	4.44	2.84	62.3	39.6	11.15	4.
124	39.50N	84.50W	3.50	48	94.	3.10	2.59	147.3	25.3	11.75	1.
125	39.50N	85.00W	3.50	47	114.	4.67	2.54	137.8	37.3	12.62	1.
126	39.50N	85.50W	3.50	47	133.	5.89	3.02	147.4	55.9	12.78	1.
127	39.50N	86.00W	3.50	46	146.	4.50	2.42	171.6	34.3	11.77	1.
128	39.50N	86.50W	3.50	45	148.	6.56	3.25	146.1	66.9	9.62	1.
129	39.50N	87.00W	3.50	44	152.	4.81	2.81	170.1	42.4	9.75	1.
130	39.50N	87.50W	3.50	43	157.	6.68	2.99	145.2	62.7	10.25	1.
131	39.50N	88.00W	3.50	42	163.	6.98	3.09	139.9	67.8	10.79	1.
132	39.50N	88.50W	3.50	41	171.	6.91	3.33	141.7	72.4	11.65	0.
133	39.50N	89.00W	3.50	40	180.	7.80	3.66	142.6	89.7	13.48	0.
134	40.00N	80.00W	3.50	53	51.	3.70	2.70	67.0	31.5	9.17	9.
135	40.00N	80.50W	3.50	53	55.	3.63	2.71	53.0	30.9	9.54	9.
136	40.00N	81.00W	3.50	52	60.	3.84	2.97	50.6	35.9	10.32	6.
137	40.00N	81.50W	3.50	51	64.	4.25	3.20	44.7	42.7	10.95	5.
138	40.00N	82.00W	3.50	51	52.	4.32	3.07	41.7	41.6	11.76	5.
139	40.00N	82.50W	3.50	50	46.	3.84	2.63	19.6	31.7	10.68	5.
140	40.00N	83.00W	3.50	49	40.	3.56	2.44	23.5	27.3	9.89	5.
141	40.00N	83.50W	3.50	48	48.	4.78	2.37	44.7	35.5	9.12	3.
142	40.00N	84.00W	3.50	47	76.	3.68	2.53	63.0	29.3	10.25	1.
143	40.00N	84.50W	3.50	47	87.	3.22	2.48	129.6	25.2	10.40	1.
144	40.00N	85.00W	3.50	46	94.	3.69	2.31	142.8	26.7	11.55	1.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
145	40.00N	85.50W	3.50	45	103.	6.71	2.82	143.7	59.4	11.28	1.
146	40.00N	86.00W	3.50	44	114.	7.33	3.08	146.1	70.9	12.28	1.
147	40.00N	86.50W	3.50	43	122.	5.01	2.88	159.6	45.3	12.00	1.
148	40.00N	87.00W	3.50	42	132.	6.39	3.45	146.3	69.3	11.51	1.
149	40.00N	87.50W	3.50	41	115.	6.85	3.28	143.5	70.7	10.97	1.
150	40.00N	88.00W	3.50	40	131.	8.11	3.27	142.9	83.3	11.14	1.
151	40.00N	88.50W	3.50	39	146.	8.81	3.48	140.9	96.5	11.94	1.
152	40.00N	89.00W	3.50	38	192.	8.51	3.84	141.5	102.8	12.46	0.
153	40.50N	80.00W	3.50	53	46.	3.60	2.73	55.2	30.8	9.29	8.
154	40.50N	80.50W	3.50	52	62.	3.31	2.71	93.5	28.2	8.92	5.
155	40.50N	81.00W	3.50	52	69.	3.49	3.38	77.0	37.1	10.29	5.
156	40.50N	81.50W	3.50	51	52.	3.85	3.47	41.9	42.0	11.71	5.
157	40.50N	82.00W	3.50	50	53.	3.97	2.84	45.8	35.4	11.34	4.
158	40.50N	82.50W	3.50	49	42.	4.48	2.83	25.6	39.9	10.63	3.
159	40.50N	83.00W	3.50	48	40.	4.33	2.63	22.9	35.7	9.62	2.
160	40.50N	83.50W	3.50	47	44.	3.54	2.39	23.7	26.6	8.74	1.
161	40.50N	84.00W	3.50	46	45.	2.50	1.75	5.5	13.7	5.22	1.
162	40.50N	84.50W	3.50	45	46.	2.60	1.80	56.4	14.7	4.11	1.
163	40.50N	85.00W	3.50	44	97.	5.30	2.40	146.6	40.0	8.36	1.
164	40.50N	85.50W	3.50	43	108.	4.86	2.84	169.1	43.4	9.99	1.
165	40.50N	86.00W	3.50	42	77.	5.84	2.83	143.1	51.8	11.30	1.
166	40.50N	86.50W	3.50	42	90.	4.39	3.24	174.8	44.7	12.01	1.
167	40.50N	87.00W	3.50	41	104.	6.70	3.00	139.8	63.2	12.88	1.
168	40.50N	87.50W	3.50	40	122.	7.32	3.57	144.0	82.1	11.88	1.
169	40.50N	88.00W	3.50	39	140.	4.23	3.42	133.5	45.5	11.39	1.
170	40.50N	88.50W	3.50	37	158.	7.20	3.07	129.8	69.4	12.46	1.
171	40.50N	89.00W	3.50	36	174.	7.81	3.32	126.0	81.5	13.56	0.
172	41.00N	80.00W	3.50	52	59.	3.36	2.85	75.9	30.1	9.67	2.
173	41.00N	80.50W	3.50	52	68.	3.69	2.83	65.0	32.8	8.58	2.
174	41.00N	81.00W	3.50	51	52.	3.82	3.09	47.7	37.0	9.91	2.
175	41.00N	81.50W	3.50	50	64.	3.73	3.19	76.3	37.3	10.17	2.
176	41.00N	82.00W	3.50	49	53.	3.71	3.47	172.0	40.4	11.16	2.
177	41.00N	82.50W	3.50	48	53.	4.31	3.15	14.3	42.6	11.21	2.
178	41.00N	83.00W	3.50	46	50.	4.22	3.19	9.3	42.2	10.74	1.
179	41.00N	83.50W	3.50	45	52.	3.70	2.55	154.7	29.6	8.33	1.
180	41.00N	84.00W	3.50	44	76.	3.30	2.66	145.9	27.5	6.13	1.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
181	41.00N	84.50W	3.50	43	86.	3.84	3.04	119.7	36.7	7.39	1.
182	41.00N	85.00W	3.50	42	99.	4.24	2.62	145.2	34.9	9.04	1.
183	41.00N	85.50W	3.50	41	61.	5.36	3.80	166.4	64.1	10.30	1.
184	41.00N	86.00W	3.50	41	70.	3.54	2.78	179.5	30.9	11.00	1.
185	41.00N	86.50W	3.50	40	84.	5.94	4.08	156.0	76.2	11.43	1.
186	41.00N	87.00W	3.50	39	100.	5.61	3.92	140.6	69.1	11.57	1.
187	41.00N	87.50W	3.50	38	125.	6.34	3.84	140.6	76.5	11.02	1.
188	41.00N	88.00W	3.50	37	151.	6.39	2.51	137.1	50.3	10.85	1.
189	41.00N	88.50W	3.50	36	174.	7.25	3.11	128.1	70.7	12.06	1.
190	41.00N	89.00W	3.50	34	192.	7.97	3.36	124.7	84.1	13.39	0.
191	41.50N	80.00W	3.50	51	59.	3.53	3.20	103.5	35.5	9.78	2.
192	41.50N	80.50W	3.50	50	62.	3.47	3.34	155.7	36.4	9.75	2.
193	41.50N	81.00W	3.50	50	67.	3.86	3.18	8.2	38.5	9.21	2.
194	41.50N	81.50W	3.50	49	61.	4.04	2.55	143.8	32.3	5.16	2.
195	41.50N	82.00W	3.50	48	70.	4.31	3.33	159.9	45.0	9.72	1.
196	41.50N	82.50W	3.50	46	73.	4.38	3.25	170.8	44.7	10.91	1.
197	41.50N	83.00W	3.50	45	67.	3.89	3.39	7.8	41.4	10.34	1.
198	41.50N	83.50W	3.50	43	62.	4.65	2.65	87.5	38.7	7.97	1.
199	41.50N	84.00W	3.50	42	70.	4.03	2.89	100.2	36.6	7.21	1.
200	41.50N	84.50W	3.50	41	81.	5.39	3.31	110.7	56.0	8.24	1.
201	41.50N	85.00W	3.50	40	80.	4.59	3.26	121.3	47.1	9.80	1.
202	41.50N	85.50W	3.50	40	72.	4.74	3.33	150.7	49.6	10.75	1.
203	41.50N	86.00W	3.50	39	58.	4.99	3.37	130.9	52.9	12.44	1.
204	41.50N	86.50W	3.50	38	68.	5.42	4.41	163.3	75.1	12.56	1.
205	41.50N	87.00W	3.50	37	82.	4.74	4.49	150.4	66.9	11.40	1.
206	41.50N	87.50W	3.50	36	121.	4.68	3.02	106.3	44.5	11.20	1.
207	41.50N	88.00W	3.50	35	147.	6.84	3.57	129.2	76.7	11.05	1.
208	41.50N	88.50W	3.50	34	159.	8.14	3.71	145.0	94.8	12.37	0.
209	41.50N	89.00W	3.50	32	175.	10.43	4.20	139.0	137.7	12.30	0.
210	42.00N	80.00W	3.50	49	54.	3.72	2.53	105.5	29.5	8.75	0.
211	42.00N	80.50W	3.50	48	71.	4.07	3.04	153.0	38.8	9.44	1.
212	42.00N	81.00W	3.50	48	73.	3.90	3.34	147.1	40.9	9.65	1.
213	42.00N	81.50W	3.50	47	75.	4.16	3.48	116.0	45.4	9.49	1.
214	42.00N	82.00W	3.50	46	96.	4.27	3.51	138.5	47.1	10.31	1.
215	42.00N	82.50W	3.50	44	106.	3.83	3.23	176.4	38.8	11.24	1.
216	42.00N	83.00W	3.50	43	104.	3.62	3.36	47.9	38.2	9.24	1.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
217	42.00N	83.50W	3.50	41	74.	4.97	3.49	97.3	54.5	7.29	1.
218	42.00N	84.00W	3.50	40	104.	4.16	3.35	73.1	43.8	7.54	1.
219	42.00N	84.50W	3.50	39	119.	3.83	3.21	116.2	38.7	8.99	1.
220	42.00N	85.00W	3.50	38	109.	4.77	3.63	54.3	54.5	9.85	1.
221	42.00N	85.50W	3.50	37	89.	5.17	4.40	64.9	71.5	10.59	1.
222	42.00N	86.00W	3.50	36	61.	4.99	3.30	136.0	51.7	12.10	1.
223	42.00N	86.50W	3.50	36	79.	5.78	4.38	154.9	79.4	12.54	1.
224	42.00N	87.00W	3.50	35	83.	5.81	3.88	167.2	70.8	10.33	1.
225	42.00N	87.50W	3.50	34	121.	6.10	3.25	152.8	62.3	7.51	1.
226	42.00N	88.00W	3.50	33	147.	5.86	3.57	120.0	65.6	10.89	1.
227	42.00N	88.50W	3.50	32	169.	5.50	2.76	143.2	47.7	10.86	0.
228	42.00N	89.00W	3.50	30	188.	12.22	5.24	140.7	201.1	12.55	0.

NETWORK SUMMARY- ERROR ELLIPSES
(MAGNITUDES RANGE FROM, 3.00 TO 3.00 IN STEPS OF 0.0)

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B(KM)	AZ IM	AREA	DEPTH	NO. NEAR STA DET
1	36.50N	80.00W	3.00	26	89.	4.97	3.90	87.8	60.9	22.81	7.
2	36.50N	80.50W	3.00	26	72.	5.08	3.79	93.1	60.4	22.76	6.
3	36.50N	81.00W	3.00	26	99.	6.82	3.58	106.8	76.8	19.84	6.
4	36.50N	81.50W	3.00	26	98.	9.18	3.79	113.7	109.3	20.58	6.
5	36.50N	82.00W	3.00	26	115.	8.74	4.30	118.5	118.2	26.43	4.
6	36.50N	82.50W	3.00	26	67.	5.18	3.53	176.6	57.4	25.32	3.
7	36.50N	83.00W	3.00	25	69.	5.76	4.97	125.2	90.0	21.41	1.
8	36.50N	83.50W	3.00	24	60.	5.18	4.29	107.6	69.8	23.23	0.
9	36.50N	84.00W	3.00	23	75.	5.32	3.94	84.4	65.9	28.49	0.
10	36.50N	84.50W	3.00	22	95.	4.86	3.12	33.7	47.6	32.23	0.
11	36.50N	85.00W	3.00	21	115.	6.28	4.04	19.6	79.7	27.99	0.
12	36.50N	85.50W	3.00	21	83.	6.42	4.53	7.6	91.3	24.14	0.
13	36.50N	86.00W	3.00	21	93.	6.90	5.05	179.6	109.5	25.75	0.
14	36.50N	86.50W	3.00	21	85.	6.83	5.39	172.7	115.6	24.20	0.
15	36.50N	87.00W	3.00	21	96.	8.05	3.50	19.1	88.6	23.89	0.
16	36.50N	87.50W	3.00	22	118.	6.93	5.70	5.5	124.0	21.70	0.
17	36.50N	88.00W	3.00	23	113.	5.74	4.75	159.6	85.7	20.79	0.
18	36.50N	88.50W	3.00	24	91.	7.54	3.98	119.9	94.2	15.76	0.
19	36.50N	89.00W	3.00	24	80.	5.25	2.48	119.9	40.8	8.88	0.
20	37.00N	80.00W	3.00	27	59.	4.15	3.19	165.5	41.5	13.40	7.
21	37.00N	80.50W	3.00	27	55.	3.80	2.93	162.0	34.9	11.99	7.
22	37.00N	81.00W	3.00	27	72.	4.39	3.66	124.3	50.5	9.06	7.
23	37.00N	81.50W	3.00	28	68.	6.76	3.85	128.9	81.7	14.84	6.
24	37.00N	82.00W	3.00	27	71.	4.99	4.15	5.6	65.1	17.72	5.
25	37.00N	82.50W	3.00	27	71.	5.44	4.15	49.2	70.9	19.46	4.
26	37.00N	83.00W	3.00	26	58.	5.14	4.20	65.6	67.8	19.05	2.
27	37.00N	83.50W	3.00	25	60.	5.17	4.29	66.3	69.7	21.38	0.
28	37.00N	84.00W	3.00	24	78.	5.58	4.39	62.9	77.0	29.05	0.
29	37.00N	84.50W	3.00	23	82.	5.21	4.38	50.5	71.7	30.06	0.
30	37.00N	85.00W	3.00	22	100.	5.13	4.71	5.7	75.9	35.60	0.
31	37.00N	85.50W	3.00	22	106.	5.78	4.58	157.3	83.2	39.51	0.
32	37.00N	86.00W	3.00	22	107.	6.37	4.79	153.9	95.9	34.08	0.
33	37.00N	86.50W	3.00	22	107.	6.83	5.10	158.2	109.4	28.15	0.
34	37.00N	87.00W	3.00	23	106.	6.38	3.50	26.8	70.2	25.62	0.
35	37.00N	87.50W	3.00	24	104.	5.55	5.18	48.6	90.4	20.73	0.
36	37.00N	88.00W	3.00	25	100.	3.91	3.30	28.0	40.6	18.00	0.

APPENDIX IIe

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
37	37.00N	88.50W	3.00	26	94.	5.81	2.71	123.9	49.5	11.77	0.
38	37.00N	89.00W	3.00	26	58.	2.58	2.44	137.5	19.7	8.84	0.
39	37.50N	80.00W	3.00	28	49.	3.55	2.55	141.1	28.4	12.38	7.
40	37.50N	80.50W	3.00	28	68.	3.36	2.42	146.0	25.6	11.70	7.
41	37.50N	81.00W	3.00	28	79.	4.08	2.41	117.6	30.9	8.12	7.
42	37.50N	81.50W	3.00	29	84.	4.77	3.36	13.4	50.4	15.44	7.
43	37.50N	82.00W	3.00	29	85.	5.51	3.06	24.2	53.0	15.75	5.
44	37.50N	82.50W	3.00	28	83.	6.20	2.99	38.4	58.1	16.04	4.
45	37.50N	83.00W	3.00	27	59.	5.26	3.71	63.4	61.3	16.39	3.
46	37.50N	83.50W	3.00	26	62.	4.95	4.03	37.7	62.7	21.77	0.
47	37.50N	84.00W	3.00	25	74.	5.65	4.19	47.6	74.5	31.56	0.
48	37.50N	84.50W	3.00	23	83.	5.07	4.47	34.8	71.2	32.14	0.
49	37.50N	85.00W	3.00	23	85.	5.01	4.46	150.1	70.3	29.53	0.
50	37.50N	85.50W	3.00	22	95.	6.00	4.23	137.0	79.8	31.35	0.
51	37.50N	86.00W	3.00	23	101.	6.81	4.19	140.0	89.6	26.05	0.
52	37.50N	86.50W	3.00	23	96.	6.82	4.45	144.8	95.2	22.39	0.
53	37.50N	87.00W	3.00	25	95.	5.38	4.59	147.9	77.7	21.17	0.
54	37.50N	87.50W	3.00	25	96.	5.17	4.22	109.1	68.5	16.55	0.
55	37.50N	88.00W	3.00	26	89.	4.50	3.03	128.7	42.8	9.73	0.
56	37.50N	88.50W	3.00	26	75.	3.45	2.53	123.4	27.4	8.77	0.
57	37.50N	89.00W	3.00	26	65.	3.88	2.24	137.1	27.3	10.20	0.
58	38.00N	80.00W	3.00	29	64.	3.62	2.39	117.3	27.1	10.55	7.
59	38.00N	80.50W	3.00	29	94.	4.45	2.65	137.9	37.1	12.96	7.
60	38.00N	81.00W	3.00	29	103.	4.04	3.44	91.6	43.6	16.38	7.
61	38.00N	81.50W	3.00	29	106.	4.69	3.28	22.6	48.4	19.13	7.
62	38.00N	82.00W	3.00	29	103.	4.96	3.07	24.9	47.8	20.76	5.
63	38.00N	82.50W	3.00	28	99.	4.46	3.45	13.1	48.4	15.48	3.
64	38.00N	83.00W	3.00	27	93.	6.71	2.86	56.9	60.3	9.59	1.
65	38.00N	83.50W	3.00	26	86.	6.49	3.56	37.9	72.6	19.64	0.
66	38.00N	84.00W	3.00	25	79.	6.48	4.06	44.1	82.7	25.69	0.
67	38.00N	84.50W	3.00	24	81.	5.31	4.51	32.7	75.2	25.87	0.
68	38.00N	85.00W	3.00	23	80.	5.27	4.62	144.5	76.5	25.91	0.
69	38.00N	85.50W	3.00	23	82.	6.40	4.22	136.2	84.8	30.05	0.
70	38.00N	86.00W	3.00	23	92.	4.26	3.72	12.6	49.7	28.78	0.
71	38.00N	86.50W	3.00	24	90.	6.43	3.63	145.6	73.3	23.75	0.
72	38.00N	87.00W	3.00	25	86.	3.74	3.15	7.2	37.0	20.90	0.

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
73	38.00N	87.50W	3.00	25	85.	4.98	3.53	111.9	55.2	15.58	0.
74	38.00N	88.00W	3.00	26	61.	4.15	2.37	137.7	30.8	8.18	0.
75	38.00N	88.50W	3.00	26	53.	3.02	2.63	114.2	24.9	9.75	0.
76	38.00N	89.00W	3.00	26	112.	3.67	3.19	156.2	36.8	12.73	0.
77	38.50N	80.00W	3.00	29	146.	5.11	3.25	13.2	52.1	9.01	6.
78	38.50N	80.50W	3.00	29	141.	4.88	3.36	17.0	51.6	15.69	7.
79	38.50N	81.00W	3.00	29	136.	5.29	3.21	35.7	53.3	25.08	6.
80	38.50N	81.50W	3.00	29	131.	6.64	3.37	40.4	70.2	21.23	5.
81	38.50N	82.00W	3.00	29	125.	5.37	3.49	36.8	58.9	22.14	4.
82	38.50N	82.50W	3.00	28	116.	4.23	3.33	9.5	44.3	16.58	1.
83	38.50N	83.00W	3.00	27	106.	5.90	3.76	58.0	69.7	17.69	0.
84	38.50N	83.50W	3.00	26	97.	6.95	3.79	53.6	82.8	25.53	0.
85	38.50N	84.00W	3.00	25	85.	6.67	3.76	54.4	78.8	18.98	0.
86	38.50N	84.50W	3.00	24	74.	5.31	4.46	69.9	74.4	20.02	0.
87	38.50N	85.00W	3.00	23	73.	5.57	4.54	137.8	79.5	21.89	0.
88	38.50N	85.50W	3.00	23	77.	4.53	3.73	46.9	53.0	23.93	0.
89	38.50N	86.00W	3.00	23	88.	6.54	4.13	141.0	84.9	19.45	0.
90	38.50N	86.50W	3.00	24	85.	6.43	3.44	139.7	69.5	19.13	0.
91	38.50N	87.00W	3.00	24	113.	7.44	2.87	146.2	67.2	21.48	0.
92	38.50N	87.50W	3.00	25	108.	3.51	2.93	145.7	32.3	11.83	0.
93	38.50N	88.00W	3.00	25	134.	4.15	2.54	178.6	33.2	7.30	0.
94	38.50N	88.50W	3.00	25	147.	5.60	3.45	163.4	60.8	12.05	0.
95	38.50N	89.00W	3.00	24	149.	6.10	3.34	6.7	64.1	16.77	0.
96	39.00N	80.00W	3.00	29	107.	5.64	3.46	69.3	61.3	13.90	2.
97	39.00N	80.50W	3.00	29	99.	5.42	3.54	52.9	60.3	19.14	3.
98	39.00N	81.00W	3.00	29	159.	7.98	3.35	37.7	84.0	31.81	3.
99	39.00N	81.50W	3.00	28	113.	8.79	3.51	42.6	96.8	29.91	3.
100	39.00N	82.00W	3.00	28	95.	9.68	3.76	44.5	114.2	25.19	2.
101	39.00N	82.50W	3.00	27	88.	7.50	3.98	47.2	93.7	21.24	0.
102	39.00N	83.00W	3.00	26	82.	7.32	3.82	53.9	87.8	23.82	1.
103	39.00N	83.50W	3.00	25	76.	6.66	3.81	58.6	79.8	23.73	1.
104	39.00N	84.00W	3.00	24	73.	5.39	3.40	43.6	57.6	12.54	1.
105	39.00N	84.50W	3.00	23	78.	5.29	3.94	125.6	65.5	13.56	1.
106	39.00N	85.00W	3.00	22	90.	5.68	4.13	143.2	73.6	20.51	1.
107	39.00N	85.50W	3.00	22	99.	6.76	3.92	146.1	83.3	18.63	1.
108	39.00N	86.00W	3.00	22	100.	6.23	4.05	150.5	79.2	19.60	0.

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
109	39.00N	86.50W	3.00	22	97.	6.33	3.33	124.1	66.1	23.01	0.
110	39.00N	87.00W	3.00	23	146.	11.48	2.87	145.1	103.7	14.77	0.
111	39.00N	87.50W	3.00	23	152.	8.20	3.03	136.0	78.0	15.36	0.
112	39.00N	88.00W	3.00	23	157.	6.24	3.64	131.4	71.5	17.08	0.
113	39.00N	88.50W	3.00	23	159.	6.35	4.51	168.6	90.0	17.00	0.
114	39.00N	89.00W	3.00	22	187.	11.14	4.43	6.5	155.0	17.55	0.
115	39.50N	80.00W	3.00	29	107.	4.98	2.76	85.7	43.1	16.04	2.
116	39.50N	80.50W	3.00	29	89.	5.25	3.41	33.6	56.2	20.54	2.
117	39.50N	81.00W	3.00	28	96.	6.87	3.42	36.1	73.8	20.13	1.
118	39.50N	81.50W	3.00	27	114.	5.68	3.38	62.3	60.4	25.10	1.
119	39.50N	82.00W	3.00	26	104.	6.12	3.41	62.8	65.6	21.39	0.
120	39.50N	82.50W	3.00	26	96.	5.81	3.16	56.0	57.8	18.39	1.
121	39.50N	83.00W	3.00	25	88.	6.16	2.97	57.5	57.4	19.03	1.
122	39.50N	83.50W	3.00	24	81.	5.13	2.38	65.9	38.4	16.23	1.
123	39.50N	84.00W	3.00	22	79.	5.72	3.30	90.5	59.3	13.51	1.
124	39.50N	84.50W	3.00	22	94.	6.34	3.21	86.9	64.0	14.65	1.
125	39.50N	85.00W	3.00	21	117.	5.92	3.90	120.5	72.6	17.34	1.
126	39.50N	85.50W	3.00	21	137.	10.24	3.62	138.6	116.4	22.51	1.
127	39.50N	86.00W	3.00	21	151.	15.59	3.57	141.8	175.1	20.65	1.
128	39.50N	86.50W	3.00	21	160.	10.74	3.88	136.7	131.0	15.63	0.
129	39.50N	87.00W	3.00	21	168.	7.78	3.87	143.5	94.5	17.18	0.
130	39.50N	87.50W	3.00	21	171.	8.71	3.69	140.7	101.1	18.16	0.
131	39.50N	88.00W	3.00	21	178.	8.97	3.92	135.1	110.4	18.60	0.
132	39.50N	88.50W	3.00	21	182.	8.07	4.48	142.8	113.7	19.32	0.
133	39.50N	89.00W	3.00	20	193.	10.37	5.54	155.4	180.5	19.85	0.
134	40.00N	80.00W	3.00	28	154.	7.33	3.34	59.6	77.0	12.89	2.
135	40.00N	80.50W	3.00	28	120.	5.63	3.24	53.9	57.3	15.23	1.
136	40.00N	81.00W	3.00	27	97.	5.78	3.76	55.5	68.3	17.16	1.
137	40.00N	81.50W	3.00	26	75.	5.97	4.06	53.2	76.1	17.06	0.
138	40.00N	82.00W	3.00	25	112.	6.49	3.79	47.2	77.3	18.16	1.
139	40.00N	82.50W	3.00	24	102.	6.65	3.66	37.7	76.6	16.16	1.
140	40.00N	83.00W	3.00	23	93.	6.60	3.24	34.2	67.2	14.62	1.
141	40.00N	83.50W	3.00	22	91.	6.51	3.45	47.7	70.5	13.62	1.
142	40.00N	84.00W	3.00	21	83.	4.50	3.96	65.1	56.0	14.79	1.
143	40.00N	84.50W	3.00	21	94.	4.37	3.00	133.6	41.2	14.29	1.
144	40.00N	85.00W	3.00	20	134.	9.04	3.87	137.0	109.8	17.86	1.

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZIM	AREA	DEPTH	NO. STA	NEAR DET
145	40.00N	85.50W	3.00	20	156.	12.30	3.64	140.5	140.8	19.56	1.	
146	40.00N	86.00W	3.00	19	162.	15.61	3.87	143.3	190.0	19.03	1.	
147	40.00N	86.50W	3.00	19	178.	13.39	4.26	143.0	179.4	20.48	0.	
148	40.00N	87.00W	3.00	19	185.	11.83	4.61	143.1	171.3	20.32	0.	
149	40.00N	87.50W	3.00	19	190.	12.03	4.40	146.3	166.3	19.18	0.	
150	40.00N	88.00W	3.00	19	197.	13.55	4.27	142.8	181.8	20.75	0.	
151	40.00N	88.50W	3.00	18	205.	14.51	4.55	139.9	207.4	24.99	0.	
152	40.00N	89.00W	3.00	17	212.	14.91	5.41	141.6	253.5	24.36	0.	
153	40.50N	80.00W	3.00	27	90.	6.29	3.33	55.8	65.8	14.71	0.	
154	40.50N	80.50W	3.00	26	105.	4.13	3.51	97.3	45.5	15.83	0.	
155	40.50N	81.00W	3.00	25	73.	5.11	4.24	29.0	68.0	16.98	0.	
156	40.50N	81.50W	3.00	25	76.	5.92	4.37	35.3	81.3	17.22	0.	
157	40.50N	82.00W	3.00	24	83.	6.18	4.19	28.8	81.4	16.90	1.	
158	40.50N	82.50W	3.00	23	106.	6.23	3.88	23.2	75.9	14.41	1.	
159	40.50N	83.00W	3.00	22	103.	5.36	3.98	2.9	67.1	13.73	1.	
160	40.50N	83.50W	3.00	21	94.	4.39	3.55	141.4	48.9	12.16	1.	
161	40.50N	84.00W	3.00	20	83.	3.34	2.07	155.9	21.8	7.99	1.	
162	40.50N	84.50W	3.00	19	71.	2.81	1.85	57.9	16.3	7.28	1.	
163	40.50N	85.00W	3.00	19	159.	7.32	4.55	146.0	104.7	14.57	1.	
164	40.50N	85.50W	3.00	18	165.	11.70	4.35	153.2	160.1	19.55	1.	
165	40.50N	86.00W	3.00	18	172.	12.02	4.71	151.1	177.7	21.94	1.	
166	40.50N	86.50W	3.00	18	178.	15.10	4.80	149.8	227.8	24.49	1.	
167	40.50N	87.00W	3.00	18	183.	16.48	5.22	146.9	270.1	24.41	0.	
168	40.50N	87.50W	3.00	17	209.	19.37	5.23	146.5	318.3	21.57	0.	
169	40.50N	88.00W	3.00	17	215.	17.93	4.84	148.1	272.6	22.55	0.	
170	40.50N	88.50W	3.00	16	221.	20.87	5.08	144.9	333.3	23.01	0.	
171	40.50N	89.00W	3.00	15	227.	22.73	5.56	142.7	396.9	28.78	0.	
172	41.00N	80.00W	3.00	25	79.	4.53	4.35	121.1	61.8	15.44	0.	
173	41.00N	80.50W	3.00	25	81.	5.16	4.00	39.0	64.9	13.22	0.	
174	41.00N	81.00W	3.00	24	78.	5.94	4.22	22.8	78.9	14.85	0.	
175	41.00N	81.50W	3.00	24	89.	5.04	4.11	66.1	65.0	14.01	0.	
176	41.00N	82.00W	3.00	22	89.	6.83	4.68	16.0	100.5	15.74	1.	
177	41.00N	82.50W	3.00	22	108.	6.13	4.68	10.0	90.2	14.29	1.	
178	41.00N	83.00W	3.00	21	105.	5.99	4.54	121.6	85.4	14.50	1.	
179	41.00N	83.50W	3.00	20	127.	6.99	3.03	114.9	66.5	12.10	1.	
180	41.00N	84.00W	3.00	19	141.	3.68	2.55	129.4	29.5	9.63	1.	

