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DEVELOPMENT OF TECHNIQUES FOR SHORT-RANGE PRECIPITATION FORECAS--ETC(U)
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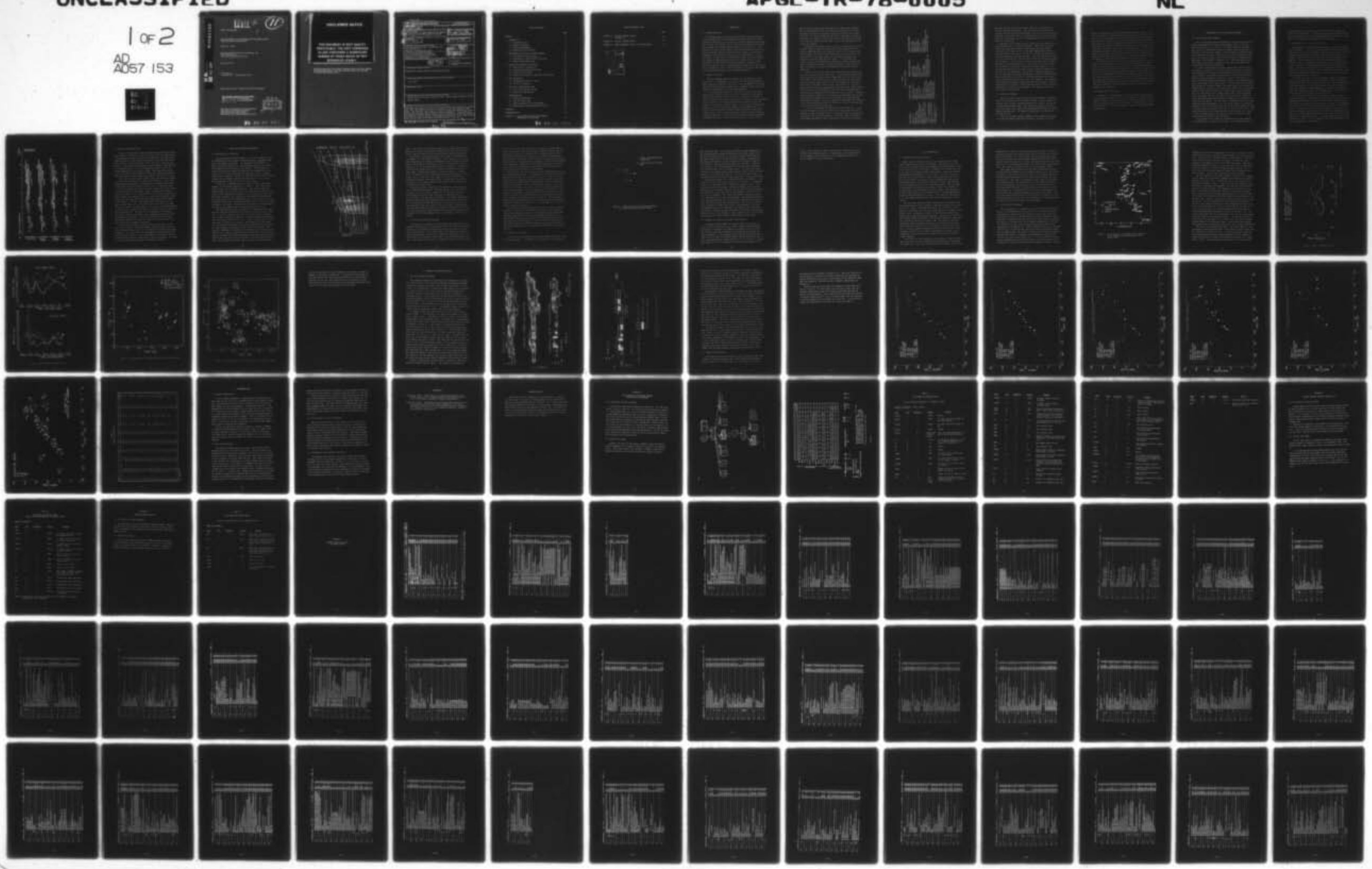

AFGL-TR-78-0005

DEVELOPMENT OF TECHNIQUES FOR SHORT-RANGE PRECIPITATION FORECASTS

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December 1977

Final Report
1 January 1977 - 30 September 1977

Approved for public release; distribution unlimited

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REPORT DOCUMENTATION PAGE

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1. REPORT NUMBER: AFGL-TR-78-0005	2. GOVT ACCESSION NO.
	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle): DEVELOPMENT OF TECHNIQUES FOR SHORT-RANGE PRECIPITATION FORECASTS	5. TYPE OF REPORT & PERIOD COVERED: Final 1 Jan [redacted] - 30 Sep [redacted]
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s): Robert K. Crane	8. CONTRACT OR GRANT NUMBER(s): F19628-77-C-0058
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Environmental Research & Technology, Inc. 696 Virginia Road Concord, Massachusetts 01742	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: 62101F 667203AD
11. CONTROLLING OFFICE NAME AND ADDRESS: Air Force Geophysics Laboratory Hanscom AFB, Massachusetts 01731 Monitor/A.C. Chmela/LYW	12. REPORT DATE: Dec[redacted] 1977
	13. NUMBER OF PAGES: 180
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office): 179 p.	15. SECURITY CLASS. (of this report): Unclassified
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

391 776

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

weather radar, echo areas, convective cells, severe storms, tangential shear, Doppler spread

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Algorithms were developed for the detection and tracking of reflectivity, tangential shear, and Doppler spread cells as detected by a single Doppler weather radar. The previously developed cell detection program was extensively revised to increase speed and reduce computer storage requirements. A new volume cell detection and tracking program was developed to combine the radar data obtained on successive scans to provide a three-dimensional analysis of the radar detected cells and to establish the motion and time histories of the cells.

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TABLE OF CONTENTS

	Page
ABSTRACT	1
1. INTRODUCTION	5
1.1 Program Objectives	5
1.2 Summary of Results	5
1.3 Software Development	8
1.4 Organization of the Report	9
2. IMPROVEMENTS TO THE CELL DETECTION PROGRAM	10
2.1 Cell Detection Logic Changes	10
2.2 Refinements in Velocity Data Processing	11
2.3 Doppler Spread Processing	13
3. VOLUME CELL DETECTION AND TRACKING	14
3.1 Definition of a Volume Cell	14
3.2 Detection and Tracking Algorithms	16
3.3 Volume Cell Attributes	17
3.4 Software for Volume Cell Detection and Tracking	19
4. CELL FORECASTING	21
4.1 Extrapolation Along Cell Tracks	21
4.2 New Cell Development	22
5. ANALYSIS OF SELECTED DATA SETS	30
5.1 Use of the Computer Programs	30
5.2 Volume Cell Observations	33
6. RECOMMENDATIONS	42
6.1 Parameter Optimization	42
6.2 Real Time Processing	42
6.3 Spatial Analysis of Cell Development	43
6.4 Morphological and Climatological Analysis	43
REFERENCES	44
ACKNOWLEDGEMENTS	45
APPENDIX A: CELL DETECTION AND TRACKING PROGRAM INSTRUCTIONS FOR OPERATION	A-1

TABLE OF CONTENTS (cont)

		Page
APPENDIX B:	PLOTTING PROGRAM 'EXPAND' (VERSION 1.0)	B-1
APPENDIX C:	TRACKING PROGRAM (ASOCCL)	C-1
APPENDIX D:	COMPUTER PROGRAM LISTINGS AND SAMPLE OUTPUT	D-1

1. INTRODUCTION

1.1 Program Objectives

The ultimate goal of the work reported herein is the development of a real-time method for the short-range (0-20 minute) forecast of storm development and motion. The initial step in this program was the development of objective techniques for the efficient representation of information obtained from a single Doppler weather radar (Crane, 1977). The radar data are processed to obtain fixed and peak referenced reflectivity contours and peak referenced tangential shear contours. The essential information contained in the contour data are represented by a set of attributes. In this report, we consider the second step in the program, the assembly of data obtained from a set of radar scans into a set of attributes that characterize the three-dimensional structure of the small precipitation cells and surrounding echo regions, their motion, and their development in time. Initial consideration is given to the problem of forecasting precipitation cell development and motion.

1.2 Summary of Results

The work performed under this contract was concentrated in three major areas: (a) improvement to the cell detection program developed under the previous contract (Crane, 1977), (b) development of the volume cell detection and tracking program, and (c) preparatory data analysis to support the development of cell forecast algorithms.

The cell detection program was extensively revised to reduce the amount of core storage required for some of the integer arrays used in peak referenced contour analysis; to process reflectivity, tangential shear, and Doppler spread data simultaneously; to include spread information in the reflectivity and tangential shear peak attributes; to use the relatively spiky nature of ground clutter as an aid in rejecting ground clutter; to resolve automatically Doppler velocity ambiguities using radial velocity data from resolution elements adjacent in range and in azimuth; and to vary the quantization steps used in the peak referenced contouring operation. In the process of revising the program additional refinements were made in the cell detection logic to correct several defects detected using actual radar data and to improve the technique used to store temporarily the peak referenced contour data to increase the speed of the processing algorithm and reduce overall core storage. At present, the entire program required for the simultaneous processing of reflectivity, tangential shear, and Doppler spread data fits into the core storage available on the CDC 6600; a result not anticipated at the start of the program.

The program is currently relatively slow in operation due to (1) the extensive number of input and output tape or disk operations used to read the input radar data, store data for plotting, store data for subsequent volume cell detection and tracking and to store data for B scan printouts and (2) the large number of bit manipulation operations required to pack and unpack data for storage. A considerable time savings can still be accomplished by reducing the amount of output data and by rewriting the program in assembler language to reduce the time spent in subroutine calls for bit manipulation and indirect storage addressing.

A volume cell detection and tracking algorithm was developed to combine the data from successive radar scans. The fixed and peak referenced contouring operations are performed independently for each azimuth scan of the radar. The reflectivity cells (peak referenced) are associated from one elevation angle to the next to form a volume cell and from one volume cell to the next to form a track. The reflectivity cells are used to identify the basic organization of the radar data. Fixed contours that enclose associated reflectivity cells are used to determine the 3-dimensional echo envelope for the reflectivity cell (or cells). Tangential shear and Doppler spread cells are likewise associated from scan-to-scan; associated with reflectivity cells (if possible); and identified with fixed contour envelopes. The lowest threshold fixed contour that encloses each of the reflectivity, shear, or spread cells is used to tag that cell to aid in the association processing.

A new set of attributes are developed for each volume cell. A list of these attributes are given in Table I for fixed contours and for reflectivity, shear, and spread cells. The attributes to be calculated for each volume cell are readily modified. The basic volume cell detection and tracking algorithm is used to perform the scan-to-scan association.

TABLE I

VOLUME CELL ATTRIBUTES

Fixed Contours	Reflectivity Peaks	Tangential Shear Peaks	Doppler Spread Peaks
Surface Area	Reflectivity at Peak	Shear at Peak	Spread at Peak
Echo Top	Height of Peak	Height of Peak	Height of Peak
Enclosed Volume	Height of Top	Height of Top	Height of Top
Centroid Location*	Height of Base	Height of Base	Height of Base
Total Surface Precipitation	Centroid Location*	Centroid Location*	Centroid Location*
Average Surface Rain Rate	Area at Peak	Area at Peak	Area at Peak
Average Reflectivity	Volume	Volume	Volume
Maximum Enclosed Peak Values	Area at Surface	Area at Surface	Area at Surface
Profile of Areas vs Centroid Heights	Reflectivity at Surface	Shear at Surface	Spread at Surface
Profile of Average Reflectivity vs Centroid Heights	Average Tangential Shear	Average Velocity Spread	Associated Reflectivity Peaks
Number of Enclosed Peaks (by type)	Average Radial Shear	Associated Reflectivity Peaks	Associated Shear Peaks
Nearest Neighbor Distances for Enclosed Cells	Average Vertical Shear	Associated Spread Peaks	
	Average Velocity Spread		
	Associated Shear Peaks		
	Associated Spread Peaks		

*Centroid Locations are Defined on the Surface Using Data from the Lowest Possible Elevation Angle

When data from two scans are associated, they can be used readily to calculate any desired attribute. The lists given in Table I are preliminary in nature covering the parameters we currently expect to be most important in subsequent analyses. Experience with the use of these programs for a larger data set will be required before a final set of attributes can be specified.

Experience with a larger data set is required as a prerequisite to the development of cell forecast algorithms. Crane (1976) processed reflectivity data from a number of radar scans obtained at Wallops Island during the summer of 1973 by the Johns Hopkins Applied Physics Laboratory (APL) in the process of initially establishing the utility of the peak referenced contouring technique. These data were used by Crane (1976) to investigate cell lifetime and possible cell tracking/extrapolation techniques. In this study, we used the same data set to determine the relative spacings between cells. The object of the spacing study was to determine if preferred spacings are evident in nature. If so, the preferred structure can be used to forecast the most probable location for new cell development. The ability to forecast locations for new cell development would add significantly to the 0-20 minute forecast because the median cell lifetime is less than 20 minutes and forecasting by extrapolation along a cell track is not adequate. An examination of the Wallops Island data revealed that the nearest neighbor distances between cells were between 7 and 9 km and that these distance values did not depend on the type of rain observed. This suggests that new cell site forecasts are feasible.

1.3 Software Development

The goal of this contract with the Air Force Geophysics Laboratory (AFGL) is to provide efficient computer software to obtain parameters to represent the essential information obtained in a sequence of scans of a single Doppler weather radar. The radar used to provide the data is the C-band Doppler radar operated by the Weather Radar Branch of AFGL at Sudbury, Massachusetts. The computer programs were prepared for the CDC-6600 at AFGL.

There are now three separate programs in the sequence of programs to be used for weather radar data processing. The first is the cell detection program which was developed under the previous contract (Crane, 1977) and extensively modified during the course of this contract. The second is a plotting program used to display contours and cell centroids. This program was developed under the previous contract and modified under this contract to display separately the locations of the centroids of the fixed echo regions and the centroids for each of the peak detected cells - reflectivity, tangential shear, and Doppler spread cells. The third program detects and tracks volume cells. It was developed under this contract. This program uses data generated by the cell detection program to develop three-dimensional cells and to describe their location, height and intensity. The volume cell attributes are listed in Table 1.

The ultimate goal of this work will be the development of real-time radar processing techniques to be used on a dedicated computer system that is an integral part of the radar system. The programs generated to date on the current contract are exploratory in nature. They were designed to fit within the core storage limitations of the CDC-6600 computer but still have a high degree of flexibility in modifying storage array sizes and in providing auxilliary output for testing the program. The program design had real-time processing in mind and, in the end, should be reasonably efficient when tailored to an on-site computer system. Listing and operating instructions for the programs developed on this contract are included in the appendices.

1.4 Organization of the Report

A summary of the modifications to the cell detection program and plotting program is given in Section 2. A description of the volume cell detection program is given in Section 3. Initial consideration of the cell forecasting problem is given in Section 4. Sample outputs are provided in Section 5. Section 6 summarizes progress to date and provides recommendations.

2. IMPROVEMENTS TO THE CELL DETECTION PROGRAM

2.1 Cell Detection Logic Changes

The cell detection program was modified to include the detection of Doppler spread peaks and to pack integer addresses used in the peak detection routine six to a CDC word. The latter change was required to make room for the additional data used in Doppler spread processing. In the process of revising the address storage procedure, a number of minor logic errors were detected. These errors were associated with the operation of the radial-to-radial association of contours at different threshold levels (see Section 5.2 of Crane, 1977). The errors have been corrected and, in the process, changes were also made to streamline the storage of the temporary contour data.

At present, the temporary attribute storage array (TATR in subroutine PEAKD, see Appendix D) is used to identify active cells at each possible threshold level (relative to the peak level for the cell) and to store pointers to previously associated active cells as well as provide partial attribute summations for the active cells. The TATR array is doubly subscripted maintaining temporary storage for the number identification of the peak for the active cells. For each active cell the stored data includes the current estimate of the peak value; a set of partially summed attribute values for each of the nested contours for each possible threshold level below the peak, area, average value, centroid location plus, for reflectivity cells, Doppler spread, radial shear, tangential shear, and radial velocity; the azimuth count for the last azimuth on which the attributes for each contour were updated; and a pointer to the enclosing fixed contour. This last item is included for later use in the volume cell detection program. If a cell is not active at a particular threshold level but was previously active on the current radial, the area attribute contains a pointer to the cell, now active at that level. After processing the data for a radial the cell-to-cell pointers are zeroed. If a cell becomes inactive, all pointers to that cell are also zeroed before processing data for the next radial.

The program as it now sands is configured to allow rapid changes in the dimensions of all the storage arrays. This convenience costs in producing relatively longer processing times than for a program with fixed storage allocations. A final program modification should be made when the exploratory runs of the computer program are finished to fix the array sizes and optimize the program for rapid operation.

2.2 Refinements in Velocity Data Processing

The program was modified to provide automatic resolution of Doppler velocity ambiguities. The first detected velocity data for each scan is assumed to be in the velocity interval spanning zero velocity. Successive observations at different but adjacent range or azimuth locations are assumed to differ from the first observation by less than the velocity ambiguity. If the difference is larger, it is adjusted so that it is smaller by adding or subtracting a value equal to the velocity ambiguity ($\lambda/2 \cdot PRF$ where λ is the wavelength and PRF is the pulse repetition frequency). The data for each radial are then reexamined to ensure that each velocity observation differs from the average of the velocity values for the two surrounding range intervals by less than the velocity ambiguity and adjusted again if required.

The above processing is used for contiguous range and azimuth elements. If large spacings exist between regions of radar data above the processing threshold, the first data point in one region is compared with the average velocity for the previous region. The data therefore are objectively adjusted to remove ambiguities. Provision is provided to reject data from this analysis if the Doppler spread is not within preset bounds but this option has not been exercised.

The processed data appear to be reasonably smoothly varying as indicated in Figure 1. The tangential shear data obtained by numerically differentiating the radial velocity data are however, more variable as illustrated in the figure. The apparent noise evident in the tangential shear field led to the inclusion of Doppler spread data in the analysis process. The program was also modified to introduce a new constant to specify the quantization interval for peak detection contouring. By setting this constant, additional control is exercised over the peak detection process. Referring to Figure 1, no peaks would be detected if the quantization step is 1 m/s but a number of peaks are detected for a 0.1 m/s quantization step (see Section 5).