	LAT.	LONG.	MAG	NST	LOA	A (KM)	B (KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
181	41.00N	84.50W	3.00	19	164.	5.69	3.05	122.5	54.5	14.45	1.
182	41.00N	85.00W	3.00	18	170.	6.23	3.51	151.5	68.8	16.22	1.
183	41.00N	85.50W	3.00	17	113.	7.88	6.17	2.1	152.7	21.64	1.
184	41.00N	86.00W	3.00	17	129.	9.01	6.47	160.0	183.1	24.01	1.
185	41.00N	86.50W	3.00	17	144.	10.51	6.68	148.7	220.7	26.86	0.
186	41.00N	87.00W	3.00	16	119.	7.83	6.58	19.9	162.0	27.42	0.
187	41.00N	87.50W	3.00	16	129.	7.35	6.93	118.6	160.1	23.28	0.
188	41.00N	88.00W	3.00	15	157.	9.35	6.45	127.3	189.4	23.31	0.
189	41.00N	88.50W	3.00	14	180.	13.60	5.96	135.3	254.4	29.85	0.
190	41.00N	89.00W	3.00	13	240.	28.48	6.36	146.1	569.1	37.31	0.
191	41.50N	80.00W	3.00	24	86.	5.06	3.77	121.3	59.9	14.41	0.
192	41.50N	80.50W	3.00	23	79.	4.82	4.06	135.2	61.6	15.59	0.
193	41.50N	81.00W	3.00	23	77.	4.93	4.01	173.4	62.1	13.21	0.
194	41.50N	81.50W	3.00	22	103.	5.72	3.35	131.3	60.2	7.18	0.
195	41.50N	82.00W	3.00	22	95.	6.02	4.04	171.3	76.4	14.54	0.
196	41.50N	82.50W	3.00	21	107.	6.25	5.16	139.0	101.2	16.53	1.
197	41.50N	83.00W	3.00	20	130.	6.55	4.64	110.2	95.6	16.93	1.
198	41.50N	83.50W	3.00	19	120.	7.86	2.59	102.3	64.0	11.21	1.
199	41.50N	84.00W	3.00	19	137.	9.43	3.18	118.6	94.2	12.37	1.
200	41.50N	84.50W	3.00	18	81.	7.11	3.73	108.1	83.3	19.99	1.
201	41.50N	85.00W	3.00	17	95.	7.30	5.24	87.4	120.2	21.25	1.
202	41.50N	85.50W	3.00	17	114.	6.17	4.04	145.3	78.4	21.72	1.
203	41.50N	86.00W	3.00	16	135.	8.90	7.34	75.8	205.3	25.96	1.
204	41.50N	86.50W	3.00	16	87.	8.24	5.69	25.1	147.4	35.94	0.
205	41.50N	87.00W	3.00	15	86.	8.28	5.28	31.4	137.3	42.79	0.
206	41.50N	87.50W	3.00	15	126.	7.92	4.61	63.5	114.7	25.31	0.
207	41.50N	88.00W	3.00	14	179.	10.55	5.60	112.0	185.5	36.43	0.
208	41.50N	88.50W	3.00	13	207.	18.02	6.80	134.9	385.1	36.61	0.
209	41.50N	89.00W	3.00	12	223.	27.06	7.44	139.8	632.7	51.32	0.
210	42.00N	80.00W	3.00	22	79.	5.08	3.20	121.9	51.1	12.43	0.
211	42.00N	80.50W	3.00	21	87.	6.31	3.36	157.7	66.6	14.52	0.
212	42.00N	81.00W	3.00	21	87.	5.68	4.08	144.0	72.9	15.11	0.
213	42.00N	81.50W	3.00	20	111.	6.37	3.86	119.1	77.1	14.19	0.
214	42.00N	82.00W	3.00	20	96.	9.32	4.19	135.9	122.6	22.26	0.
215	42.00N	82.50W	3.00	19	133.	10.05	4.45	134.1	140.7	18.42	0.
216	42.00N	83.00W	3.00	19	119.	7.16	4.55	124.8	102.3	14.06	1.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
217	42.00N	83.50W	3.00	18	108.	9.24	3.72	96.9	107.9	10.83	1.
218	42.00N	84.00W	3.00	18	104.	7.07	4.11	109.5	91.3	13.53	1.
219	42.00N	84.50W	3.00	17	119.	7.05	4.92	115.7	108.9	20.74	1.
220	42.00N	85.00W	3.00	17	109.	6.50	5.27	84.3	107.7	28.52	1.
221	42.00N	85.50W	3.00	16	109.	8.80	4.99	74.4	138.0	19.79	1.
222	42.00N	86.00W	3.00	15	104.	5.97	3.91	132.1	73.3	34.91	0.
223	42.00N	86.50W	3.00	15	133.	7.29	5.85	162.4	134.0	31.22	0.
224	42.00N	87.00W	3.00	14	154.	9.23	4.55	174.4	131.9	26.00	0.
225	42.00N	87.50W	3.00	13	121.	7.26	3.81	157.8	87.0	18.86	0.
226	42.00N	88.00W	3.00	13	153.	8.32	7.03	72.2	183.6	25.40	0.
227	42.00N	88.50W	3.00	12	175.	10.79	7.81	126.0	264.7	48.88	0.
228	42.00N	89.00W	3.00	10	252.	53.22	9.08	149.7	1518.7	58.34	0.

NETWORK SUMMARY- ERROR ELLIPSES
(MAGNITUDES RANGE FROM, 2.50 TO 2.50 IN STEPS OF 0.0)

	LAT.	LONG.	MAG	NST	TO STATION LOA	MINIMUM A(KM)	COVERAGE B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA. DET
1	36.50N	80.00W	2.50	14	89.	6.06	4.82	81.0	91.9	29.26	4.
2	36.50N	80.50W	2.50	13	120.	6.99	4.77	82.0	104.8	32.73	4.
3	36.50N	81.00W	2.50	12	152.	11.03	4.93	97.7	171.0	34.04	4.
4	36.50N	81.50W	2.50	11	187.	17.19	5.64	108.7	304.7	45.49	3.
5	36.50N	82.00W	2.50	10	147.	13.49	6.23	122.9	263.9	100.94	1.
6	36.50N	82.50W	0.77	0	0.	0.0	0.0	0.0	0.0	0.0	0.
7	36.50N	83.00W	0.57	0	0.	0.0	0.0	0.0	0.0	0.0	0.
8	36.50N	83.50W	0.45	0	0.	0.0	0.0	0.0	0.0	0.0	0.
9	36.50N	84.00W	0.34	0	0.	0.0	0.0	0.0	0.0	0.0	0.
10	36.50N	84.50W	0.24	0	0.	0.0	0.0	0.0	0.0	0.0	0.
11	36.50N	85.00W	0.22	0	0.	0.0	0.0	0.0	0.0	0.0	0.
12	36.50N	85.50W	0.24	0	0.	0.0	0.0	0.0	0.0	0.0	0.
13	36.50N	86.00W	0.29	0	0.	0.0	0.0	0.0	0.0	0.0	0.
14	36.50N	86.50W	0.38	0	0.	0.0	0.0	0.0	0.0	0.0	0.
15	36.50N	87.00W	0.55	0	0.	0.0	0.0	0.0	0.0	0.0	0.
16	36.50N	87.50W	0.76	0	0.	0.0	0.0	0.0	0.0	0.0	0.
17	36.50N	88.00W	2.50	10	258.	22.86	7.61	102.2	546.4	83.96	0.
18	36.50N	88.50W	2.50	12	225.	12.10	4.78	111.4	181.7	34.78	0.
19	36.50N	89.00W	2.50	14	196.	6.79	2.73	117.0	58.2	12.92	0.
20	37.00N	80.00W	2.50	16	68.	4.99	3.57	168.4	56.0	16.79	6.
21	37.00N	80.50W	2.50	15	70.	4.25	3.39	157.0	45.3	16.40	6.
22	37.00N	81.00W	2.50	14	152.	4.94	4.47	90.0	69.3	12.47	5.
23	37.00N	81.50W	2.50	12	208.	12.51	4.69	120.9	184.4	23.07	5.
24	37.00N	82.00W	2.50	11	177.	15.47	5.40	134.9	262.2	43.62	3.
25	37.00N	82.50W	2.50	10	107.	7.10	5.24	72.3	116.9	47.85	0.
26	37.00N	83.00W	0.80	0	0.	0.0	0.0	0.0	0.0	0.0	0.
27	37.00N	83.50W	0.58	0	0.	0.0	0.0	0.0	0.0	0.0	0.
28	37.00N	84.00W	0.41	0	0.	0.0	0.0	0.0	0.0	0.0	0.
29	37.00N	84.50W	0.32	0	0.	0.0	0.0	0.0	0.0	0.0	0.
30	37.00N	85.00W	0.29	0	0.	0.0	0.0	0.0	0.0	0.0	0.
31	37.00N	85.50W	0.31	0	0.	0.0	0.0	0.0	0.0	0.0	0.
32	37.00N	86.00W	0.37	0	0.	0.0	0.0	0.0	0.0	0.0	0.
33	37.00N	86.50W	0.50	0	0.	0.0	0.0	0.0	0.0	0.0	0.
34	37.00N	87.00W	0.71	0	0.	0.0	0.0	0.0	0.0	0.0	0.
35	37.00N	87.50W	2.50	10	278.	31.33	9.19	90.9	904.9	63.14	0.
36	37.00N	88.00W	2.50	12	236.	13.15	4.81	113.5	198.7	32.98	0.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
37	37.00N	88.50W	2.50	14	185.	7.98	3.22	117.4	80.9	16.86	0.
38	37.00N	89.00W	2.50	15	70.	2.80	2.63	179.9	23.1	15.54	0.
39	37.50N	80.00W	2.50	17	88.	3.93	2.74	138.3	33.8	21.67	7.
40	37.50N	80.50W	2.50	16	100.	3.60	2.67	139.8	30.3	19.99	7.
41	37.50N	81.00W	2.50	14	206.	6.75	2.55	118.1	54.1	11.51	5.
42	37.50N	81.50W	2.50	13	222.	11.29	5.67	129.2	201.2	25.79	5.
43	37.50N	82.00W	2.50	12	123.	8.03	3.96	18.5	99.9	35.06	4.
44	37.50N	82.50W	2.50	11	104.	7.83	3.71	43.2	91.3	40.39	0.
45	37.50N	83.00W	0.88	0	0.	0.0	0.0	0.0	0.0	0.0	0.
46	37.50N	83.50W	0.77	0	0.	0.0	0.0	0.0	0.0	0.0	0.
47	37.50N	84.00W	0.56	0	0.	0.0	0.0	0.0	0.0	0.0	0.
48	37.50N	84.50W	0.42	0	0.	0.0	0.0	0.0	0.0	0.0	0.
49	37.50N	85.00W	0.37	0	0.	0.0	0.0	0.0	0.0	0.0	0.
50	37.50N	85.50W	0.38	0	0.	0.0	0.0	0.0	0.0	0.0	0.
51	37.50N	86.00W	0.47	0	0.	0.0	0.0	0.0	0.0	0.0	0.
52	37.50N	86.50W	0.63	0	0.	0.0	0.0	0.0	0.0	0.0	0.
53	37.50N	87.00W	0.88	0	0.	0.0	0.0	0.0	0.0	0.0	0.
54	37.50N	87.50W	2.50	12	248.	15.73	5.62	112.5	277.8	36.09	0.
55	37.50N	88.00W	2.50	13	197.	7.81	3.49	123.2	85.7	14.09	0.
56	37.50N	88.50W	2.50	14	107.	3.72	2.69	122.4	31.4	14.26	0.
57	37.50N	89.00W	2.50	15	91.	4.55	2.50	139.4	35.8	13.81	0.
58	38.00N	80.00W	2.50	17	137.	4.51	2.48	116.4	35.2	18.78	6.
59	38.00N	80.50W	2.50	16	196.	9.49	2.76	134.8	82.2	22.24	6.
60	38.00N	81.00W	2.50	15	228.	14.69	3.90	124.0	180.2	28.95	6.
61	38.00N	81.50W	2.50	13	241.	15.26	6.70	119.8	321.2	45.10	4.
62	38.00N	82.00W	2.50	12	173.	11.44	4.25	5.1	152.9	42.62	1.
63	38.00N	82.50W	2.50	11	101.	8.82	4.58	2.4	126.8	42.91	0.
64	38.00N	83.00W	2.50	10	172.	13.47	5.62	62.8	237.7	13.68	0.
65	38.00N	83.50W	0.84	0	0.	0.0	0.0	0.0	0.0	0.0	0.
66	38.00N	84.00W	0.71	0	0.	0.0	0.0	0.0	0.0	0.0	0.
67	38.00N	84.50W	0.55	0	0.	0.0	0.0	0.0	0.0	0.0	0.
68	38.00N	85.00W	0.50	0	0.	0.0	0.0	0.0	0.0	0.0	0.
69	38.00N	85.50W	0.51	0	0.	0.0	0.0	0.0	0.0	0.0	0.
70	38.00N	86.00W	0.58	0	0.	0.0	0.0	0.0	0.0	0.0	0.
71	38.00N	86.50W	0.74	0	0.	0.0	0.0	0.0	0.0	0.0	0.
72	38.00N	87.00W	2.50	10	217.	13.87	7.45	127.0	324.4	47.44	0.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
73	38.00N	87.50W	2.50	12	188.	8.42	4.40	110.6	116.3	22.10	0.
74	38.00N	88.00W	2.50	13	123.	4.53	2.50	137.8	35.6	12.84	0.
75	38.00N	88.50W	2.50	14	66.	3.34	2.82	106.7	29.6	16.23	0.
76	38.00N	89.00W	2.50	14	122.	4.64	3.75	134.9	54.7	24.46	0.
77	38.50N	80.00W	2.50	15	237.	14.38	4.47	162.1	201.9	16.04	1.
78	38.50N	80.50W	2.50	14	252.	19.91	4.69	151.9	293.4	27.30	2.
79	38.50N	81.00W	2.50	13	257.	27.57	5.81	143.1	503.5	40.92	2.
80	38.50N	81.50W	2.50	12	262.	25.30	8.07	133.2	641.4	70.06	1.
81	38.50N	82.00W	2.50	11	223.	18.18	6.69	161.2	382.0	66.05	0.
82	38.50N	82.50W	2.50	10	150.	9.15	6.37	80.5	183.2	56.36	0.
83	38.50N	83.00W	2.50	10	155.	26.38	4.83	72.6	400.4	39.86	0.
84	38.50N	83.50W	0.88	0	0.	0.0	0.0	0.0	0.0	0.0	0.
85	38.50N	84.00W	0.79	0	0.	0.0	0.0	0.0	0.0	0.0	0.
86	38.50N	84.50W	0.74	0	0.	0.0	0.0	0.0	0.0	0.0	0.
87	38.50N	85.00W	0.69	0	0.	0.0	0.0	0.0	0.0	0.0	0.
88	38.50N	85.50W	0.62	0	0.	0.0	0.0	0.0	0.0	0.0	0.
89	38.50N	86.00W	0.65	0	0.	0.0	0.0	0.0	0.0	0.0	0.
90	38.50N	86.50W	0.79	0	0.	0.0	0.0	0.0	0.0	0.0	0.
91	38.50N	87.00W	2.50	10	113.	10.16	5.48	143.1	174.9	29.89	0.
92	38.50N	87.50W	2.50	11	154.	5.99	3.98	79.7	74.8	15.31	0.
93	38.50N	88.00W	2.50	12	157.	5.21	2.79	3.1	45.7	10.66	0.
94	38.50N	88.50W	2.50	12	166.	9.03	4.04	148.4	114.6	16.88	0.
95	38.50N	89.00W	2.50	12	169.	8.49	3.82	18.4	101.8	31.93	0.
96	39.00N	80.00W	2.50	13	277.	21.61	9.10	163.0	617.8	46.18	1.
97	39.00N	80.50W	2.50	12	276.	27.60	9.57	168.1	830.1	60.90	1.
98	39.00N	81.00W	2.50	11	275.	46.76	10.15	158.4	1491.0	80.34	1.
99	39.00N	81.50W	2.50	10	276.	42.35	11.83	148.2	1573.5	181.19	0.
100	39.00N	82.00W	0.90	0	0.	0.0	0.0	0.0	0.0	0.0	0.
101	39.00N	82.50W	0.87	0	0.	0.0	0.0	0.0	0.0	0.0	0.
102	39.00N	83.00W	0.86	0	0.	0.0	0.0	0.0	0.0	0.0	0.
103	39.00N	83.50W	0.88	0	0.	0.0	0.0	0.0	0.0	0.0	0.
104	39.00N	84.00W	0.88	0	0.	0.0	0.0	0.0	0.0	0.0	0.
105	39.00N	84.50W	0.87	0	0.	0.0	0.0	0.0	0.0	0.0	0.
106	39.00N	85.00W	0.84	0	0.	0.0	0.0	0.0	0.0	0.0	0.
107	39.00N	85.50W	0.74	0	0.	0.0	0.0	0.0	0.0	0.0	0.
108	39.00N	86.00W	0.68	0	0.	0.0	0.0	0.0	0.0	0.0	0.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
109	39.00N	86.50W	0.71	0	0.	0.0	0.0	0.0	0.0	0.0	0.
110	39.00N	87.00W	0.82	0	0.	0.0	0.0	0.0	0.0	0.0	0.
111	39.00N	87.50W	0.89	0	0.	0.0	0.0	0.0	0.0	0.0	0.
112	39.00N	88.00W	2.50	10	190.	10.41	6.77	162.8	221.5	32.50	0.
113	39.00N	88.50W	2.50	10	189.	11.58	6.61	177.5	240.5	38.90	0.
114	39.00N	89.00W	0.87	0	0.	0.0	0.0	0.0	0.0	0.0	0.
115	39.50N	80.00W	2.50	11	175.	19.91	3.21	92.1	200.9	21.62	1.
116	39.50N	80.50W	2.50	10	244.	27.73	6.19	124.9	539.0	42.51	0.
117	39.50N	81.00W	0.90	0	0.	0.0	0.0	0.0	0.0	0.0	0.
118	39.50N	81.50W	0.85	0	0.	0.0	0.0	0.0	0.0	0.0	0.
119	39.50N	82.00W	0.84	0	0.	0.0	0.0	0.0	0.0	0.0	0.
120	39.50N	82.50W	0.85	0	0.	0.0	0.0	0.0	0.0	0.0	0.
121	39.50N	83.00W	0.88	0	0.	0.0	0.0	0.0	0.0	0.0	0.
122	39.50N	83.50W	2.50	10	251.	31.97	6.39	110.7	641.6	43.92	1.
123	39.50N	84.00W	2.50	10	199.	17.52	3.92	104.5	215.8	45.35	1.
124	39.50N	84.50W	2.50	10	118.	9.66	3.87	83.8	117.6	50.12	1.
125	39.50N	85.00W	0.90	0	0.	0.0	0.0	0.0	0.0	0.0	0.
126	39.50N	85.50W	0.81	0	0.	0.0	0.0	0.0	0.0	0.0	0.
127	39.50N	86.00W	0.71	0	0.	0.0	0.0	0.0	0.0	0.0	0.
128	39.50N	86.50W	0.63	0	0.	0.0	0.0	0.0	0.0	0.0	0.
129	39.50N	87.00W	0.61	0	0.	0.0	0.0	0.0	0.0	0.0	0.
130	39.50N	87.50W	0.62	0	0.	0.0	0.0	0.0	0.0	0.0	0.
131	39.50N	88.00W	0.56	0	0.	0.0	0.0	0.0	0.0	0.0	0.
132	39.50N	88.50W	0.52	0	0.	0.0	0.0	0.0	0.0	0.0	0.
133	39.50N	89.00W	0.47	0	0.	0.0	0.0	0.0	0.0	0.0	0.
134	40.00N	80.00W	0.86	0	0.	0.0	0.0	0.0	0.0	0.0	0.
135	40.00N	80.50W	0.82	0	0.	0.0	0.0	0.0	0.0	0.0	0.
136	40.00N	81.00W	0.78	0	0.	0.0	0.0	0.0	0.0	0.0	0.
137	40.00N	81.50W	0.75	0	0.	0.0	0.0	0.0	0.0	0.0	0.
138	40.00N	82.00W	0.79	0	0.	0.0	0.0	0.0	0.0	0.0	0.
139	40.00N	82.50W	0.85	0	0.	0.0	0.0	0.0	0.0	0.0	0.
140	40.00N	83.00W	0.87	0	0.	0.0	0.0	0.0	0.0	0.0	0.
141	40.00N	83.50W	0.89	0	0.	0.0	0.0	0.0	0.0	0.0	0.
142	40.00N	84.00W	2.50	10	161.	5.89	4.83	130.8	89.3	28.20	1.
143	40.00N	84.50W	0.90	0	0.	0.0	0.0	0.0	0.0	0.0	0.
144	40.00N	85.00W	0.86	0	0.	0.0	0.0	0.0	0.0	0.0	0.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
145	40.00N	85.50W	0.81	0	0.	0.0	0.0	0.0	0.0	0.0	0.
146	40.00N	86.00W	0.72	0	0.	0.0	0.0	0.0	0.0	0.0	0.
147	40.00N	86.50W	0.57	0	0.	0.0	0.0	0.0	0.0	0.0	0.
148	40.00N	87.00W	0.44	0	0.	0.0	0.0	0.0	0.0	0.0	0.
149	40.00N	87.50W	0.34	0	0.	0.0	0.0	0.0	0.0	0.0	0.
150	40.00N	88.00W	0.26	0	0.	0.0	0.0	0.0	0.0	0.0	0.
151	40.00N	88.50W	0.18	0	0.	0.0	0.0	0.0	0.0	0.0	0.
152	40.00N	89.00W	0.13	0	0.	0.0	0.0	0.0	0.0	0.0	0.
153	40.50N	80.00W	0.59	0	0.	0.0	0.0	0.0	0.0	0.0	0.
154	40.50N	80.50W	0.61	0	0.	0.0	0.0	0.0	0.0	0.0	0.
155	40.50N	81.00W	0.66	0	0.	0.0	0.0	0.0	0.0	0.0	0.
156	40.50N	81.50W	0.69	0	0.	0.0	0.0	0.0	0.0	0.0	0.
157	40.50N	82.00W	0.75	0	0.	0.0	0.0	0.0	0.0	0.0	0.
158	40.50N	82.50W	0.84	0	0.	0.0	0.0	0.0	0.0	0.0	0.
159	40.50N	83.00W	0.88	0	0.	0.0	0.0	0.0	0.0	0.0	0.
160	40.50N	83.50W	0.89	0	0.	0.0	0.0	0.0	0.0	0.0	0.
161	40.50N	84.00W	0.88	0	0.	0.0	0.0	0.0	0.0	0.0	0.
162	40.50N	84.50W	0.84	0	0.	0.0	0.0	0.0	0.0	0.0	0.
163	40.50N	85.00W	0.81	0	0.	0.0	0.0	0.0	0.0	0.0	0.
164	40.50N	85.50W	0.76	0	0.	0.0	0.0	0.0	0.0	0.0	0.
165	40.50N	86.00W	0.65	0	0.	0.0	0.0	0.0	0.0	0.0	0.
166	40.50N	86.50W	0.47	0	0.	0.0	0.0	0.0	0.0	0.0	0.
167	40.50N	87.00W	0.30	0	0.	0.0	0.0	0.0	0.0	0.0	0.
168	40.50N	87.50W	0.19	0	0.	0.0	0.0	0.0	0.0	0.0	0.
169	40.50N	88.00W	0.10	0	0.	0.0	0.0	0.0	0.0	0.0	0.
170	40.50N	88.50W	0.06	0	0.	0.0	0.0	0.0	0.0	0.0	0.
171	40.50N	89.00W	0.03	0	0.	0.0	0.0	0.0	0.0	0.0	0.
172	41.00N	80.00W	0.42	0	0.	0.0	0.0	0.0	0.0	0.0	0.
173	41.00N	80.50W	0.48	0	0.	0.0	0.0	0.0	0.0	0.0	0.
174	41.00N	81.00W	0.55	0	0.	0.0	0.0	0.0	0.0	0.0	0.
175	41.00N	81.50W	0.62	0	0.	0.0	0.0	0.0	0.0	0.0	0.
176	41.00N	82.00W	0.70	0	0.	0.0	0.0	0.0	0.0	0.0	0.
177	41.00N	82.50W	0.84	0	0.	0.0	0.0	0.0	0.0	0.0	0.
178	41.00N	83.00W	2.50	10	271.	31.01	7.69	86.1	749.2	45.63	1.
179	41.00N	83.50W	2.50	10	202.	9.94	3.68	104.4	114.9	42.81	1.
180	41.00N	84.00W	2.50	10	146.	5.03	3.03	126.6	47.8	26.26	1.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA. DET
181	41.00N	84.50W	0.86	0	0.	0.0	0.0	0.0	0.0	0.0	0.
182	41.00N	85.00W	0.79	0	0.	0.0	0.0	0.0	0.0	0.0	0.
183	41.00N	85.50W	0.69	0	0.	0.0	0.0	0.0	0.0	0.0	0.
184	41.00N	86.00W	0.53	0	0.	0.0	0.0	0.0	0.0	0.0	0.
185	41.00N	86.50W	0.34	0	0.	0.0	0.0	0.0	0.0	0.0	0.
186	41.00N	87.00W	0.19	0	0.	0.0	0.0	0.0	0.0	0.0	0.
187	41.00N	87.50W	0.12	0	0.	0.0	0.0	0.0	0.0	0.0	0.
188	41.00N	88.00W	0.05	0	0.	0.0	0.0	0.0	0.0	0.0	0.
189	41.00N	88.50W	0.02	0	0.	0.0	0.0	0.0	0.0	0.0	0.
190	41.00N	89.00W	0.01	0	0.	0.0	0.0	0.0	0.0	0.0	0.
191	41.50N	80.00W	0.41	0	0.	0.0	0.0	0.0	0.0	0.0	0.
192	41.50N	80.50W	0.45	0	0.	0.0	0.0	0.0	0.0	0.0	0.
193	41.50N	81.00W	0.47	0	0.	0.0	0.0	0.0	0.0	0.0	0.
194	41.50N	81.50W	0.63	0	0.	0.0	0.0	0.0	0.0	0.0	0.
195	41.50N	82.00W	0.67	0	0.	0.0	0.0	0.0	0.0	0.0	0.
196	41.50N	82.50W	0.83	0	0.	0.0	0.0	0.0	0.0	0.0	0.
197	41.50N	83.00W	2.50	10	167.	9.76	6.96	78.7	213.4	49.22	0. ∞
198	41.50N	83.50W	2.50	10	209.	14.76	2.92	97.3	135.6	19.22	0.
199	41.50N	84.00W	2.50	10	214.	9.83	3.87	136.1	119.7	40.82	1.
200	41.50N	84.50W	0.88	0	0.	0.0	0.0	0.0	0.0	0.0	0.
201	41.50N	85.00W	0.75	0	0.	0.0	0.0	0.0	0.0	0.0	0.
202	41.50N	85.50W	0.59	0	0.	0.0	0.0	0.0	0.0	0.0	0.
203	41.50N	86.00W	0.39	0	0.	0.0	0.0	0.0	0.0	0.0	0.
204	41.50N	86.50W	0.25	0	0.	0.0	0.0	0.0	0.0	0.0	0.
205	41.50N	87.00W	0.15	0	0.	0.0	0.0	0.0	0.0	0.0	0.
206	41.50N	87.50W	0.07	0	0.	0.0	0.0	0.0	0.0	0.0	0.
207	41.50N	88.00W	0.03	0	0.	0.0	0.0	0.0	0.0	0.0	0.
208	41.50N	88.50W	0.01	0	0.	0.0	0.0	0.0	0.0	0.0	0.
209	41.50N	89.00W	0.00	0	0.	0.0	0.0	0.0	0.0	0.0	0.
210	42.00N	80.00W	0.36	0	0.	0.0	0.0	0.0	0.0	0.0	0.
211	42.00N	80.50W	0.34	0	0.	0.0	0.0	0.0	0.0	0.0	0.
212	42.00N	81.00W	0.34	0	0.	0.0	0.0	0.0	0.0	0.0	0.
213	42.00N	81.50W	0.37	0	0.	0.0	0.0	0.0	0.0	0.0	0.
214	42.00N	82.00W	0.46	0	0.	0.0	0.0	0.0	0.0	0.0	0.
215	42.00N	82.50W	0.72	0	0.	0.0	0.0	0.0	0.0	0.0	0.
216	42.00N	83.00W	0.86	0	0.	0.0	0.0	0.0	0.0	0.0	0.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
217	42.00N	83.50W	0.90	0	0.	0.0	0.0	0.0	0.0	0.0	0.
218	42.00N	84.00W	0.89	0	0.	0.0	0.0	0.0	0.0	0.0	0.
219	42.00N	84.50W	0.83	0	0.	0.0	0.0	0.0	0.0	0.0	0.
220	42.00N	85.00W	0.62	0	0.	0.0	0.0	0.0	0.0	0.0	0.
221	42.00N	85.50W	0.41	0	0.	0.0	0.0	0.0	0.0	0.0	0.
222	42.00N	86.00W	0.24	0	0.	0.0	0.0	0.0	0.0	0.0	0.
223	42.00N	86.50W	0.18	0	0.	0.0	0.0	0.0	0.0	0.0	0.
224	42.00N	87.00W	0.09	0	0.	0.0	0.0	0.0	0.0	0.0	0.
225	42.00N	87.50W	0.03	0	0.	0.0	0.0	0.0	0.0	0.0	0.
226	42.00N	88.00W	0.01	0	0.	0.0	0.0	0.0	0.0	0.0	0.
227	42.00N	88.50W	0.00	0	0.	0.0	0.0	0.0	0.0	0.0	0.
228	42.00N	89.00W	0.00	0	0.	0.0	0.0	0.0	0.0	0.0	0.

NETWORK SUMMARY- ERROR ELLIPSES
(MAGNITUDES RANGE FROM, 2.50 TO 2.50 IN STEPS OF 0.0)

	LAT.	LONG.	MAG	NST	LOA	5 STATION MINIMUM COVERAGE		AZIM	AREA	DEPTH	NO. NEAR STA	DET
						A(KM)	B(KM)					
1	36.50N	80.00W	2.50	14	89.	6.06	4.82	81.0	91.9	29.26	4.	
2	36.50N	80.50W	2.50	13	120.	6.99	4.77	82.0	104.8	32.73	4.	
3	36.50N	81.00W	2.50	12	152.	11.03	4.93	97.7	171.0	34.04	4.	
4	36.50N	81.50W	2.50	11	187.	17.19	5.64	108.7	304.7	45.49	3.	
5	36.50N	82.00W	2.50	10	147.	13.49	6.23	122.9	263.9	100.94	1.	
6	36.50N	82.50W	2.50	8	162.	14.06	7.08	132.3	312.8	209.61	0.	
7	36.50N	83.00W	2.50	7	176.	14.34	8.31	147.6	374.2	141.39	0.	
8	36.50N	83.50W	2.50	6	201.	17.45	7.81	155.0	428.2	76.52	0.	
9	36.50N	84.00W	2.50	6	199.	13.06	8.78	10.6	360.2	53.53	0.	
10	36.50N	84.50W	2.50	5	200.	17.97	9.42	37.8	531.9	368.89	0.	
11	36.50N	85.00W	2.50	5	194.	69.59	7.17	31.7	1567.1	80.46	0.	
12	36.50N	85.50W	2.50	5	195.	97.86	6.68	24.3	2052.8	102.56	0.	
13	36.50N	86.00W	2.50	6	179.	73.74	7.07	23.5	1637.5	97.84	0.	
14	36.50N	86.50W	2.50	6	180.	63.45	8.45	23.8	1683.9	111.66	0.	
15	36.50N	87.00W	2.50	7	165.	34.98	8.19	24.7	900.0	70.68	0.	
16	36.50N	87.50W	2.50	8	288.	47.70	13.86	100.4	2076.9	65.48	0.	
17	36.50N	88.00W	2.50	10	258.	22.86	7.61	102.2	546.4	83.96	0.	
18	36.50N	88.50W	2.50	12	225.	12.10	4.78	111.4	181.7	34.78	0.	
19	36.50N	89.00W	2.50	14	196.	6.79	2.73	117.0	58.2	12.92	0.	
20	37.00N	80.00W	2.50	16	68.	4.99	3.57	168.4	56.0	16.79	6.	
21	37.00N	80.50W	2.50	15	70.	4.25	3.39	157.0	45.3	16.40	6.	
22	37.00N	81.00W	2.50	14	152.	4.94	4.47	90.0	69.3	12.47	5.	
23	37.00N	81.50W	2.50	12	208.	12.51	4.69	120.9	184.4	23.07	5.	
24	37.00N	82.00W	2.50	11	177.	15.47	5.40	134.9	262.2	43.62	3.	
25	37.00N	82.50W	2.50	10	107.	7.10	5.24	72.3	116.9	47.85	0.	
26	37.00N	83.00W	2.50	8	142.	10.49	5.17	90.5	170.5	39.44	0.	
27	37.00N	83.50W	2.50	7	182.	15.49	6.87	112.9	334.2	46.40	0.	
28	37.00N	84.00W	2.50	6	210.	19.71	9.59	28.1	593.9	59.99	0.	
29	37.00N	84.50W	2.50	6	205.	20.48	9.50	35.9	611.2	61.21	0.	
30	37.00N	85.00W	2.50	5	206.	49.03	8.12	32.2	1250.8	76.37	0.	
31	37.00N	85.50W	2.50	6	201.	67.61	7.02	26.5	1492.0	69.66	0.	
32	37.00N	86.00W	2.50	6	196.	76.10	7.63	24.1	1823.5	140.63	0.	
33	37.00N	86.50W	2.50	7	191.	43.28	8.77	22.6	1193.0	89.94	0.	
34	37.00N	87.00W	2.50	8	184.	24.92	3.99	24.6	312.1	83.37	0.	
35	37.00N	87.50W	2.50	10	278.	31.33	9.19	90.9	904.9	63.14	0.	
36	37.00N	88.00W	2.50	12	236.	13.15	4.81	113.5	198.7	32.98	0.	

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
37	37.00N	88.50W	2.50	14	185.	7.98	3.22	117.4	80.9	16.86	0.
38	37.00N	89.00W	2.50	15	70.	2.80	2.63	179.9	23.1	15.54	0.
39	37.50N	80.00W	2.50	17	88.	3.93	2.74	138.3	33.8	21.67	7.
40	37.50N	80.50W	2.50	16	100.	3.60	2.67	139.8	30.3	19.99	7.
41	37.50N	81.00W	2.50	14	206.	6.75	2.55	118.1	54.1	11.51	5.
42	37.50N	81.50W	2.50	13	222.	11.29	5.67	129.2	201.2	25.79	5.
43	37.50N	82.00W	2.50	12	123.	8.03	3.96	18.5	99.9	35.06	4.
44	37.50N	82.50W	2.50	11	104.	7.83	3.71	43.2	91.3	40.39	0.
45	37.50N	83.00W	2.50	9	160.	11.59	4.54	90.6	165.5	34.24	0.
46	37.50N	83.50W	2.50	8	209.	24.19	5.87	118.9	446.2	43.85	0.
47	37.50N	84.00W	2.50	7	153.	12.74	8.66	148.8	346.6	41.32	0.
48	37.50N	84.50W	2.50	6	215.	31.86	9.31	30.0	932.0	65.94	0.
49	37.50N	85.00W	2.50	6	216.	45.24	8.02	28.7	1139.7	62.82	0.
50	37.50N	85.50W	2.50	6	212.	53.90	7.91	25.7	1340.0	73.71	0.
51	37.50N	86.00W	2.50	6	142.	15.22	9.50	31.6	454.0	189.51	0.
52	37.50N	86.50W	2.50	7	135.	13.04	11.60	173.6	475.4	90.01	0.
53	37.50N	87.00W	2.50	9	118.	10.38	8.89	135.6	289.7	51.53	0.
54	37.50N	87.50W	2.50	12	248.	15.73	5.62	112.5	277.8	36.09	0.
55	37.50N	88.00W	2.50	13	197.	7.81	3.49	123.2	85.7	14.09	0.
56	37.50N	88.50W	2.50	14	107.	3.72	2.69	122.4	31.4	14.26	0.
57	37.50N	89.00W	2.50	15	91.	4.55	2.50	139.4	35.8	13.81	0.
58	38.00N	80.00W	2.50	17	137.	4.51	2.48	116.4	35.2	18.78	6.
59	38.00N	80.50W	2.50	16	196.	9.49	2.76	134.8	82.2	22.24	6.
60	38.00N	81.00W	2.50	15	228.	14.69	3.90	124.0	180.2	28.95	6.
61	38.00N	81.50W	2.50	13	241.	15.26	6.70	119.8	321.2	45.10	4.
62	38.00N	82.00W	2.50	12	173.	11.44	4.25	5.1	152.9	42.62	1.
63	38.00N	82.50W	2.50	11	101.	8.82	4.58	2.4	126.8	42.91	0.
64	38.00N	83.00W	2.50	10	172.	13.47	5.62	62.8	237.7	13.68	0.
65	38.00N	83.50W	2.50	9	148.	9.67	6.15	45.4	186.9	52.77	0.
66	38.00N	84.00W	2.50	8	93.	10.28	8.19	57.1	264.6	32.65	0.
67	38.00N	84.50W	2.50	7	140.	13.23	8.68	72.5	360.7	65.98	0.
68	38.00N	85.00W	2.50	6	185.	21.33	9.35	34.6	626.4	73.43	0.
69	38.00N	85.50W	2.50	7	122.	10.03	9.55	40.0	300.9	53.38	0.
70	38.00N	86.00W	2.50	7	152.	12.88	11.45	69.1	463.6	70.60	0.
71	38.00N	86.50W	2.50	8	130.	12.26	9.60	139.8	369.9	44.48	0.
72	38.00N	87.00W	2.50	10	217.	13.87	7.45	127.0	324.4	47.44	0.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
73	38.00N	87.50W	2.50	12	188.	8.42	4.40	110.6	116.3	22.10	0.
74	38.00N	88.00W	2.50	13	123.	4.53	2.50	137.8	35.6	12.84	0.
75	38.00N	88.50W	2.50	14	66.	3.34	2.82	106.7	29.6	16.23	0.
76	38.00N	89.00W	2.50	14	122.	4.64	3.75	134.9	54.7	24.46	0.
77	38.50N	80.00W	2.50	15	237.	14.38	4.47	162.1	201.9	16.04	1.
78	38.50N	80.50W	2.50	14	252.	19.91	4.69	151.9	293.4	27.30	2.
79	38.50N	81.00W	2.50	13	257.	27.57	5.81	143.1	503.5	40.92	2.
80	38.50N	81.50W	2.50	12	262.	25.30	8.07	133.2	641.4	70.06	1.
81	38.50N	82.00W	2.50	11	223.	18.18	6.69	161.2	382.0	66.05	0.
82	38.50N	82.50W	2.50	10	150.	9.15	6.37	80.5	183.2	56.36	0.
83	38.50N	83.00W	2.50	10	155.	26.38	4.83	72.6	400.4	39.86	0.
84	38.50N	83.50W	2.50	9	168.	32.72	5.08	64.7	521.7	73.94	0.
85	38.50N	84.00W	2.50	8	183.	56.23	8.11	77.2	1432.7	225.62	0.
86	38.50N	84.50W	2.50	8	136.	14.99	8.75	79.1	412.0	247.95	0.
87	38.50N	85.00W	2.50	7	135.	12.68	9.33	129.9	371.5	80.45	0.
88	38.50N	85.50W	2.50	7	121.	11.08	8.85	143.6	308.1	68.62	0.
89	38.50N	86.00W	2.50	7	108.	11.05	7.92	116.7	274.8	83.73	0.
90	38.50N	86.50W	2.50	8	197.	16.74	5.92	128.4	311.2	72.27	0.
91	38.50N	87.00W	2.50	10	113.	10.16	5.48	143.1	174.9	29.89	0.
92	38.50N	87.50W	2.50	11	154.	5.99	3.98	79.7	74.8	15.31	0.
93	38.50N	88.00W	2.50	12	157.	5.21	2.79	3.1	45.7	10.66	0.
94	38.50N	88.50W	2.50	12	166.	9.03	4.04	148.4	114.6	16.88	0.
95	38.50N	89.00W	2.50	12	169.	8.49	3.82	18.4	101.8	31.93	0.
96	39.00N	80.00W	2.50	13	277.	21.61	9.10	163.0	617.8	46.18	1.
97	39.00N	80.50W	2.50	12	276.	27.60	9.57	168.1	830.1	60.90	1.
98	39.00N	81.00W	2.50	11	275.	46.76	10.15	158.4	1491.0	80.34	1.
99	39.00N	81.50W	2.50	10	276.	42.35	11.83	148.2	1573.5	181.19	0.
100	39.00N	82.00W	2.50	9	149.	16.32	6.81	45.0	349.1	191.86	0.
101	39.00N	82.50W	2.50	9	200.	66.40	8.30	65.7	1730.4	166.46	0.
102	39.00N	83.00W	2.50	9	185.	58.09	8.00	68.7	1460.4	104.66	0.
103	39.00N	83.50W	2.50	9	178.	42.05	10.43	74.4	1377.2	79.29	0.
104	39.00N	84.00W	2.50	9	177.	35.31	10.80	79.1	1198.0	84.01	0.
105	39.00N	84.50W	2.50	9	254.	46.69	11.07	146.5	1623.2	84.57	0.
106	39.00N	85.00W	2.50	8	242.	47.01	8.89	152.8	1312.7	130.04	0.
107	39.00N	85.50W	2.50	8	221.	34.11	6.57	155.4	703.7	91.25	0.
108	39.00N	86.00W	2.50	8	190.	12.48	5.72	161.6	224.1	57.94	0.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
109	39.00N	86.50W	2.50	8	170.	10.30	5.26	113.7	170.2	44.30	0.
110	39.00N	87.00W	2.50	9	153.	23.76	3.90	148.5	290.8	26.03	0.
111	39.00N	87.50W	2.50	9	183.	10.70	5.58	145.9	187.7	28.42	0.
112	39.00N	88.00W	2.50	10	190.	10.41	6.77	162.8	221.5	32.50	0.
113	39.00N	88.50W	2.50	10	189.	11.58	6.61	177.5	240.5	38.90	0.
114	39.00N	89.00W	2.50	9	235.	22.55	6.03	13.5	427.0	41.16	0.
115	39.50N	80.00W	2.50	11	175.	19.91	3.21	92.1	200.9	21.62	1.
116	39.50N	80.50W	2.50	10	244.	27.73	6.19	124.9	539.0	42.51	0.
117	39.50N	81.00W	2.50	9	185.	16.22	8.28	53.4	421.9	47.90	0.
118	39.50N	81.50W	2.50	9	184.	9.02	4.41	80.6	125.0	86.83	0.
119	39.50N	82.00W	2.50	9	172.	34.55	8.84	41.0	959.0	146.12	0.
120	39.50N	82.50W	2.50	9	337.	94.21	41.64	133.2	12323.3	107.85	0.
121	39.50N	83.00W	2.50	9	334.	88.22	31.26	140.5	8662.8	80.93	0.
122	39.50N	83.50W	2.50	9	331.	62.64	21.57	147.7	4244.2	82.65	1.
123	39.50N	84.00W	2.50	9	322.	66.21	16.24	171.1	3378.9	69.63	1.
124	39.50N	84.50W	2.50	9	223.	19.23	8.75	143.1	528.4	66.62	1.
125	39.50N	85.00W	2.50	9	204.	20.87	7.29	143.6	477.8	70.02	0.
126	39.50N	85.50W	2.50	9	187.	30.11	5.74	146.7	542.8	80.66	0.
127	39.50N	86.00W	2.50	8	171.	39.37	4.67	142.6	577.7	55.96	0.
128	39.50N	86.50W	2.50	7	161.	13.30	5.97	129.9	249.6	137.48	0.
129	39.50N	87.00W	2.50	7	169.	9.74	6.44	170.0	197.2	118.06	0.
130	39.50N	87.50W	2.50	7	179.	15.04	6.60	160.3	311.7	54.19	0.
131	39.50N	88.00W	2.50	7	224.	18.64	9.63	164.5	564.2	59.97	0.
132	39.50N	88.50W	2.50	7	225.	18.90	11.45	168.1	679.6	77.31	0.
133	39.50N	89.00W	2.50	6	294.	117.02	15.07	22.1	5539.8	98.31	0.
134	40.00N	80.00W	2.50	9	166.	29.03	4.64	75.7	423.5	17.32	0.
135	40.00N	80.50W	2.50	9	121.	10.72	4.82	69.0	162.3	29.88	0.
136	40.00N	81.00W	2.50	8	111.	8.38	7.85	54.6	206.6	67.51	0.
137	40.00N	81.50W	2.50	8	206.	66.48	10.93	32.4	2283.3	125.96	0.
138	40.00N	82.00W	2.50	8	338.	85.76	42.64	117.7	11488.3	153.36	0.
139	40.00N	82.50W	2.50	9	332.	107.34	27.60	123.4	9308.0	84.37	0.
140	40.00N	83.00W	2.50	9	323.	72.01	17.13	123.3	3874.1	82.70	1.
141	40.00N	83.50W	2.50	9	311.	48.27	11.02	135.1	1670.6	49.49	1.
142	40.00N	84.00W	2.50	9	284.	19.57	5.31	171.4	326.6	40.19	1.
143	40.00N	84.50W	2.50	9	279.	28.51	6.54	25.8	585.7	33.07	1.
144	40.00N	85.00W	2.50	9	160.	10.63	7.15	143.8	238.9	54.30	1.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
145	40.00N	85.50W	2.50	9	183.	20.48	6.39	140.5	410.8	60.87	0.
146	40.00N	86.00W	2.50	8	210.	44.32	6.18	134.4	861.0	79.17	0.
147	40.00N	86.50W	2.50	7	181.	16.76	6.53	135.8	343.8	132.45	0.
148	40.00N	87.00W	2.50	6	188.	13.39	7.85	147.4	329.9	437.37	0.
149	40.00N	87.50W	2.50	6	195.	16.47	7.97	154.0	412.7	220.41	0.
150	40.00N	88.00W	2.50	5	204.	20.90	8.89	157.8	583.8	381.37	0.
151	40.00N	88.50W	2.50	5	250.	43.06	13.64	173.9	1845.1	80.83	0.
152	40.00N	89.00W	0.90	0	0.	0.0	0.0	0.0	0.0	0.0	0.
153	40.50N	80.00W	2.50	7	177.	19.68	6.56	61.0	405.8	30.55	0.
154	40.50N	80.50W	2.50	7	116.	8.70	5.44	120.9	148.8	45.01	0.
155	40.50N	81.00W	2.50	7	195.	23.43	5.57	167.7	410.4	89.00	0.
156	40.50N	81.50W	2.50	7	185.	21.80	6.51	170.3	446.1	197.29	0.
157	40.50N	82.00W	2.50	8	334.	103.80	36.40	94.4	11868.8	125.53	0.
158	40.50N	82.50W	2.50	9	326.	67.93	21.37	93.3	4560.4	105.97	0.
159	40.50N	83.00W	2.50	9	310.	77.26	11.64	92.9	2826.0	48.57	1.
160	40.50N	83.50W	2.50	9	261.	13.54	5.34	85.9	227.1	28.19	1.
161	40.50N	84.00W	2.50	9	83.	3.60	2.25	162.7	25.4	22.21	1.
162	40.50N	84.50W	2.50	9	142.	3.12	1.90	55.1	18.6	19.02	1.
163	40.50N	85.00W	2.50	9	301.	40.81	8.31	86.2	1065.4	31.26	1.
164	40.50N	85.50W	2.50	8	322.	77.94	18.06	90.2	4423.1	75.74	1.
165	40.50N	86.00W	2.50	8	235.	42.48	8.91	141.1	1189.4	74.51	0.
166	40.50N	86.50W	2.50	7	198.	23.77	7.88	149.4	588.3	138.73	0.
167	40.50N	87.00W	2.50	6	204.	21.38	8.42	150.5	565.2	345.88	0.
168	40.50N	87.50W	2.50	5	213.	22.81	9.72	155.2	696.6	279.04	0.
169	40.50N	88.00W	0.87	0	0.	0.0	0.0	0.0	0.0	0.0	0.
170	40.50N	88.50W	0.79	0	0.	0.0	0.0	0.0	0.0	0.0	0.
171	40.50N	89.00W	0.70	0	0.	0.0	0.0	0.0	0.0	0.0	0.
172	41.00N	80.00W	2.50	6	185.	14.66	7.47	88.9	344.2	79.86	0.
173	41.00N	80.50W	2.50	6	172.	13.97	6.02	58.0	264.1	130.68	0.
174	41.00N	81.00W	2.50	7	138.	11.20	6.25	29.1	219.8	186.48	0.
175	41.00N	81.50W	2.50	7	139.	16.28	6.94	2.8	355.0	183.53	0.
176	41.00N	82.00W	2.50	8	227.	47.43	11.49	135.7	1712.4	110.20	0.
177	41.00N	82.50W	2.50	9	210.	26.23	9.77	137.7	805.4	69.32	0.
178	41.00N	83.00W	2.50	9	313.	69.73	14.70	63.7	3219.7	75.18	1.
179	41.00N	83.50W	2.50	9	202.	10.05	4.89	101.0	154.5	49.10	1.
180	41.00N	84.00W	2.50	9	146.	5.09	4.66	147.0	74.6	26.91	1.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
181	41.00N	84.50W	2.50	9	271.	25.68	4.31	147.2	347.7	36.19	1.
182	41.00N	85.00W	2.50	8	305.	43.98	10.45	124.0	1443.9	42.07	1.
183	41.00N	85.50W	2.50	8	325.	81.60	20.34	115.2	5214.8	142.06	0.
184	41.00N	86.00W	2.50	7	333.	242.53	37.30	104.6	28421.2	100.89	0.
185	41.00N	86.50W	2.50	6	220.	71.73	10.82	169.4	2439.0	160.30	0.
186	41.00N	87.00W	2.50	5	222.	92.13	11.25	165.0	3254.9	493.37	0.
187	41.00N	87.50W	0.89	0	0.	0.0	0.0	0.0	0.0	0.0	0.
188	41.00N	88.00W	0.79	0	0.	0.0	0.0	0.0	0.0	0.0	0.
189	41.00N	88.50W	0.63	0	0.	0.0	0.0	0.0	0.0	0.0	0.
190	41.00N	89.00W	0.50	0	0.	0.0	0.0	0.0	0.0	0.0	0.
191	41.50N	80.00W	2.50	6	150.	13.41	5.98	99.0	252.1	30.83	0.
192	41.50N	80.50W	2.50	6	140.	10.49	5.86	93.2	193.1	87.92	0.
193	41.50N	81.00W	2.50	6	155.	12.47	6.80	70.3	266.5	168.34	0.
194	41.50N	81.50W	2.50	7	212.	33.88	4.35	109.7	462.7	43.95	0.
195	41.50N	82.00W	2.50	7	218.	76.61	6.82	128.4	1640.6	139.15	0.
196	41.50N	82.50W	2.50	8	189.	14.40	6.63	131.7	299.9	97.90	0.
197	41.50N	83.00W	2.50	9	167.	10.54	6.99	81.6	231.7	53.98	0.
198	41.50N	83.50W	2.50	10	209.	19.57	3.13	93.8	192.7	40.78	0.
199	41.50N	84.00W	2.50	10	214.	16.42	4.29	126.1	221.4	40.52	1.
200	41.50N	84.50W	2.50	9	248.	24.53	6.37	128.0	490.8	46.18	1.
201	41.50N	85.00W	2.50	8	327.	87.26	20.83	146.6	5710.3	120.17	0.
202	41.50N	85.50W	2.50	7	333.	91.00	31.20	133.2	8920.4	93.57	0.
203	41.50N	86.00W	2.50	6	339.	167.95	49.38	116.7	26052.1	144.95	0.
204	41.50N	86.50W	2.50	5	240.	91.22	13.05	174.5	3740.3	539.45	0.
205	41.50N	87.00W	2.50	5	154.	18.25	6.90	32.5	395.7	1318.58	0.
206	41.50N	87.50W	0.85	0	0.	0.0	0.0	0.0	0.0	0.0	0.
207	41.50N	88.00W	0.73	0	0.	0.0	0.0	0.0	0.0	0.0	0.
208	41.50N	88.50W	0.56	0	0.	0.0	0.0	0.0	0.0	0.0	0.
209	41.50N	89.00W	0.33	0	0.	0.0	0.0	0.0	0.0	0.0	0.
210	42.00N	80.00W	2.50	6	241.	15.14	8.33	0.1	396.4	37.09	0.
211	42.00N	80.50W	2.50	6	170.	11.19	5.35	0.9	187.9	39.98	0.
212	42.00N	81.00W	2.50	6	157.	8.12	7.11	0.7	181.5	132.45	0.
213	42.00N	81.50W	2.50	6	224.	61.04	6.47	115.2	1241.2	156.86	0.
214	42.00N	82.00W	2.50	6	198.	88.25	6.49	124.4	1798.9	135.17	0.
215	42.00N	82.50W	2.50	8	175.	27.65	5.04	135.9	437.5	77.13	0.
216	42.00N	83.00W	2.50	9	153.	8.10	5.03	132.4	127.8	37.30	0.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
217	42.00N	83.50W	2.50	9	133.	14.74	4.25	90.6	196.7	17.44	0.
218	42.00N	84.00W	2.50	9	201.	10.20	4.75	110.3	152.2	70.87	0.
219	42.00N	84.50W	2.50	8	239.	20.81	6.25	126.3	408.7	86.67	0.
220	42.00N	85.00W	2.50	7	192.	43.37	6.06	56.5	825.2	106.28	0.
221	42.00N	85.50W	2.50	6	181.	56.53	5.72	62.5	1016.6	115.62	0.
222	42.00N	86.00W	2.50	5	224.	81.91	6.66	75.6	1713.1	221.03	0.
223	42.00N	86.50W	2.50	5	133.	10.23	7.05	162.1	226.6	1085.99	0.
224	42.00N	87.00W	0.87	0	J.	0.0	0.0	0.0	0.0	0.0	0.
225	42.00N	87.50W	0.76	0	J.	0.0	0.0	0.0	0.0	0.0	0.
226	42.00N	88.00W	0.62	0	0.	0.0	0.0	0.0	0.0	0.0	0.
227	42.00N	88.50W	0.44	0	J.	0.0	0.0	0.0	0.0	0.0	0.
228	42.00N	89.00W	0.21	0	0.	0.0	0.0	0.0	0.0	0.0	0.

NETWORK SUMMARY- ERROR ELLIPSES
(MAGNITUDES RANGE FROM, 2.00 TO 2.00 IN STEPS OF 0.0)