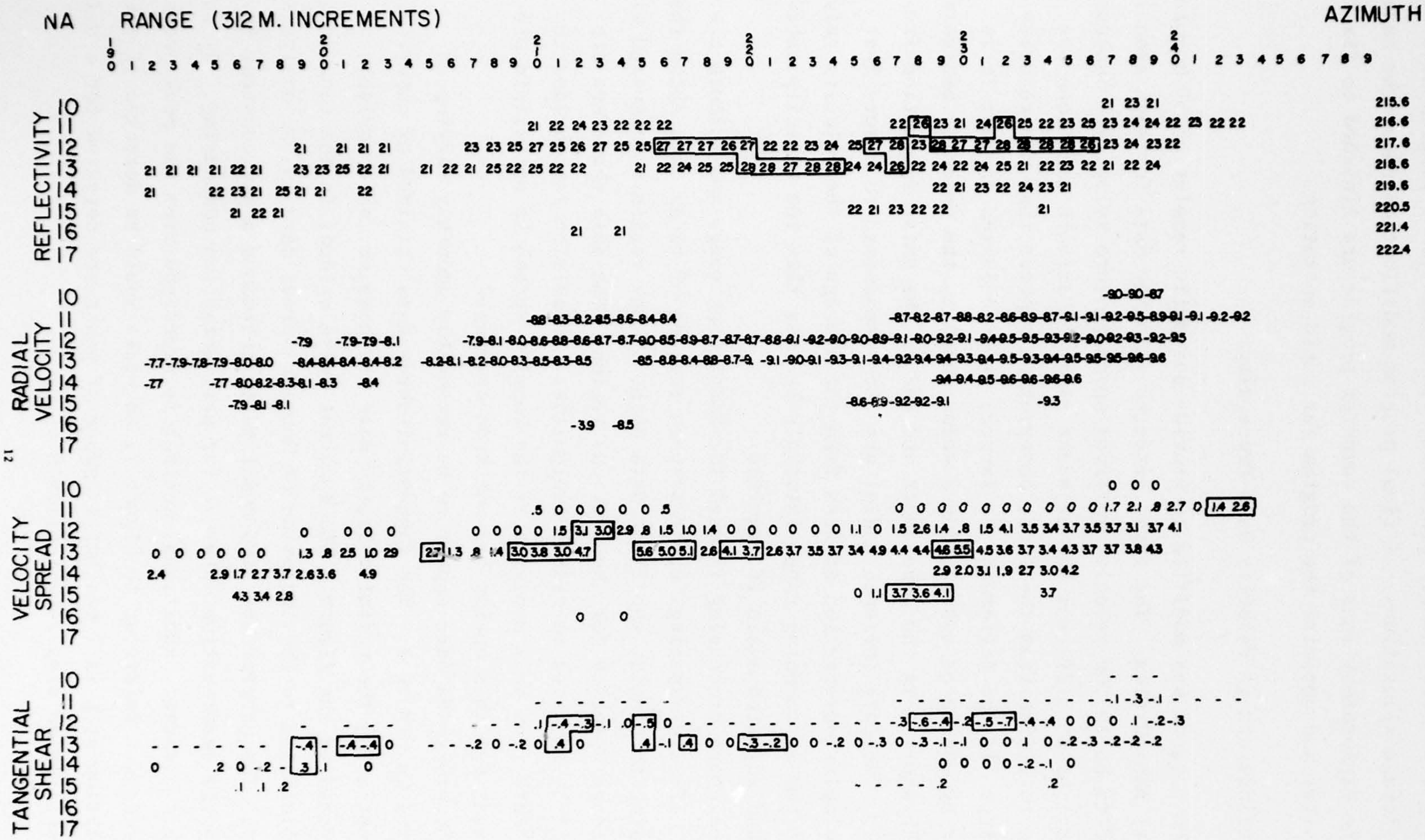


Figure 1 Sample Data Set Including Two Fixed Contour Echo Areas and Three Reflectivity Peaks

2.3 Doppler Spread Processing

Velocity variance data may now be routinely processed using the computer program. Facilities to analyze this data field were added because of the apparently high noise levels in the tangential shear data and the expectation that at high signal-to-noise ratios, the spread data may be more reliable. As discussed before (Crane, 1977), the spread data are assumed to contain the same information as the tangential shear data due to the dominant effect of velocity fluctuations on the scale of the antenna beamwidth at the observation range. Both data fields are now processed to allow an intercomparison between the information available from each field and to investigate their relative sensitivity to noise.

The velocity variance output from the pulse pair processor is known to be adversely affected by low signal-to-noise ratios. A noise level dependent threshold parameter is provided for thresholding the velocity variance data but has not been exercised as yet. To reduce the sensitivity of the variance data due to noise, the square root of the variance is used for analysis of the Doppler spread. A sample of this data is depicted in Figure 1. It is noted that the velocity data, radial velocity, Doppler spread, and tangential shear, are processed only when the reflectivity values are above the lowest (processing) threshold level which, for this figure, is 20 dBZ. High Doppler spreads are evident in two regions of the figure, (1) at low reflectivity values and (2) at high reflectivity values. The high spreads at low values are presumably caused by signal-to-noise problems and should be suppressed using the signal-to-noise threshold level. The high values corresponding to the higher reflectivity values are presumably real, although the correlation with the tangential shear values is not good for the data in this figure. A larger data sample must be analyzed to optimize the processing of tangential shear and/or Doppler spread data.

Modifications for Doppler spread processing were made in several areas of the program. The largest change included the addition of temporary attribute storage arrays for the detection of Doppler spread peaks. In addition, the reflectivity peak and tangential shear peak detection algorithms were changed to increase the number of attributes so the average Doppler spread within a detected cell could be determined. This attribute is now listed with the others as described in Section 5.

3. VOLUME CELL DETECTION AND TRACKING

3.1 Definition of a Volume Cell

The cell detection program provides, as one of its outputs, a list of attributes for fixed contours, reflectivity peaks, tangential shear peaks, and Doppler spread peaks. At a minimum, each attribute list defines the average value, area, and centroid location of each cell for each azimuth scan of an elevation scan sequence. The expected scan sequence for the radar includes azimuth scans (or azimuth sectors in a raster scan) at successively higher elevation angles until a complete volume scan is completed. The data for each elevation or tilt of the scan sequence must be combined with the data from other tilts to provide a three-dimensional picture of each cell or echo volume.

The process of combining data from scan to scan in a volume scan sequence is illustrated schematically in Figure 2. This figure represents a height section through three cells. The contours represent quantized data (e.g. reflectivity data in 1 dB steps) that have been processed on each azimuth scan to produce a set of reflectivity peak cells. The minimum attribute set is identified by the length of the heavy bar (detected length or in three-dimensions, the cell area) and its location (centroid) on each tilt. The data obtained for the lowest tilt is assumed to extend to the surface. The height of the centroid is determined from the range to the centroid and the elevation angle for the scan.

The three-dimensional cell or volume cell is defined by the volume enclosed within the peak detected cells that are associated from scan-to-scan. A criterion similar to the one used to define a peak referenced cell is used to define the volume cell. From the sequence of attributes for cells detected scan-to-scan, cells 1, 2 and 3 on this figure, a peak value and its height may be selected. The top and base of the volume cell are defined by the height at which the reported average value drops the required number of quantization units below the peak value. This height is determined by extrapolation if detected cells are obtained for each tilt or is taken as halfway between the height of a value above the required threshold and the expected height of the intersection of the cell with the next tilt plane if no associated cell was detected on the next scan. The locations of the peaks, tops, and bases are depicted on the

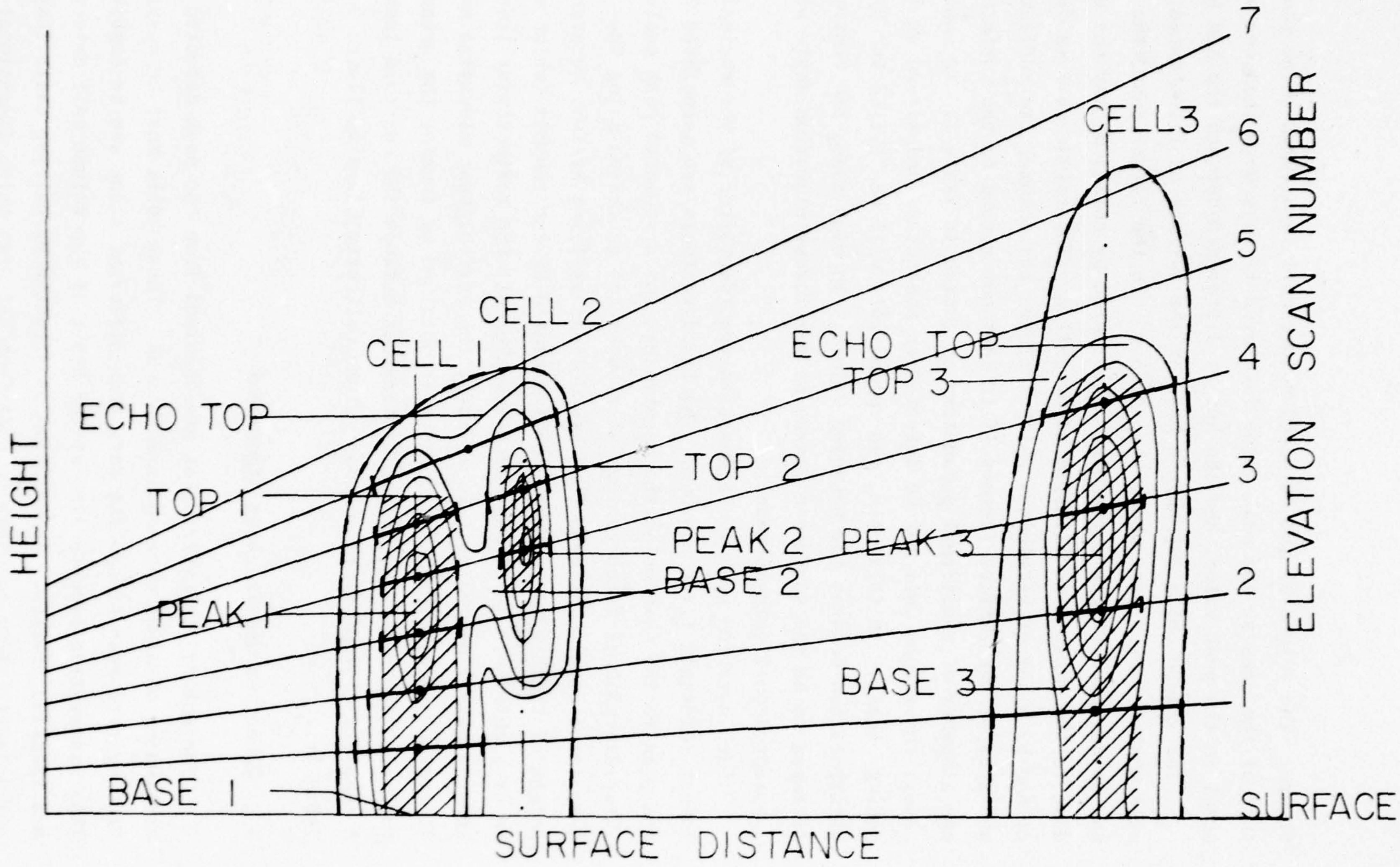


Figure 2 Illustration of Scan-to-Scan Data Association in a Volume Scan Sequence

figure. The volume of the detected volume cell is assumed to be the product of the area at the peak value (averaged if have more than one value equal to the peak value) and the height difference between top and base.

The volume cells may have a base at the surface as illustrated by cell number 1 or a base above the surface. In the latter case, the cell may be detected at the surface as illustrated by cell 3 or may not extend down to the surface as illustrated by cell 2. The volume cell is described by a set of attributes which includes its volume, its reflectivity and area at the surface (zeroes if it does not extend to the surface) and a number of additional parameters as listed in Table I. In some cases, the volume cell may be detected on some scans and missed on intervening scans. In this case, the volume cell will be "filled in" by interpolation between the measured values. In each case, the centroid is taken to be the surface distance at the lowest elevation angle with a detected cell (single scan).

Each detected peak is tagged with the identifier of the enclosing lowest threshold fixed contour. The fixed contours are associated from one scan to the next using the identifiers for associated peak cells. Three-dimensional fixed contour attributes are generated using the associated data. The echo tops are defined as lying halfway between the height of the highest detected peak enclosed by the contour (which may be at a threshold level many dB below the cell top reflectivity level) and the height of the cell location at the next highest elevation angle. The volume within the fixed contour is obtained by summing the areas on each scan and using the height differences between the centroid locations. A complete list of fixed contour volume cell attributes is listed in Table I.

3.2 Detection and Tracking Algorithms

The volume cell attributes are obtained from the peak detected cell attributes obtained on each azimuth scan. These cells must be associated from scan-to-scan before the data from different scans can be combined. This association process lies at the heart of the volume cell detection and tracking process. Association is affected by pairing cells that are sufficiently close together to come from the same three-dimensional structure. The location of the contours surrounding each peak is not available for use by the association algorithm. Association is accomplished by first selecting cells from each scan whose centroid locations, when projected on the surface, are separated by less than the square root of the combined areas, plus the distance the cell might move during the interval between scans, plus a fixed distance to account for the statistical centroid location uncertainty introduced by the expected variability of the radar data. Comparison is always made between the cell location for a particular scan and the detected volume cell location from the lowest elevation scan on which it was observed.

In most cases, only pairs of cells will be evident from the association algorithm listed above. Occasionally, in a cluster of cells, more than one cell may meet the association criterion. In this case, the cells will be associated by picking those cells which are closest after a uniform offset is made between cell locations to provide the largest number of associations. This is illustrated in Figure 3. In this figure, the cell to be tested, cell A, is closest to the previously detected volume cell number 2, but after translation of the surface locations *relative to each other* by the amount shown by the straight line on the figure, all three cells (lettered) may be associated with the detected cells (numbered) with smaller physical separations. This procedure for conflict resolution (correlation) will be used only when the resultant translation is physically realizable (i.e. corresponds to a possible cell tilt or translation velocity).

The scan-to-scan cell association logic is also used for volume-to-volume scan sequence association for cell tracking. For the tracking problem, the translation analysis for conflict resolution becomes more important and guidance in selecting the appropriate translations is taken either from a prescribed wind vector (700 mb wind for instance) or from the results from the previous scan. The conflict resolution or correlation algorithm is performed separately for large echo regions in that the translation values are allowed to vary from one echo region to the next.

3.3 Volume Cell Attributes

The volume cell attributes were partially defined in Section 3.1 and are listed in Table 1. A different set of attributes is generated for

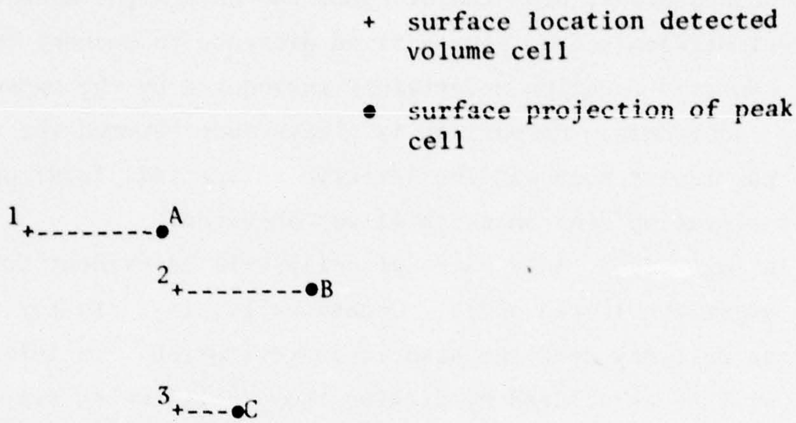


Figure 3 Illustration of Scan-to-Scan Association for Volume Cell Detection and Tracking

each volume cell type. Fixed contour attributes include measurements of the total precipitation produced within the echo region, average rain rates on the surface, profiles of area and of average reflectivity for the data contained within the fixed contour envelope, and summaries of the numbers and locations of peak referenced cells detected within the echo envelope. The peak referenced volume cell attributes include the size, intensity, and location parameters listed above plus information on associated volume cells of different types. The reflectivity peak attributes also include average spread and shear values for data obtained within the cell (between base and top). The vertical shear values are calculated using the variation of the average radial velocity with height.

Each detected volume cell is characterized by its attributes. Each volume cell track by the time variation of its attributes. In addition, tracks may be characterized by a lifetime and average velocity. Observations obtained to date indicate that the individual peak referenced reflectivity cells neither merge nor split but only develop and translate. Observations of a much larger data set are needed to verify this model for small cell behavior. The larger fixed contour regions may merge or split depending upon its stage of development. By tracking the enclosed cells and maintaining the cell to fixed contour identification relationship, the merger, growth, division and decay of the larger echo regions may be automatically taken into account. The morphology of the echo development process may be important to the understanding of precipitation dynamics, however, suitable attributes to characterize the relevant processes have yet to be defined. Again, experience with a significantly larger data set is required before further progress can be made.

3.4 Software for Volume Cell Detection and Tracking

A computer program (TRACK) was generated under this contract to associate cells from scan-to-scan, resolve conflicts between multiple associations and generate the volume cell attributes listed in Table I. The listing is provided in Appendix D and operating instructions are given in Appendix C. The program processes data which have been generated by the cell detection program (EXTRAD) and then recorded on disk or tape; the algorithms described in Sections 3.1 to 3.3 are used. The current output is a list of attributes for each detected volume cell (or track). These outputs are again stored on disk or tape and listed on printout for subsequent analysis. Programs have not been generated as yet to summarize the track histories, do climatological analysis, or provide samples for case study analysis.

4. CELL FORECASTING

4.1 Extrapolation Along Cell Tracks

Short range, 0-20 minute, forecasts are of importance for severe weather warning and weather hazard avoidance. The objective of a forecast on this time (and by implication comparatively small distance) scale is the occurrence of a severe event at a point or over a small area such as an airport or the approach path to the airport. Events such as high winds produced by downbursts or by gust fronts, or regions of intense hail fall are of most interest. Larger time and area forecasts may be made of the probable occurrence of a severe weather event but the problem considered here is the remote detection, tracking, and prediction of the development and decay of a severe weather event. The first parts of the problem, the detection and tracking of small scale features in the radar data, were considered in previous sections. The association of these features with severe weather events is a second problem that is not being considered under this contract. The third part, the forecast of cell development and motion are given initial consideration in this section.

The short range forecast problem considered here is different from most meteorological forecast problems in that the occurrence of at least one cell is assumed. The problems are where will it move, how will it develop in time, where will new ones develop, and will it produce a severe weather event. The measure of success of the forecast procedure must depend upon the particular problem addressed. The success of a cell position forecast should be measured by the distance between its actual position and forecast position at forecast time. The success of the cell development forecast should be measured by the difference between the actual intensity (reflectivity, say) and forecast intensity at forecast time. Classical evaluation procedures that test the occurrence or non-occurrence of the event at a number of geographical locations are not recommended in that the reason for failure of the forecast may not be readily apparent.