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
1	36.50N	80.00W	2.00	5	114.	9.38	6.39	65.4	188.3	200.34	1.
2	36.50N	80.50W	2.00	6	138.	10.20	6.45	64.1	206.8	127.12	1.
3	36.50N	81.00W	2.00	5	172.	21.65	8.66	99.8	589.3	102.61	1.
4	36.50N	81.50W	0.77	0	0.	0.0	0.0	0.0	0.0	0.0	0.
5	36.50N	82.00W	0.40	0	0.	0.0	0.0	0.0	0.0	0.0	0.
6	36.50N	82.50W	0.19	0	0.	0.0	0.0	0.0	0.0	0.0	0.
7	36.50N	83.00W	0.09	0	0.	0.0	0.0	0.0	0.0	0.0	0.
8	36.50N	83.50W	0.07	0	0.	0.0	0.0	0.0	0.0	0.0	0.
9	36.50N	84.00W	0.04	0	0.	0.0	0.0	0.0	0.0	0.0	0.
10	36.50N	84.50W	0.03	0	0.	0.0	0.0	0.0	0.0	0.0	0.
11	36.50N	85.00W	0.03	0	0.	0.0	0.0	0.0	0.0	0.0	0.
12	36.50N	85.50W	0.02	0	0.	0.0	0.0	0.0	0.0	0.0	0.
13	36.50N	86.00W	0.03	0	0.	0.0	0.0	0.0	0.0	0.0	0.
14	36.50N	86.50W	0.04	0	0.	0.0	0.0	0.0	0.0	0.0	0.
15	36.50N	87.00W	0.11	0	0.	0.0	0.0	0.0	0.0	0.0	0.
16	36.50N	87.50W	0.35	0	0.	0.0	0.0	0.0	0.0	0.0	0.
17	36.50N	88.00W	0.75	0	0.	0.0	0.0	0.0	0.0	0.0	0.
18	36.50N	88.50W	2.00	5	267.	24.17	6.93	104.2	525.8	86.08	0.
19	36.50N	89.00W	2.00	8	201.	9.71	2.96	115.3	90.3	17.29	0.
20	37.00N	80.00W	2.00	8	145.	8.23	4.12	170.7	106.5	33.25	4.
21	37.00N	80.50W	2.00	8	118.	6.22	3.71	161.9	72.5	25.55	6.
22	37.00N	81.00W	2.00	7	169.	7.98	4.91	36.0	123.0	23.04	5.
23	37.00N	81.50W	2.00	5	315.	90.44	12.07	66.6	3428.4	95.56	4.
24	37.00N	82.00W	0.63	0	0.	0.0	0.0	0.0	0.0	0.0	0.
25	37.00N	82.50W	0.27	0	0.	0.0	0.0	0.0	0.0	0.0	0.
26	37.00N	83.00W	0.13	0	0.	0.0	0.0	0.0	0.0	0.0	0.
27	37.00N	83.50W	0.05	0	0.	0.0	0.0	0.0	0.0	0.0	0.
28	37.00N	84.00W	0.03	0	0.	0.0	0.0	0.0	0.0	0.0	0.
29	37.00N	84.50W	0.02	0	0.	0.0	0.0	0.0	0.0	0.0	0.
30	37.00N	85.00W	0.02	0	0.	0.0	0.0	0.0	0.0	0.0	0.
31	37.00N	85.50W	0.02	0	0.	0.0	0.0	0.0	0.0	0.0	0.
32	37.00N	86.00W	0.03	0	0.	0.0	0.0	0.0	0.0	0.0	0.
33	37.00N	86.50W	0.05	0	0.	0.0	0.0	0.0	0.0	0.0	0.
34	37.00N	87.00W	0.16	0	0.	0.0	0.0	0.0	0.0	0.0	0.
35	37.00N	87.50W	0.55	0	0.	0.0	0.0	0.0	0.0	0.0	0.
36	37.00N	88.00W	2.00	5	254.	25.61	6.37	120.1	512.8	106.44	0.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
37	37.00N	88.50W	2.00	6	239.	19.06	4.41	110.2	263.8	27.58	0.
38	37.00N	89.00W	2.00	8	101.	4.11	2.83	57.5	36.6	22.90	0.
39	37.50N	80.00W	2.00	10	90.	4.43	3.18	141.0	44.3	66.70	5.
40	37.50N	80.50W	2.00	9	103.	3.86	3.21	158.4	38.9	40.59	5.
41	37.50N	81.00W	2.00	7	220.	7.34	2.93	119.7	67.5	21.95	5.
42	37.50N	81.50W	2.00	5	309.	47.56	12.40	109.6	1852.6	83.37	4.
43	37.50N	82.00W	0.74	0	0.	0.0	0.0	0.0	0.0	0.0	0.
44	37.50N	82.50W	0.46	0	0.	0.0	0.0	0.0	0.0	0.0	0.
45	37.50N	83.00W	0.27	0	0.	0.0	0.0	0.0	0.0	0.0	0.
46	37.50N	83.50W	0.11	0	0.	0.0	0.0	0.0	0.0	0.0	0.
47	37.50N	84.00W	0.02	0	0.	0.0	0.0	0.0	0.0	0.0	0.
48	37.50N	84.50W	0.02	0	0.	0.0	0.0	0.0	0.0	0.0	0.
49	37.50N	85.00W	0.01	0	0.	0.0	0.0	0.0	0.0	0.0	0.
50	37.50N	85.50W	0.02	0	0.	0.0	0.0	0.0	0.0	0.0	0.
51	37.50N	86.00W	0.03	0	0.	0.0	0.0	0.0	0.0	0.0	0.
52	37.50N	86.50W	0.07	0	0.	0.0	0.0	0.0	0.0	0.0	0.
53	37.50N	87.00W	0.31	0	0.	0.0	0.0	0.0	0.0	0.0	0.
54	37.50N	87.50W	0.82	0	0.	0.0	0.0	0.0	0.0	0.0	0.
55	37.50N	88.00W	2.00	6	249.	18.36	5.29	116.2	305.1	19.63	0.
56	37.50N	88.50W	2.00	7	107.	4.09	3.71	79.6	47.7	22.46	0.
57	37.50N	89.00W	2.00	7	120.	5.69	2.99	141.0	53.5	24.31	0.
58	38.00N	80.00W	2.00	9	137.	5.55	2.91	110.3	50.7	41.42	2.
59	38.00N	80.50W	2.00	9	196.	11.73	3.02	135.0	111.1	63.44	3.
60	38.00N	81.00W	2.00	6	245.	29.44	5.44	122.3	503.3	71.93	2.
61	38.00N	81.50W	0.87	0	0.	0.0	0.0	0.0	0.0	0.0	0.
62	38.00N	82.00W	0.52	0	0.	0.0	0.0	0.0	0.0	0.0	0.
63	38.00N	82.50W	0.43	0	0.	0.0	0.0	0.0	0.0	0.0	0.
64	38.00N	83.00W	0.28	0	0.	0.0	0.0	0.0	0.0	0.0	0.
65	38.00N	83.50W	0.13	0	0.	0.0	0.0	0.0	0.0	0.0	0.
66	38.00N	84.00W	0.04	0	0.	0.0	0.0	0.0	0.0	0.0	0.
67	38.00N	84.50W	0.02	0	0.	0.0	0.0	0.0	0.0	0.0	0.
68	38.00N	85.00W	0.02	0	0.	0.0	0.0	0.0	0.0	0.0	0.
69	38.00N	85.50W	0.03	0	0.	0.0	0.0	0.0	0.0	0.0	0.
70	38.00N	86.00W	0.05	0	0.	0.0	0.0	0.0	0.0	0.0	0.
71	38.00N	86.50W	0.11	0	0.	0.0	0.0	0.0	0.0	0.0	0.
72	38.00N	87.00W	0.46	0	0.	0.0	0.0	0.0	0.0	0.0	0.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
73	38.00N	87.50W	2.00	5	268.	33.78	9.26	87.6	982.8	33.22	0.
74	38.00N	88.00W	2.00	7	146.	5.94	2.89	148.0	54.0	18.66	0.
75	38.00N	88.50W	2.00	7	89.	4.16	3.42	92.7	44.7	21.99	0.
76	38.00N	89.00W	2.00	6	142.	7.97	4.81	120.7	120.4	55.88	0.
77	38.50N	80.00W	2.00	6	284.	23.27	7.65	145.2	559.5	26.60	1.
78	38.50N	80.50W	2.00	6	261.	27.84	7.42	148.7	648.5	78.00	1.
79	38.50N	81.00W	0.87	0	0.	0.0	0.0	0.0	0.0	0.0	0.
80	38.50N	81.50W	0.43	0	0.	0.0	0.0	0.0	0.0	0.0	0.
81	38.50N	82.00W	0.21	0	0.	0.0	0.0	0.0	0.0	0.0	0.
82	38.50N	82.50W	0.17	0	0.	0.0	0.0	0.0	0.0	0.0	0.
83	38.50N	83.00W	0.14	0	0.	0.0	0.0	0.0	0.0	0.0	0.
84	38.50N	83.50W	0.12	0	0.	0.0	0.0	0.0	0.0	0.0	0.
85	38.50N	84.00W	0.08	0	0.	0.0	0.0	0.0	0.0	0.0	0.
86	38.50N	84.50W	0.08	0	0.	0.0	0.0	0.0	0.0	0.0	0.
87	38.50N	85.00W	0.07	0	0.	0.0	0.0	0.0	0.0	0.0	0.
88	38.50N	85.50W	0.07	0	0.	0.0	0.0	0.0	0.0	0.0	0.
89	38.50N	86.00W	0.09	0	0.	0.0	0.0	0.0	0.0	0.0	0.
90	38.50N	86.50W	0.18	0	0.	0.0	0.0	0.0	0.0	0.0	0.
91	38.50N	87.00W	0.59	0	0.	0.0	0.0	0.0	0.0	0.0	0.
92	38.50N	87.50W	0.89	0	0.	0.0	0.0	0.0	0.0	0.0	0.
93	38.50N	88.00W	2.00	5	179.	7.30	2.96	3.6	67.9	23.41	0.
94	38.50N	88.50W	2.00	5	190.	17.63	5.35	144.7	296.3	34.30	0.
95	38.50N	89.00W	2.00	5	192.	11.59	7.17	166.6	261.3	105.10	0.
96	39.00N	80.00W	0.86	0	0.	0.0	0.0	0.0	0.0	0.0	0.
97	39.00N	80.50W	0.68	0	0.	0.0	0.0	0.0	0.0	0.0	0.
98	39.00N	81.00W	0.34	0	0.	0.0	0.0	0.0	0.0	0.0	0.
99	39.00N	81.50W	0.17	0	0.	0.0	0.0	0.0	0.0	0.0	0.
100	39.00N	82.00W	0.09	0	0.	0.0	0.0	0.0	0.0	0.0	0.
101	39.00N	82.50W	0.09	0	0.	0.0	0.0	0.0	0.0	0.0	0.
102	39.00N	83.00W	0.14	0	0.	0.0	0.0	0.0	0.0	0.0	0.
103	39.00N	83.50W	0.26	0	0.	0.0	0.0	0.0	0.0	0.0	0.
104	39.00N	84.00W	0.39	0	0.	0.0	0.0	0.0	0.0	0.0	0.
105	39.00N	84.50W	0.41	0	0.	0.0	0.0	0.0	0.0	0.0	0.
106	39.00N	85.00W	0.32	0	0.	0.0	0.0	0.0	0.0	0.0	0.
107	39.00N	85.50W	0.23	0	0.	0.0	0.0	0.0	0.0	0.0	0.
108	39.00N	86.00W	0.15	0	0.	0.0	0.0	0.0	0.0	0.0	0.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
109	39.00N	86.50W	0.14	0	0.	0.0	0.0	0.0	0.0	0.0	0.
110	39.00N	87.00W	0.27	0	0.	0.0	0.0	0.0	0.0	0.0	0.
111	39.00N	87.50W	0.56	0	0.	0.0	0.0	0.0	0.0	0.0	0.
112	39.00N	88.00W	0.60	0	0.	0.0	0.0	0.0	0.0	0.0	0.
113	39.00N	88.50W	0.54	0	0.	0.0	0.0	0.0	0.0	0.0	0.
114	39.00N	89.00W	0.50	0	0.	0.0	0.0	0.0	0.0	0.0	0.
115	39.50N	80.00W	0.43	0	0.	0.0	0.0	0.0	0.0	0.0	0.
116	39.50N	80.50W	0.18	0	0.	0.0	0.0	0.0	0.0	0.0	0.
117	39.50N	81.00W	0.09	0	0.	0.0	0.0	0.0	0.0	0.0	0.
118	39.50N	81.50W	0.06	0	0.	0.0	0.0	0.0	0.0	0.0	0.
119	39.50N	82.00W	0.08	0	0.	0.0	0.0	0.0	0.0	0.0	0.
120	39.50N	82.50W	0.19	0	0.	0.0	0.0	0.0	0.0	0.0	0.
121	39.50N	83.00W	0.45	0	0.	0.0	0.0	0.0	0.0	0.0	0.
122	39.50N	83.50W	0.73	0	0.	0.0	0.0	0.0	0.0	0.0	0.
123	39.50N	84.00W	0.86	0	0.	0.0	0.0	0.0	0.0	0.0	0.
124	39.50N	84.50W	0.87	0	0.	0.0	0.0	0.0	0.0	0.0	0.
125	39.50N	85.00W	0.75	0	0.	0.0	0.0	0.0	0.0	0.0	0.
126	39.50N	85.50W	0.56	0	0.	0.0	0.0	0.0	0.0	0.0	0.
127	39.50N	86.00W	0.31	0	0.	0.0	0.0	0.0	0.0	0.0	0.
128	39.50N	86.50W	0.15	0	0.	0.0	0.0	0.0	0.0	0.0	0.
129	39.50N	87.00W	0.11	0	0.	0.0	0.0	0.0	0.0	0.0	0.
130	39.50N	87.50W	0.11	0	0.	0.0	0.0	0.0	0.0	0.0	0.
131	39.50N	88.00W	0.08	0	0.	0.0	0.0	0.0	0.0	0.0	0.
132	39.50N	88.50W	0.06	0	0.	0.0	0.0	0.0	0.0	0.0	0.
133	39.50N	89.00W	0.06	0	0.	0.0	0.0	0.0	0.0	0.0	0.
134	40.00N	80.00W	0.07	0	0.	0.0	0.0	0.0	0.0	0.0	0.
135	40.00N	80.50W	0.05	0	0.	0.0	0.0	0.0	0.0	0.0	0.
136	40.00N	81.00W	0.04	0	0.	0.0	0.0	0.0	0.0	0.0	0.
137	40.00N	81.50W	0.04	0	0.	0.0	0.0	0.0	0.0	0.0	0.
138	40.00N	82.00W	0.12	0	0.	0.0	0.0	0.0	0.0	0.0	0.
139	40.00N	82.50W	0.40	0	0.	0.0	0.0	0.0	0.0	0.0	0.
140	40.00N	83.00W	0.79	0	0.	0.0	0.0	0.0	0.0	0.0	0.
141	40.00N	83.50W	2.00	5	316.	58.84	14.36	132.6	2655.2	165.95	1.
142	40.00N	84.00W	2.00	6	284.	28.39	6.80	179.3	606.4	58.73	1.
143	40.00N	84.50W	2.00	6	279.	32.41	6.79	27.4	691.4	93.82	1.
144	40.00N	85.00W	2.00	5	318.	284.87	13.51	44.3	12089.0	109.55	1.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
145	40.00N	85.50W	0.81	0	0.	0.0	0.0	0.0	0.0	0.0	0.
146	40.00N	86.00W	0.49	0	0.	0.0	0.0	0.0	0.0	0.0	0.
147	40.00N	86.50W	0.21	0	0.	0.0	0.0	0.0	0.0	0.0	0.
148	40.00N	87.00W	0.08	0	0.	0.0	0.0	0.0	0.0	0.0	0.
149	40.00N	87.50W	0.03	0	0.	0.0	0.0	0.0	0.0	0.0	0.
150	40.00N	88.00W	0.02	0	0.	0.0	0.0	0.0	0.0	0.0	0.
151	40.00N	88.50W	0.01	0	0.	0.0	0.0	0.0	0.0	0.0	0.
152	40.00N	89.00W	0.01	0	0.	0.0	0.0	0.0	0.0	0.0	0.
153	40.50N	80.00W	0.02	0	0.	0.0	0.0	0.0	0.0	0.0	0.
154	40.50N	80.50W	0.03	0	0.	0.0	0.0	0.0	0.0	0.0	0.
155	40.50N	81.00W	0.03	0	0.	0.0	0.0	0.0	0.0	0.0	0.
156	40.50N	81.50W	0.05	0	0.	0.0	0.0	0.0	0.0	0.0	0.
157	40.50N	82.00W	0.16	0	0.	0.0	0.0	0.0	0.0	0.0	0.
158	40.50N	82.50W	0.54	0	0.	0.0	0.0	0.0	0.0	0.0	0.
159	40.50N	83.00W	2.00	5	310.	89.76	12.60	92.0	3553.9	104.11	0.
160	40.50N	83.50W	2.00	6	271.	19.21	6.91	71.0	417.2	31.88	1.
161	40.50N	84.00W	2.00	6	104.	4.22	2.42	172.0	32.0	25.07	1.
162	40.50N	84.50W	2.00	6	172.	5.11	2.71	14.3	43.6	48.63	1.
163	40.50N	85.00W	2.00	6	321.	82.28	11.80	76.3	3049.3	46.81	1.
164	40.50N	85.50W	0.87	0	0.	0.0	0.0	0.0	0.0	0.0	0.
165	40.50N	86.00W	0.48	0	0.	0.0	0.0	0.0	0.0	0.0	0.
166	40.50N	86.50W	0.15	0	0.	0.0	0.0	0.0	0.0	0.0	0.
167	40.50N	87.00W	0.04	0	0.	0.0	0.0	0.0	0.0	0.0	0.
168	40.50N	87.50W	0.01	0	0.	0.0	0.0	0.0	0.0	0.0	0.
169	40.50N	88.00W	0.00	0	0.	0.0	0.0	0.0	0.0	0.0	0.
170	40.50N	88.50W	0.00	0	0.	0.0	0.0	0.0	0.0	0.0	0.
171	40.50N	89.00W	0.00	0	0.	0.0	0.0	0.0	0.0	0.0	0.
172	41.00N	80.00W	0.01	0	0.	0.0	0.0	0.0	0.0	0.0	0.
173	41.00N	80.50W	0.02	0	0.	0.0	0.0	0.0	0.0	0.0	0.
174	41.00N	81.00W	0.03	0	0.	0.0	0.0	0.0	0.0	0.0	0.
175	41.00N	81.50W	0.04	0	0.	0.0	0.0	0.0	0.0	0.0	0.
176	41.00N	82.00W	0.15	0	0.	0.0	0.0	0.0	0.0	0.0	0.
177	41.00N	82.50W	0.52	0	0.	0.0	0.0	0.0	0.0	0.0	0.
178	41.00N	83.00W	2.00	5	313.	112.90	15.73	63.0	5579.0	113.89	0.
179	41.00N	83.50W	2.00	6	296.	63.76	8.69	50.4	1740.7	63.52	1.
180	41.00N	84.00W	2.00	7	283.	31.71	5.05	24.6	503.0	40.22	1.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
181	41.00N	84.50W	2.00	6	271.	28.45	4.81	147.9	429.5	48.97	1.
182	41.00N	85.00W	2.00	5	305.	46.79	11.16	122.8	1640.0	85.93	0.
183	41.00N	85.50W	0.78	0	0.	0.0	0.0	0.0	0.0	0.0	0.
184	41.00N	86.00W	0.34	0	0.	0.0	0.0	0.0	0.0	0.0	0.
185	41.00N	86.50W	0.08	0	0.	0.0	0.0	0.0	0.0	0.0	0.
186	41.00N	87.00W	0.02	0	0.	0.0	0.0	0.0	0.0	0.0	0.
187	41.00N	87.50W	0.01	0	0.	0.0	0.0	0.0	0.0	0.0	0.
188	41.00N	88.00W	0.00	0	0.	0.0	0.0	0.0	0.0	0.0	0.
189	41.00N	88.50W	0.00	0	0.	0.0	0.0	0.0	0.0	0.0	0.
190	41.00N	89.00W	0.00	0	0.	0.0	0.0	0.0	0.0	0.0	0.
191	41.50N	80.00W	0.02	0	0.	0.0	0.0	0.0	0.0	0.0	0.
192	41.50N	80.50W	0.03	0	0.	0.0	0.0	0.0	0.0	0.0	0.
193	41.50N	81.00W	0.03	0	0.	0.0	0.0	0.0	0.0	0.0	0.
194	41.50N	81.50W	0.14	0	0.	0.0	0.0	0.0	0.0	0.0	0.
195	41.50N	82.00W	0.14	0	0.	0.0	0.0	0.0	0.0	0.0	0.
196	41.50N	82.50W	0.41	0	0.	0.0	0.0	0.0	0.0	0.0	0.
197	41.50N	83.00W	0.80	0	0.	0.0	0.0	0.0	0.0	0.0	0.
198	41.50N	83.50W	2.00	5	213.	24.31	3.55	94.8	271.5	100.59	0.
199	41.50N	84.00W	2.00	6	217.	20.43	4.58	123.4	293.7	72.01	0.
200	41.50N	84.50W	2.00	5	316.	126.86	15.84	166.4	6311.7	89.16	0.
201	41.50N	85.00W	0.76	0	0.	0.0	0.0	0.0	0.0	0.0	0.
202	41.50N	85.50W	0.42	0	0.	0.0	0.0	0.0	0.0	0.0	0.
203	41.50N	86.00W	0.14	0	0.	0.0	0.0	0.0	0.0	0.0	0.
204	41.50N	86.50W	0.03	0	0.	0.0	0.0	0.0	0.0	0.0	0.
205	41.50N	87.00W	0.02	0	0.	0.0	0.0	0.0	0.0	0.0	0.
206	41.50N	87.50W	0.01	0	0.	0.0	0.0	0.0	0.0	0.0	0.
207	41.50N	88.00W	0.00	0	0.	0.0	0.0	0.0	0.0	0.0	0.
208	41.50N	88.50W	0.00	0	0.	0.0	0.0	0.0	0.0	0.0	0.
209	41.50N	89.00W	0.00	0	0.	0.0	0.0	0.0	0.0	0.0	0.
210	42.00N	80.00W	0.06	0	0.	0.0	0.0	0.0	0.0	0.0	0.
211	42.00N	80.50W	0.07	0	0.	0.0	0.0	0.0	0.0	0.0	0.
212	42.00N	81.00W	0.07	0	0.	0.0	0.0	0.0	0.0	0.0	0.
213	42.00N	81.50W	0.09	0	0.	0.0	0.0	0.0	0.0	0.0	0.
214	42.00N	82.00W	0.14	0	0.	0.0	0.0	0.0	0.0	0.0	0.
215	42.00N	82.50W	0.27	0	0.	0.0	0.0	0.0	0.0	0.0	0.
216	42.00N	83.00W	0.54	0	0.	0.0	0.0	0.0	0.0	0.0	0.

	LAT.	LONG.	MAG	NST	LOA	A(KM)	B(KM)	AZIM	AREA	DEPTH	NO. NEAR STA DET
217	42.00N	83.50W	0.77	0	0.	0.0	0.0	0.0	0.0	0.0	0.
218	42.00N	84.00W	0.75	0	0.	0.0	0.0	0.0	0.0	0.0	0.
219	42.00N	84.50W	0.53	0	0.	0.0	0.0	0.0	0.0	0.0	0.
220	42.00N	85.00W	0.30	0	0.	0.0	0.0	0.0	0.0	0.0	0.
221	42.00N	85.50W	0.16	0	0.	0.0	0.0	0.0	0.0	0.0	0.
222	42.00N	86.00W	0.06	0	0.	0.0	0.0	0.0	0.0	0.0	0.
223	42.00N	86.50W	0.03	0	0.	0.0	0.0	0.0	0.0	0.0	0.
224	42.00N	87.00W	0.01	0	0.	0.0	0.0	0.0	0.0	0.0	0.
225	42.00N	87.50W	0.00	0	0.	0.0	0.0	0.0	0.0	0.0	0.
226	42.00N	88.00W	0.00	0	0.	0.0	0.0	0.0	0.0	0.0	0.
227	42.00N	88.50W	0.00	0	0.	0.0	0.0	0.0	0.0	0.0	0.
228	42.00N	89.00W	0.00	0	0.	0.0	0.0	0.0	0.0	0.0	0.

THE UNIVERSITY OF CHICAGO

BEING A TOTALLY NEW VERSION OF THE NETWORK CAPABILITY ESTIMATION
PROGRAM BY MARK WIRTH, MAY 1970
REVISED W/ NEW NETPROB ROUTINE, MAY 1971, BY M. WIRTH

NOTE: COMMENT CARD C'S HAVE BEEN ADDED TO CALL SUBROUTINES THAT DO NOT EXIST ON OUR SYSTEM RATHER THAN REMOVING THE STATEMENT TO MAINTAIN THE INTEGRITY OF THE ORIGINAL PROGRAM. 2/21/80

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$RUN NETWORK.H.O 4=INPUT (STATION DATA FILES) 5=INPUT (DATA AND TABLES)
                  6=OUTPUT (FOR PRINTER) 7=OUTPUT (FOR PLOT FILE)
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THIS LISTING OF THE PROGRAM NETWORK IS SET UP FOR THE USE OF THE UNIVERSITY OF MICHIGAN SEISMIC OBSERVATORY AND IS NOT MEANT TO BE DIRECTLY TRANSFERABLE TO OTHER SYSTEMS AT THIS TIME. SOME PARTS OF THE ORIGINAL PROGRAM BY M. WIRTH 1971 HAVE BEEN TOTALLY REMOVED.

NOTES-- SUBR. TIMET AND TIMEDF HAVE BEEN ALTERED TO RUN ON ONE PARTICULAR SET OF UNEVENLY SPACED TRAVEL TIME DATA. IF NEW DATA IS TO BE USED THESE SUBR. SHOULD BE ALTERED.

--THE SP MAGNITUDE CORR. WRITE STATEMENTS HAVE BEEN ALTERED FOR THE TECHNICAL REPORT AND MUST BE CHANGED IF INPUT DATA IS CHANGED.

INSTRUCTIONS FOR CHANGING THE MAX. NUMBER OF STATIONS, WHICH
IS NOW SET AT 200 (6/18/80)
THE FOLLOWING LIST OF IDEMS NEED TO BE CHANGED:

- * CALL ERASE(400,SLAT) (IN MAIN)
- * CALL ERASE(400,SLONG) (IN MAIN)
- * CALL ERASE(200,SEC) (IN MAIN)
- * CALL ERASE(5050,LLIST) (IN SUBROUTINE LDLPDT)
- * CALL ERASE(10100,LLIST) (IN SUBROUTINE LDSPDT)
- * DIMENSION NAMES(NST),ILIST(5050) (IN SUBR. LDLPDT)
- * DIMENSION ILIST(10100) (IN SUBR. SPHAG, LDSPDT)
- * DIMENSION W(1000) (IN SUBR. NETPRB)
- * LOGICAL*1 LLIST(202,20) (IN MAIN)
- * LOGICAL*1 IARRY(202) (IN SUBR. LOGCHK)
- * DO 10 I=1,202 (IN SUBR. LOGCHK)

THE FOLLOWING COMMON STATEMENTS NEED TO BE CHANGED AT ALL OCCURRANCES

- ALT ITABL(200) (IN MAIN, TIMET, TIMEDF, LDTTAB)
- ETABLE LLIST(202,200) (IN SUBR. SPHAG,LDSPDT)
- TABLE1 LLIST(202,100), IST, Z (IN SUBR. LPHAG, LDLPDT)

IST AND Z CHANGE ONLY IN LPHAG

THE COMMON STATEMENTS ARE VERY TRICKY TO CHANGE--SO BE CAREFUL
LLIST IS A LOGICAL*1

THE FOLLOWING DIMENSION STATEMENT NEEDS TO BE CHANGED TOTALLY
THE REST OF THE DIMENSION STATEMENTS DO NOT NEED TO BE CHANGED

DIMENSION SLAT(200,2),SLONG(200,2),SNOIS(200),SDN(200),SCOR(200),
1 NAMES(200),SVAR(200),ANGD(200),AZH(200),BAZH(200),DIST(200),
2 SMAG(200),SPROB(200),PNET(200,20),SSPROB(200),PHETSS(200),WU(200),
3 SPROBM(200,20),ILIST(1010),U(200),V(200),SDT(200),INN(200),
4 WV(200),WSDT(200),WAZH(200),WPROB(200),RPROB(200),IND(200),
5 PSDT(200),PTEN(200),SMAGH(200,20),R(200),MIN(200),SEC(200),
6 T(200,20),W(200),WH(200),HIV4(200),REL(200)

DIMENSION LMODE(2),LISS(101,6),LLAT(2),LLONG(2),ELAT(400),
1SSTH(7),PTH(7),EVHAG(20),PASS(20,7),THRESH(7,400),A(400,2),
2ELAZ(400,2),OA(400,2),NIN(400,2),RA(20),RB(20),RELAZ(20),
3AS(30,30),AN(30,30),THRI V4(7,400),IADP(5),ALPA(5),SATHRI(7,400),
4QUANT(5),ICTS(10),BIAS(400),B(400,2),ELONG(400)
EQUIVALENCE (LLIST,ILIST)

```

REAL*8 LMODE, NAMES, LTAB, ALPA, IDA, IDB, IDC
REAL*8 COMB1, COMB2, COMB3
COMMON /ALT/ ITABL(200), IALT
DATA COMB1, COMB2, COMB3 /'END OF C', 'COMBINATI', 'ON RUN'/
DATA ALPA /'DEPTH PK', 'DEPTH MP', 'AXIS MPK', 'AXIS MP',
1 'NEAR STA'/
DATA ICTS /'A', 'L', 'S', 'U', 'DSP', 'DLP', 'T', 'V', 'E', 'P'/
DATA LMODE /'SHORT', 'LONG'//, LSS /'SS'//, LLAT /'S', 'N'//, LLONG
1 /'E', 'W'/
LOGICAL*1 LLIST(202,20), LLP
LLP(X) = X .GE. 0.
AREAP(X,Y) = 3.141593 * X * Y
IOUT = 999
IX = 777773777
CALL ERASE(400, SLAT)
CALL ERASE(400, SLONG)
10 READ (5,1890,END=1870) IDA, IDB, IDC, (QUANT(I),I=1,5)
C
DO 20 I = 1, 5
  IF (QUANT(I) .EQ. 0.) QUANT(I) = 1.0E67
20 CONTINUE
C
C
C
C
A - CARD
READ (5,1920) LAB, LAPHA, SDSIG, MODE, NUMAG, BNAG, DMAG, PTN,
1IADP, ICOMB, INBIAS
IF (LAB .NE. ICTS(1)) GO TO 450
IDAP = IADP(1) + IADP(2) + IADP(3) + IADP(4) + IADP(5)
NSD = 0
NRM = 0
NRANDS = 0
40 WRITE (6,1970) LAPHA, LMODE(MODE), SDSIG, PTN
C
C
C
C
L - CARD
READ (5,1980) LAB, NELL, ELVAR, PELL, IFPREL

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```

      IF (LAB .NE. ICTS(2)) GO TO 450
50  IF (MODE .NE. 2) GO TO 70
60  PELL = 0.
70  IF (PELL) 80, 90, 80
80  IPELL = PELL * 100.0 + 0.5
      WRITE (6,1990) IPELL, NELL
      CALL ERASE(800, A)
      CALL ERASE(800, B)
      CALL ERASE(800, ELAZ)
      CALL ERASE(800, OA)
      CALL ERASE(800, NIN)
90  ELVAR = ELVAR * ELVAR
      CSQ = -2. * ALOG(1. - PELL)

```

S - CARD

```

      HEAD (5,2000) LAB, NST, IPLOC, SNR, ANOIS, ASDN
      IF (LAB .NE. ICTS(3)) GO TO 450
100 WRITE (6,2010)
      SNRLOG = ALOG(SNR) * .4342945
      READ STATION INFORMATION

```

IALT = 0

DO 180 I = 1, NST

```

      ITABL(I)=0
      SCOR(I)=0.0
      SVAR(I)=0.0
      READ (4,2040) NAMES(I), SLAT(I,1), SLONG(I,1), SNOIS(I), REL(I)
      IF (REL(I) .EQ. 0.) REL(I) = 0.88
      IF (ITABL(I) .NE. 0) IALT = 1
      SVAR(I) = SQRT(ELVAR + SVAR(I) * SVAR(I))
      IF (ANOIS) 110, 120, 110
110  SNOIS(I) = ANOIS
120  IF (ASDN) 130, 140, 130
130  SDN(I) = ASDN

```

```

140 IF (IFLOC) 150, 160, 150
150 WRITE (6,2030) I, NAMES(I), SNOIS(I), SDN(I), SNR, SCOR(I),
1 SVAR(I), ITABL(I), REL(I)
    ILOC = 2
    GO TO 170
160 WRITE (6,2020) I, NAMES(I), SLAT(I,1), SLONG(I,1), SNOIS(I),
1 SDN(I), SNR, SCOR(I), SVAR(I), ITABL(I), REL(I)
    ILOC = 1
170 CONTINUE
    R(I) = SDN(I)
    SDN(I) = SQRT(SDN(I)*SDN(I) + SDSIG*SDSIG)
    SVAR(I) = SVAR(I) * SVAR(I)
180 SNOIS(I) = ALOG(SNOIS(I)) * .4342945 + SNRLOG
    NOISE AMPLITUDES ARE INPUT AS EXPONENTIATED MEAN LOGS (I.E. GEOM.
    MEANS), VARIANCES AS MAGNITUDE (BASE 10 LOGARITHMIC) VARIANCES.
    THIS CONVENTION ACCORDS WITH OLD PROGRAM. SEE REPORT FOR DISCUSSI
    (MARK WIRTH, 4-70)

```

U - CARD

```

200 READ (5,2000) LAB, NSS
    IF (LAB.NE. ICTS(4)) GO TO 450
210 IF (NST + 4*NSS.LE. 44) GO TO 230
220 WRITE (6,2280)
230 IF (NSS.EQ. 0) GO TO 250

DO 240 I = 1, NSS
    READ (5,2050) KL, (LISS(K + 1,I),K=1,KL)
    IP1 = I + 1
    LISS(1,I) = KL
240 WRITE (6,2060) IP1, KL, (LISS(K + 1,I),K=1,KL)

250 NSSP = NSS + 1

IFLD = -2

DSP - CARD

```

C DLP - CARD

C
260 READ (5,2070) LAB, NDC, NC1, NC2, IPDT
IF (LAB.NE. ICTS(5)) GO TO 330
270 IFLD = IFLD + 1
GO TO (280, 300), MODE
280 CALL LDSPDT(NC1, NC2, NST, NAMES, IPDT)
290 NTAB = NC1
NCOR = NC2
IF (IFLD) 260, 360, 260
300 IF (NDC.EQ. 0) GO TO 320

C DO 310 K = 1, NDC

C READ A BLANK CARD

C READ (5,2080)

C 310 CONTINUE

C
320 IF (IFLD) 260, 360, 260
330 IF (LAB.NE. ICTS(6)) GO TO 450
340 IFLD = IFLD + 1
GO TO (300, 350), MODE
350 CALL LDLPDT(NC1, NST, NAMES, IPDT)
GO TO 290

C T - CARD

C
360 READ (5,2090) LAB, NTCAR, NTIM, LTAB, IPPT
IF (LAB.NE. ICTS(7)) GO TO 450
370 IF (PELL) 440, 380, 440
380 IF (NTCAR.EQ. 0) GO TO 400

C DO 390 K = 1, NTCAR

C READ (NTCAR) BLANK CARDS

```

390 READ (5,2080)
C
C      V - CARD
C
400 READ (5,2090) LAB, NVAR
    IF (LAB .NE. ICTS(8)) GO TO 450
410 IF (NVAR .EQ. 0) GO TO 430
C
    DO 420 K = 1, NVAR
C
C      READ (NVAR) BLANK CARDS
C
420 READ (5,2080)
C
430 CALL ERASE(NST, PSDT)
    GO TO 470
440 CALL LDTTAB(NTIM, IPPT, LTAB)
    GO TO 470
C
C
450 CONTINUE
C
C      P - CARD      FOR END OF JOB
C
    IF (LAB .EQ. ICTS(10)) GO TO 460
    WRITE (6,2100) LAB
    GO TO 1880
460 WRITE (6,2110) IX
    GO TO 1870
C
C
C
C      READ *E* CARD AND BEGIN EPICENTER LOOP
C
470 READ (5,2120) LAB, NE, IFSMON, IFSUPT
    IF (LAB .NE. ICTS(9)) GO TO 450
480 J = 0
    TMAG = DMAG

```

CALL ERASE(400, BIAS)

C

```
490 DO 1510 JE = 1, NE
    READ (5,2130) NLAT, NLONG, FLAT, LA, BLONG, LO, FMAG, DLOC
    IF (LA.NE. ICTS(3)) GO TO 510
500   FLAT = -FLAT
510   IF (LO.NE. ICTS(9)) GO TO 530
520   BLONG = -BLONG
530   FLAT = FLAT - DLOC
    ELONG = BLONG - DLOC
    IF (NLAT) 550, 540, 550
540   NLAT = 1
550   IF (NLONG) 570, 560, 570
560   BLONG = 1
```

C

```
570 DO 1510 JLAT = 1, NLAT
    IF (ABS(FLAT).EQ. 89.9) FLAT = SIGN(90.,FLAT)
    FLAT = FLAT + DLOC
    IF (ABS(FLAT).GT. 89.9) FLAT = SIGN(89.9,FLAT)
    FLONG = BLONG
```

C

```
DO 1510 JLONG = 1, NLONG
    J = J + 1
    THRIV4(1,J) = 0.
    THRIV4(2,J) = 0.
    THRIV4(3,J) = 0.
    THRIV4(4,J) = 0.
    THRIV4(5,J) = 0.
    ELAT(J) = FLAT
    FLONG = FLONG + DLOC
    IF (ABS(FLONG).LE. 180.) GO TO 590
580   FLONG = FLONG - SIGN(360.,DLOC)
590   ELONG(J) = FLONG
    IF (NMAG) 600, 620, 610
600   EMAG = BMAG
    NMAG = -NMAG
    NT = NMAG + 1
    NB = 1
```

```

        DMAG = 0.
        GO TO 630
610      EMAG = BMAG - DMAG
        NMAG = NUMAG
        GO TO 630
620      EMAG = FMAG
        NMAG = 1
        DMAG = 0.
630      CALL DISTAZ(NST, FLAT, FLONG, SLAT, SLONG, AZH, BAZH, DIST,
1          ANGDI)
        GO TO (640, 650), MODE
640      CALL SPHAG(NST, SCOR, DIST, SMAG, NCOR, NTAB, EMAG, FLONG,
1          FLAT)
        GO TO 660
650      CALL LPHAG(NST, DIST, SMAG, NTAB, EMAG, FLONG, FLAT)
660      CONTINUE
        PLAT = ABS(FLAT)
        IF (IPSNOW) 680, 670, 680
670      CONTINUE
        PLONG = ABS(FLONG)
        LXX = 0
        LXY = 0
        IF (LLP(FLAT)) LXX = 1
        IF (LLP(FLONG)) LXY = 1
        LA = LLAT(LXX + 1)
        LO = LLONG(LXY + 1)
        WRITE (6,2140) J, PLAT, LA, PLONG, LO
C
C      COMPUTE PROBABILITIES, ALL STATIONS. TEST FOR THRESHOLD
680      CALL ERASE(7, SSTH)
        MTH = NMAG
        IF (NMAG .LT. 1) GO TO 1350
        IFHRSD = 0
        ITHRSO = 0
C
        DO 1340 M = 1, NMAG
C
        DO 690 I = 1, NST

```



```

        SMAG(I) = SMAG(I) + DMAG
        SEC(I) = (SMAG(I) - SNOIS(I)) / R(I)
690      SPROB(I) = PROBP((SMAG(I) - SNOIS(I))/SDN(I)) * REL(I)
C
        CALL NETPRB(NST, SPROB, PTEM)
        IF (NUMAG .LT. 0) GO TO 730
        IF (PTEM(LAPHA) .LT. PTN .OR. IPHRSD .EQ. 1)
1          GO TO 750
730      IPHRSD = 1
        THRIV4(5,J) = 0.
C
        DO 740 I = 1, NST
        IF (ANGD(I) .GT. 25.0) GO TO 740
        IF (SPROB(I) .GT. PTN) THRIV4(5,J) = THRIV4(5,J) + 1.0
740      CONTINUE
C
750      CONTINUE
        PTEST = PTEM(LAPHA)
        EMAG = EMAG + DMAG
        MM = M
        IF (NUMAG) 760, 850, 850
C
C      DIVERSION FOR BINARY PARTITION OPTION
C
760      IF (PTEST .LT. PTN) GO TO 780
770      IF (M .LT. 2) GO TO 790
        GO TO 820
780      GO TO (800, 790, 810), M
        IF (M .LT. 3) GO TO 800
        GO TO 810
790      NT = M
        NMAG = M
        GO TO 850
800      DMAG = TMAG - BMAG
        GO TO 850
810      DMAG = 0.5 * ABS(DMAG)
        MM = NB + 1
        NB = NB + 1

```

```

      GO TO 850
820    DMAG = -0.5 * ABS(DMAG)
      MM = NT - 1
      NT = MM
      GO TO 850
830    IF (M .NE. NMAG) GO TO 1190
840    MTH = NT
      IF (NMAG .NE. 2) GO TO 900
      GO TO 1150
850    PASS(MM,1) = PTEST
      EVMAG(MM) = EMAG
C
      DO 860 I = 1, NST
        T(I,MM) = SEC(I)
        SPROBM(I,MM) = SPROB(I)
        SMAGM(I,MM) = SMAG(I)
860    PNET(I,MM) = PTEN(I)
C
      IF (NUMAG) 830, 870, 870
870    IF (SSTH(1)) 1190, 880, 1190
880    IF (PTEST .LT. PTN) GO TO 1140
890    MTH = M
900    THRESH(1,J) = EVMAG(MTH)
      SSTH(1) = EVMAG(MTH)
      IF (PELL) 910, 1160, 910
C
C    COMPUTE ERROR ELLIPSES
910    CALL TIMEDF(NST, AZM, ANGD, SVAR, U, V, SDT)
      CALL TIMWDF(NST, ANGD, W, SDT, ITABL)
C
      DO 950 I = 1, NST
        IF (U(I) .NE. 0. .OR. V(I) .NE. 0.) GO TO 930
920    WPROB(I) = 0.
        PSDT(I) = 0.
        GO TO 950
930    CONTINUE

```

C

```

ARG = 1.0 / 4.56
IF (ANGD(I) .LE. 106.) GO TO 940
IF (ANGD(I) .GE. 114.) GO TO 940
TST = SQRT(U(I)*U(I) + V(I)*V(I))
IF (TST .LE. ARG) GO TO 940
THTA = 1.74539252E-2 * AZM(I)
U(I) = -ARG * COS(THTA)
V(I) = ARG * SIN(THTA)

```

C
C
C

```

940      WPROB(I) = SPROBM(I, MTH)
          PSDT(I) = 1. / SDT(I)
950      RPHOB(I) = WPROB(I)

```

C

```

CALL ORDRXI(NST, WPROB, INN)

```

C

```

DO 970 I = LAPHA, NST
  IF (PNET(I, MTH) .GE. PTN) GO TO 970
960  MIN(J, 1) = I - 1
      GO TO 980
970  CONTINUE

```

C

```

      MIN(J, 1) = NST

```

C

```

THIS SECTION IS USED IN CALCULATING THE 50 PERCENT PROBABILITIES
AND IS NOT CURRENTLY USED.