Crane (1976) used data obtained by APL at Wallops Island to perform some initial tests of cell tracking/track position forecast algorithms. He assumed that a single cell motion vector would adequately describe the propagation of a field of cells and tested that assumption by measuring the along track and cross track position errors as a function of forecast time (0-20 minutes). His results showed that the forecast error (position) was the order of the cell diameter (median value) at the half life (median lifetime) of the cell. He also found that the half life was of the order of 10 to 15 minutes and the median cell diameter was of the order of 3 km. This result was, however, based on a limited amount of data.

Crane found that the operation of the track extrapolation forecast procedure could be improved by using different motion vectors for different regions of the display area (see Figure 4 for an example showing the different directions possible for cell tracks observed during the same time interval). This idea is incorporated in the volume cell detection and tracking program. The major problem of using extrapolation along a track for forecasting is the relatively short lifetime of most cells. The largest and most intense cells persisted for a relatively long time, 40 to 50 minutes. Except for these cells, the cell could disappear by forecast time and a significant number of new cells could appear. Forecasts based upon cell time histories could be used to estimate cell lifetime but the forecast of new cell site development is a major problem for any radar data based short range forecast procedure.

4.2 New Cell Site Development

The requirement for a procedure to forecast the most probable sites for new cell development and the observation of a seemingly persistant organization or structure for the location of active cells lead to an investigation of the most probable distance or spacing between the cells. The Wallops Island data previously processed by Crane (1976) were used for this analysis. The data consisted of computer prepared maps of detected cell locations for each of the azimuth scans processed from the 1973 summer data set provided by APL. Nearest neighbor distances were obtained from the data to investigate the existence of persistant dominant scales for cell organization. The smallest, second and third shortest distances between each cell and its neighbors were determined and tabulated for each cell for each available volume scan. It is noted that with the processing technique used, the distance between two closely spaced cells is counted twice, each cell being the nearest neighbor of the other. Nearest

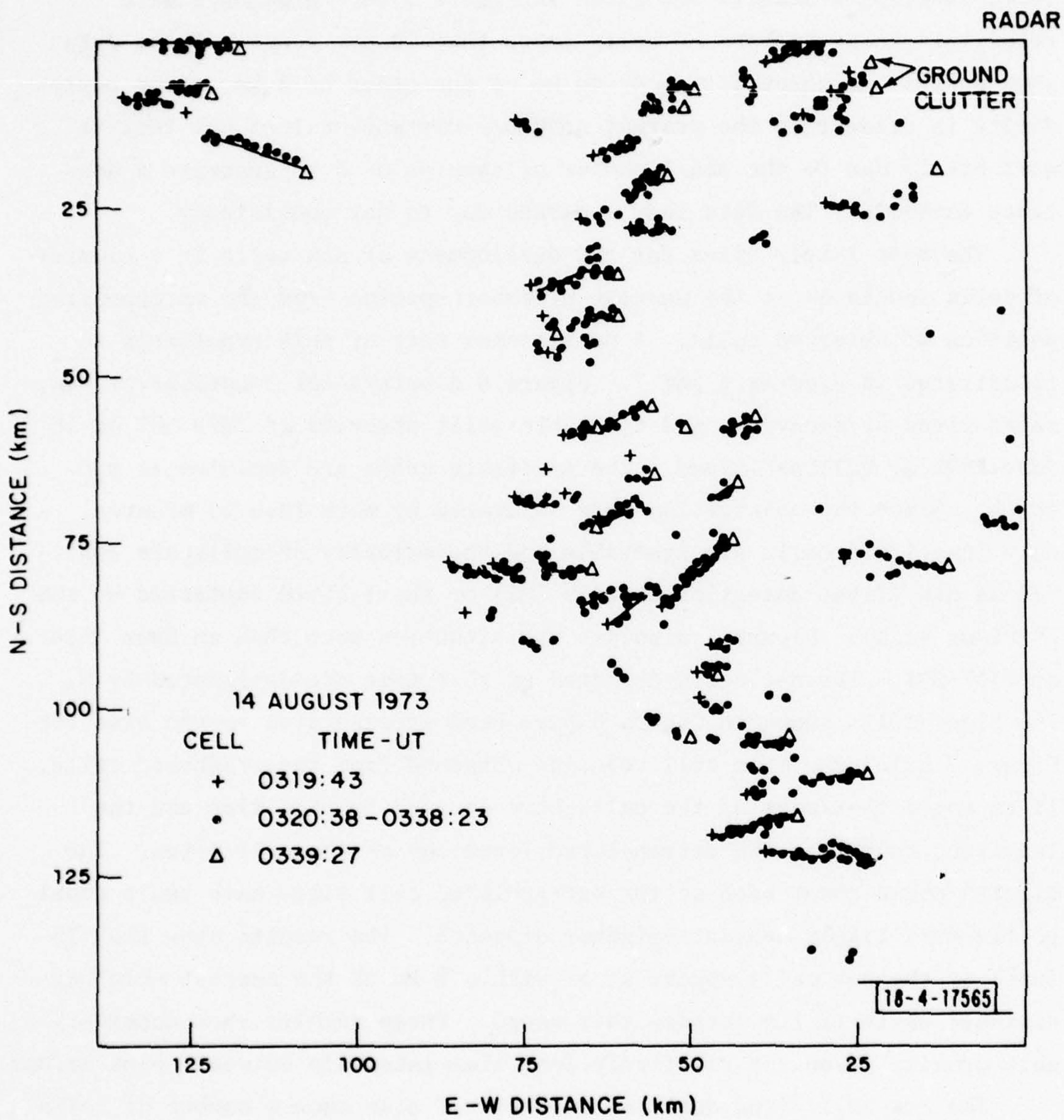


Figure 4 Cell Tracks for a 20-minute Interval Observed by the Wallops Island SPANDAR Radar (from Crane, 1976)

neighbor distributions were generated for each scan. The mode for each distribution was used to estimate the most probable cell spacing for that scan. Time histories of the modal values for the smallest, second and third shortest distances are given in Figure 5 for three days with relatively large numbers of cells (more than 20 per scan). These data show nearest neighbor distances to be on the order of 8 km. Some periodicity is evident in the nearest neighbor distance values but this is most likely due to the small number of samples used to generate a distance estimate. The data show a marked day to day consistency.

The most likely sites for the development of new cells in a cluster of cells should be at the nearest neighbor spacing from the extrapolated position of observed cells. A preliminary test of this hypothesis is illustrated in Figures 6 and 7. Figure 6 displays the locations of new, short-lived or decaying, and trackable cells observed at 2229 GMT on 18 June 1973 at Wallops Island. The trackable cells are depicted at mid-track. Since the observations are separated by more than 20 minutes, only long-lived cells are trackable and the majority of cells are depicted as new (first detection at 2229 GMT) or short-lived (detected on the previous scan). Figure 7 displays the situation more than an hour later, at 2337 GMT. The new cells depicted at this time are designated by N. The older cells shown on Figure 6 have been extrapolated to the time for Figure 7 using the mean cell velocity obtained from the trackable cells. It is noted that most of the cells have decayed by this time and the locations represent the extrapolated locations of the cell sites. The circles drawn about each of the extrapolated cell sites have radii equal to the most likely nearest neighbor distance. The results show that 23 (66%) of the new cells appear at or within 2 km of the nearest neighbor distance while 12 lie outside this range. These results show considerable promise given the relatively long time intervals between observations.

The new cell sites depicted on Figure 7 also show a number of cells approximately spaced from each other by the nearest neighbor distance but not connected to an older cell site. A forecast based upon a more complex pattern using the nearest neighbor distances in a more regular extended structure may be capable of predicting the locations of a larger number of cells. The structure may also reduce the size of the region

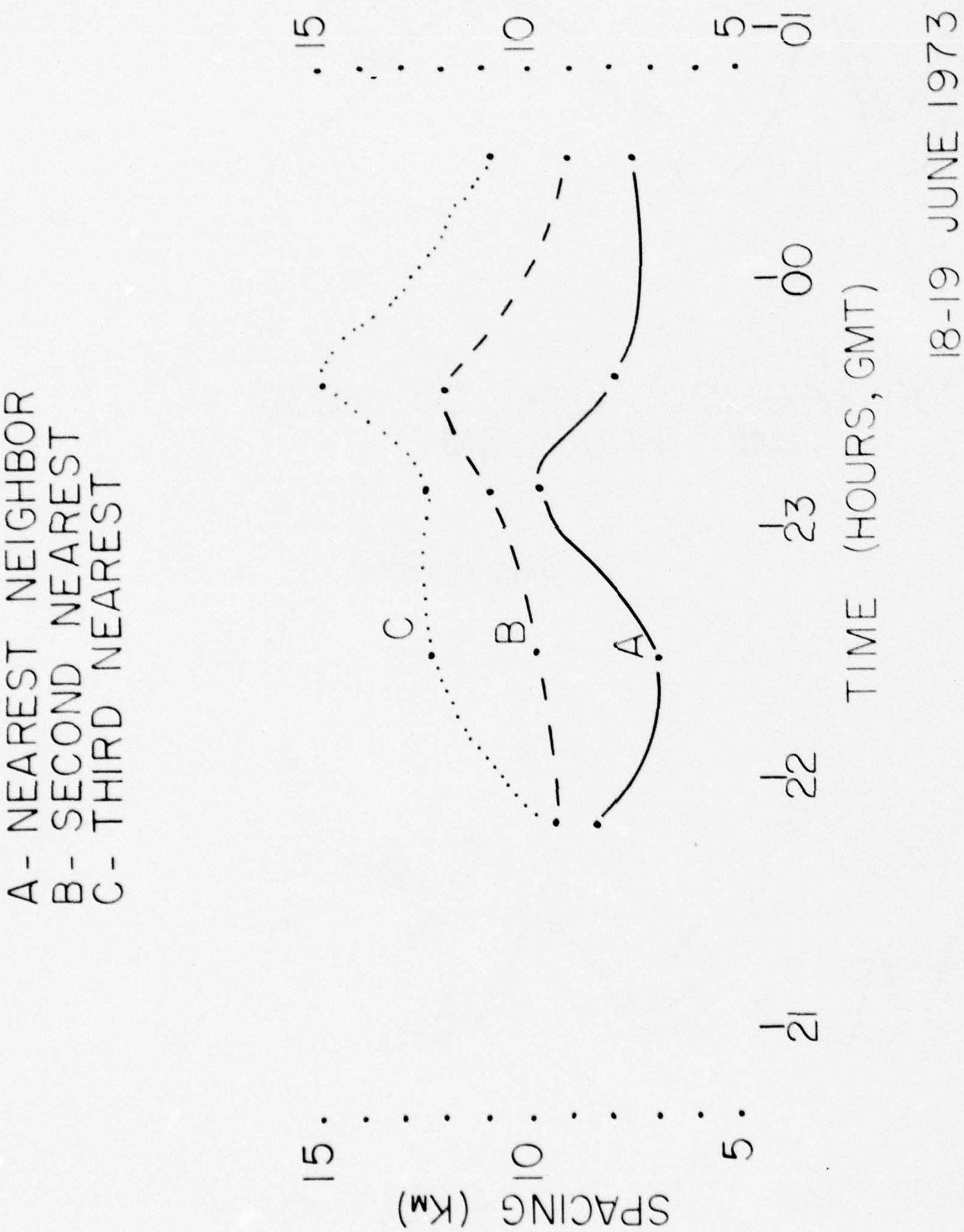
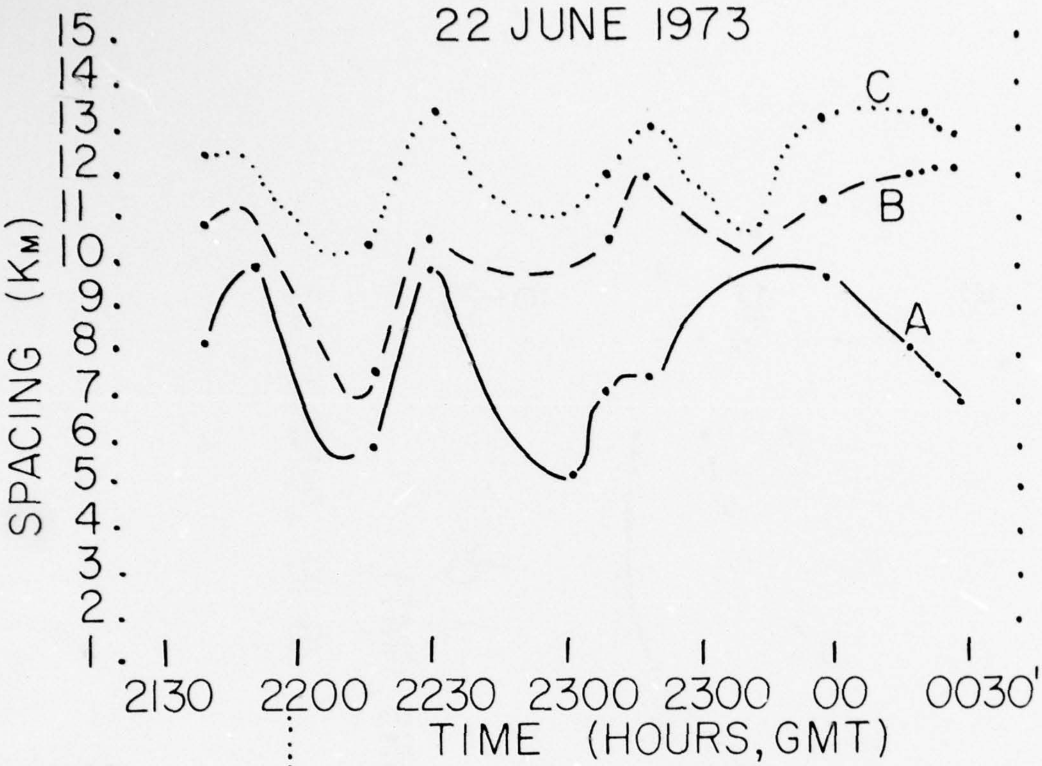


Figure 5 Nearest Neighbor Distances



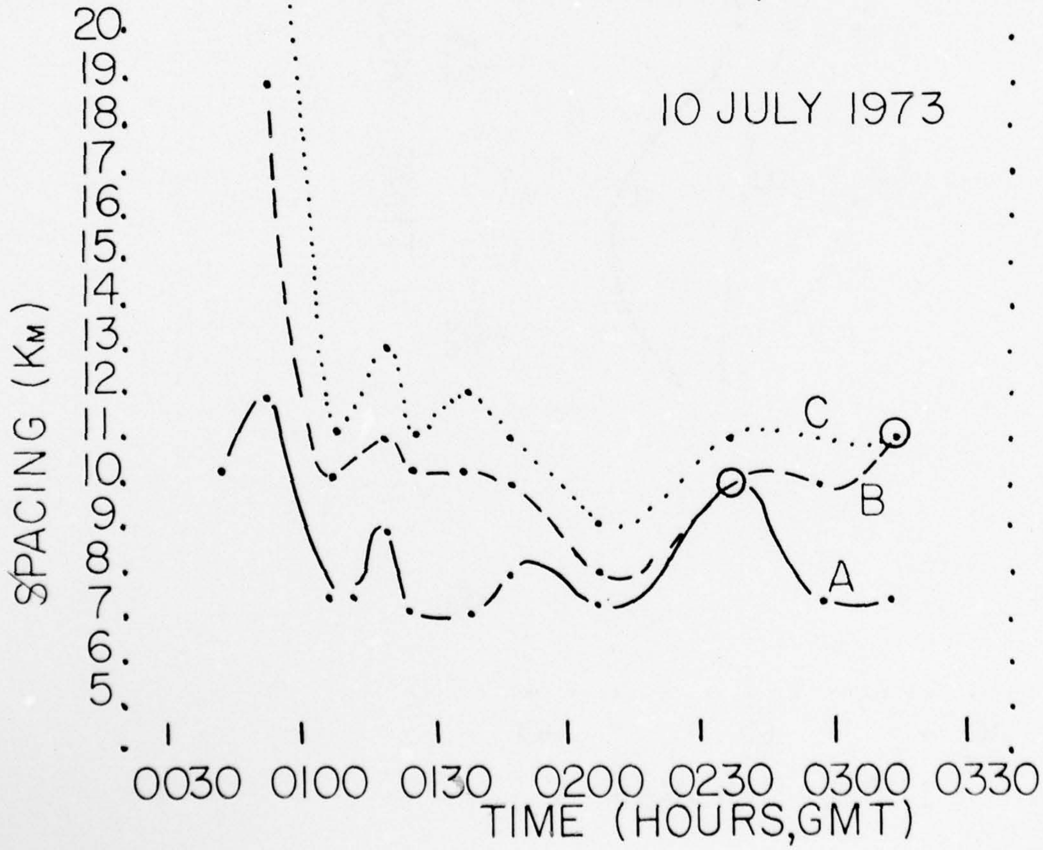


Figure 5 (cont) Nearest Neighbor Distances

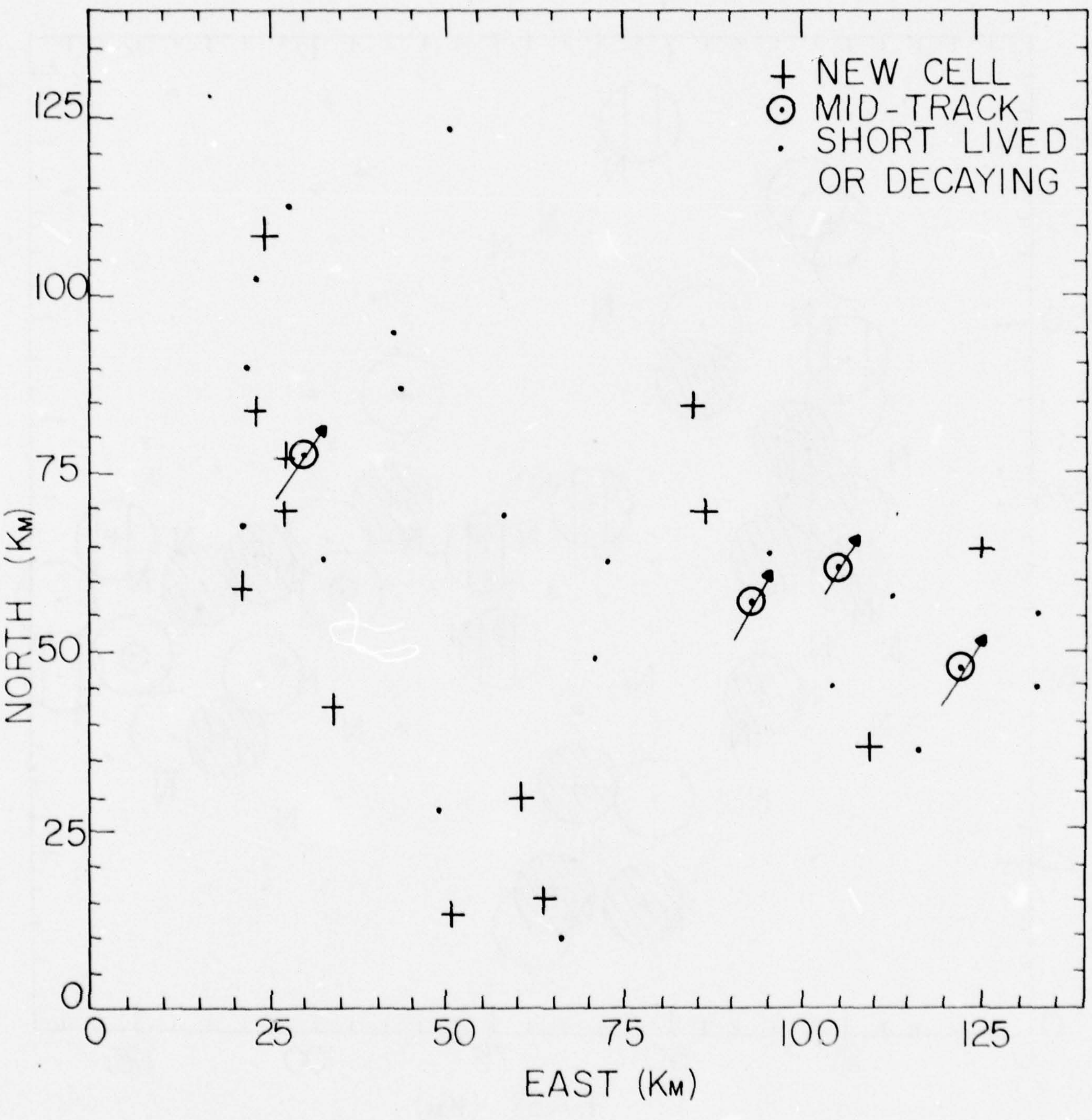


Figure 6 Cell Locations at 2229 GMT, 18 June 1973 at Wallops Island

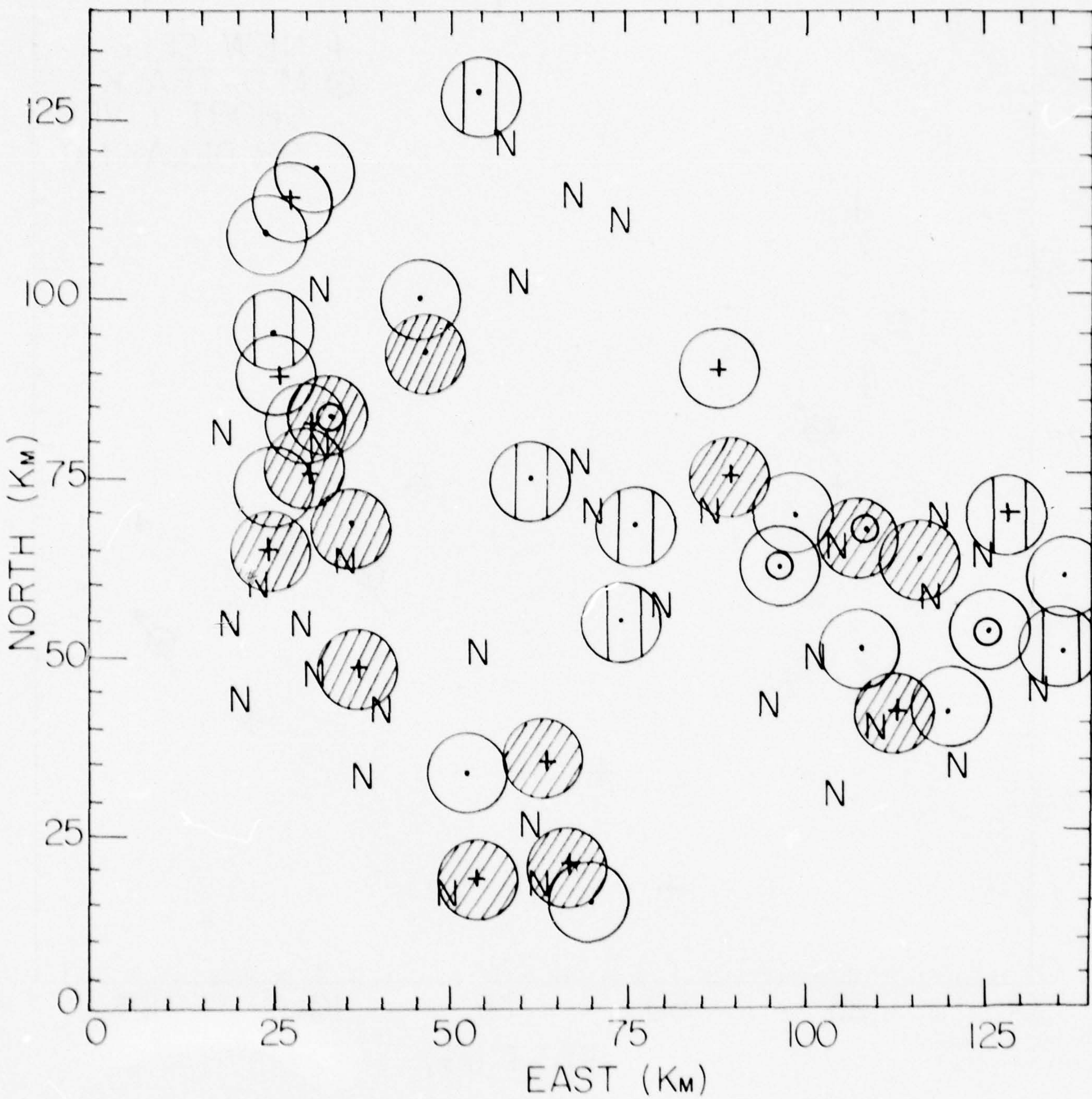


Figure 7 Cell Locations at 2337 GMT, 18 June 1973 at Wallops Island

forecast for probable new cell development by specifying a segment or segments of the nearest neighbor arc. A considerably larger sample of data with smaller time steps between observations is required before a procedure for new cell site forecasting can be developed and tested. The preliminary results presented here are encouraging and indicate that a new cell site forecasting procedure can be developed.

5. ANALYSIS OF SELECTED DATA SETS

5.1 Use of the Computer Programs

The computer programs described above were developed as a prototype for a real-time processing system to be employed in reducing the number of data bits required to describe a set of radar observations. The objective of the program was to replace the large volumes of data obtained by a radar system to a set of fixed contour and peak referenced cell attributes capable of representing the same essential information. A prototype program is now available with optional choices for many of the processing parameters and for representing the cell and contour attributes. The major thrust of this contract has been program development and initial testing of critical hypotheses such as the possibility of forecasting the locations of new cell sites. A considerable amount of work still remains using the programs to optimize the processing parameters.

An example of the input radar data for a pair of fixed contours is given in Figure 1. The raw data are the three input parameters, reflectivity, radial velocity, and Doppler (or velocity) spread. An internally generated data field, tangential shear, is also depicted. Contoured data for the three fields used in further processing for one of the echo regions are depicted in Figure 8. In this figure, the quantization steps for each data field are 1 dB, 0.5 m/s, and 0.1 m/s/km for the reflectivity, spread, and tangential shear fields respectively. The reflectivity data show relatively long, thin contours. The basic resolution element for processing, 1° by 0.3 km, is a square on this figure. For more efficient processing, the resolution elements should be adjusted so the contours to be detected are nearly circular. The radar data are read into the computer in 1° by 0.15 km resolution elements. In this example, the data along a radial should be averaged by at least a factor of 6 (3 times the factor used for this figure) to produce 1° x 0.9 km resolution elements. This adjustment may be made automatically in the cell detection program. The spread and tangential shear data show large changes from one resolution element to the next although, with the quantization steps used, the data reveal the same tendency toward elongation as the reflectivity data.

Contours enclosing peak detected cells are indicated by the cross hatching on Figure 8 and on Figure 9. The contours are generated at

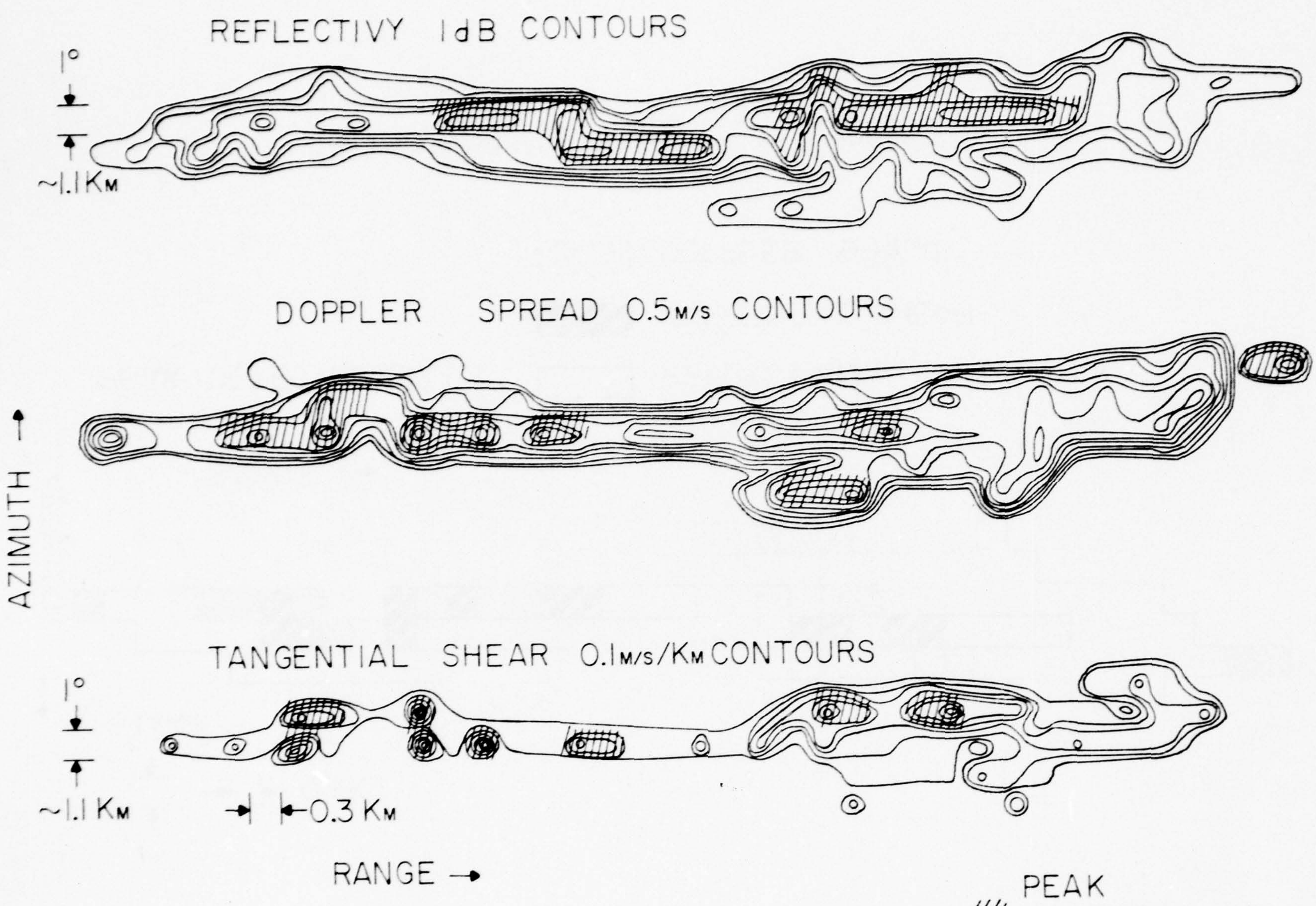


Figure 8 Contoured Data from the Sample Set Depicted in Figure 1

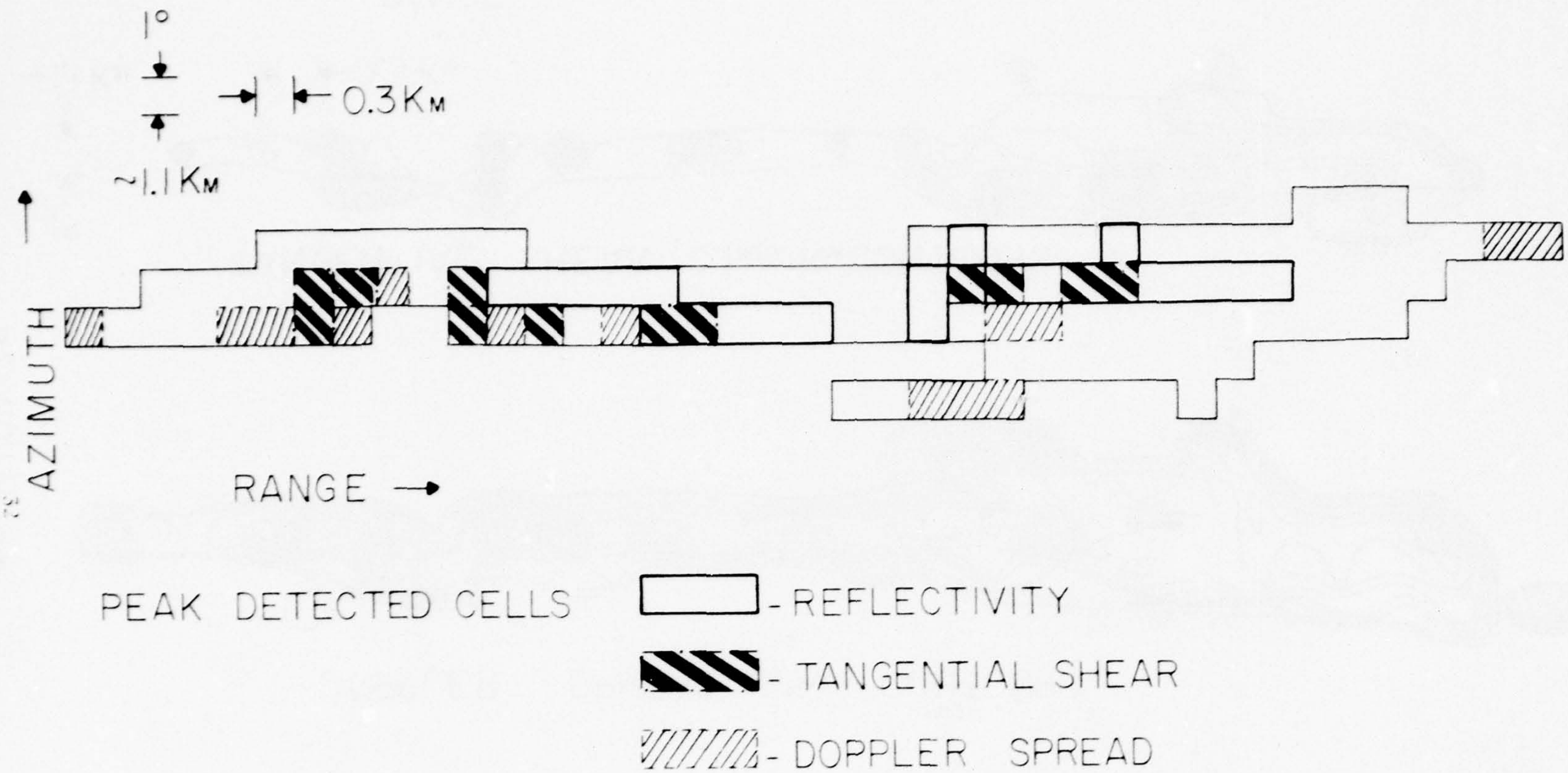


Figure 9 Composite of Fixed Contour Echo and Detected Reflectivity, Tangential Shear, and Doppler Spread Peaks for the Data Depicted in Figure 8

three quantization units below the peak values. The outer contour for reflectivity on Figure 8 and the outer contour on Figure 9 correspond to the 20 dBZ threshold used for processing. Two reflectivity peaks were detected although a shoulder on the first peak (in range, the shoulder is at shorter ranges) would have been detected as an individual cell if two quantization steps were used to define the cell. The shoulder would also be included with the two detected cells in a single cell if the 1° by 0.9 km resolution area were used.

The tangential shear and Doppler spread peaks are shown superimposed on the reflectivity contours in Figure 9. The two tangential shear peaks occur for each reflectivity peak if the shoulder were included. These peaks together with the reflectivity data appear to be delineating the updraft, down draft structure of the cell. With a change to a 1° by 0.9 km resolution area, these sub-cell structures would be averaged to a consistent, one cell picture for this echo region. The Doppler spread data reveal two types of peaks, four of the seven detected peaks coincide with the tangential shear peaks outlining regions of high shear and high spread. These peaks are also intimately related to the reflectivity structure. Three other Doppler spread peaks also are evident at the very edges of the 20 dBZ contour. These peaks correspond to regions of relatively low reflectivity (23 dBZ and lower) and austensibly represent regions where low signal-to-noise values give rise to deceptively high Doppler spreads.

The number and shapes of the peak referenced cells will vary as the quantization step size, the number of quantization steps for peak detection, and the size of the resolution area are changed. More experience is required using these computer programs to select the optimum combination of these parameters for the detection of physically meaningful cells. As used in generating Figures 8 and 9, it appears that too much detail is present and some of the detected regions especially for spread and tangential shear data represent structure on too small a scale (for example, the individual updraft and downdraft regions within a cell).

5.2 Volume Cell Observations

The volume cell detection program is used to combine the data from a number of individual azimuth scans. Data obtained from the Sudbury radar, subsequent to 1928 GMT on August 13, 1975 using 1° by 0.9 km resolution areas are depicted in Figures 10-14. These data show the centroid location of each reflectivity peak referenced cell coded both by average reflectivity and by area. The locations of the tangential shear peaks are denoted by X and the locations of Doppler spread peaks are denoted by +.

The data from each of the scans were combined to form volume cells shown in Figure 15. In this figure, the solid lines connect the cell locations as detected on each scan using the algorithms described in SEction 3 (Track Program). Cells within 50 km of the radar were detected at elevation angles up to 5°; cells at further ranges were only detected at elevation angles below 4° (heights less than 5 km). A limited set of volume cell attributes for this data set is listed in Table 2.