```

C

C

C

C

C

C

C

C

C

C

C

C

C

C

C

C

C

C

```

980      DO 1000 I = 1, NST
          IF (WPROB(I) .GE. .50) GO TO 1000
990      MIN(J, 2) = I - 1
          GO TO 1010
1000     CONTINUE
          MIN(J, 2) = NST
1010     DO 1050 K = 1, 2

```

980 K=1

```
C      NINK = NIN(J,K)

      DO 1020 I = 1, NINK
        II = INN(I)
        WU(I) = U(II)
        WV(I) = V(II)
        WSDT(I) = SDT(II)
        WW(I) = W(II)
1020    WAZH(I) = AZH(II)
C
      CALL ERELIP(NINK, WU, WV, WSDT, CSQ, A(J,K), B(J,K),
        1      ELAZ(J,K), WW, H44, PLAT)
C
      95 PERCENT CONFIDENCE ON DEPTH
C
      THRIV4(K,J) = 1.96 * SQRT(H44)
      CALL ORDRXI(NINK, WAZH, IND)
      FLOA = 360. - WAZH(1) + WAZH(NINK)
      IF (NINK .LT. 2) GO TO 1050
C
      DO 1040 I = 2, NINK
        IF (WAZH(I - 1) - WAZH(I) .LE. FLOA) GO TO 1040
1030    FLOA = WAZH(I - 1) - WAZH(I)
1040    CONTINUE
C
1050    OA(J,K) = FLOA
      GO TO 1160
C
1140    IF (M .NE. NHAG) GO TO 1190
1150    THRESH(1,J) = PTEST
      SSTH(1) = PTEST
1160    PTH(1) = PNET(LAPHA, MTH)
      IF (IFSMON) 1190, 1170, 1190
1170    CONTINUE
      CALL ERASE(200, SEC)
      IF (PELL .NE. 0.) CALL TIMET(NST, ANGD, SEC)
```

```

DO 1180 IJK = 1, NST
  MIN(IJK) = SEC(IJK) / 60.
  SEC(IJK) = SEC(IJK) - 60. * MIN(IJK)
1180 CONTINUE
C
  WRITE (6,2150) (I, NAMES(I), DIST(I), AZM(I), SMAGM(I, MTH),
1    PSDT(I), SPROBM(I, MTH), MIN(I), SEC(I), I=1, NST)
C
  REPEAT PROBABILITY CALCS FOR SUBSETS
1190 CONTINUE
1240 CONTINUE
  IF (NSS .LT. 1) GO TO 1340
C
  DO 1330 ISS = 1, NSS
    NISS = LISS(1, ISS)
    IF (NISS .LT. 1) GO TO 1260
C
    DO 1250 K = 1, NISS
      SSPROB(K) = SPROB(LISS(K + 1, ISS))
1250
C
1260 CALL NETPRB(NISS, SSPROB, PNETSS)
      PASS(M, ISS + 1) = PNETSS(LAPHA)
      IF (M .NE. MTH) GO TO 1280
1270 PTH(ISS + 1) = PNETSS(LAPHA)
1280 IF (SSTH(ISS + 1)) 1330, 1290, 1330
1290 IF (PNETSS(LAPHA) .LT. PTN) GO TO 1310
1300 THRESH(ISS + 1, J) = ENAG
      SSTH(ISS + 1) = ENAG
      GO TO 1330
1310 IF (M .NE. NMAG) GO TO 1330
1320 THRESH(ISS + 1, J) = PNETSS(LAPHA)
      SSTH(ISS + 1) = PNETSS(LAPHA)
1330 CONTINUE
C
1340 CONTINUE
C
C    END MAGNITUDE LOOP. OUTPUT SUMMARY FOR EPICENTER
1350 CONTINUE

```

```

1360      IF (IPSHON) 1500, 1360, 1500
1      WRITE (6,2160) LAPHA, EVHAG(MTH), (LSS,ISS,PTH(ISS),ISS=1,
      NSSP)
      WRITE (6,2170) (LSS,ISS,SSTH(ISS),ISS=1,NSSP)
      WRITE (6,2180) BIAS(J)
      WRITE (6,2190) LAPHA, (EVHAG(M),M=1,NHAG)
      WRITE (6,2200)
      IF (NSSP .LT. 1) GO TO 1380
C
      DO 1370 ISS = 1, NSSP
1370     WRITE (6,2210) ISS, (PASS(M,ISS),M=1,NHAG)
C
1380     IF (IPSUPT) 1440, 1390, 1440
1390     WRITE (6,2220) (EVHAG(M),M=1,NHAG)
      WRITE (6,2200)
C
      DO 1400 I = 1, NST
1400     WRITE (6,2210) I, (PHET(I,M),M=1,NHAG)
C
      IF (NST .LE. 23) GO TO 1420
1410     WRITE (6,2280)
1420     WRITE (6,2230) (EVHAG(M),M=1,NHAG)
      WRITE (6,2200)
C
      DO 1430 I = 1, NST
1430     WRITE (6,2240) NAMES(I), (SPROBM(I,M),M=1,NHAG)
C
1440 CONTINUE
1500     IF (J .EQ. 400) GO TO 1520
1510 CONTINUE
C
C      END EPICENTERS. OUPUT FINAL SUMMARY
1520 NEP = J
      IF (NUMAG) 1530, 1540, 1540
1530 NMAG = -NUMAG
      DMAG = (TMAG - BMAG) / 2 ** (NMAG - 2)
      EVHAG(NMAG) = TMAG
1540 IF (PELL .GT. 0. .AND. NSS .EQ. 0) GO TO 1610

```

```

C
1550 DO 1600 J = 1, NRP
      IF (MOD(J - 1, 50)) 1590, 1560, 1590
1560  WRITE (6, 2280)
      IF (J .NE. 1) GO TO 1580
1570  WRITE (6, 2290) IDA, IDB, IDC, EVHAG(1), EVHAG(NHAG), DHAG
1580  WRITE (6, 2300) (LSS, ISS, ISS=1, NSSP)
      WRITE (6, 2200)
1590  PLAT = ABS(ELAT(J))
      PLONG = ABS(ELONG(J))
      LXX = 0
      LXY = 0
      IF (ELONG(J) .GE. 0.) LXY = 1
      IF (ELAT(J) .GE. 0.) LXX = 1
      LO = LLONG(LXY + 1)
      LA = LLAT(LXX + 1)
1600  WRITE (6, 2310) J, PLAT, LA, PLONG, LO, BIAS(J), (THRESH(ISS, J),
      1ISS=1, NSSP)

```

```

C
      IF (PELL) 1610, 1670, 1610

```

```

C
1610 DO 1660 J = 1, NRP
      IF (MOD(J - 1, 36)) 1650, 1620, 1650
1620  WRITE (6, 2280)
      IF (J .NE. 1) GO TO 1640
1630  WRITE (6, 2320) EVHAG(1), EVHAG(NHAG), DHAG
1640  WRITE (6, 2330)
1650  PLAT = ABS(ELAT(J))
      PLONG = ABS(ELONG(J))
      LXX = 0
      LXY = 0
      IF (ELAT(J) .GE. 0.) LXX = 1
      IF (ELONG(J) .GE. 0.) LXY = 1
      LO = LLONG(LXY + 1)
      LA = LLAT(LXX + 1)
      AREA = AREA + (A(J, 1), B(J, 1))
      THRI V4(3, J) = A(J, 1)

```

```

C      THIS IS THE MAIN OUTPUT FOR THE PRINTER

```

```

        WRITE (6,2340) J, PLAT, LA, PLONG, LO, THRESH(1,J),
1     NIN(J,1), OA(J,1), A(J,1), B(J,1), ELAZ(J,1), AREA, THRIV4(1,J),
2     THRIV4(5,J)
C     THIS IS THE OUTPUT THAT IS USED FOR PLOTS
        WRITE(7,2325) ELAT(J),ELONG(J), THRESH(1,J),A(J,1),B(J,1),
1ELAZ(J,1)
2325 FORMAT (1X,F7.2,F7.2,F4.2,2F12.2,F5.1)
        IF (THRIV4(5,J) .GT. 0.) THRIV4(5,J) = 2.0
C     THIS SET OF STATEMENTS PRINT THE 50 PERCENT PROBABILITIES
C     AND IS NOT USED AT THIS TIME
C     AREA = AREA* (A(J,2),B(J,2))
        THRIV4(4,J) = A(J,2)
C1660 WRITE (6,2350) NIN(J,2), OA(J,2), A(J,2), B(J,2), ELAZ(J,2), AREA,
C     1THRIV4(2,J)
C
1660 CONTINUE
C
1670 CONTINUE
C     CALL MTCWTH(8, 1)
        IF (IDAP .EQ. 0) GO TO 1760
1680 CONTINUE
        WRITE (6,2360)
C
        DO 1690 K = 1, 5
            IF (IADP(K) .EQ. 0) GO TO 1690
            CALL MINMAX(THRIV4, NEP, THIN, THAX, K)
            IF (THAX .GT. QUANT(K)) CALL QUTIZE(THRIV4, NEP, QUANT(K), K,
1            THAX)
            TINC = (THAX - THIN) / 50.0
            WRITE (6,2370) THAX, THIN, TINC, ALPA(K)
            IF (K .EQ. 5) THAX = 10.5
C            CALL MTCWTH(7, 1)
1690 CONTINUE
C
        IF (ICOMB .EQ. 0) GO TO 10
        IF (IOUT .LT. 0) GO TO 1720
C
        DO 1710 K = 1, 5

```



```

      IF (IADP(K) .EQ. 0) GO TO 1710
C
      DO 1700 J = 1, NEP
        SATHRI(K,J) = THRIV4(K,J)
1700  CONTINUE
C
1710  CONTINUE
C
      IOUT = -999
      GO TO 10
1720  CONTINUE
C
      DO 1750 K = 1, 5
        IF (IADP(K) .EQ. 0) GO TO 1750
C
        DO 1730 J = 1, NEP
          THRIV4(K,J) = SATHRI(K,J) - THRIV4(K,J)
1730  CONTINUE
C
          CALL MINMAX(THRIV4, NEP, TMIN, TMAX, K)
          IF (TMIN .GT. 1.5) GO TO 1750
          WRITE (6,2370) TMAX, TMIN
          TMIN = ABS(TMIN) + 1.5
C
          DO 1740 J = 1, NEP
            THRIV4(K,J) = THRIV4(K,J) + TMIN
1740  CONTINUE
C
1750  CONTINUE
C
      ICOMB = 0
      IOUT = 999
      IDA = COMB1
      IDB = COMB2
      IDC = COMB3
      GO TO 1680
1760  CONTINUE
      GO TO 1780

```

```

1770 CONTINUE
1780 CONTINUE
1800 CONTINUE
C   CALL MTCWTH(7, 1)
    IF (ICOMB .EQ. 0) GO TO 10
    IF (IOUT .LT. 0) GO TO 1830
C
    DO 1820 IS = 1, NSSP
C
        DO 1810 J = 1, NEP
            SATHRI(IS,J) = THRESH(IS,J)
1810    CONTINUE
C
1820    CONTINUE
C
        IOUT = -999
        GO TO 10
1830    CONTINUE
        WRITE (6,2360)
C
        DO 1860 IS = 1, NSSP
C
            DO 1840 J = 1, NEP
                THRESH(IS,J) = SATHRI(IS,J) - THRESH(IS,J)
1840    CONTINUE
C
            CALL MINMAX(THRESH, NEP, TMIN, THAX, IS)
            WRITE (6,2370) THAX, TMIN
            EVHAG(1) = TMIN
            EVHAG(NMAG) = THAX
            IF (TMIN .GT. 1.5) GO TO 1860
            TMIN = ABS(TMIN) + 1.5
C
            DO 1850 J = 1, NEP
                THRESH(IS,J) = THRESH(IS,J) + TMIN
1850    CONTINUE
C
            EVHAG(1) = EVHAG(1) + TMIN

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```

      EVHAG(NHAG) = EVHAG(NHAG) + THIN
1860 CONTINUE
C
      TINC = (EVHAG(NHAG) - EVHAG(1)) / 50.
      WRITE (6,2370) EVHAG(NHAG), EVHAG(1), TINC
      ICOMB = 0
      IOUT = 999
      IDA = COMB1
      IDB = COMB2
      IDC = COMB3
      GO TO 1760
1870 CCNTINUE
      WRITE (6,2380)
1880 STOP
1890 FORMAT (3A8, 6X, 5F10.0)
1910 FORMAT (3A8)
1920 FORMAT (A1, 7X, I2, F10.0, 2I10, 3F10.0, 5I1, I3, I2)
1930 FORMAT (7I10)
1940 FORMAT (' THIS IS A NETWORK RUN WITH BIAS')
1950 FORMAT (' NSD = ', I10, ' NRM = ', I10, ' NRANDS = ', I10,
1      ' NREP = ', I10, ' NS = ', I10, ' NH = ', I10,
2      ' NREPK(NO. OF TIMES '/' TO REPEAT EXPERIMENT) = ', I10,
3      ' FIRST RANDOM INTEGER = ', I10)
1960 FORMAT ('+', 32X, ' AND CORRELATION')
1970 FORMAT ('1', 52X, 8HNETWORTH, '//, 9H AT LEAST, I3,
1      20H STATIONS DETECTING,A6, 6HPERIOD, 31X,
2      25HSIGN CONVENTION   + = N,W, /12HSSIGNAL SD =, F6.3, 8X,
3      22HNETWORK PROB. THRESH.=, F5.2)
1980 FORMAT (A1, 7X, I2, 2F10.0, I10)
1990 FORMAT (' ', I2, ' PERCENT ELLIPSES', 12X, I2, ' RANDOM SUBSETS')
2000 FORMAT (A1, 6X, I3, I10, 3F10.0)
2010 FORMAT (////49X, 13HSTATION TABLE, //55X, 5HNOISE, 30X, 3HS-P,
1      13X, 2HSD, 10X, 'RELIABILITY', /2X, 8HI IDENT, 11X,
2      4HLAT., 10X, 5HLONG., 9X, 5H AMPL, 8X, 2HSD, 8X,
3      9HS/N RATIO, 7X, 7HHAG COR, 10X, 4HTIME, 5X, 'TABLE USED' /)
2020 FORMAT (1X,I3, 2X, A5, 2F15.2, 4X, 2F10.2, 3F15.2, 5X, I5, F10.5)
2030 FORMAT (1X,I3, 2X, A5, 34X, 2F10.2, 3F15.2, 5X, I5, F10.5)
2040 FORMAT (A4,F6.3,F7.3,25X,F6.1,F4.2)

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```

2050 FORMAT (8X, I2, 10X, (20I3))
2060 FORMAT (/7H0SUBSETI3, 9H CONTAINS I3, 9H STATIONS2X(20I4))
2070 FORMAT (A3, 7X, 3I10, 30X, I10)
2080 FORMAT (80X)
2090 FORMAT (A1, 7X, I2, I10, 10X, A8, 32X, I10)
2100 FORMAT (//1X, A5// ' CARDS OUT OF ORDER. REQUIRED ORDER IS * A L S
1 U D T V E P *'// ' PROGRAM HALTED')
2110 FORMAT (1X, ' P CARD --- TAPES REWOUND WITHOUT INTERLOCK'//10X,
1 ' CALL NETPLOT', 5X, 'LAST RANDOM INTEGER', I10)
2120 FORMAT (A1, 6X, I3, 3I10)
2130 FORMAT (2(2X, I3), 4X, F4.2, A1, F5.2, A1, 3X, F3.1, 9X, F10.0)
2140 FORMAT ('1'//, 10H EPICENTER, I5, 10X, 3HLAT, F6.1, A1, 5X,
1 4HLONG, F7.1, A1/)
2150 FORMAT (/2X, 7HSTATION, 9X, 8HDIST(KM), 10X, 4HAZIM, 9X, 5HSTMAG, 9X, 7HSDTI
1ME, 4HPROB, 8X, 'TRAVEL-TIME', /(I3, 2X, A5, F16.1, F15.1, 2F15.2,
2 10X, F10.3, 5X, I5, 'M', 2X, F5.2, 'S'))
2160 FORMAT (//24H PROBABILITY OF AT LEAST I3, 19H STATIONS DETECTING/
1 5H MAG=F6.2, 4X, 7(6X, A2, I1, 1H=F5.2))
2170 FORMAT (//15H THRESHOLD MAG 7(6X, A2, I1, 1H=F5.2))
2180 FORMAT ('0BIAS = ', F12.3)
2190 FORMAT (///17H PROB OF AT LEAST I3, 28H-STATION DETECTION (SUBSETS)
1//7H SS/MAG2X20F5.2)
2200 FORMAT (1X)
2210 FORMAT (I3, 6X, 20F5.2)
2220 FORMAT ('1'///52H PROB OF AT LEAST N-STATION DETECTION (ALL STATIO
1NS) //7H N/MAG2X20F5.2)
2230 FORMAT (///33H INDIVIDUAL STATION PROBABILITIES//7H ST/MAG2X20F5.
1 2)
2240 FORMAT (1X, A5, 3X, 20F5.2)
2250 FORMAT ('1'//, 45X, 15HRANDOM ELLIPSES, /, 41X, 1H(I2,
1 12H HITS OUT OF I3, 6H TRYS), //30X, 4HSHAJ, 8X, 4HSMIN, 7X,
2 4HAZIM, 8X, 4HAREA, 9X, 8HSTATIONS, /)
2260 FORMAT (20X, I2, 3F12.2, 5X, F7.1, 8X, Z6, 4X, I2)
2270 FORMAT (//)
2280 FORMAT ('1'///, 1X)
2290 FORMAT (35X, 16HNETWORK SUMMARY-, 2X, 27HSUBSET THRESHOLD MAGNITUD
1ES, 15X, 3A8//30X, 23H (MAGNITUDES RANGE FROM, F6.2, 3H TO, F6.2,
2 12H IN STEPS OF, F5.2, 1H) /)

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2300 FORMAT (/26X, 4HLAT., 5X, 5HLONG., 9X, 'BIAS', 1X, 7(5X,A2,I1))
2310 FORMAT (13X, I6, 1X, 2(F10.2,A1), 4X, 8F8.2)
2320 PORMAT (37X, 32HNETWORK SUMMARY- ERROR ELLIPSES, /25X,
1      23H(MAGNITUDES RANGE FROM, F6.2, 3H TO, F6.2,
2      12H IN STEPS OF, F5.2, 1H)/)
2330 FORMAT (8X, 4HLAT.5X5HLONG.5X3HMAG, 3X,
1      3HNST4X3HLOA5X5HA (KM) 5X5HB (KM) 4X4HAZIM5X4HARE, 5X,
2      5HDEPTH, 3X, 8HNO. NEAR/93X, 8HSTA DET)
2340 FORMAT (1X, I3, 2X, F6.2, A1, 2X, F7.2, A1, F7.2, 3X, I3, F7.0, 3X, F7.2, 3X,
1F7.2, 3X, F5.1, 3X, F7.1, F10.2, 4X, F3.0)
2350 FORMAT (46X, I2, F8.0, 2F12.2, F12.1, 5X, F7.1, 2X, F10.2)
2360 FORMAT ('0***** CONTOUR PLOT INFORMATION *****')
2370 FORMAT (' MAX =', E20.5, 5X, 'MIN =', E20.5, 5X, 'INC =', E20.5,
1      5X, A8)
2380 FORMAT (1X// ' END OF NETWORK DATA' )
      END
      SUBROUTINE DISTAZ (NS, ELAT, ELONG, SLAT, SLONG, AZM, BAZM, DIST,
1      ANG)
      DIMENSION SLAT(NS), SLONG(NS), AZM(NS), BAZM(NS), DIST(NS),
1      ANG(NS)
      DATA RAD /1.745329252E-2/, DEG /57.29577951/, ELIPT /.9932315/
      INPUT EVENT
      LONG.S (USE WEST LONG.),
      STATION LAT.S
      OUTPUT AZIMUTH
      BACKAZIMUTH, DISTANCE (KM)
      ANG. DIST. (DEG).

      *M. WIRTH, 4-70*

      CONVERT COORDINATES
      IF (ABS(ELAT) .LE. 89.9999999) GO TO 20
10  SINEV = 0.
      POLEV = 0.
      COSEV = 1.
      GO TO 30
20  TANL = ELIPT * TAN(ELAT*RAD)
      POLEV = 1.
      SINEV = 1. / (1. + TANL*TANL)
      COSEV = 1. - SINEV

```

C
C
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```

    SINEV = SQRT(SINEV)
    COSEV = SQRT(COSEV)
30 IF (ELAT) 40, 50, 50
40 COSEV = -COSEV
C
50 DO 310 I = 1, NS
    DLONG = POLEV * ABS(ELONG - SLONG(I))
    SGNL = -POLEV
    IF (DLONG - 180.) 80, 60, 70
60 SGNL = 0.
    GO TO 80
70 DLONG = 360. - DLONG
    SGNL = 1.
80 DLONG = DLONG * RAD
    IF (ABS(SLAT(I)) .LE. 89.9999999) GO TO 100
90 SINST = 0.
    DLONG = 0.
    SGNL = 0.
    COSST = 1.
    GO TO 110
100 TANL = ELIPT * TAN(SLAT(I)*RAD)
    SINST = 1. / (1. + TANL*TANL)
    COSST = 1. - SINST
    SINST = SQRT(SINST)
    COSST = SQRT(COSST)
110 IF (SLAT(I)) 120, 130, 130
120 COSST = -COSST
C COMPUTE EVENT-STATION POLAR TRIANGLE
130 COSANG = COSST * COSEV + SINST * SINEV * COS(DLONG)
    IF (ABS(COSANG) .LT. 1.) GO TO 160
140 AZH(I) = 0.
    BAZH(I) = 0.
    ANGDI(I) = 0.
    IF (COSANG) 150, 310, 310
150 ANGDI(I) = 180.
    GO TO 310
160 ANGDI(I) = ARCCOS(COSANG)
    SINA = SIN(ANGDI(I))

```

```

      ANGD(I) = ANGD(I) * DEG
C     COMPUTE AZIM.
C     BACKAZIM.
170   IF (SINA) 180, 140, 180
180   B = SIN(DLONG) / SINA
      AZM(I) = B * SINST
      BAZM(I) = B * SINEV
      IF (AZM(I) .LT. 1.) GO TO 200
190   AZM(I) = 90.
      GO TO 210
200   AZM(I) = ARSIN(AZM(I)) * DEG
210   IF (BAZM(I) .LT. 1.) GO TO 230
220   BAZM(I) = 90.
      GO TO 240
230   BAZM(I) = ARSIN(BAZM(I)) * DEG
C     ADJUST QUADRANTS
240   IF (COSEV * COSANG - COSST) 260, 260, 250
250   AZM(I) = 180. - AZM(I)
260   IF (COSST * COSANG - COSEV) 280, 280, 270
270   BAZM(I) = 180. - BAZM(I)
280   IF (SGNL * (ELONG - SLONG(I))) 290, 310, 300
290   BAZM(I) = 360. - BAZM(I)
      GO TO 310
300   AZM(I) = 360. - AZM(I)
310   DIST(I) = 111.195 * ANGD(I)
C
      RETURN
      END
      SUBROUTINE ERELIP(NS, U, V, SD, CSQ, A, B, ELAZ, W, H44, PLAT)
      DIMENSION U(NS), V(NS), SD(NS)
      DIMENSION W(NS)
      REAL*8 H, WRK
      REAL*8 EP
      DIMENSION H(4,4), WRK(4,4)
      DATA RAD /1.745329252E-2/, DEG /57.29577951/
C     OUTPUT  A = SEMI-MAJOR AXIS, B = SEMI-MINOR AXIS, BOTH IN KM.,
C             ELAZ = AZIM. OF MAJOR AXIS, IN DEG. CW FROM NORTH
C

```

SS = 0.
 SV = 0.
 SU = 0.
 UV = 0.
 VV = 0.
 UU = 0.
 EP = 0.1E-20
 U14 = 0.
 U24 = 0.
 U34 = 0.
 U44 = 0.

C

DO 10 I = 1, NS
 U14 = U14 + U(I) * W(I)
 U24 = U24 + V(I) * W(I)
 U34 = U34 + W(I) * SD(I)
 U44 = U44 + W(I) * W(I)
 UU = UU + U(I) * U(I)
 VV = VV + V(I) * V(I)
 UV = UV + U(I) * V(I)
 SU = SU + U(I) * SD(I)
 SV = SV + V(I) * SD(I)
 SS = SS + SD(I) * SD(I)

10 CONTINUE

C

H44 = 0.
 TEST = PLAT - 89.9999
 TEST = ABS(TEST)
 IF (TEST .LT. .001) GO TO 30
 IF (NS .LT. 4) GO TO 30
 H(1,1) = UU
 H(1,2) = UV
 H(1,3) = SU
 H(1,4) = U14
 H(2,1) = H(1,2)
 H(2,2) = VV
 H(2,3) = SV
 H(2,4) = U24


```

H(3,1) = H(1,3)
H(3,2) = H(2,3)
H(3,3) = SS
H(3,4) = U34
H(4,1) = H(1,4)
H(4,2) = H(2,4)
H(4,3) = H(3,4)
H(4,4) = U44
N4 = 4
CALL GAUSS3(N4, EP, H, WRK, KER)
IF (KER .NE. 2) GO TO 20
WRITE (6,180)
GO TO 30
20 CONTINUE
H44 = WRK(4,4)
IF (H44 .LT. 0.) H44 = 0.
30 CONTINUE
SS = 1. / SS
UU = UU - SS * SU * SU
VV = VV - SS * SV * SV
UV = 2. * (UV - SS*SU*SV)
DUV = UU - VV
IF (DUV) 50, 40, 50
40 ALPH = 45. * RAD
GO TO 60
50 ALPH = .5 * ATAN(UV/DUV)
60 COSA = COS(ALPH)
SINA = SIN(ALPH)
ALPH = ALPH * DEG
SCUV = UV * SINA * COSA
COSA = COSA * COSA
SINA = SINA * SINA
A = UU * COSA + VV * SINA + SCUV
B = UU * SINA + VV * COSA - SCUV
IF (B - A) 70, 80, 90
70 DX = A
A = B
B = DX

```

```

      ELAZ = 90. - ALPH
      GO TO 110
80    ELAZ = 0.
      GO TO 110
90    ELAZ = ABS(ALPH)
      IF (ALPH) 110, 110, 100
100   ELAZ = 180. - ALPH
110   IF (A) 120, 120, 130
120   A = 1E+4
      GO TO 140
130   A = SQRT(CSQ/A) * 111.195
      IF (A .GT. 1E+4) GO TO 120
140   IF (B) 150, 150, 160
150   B = 1E+4
      RETURN
160   B = SQRT(CSQ/B) * 111.195
      IF (B .GT. 1E+4) GO TO 150
170   RETURN
180   FORMAT (' DEPTH MATRIX SINGULAR')
      END
      SUBROUTINE GAUSS3(N, EP, A, X, KER)
      IMPLICIT REAL*8(A - H, O - Z)
      DIMENSION A(4,4), X(4,4)

```

```

C      DO 10 I = 1, N
C
C      DO 10 J = 1, N
10    X(I,J) = 0.0
C
C      DO 20 K = 1, N
20    X(K,K) = 1.0
C
C      DO 160 L = 1, N
      KP = 0
      Z = 0.0
C
      DO 50 K = L, N
        IF (Z - DABS(A(K,L))) 40, 50, 50

```

40 Z = DABS (A(K,L))

KP = K

50 CONTINUE

IF (L - KP) 60, 90, 90

60 DO 70 J = 1, N

Z = A(L,J)

A(L,J) = A(KP,J)

70 A(KP,J) = Z

DO 80 J = 1, N

Z = X(L,J)

X(L,J) = X(KP,J)

80 X(KP,J) = Z

90 IF (DABS (A(L,L)) - EP) 220, 220, 100

100 IF (L - N) 110, 160, 160

110 LP1 = L + 1

DO 150 K = LP1, N

IF (A(K,L)) 120, 150, 120

120 RATIO = A(K,L) / A(L,L)

DO 130 J = LP1, N

130 A(K,J) = A(K,J) - RATIO * A(L,J)

DO 140 J = 1, N

140 X(K,J) = X(K,J) - RATIO * X(L,J)

150 CONTINUE

160 CONTINUE

170 DO 210 I = 1, N

II = N + 1 - I

IF (DABS (A(II,II)) - EP) 220, 220, 180

180 CONTINUE

```

C      DO 210 J = 1, N
        S = 0.0
        IF (II - N) 190, 210, 210
190      IIP1 = II + 1
C
        DO 200 K = IIP1, N
200      S = S + A(II,K) * X(K,J)
C
210      X(II,J) = (X(II,J) - S) / A(II,II)
C
        KER = 1
        GO TO 230
220      KER = 2
230      CONTINUE
        RETURN
        END
        SUBROUTINE LDLPDT(NTAB, NST, NAMES, IFPRIN)
        COMMON /TABLE1/ ELOC(100,4), ILIST(202,100), DEL(5,100), B(5,100),
1          C(5,100), LAB(6), Z(1938)
        LOGICAL*1 LOGCHK
        LOGICAL*1 LLIST
        DIMENSION NAMES(NST), ILIST(5050)
        REAL*8 NAMES, LAB
        LOAD
        COMPRESS LONG-PERIOD D-TABLE (MAGNITUDE CORRECTIONS).
C      IF IFPRINT = 0, PRINT TABLE.
C      EQUIVALENCE (ILIST,LLIST)
C
        CALL ERASE(400, ELOC)
        CALL ERASE(5050, LLIST)
        CALL ERASE(500, DEL)
        CALL ERASE(500, B)
        CALL ERASE(500, C)
        CALL ERASE(12, LAB)
        CALL ERASE(1938, Z)
        LLIST(202, 1) = .TRUE.
        J = 1

```

```

C      DO 140 I = 1, NTAB
        ICD = 0
10     READ (5,160) (ELOC(J,K),K=1,4), NLC, NTC, (LAB(L),L=1,6)
        ICD = ICD + 1
C
C      DO 30 K = 1, 6
C
        DO 30 L = 1, NST
            IF (LAB(K) .NE. NAMES(L)) GO TO 30
20         LLIST(L + 1,J) = .TRUE.
30     CONTINUE
C
        IF (ICD .NE. NLC) GO TO 10
40     ASSIGN 120 TO LWRITE
        IF (IFPRIN .EQ. 0 .AND. LOGCHK(LLIST(1,J))) GO TO 50
        GO TO 80
50     ASSIGN 90 TO LWRITE
        IF (MOD(J - 1,7)) 70, 60, 70
60     WRITE (6,190)
70     WRITE (6,200)
80     KS = 6 - NTC
C
        DO 120 K = KS, 5
            READ (5,170) DKM, DDEG, B(K,J), C(K,J)
            DKM = DKM + DDEG * 111.195
            DEL(K,J) = DKM
            GO TO LPRINT, (90, 120)
90         IF (K .NE. KS) GO TO 110
100        WRITE (6,180) DKM, DDEG, B(K,J), C(K,J), (ELOC(J,M),M=1,4),
1         (LLIST(L + 1,J),L=1,NST)
            GO TO 120
110       WRITE (6,180) DKM, DDEG, B(K,J), C(K,J)
120       C(K,J) = C(K,J) * .4342945
C
        IF (LOGCHK(LLIST(1,J))) GO TO 130
        GO TO 140
130     J = J + 1

```