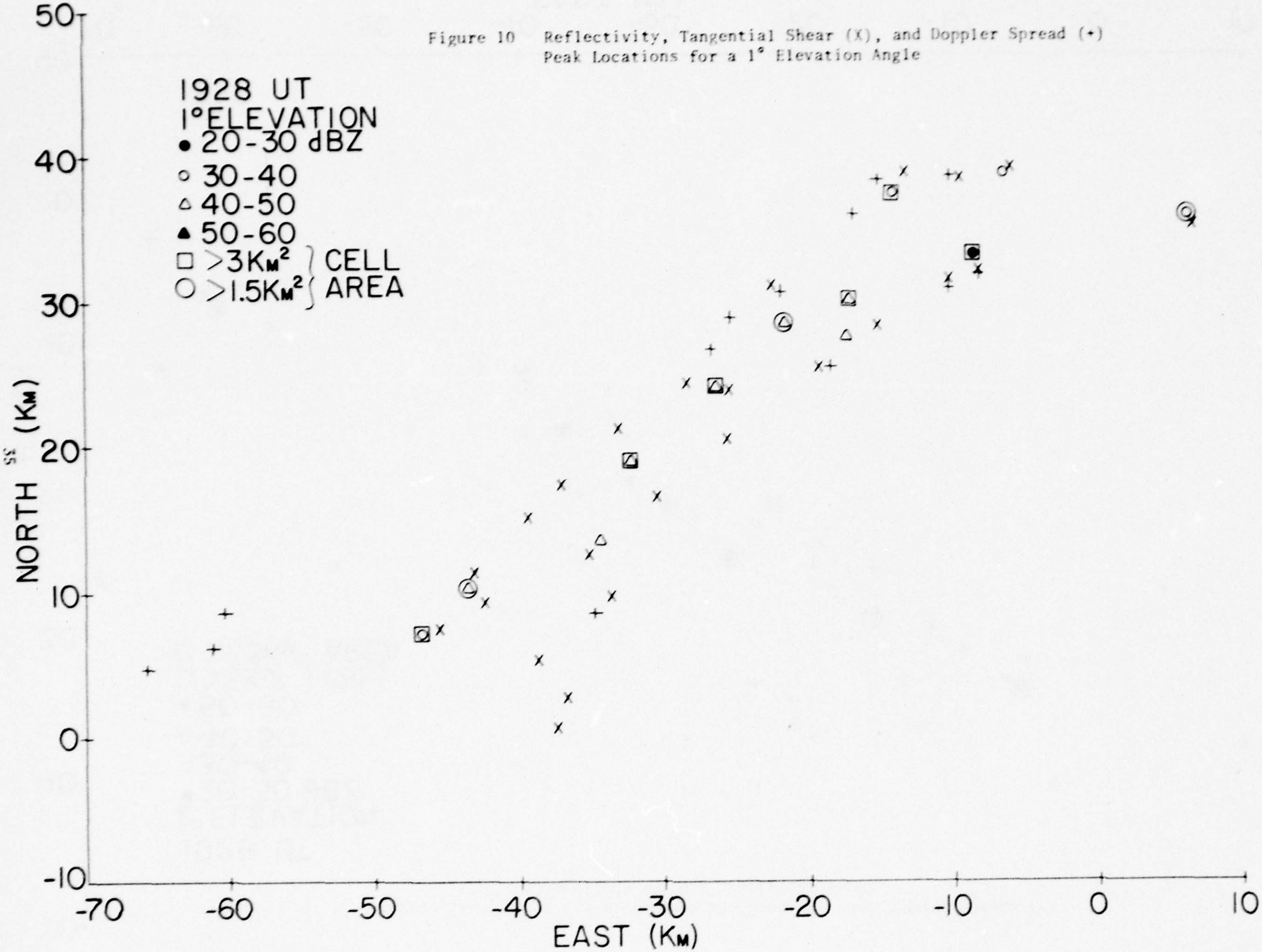
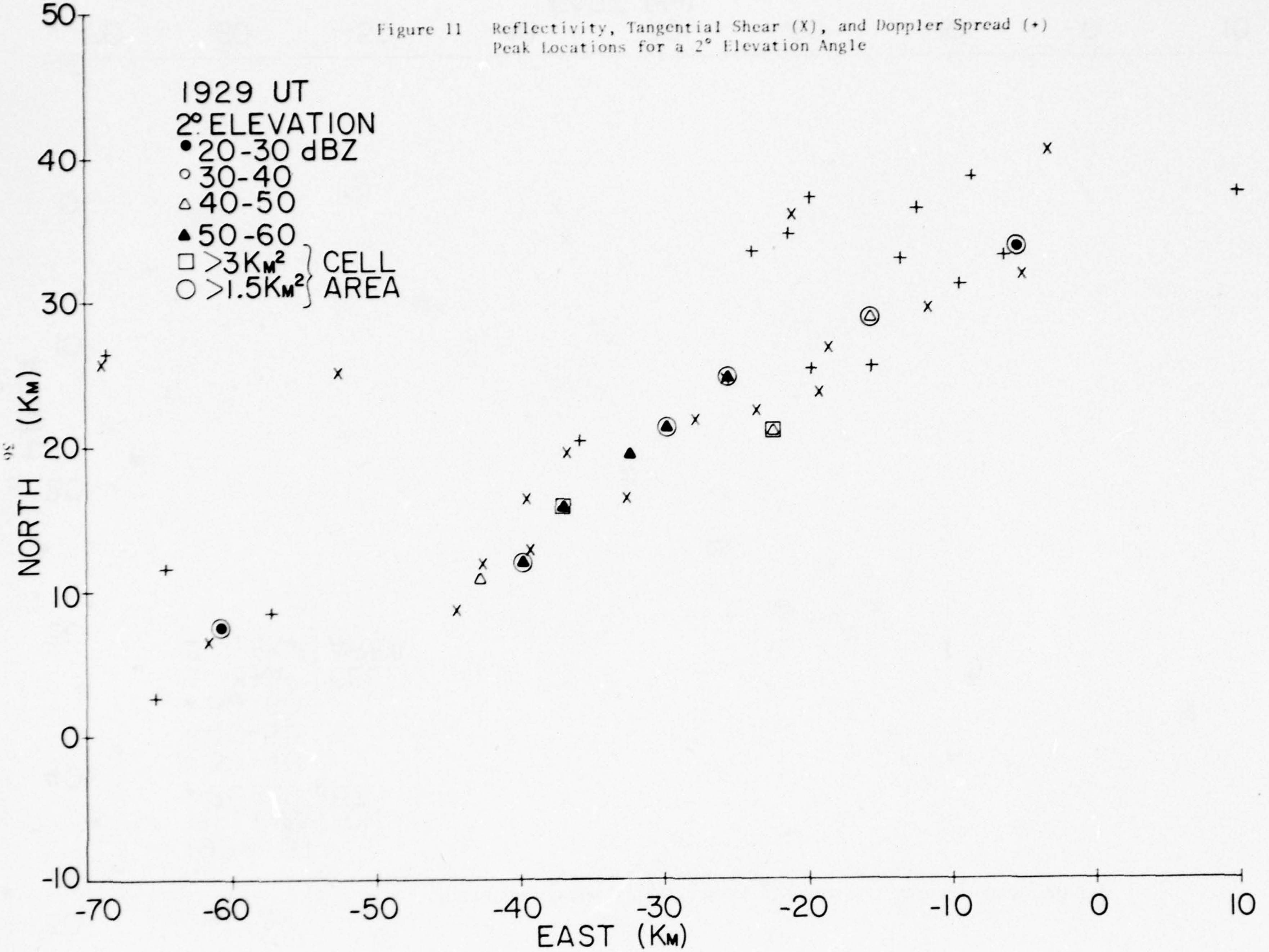


Figure 10 Reflectivity, Tangential Shear (X), and Doppler Spread (+) Peak Locations for a 1° Elevation Angle

Figure 11 Reflectivity, Tangential Shear (X), and Doppler Spread (+) Peak Locations for a 2° Elevation Angle



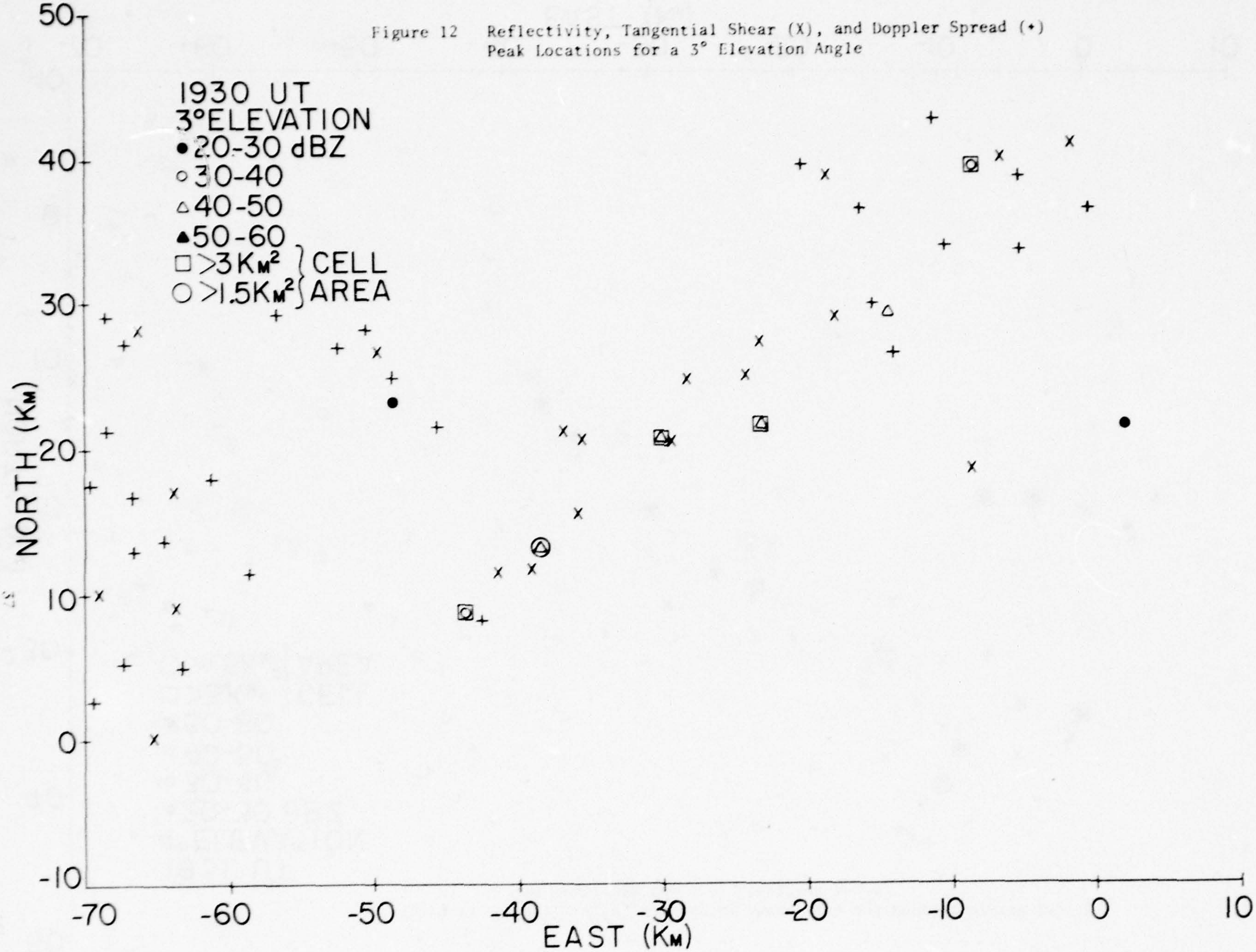
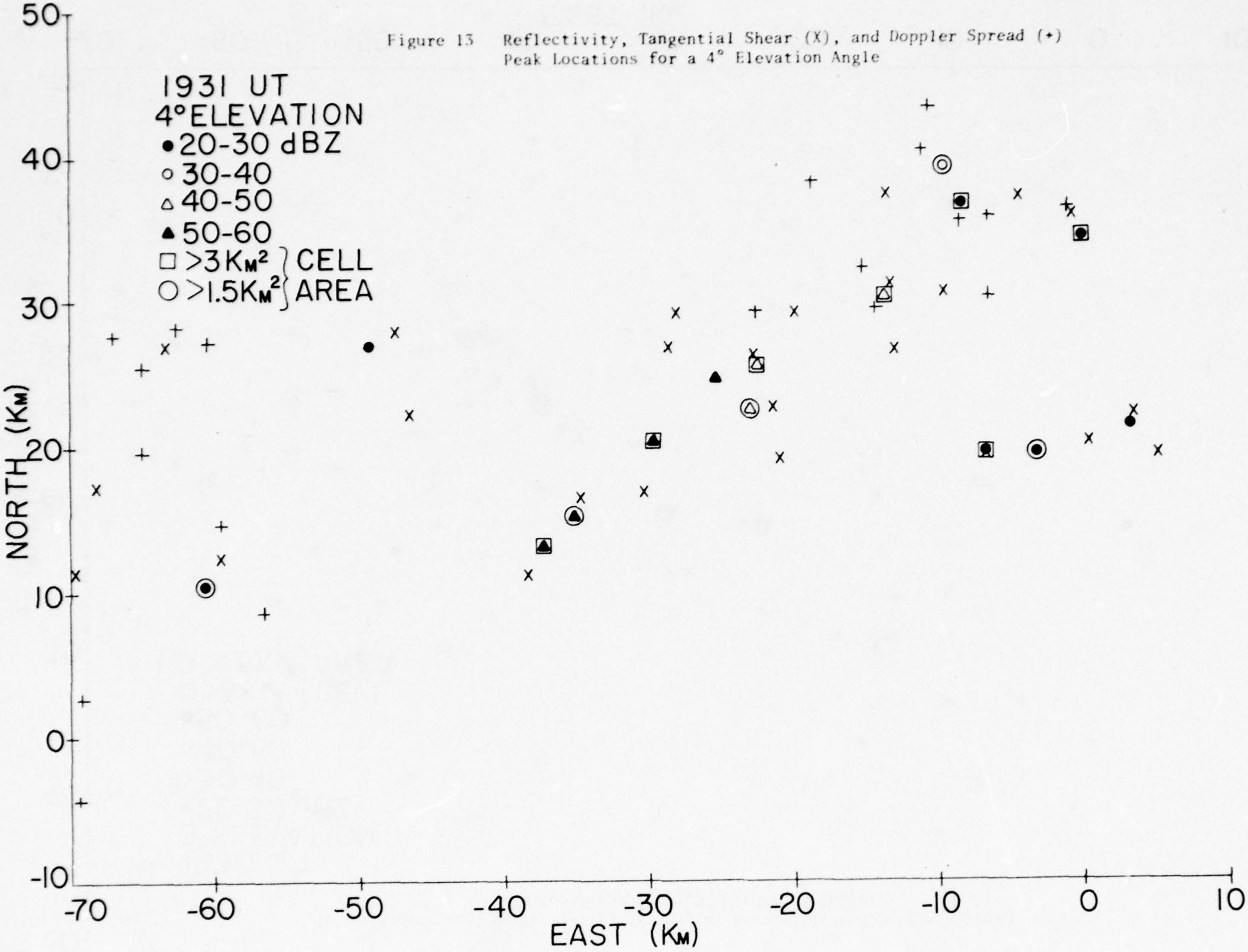


Figure 12 Reflectivity, Tangential Shear (X), and Doppler Spread (+) Peak Locations for a 3° Elevation Angle

Figure 13 Reflectivity, Tangential Shear (X), and Doppler Spread (+) Peak Locations for a 4° Elevation Angle



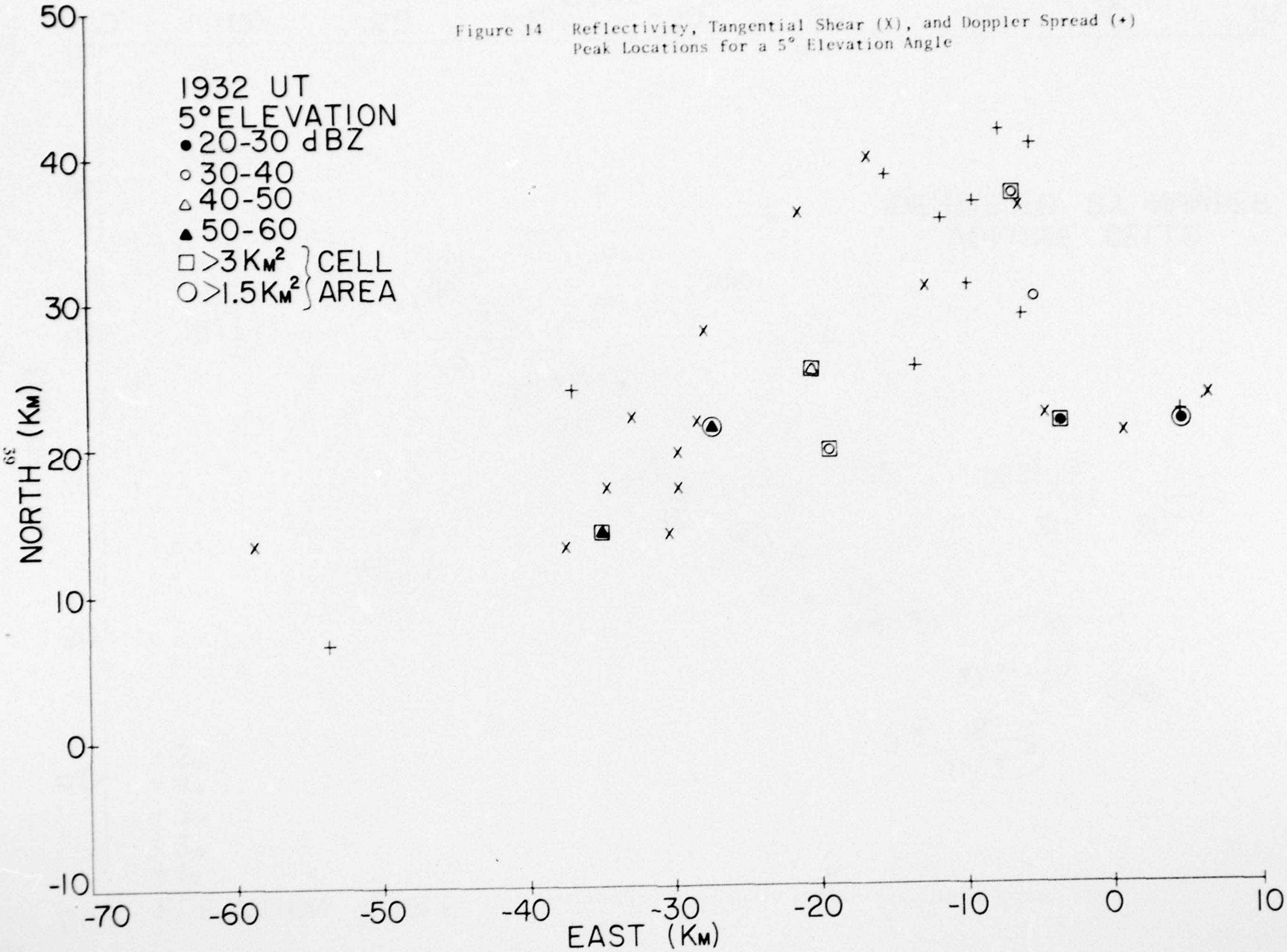


Figure 14 Reflectivity, Tangential Shear (X), and Doppler Spread (+) Peak Locations for a 5° Elevation Angle

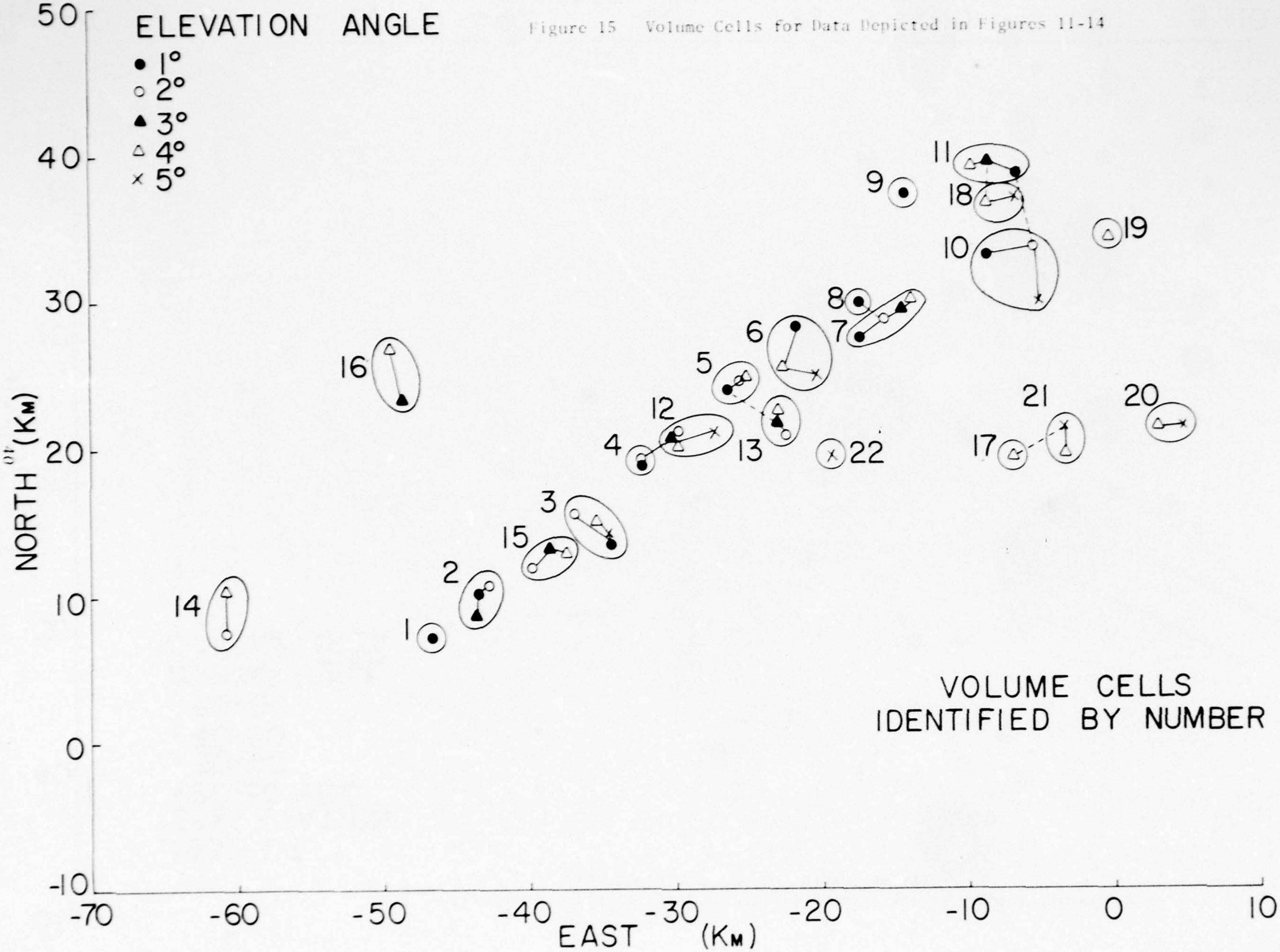


Figure 15 Volume Cells for Data Depicted in Figures 11-14

TABLE 2

VOLUME CELL ATTRIBUTES

ID*	X	Y	H_p	Z_p	H_b	H_T	ΔH	Δp	Volume
1	-46.8	7.3	0.9	39.9	0.9	0.9	0.5	4.0	2.0
2	-43.8	10.3	1.7	49.0	1.1	1.8	0.7	1.5	1.1
3	-34.4	13.7	3.4	54.9	2.9	-	-	3.5	-
4	-32.3	19.1	1.4	53.2	0.9	1.4	0.5	1.5	0.8
5	-26.4	24.1	2.5	52.9	1.0	2.4	1.4	5.4	7.6
6	-21.8	28.5	2.5	49.5	1.9	-	-	3.5	-
7	-17.4	27.8	2.4	47.8	0.7	2.4	1.7	3.2	5.4
8	-17.2	30.1	0.7	40.9	0.7	0.7	0.5	3.9	2.0
9	-14.2	37.5	0.8	33.0	0.8	0.8	0.5	4.4	2.2
10	- 8.9	33.1	2.7	30.7	1.8	-	-	1.4	-
11	- 6.8	38.8	2.2	31.9	0.8	2.9	2.1	2.0	4.2
12	-29.8	21.3	2.4	55.3	1.4	-	-	3.5	-
13	-22.4	21.1	2.3	44.6	1.1	2.3	1.2	1.4	1.7
14	-60.9	7.6	2.4	29.1	2.4	3.6	1.2	1.9	2.3
15	-39.9	12.0	2.2	53.6	1.7	2.8	1.1	1.2	1.4
16	-48.7	23.4	3.0	25.7	3.0	4.0	1.0	12.9	12.9
17	- 6.9	19.8	1.5	21.9	1.5	1.5	0.5	3.4	1.7
18	- 8.5	36.5	3.4	31.0	2.7	-	-	1.9	-
19	- 0.0	34.2	2.5	23.8	2.5	2.5	0.5	1.0	0.5
20	3.4	21.7	2.0	22.4	1.6	-	-	9.0	-
21	- 3.1	19.9	1.9	22.5	1.4	-	-	12.4	-
22	-19.3	-19.8	2.5	39.1	2.5	-	-	1.0	-

*See Figure 15

6. RECOMMENDATIONS

6.1 Parameter Optimization

A set of computer programs has been generated to provide an automatic means for the extraction of information from large volumes of radar data. The programs are written to be as general as possible to enable rapid changes in processing parameters. As indicated in Section 5, the optimum values for these parameters are not known and must be determined. It is expected that the parameters should change from one radar system to the next depending principally on the resolution volume and number of independent samples per resolution element. The first problem to be considered in the use of this set of programs is the optimization of parameters. This can only be done by processing a relatively large number of radar scans for different rain conditions.

Ideally, auxiliary data should be available to provide a standard of comparison for the output from the program. Many case studies such as the one reported in Section 5.1 should be performed to obtain the raw contour data to provide a comparison standard. For use in detecting severe weather events, auxiliary data on the severe events are also required.

6.2 Real Time Processing

The programs, although general in nature, were written with the ultimate goal of use in a real time processor. After the analysis for parameter optimization has been completed, specialization to a real time processor may be accomplished. Real-time processing requires the minimization of computer storage and operating time. Major steps can be made in this direction by increasing the resolution element area for processing (averaging over $\sim$1 km in range as recommended in Section 5.1) and by reducing the number of peak detection operations. The latter can be accomplished by processing either tangential shear or Doppler spread data but not both as is currently done. Another time saving step is to reduce the volume of output by not preparing the fixed level contour plotting displays in the computer but doing the fixed contouring in the color display processor as is currently done for the output of digital integrators.

Preprocessing of the data for calibration, velocity ambiguity resolution, and conversion from variance to velocity spread will also save some time.

Current running time for reflectivity processing only but including fixed contour generation for display is 2 minutes per azimuth scan. By just doing the preprocessing, the running time could be reduced by more than a factor of two. The other reductions recommended above plus internal programming changes to reduce the use of indirect array addressing should result in a program that will do at least two data fields, reflectivity and tangential shear or Doppler spread, in real time (30 seconds per scan).

6.3 Spatial Analysis of Cell Development

The initial considerations of the forecast of new cell site locations indicates that improvements should be possible if attention is focused on the structure or organization of the cell location patterns. Processing to date has used the determination of nearest neighbor distances to obtain information about cell spacings. The nearest neighbor distances provide estimates of the locations of secondary maxima in the spatial correlation function for cell locations. Information on structure can better be obtained from more refined correlation function (or spatial power spectra) of cell location. These analyses should be conducted using a much larger data sample preferably for a number of different locations and storm types.

6.4 Morphological and Climatological Analysis

The programs described above are used to extract the significant information from a large volume of radar data. The result is still a formidable data set comprised of a number of lists of volume cell attributes for each scan, storm, and day. These data must in turn be reduced to a manageable set to describe the morphology of cell development. This analysis must be performed before any meaningful cell forecast procedures can be developed and tested. The analysis entails both the construction of new programs and the processing of large volumes of data.

REFERENCES

Crane, R.K. (1976): "Radar Detection of Thunderstorm Hazards for Air Traffic Control Vol. I Storm Detection", Project Report ATC-67, Vol. I, MIT Lincoln Laboratory, Lexington, Massachusetts.

Crane, R.K. (1977): "Parameterization of Weather Radar Data for Use in the Prediction of Storm Motion and Development", Final Report, Contract No. F19628-76-C-0264, Environmental Research & Technology, Inc.; AFGL-TR-77-0216, Air Force Geophysics Laboratory, Hanscom Air Force Base, Massachusetts.

ACKNOWLEDGEMENTS

The author wishes to acknowledge the help of Messers J. Willand, R. Collins, and P. Piechota in the programming task that comprised the bulk of the work performed under this contract. Mr. P. Feteris performed the nearest neighbor distance analysis using printouts and computer plots made available by MIT Lincoln Laboratory (Crane, 1976). The author also wishes to acknowledge the discussions about the desirability and utility of the processing concepts with Dr. K. Hardy and with the AFGL technical program monitors Messers K. Glover and A. Chmela.

APPENDIX A

CELL DETECTION AND TRACKING PROGRAM INSTRUCTIONS FOR OPERATION

A.1 Description of Input and Output

Program input and output are depicted in Figure A1. The tape input format is given in Table A1. The control cards are discussed in section A2. The program produces (a) tapes of computed attributes for input to a second program for computing volume scans; (b) a plot tape is generated that can be stored for input to another program "EXPAND" which is a general purpose plotting package for plotting the fixed contours, centroids, cell identification and peak locations expanded over selected areas; (c) B-scan maps are also produced as an option; and (d) at the completion of a scan the program will print out fixed contour attributes, peak detected cell attributes and tangential shear maxima attributes. All of the attributes printed have identifiers which can be associated with the identifiers displayed on the expanded plots.

A.2 Control Card Format

Control card input to the program is NAMELIST input which allows certain parameters in the program to default or to be set to different values. The variable names, type (LOGICAL L, INTEGER I, and REAL R), dimension, default value and their meanings are listed in Table A2.

710053

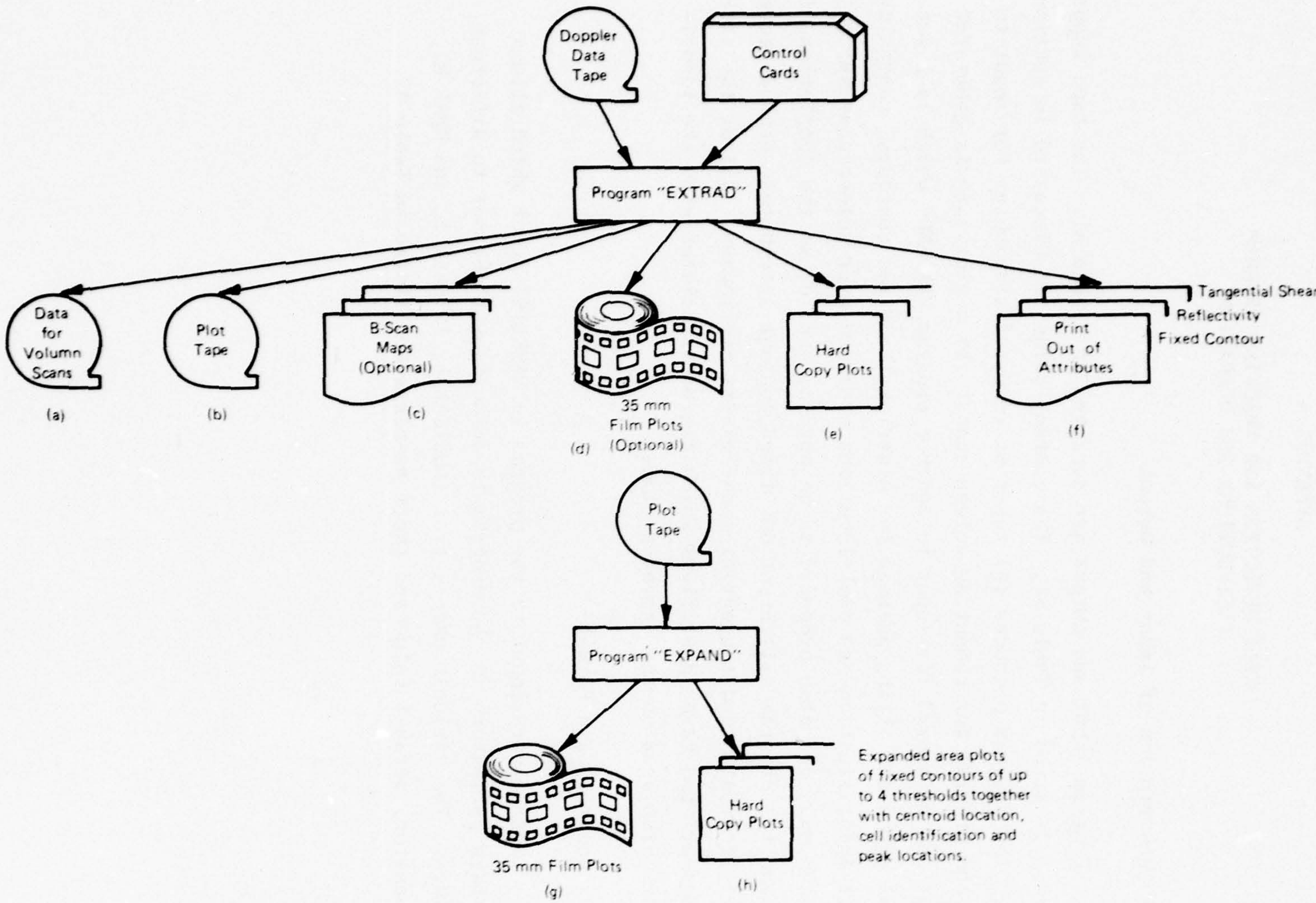


Figure A1 EXTRAD Products

		2^{11}	2^{10}	2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	12 Bit Word Position
ANCILLARY DATA	Day	800	400	200	100	80	40	20	10	8	4	2	1	1
	Hour				20	10	8	4	2	1				2
	Min			40	20	10	8	4	2	1				3
	Sec						40	20	10	8	4	2	1	4
	Status		T_p1	T_p0	SF_1	SF_0		DD	1) NRC_1	1) NRC_0				5
		B					A							
	*PRF	PRF_{11}	PRF_{10}	PRF_9	PRF_8	PRF_7	PRF_6	PRF_5	PRF_4	PRF_3	PRF_2	PRF_1	PRF_0	6
	Azimuth	AZ_{11}	AZ_{10}	AZ_9	AZ_8	AZ_7	AZ_6	AZ_5	AZ_4	AZ_3	AZ_2	AZ_1	2) AZ_0	7
	Spare													8
	Spare													9
	Elevation	EL_{11}	EL_{10}	EL_9	EL_8	EL_7	EL_6	EL_5	EL_4	EL_3	EL_2	EL_1	2) EL_0	10
	Spare													11
	Spare													12
VIDEO DATA Repeated 256 times**	Mean	6) M_{11}	5) M_{10}	M_9	M_8	M_7	M_6	M_5	M_4	M_3	M_2	4) M_1	2) M_2	13 + (I-1)·3
	Variance	6) V_8	V_7	V_6	V_5	V_4	V_3	V_2	V_1	2) V_0				14 + (I-1)·3
	Power	6) P_8	P_7	P_6	P_5	P_4	P_3	P_2	P_1	2) P_0				15 + (I-1)·3

1)

Number Range Cells	NRC_1	NRC_0
256	0	0
512	0	1
768	1	0
1024	1	1

Frequency of Dump Pulses DD	
ALT	0
ALL	1

Subframe SF_1	SF_0
0	0
0	1
1	0
1	1

Cell Width	T_{p1}	T_{p0}
0.5 μs	0	0
1 μs	0	1
2 μs	1	0

2) Least Significant Bit
3) ---------
4) Not Included in Parity
5) Sign
6) Parity

1 physical record = 158 sixty bit words

* If any group A bit = 1 and any group B bit = 1: PRF = 394
If A has 1 bit and B has 3 bits: PRF = 794
If A has 3 or more and B has 1 or less: PRF = 1613
If A has 3 or more and B has 3 or more: PRF = 3333
If A has 2 bits or B has 2 bits: PRF = Previous PRF
If all zero for A and B groups: use an input PRF

** First cell is the 21st twelve bit data word.

TABLE A1

TABLE A2

CARD FORMAT FOR PROGRAM EXTRAD

Reads in program parameters via NAMELIST format.