```

      IF (J .EQ. 100) GO TO 150
140 CONTINUE
C
150 NTAB = J
    RETURN
160 FORMAT (4F10.0, 2I4, 2X, 6A5)
170 FORMAT (10X, 4F10.3)
180 FORMAT (2(F10.2,F9.2,1X), 5X, 2(F10.2,F9.2,1X), 5X,
1      30L1/((90X,30L1)))
190 FORMAT ('1'//, 46X, 27HLP DISTANCE-AMPLITUDE TABLE, //6X, 2HKN,
1      7X, 3HDEG, 9X, 1HB, 8X, 1HC, 15X, 10HEVENT LAT., 9X,
2      11HEVENT LONG., 8X, 18HSTATION LIST (L-R))
200 FORMAT (/)
    END
    SUBROUTINE LDSPDT(ND, NCOR, NST, NAMES, IFPRIN)
    COMMON /DTABLE/ DEL(100), B(100), C(100), COR(200,5),
1      LLIST(202,200)
    LOGICAL*1 LOGCHK
    LOGICAL*1 LLIST
    DIMENSION LAB(6), NAMES(NST), ILIST(10100), DEGRE(100)
    REAL*8 LAB, NAMES, IBLNK
    DATA IBLNK /'      '/
    EQUIVALENCE (ILIST,LLIST)
C    LOAD
C      COMPRESS SHORT-PERIOD D-TABLE (MAGNITUDE CORRECTIONS) .
C      IF IFPRINT = 0, PRINT TABLE.
C
C    LOAD STANDARD TABLE
C      C(100) = 0.
C      IF (ND .LT. 1) GO TO 50
C
C    DO 40 I = 1, ND
      READ (5,210) DKM, DDEG, B(I), C(I)
      DKM = DKM + DDEG * 111.195
      DEL(I) = DKM
      DEGRE(I) = DKM/111.195
C      IF (IFPRIN) 40, 10, 40
C 10  IF (I .NE. 1 .AND. I .NE. 51) GO TO 30

```

```

C 20  WRITE (6,230)
C 30  WRITE (6,220) DKN, DDEG, B(I), C(I)
40  C(I) = C(I) * .4342945
C    THIS LOOP CONTAINS WRITE STATEMENTS USED TO PRINT THE
C    SHORT PERIOD MAGNITUDE CORR. IN PAGE FORM, FOR THE
C    TECHNICAL REPORT. IF THE SP MAG. CORR. ARE CHANGED
C    REVERT BACK TO EARLIER WRITE AND FORMAT CODES, WHICH
C    ARE NOW LISTED AS COMMENT STATEMENTS.
      DO 45 I=1,36
      IF (IPPRIN) 50,10,50
10  IF (I.NE.1 .AND. I.NE.37) GO TO 30
      WRITE (6,230)
30  IF (I.EQ.36) WRITE (6,220) DEL(I),DEGRE(I),B(I)
      IF (I.EQ.36) GO TO 50
      WRITE (6,220) DEL(I),DEGRE(I),B(I),DEL(I+36),DEGRE(I+36),B(I+36)
45  CONTINUE
C
50  CONTINUE
C    LOAD CORRECTIONS
      IF (NCOR) 60, 200, 60
60  I = 0
      J = 0
      CALL ERASE(10100, LLIST)
      COR(200,1) = 0.
      COR(200,2) = 0.
      COR(200,3) = 0.
      COR(200,4) = 0.
70  I = I + 1
      READ (5,240) (COR(J + 1,K),K=1,5), (LAB(L),L=1,6)
      IF (LAB(1) .NE. IBLNK) GO TO 90
80  J = J + 1
      GO TO 150
90  IF (COR(J + 1,1) .EQ. COR(J,1) .AND. COR(J + 1,2) .EQ. COR(J,2) .
1    AND. COR(J + 1,3) .EQ. COR(J,3) .AND. COR(J + 1,4) .EQ. COR(J,
2    4) .AND. COR(J + 1,5) .EQ. COR(J,5) .AND. (LOGCHK(LLIST(1,J))))
3    GO TO 110
100 J = J + 1

```

```

110 DO 130 K = 1, 6
C
      DO 130 L = 1, NST
        IF (LAB(K) .NE. NAMES(L)) GO TO 130
120      LLIST(L + 1, J) = .TRUE.
130 CONTINUE
C
      IF (LOGCHK(LLIST(1, J))) GO TO 150
140 J = J - 1
150 IF (J .NE. 200 .AND. I .NE. NCOR) GO TO 70
160 NCOR = J
      IF (IFPRIN) 200, 170, 200
C
170 DO 190 I = 1, NCOR
      IF (MOD(I - 1, 50)) 190, 180, 190
180 WRITE (6, 260)
190 WRITE (6, 250) (COR(I, K), K=1, 5), (LLIST(L + 1, I), L=1, NST)
C
200 RETURN
210 FORMAT (10X, 4F10.3)
C 220 FORMAT (20X, 2(F16.2, F14.2))
220 FORMAT (10X, 2(F16.2, F14.3, F14.2))
230 FORMAT ('1'////, 47X, 27HSP DISTANCE-AMPLITUDE TABLE, /22X, 2HKM,
112X, 3HDEG, 13X, 1HB, 13X, 'KM', 12X, 'DEG', 13X, 'B')
C 230 FORMAT ('1'//, 40X, 27HSP DISTANCE-AMPLITUDE TABLE, /32X, 2HKM,
C 1 12X, -3HDEG, 14X, 1HB, 13X, 1HC, /)
240 FORMAT (5F10.0, 6A5)
250 FORMAT (6X, 2(2F12.2, 5X), F12.3, 8X, 30L1/((84X, 30L1)))
260 FORMAT ('1'//, 43X, 24HSP AMPLITUDE CORRECTIONS, //16X,
1 10HEVENT LAT., 19X, 11HEVENT LONG., 10X, 10HCORRECTION, 8X,
2 18HSTATION LIST (L-R) /)
END
SUBROUTINE LDTTAB(NTAB, IFPRIN, NAME)
COMMON /ALT/ ITABL(200), IALT
COMMON /ALTAB/ ADIST(185), ATIME(185)
COMMON /TRAVLT/ NT, DIST(185), TIME(185), NV, VDIST(100), VAR(100)
C LOADS
C PRINTS TRAVEL-TIME

```


VARIANCE TABLES.

```

REAL*8 NAME
DATA IV /'V'/
NT = NTAB
READ (5,160) (DIST(I),TIME(I),I=1,NT)
IF (IALT .NE. 0) READ (5,160) (ADIST(I),ATIME(I),I=1,NT)

      V - CARD

READ (5,170) LAB, NV
IF (LAB .EQ. IV) GO TO 20
10 WRITE (6,180)
STOP
20 IF (NV) 30, 40, 30
30 READ (5,160) (VDIST(I),VAR(I),I=1,NV)
40 IF (IPPRIN) 130, 50, 130
50 WRITE (6,190) NAME
WRITE (6,200)
ND = (NT + 3) / 4

DO 70 I = 1, ND
  L = I + 3 * ND
  IF (L .LE. NT) GO TO 70
60  L = NT
70 WRITE (6,210) (DIST(J),TIME(J),J=I,L,ND)

IF (IALT .EQ. 0) GO TO 90
WRITE (6,220)
WRITE (6,200)

DO 80 I = 1, ND
  L = I + 3 * ND
  IF (L .LE. NT) GO TO 80
  L = NT
80 WRITE (6,210) (ADIST(J),ATIME(J),J=I,L,ND)

90 CONTINUE

```

```

      IF (NV) 100, 150, 100
100 WRITE (6,230)
      WRITE (6,200)
      ND = (NV + 3) / 4
C
      DO 120 I = 1, ND
        L = I + 3 * ND
        IF (L .LE. NV) GO TO 120
110   L = NV
120 WRITE (6,240) (VDIST(J),VAR(J),J=I,L,ND)
C
130 DO 140 I = 1, NV
140 VAR(I) = VAR(I) * VAR(I)
C
150 RETURN
160 FORMAT (8(F4.1,P6.2))
170 FORMAT (A1, 9X, I10)
180 FORMAT (///23H VARIANCE TABLE MISSING)
190 FORMAT ('1'///, 53X, A8/, 49X, 17HTRAVEL-TIME TABLE//)
200 FORMAT (9X, 4(10X,3HDEG,6X,3HSEC)/)
210 FORMAT (10X, 4(P12.1,P10.2))
220 FORMAT ('1'///39X, 'ALTERNATE TRAVEL-TIME TABLE'//)
230 FORMAT ('1'///. 52X, 11HTRAVEL-TIME, /47X, 21HSTD. DEV. VS. DISTANCE
      1, /)
240 FORMAT (9X, 4(P13.0,P9.2))
      END
      FUNCTION LOGCHK(IARRY)
      LOGICAL*1 IARRY(202), LOGCHK
      LOGCHK = .FALSE.
C
      DO 10 I = 1, 202
        IF (IARRY(I)) GO TO 20
10 CONTINUE
C
      GO TO 30
20 LOGCHK = .TRUE.
30 RETURN
      END

```

```

SUBROUTINE LPMAG(NST, DIST, SMAG, NTAB, FMAG, ELONG, ELAT)
COMMON /TABLE1/ CLATH(100), CLATP(100), CLONGH(100), CLONGP(100),
1      LLIST(202,100), DEL(5,100), B(5,100), C(5,100), IST(200),
2      Z(1750)
LOGICAL*1 LLIST
DIMENSION DIST(NST), SMAG(NST)
C      DOES LONG-PERIOD MAGNITUDE CORRECTIONS.
C      OUTPUT SMAG = MAGNITUDES AS RECVD BY EACH STATION.
C
DO 10 I = 1, NST
10 IST(I) = 1
C
IF (NTAB .LT. 2) GO TO 60
C
DO 50 I = 2, NTAB
IF (CLATH(I) .LE. ELAT .AND. ELAT .LE. CLATP(I) .AND. CLONGH(I)
1  .LE. ELONG .AND. ELONG .LE. CLONGP(I)) GO TO 20
GO TO 50
C
20 DO 40 J = 1, NST
IF (LLIST(J + 1,I)) GO TO 30
GO TO 40
30 IST(J) = I
40 CONTINUE
C
50 CONTINUE
C
60 DO 160 J = 1, NST
JJ = IST(J)
C
DO 70 I = 1, 5
IF (DEL(I,JJ) .GE. DIST(J)) GO TO 80
70 CONTINUE
C
I = 5
80 SMAG(J) = FMAG + B(I,JJ)
IF (C(I,JJ)) 90, 110, 90
90 IF (DIST(J) .LE. 1.) GO TO 160

```

```

100  SMAG(J) = SMAG(J) + C(I,JJ) * ALOG(DIST(J))
      GO TO 160
110  IF (I .NE. 1) GO TO 130
120  BL = 0.
      DL = 0.
      GO TO 150
130  DL = DEL(I - 1,JJ)
      BL = B(I - 1,JJ)
      IF (C(I - 1,JJ) .GT. 0. .AND. DL .GT. 0.) GO TO 140
      GO TO 150
140  BL = BL + C(I - 1,JJ) * ALOG(DL)
150  SMAG(J) = SMAG(J) - (DEL(I,JJ) - DIST(J)) * (B(I,JJ) - BL) / (
1    DEL(I,JJ) - DL)
160  CONTINUE

```

```

C      RETURN
      END
      SUBROUTINE MINMAX(X, N, XMIN, XMAX, IDAP)
      DIMENSION X(7,400)
      XMIN = 1.00E69
      XMAX = -XMIN

```

```

C      DO 10 I = 1, N
          IF (X(IDAP,I) .EQ. 0.) GO TO 10
          IF (X(IDAP,I) .GT. XMAX) XMAX = X(IDAP,I)
          IF (X(IDAP,I) .LT. XMIN) XMIN = X(IDAP,I)
10  CONTINUE

```

```

C      RETURN
      END
      SUBROUTINE NETPRB(N, P, PN)
      DIMENSION P(N), PN(N), W(1000)
      PN(K) = PROB. OF AT LEAST K OUT OF N EVENTS WHEN INDIVIDUAL EVENTS
C      HAVE PROB. P(I).    N = 50                                M. WIRTH
C

```

```

C      II = 2
C
      DO 10 I = 1, N

```

```

      W(II) = P(I)
      W(II - 1) = 1. - P(I)
10  II = II + 2

```

C

```

      NING = 2
      LOC = 2 * N
      NT2 = LOC
20  NING2 = NING
      N2 = NING2 / 2
      NING = NING * 2
      NNG = NT2 - NING
      LOC2 = LOC
      LOC = NT2 - LOC
      IF (NNG) 80, 80, 30

```

C

```

30  DO 40 IB = 1, NNG, NING
      L = LOC + IB
      CALL PROBK(N2, W(L), W(L + NING2), NING2, W(LOC2 + IB))
40  II = IB

```

C

```

      IB = II + NING
      NE = NT2 + 1 - IB
      IF (NR .LE. NING2) GO TO 60
50  L = LOC + IB
      CALL PROBK(N2, W(L), W(L + NING2), NR/2, W(LOC2 + IB))
      GO TO 20

```

C

```

60  DO 70 I = IB, NT2
70  W(LOC2 + I) = W(LOC + I)

```

C

```

      GO TO 20
80  CALL PROBK(N2, W(LOC + 1), W(LOC + NING2 + 1), N, W(LOC2 + 1))
      K = N
      PN(K) = W(LOC2 + K + 1)

```

C

```

      DO 90 I = 2, N
      K = K - 1
90  PN(K) = PN(K + 1) + W(LOC2 + K + 1)

```

```

C      RETURN
      END
      SUBROUTINE ORDRXI (N, X, I)
      DIMENSION X(N), I(N)
C      ORDER *X*, LARGEST TO SMALLEST, AND REMEMBER ITS SUBSCRIPTS *I*
      DO 10 J = 1, N
10     I(J) = J
C
      DO 40 J = 1, N
        XMAX = X(J)
        LMAX = J
C
        DO 30 K = J, N
          IF (X(K) .LE. XMAX) GO TO 30
20         XMAX = X(K)
          LMAX = K
30        CONTINUE
C
        X(LMAX) = X(J)
        K = I(LMAX)
        I(LMAX) = I(J)
        I(J) = K
40     X(J) = XMAX
C
      RETURN
      END
      FUNCTION PROBF(X)
C      PROBF = PROB ( U*X ), WHERE U DISTRIB. AS ZERO-MEAN UNIT NORMAL
      DOUBLE PRECISION Q, T
      T = ABS(X)
      Q = (((T*.00063419 - .00010754)*T + .01057706)*T + .04833145)*T +
1     .10882473)*T + 1.09050773
      Q = 1.0 / (Q*Q)
      Q = Q * Q
      PROBF = Q * Q
      IF (X .LE. 0.) GO TO 20
10     PROBF = 1. - PROBF

```

```

20 RETURN
   END
   SUBROUTINE PROBK (N2, P2, P1, NT, PT)
   DIMENSION P1(N2), P2(N2), PT(NT)
C   PT(K+1) = PROB. OF EXACTLY K OUT OF NT EVENTS TOTAL FROM TWO
C   GROUPS, WITH P1,P2(I+1) = PROB. OF EXACTLY I EVENTS OUT OF N1,N2.
C
   TEST = 1.0E-30
   N1 = NT - N2
   IS = 0
   IF (P1(1) .LE. TEST) P1(1) = 0.0
   IF (P2(1) .LE. TEST) P2(1) = 0.0
   PT(1) = P1(1) * P2(1)
   IF (NT .LE. 0) GO TO 60
C
   DO 50 K = 1, NT
      PT(K + 1) = 0.
      IF (K .GT. N1) GO TO 20
10    IL = K
      GO TO 40
20    IL = N1
      IF (K .LE. N2) GO TO 40
30    IS = K - N2
C
40    DO 50 I = IS, IL
      IF (P1(I + 1) .LE. TEST) P1(I + 1) = 0.0
      IF (P2(K - I + 1) .LE. TEST) P2(K - I + 1) = 0.0
50    PT(K + 1) = PT(K + 1) + P1(I + 1) * P2(K - I + 1)
C
60 RETURN
   END
   SUBROUTINE QUTIZE(X, N, Q, K, XMAX)
   DIMENSION X(7,400)
   XEAX = Q
C
   DO 10 I = 1, N
      IF (X(K,I) .GT. Q) X(K,I) = Q
10 CONTINUE

```

C

```

RETURN
END
SUBROUTINE SPMAG(NST, SCOR, DIST, SMAG, NCOR, ND, FMAG, ELONG,
1      ELAT)
LOGICAL*1 LOGCHK
COMMON /DTABLE/ DEL(100), B(100), C(100), CLATH(200), CLATP(200),
1      CLONGH(200), CLONGP(200), COR(200), LLIST(202,200)
LOGICAL*1 LLIST
DIMENSION SCOR(NST), DIST(NST), SMAG(NST), ILIST(10100)
EQUIVALENCE (ILIST,LLIST)
C DOES SHORT-PERIOD MAGNITUDE CORRECTIONS.
C INPUT NST = NO. STATIONS, SCOR = STAT. CORRECTIONS, ETC.
C OUTPUT SMAG = MAGNITUDES AS RECVD BY EACH STATION

```

C
C
C
C

```

CALL ERASE(NST, SMAG)
EVCOR = 0.
IPES = 0
IPEV = 0
IF (NCOR .LT. 1) GO TO 80

```

C

```

DO 70 I = 1, NCOR
  IF (CLATH(I) .LE. ELAT .AND. ELAT .LE. CLATP(I) .AND. CLONGH(I)
1    .LE. ELONG .AND. ELONG .LE. CLONGP(I)) GO TO 20
10  IF (IPES .EQ. 1 .AND. IPEV .EQ. 1) GO TO 80
    GO TO 70
20  IF (LOGCHK(LLIST(1,I))) GO TO 40
30  IPEV = 1
    EVCOR = COR(I)
    GO TO 70
40  IPES = 1

```

C

```

DO 60 J = 1, NST
  IF (LLIST(J + 1,I)) GO TO 50
  GO TO 60
50  SMAG(J) = COR(I)
60  CONTINUE

```

C

70 CONTINUE

80 DO 200 J = 1, NST

DO 90 I = 1, ND

IF (DEL(I) .GE. DIST(J)) GO TO 100

90 CONTINUE

I = ND

100 XMAG = FMAG + B(I)

IF (C(I)) 110, 130, 110

110 IF (DIST(J) .LE. 1) GO TO 180

120 XMAG = XMAG + C(I) * ALOG(DIST(J))

GO TO 180

130 IF (I .NE. 1) GO TO 150

140 BL = 0

DL = 0

GO TO 170

150 DL = DEL(I - 1)

BL = B(I - 1)

IF (C(I - 1) .GT. 0. .AND. DL .GT. 0.) GO TO 160

GO TO 170

160 BL = BL + C(I - 1) * ALOG(DL)

170 XMAG = XMAG - (DEL(I) - DIST(J)) * (B(I) - BL) / (DEL(I) - DL)

180 IF (SMAG(J)) 200, 190, 200

190 SMAG(J) = EVCOR + SCOR(J)

200 SMAG(J) = SMAG(J) + XMAG

RETURN

END

SUBROUTINE TIMEDF(NS, AZ, ANGDI, STVAR, U, V, SD)

THIS SUBR. HAS BEEN ALTERED TO RUN WITH ONE PARTICULAR

SET OF UNEVENLY SPACED TRAVEL TIME CURVES. ANY CHANGE

IN THE TRAVEL TIMES USED WILL REQUIRE THAT THIS SUBR.

BE ALTERED.

COMMON /TRAVLT/ NT, DIST(185), TIME(185), NV, VDIST(100), VAR(100)

COMMON /ALT/ ITABL(200), IALT

COMMON /ALTAB/ ADIST(185), ATIME(185)

DIMENSION AZ(NS), ANGDN(NS), STVAR(NS), U(NS), V(NS), SD(NS)
 COMPUTES TRAVEL-TIME DERIV.0

DO 100 I = 1, NS
 SD(I) = 0.

TEST IF STATION AND EPICENTER AT SAME LOCATION

IF (ANGD(I) .GT. 0.) GO TO 10
 SD(I) = VAR(1)
 GO TO 60
 10 CONTINUE
 IF (ANGD(I) .LT. DIST(NT)) GO TO 30
 20 U(I) = 0.
 V(I) = 0.
 GO TO 100
 30 DO 50 K = 1, NV
 IF (VDIST(K) .LT. ANGDN(I)) GO TO 50
 40 SD(I) = VAR(K) - (VDIST(K) - ANGDN(I)) * (VAR(K) - VAR(K - 1))
 1 / (VDIST(K) - VDIST(K - 1))
 GO TO 60
 50 CONTINUE
 60 SD(I) = 1. / SQRT(STVAR(I) + SD(I))
 JS = ANGDN(I) + 2.
 DO 70 J = JS, NT
 IF (DIST(J) .GE. ANGDN(I)) GO TO 80
 70 CONTINUE
 C USES LAGRANGE 4-POINT DERIVATIVE FORMULA FOR EQUALLY-SPACED ARG.S
 80 DX = ANGDN(I) - DIST(J - 1)
 DXSQ = .5 * DX * DX
 DXSQ3 = 3. * DXSQ
 TMJM1 = TIME(J - 1)
 TMJM2 = TIME(J - 2)

```

C      IF ((ANGD(I).GT.11.0).AND.(ANGD(I).LE.11.5)) TMJM2=TIME(J-6)
C
C      TMJP1 = TIME(J + 1)
C
C      IF ((ANGD(I).GT.10.9).AND.(ANGD(I).LE.11.0)) TMJP1=159.10
C
C      TMJ = TIME(J)
C      IF (ITABL(I).EQ.0) GO TO 90
C      TMJM1 = ATIME(J - 1)
C      TMJM2 = ATIME(J - 2)
C
C      IF ((ANGD(I).GT.11.0).AND.(ANGD(I).LE.11.5)) TMJM2=TIME(J-6)
C
C      THJP1 = ATIME(J + 1)
C
C      IF ((ANGD(I).GT.10.9).AND.(ANGD(I).LE.11.0)) THJP1=159.10
C
C      TMJ = ATIME(J)
90    CONTINUE
      R = ((DXSQ3 - 2.*DX - .5) * TMJM1 - (DXSQ - DX + .333333) *
1    TMJM2 - (DXSQ3 - DX - 1.) * TMJ + (DXSQ - .166667) * THJP1) /
2    (DIST(J)-DIST(J-1))
      IF (ANGD(I).LE.109..AND. ANGD(I).GE. 106.) R = 4.56
      R = R * SD(I)
      AZR = AZ(I) * 1.745329252E-2
      U(I) = -R * COS(AZR)
      V(I) = R * SIN(AZR)
100 CONTINUE
C
C      RETURN
C      END
C      SUBROUTINE TIMET(NS, ANGD, R)
C      THIS SUBROUTINE HAS BEEN ALTERED TO RUN WITH ONE
C      PARTICULAR SET OF UNEVENLY SPACED TRAVEL TIME
C      CURVES. ANY CHANGE IN THE TRAVEL TIMES USED
C      WILL REQUIRE THAT THIS SUBR. BE ALTERED.
C      COMMON /ALT/ ITABL(200), IALT

```

```

COMMON /ALTAB/ ADIST(185), ATIME(185)
COMMON /TRAVLT/ NT, DIST(185), TIME(185)
DIMENSION ANGD(NS), R(NS)

```

```

C      DO 60 I = 1, NS
        IF (ANGD(I) .LT. DIST(NT)) GO TO 20
10      R(I) = 0.
        GO TO 60
20      JS = ANGD(I) + 2.
C
        DO 30 J = JS, NT
            IF (DIST(J) .GE. ANGD(I)) GO TO 40
30      CONTINUE
C
40      DX = ANGD(I) - DIST(J - 1)
        P = DX
        PM1 = P - 1
        PM2 = P - 2
        PSM1 = P * P - 1
        PP1 = P + 1
        TMJM1 = TIME(J - 1)
        TMJM2 = TIME(J - 2)
C
        IF ((ANGD(I) .GT. 11.0) .AND. (ANGD(I) .LE. 11.5)) TMJM2=TIME(J-6)
C
        TMJPI = TIME(J + 1)
C
        IF ((ANGD(I) .GT. 10.9) .AND. (ANGD(I) .LE. 11.0)) TMJPI=159.10
C
        TMJ = TIME(J)
        IF (ITABL(I) .EQ. 0) GO TO 50
        TMJM1 = ATIME(J - 1)
        TMJM2 = ATIME(J - 2)
C
        IF ((ANGD(I) .GT. 11.0) .AND. (ANGD(I) .LE. 11.5)) TMJM2=TIME(J-6)
C
        TMJPI = ATIME(J + 1)
C

```

IF((ANGD(I).GT.10.9).AND.(ANGD(I).LE.11.0)) THJP1=159.10

C
TMJ = ATIME(J)
50 CONTINUE
R(I) = -((P*PM1*PM2)/6.) * TMJM2 + ((PSM1*PM2)/2.) * THJM1 - ((
1 P*PP1*PM2)/2.) * THJ + ((P*PSH1)/6.) * THJP1
60 CONTINUE

C
RETURN
END

SUBROUTINE TIMWDF(N, D, W, SD, ITABL)
DIMENSION D(N), W(N), SD(N), ITABL(N)

C
DO 50 II = 1, N
IF (D(II) .GT. 15.) GO TO 10
W(II) = .112 + .000311 * D(II)
GO TO 40
10 IF (D(II) .GT. 25.) GO TO 20
W(II) = 0.072 + .00294 * D(II)
GO TO 40
20 IF (D(II) .GT. 90.) GO TO 30
W(II) = 0.140 + .000247 * D(II)
GO TO 40
3 W(II) = 0.161
30 W(II) = 0.161 + (.006/20.) * (D(II) - 90.)
C IF(D(II) .GT.110.)W(II) = 0.167
IF (D(II) .GT. 110.) W(II) = 0.167 + (.003/70.) * (D(II) - 110.)
W(II) = W(II) * SD(II)
40 CONTINUE
C ITABL(II) NOT 0 => SHEAR PHASE DIFFERENCE.
IF (ITABL(II) .NE. 0) W(II) = W(II) * 1.73
50 CONTINUE

C
RETURN
END
SUBROUTINE BRASE(N, X)
DIMENSION X(1)
IF (N .LE. 0) RETURN

```
C      DO 10 I = 1, N
        X(I) = 0.
C      10 CONTINUE

      RETURN
      END
```

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MAPBUILD PLOT GENERATION SYSTEM
UNIVERSITY OF MICHIGAN SEISMOLOGY LAB

VERSION I, 01 JUN 1980

MAPBUILD UTILIZES A NUMBER OF SUBROUTINES TO MANIPULATE DATA AND GENERATE GRAPHIC OUTPUTS OF THAT DATA. THE MAIN BLOCK OF THE SYSTEM INITIALIZES THE GRAPHICS SYSTEM AND THE PARAMETERS NEEDED FOR MAP GENERATION, WHICH ARE PASSED TO THE APPROPRIATE SUBROUTINE FOR PROCESSING.

THE GRAPHICS ROUTINES UTILIZED ARE THE UNIVERSITY OF MICHIGAN'S PLOTSYS (*PLOTSYS) AND INTEGRATED GRAPHICS (*IG) PACKAGES. DOCUMENTATION OF THESE PACKAGES MAY BE FOUND IN THE MICHIGAN TERMINAL SYSTEM - VOL 11 (MTS 11).

THROUGHOUT THE SYSTEM, NORTH AND EAST ARE POSITIVE ANGLES. ALL ANGLES ARE IN RADIANES BETWEEN PI AND NEGATIVE PI. INPUT IS ENTERED IN DEGREES AND CONVERTED. IN CASES WHERE WEST LONGITUDE IS EXPRESSED AS POSITIVE NUMBERS IN DATA SETS, THE NECESSARY CONVERSIONS, BOTH IN SIGN AND ARRAY SUBSCRIPTING, ARE PERFORMED.

M. HENEY

```

INTEGER*4 NPTS(25), CHECK, YES, CONT, NONE, ELLIP, PTS, DSH
LOGICAL*1 DETAIL(3), DASH, LABEL, PFLAG, CFLAG, EFLAG
REAL LAT, LON, LATMIN, LATMAX, LONMIN, LONMAX

```

```

4      COMMON LAT(2000), LON(2000), X(2000), Y(2000)
5      COMMON /B/ LATMIN, LATMAX, LONMIN, LONMAX, MP
6      DIMENSION DLTMN(3), DLTMX(3), DLNMN(3), DLNMX(3), LDPROJ(3)

      C
      C

7      DATA PI /3.14159256/
8      DATA BLANK, YES, ELLIP, CONT, NONE /' ', 'Y', 'E', 'C', 'N'/
9      DATA PTS, DSH /'P', 'D'/
10     DATA DLTMN /24.0, 36.0, 41.5/
11     DATA DLTMX /50.0, 42.5, 47.5/
12     DATA DLNMN /-127.0, -90.0, -90.5/
13     DATA DLNMX /-66.0, -79.0, -82.5/
14     DATA LDPROJ /2, 2, 2/

      C
15     10 CONTINUE
16     DASH = .TRUE.
17     PFLAG = .FALSE.
18     CFLAG = .FALSE.
19     EFLAG = .FALSE.