NAMELIST VARIABLES: (Level 780415)

NAME	TYPE	DIMENSION	DEFAULT	MEANING
PRINT1	L	1	FALSE	Unused.
PRINT2	L	1	FALSE	If .TRUE. print B-scan maps of mean and variance.
PRINT3	L	1	FALSE	If .TRUE. print B-scan maps of dBz.
PRINT4	L	1	FALSE	Unused.
ICODES	I	36	Blank thru Z then 1 thru 9.	Codes for representing dBz categories for B-scan map output.
A1	R	1	.13779	In the linear equation y = mx+b for computing coded dBz for B-
B1	R	1	1.5	scans, A1 = M and B1 = b.
A2	$	1	.017	Unused.
B2	R	1	18.6	Unused.
CONTRZ	L	1	TRUE	If FALSE, do not process peak cell attributes.
CONTRV	L	1	TRUE	If FALSE, do not process reflectivity, shear, & spread.
CONTRS	L	1	TRUE	If FALSE, do not process shear and spread.
NFILE	I	1	0	Number of files on tape to skip before processing.
NUMF	I	1	1	Number of files on tape to process.
AC	R	4	-107.7, +1.97, -0.94, +.0018	Calibration coefficients for computing DBM below a threshold XCUT. (see XCUT)

NAME	TYPE	DIMENSION	DEFAULT	MEANING
COPLOT	L	1	FALSE	If TRUE, output a tape for plotting.
VOLTAP	L	1	TRUE	If FALSE, do not output an attribute tape.
CALM	R	1	.332	In the calibration equation for
CALB	R	1	-98.3	DBM y = mx+b, CALM = M & CALB = b.
XCUT	R	1	10.0	Threshold value that determines which equation to use for calibration. (linear or non-linear)
CK	R	1	10.0	In the equation for computing dBz, K+P+20ALOG10(S(I-.5)) K = CK.
ZMAX	R	1	0.0	Not currently used.
VMAX	R	1	0.0	Not currently used.
NREC	I	1	1	Not currently used.
NUMR	I	1	999	Number of radials to be processed. Use default value when doing full scan.
IRUN	I	1	0	Run number chosen by user.
INC	I	1	0	Not currently used.
STARTR	R	1	0.0	Where along a radial in kilometers processing is to start.
STOPR	R	1	300.0	Where along a radial in kilometers processing is to stop.
INPRF	I	1	3333	Value of PRF (Pulse Repetition Frequency) to be used when PRF cannot be obtained from the data tape.
SCALE	R	1	1.0	Scale factor for drawing fixed contours.
AE	R	1	1.21	Constant for computing heights of cells.
AA	R	1	300	Constant for computing rain rate.
BB	R	1	1.5	Exponent for computing rain rate.

NAME	TYPE	DIMENSION	DEFAULT	MEANING
X1	R	1	0.0	Frame size coordinates for fixed contour plotting. Less than or equal to 8 inches.
X2	R	1	8.0	Same as above.
Y1	R	1	0.0	Same as above.
Y2	R	1	8.0	Same as above.
TV	I	1	35	Mean wind velocity in a fixed echo contour is not computed for dBz greater than this value.
TSV	R	1	10^6	Not currently used.
LDV	I	1	3	Cell detection threshold for reflectance peaks.
LTV	I	1	3	Cell detection threshold for velocity peaks.
LSV	I	1	3	Cell detection threshold for shear peaks.
ICOMP	I	1	6	Data compression factor. (range integration)
VMIN	R	1	0.0	Unused.
SVMIN	R	1	0.0	Unused.
AREAMN	R	1	1.0	Any completed contour having an area less than AREAMN will be ignored but is plotted if a fixed contour.
WAVEL	R	1	0.0542	Radar wavelength in meters.
VQUANT	R	1	10.0	Tangential shear quantization step $(m/s/km)^{-1}$.
SQUANT	R	1	2.0	Doppler spread quantization step $(m/s)^{-1}$.
RQUANT	R	1	1.0	Reflectivity quantization steps (in dB^{-1}).
DAZM	R	1	1.0	Beam width (degrees).

NAME	TYPE	DIMENSION	DEFAULT	MEANING
ESTART	R	1	(1.5°)	Elevation start angle (degrees).
DELT	R	1	(.5°)	Delta elevation angle (degrees) defining next scan.

APPENDIX B

PLOTTING PROGRAM 'EXPAND' (VERSION 1.0)

B.1 Description of Input and Output

Program EXPAND utilizes the plot tape generated by program 'EXTRAD' as input to generate not only full scan plots of fixed contours and their centroids but on option will expand and plot certain areas of interest. Also on option, it will plot out locations of centroids of fixed contours, peak detected cells, Doppler spread and tangential shear locals. These plotting options apply to full scan plots as well as expanded plots.

The plots are generated on the CALCOMP ink pen drum plotter. The X axis are labeled negative kilometers west of the radar and positive east. Y axis are labeled negative kilometers south of the radar and positive north. The date and elevation angle are also annotated.

B.2 Control Card Format

Control card input to the program is NAMELIST input which allows certain parameters to default or to be set to different values. The variable names, type, dimension, default and meaning are listed in Table B1.

It is suggested that program EXPAND generate full scan plots of fixed contours from the entire EXTRAD tape first before generating expanded areas of view. This allows one to examine exactly what each scan contains and where expansion would be of interest. One set of NAMELIST input cards are needed for each scan. If, for example, it is desired to go into the third scan on tape, three NAMELIST set ups must occur.

TABLE B1

CARD FORMAT FOR PROGRAM EXPAND
READS IN PROGRAM PARAMETERS VIA NAMELIST INPUT

NAMELIST VARIABLES:

NAME	TYPE	DIMENSION	DEFAULT	MEANING
IPLT	L	4		
IPLT(1)	L		.FALSE.	If .TRUE. plot a dot to locate peak detected cells.
IPLT(2)	L		.FALSE.	If .TRUE. plot a C to locate fix contour centroids.
IPLT(3)	L		.FALSE.	If .TRUE. plot a + to locate Doppler spread.
IPLT(4)	L		.FALSE.	If .TRUE. plot an X to locate tangential shear.
Z1	L	1	.TRUE.	Plot fix contours for first level contour.
Z2	L	1	.TRUE.	Plot fix contours for second level contour.
Z3	L	1	.TRUE.	Always set to .FALSE.
Z4	L	1	.TRUE.	Always set to .FALSE.
LS	L	1	.FALSE.	When .TRUE. expanded area plots are requested. When .FALSE. draw full scan only.
XK1	R	1	-320.0	Western plot area limit (km).
XK2	R	1	320.0	Eastern plot area limit (km).
YK1	R	1	-320.0	Southern plot area limit (km).
YK2	R	1	320.0	Northern plot area limit (km).
LK	L	1	.FALSE.	If .TRUE. plot centroids of given areas.

*Note: Expanded plots will always square off any rectangular area request to the largest axis requested.

APPENDIX C

TRACKING PROGRAM (ASOCCL)

C.1 Description of Input and Output

The input tape is the tape produced by program "EXTRAD". This program takes the cell attributes and associate cells for tracking volume cells. The output listing includes the location of volume cells and the updated cell ID.

C.2 Control Card Format

Control card input to the program is NAMELIST input which allows certain parameters in the program to default or to be set to different values. The variable names, type (LOGICAL L, INTEGER I, and REAL R), dimensions, default values and their meanings are listed in Table C1.

TABLE C1

CARD FORMAT FOR PROGRAM ASOCCL

Reads in Program Parameters via NAMELIST Format

NAMELIST VARIABLES:

NAME	TYPE	DIMENSION	DEFAULT	MEANING
PR1	L	1	FALSE	When .TRUE. program prints out the input attributes data.
PR2	L	1	FALSE	When .TRUE. program prints out the initial volume cell attributes and the total number of cells.
PR3	L	1	FALSE	When .TRUE. program prints out the associated update cell attributes and the total number of associated cells.
PR4	L	1	FALSE	Currently unused.
IDEV1	I	1	1	Input tape or file.
IDEV2	I	1	1	Currently unused.
ISTOP	I	1	1	Stop program, when "0" continue processing.