      C
      C      INITIALIZE THE GRAPHICS PACKAGE
      C

20     CALL IGINIT
21     CALL IGPDSW(0, 0)
22     CALL CLRSCR

      C
      C      CALL SUBROUTINES TO SET PARAMETERS FOR MAP GENERATION
      C

23     CALL DEFLT(DLTMN, DLTMX, DLNMN, DLNMX, LDPROJ, DETAIL)
24     CALL PLTST(XMIN, YMIN, XSIZE, YSIZE, SCALE)
25     CALL IGBGNS('PLOT')
26     CALL PLTOFS(XMIN, SCALE, YMIN, SCALE, 1.0, 1.0)

      C
      C      SET FLAGS TO DETERMINE WHICH MAPS AND OVERLAYS ARE NEEDED

```


C

```

27      WRITE (6,20)
28      20 FORMAT ('DO YOU WANT A LATITUDE/LONGITUDE GRID? (YES OR NO)')
29      READ (5,30) CHECK
30      30 FORMAT (A1)
31      IF (CHECK .EQ. YES) GO TO 60
32      WRITE (6,40)
33      40 FORMAT ('TICK MARKS?')
34      READ (5,50) CHECK
35      50 FORMAT (A1)
36      IF (CHECK .NE. YES) GO TO 90
37      CALL LATTIC
38      GO TO 90
39      60 WRITE (6,70)
40      70 FORMAT (' DASHED OR SOLID LINES?')
41      READ (5,80) CHECK
42      80 FORMAT (A1)
43      IF (CHECK .EQ. DSH) DASH = .FALSE.
44      CALL LATLIN(DASH)
45      90 CONTINUE
46      WRITE (6,100)
47      100 FORMAT ('ENTER ELLIPSE, CONTOUR, POINTS, OR NONE FOR MAP',
1          ' OVERLAY DESIRED.')
48      READ (5,110) CHECK
49      110 FORMAT (A1)
50      IF (CHECK .EQ. NONE) GO TO 210
51      IF (CHECK .EQ. ELLIP) GO TO 130
52      IF (CHECK .EQ. CONT) GO TO 170
53      IF (CHECK .EQ. PTS) GO TO 140
54      WRITE (6,120)
55      120 FORMAT (' UNRECOGNIZABLE OPTION - IGNORED.')
56      GO TO 90
57      130 EFLAG = .TRUE.
58      CALL FILEIN(4)

```

```

59      GO TO 180
60      140 CALL FILEIN(7)
61          PFLAG = .TRUE.
62          WRITE (6,150)
63      150 FORMAT (' DO YOU WANT STATIONS LABELED? (YES OR NO)')
64          READ (5,160) CHECK
65      160 FORMAT (A1).
66          LABEL = .FALSE.
67          IF (CHECK .EQ. YES) LABEL = .TRUE.
68          GO TO 180
69      170 CONTINUE
70          CALL FILEIN(10)
71          CFLAG = .TRUE.
72          GO TO 180
73      180 WRITE (6,190)
74      190 FORMAT (' ANY OTHER OVERLAYS? (YES OR NO)')
75          READ (5,200) CHECK
76      200 FORMAT (A1)
77          IF (CHECK .EQ. YES) GO TO 90
78      210 CONTINUE
79          CALL CLRSCR
80          WRITE (6,220)
81      220 FORMAT (' DO YOU WANT A MAP DRAWN? (YES OR NO)')
82          READ (5,230) CHECK
83      230 FORMAT (A1)
C
C      CALL SUBROUTINES TO GENERATE PLOT DESCRIPTIONS FOR
C      PLOT SEGMENTS INDICATED BY FLAGS.
C
84          IF (CHECK .NE. YES) GO TO 240
85          CALL BOXER
86          CALL MAPIN(DETAIL)
87      240 CONTINUE
88          IF (CFLAG) CALL CONTRR

```

```

89      IF (PFLAG) CALL SPOTZ(LABEL)
90      IF (EFLAG) CALL ELLPS(MP)
91      CALL IGENDS('PLOT')

C
C      SET GRAPHICS SYSTEM PARAMETERS TO ALLOW PLOT TO BE DRAWN
C
92      YCTR = (YSIZE + 2.) / 2.
93      SCL = 2. / 12.
94      CALL IGTAN('PLOT', 'MOVE', -6.0, -YCTR, 'SCALE', SCL)
95      WRITE (6,250)
96      250 FORMAT (' DO YOU WANT A TERMINAL PLOT? (YES OR NO)')
97      READ (5,260) CHECK
98      260 FORMAT (A1)
99      IF (CHECK .NE. YES) GO TO 280
100     WRITE (6,340)
101     WRITE (6,350)
102     WRITE (6,360)
103     WRITE (6,370)
104     WRITE (6,380)
105     WRITE (6,390)
106     READ (5,270) ELFIN
107     CALL IGDRON('TERM')
108     READ (5,270) ELFIN
109     270 FORMAT (A1)
110     280 CONTINUE
111     WRITE (6,290)
112     290 FORMAT (' DO YOU WANT A PLOT FILE GENERATED? (YES OR NO)')
113     READ (5,300) CHECK
114     300 FORMAT (A1)
115     IF (CHECK .NE. YES) GO TO 310
116     CALL DODRAW(XSIZE, YSIZE)
117     310 CONTINUE
118     WRITE (6,320)
119     320 FORMAT (' ARE YOU READY TO STOP? (YES OR NO)')

```

```

120      READ (5,330) CHECK
121      330 FORMAT (A1)
122      IF (CHECK .NE. YES) GO TO 10
123      340 FORMAT (' ', /, /' *****
124      1****')
125      350 FORMAT (' ', //, ' AFTER PLOT IS DRAWN HIT RETURN TO CONTINUE. ')
126      360 FORMAT (' NO FURTHER PROSSESING TAKES PLACE UNTIL THEN')
127      370 FORMAT (' TO ALLOW A HARD COPY TO BE PRODUCED.', //, ' ')
128      380 FORMAT ('*****')
129      390 FORMAT (' ', /, ' ENTER RETURN TO START PLOT. THANK YOU.')
      END

```

```

1      SUBROUTINE DODRAW(XSIZE, YSIZE)
C
C      DODRAW PERFORMS THE *IG SYSTEM TRANSFORMATIONS NECESSARY
C      TO SCALE A PLOT FOR CALCOMP PLOTTING. THE DEFAULT MAXIMUM
C      PLOT DIMENSIONS ARE 33 X 360 INCHES, THESE MAXIMUMS MAY BE
C      REDEFINED BY THE USER HERE.
C
2      INTEGER*4 CHECK, YES /'Y'/
3      CALL FILEIN(9)
4      XSMAX = 360.0
5      YSMAX = 33.0
6      WRITE (6,10)
7      10 FORMAT ('DO YOU WANT TO SPECIFY A MAXIMUM VERTICAL SIZE?',
1         ' (YES OR NO)')
8      READ (5,20) CHECK
9      20 FORMAT (A1)
10     IF (CHECK .NE. YES) GO TO 50
11     WRITE (6,30)
12     30 FORMAT (' ENTER MAXIMUM VERTICAL SIZE IN INCHES - MUST BE',
1         ' LESS THAN 33.0')
13     READ (5,40) YSMAX
14     40 FORMAT (F7.4)
15     IF (YSMAX .GT. 33.0) YSMAX = 33.0
16     50 CONTINUE
17     WRITE (6,60)
18     60 FORMAT ('DO YOU WANT TO SPECIFY A MAXIMUM HORIZONTAL SIZE?',
1         ' (YES OR NO)')
19     READ (5,70) CHECK
20     70 FORMAT (A1)
21     IF (CHECK .NE. YES) GO TO 100
22     WRITE (6,80)
23     80 FORMAT (' ENTER MAXIMUM HORIZONTAL SIZE IN INCHES - MUST BE',
1         ' LESS THAN 360.0')
24     READ (5,90) XSMAX

```

```
25      90 FORMAT (F7.4)
26      IF (XSMAX .GT. 360.0) XSMAX = 360.0
27      100 CONTINUE
28      SC3 = 12.0 / (Ysize + 2.)
29      SIZE2 = YSMAX * 12. / 11.
30      CALL IGCTRL('CALCOMP', 'SIZE', SIZE2)
31      CALL IGDRON('CALCOMP')
32      RETURN
33      END
```

```

1      SUBROUTINE FILEIN(N)
C
C      FILEIN ASSIGNS DATA FILES TO THE APPROPRIATE LOGICAL DEVICE
C      FOR THE FUNCTION TO BE PERFORMED. UNIT 4 IS ATTACHED TO THE
C      FILE CONTAINING DATA FOR ELLIPSE GENERATION, UNIT 7 FOR STATION
C      LOCATION, UNIT 10 FOR CONTOURS, AND UNIT 9 FOR THE PLOT OUTPUT
C      FILE. UNITS 5 AND 6 ARE USED THROUGHOUT AS THE TERMINAL INPUT
C      AND OUTPUT CHANNELS AS PER CONVENTION.
C
2      LOGICAL*1 UNIT(18)
3      WRITE (6,10)
4      10 FORMAT (' ENTER NAME OF DATA FILE')
5      READ (5,20) (UNIT(I),I=1,17)
6      20 FORMAT (17A1)
7      GO TO (70, 70, 70, 30, 70, 70, 40, 70, 50, 60), N
8      30 CALL SETLIO('4      ', UNIT)
9      GO TO 70
10     40 CALL SETLIO('7      ', UNIT)
11     GO TO 70
12     50 CALL SETLIO('9      ', UNIT)
13     GO TO 70
14     60 CALL SETLIO('10     ', UNIT)
15     GO TO 70
16     70 CONTINUE
17     RETURN
18     END

```

```

1      SUBROUTINE SPOTZ(LABEL)
C
C      SPOTZ READS STATION LOCATION DATA FROM THE FILE ATTACHED TO
C      UNIT 7. THE LOGICAL VARIABLE LABEL ,PASSED TO THE SUBROUTINE,
C      INDICATES WHETHER STATIONS ARE TO BE LABELLED WITH THEIR 3 OR 4
C      CHARACTER DESIGNATION WHEN PLOTTED.
C
C      THE SIZE OF THE SYMBOLS DRAWN IS A FUNCTION OF THE SIZE OF
C      THE MAP SPECIFIED IN ORDER TO ALLOW SCALING OF THE MAP. THE
C      SIZE MAY BE ALTERED BY CHANGING THE NUMERATOR OF THE FUNCTION
C      DEFINING THE VARIABLE HT
C
2      COMMON /B/ LATMIN, LATMAX, LONMIN, LONMAX, MP
3      REAL LATMIN, LATMAX, LONMIN, LONMAX
4      INTEGER TRI(2)
5      LOGICAL*1 LABEL
6      DATA TRI(1) /25C401640/
7      DATA PI /3.14159256/
C
8      HT = 0.025 / (LONMAX - LONMIN)
9      READ (7,10) NSTA
10     FORMAT (I4)
C
11     DO 30 I = 1, NSTA
12     READ (7,20) TRI(2), TLAT, TLON
13     20    FORMAT (A4, 2F9.4)
14     TLAT = PI / 2. - (TLAT*PI/180.)
15     TLON = TLON * PI / 180.
16     CALL BOUNDS(K, TLAT, TLON, TLAT, TLON, 9999)
17     IF (K .EQ. 1) GO TO 30
18     CALL TRANFM(TLON, TLAT, 1)
19     CALL PLOOK(TLON, TLAT, TLN, TLT, 1)
20     TLN1 = TLN - (HT/2.)
21     TLT1 = TLT - (HT/2.)

```



```

22      CALL PSYM(TLN1, TLT1, HT, TRI(1), 0.0, 4, 0)
23      IF (LABEL) CALL PSYM(-0.0, -0.0, HT, TRI(2), 0.0, 4, 1)
24      30 CONTINUE
      C
25      RETURN
      C
27      SUBROUTINE BOXER
      C
      C BOXER DRAWS A BORDER AROUND THE MAP AREA IF A MAP IS TO BE DRAWN.
      C LINE SEGMENTS OF 1/100TH THE DISTANCE BETWEEN CORNERS ARE
      C GENERATED AND TRANSFORMED ACCORDING TO THE PROJECTION SPECIFIED
      C FOR PLOTTING
      C
28      REAL LATMIN, LATMAX, LONMIN, LONMAX, X(2000), Y(2000)
29      DATA PI /3.14159256/
30      COMMON /B/ LATMIN, LATMAX, LONMIN, LONMAX, MP
31      DELLAT = (LATMAX - LATMIN) / 100
32      DELLON = (LONMAX - LONMIN) / 100
      C
33      DO 10 I = 1, 101
34          X(I) = LONMIN + (I - 1) * DELLON
35          Y(I) = PI / 2 - LATMIN
36      10 CONTINUE
      C
37      DO 20 I = 102, 201
38          X(I) = LONMAX
39          Y(I) = PI / 2 - (LATMIN + (I - 101)*DELLAT)
40      20 CONTINUE
      C
41      DO 70 I = 202, 301
42          X(I) = LONMAX - (I - 201) * DELLON
43          Y(I) = PI / 2 - LATMAX
44      70 CONTINUE
      C

```

```

45      DO 80 I = 302, 401
46          X(I) = LONMIN
47          Y(I) = PI / 2 - (LATMAX - (I - 301)*DELLAT)
48      80 CONTINUE
      C
49      CALL TRANFM(X, Y, 401)
50      CALL PLINE(X, Y, 401, 1, 0, 0, 1)
51      CONTINUE
52      RETURN
53      END

```

```

1      SUBROUTINE PLTST(XMIN, YMIN, XSIZE, YSIZE, SCALE)
C
C      PLTST INITIALIZES THE PLOT TRANSFORMATION PARAMETERS BASED ON
C      THE MAP BOUNDARIES AND PROJECTION SPECIFIED. THE MINIMUM
C      AND MAXIMUM CO-ORDINATES IN THE X AND Y DIRECTION ARE
C      DETERMINED, ALLOWING FOR THE USE OF A RELATIVE INSTEAD
C      OF ABSOLUTE CO-ORDINATE SYSTEM.
C
2      COMMON /B/ LATMIN, LATMAX, LONMIN, LONMAX, MP
3      REAL LATMIN, LATMAX, LONMIN, LONMAX
4      DIMENSION A(4), B(4)
5      DATA PI /3.14159256/
6      CALL CLRSCR
7      GO TO (10, 10, 20, 10, 10, 10, 10, 10), MP
8      10 A(1) = LONMIN
9         B(1) = PI / 2.0 - LATMIN
10        A(2) = LONMAX
11        B(2) = PI / 2.0 - LATMAX
12        CALL TRANFM(A, B, 2)
13        XMIN = A(1)
14        YMIN = B(1)
15        XMAX = A(2)
16        YMAX = B(2)
17        GO TO 30
C
18        20 A(1) = (LONMIN + LONMAX) / 2
19           B(1) = PI / 2 - LATMIN
20           A(2) = LONMIN
21           B(2) = PI / 2 - LATMAX
22           A(3) = LONMIN
23           B(3) = B(1)
24           A(4) = LONMAX
25           B(4) = B(1)
26           CALL TRANFM(A, B, 4)

```

```

27      YMIN = B(1)
28      YMAX = B(2)
29      XMIN = A(3)
30      XMAX = A(4)
31      GO TO 30
32  30 SCALE = (XMAX - XMIN) / 10.
33      SCALE2 = (YMAX - YMIN) / 10.
34      IF (SCALE2 .GT. SCALE) SCALE = SCALE2
35      YSIZE = (YMAX - YMIN) / SCALE
36      XSIZE = (XMAX - XMIN) / SCALE
37      GO TO 40
38  40 CONTINUE
39      RETURN
40      END

```

```

1      SUBROUTINE VALIN(LATMIN, LATMAX, LONMIN, LONMAX, MP, DETAIL)
C
C      VALIN IS CALLED FROM SUBROUTINE DEFLT AND ALLOWS THE USER TO
C      DEFINE MAP BOUNDARY, PROJECTION, TYPE (STATE OR COUNTY), AND
C      DEGREE OF DETAIL PARAMETERS IF ONE OF THE DEFAULTS IS NOT
C      APPROPRIATE.
C
2      REAL LATMIN, LATMAX, LONMIN, LONMAX
3      INTEGER*4 TYPE, LIST, MERC, GNOM, SQ, CYL, TMERC
4      INTEGER*4 ONE, TWO, THREE, FOUR, FIVE, SIX, ZERO
5      INTEGER*4 DETL2, STATE, COUNTY
6      LOGICAL*1 DETAIL(3), DET
7      DATA LIST, MERC, GNOM, SQ, CYL, TMERC /'L', 'M', 'G', 'S', 'C',
1      'T'/
8      DATA ONE, TWO, THREE, FOUR /'1', '2', '3', '4'/
9      DATA FIVE, SIX, ZERO /'5', '6', '0'/
10     DATA DET, STATE, COUNTY /'2', 'S', 'C'/
11     DETAIL(2) = DET
12     WRITE (6,10)
13     10 FORMAT (' ENTER STATE OR COUNTY FOR TYPE OF MAP REQUIRED')
14     READ (5,20) DETAIL(1)
15     20 FORMAT (A1)
16     WRITE (6,30)
17     30 FORMAT (' ENTER MAP DETAIL LEVEL DESIRED ON A SCALE OF 0 TO 6', /,
1      ' WITH 0 AS LEAST DETAILED AND 6 MOST DETAILED. DEFAULT IS 4
2      2.')
18     READ (5,40) DETAIL(3)
19     40 FORMAT (A1)
20     WRITE (6,50)
21     50 FORMAT (' PLEASE ENTER MAP BOUNDRIES IN MINIMUM AND MAXIMUM', /,
1      ' LATITUDES AND LONGITUDES IN DEGREES, AS PROMPTED.')
22     WRITE (6,60)
23     60 FORMAT (' MINIMUM NORTH LATITUDE - DEGREES (EG 41.5):')
24     READ (5,100) LATMIN

```

```

25      WRITE (6,70)
26      70 FORMAT (' MAXIMUM NORTH LATITUDE - DEGREES ')
27      READ (5,100) LATMAX
28      WRITE (6,80)
29      80 FORMAT (' MINIMUM WEST LONGITUDE - DEGREES (EG 105.0)')
30      READ (5,100) LONMAX
31      WRITE (6,90)
32      90 FORMAT (' MAXIMUM WEST LONGITUDE - DEGREES ')
33      READ (5,100) LONMIN
34      100 FORMAT (F8.4)
35      LONMIN = -LONMIN
36      LONMAX = -LONMAX
37      110 CONTINUE
38      WRITE (6,120)
39      120 FORMAT (' ENTER THE NAME OF THE PROJECTION DESIRED, OR LIST', /,
40      1      ' FOR A LIST OF AVAILABLE PROJECTIONS.')
41      READ (5,130) TYPE
42      130 FORMAT (A1)
43      IF (TYPE .EQ. LIST) GO TO 140
44      MP = 7
45      IF (TYPE .EQ. TMERC) MP = 2
46      IF (TYPE .EQ. MERC) MP = 2
47      IF (TYPE .EQ. GNOM) MP = 3
48      IF (TYPE .EQ. SQ) MP = 7
49      IF (TYPE .EQ. CYL) MP = 8
50      GO TO 160
51      140 CALL CLRSCR
52      WRITE (6,150)
53      150 FORMAT (' MAP PROJECTION CHOICES: ', /, ' TRANSVERSE MERCATOR', /,
54      1      ' GNOMONIC', /, ' SQUARE', /, ' CYLINDRICAL EQUAL AREA')
55      GO TO 110
56      160 CONTINUE
57      RETURN
58      END

```

```

1      SUBROUTINE DEFLT(DLTMN, DLTMX, DLNMN, DLNMX, LDPROJ, DETAIL)
C
C      DEFLT INITIALIZES THE MAP GENERATION PARAMETERS - MAXIMUM ANN
C      MINIMUM LATITUDE AND LONGITUDE, PROJECTION DESIRED, TYPE (STATE
C      OR COUNTY), AND DEGREE OF DETAIL. THREE PRE-DEFINED MAPS ARE
C      PROVIDED AS DEFAULTS, OR THE USER MAY SPECIFY HIS/HER OWN
C      PARAMETER SET THROUGH SUBROUTINE VALIN.
C
2      INTEGER*4 CHECK, TWO, THREE, OTHER
3      LOGICAL*1 DETAIL(3), DET(3,3)
4      COMMON /B/ LATMIN, LATMAX, LONMIN, LONMAX, MP
5      DIMENSION DLTMN(3), DLTMX(3), DLNMN(3), DLNMX(3), LDPROJ(3)
6      COMMON LAT(2000), LON(2000), X(2000), Y(2000)
7      REAL LAT, LON, LATMIN, LATMAX, LONMIN, LONMAX
8      DATA TWO, THREE, OTHER /'2', '3', '0'/
9      DATA DET(1,1), DET(2,1), DET(3,1) /'S', '2', '0'/
10     DATA DET(1,2), DET(2,2), DET(3,2) /'S', '2', '6'/
11     DATA DET(1,3), DET(2,3), DET(3,3) /'C', '2', '3'/
12     DATA PI /3.14159256/
13     WRITE (6,10)
14     10 FORMAT (' BASE MAP DEFAULT PARAMETERS:', /, ' PARAMETER
15     1AULT 1      DEFAULT 2      DEFAULT 3', /, ' MAP TYPE      DEF
16     2          STATE      COUNTY', /, ' DETAIL LEVEL      STATE
17     3          6          3', /, ' MIN LATITUDE      24.0 N      36.0
18     4N          41.5 N', /, ' MAX LATITUDE      50.0 N      42.5 N
19     5          47.5 N', /, ' MIN LONGITUDE      66.0 W      79.0 W      82.
20     65 W', /, ' MAX LONGITUDE      127.0 W      90.0 W      90.5 W',
21     7          /, ' PROJECTION      MERCATOR      MERCATOR      MERCATOR')
22     WRITE (6,20)
23     20 FORMAT (' ENTER 1,2 OR 3 FOR DEFAULT LIST DESIRED OR')
24     WRITE (6,30)
25     30 FORMAT (' OTHER TO PROVIDE YOUR OWN VALUES. DEFAULT 1 IS ',
26     1          'THE GLOBAL DEFAULT')
27     READ (5,40) CHECK

```

```

20      40 FORMAT (A1)
21      I = 1
22      IF (CHECK .EQ. TWO) I = 2
23      IF (CHECK .EQ. THREE) I = 3
24      IF (CHECK .EQ. OTHER) I = 4
25      GO TO (50, 50, 50, 70), I
26      50 LATMIN = DLTMN(I)
27      LATMAX = DLTMX(I)
28      LONMIN = DLNMN(I)
29      LONMAX = DLNMX(I)
30
31      C
32      DO 60 J = 1, 3
33      60 DETAIL(J) = DET(J,I)
34
35      C
36      MP = LDPROJ(I)
37      GO TO 80
38      70 CALL CLRSCR
39      CALL VALIN(LATMIN, LATMAX, LONMIN, LONMAX, MP, DETAIL)
40      80 CONTINUE
41      IF (LATMIN .LT. LATMAX) GO TO 90
42      TEMP = LATMIN
43      LATMIN = LATMAX
44      LATMAX = TEMP
45      90 CONTINUE
46      IF (LONMAX .GT. LONMIN) GO TO 100
47      TEMP = LONMIN
48      LONMIN = LONMAX
49      LONMAX = TEMP
50      100 CONTINUE
51      LONMIN = LONMIN * PI / 180.
52      LONMAX = LONMAX * PI / 180.
53      LATMIN = LATMIN * PI / 180.
54      LATMAX = LATMAX * PI / 180.
55      RETURN

```


52

END

```
1      SUBROUTINE CLRSCR  
      C  
      C CLRSCR ERASES THE TERMINAL SCREEN.  
      C  
2      CALL IGBGNS('BLNK')  
3      CALL IGCTRL('TERMINAL', 'ERASE')  
4      CALL IGENDS('BLNK')  
5      RETURN  
6      END
```

```

1      SUBROUTINE MAPIN(DETAIL)
C
C      MAPIN GENERATES THE PLOT DESCRIPTION INFORMATION NEEDED
C      TO DRAW THE SPECIFIED MAP. DATA FOR BORDERS IS STANDARD
C      FIPS FORMAT, AND IS ACCESSED THROUGH THE STATISTICAL
C      RESEARCH LABORATORY'S STAT:USA/MAP PROGRAM. TWO MIDAS
C      SUBROUTINES FROM THIS PROGRAM, INITXY AND READXY, ARE
C      CALLED TO RETRIEVE THE DATA.
C
C      THIS SUBROUTINE UTILIZES THE LOOP FEATURE OF THE
C      FORTRAN 77 LANGUAGE. WHEN COMPILING, PAR=OVER MUST
C      BE SPECIFIED TO USE THIS OPTION. MH
C
2      INTEGER*4 NPTS(25), CHECK, SOLID /'S'/, BROKEN /'B'/, YES /'Y'/
3      LOGICAL LINTYP
4      REAL LAT, LON, LATMIN, LONMIN, LATMAX, LONMAX
5      COMMON LAT(2000), LON(2000), X(2000), Y(2000)
6      COMMON /B/ LATMIN, LATMAX, LONMIN, LONMAX, MP
7      PI = 3.14159265
8      10 CONTINUE
9      WRITE (6,20)
10     FORMAT (' DO YOU WANT SOLID OR BROKEN BORDERS ON MAP?')
11     READ (5,30) CHECK
12     30 FORMAT (A1)
13     IF (CHECK .EQ. SOLID) GO TO 50
14     IF (CHECK .EQ. BROKEN) GO TO 60
15     WRITE (6,40)
16     40 FORMAT (' UNRECOGNIZABLE OPTION - ENTER SOLID OR BROKEN.')
17     GO TO 10
18     50 LINTYP = .TRUE.
19     GO TO 70
20     60 LINTYP = .FALSE.
21     70 CONTINUE
22     CALL INITXY(DETAIL, 3, MINARG)

```

```

23      LOOP
      C
      C      READ THE DATA POINTS (RADIAN MEASURES) FOR EACH
      C      MAP SUBSECTION (STATE,COUNTY, ISLAND, ETC) INTO
      C      THE ARRAYS LAT AND LON.
      C
24      CALL READXY(NST, IOBJ, NSUB, NPTS, LON, LAT, NAME, LENAME, IATT)
25      IF (NST .EQ. 0) GO TO 190

26      IF (NSUB .EQ. 0) EXITLOOP
27      IPT = 1

      C
      C      CONVERT EACH POINT INTO COLATITUDE AND LONGITUDE.
      C      S AND P ARE THE CO-ORDINATES OF THE CURRENT POINT,
      C      SS AND PP ARE THE LAST POINT, USED TO ELIMINATE
      C      EDGE EFFECTS THROUGH CALLS TO PROCEDURE BOUNDS.
      C      THE CALL TO TRANFM CONVERTS THE POINTS FROM
      C      RADIAN MEASURES TO MAP CO-ORDINATES ACCORDING
      C      TO THE PROJECTION SPECIFIED.
      C

28      LOOPFOR(ISUB=1,NSUB)
29      N = NPTS(ISUB)
30      80 CONTINUE
31      K = 0
32      J = 0
33      IPT2 = IPT + N - 1

      C
34      DO 150 I = IPT, IPT2
35          S = PI / 2.0 - LAT(I)
36          P = LON(I)
37          II = IPT
38          IF (I .GT. IPT) II = I - 1

```

```

39      SS = PI / 2.0 - LAT(II)
40      PP = LON(II)
41      CALL BOUNDS(K15, S, P, SS, PP, J)
42      IF (K15 .EQ. 1) GO TO 100
43      IF (J .EQ. 0) GO TO 90
44      IF (MP .EQ. 1 .OR. MP .EQ. 3 .OR. MP .EQ. 4) GO TO 90
45      90      J = J + 1
46      X(J) = P
47      Y(J) = S
48      GO TO 150
49      100     CONTINUE
50      IF (J .EQ. 0) GO TO 150
51      110     CALL TRANFM(X, Y, J)
52      IF ( .NOT. LINTYP) GO TO 130
53      120     CALL PLINE(X, Y, J, 1, 0, 0, 1)
54      GO TO 140
55      130     CALL PCTRLN(X, Y, J, 1, 1)
56      140     CONTINUE
57      J = 0
58      150     CONTINUE
59      C      IF (J .EQ. 0) GO TO 190
60      CALL TRANFM(X, Y, J)
61      IF ( .NOT. LINTYP) GO TO 170
62      160     CALL PLINE(X, Y, J, 1, 0, 0, 1)
63      GO TO 180
64      170     CALL PCTRLN(X, Y, J, 1, 1)
65      180     CONTINUE
66      IPT = IPT + NPTS(ISUB)

67      ENDLOOP
68      190     CONTINUE

69      ENDLOOP

```

70
71

RETURN
END

```

1      SUBROUTINE TAZAR(X, Y, Z, J)
2      REAL X(J), Y(J), Z(J)
      C ON ENTRY, X CONTAINS E LONGITUDES (RAD)
      C Y CONTAINS COLATITUDES. THESE ARE CONVERTED TO
      C X,Y COORDINATES OF AN AZIMUTHAL EQUAL AREA PROJECTION,
      C WITH THE NORTH POLE BEING THE PROJECTION POLE
3      DO 10 I = 1, J
4          C = Y(I)
5          R = 2. * SIN(C/2.)
6          Y1 = -R * COS(X(I))
7          X1 = R * SIN(X(I))
8          X(I) = X1
9          Y(I) = Y1
10     CONTINUE
      C
11     RETURN
12     END

```

```

C
C
1  SUBROUTINE TMERC(X, Y, Z, J)
2  REAL X(J), Y(J), Z(J)
C ON ENTRY X CONTAINS E LONGITUDES (RAD), Y CONTAINS COLATITUDES
C THESE ARE CONVERTED TO X,Y COORDINATES FOR A MERCATOR PROJECTION
3  PI = 3.14159265
C
4  DO 10 I = 1, J
5      P = PI / 2. - Y(I)
6      Y(I) = ALOG(TAN(PI/4. + P/2))
7  10 CONTINUE
C
8  RETURN
9  END

```



```

1      SUBROUTINE TRANFM(X, Y, J)
2      COMMON /B/ LATMIN, LATMAX, LONMIN, LONMAX, MP
C CONVERTS X=E LON, Y=COLAT INTO X,Y MAP COORDINATES
C BY CALLING APPROPRIATE MAP PROJECTION SUBROUTINE
3      REAL X(J), Y(J), Z(2000)
4      GO TO (10, 20, 30, 40, 50, 60, 70, 80), MP
5      10 CALL TRNMRC(X, Y, Z, J)
6      RETURN
7      20 CALL TMERC(X, Y, Z, J)
8      RETURN
9      30 CALL GNOMON(X, Y, Z, J)
10     RETURN
11     40 CALL EQDIST(X, Y, Z, J)
12     RETURN
13     50 CALL ELLIP(X, Y, Z, J)
14     RETURN
15     60 CALL SINUS(X, Y, Z, J)
16     RETURN
17     70 CALL SQUARE(X, Y, Z, J)
18     RETURN
19     80 CALL CYLIND(X, Y, Z, J)
20     RETURN
21     END

```

```

C
C
1      SUBROUTINE GNOMON(X, Y, Z, J)
2      COMMON /B/ LATMIN, LATMAX, LONMIN, LONMAX, MP
3      REAL X(J), Y(J), Z(J), LATMIN, LATMAX, LONMIN, LONMAX
C GNOMONIC PROJECTION - PROJECTION POLE= 90N, 0E
C ON ENTRY, X=E LONG (RAD), Y=COLAT
C THESE ARE CONVERTED TO X,Y MAP COORDINATES
4      PI = 3.14159256
5      PLAT = PI / 2.0
6      PLON = (LONMIN + LONMAX) / 2
C
7      DO 10 I = 1, J
8          C = PI / 2 - Y(I)
9          DEN = (SIN(PLAT)*SIN(C)) + (COS(PLAT)*COS(C)*COS(X(I) - PLON))
10         XX = PLON + (COS(C)*SIN(X(I) - PLON)/DEN)
11         YY = (COS(PLAT)*SIN(C)) - (SIN(PLAT)*COS(C)*COS(X(I) - PLON)) /
12         1 DEN
13         X(I) = XX
14         Y(I) = YY
10     CONTINUE
C
15     RETURN
16     END

```

```

C
C
1      SUBROUTINE EQDIST(X, Y, Z, J)
2      REAL X(J), Y(J), Z(J)
C      AZIMUTHAL EQUIDISTANT PROJECTION ABOUT N POLE
C      ON ENTRY, X=E LONG (RAD), Y=COLAT
C      THESE ARE CONVERTED TO X,Y MAP COORDINATES
3      DO 10 I = 1, J
4          R = Y(I)
5          T = X(I)
6          X(I) = R * SIN(T)
7          Y(I) = -R * COS(T)
8      10 CONTINUE
C
9      RETURN
10     END

```

```

C
C
1      SUBROUTINE CYLIND(X, Y, Z, J)
2      REAL X(J), Y(J), Z(J)
C LAMBERTS CYLINDRICAL EQUAL AREA PROJECTION
C ON ENTRY, X=E LONG (RAD), Y=COLAT
C THESE ARE CONVERTED TO X,Y MAP COORDINATES
3      PI = 3.14159256
C
4      DO 10 I = 1, J
5      10 Y(I) = SIN(PI/2. - Y(I))
C
6      RETURN
7      END

```

```

C
C
1  SUBROUTINE SINUS(X, Y, Z, J)
2  REAL X(J), Y(J), Z(J)
C SINUSOIDAL EQUAL AREA PROJECTION
C ON ENTRY, X= E LONG (RAD), Y=COLAT
C THESE ARE CONVERTED TO X,Y MAP COORDS
3  PI = 3.14159256
C
4  DO 10 I = 1, J
5      P = PI / 2. - Y(I)
6      X(I) = X(I) * COS(P)
7      Y(I) = P
8  10 CONTINUE
C
9  RETURN
10 END

```

```

C
C
1      SUBROUTINE SQUARE(X, Y, Z, J)
2      REAL X(J), Y(J), Z(J)
C SQUARE PROJECTION
C ON ENTRY, X=E LONG (RAD), Y=COLAT
C THESE ARE CONVERTED TO X,Y MAP COORDINATES
3      PI = 3.14159256
C
4      DO 10 I = 1, J
5      10 Y(I) = PI / 2. - Y(I)
C
6      RETURN
7      END

```

```

C
C
1  SUBROUTINE ELLIP(X, Y, Z, J)
2  REAL X(J), Y(J), Z(J)
C
C MOLLWEIDES'S EQUAL AREA ELLIPTICAL PROJECTION
C ON ENTRY, X=E LONG (RAD), Y=COLAT
C THESE ARE CONVERTED TO X,Y MAP COORDINATES
C FOR EACH POINT, THE TRANSCENDENTAL EQUATION  $2A + \sin 2A = \pi \sin(LAT)$ 
C MUST BE SOLVED
3      PI = 3.14159256
C
4      DO 30 K = 1, J
5          A = 0
6          D = PI / 4.
7          CONST = PI * SIN(PI/2. - Y(K))
C
8          DO 10 I = 1, 10
9              F = 2. * A + SIN(2.*A) - CONST
10             IF (ABS(F) .LT. 0.001) GO TO 20
11             A = A - (F/ABS(F)) * D
12             D = D / 2.
13         10 CONTINUE
C
14         20  X(K) = 2.82843 * X(K) * COS(A) / PI
15             Y(K) = 1.414214 * SIN(A)
16         30 CONTINUE
C
17     RETURN
18     END

```

```

1      SUBROUTINE BOUNDS(K, COLAT, ELON, LSTY, LSTX, J)
C      BOUNDS REMOVES EDGE EFFECTS BY EXAMINING THE CURRENT
C      AND LAST POINTS TO BE DRAWN. IF EITHER POINT IS OUTSIDE
C      THE MAP BOUNDARY AREA, A POINT ALONG THE SAME SEGMENT
C      AS THE ORIGINAL POINTS AND LYING ON THE MAP BOUNDARY
C      IS GENERATED. IF BOTH POINTS ARE OUT, BOUNDS CHECKS
C      TO SEE IF THE SEGMENT CONNECTING THE POINTS CROSSES
C      THROUGH THE MAP REGION, AND, IF SO, GENERATES THE
C      APPROPRIATE LINE SEGMENT.
C
C      K=1 MEANS THE CURRENT POINT IS OUT OF BOUNDS
C      K2=1 MEANS THE LAST POINT WAS OUT OF BOUNDS
C
2      REAL LATMIN, LATMAX, LONMIN, LONMAX, LSTX, LSTY
3      COMMON LAT(2000), LON(2000), X(2000), Y(2000)
4      COMMON /B/ LATMIN, LATMAX, LONMIN, LONMAX, MP
5      PI = 3.14159256
6      K = 0
7      K2 = 0
8      10 CONTINUE
9      IF (ELON .LT. (LONMIN - 0.0001) .OR. ELON .GT. (LONMAX + 0.0001))
10     1K = 1
11     IF (LSTX .GT. (LONMAX + 0.0001) .OR. LSTX .LT. (LONMIN - 0.0001))
12     1K2 = 1
13     XLAT = 1.570796 - COLAT
14     YLST = 1.570796 - LSTY
15     IF (XLAT .LT. (LATMIN - 0.0001) .OR. XLAT .GT. (LATMAX + 0.0001))
16     1K = 1
17     IF (YLST .LT. (LATMIN - 0.0001) .OR. YLST .GT. (LATMAX + 0.0001))
18     1K2 = 1
19     IF (J .EQ. 9999) GO TO 90
20     IF (K .EQ. K2) GO TO 50
21     J = J + 1
22     IF (LSTX .GT. LONMAX .OR. ELON .GT. LONMAX) GO TO 40

```



```

19      IF (LSTX .LT. LONMIN .OR. ELON .LT. LONMIN) GO TO 30
20      IF (YLST .GT. LATMAX .OR. XLAT .GT. LATMAX) GO TO 20
21      Y(J) = PI / 2 - (LATMIN)
22      X(J) = ELON + ((LATMIN - XLAT)*(ELON - LSTX)/(XLAT - YLST))
23      GO TO 90
24      20 Y(J) = PI / 2 - (LATMAX)
25      X(J) = ELON + ((LATMAX - XLAT)*(ELON - LSTX)/(XLAT - YLST))
26      GO TO 90
27      30 X(J) = LONMIN
28      Y(J) = PI / 2 - (XLAT + ((LONMIN - ELON)*(XLAT - YLST)/(ELON -
        1LSTX)))
29      GO TO 90
30      40 X(J) = LONMAX - 0.00001
31      Y(J) = PI / 2 - (XLAT + ((LONMAX - ELON)*(XLAT - YLST)/(ELON -
        1LSTX)))
32      GO TO 90
33      50 CONTINUE
34      IF (K .EQ. 0) GO TO 90
35      IF (ELON .GT. LONMAX .AND. LSTX .GT. LONMAX) GO TO 90
36      IF (ELON .LT. LONMIN .AND. LSTX .LT. LONMIN) GO TO 90
37      IF (XLAT .GT. LATMAX .AND. YLST .GT. LATMAX) GO TO 90
38      IF (XLAT .LT. LATMIN .AND. YLST .LT. LATMIN) GO TO 90
39      IF (ELON .NE. LSTX) GO TO 60
40      X(1) = ELON
41      X(2) = X(1)
42      Y(1) = PI / 2 - LATMIN
43      Y(2) = PI / 2 - LATMAX
44      JJ = 2
45      GO TO 80
46      60 CONTINUE
47      IF (XLAT .NE. YLST) GO TO 70
48      Y(1) = PI / 2 - XLAT
49      Y(2) = Y(1)
50      X(1) = LONMIN

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51      X(2) = LONMAX
52      JJ = 2
53      GO TO 80
54      70 JJ = 1
55      Y(JJ) = PI / 2 - (LATMIN)
56      X(JJ) = ELON + ((LATMIN - XLAT)*(ELON - LSTX)/(XLAT - YLST))
57      IF (X(JJ) .GT. LONMAX .OR. X(JJ) .LT. LONMIN) JJ = JJ - 1
58      JJ = JJ + 1
59      Y(JJ) = PI / 2 - (LATMAX)
60      X(JJ) = ELON + ((LATMAX - XLAT)*(ELON - LSTX)/(XLAT - YLST))
61      IF (X(JJ) .GT. LONMAX .OR. X(JJ) .LT. LONMIN) JJ = JJ - 1
62      JJ = JJ + 1
63      X(JJ) = LONMIN
64      Y(JJ) = PI / 2 - (XLAT + ((LONMIN - ELON)*(XLAT - YLST)/(ELON -
        1LSTX)))
65      IF (Y(JJ) .GT. LATMAX .OR. Y(JJ) .LT. LATMIN) JJ = JJ - 1
66      JJ = JJ + 1
67      X(JJ) = LONMAX - 0.00001
68      Y(JJ) = PI / 2 - (XLAT + ((LONMAX - ELON)*(XLAT - YLST)/(ELON -
        1LSTX)))
69      IF (Y(JJ) .GT. LATMAX .OR. Y(JJ) .LT. LATMIN) JJ = JJ - 1
70      80 CONTINUE
71      IF (JJ .EQ. 0) GO TO 90
72      CALL TRANFM(X, Y, JJ, MP)
73      CALL PLINE(X, Y, JJ, 1, 0, 0, 1)
74      90 CONTINUE
75      RETURN
76      END

```

```

1      SUBROUTINE LATLIN(DASH)
C
C      LATLIN GENERATES A LATITUDE/LONGITUDE GRID. THE LOGICAL
C      VARIABLE DASH DETERMINES WHETHER SOLID OR DASHED
C      LINES ARE DRAWN.
C
2      COMMON /B/ LATMIN, LATMAX, LONMIN, LONMAX, MP
3      REAL LATMIN, LATMAX, LONMIN, LONMAX
4      REAL*4 DSLEN
5      LOGICAL*1 DASH
6      DIMENSION X(101), Y(101)
7      PI = 3.14159256
8      WRITE (6,10)
9      10 FORMAT ('ENTER SPACING IN DEGREES OF LATITUDE LINES')
10     READ (5,20) DLAT
11     20 FORMAT (F6.3)
12     WRITE (6,30)
13     30 FORMAT ('ENTER SPACING IN DEGREES OF LONGITUDE LINES')
14     READ (5,20) DLON
15     DLON = DLON * 3.14159 / 180
16     DLAT = DLAT * 3.14159 / 180
17     TLAT = 0
18     TLON = 0
19     DELLAT = (LATMAX - LATMIN) / 100
20     DELLON = (LONMAX - LONMIN) / 100
C      DSLEN=DELLAT/4
C      IF (DELLON.LT.DELLAT) DSLEN=DELLON/4
21     40 IF (TLAT .GE. LATMIN) GO TO 50
22     TLAT = TLAT + DLAT
23     GO TO 40
24     50 IF (TLAT .GT. LATMAX) GO TO 70
C
25     DO 60 I = 1, 101
26     Y(I) = PI / 2 - TLAT

```

```

27      X(I) = LONMIN + DELLON * (I - 1)
28      60 CONTINUE
      C
29      CALL TRANFM(X, Y, 101)
30      IF (DASH) CALL PLINE(X, Y, 101, 1, 0, 0, 1)
31      IF ( .NOT. DASH) CALL PDSHLN(X, Y, 101, 1, DSLEN, 1)
32      TLAT = TLAT + DLAT
33      GO TO 50
34      70 IF (TLON .LE. LONMAX) GO TO 80
35      TLON = TLON - DLON
36      GO TO 70
37      80 IF (TLON .LT. LONMIN) GO TO 100
      C
38      DO 90 I = 1, 101
39      X(I) = TLON
40      Y(I) = PI / 2 - (LATMIN + DELLAT*(I - 1))
41      90 CONTINUE
      C
42      CALL TRANFM(X, Y, 101)
43      IF (DASH) CALL PLINE(X, Y, 101, 1, 0, 0, 1)
44      IF ( .NOT. DASH) CALL PDSHLN(X, Y, 101, 1, DSLEN, 1)
45      TLON = TLON - DLON
46      GO TO 80
47      100 CONTINUE
48      RETURN
49      END

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1

SUBROUTINE LATTIC

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LATTIC GENERATES TICK MARKS AND LATITUDE/LOGITUDE
 LABELS. THE SIZE OF THE TICK MARKS AND NUMBERS IS
 DETERMINED AS A FUNCTION OF THE MAP SIZE, CHANGES
 IN THE CONSTANT FACTOR DETERMINING THE VALUE OF
 HT MAY BE MADE TO ALTER THE SE SIZES.

REAL LATMIN, LATMAX, LONMIN, LONMAX, LAT1, LAT2

DIMENSION R(2), S(2)

COMMON /B/ LATMIN, LATMAX, LONMIN, LONMAX, MP

DATA PI /3.14159256/

DLAT = LATMAX - LATMIN

DLOD = LONMAX - LONMIN

FAC = PI / 180.

BREAK1 = 3.0 * FAC

DELTA = 1.0

IF ((LATMAX - LATMIN) .LT. BREAK1 .OR. (LONMAX - LONMIN) .LT.

1BREAK1) DELTA = 0.25

HT = 0.025 / DLOD * DELTA * 1.25

HT2 = 2.0 * HT

TLON = -180.0

TLAT = 0.0

10 IF (((TLAT * FAC) - LATMIN) .GE. - 0.001) GO TO 20

TLAT = TLAT + DELTA

GO TO 10

20 HERE = TLAT * FAC

HERE = PI / 2. - HERE

CALL TRANFM(LONMIN, HERE, 1)

CALL PLOOK(LONMIN, HERE, XX, YY, 1)

R(1) = XX

S(1) = YY

R(2) = XX + HT2

```

26      S(2) = YY
27      CALL PLINE(R, S, 2, 1, 0, 0, 0)
28      Q = XX - HT2
29      Y2 = YY + HT2
30      CALL PNUMBR(Q, Y2, HT, TLAT, 270.0, 'JF4.2*', 0)
31      HERE = PI / 2. - TLAT * FAC
32      CALL TRANFM(LONMAX, HERE, 1)
33      CALL PLOOK(LONMAX, HERE, XX, YY, 1)
34      R(1) = XX
35      R(2) = XX - HT2
36      S(1) = YY
37      S(2) = YY
38      CALL PLINE(R, S, 2, 1, 0, 0, 0)
39      TLAT = TLAT + DELTA
40      IF ((TLAT * FAC - LATMAX) .GT. 0.001) GO TO 30
41      GO TO 20
42  30 CONTINUE
43  40 IF ((TLON * FAC - LONMIN) .GE. - 0.001) GO TO 50
44      TLON = TLON + DELTA
45      GO TO 40
46  50 HERE = TLON * FAC
47      LAT2 = PI / 2. - LATMIN
48      CALL TRANFM(HERE, LAT2, 1)
49      CALL PLOOK(HERE, LAT2, XX, YY, 1)
50      R(1) = XX
51      S(1) = YY
52      R(2) = XX
53      S(2) = YY + HT2
54      CALL PLINE(R, S, 2, 1, 0, 0, 0)
55      Q = XX - 3. * HT
56      Y2 = YY - 3. * HT
57      IF (HT .GT. 0.3) Y2 = YY - 0.9
58      CALL PNUMBR(Q, Y2, HT, TLON, 0.0, 'JF4.2*', 0)
59      HERE = TLON * FAC

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60      LAT1 = PI / 2. - LATMAX
61      CALL TRANFM(HERE, LAT1, 1)
62      CALL PLOOK(HERE, LAT1, XX, YY, 1)
63      R(1) = XX
64      R(2) = XX
65      S(1) = YY
66      S(2) = YY - HT2
67      CALL PLINE(R, S, 2, 1, 0, 0, 0)
68      TLON = TLON + DELTA
69      IF ((TLON*FAC - LONMAX) .GT. 0.001) GO TO 60
70      GO TO 50
71 60 CONTINUE
72      RETURN
73      END

```

```

1      SUBROUTINE ELLPS(MP)
C
C      ELLPS DRAWS ELLIPSES CENTERED AT LAT,LON WITH
C      MAJOR AXIS A AND MINOR AXIS B, INCLINED AT
C      AZMTH DEGREES CLOCKWISE FROM THE HORIZONTAL.
C      SUBROUTINE PELIPS FROM THE *PLOTSYS SYSTEM
C      GENERATES THE ACTUAL CO-ORDINATE POINTS,
C      THE CALL TO PLINE PLACES A POINT IN THE ELLIPSE
C      CENTER. ELLIPSES WITH MAJOR AXIS LARGER THAN THE
C      DISTANCE BETWEEN DATA POINTS ARE NOT DRAWN TO
C      PREVENT OVERLAPPING; ONLY THE CENTER POINTS
C      ARE DRAWN.
2      PI = 3.14159256
3      REAL LAT, LON, MAG, LAT1, LON1, MAG1
4      N = 1
5      10 CONTINUE
6      IF (N .EQ. 2) GO TO 30
7      READ (4,20,END=60) LAT, LON, MAG, A, B, AZMTH
8      IF (N .NE. 1) GO TO 40
9      READ (4,20) LAT1, LON1, MAG1, AA, BB, AZ1
10     SZMAX = ABS(LAT - LAT1) * 111.195
11     SZMAX2 = ABS(LON - LON1) * 111.195
12     IF (SZMAX2 .GT. SZMAX) SZMAX = SZMAX2
13     20 FORMAT (1X, 2F7.2, F4.2, 2F12.2, F5.1)
14     GO TO 40
15     30 LAT = LAT1
16     LON = LON1
17     MAG = MAG1
18     A = AA
19     B = BB
20     AZMTH = AZ1
21     40 CONTINUE
22     Y = PI / 2 - (LAT*PI/180.)
23     X = -(LON*PI/180.)

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24      A1 = A / 111.195 * (PI/180.)
25      B1 = B / 111.195 * (PI/180.)
26      ANGL = 90. - AZMTH
27      CALL BOUNDS(K, Y, X, Y, X, 9999)
28      IF (K .EQ. 1) GO TO 50
29      CALL TRANFM(X, Y, 1, MP)
30      IF (A1 .LE. 0) GO TO 50
31      HT = 0.001
32      CALL PLNSYM(HT)
33      CALL PLINE(X, Y, 1, 1, 1, 11, 1)
34      IF (A .GT. SZMAX) GO TO 50
35      CALL PELIPS(X, Y, A1, B1, ANGL, 0., 360., 1)
36      50 N = N + 1
37      GO TO 10
38      60 CONTINUE
39      RETURN
40      END

```

```

1      SUBROUTINE CONTRR
C
C      CONTRR SETS UP THE PARAMETER LIST FOR THE CONTOURING
C      SUBROUTINES. THESE PARAMETERS ARE USED IN DETERMINING
C      ARRAY SUBSCRIPTS AND ARRAY ELEMENT VALUES IN SETARY.
C
2      REAL*4 XMIN, XMAX, XINC, YMIN, YMAX, YINC, ZMIN, ZMAX, ZINC
3      INTEGER*4 XPTS, YPTS, NCONT
4      COMMON /PARA/ XMIN, XMAX, XINC, YMIN, YMAX, YINC, ZMIN, ZMAX, ZINC
5      XMIN = -89.5
6      XMAX = -79.5
7      XINC = 0.5
8      YMIN = 36.0
9      YMAX = 42.5
10     YINC = 0.5
11     ZMIN = 0.5
12     ZMAX = 4.5
13     ZINC = 0.1
14     XPTS = 21
15     YPTS = 14
16     NCONT = 41
17     CALL SETARY(XPTS, YPTS, NCONT)
18     RETURN
20
20     SUBROUTINE SETARY(XPTS, YPTS, NCONT)
C
C      SETARY READS DATA VALUES TO BE CONTOURED AND PLACES
C      THEM IN THE PROPER ARRAY LOCATION PRIOR TO PROCESSING.
C      THE ARRAY Z HOLDS THE VALUES TO BE CONTOURED IN AN
C      I BY J SECTION OF THE ARRAY. THE ARRAYS X AND Y, OF
C      LENGTHS I AND J, RESPECTIVELY, CONTAIN THE MAP
C      CO-ORDINATE VALUES CORRESPONDING TO I AND J IN THE
C      Z ARRAY. THE X AND Y VALUES MUST BE EVENLY SPACED
C      AND THERE MUST BE NO GAPS IN THE DATA.

```

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C
21      INTEGER*4 XPTS, YPTS
22      COMMON /VEC/ X(100), Y(100), Z(100,100), CZ(100)
23      COMMON /PARA/ XMIN, XMAX, XINC, YMIN, YMAX, YINC, ZMIN, ZMAX, ZINC
C
24      DO 20 NCT = 1, NCONT
25          CZ(NCT) = ZMIN + ZINC * (NCT - 1)
26 20 CONTINUE
C
27      DO 50 LY = 1, YPTS
C
28          DO 40 LX = 1, XPTS
29              LLX = 1 + XPTS - LX
30              READ (10,30,END=50) YLAT, XLON, QMAG
31 30      FORMAT (1X, 2F7.2, F4.2)
32              Z(LLX,LY) = QMAG
33              IF (LY .EQ. 1) X(LLX) = -XLON
34              IF (LX .EQ. 1) Y(LY) = YLAT
35 40      CONTINUE
C
36 50 CONTINUE
C
37      CALL CONTUR(XPTS, YPTS, NCONT)
38      RETURN
39      END

```

```

1      SUBROUTINE CONTUR(IXPT, IYPT, NC)
      C
      C      CONTUR DETERMINES WHERE CONTOUR SEGMENTS ARE NEEDED.
      C      CELLS ARE DEFINED BY CO-ORDINATES (I,J) , (I,J+1),
      C      (I+1,J), AND (I+1,J+1). THE Z ARRAY VALUES AT THESE
      C      POINTS ARE EXAMINED AND THE MAXIMUM AND MINIMUM
      C      VALUES FOR THE CELL ARE DETERMINED. THE CZ ARRAY
      C      HOLDS AN ORDERED LIST OF THE VALUES FOR WHICH
      C      CONTOUR LINES ARE TO BE DRAWN; IF ANY OF THE ELEMENTS
      C      OF THE CZ ARRAY LIE BETWEEN THE MINIMUM AND MAXIMUM
      C      CELL VALUES, A CALL TO CTQQ IS MADE TO GENERATE
      C      THE CONTOUR LINE SEGMENTS IN THAT CELL.
      C
2      REAL*4 LATMIN, LATMAX, LONMIN, LONMAX
3      COMMON /B/ LATMIN, LATMAX, LONMIN, LONMAX, MP
4      COMMON /VEC/ X(100), Y(100), Z(100,100), CZ(100)
5      COMMON /PARA/ XMIN, XMAX, XINC, YMIN, YMAX, YINC, ZMIN, ZMAX, ZINC
6      COMMON /CONCOM/ LOWER, UPPER, XL, XR, XC, YL, YU, YC, ZLL, ZUL,
      C      ZLR, ZUR
7      INTEGER*4 LOWER, UPPER, CONCNT, CCP1, IXPT, IYPT
8      DATA PI /3.14159256/
9      CZMAX = CZ(NC)
10     CZMIN = CZ(1)
11     IYMI = IYPT - 1
12     YU = Y(1)
      C
13     DO 50 J = 1, IYMI
14         YL = YU
15         YU = Y(J + 1)
16         YC = 0.5 * (YL + YU)
17         XR = X(1)
18         ZLR = Z(1,J)
19         ZUR = Z(1,J + 1)
      C

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```

20      DO 40 I = 2, IXPT
21          XL = XR
22          XR = X(I)
23          ZLL = ZLR
24          ZUL = ZUR
25          ZLR = Z(I,J)
26          ZUR = Z(I,J + 1)
27          ZMIN = AMIN1(ZLL,ZUL,ZLR,ZUR)
28          IF (ZMIN .GT. CZMAX) GO TO 40
29          ZMAX = AMAX1(ZLL,ZUL,ZLR,ZUR)
30          IF (ZMAX .LT. CZMIN) GO TO 40
31          IF (ZMAX .EQ. ZMIN) GO TO 40

C
32      DO 20 CONCNT = 1, NC
33          ZO = CZ(CONCNT)
34          IF (ZO .LT. ZMIN) GO TO 20
35          IF (ZO .GT. ZMAX) GO TO 40
36          LOWER = CONCNT
37          UPPER = LOWER
38          IF (UPPER .EQ. NC) GO TO 30
39          CCP1 = CONCNT + 1

C
40      DO 10 II = CCP1, NC
41          IF (ZMAX .LT. CZ(II)) GO TO 30
42          UPPER = II
43      10  CONTINUE

C
44      GO TO 30
45      20  CONTINUE

C
46      30  CALL CTQQ(CZ, NC)
47      40  CONTINUE

C
48      50  CONTINUE

```

```

C
49      RETURN
C      *****

51      SUBROUTINE CTQQ(CZ, NC)
C      *****

C      CTQQ GENERATES CONTOUR LINE SEGMENTS WITHIN A CELL
C      USING LINEAR INTERPOLATION. THE INTERPOLATION IS
C      PERFORMED ALONG EACH OF THE FOUR EDGES OF THE CELL,
C      AS WELL AS ALONG THE SEGMENTS JOINING EACH CORNER
C      TO THE CENTER OF THE CELL, WHICH IS ASSIGNED A
C      VALUE EQUAL TO THE AVERAGE OF THE VALUES OF THE
C      CORNERS. IN ALL, THERE ARE EIGHT POSSIBLE LINE
C      SEGMENTS ALONG WHICH POINTS MAY BE GENERATED,
C      WHICH PROVIDES SMOOTHER CONTOUR LINES.
C
C
52      REAL CZ(NC)
53      LOGICAL KCHK(8), CENTER
54      REAL PX(8), PY(8), PTEMP
55      EQUIVALENCE (PX(1),PX1), (PX(2),PX2), (PX(3),PX3), (PX(4),PX4),
1        (PX(5),PX5), (PX(6),PX6), (PX(7),PX7), (PX(8),PX8)
56      EQUIVALENCE (PY(1),PY1), (PY(2),PY2), (PY(3),PY3), (PY(4),PY4),
1        (PY(5),PY5), (PY(6),PY6), (PY(7),PY7), (PY(8),PY8)
57      INTEGER*2 PTR(1)
C
58      COMMON /CONCOM/ LOWER, UPPER, XL, XR, XC, YL, YU, YC, ZLL, ZUL,
1        ZLR, ZUR
59      INTEGER*4 LOWER, UPPER
C
C
C
C

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60      XC = 0.5 * (XL + XR)
61      XLMXR = XL - XR
62      XLNXC = XL - XC
63      XRMXC = XR - XC
64      YLMYC = YL - YC
65      YLMYU = YL - YU
66      YUMYC = YU - YC
67      ZC = 0.25 * (ZLL + ZUL + ZLR + ZUR)
      C
68      DO 420 LEVEL = LOWER, UPPER
69          ZO = CZ(LEVEL)
70          TLL = ZLL - ZO
71          TUL = ZUL - ZO
72          TLR = ZLR - ZO
73          TUR = ZUR - ZO
74          TC = ZC - ZO
      C
75          IC = 0
76          CENTER = .FALSE.
      C
77          DO 10 M = 1, 8
78              KCHK(M) = .FALSE.
79      10 CONTINUE
      C
      C SEGMENT 1:
      C
80          IF (TLL*TLR .GT. 0.) GO TO 130
81          KCHK(1) = .TRUE.
82          IF (TLL*TLR .EQ. 0.) GO TO 20
83          IC = IC + 1
84          PX(IC) = TLL * XLMXR / (ZLR - ZLL) + XL
85          PY(IC) = YL
86          GO TO 120
87      20 CONTINUE

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C

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88      IF (TLL .EQ. 0.) GO TO 90
89      IC = IC + 1
90      PX(IC) = XR
91      PY(IC) = YL
92      GO TO 110
93      90 CONTINUE
94      IC = IC + 1
95      PX(IC) = XL
96      PY(IC) = YL
97      IF (TLR .NE. 0.) GO TO 100
98      IC = IC + 1
99      PX(IC) = XR
100     PY(IC) = YL
101     100 CONTINUE
102     GO TO 110
103     110 CONTINUE
104     GO TO 120
105     120 CONTINUE
106     130 CONTINUE

```

C

C

C

SEGMENT 2:

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107     IF (TLL*TC .GT. 0.) GO TO 170
108     KCHK(2) = .TRUE.
109     IF (TLL*TC .EQ. 0.) GO TO 140
110     IC = IC + 1
111     FAC = TLL / (ZC - ZLL)
112     PX(IC) = XLMXC * FAC + XL
113     PY(IC) = YLMYC * FAC + YL
114     GO TO 160
115     140 CONTINUE
116     IF (TC .NE. 0.) GO TO 150
117     CENTER = .TRUE.

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```

118      IC = IC + 1
119      PX(IC) = XC
120      PY(IC) = YC
121 150 CONTINUE
122      GO TO 160
123 160 CONTINUE
124 170 CONTINUE

C
C  SEGMENT 3:
C
125      IF (TUL*TLL .GT. 0.) GO TO 210
126      KCHK(3) = .TRUE.
127      IF (TUL*TLL .EQ. 0.) GO TO 180
128      IC = IC + 1
129      PX(IC) = XL
130      PY(IC) = TLL * YLMYU / (ZUL - ZLL) + YL
131      GO TO 50
132 180 CONTINUE
133      IF (TUL .NE. 0.) GO TO 190
134      IC = IC + 1
135      PX(IC) = XL
136      PY(IC) = YU
137 190 CONTINUE
138      GO TO 50
139 50 CONTINUE

C
140 210 CONTINUE

C
C  SEGMENT 4:
C
141      IF (TUL*TC .GE. 0.) GO TO 220
142      KCHK(4) = .TRUE.
143      IC = IC + 1
144      FAC = TUL / (ZC - ZUL)

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145      PX(IC) = XLMXC * FAC + XL
146      PY(IC) = YUMYC * FAC + YU
147      220 CONTINUE
C
C      SEGMENT 5:
C
148      IF (TUL*TUR .GT. 0.) GO TO 260
149      KCHK(5) = .TRUE.
150      IF (TUL*TUR .EQ. 0.) GO TO 230
151      IC = IC + 1
152      PX(IC) = TUL * XLMXR / (ZUR - ZUL) + XL
153      PY(IC) = YU
154      GO TO 250
155      230 CONTINUE
156      IF (TUR .NE. 0.) GO TO 240
157      IC = IC + 1
158      PX(IC) = XR
159      PY(IC) = YU
160      240 CONTINUE
161      GO TO 250
162      250 CONTINUE
163      260 CONTINUE
C
C      SEGMENT 6:
C
164      IF (TUR*TC .GE. 0.) GO TO 270
165      KCHK(6) = .TRUE.
166      IC = IC + 1
167      FAC = TUR / (ZC - ZUR)
168      PX(IC) = XRMXC * FAC + XR
169      PY(IC) = YUMYC * FAC + YU
170      270 CONTINUE
C
C      SEGMENT 7:
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C
171      IF (TLR*TUR .GE. 0.) GO TO 280
172      KCHK(7) = .TRUE.
173      IC = IC + 1
174      PX(IC) = XR
175      PY(IC) = TUR * YLMYU / (ZUR - ZLR) + YU
176      280 CONTINUE

C
C      SEGMENT 8:
C
177      IF (TLR*TC .GE. 0.) GO TO 290
178      KCHK(8) = .TRUE.
179      IC = IC + 1
180      FAC = TC / (ZC - ZLR)
181      PX(IC) = XRMXC * FAC + XC
182      PY(IC) = YLMYC * FAC + YC
183      290 CONTINUE

C
C      NOW DERIVE THE LINE SEGMENTS TO BE DRAWN FROM THE CONTENTS
C      OF THE PX AND PY ARRAYS.
C
184      IF (IC .LE. 1) GO TO 410
185      IF (IC .GE. 6 .OR. (IC .EQ. 5 .AND. CENTER)) GO TO 360
186      IF ( .NOT. KCHK(8)) GO TO 330

C
187      DO 320 L = 1, 7
188      IF ( .NOT. KCHK(L)) GO TO 310
189      PX(IC + 1) = PX(L)
190      PY(IC + 1) = PY(L)

C
191      DO 300 M = 1, IC
192      PX(M) = PX(M + 1)
193      PY(M) = PY(M + 1)
194      300 CONTINUE

```

```

C
195     IF (MOD(L,2) .EQ. 1) GO TO 330
196 310 CONTINUE
197 320 CONTINUE
C
198     GO TO 340
199 330 IF (.NOT. CENTER .OR. KCHK(1)) GO TO 340
200     PTEMP = PX1
201     PX1 = PX2
202     PX2 = PTEMP
203     PTEMP = PY1
204     PY1 = PY2
205     PY2 = PTEMP
206     GO TO 340
207 340 CONTINUE
208     CALL CKMA(PX1, PY1)
C
209     DO 350 M = 2, IC
210         PXM = PX(M)
211         PYM = PY(M)
212         CALL CKVA(PXM, PYM)
213 350 CONTINUE
C
214     GO TO 400
215 360 CONTINUE
216     IF (IC .GE. 6) GO TO 370
217     PX6 = PX5
218     PY6 = PY5
219     PX5 = PX2
220     PY5 = PY2
221 370 CONTINUE
222     IF (KCHK(2)) GO TO 380
223     CALL CKMA(PX5, PY5)
224     CALL CKVA(PX6, PY6)

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225      CALL CKVA(PX1, PY1)
226      CALL CKMA(PX2, PY2)
227      CALL CKVA(PX3, PY3)
228      CALL CKVA(PX4, PY4)
229      GO TO 390
230 380 CONTINUE
231      CALL CKMA(PX1, PY1)
232      CALL CKVA(PX2, PY2)
233      CALL CKVA(PX3, PY3)
234      CALL CKMA(PX4, PY4)
235      CALL CKVA(PX5, PY5)
236      CALL CKVA(PX6, PY6)
237      GO TO 390
238 390 CONTINUE
239      GO TO 400
240 400 CONTINUE
241 410 CONTINUE
242 420 CONTINUE
243      C
      C      RETURN
      C
245      SUBROUTINE CKMA(PT1, PT2)
      C
      C      CKMA TRANSFORMS THE POINT ON THE CONTOUR SEGMENT
      C      ACCORDING TO THE PROJECTION SPECIFIED AND MOVES
      C      WITHOUT DRAWING TO THAT POINT.
      C
246      COMMON /B/ LATHIN, LATMAX, LONMIN, LONMAX, MP
247      DATA PI /3.14159256/
      C
248      PT1 = PT1 * PI / 180.
249      PT2 = PI / 2. - (PT2*PI/180.)
250      CALL TRANFM(PT1, PT2, 1)

```

251
252
253

CALL PENUPS(PT1, PT2)
RETURN
END

```

1      SUBROUTINE CKVA(PT1, PT2)
      C
      C CKVA TRANSFORMS THE POINT ON THE CONTOUR SEGMENT
      C ACCORDING TO THE PROJECTION SPECIFIED AND DRAWS
      C TO THAT POINT FROM THE LAST POINT.
      C
2      COMMON /B/ LATMIN, LATMAX, LONMIN, LONMAX, MP
3      DATA PI /3.14159256/
      C
4      PT1 = PT1 * PI / 180.
5      PT2 = PI / 2. - (PT2*PI/180.)
6      CALL TRANFM(PT1, PT2, 1)
7      CALL PENDNS(PT1, PT2)
8      RETURN
9      END

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