APPENDIX D

COMPUTER PROGRAM LISTINGS AND SAMPLE OUTPUT

```
               PROGRAM EXTRAD(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,TAPE1=0,      EXTRAD    2
              *               TAPE2,TAPE9,DEBUG=OUTPUT,TAPE3,TAPE4)               EXTRAD    3
      C        PROGRAM EXTRAD   ERT NO. 162                                       EXTRAD    4
      C        VERSION 2.0   LEVEL 761119                                         EXTRAD    5
      C        MAIN PROGRAM SECTION.                                              EXTRAD    6
      C        JHW      AFGL      CDC 6600                                        EXTRAD    7
      C        **************************************************************    EXTRAD    8
               LOGICAL PRINT1,PRINT2,PRINT3,COPLOT,CONTRZ,CONTRV,CONTRS,VOLTAP    TEST      1
               INTEGER CWRD(3)                                                    EXTRAD   10
               COMMON /PARM/ PRINT1,PRINT2,PRINT3,COPLOT,ICODES(36),A1,B1,A2,B2,  TEST      2
              *               CONTRZ,CONTRV,CONTRS,NFILE,NUMF,NREC,NUMR,VOLTAP    TEST      3
               DATA CWRD/4HPARA,4HEXEC,4HCOMM/                                    EXTRAD   13
      C        --------------------------------------------------------------    EXTRAD   14
               CALL DAY                                                           EXTRAD   15
      1        READ (5,11) KEY                                                    EXTRAD   16
      11       FORMAT (A4)                                                        EXTRAD   17
               IF (EOF(5)) 91,21,91                                               EXTRAD   18
      21       CALL PAGE                                                          EXTRAD   19
               WRITE (6,31) KEY                                                   EXTRAD   20
      31       FORMAT (1H ,A4)                                                    EXTRAD   21
               DO 41 K=1,3                                                        EXTRAD   22
               IF (KEY.EQ.CWRD(K)) GO TO (61,71,81), K                            EXTRAD   23
      41       CONTINUE                                                           EXTRAD   24
               WRITE (6,51)                                                       EXTRAD   25
      51       FORMAT (16H ILLEGAL KEYWORD)                                       EXTRAD   26
               GO TO 91                                                           EXTRAD   27
      C                                                                           EXTRAD   28
      C                  * PARAMETERS * PACKAGE.                                  EXTRAD   29
      C                                                                           EXTRAD   30
      61       CALL INPARM                                                        EXTRAD   31
               GO TO 1                                                            EXTRAD   32
      C                                                                           EXTRAD   33
      C                  * EXECUTION * PACKAGE.                                   EXTRAD   34
      C                                                                           EXTRAD   35
      71       CALL EXTRAT                                                        EXTRAD   36
               GO TO 1                                                            EXTRAD   37
      C                                                                           EXTRAD   38
      C                  * COMMENTS CARD * PACKAGE.                               EXTRAD   39
      C                                                                           EXTRAD   40
      81       CALL INE (5)                                                       EXTRAD   41
               GO TO 1                                                            EXTRAD   42
      C                                                                           EXTRAD   43
      C                  END OF JOB.                                              EXTRAD   44
      C                                                                           EXTRAD   45
      91       WRITE (6,101)                                                      EXTRAD   46
      101      FORMAT (//2X,7H ENDJOB)                                            EXTRAD   47
      111      STOP                                                               EXTRAD   50
               END                                                                EXTRAD   51
```

```
CARD NR. SEVERITY  DETAILS    DIAGNOSIS OF PROBLEM

   22      I                  AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.
```

```
              BLOCK DATA                                                          EXTRAD    52
      C       ****************************************************************** EXTRAD    53
      C       FOR PROGRAM EXTRAD   ERT NO. 162                                    EXTRAD    54
      C       VERSION 2.0   LEVEL 761119                                          EXTRAD    55
      C       JHW  CDC6600  AFGL                                                  EXTRAD    56
      C       ****************************************************************** EXTRAD    57
              LOGICAL PRINT1,PRINT2,PRINT3,COPLOT,CONTRZ,CONTRV,CONTRS,VOLTAP     TEST       4
              INTEGER TL       ,TV,TSV                                            EXTRAD    59
      C       ------------------------------------------------------------------ EXTRAD    60
              COMMON /PARM/ PRINT1,PRINT2,PRINT3,COPLOT,ICODES(36),A1,B1,A2,B2,   TEST       5
             1CONTRZ,CONTRV,CONTRS,NFILE,NUMF,NREC,NUMR,VOLTAP                    TEST       6
              COMMON/INSUB/ TL(2),LT,TD4,DN,STARTR,STOPR,RN(4),SCON,CELWTH(3)     TEST1      1
             1,ICOMP,VMIN,SVMIN,ESTART,DELT                                       TEST2      1
              COMMON /AZM/ AZMUTH(460),NA,ELEVAT,PRF,KEEP                         EXTRAD    65
              COMMON /A1024/ MVP(3,1024)                                          EXTRAD    66
              COMMON /VALMAX/ ZMAX,VMAX,AC(4),CALM,CALB,XCUT,CK,INC               EXTRAD    67
              COMMON /ADATA/ IDAY,IHOUR,IMIN,ISEC,NTP,NSF,NDD,NRC                 EXTRAD    68
              COMMON /HEAD/ TITLE(6),ICODE,VERS,LEVEL,DAT,IRUN,NPAGE,NLOG         EXTRAD    69
              COMMON /LINUM/ LINE                                                 EXTRAD    70
      C       ****************************************************************** EXTRAD    71
              COMMON /MORED/ INPRF,SCALE,LDV,LTV,LSV                              EX2        1
              COMMON /STORE/ AE,AA,BB,SL,CL,TV,TSV                                EXTRAD    73
              COMMON /EXPAN/ X1,X2,Y1,Y2,XMIN,XMAX,YMIN,YMAX                      EXTRAD    74
              COMMON /ERROR/ IERR                                                 EXTRAD    75
              COMMON/FILTER/TATRMN,AREAMN,DAZM                                    TEST1      2
              COMMON /VELPRM/ WAVEL                                               EXTRAD    76
              COMMON /QUANTX/ VQUANT,SQUANT,RQUANT                                TEST       8
              COMMON /PWORK/ IPTC(22),TC(30,22),IPCNT(30,22),KMAX,T(50),JMXOB,    TEST       9
             +               JMAX,IPC1(2640),IPC2(2640),IPC3(2640),IAMAX,         TEST      10
             +               IR,JR,KR,IMXJMX                                      TEST      11
              COMMON /FIXED/ IC(4,22,2),IB(4,22,2),NPA,IEMAX,NFC,ICVNT(2),        TEST      12
             +               IBVNT(2),ATR(5,120,2),IAT,NIDF,KDD(2),IDSLOT(120,2)  TEST      13
              COMMON /PRSTORE/ UP(200,3),NUP,IATR(70,29),NUMAX,IACT(70),          TEST      14
             +                 IOC(22),IPTB(22),TB(30,22),IPBNT(30,22),           TEST      15
             +                 IPRNG(50),IPB1(2640),IPB2(2640),IPB3(2640)         TEST      16
              COMMON /PVSTORE/ UV(200,7),NUV,VATR(70,23),NVMAX,IACV(70),          TEST      17
             +                 IOVC(22),IPTVB(22),TVB(30,22),IPBVNT(30,22),       TEST      18
             +                 IPVRNG(60),IPV1(2640),IPV2(2640),IPV3(2640)        TEST      19
              COMMON /PSSTORE/ US(200,5),NUS,SATR(70,17),NSMAX,IACS(70),          TEST      20
             +                 IOSC(22),IPTSB(22),TSB(30,22),IPBSNT(30,22),       TEST      21
             +                 IPSRNG(60),IPS1(2640),IPS2(2640),IPS3(2640)        TEST      22
              COMMON /REFL/W(173),WI(173),VJ(173),HR(173),NCL,NID,NIDF,INCL       TEST2      2
             X,IMX,IMN                                                            TEST2      3
      C       ------------------------------------------------------------------ EXTRAD    78
              DATA PRINT1/.FALSE./,PRINT2/.FALSE./,PRINY3/.FALSE./,COPLOT/.TRUE.  EL         1
             +/,A1/.443/,B1/.56/,A2/.86/,B2/18.6/,CONTRZ/.TRUE./,CONTRV/          EL         2
             +.TRUE./,NFILE/0/,NUMF/30/,NREC/1/,NUMR/99999/,CONTRS/.TRUE./        EL         3
             +,VOLTAP/.TRUE./                                                     TEST      27
              DATA TL/20,40/                                                      TEST      28
              DATA X1/0.0/,X2/8.0/,Y1/0.0/,Y2/8.0/,AE/1.21/,AA/400./,BB/1.4/      EL         4
              DATA SL/0.0/,CL/0.0/,TV/35/,TSV/1000000/                            EXTRAD    84
              DATA LT/2/,STARTR/20./,STOPR/150./,ICOMP/6/                         EL         5
              DATA VMIN/0.0/,SVMIN/0.0/,AREAMN/1.0/,DAZM/1.0/                     TEST1      4
              DATA TOW/0.0/,DN/0.0/,RN/256.0,512.0,768.0,1024.0/                  EXTRAD    87
              DATA CELWTH/0.5,1.042,2.0/                                          EXTRAD    88
              DATA ICODES /1H ,1HA,1HB,1HC,1HD,1HE,1HF,1HG,1HH,1HI,1HJ,1HK,1HL,   TEST      30
             +             1HM,1HN,1HO,1HP,1HQ,1HR,1HS,1HT,1HU,1HV,1HW,1HX,1HY,   TEST      31
```

```
     +          1HZ,1H1,1H2,1H3,1H4,1H5,1H6,1H7,1H8,1H9/                   TEST      32
      DATA ZMAX/0.0/,VMAX/0.0/,AC/-107.76555,1.9767838,-.094297528,.0001 EXTRAD    92
     182263167,CALH/0.332/,CALB/-96.3/,XCUT/10.0/                        EXTRAD    93
      DATA TITLE/7HPROGRAM,7H EXTRAD,1H ,1H ,1H ,1H /                    EXTRAD    94
      DATA IRUN/0/,NPAGE/0/,ICODE/162/,VERS/2.0/,LEVEL/780501/           EL         6
      DATA INPRF/794/                                                    EL         7
      DATA CK/10.0/,INC/0/                                               EL         8
      DATA SCALE/1.0/,LDV/3/,LTV/3/,LSV/3/                               TEST      33
      DATA IERR/0/                                                       EXTRAD    99
      DATA WAVEL/0.0542/                                                 TEST      34
      DATA VQUANT/10.0/,SQUANT/6.0/,RQUANT/1.0/                          EL         9
      DATA NIDF/120/,IAT/5/,NPA/4/,IEMAX/22/,NFC/2/                      TEST      36
      DATA KMAX/30/,JMXDB/50/,JMAX/60/,IAMAX/2640/,IR/4/,JR/30/,KR/22/,  TEST      37
     +     IMXJMX/24/,NCL/173/                                           TEST1      5
      DATA NID/200/,NUP/9/,NIJP/70/,NUMAX/29/                            TEST      39
      DATA NVMAX/23/,NUV/7/,NSMAX/17/,NUS/5/                             TEST      40
      DATA ESTART/1.5/,DELT/.5/                                          EL        10
C     ------------------------------------------------------------------ EXTRAD   102
      END                                                                EXTRAD   103
```

```
            SUBROUTINE INPARM                                                 EXTRAD    104
C$          DEBUG                                                             TEST       41
C$          ARRAYS                                                            TEST       42
C           ****************************************************************  EXTRAD    105
C           VERSION 2.0    LEVEL 761119                                       EXTRAD    106
C           JHW    AFGL    CDC6600                                            EXTRAD    107
C           CONTROL CARD INPUT PARAMETERS.                                    EXTRAD    108
C           ****************************************************************  EXTRAD    109
            LOGICAL PRINT1,PRINT2,PRINT3,COPLOT,CONTRZ,CONTRV,CONTRS,VOLTAP  TEST       43
            INTEGER TL        ,TV,TSV                                         EXTRAD    111
C           ----------------------------------------------------------------  EXTRAD    112
            DIMENSION PROGID(3)                                               EXTRAD    113
            COMMON /PARM/ PRINT1,PRINT2,PRINT3,COPLOT,ICODES(36),A1,B1,A2,B2, TEST       44
           +CONTRZ,CONTRV,CONTRS,NFILE,NUMF,NREC,NUMR,VOLTAP                  TEST       45
            COMMON /VALMAX/ ZMAX,VMAX,AC(4),CALM,CALB,XCUT,CK,INC             EXTRAD    116
            COMMON /HEAD/ TITLE(6),ICODE,VERS,LEVEL,DAT,IRUN,NPAGE,NLOG       EXTRAD    117
            COMMON/INSUB/ TL(2),LT,TDW,DN,STARTR,STOPR,RN(4),SCON,CELWTH(3)   TEST1       6
           1,ICOMP,VMIN,SVMIN,ESTART,DELT                                     TEST2       4
            COMMON /MORED/ INPRF,SCALE,LDV,LTV,LSV                            EX2         3
            COMMON /EXPAN/ X1,X2,Y1,Y2,XMIN,XMAX,YMIN,YMAX                    EXTRAD    121
            COMMON /STORE/ AE,AA,BB,SL,CL,TV,TSV                              EXTRAD    122
            COMMON /LOOKUP/ DBZARY(51),ZARY(61)                               TEST       47
            COMMON/FILTER/TATRMN,AREAMN,DAZM                                  TEST1       7
            COMMON /ADATA/ IDAY,IHOUR,IMIN,ISEC,NTP,NSF,NDD,NRC               EXTRAD    125
            COMMON /VELPRM/ WAVEL                                             EXTRAD    126
            COMMON /QUANTX/ VQUANT,SQUANT,RQUANT                              TEST       48
            COMMON /FIXED/ IC(4,22,2),IB(4,22,2),NPA,IEMAX,NFC,ICVNT(2),      TEST       49
           +               IBVNT(2),ATR(5,120,2),IAT,NIDF,KDD(2),IDSLOT(120,2) TEST      50
C           ----------------------------------------------------------------  EXTRAD    128
            DATA AREAMN/0.0/                                                  EXTRAD    129
            DATA PROGID/7HWILLAND,1H ,1H /                                    EXTRAD    130
            NAMELIST /INPUT/ PRINT1,PRINT2,PRINT3,COPLOT,ICODES,A1,B1,A2,B2,  TEST       51
           +                 CONTRZ,CONTRV,CONTRS,NFILE,NUMF,AC,CALM,CALB,    TEST       52
           +                 XCUT,CK,ZMAX,VMAX,NREC,NUMR,IRUN,INC,TL,LT,TDW,  TEST       53
           +               DN,STARTR,STOPR,INPRF,SCALE,AE,AA,BB,X1,X2,Y1,Y2,  TEST2       5
           +                 TV,TSV,LDV,LTV,LSV,ICOMP,VMIN,SVMIN,AREAMN,WAVEL, TEST      55
           +             VQUANT,SQUANT,RQUANT,VOLTAP,DAZM,ESTART,DELT         TEST2       6
C           ----------------------------------------------------------------  EXTRAD    135
            READ (5,INPUT)                                                    EXTRAD    136
            IF (EOF(5)) 111,1,111                                             EXTRAD    137
1           IF(LDV.LT.2)LDV=2                                                 EXTRAD    138
            IF(LTV.LT.2)LTV=2                                                 EXTRAD    139
            IF(LSV.LT.2)LSV=2                                                 EX2         5
            IF(LSV.GT.3)LSV=3                                                 EX2         6
            IF(LTV.GT.3)LTV=3                                                 EX2         7
            IF(LDV.GT.3)LDV=3                                                 EX2         8
            IF(LT.GT.0.AND.LT.LE.NFC)NFC=LT                                   TEST1      10
            IF(ICOMP.LT.6)ICOMP=6                                             TEST       57
            WRITE(6,INPUT)                                                    EXTRAD    140
            DAZM=DAZM*0.017453                                                TEST1      11
            AR=ALOG10(AA)/BB                                                  EXTRAD    141
            BR=0.1/BB                                                         EXTRAD    142
            SCON=149.89625*ICOMP                                              EXTRAD    143
            BR=BR*RQUANT                                                      TEST       58
            DO 110 I=1,NFC                                                    TEST       59
110         TL(I)=IFIX(FLOAT(TL(I))*RQUANT)                                   TEST       60
            DO 10 IY=1,61                                                     TEST       61
```

```
            JX=TL(1)+IX-1                                                    EXTRAD   145
      C                                                                      EXTRAD   146
      C    PRESET RAIN RATE - 1 DBZ STEPS                                    EXTRAD   147
      C                                                                      EXTRAD   148
            DBZARY(IX)=10.**(BR*FLOAT(JX)-AR)                                EXTRAD   149
      C                                                                      EXTRAD   150
      C  BUILD LINEAR Z TABLE                                                EXTRAD   151
      C                                                                      EXTRAD   152
            ZARY(IX)=10.**(FLOAT(JX)*RQUANT/10.)                             TEST      62
   10       CONTINUE                                                         EXTRAD   154
            IF(.NOT.COPLOT)GO TO 21                                          TEST      63
   11       SCALE=8.0/(Y2-Y1)                                                EXTRAD   168
            IF ((X2-X1).GT.(Y2-Y1)) SCALE=8.0/(X2-X1)                        EXTRAD   169
            XMIN=SCALE*X1                                                    EXTRAD   170
            XMAX=SCALE*X2                                                    EXTRAD   171
            YMIN=SCALE*Y1                                                    EXTRAD   172
            YMAX=SCALE*Y2                                                    EXTRAD   173
   21       IF (.NOT.PRINT2) GO TO 51                                        EXTRAD   174
      C                                                                      EXTRAD   175
      C               PRINT ICODES VALUES.                                   EXTRAD   176
      C                                                                      EXTRAD   177
            CALL PAGE                                                        EXTRAD   178
            WRITE (6,31)                                                     EXTRAD   179
   31       FORMAT (1H0,8X,13HCODE FOR MEAN,7X,5HVALUE,5X,12HCODE FOR VAR,7X,5 EXTRAD 180
           1HVALUE/40X,7HAND PWR)                                            EXTRAD   181
            DO 41 I=1,36                                                     EXTRAD   182
            XA=(FLOAT(I)-B1)/A1                                              EXTRAD   183
            IF (XA.LT.0.) XA=0.                                              EXTRAD   184
            XB=(FLOAT(I)-B2)/A2                                              EXTRAD   185
   41       WRITE (6,51) ICODES(I),XB,ICODES(I),XA                           EXTRAD   186
   51       FORMAT (15X,A1,9X,F9.3,11X,A1,9X,F9.3)                           EXTRAD   187
   61       CONTINUE                                                         EXTRAD   188
            IF (.NOT.PRINT3) GO TO 101                                       EXTRAD   189
            CALL PAGE                                                        EXTRAD   190
            WRITE (6,71)                                                     EXTRAD   191
   71       FORMAT (1H0,8X,13HCODE FOR  DBZ,7X,5HVALUE)                      EXTRAD   192
            DO 81 I=1,36                                                     EXTRAD   193
            XA=(FLOAT(I)-B1)/A1                                              EXTRAD   194
            IF (XA.LT.0.) XA=0.                                              EXTRAD   195
   81       WRITE (6,91) ICODES(I),XA                                        EXTRAD   196
   91       FORMAT (15X,A1,9X,F9.3)                                          EXTRAD   197
  101       CONTINUE                                                         EXTRAD   198
            RETURN                                                           EXTRAD   199
  111       WRITE (6,121)                                                    EXTRAD   200
  121       FORMAT (30H END OF FILE IN NAMELIST INPUT)                       EXTRAD   201
            STOP                                                             EXTRAD   202
            END                                                              EXTRAD   203
```

```
      SUBROUTINE EXTRAT                                                  EXTRAD     204
C     ****************************************************************** EXTRAD     205
C     PJP   MODIFIED 4/27/77          MOD. 1.0                           EXTRAD     206
C     VERSION 1.0   LEVEL=760316                                         EXTRAD     207
C     JHW   AFGL   CDC 6600                                              EXTRAD     208
C     UNPACKING ROUTINE.                                                 EXTRAD     209
C     ****************************************************************** EXTRAD     210
C$    DEBUG                                                              TEST        64
C$    ARRAYS                                                             TEST        65
      LOGICAL PRINT1,PRINT2,PRINT3,COPLOT,CONTRZ,CONTRV,CONTRS,VOLTAP    TEST        66
      INTEGER W,V,VS,SV,VB,VSI                                           TEST        67
      INTEGER TL                                                         EXTRAD     221
C     ------------------------------------------------------------------ EXTRAD     225
      DIMENSION IN(158)                                                  EXTRAD     226
      DIMENSION DAYMSK(3),IDAYSFT(3),HRMSK(2),IHRSFT(2),MINMSK(2),       EXTRAD     227
     CIMINSFT(2),SECMSK(2),ISECSFT(2),MVPMSK(5),IMVPSFT(5)               EXTRAD     228
      COMMON/REFL/W(173),WI(173),VJ(173),HR(173),NCL,NID,NIDP,INCL       TEST2        7
     X,IMX,IMN                                                           TEST2        8
      COMMON /VEL/V(173),VB(173),VS(173),SV(173),VSI(173),               TEST        69
     +          SVI(173),H/(173),HS(173)                                 TEST        70
      COMMON /AZM/ AZMUTH(460),NA,ELEVAT,PRF,KEEP                        EXTRAD     230
      COMMON /PARM/ PRINT1,PRINT2,PRINT3,COPLOT,ICODES(36),A1,B1,A2,B2,  TEST        71
     +          CONTRZ,CONTRV,CONTRS,NFILE,NUMF,NREC,NUMR,VOLTAP         TEST        72
      COMMON /A1024/ MVP(3,1024)                                         EXTRAD     233
      COMMON /VALMAX/ ZMAX,VMAX,AC(4),CALM,CALB,XCUT,CK,INC              EXTRAD     234
      COMMON /ADATA/ IDAY,IHOUR,IMIN,ISEC,NTP,NSF,NOD,NRC                EXTRAD     235
      COMMON /MORED/ INPRF,SCALE,LDV,LTV,LSV                             EX2         18
      COMMON/INSUB/ TL(2),LT,ID4,DN,STARTR,STOPR,RN(4),SCON,CELWTH(3)    TEST1       12
     1,ICOMP,VMIN,SVMIN,ESTART,DELT                                      TEST2        9
      COMMON /AZ2/SINA,COSA,DELTAZ,ISCANF,NEL                            EXTRAD     239
      COMMON /ERROR/ IERR                                                EXTRAD     243
C     ------------------------------------------------------------------ EXTRAD     245
      DATA MVPMSK/77770000000000000000B,                                 EXTRAD     246
     C00007777000000000000B,                                             EXTRAD     247
     C00000000777700000000B,                                             EXTRAD     248
     C00000000000077770000B,                                             EXTRAD     249
     C00000000000000007777B/                                             EXTRAD     250
      DATA DAYMSK/00170000000000000000B,                                 EXTRAD     251
     C03600000000000000000B,                                             EXTRAD     252
     C74000000000000000000B/                                             EXTRAD     253
      DATA HRMSK/00000017000000000000B,                                  EXTRAD     254
     C00000600000000000000B/                                             EXTRAD     255
      DATA   MINMSK/00000000001700000000B,                               EXTRAD     256
     C00000000160000000000B/                                             EXTRAD     257
      DATA SECMSK/00000000000000170000B,                                 EXTRAD     258
     C00000000000001600000B/                                             EXTRAD     259
C     DATA IREGMSK/00007777000000000000B/                                EXTRAD     260
      DATA NSMSK/00000000000000000600B/                                  EXTRAD     261
      DATA VPMSK/00000000000000037700B/                                  EXTRAD     262
      DATA MEANM2/00000000000000001777B/                                 EXTRAD     263
      DATA ISGNMSK/00000000000000020000B/                                EXTRAD     264
      DATA ELMSK/00000000000000007777B/                                  EXTRAD     265
      DATA MEANM1/00000000777700000000B/                                 EXTRAD     266
      DATA VARMSK1/00000000000077770000B/                                EXTRAD     267
      DATA PWRMSK1/00000000000000007777B/                                EXTRAD     268
      DATA AZMSK/00007777000000000000B/                                  EXTRAD     269
      DATA NPSK/74000000000000000000B/                                   EXTRAD     270
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            DATA NRCMSK/00000000000000000030B/                          EXTRAD   271
      C     DATA NSFMSK/00000000000000000600B/                          EXTRAD   272
            DATA NDDMSK/00000000000000000040B/                          EXTRAD   273
            DATA NTPMSK/00000000000000003000B/                          EXTRAD   274
            DATA KMSK/00360000000000000000B/                            EXTRAD   275
      C     DATA IPARMSK/00000000000000040000B/                         EXTRAD   276
            DATA IMVPSFT/12,24,-24,-12,0/                               EXTRAD   277
            DATA IDAYSFT/12,8,4/                                        EXTRAD   278
            DATA IHRSFT/21,17/                                          EXTRAD   279
            DATA IMINSFT/-27,29/                                        EXTRAD   280
            DATA ISECSFT/-12,-16/                                       EXTRAD   281
            DATA DAZT/2.0/                                              TEST      74
            DATA RPD/0.017453/                                          TEST1     13
            DATA IEND/-999/                                             TEST2     10
      C     --------------------------------------------------------------- EXTRAD   293
            ENTODG=360./4096.                                           TEST2     11
            NEL=1                                                       TEST2     12
            IFILE=0                                                     EXTRAD   294
      2     BUFFER IN (1,1)(IN(1),IN(158))                              EXTRAD   295
            IF(UNIT(1))1,231,1                                          EXTRAD   296
      231   WRITE(6,191)                                                EXTRAD   297
            IFILE=IFILE+1                                               EXTRAD   298
      1     IF(IFILE .LT. NFILE) GO TO 2                                EXTRAD   299
      5     IEOF=0                                                      EXTRAD   300
            ISCANF=0                                                    EXTRAD   301
            IREG=SHIFT(IN(2).AND.ELMSK,0)                               TEST2     13
            NA=1                                                        EXTRAD   303
            NEL=NEL+1                                                   TEST2     14
            ELEV=IREG*ENTODG                                            TEST2     15
            IF(ELEV.GT.180.) ELEV=ELEV-360.                             TEST2     16
            IF(ELEV.LE.ESTART) NEL=1                                    TEST2     17
            IAZEND=1                                                    EXTRAD   305
            IERR=0                                                      EXTRAD   306
      12    DO 11 I=1,173                                               TEST      75
            W(I)=0                                                      EXTRAD   308
            V(I)=-999                                                   EXTRAD   309
            VS(I)=-999                                                  EXTRAD   310
      11    SV(I)=-999                                                  EXTRAD   311
      C                                                                 EXTRAD   312
      C           UNPACK DAY HOUR MINUTE SECOND AND STATUS FLAGS.       EXTRAD   313
      C                                                                 EXTRAD   314
      21    IDAY=0                                                      EXTRAD   315
            DO 23 I=1,3                                                 EXTRAD   316
            IDAY=IDAY+10**(I-1)*SHIFT(IN(1) .AND. DAYMSK(I),IDAYSFT(I)) EXTRAD   317
      23    CONTINUE                                                    EXTRAD   318
            IHOUR=0                                                     EXTRAD   319
            DO 25 I=1,2                                                 EXTRAD   320
            IHOUR=IHOUR+10**(I-1)*SHIFT(IN(1) .AND. HRMSK(I),IHRSFT(I)) EXTRAD   321
      25    CONTINUE                                                    EXTRAD   322
            IMIN=0                                                      EXTRAD   323
            DO 27 I=1,2                                                 EXTRAD   324
            IMIN=IMIN+10**(I-1)*SHIFT(IN(1) .AND. MINMSK(I),IMINSFT(I)) EXTRAD   325
      27    CONTINUE                                                    EXTRAD   326
            IHHMM=IHOUR*100+IMIN                                        TEST2     18
            ISEC=0                                                      EXTRAD   327
            DO 29 I=1,2                                                 EXTRAD   328
            ISEC=ISEC+10**(I-1)*SHIFT(IN(1) .AND. SECMSK(I),ISECSFT(I)) EXTRAD   329
```

```
        29   CONTINUE                                                    EXTRAD   330
             NTP=SHIFT(IN(1) .AND. NTPMSK,-9)                             EXTRAD   331
             NSF=SHIFT(IN(1) .AND. NSFMSK,-7)                             EXTRAD   332
             NOD=SHIFT(IN(1) .AND. NODMSK,-5)                             EXTRAD   333
             NRC=SHIFT(IN(1) .AND. NRCMSK,-3)                             EXTRAD   334
        C                                                                 EXTRAD   335
        C             UNPACK PRF AZIMUTH, AND ELEVATION.                  EXTRAD   336
        C                                                                 EXTRAD   337
             K=SHIFT(IN(2) .AND. NMSK,4)                                  EXTRAD   338
             N=SHIFT(IN(2) .AND. KMSK,11)                                 EXTRAD   339
             PRF=INPRF                                                    EXTRAD   340
             IF (K.EQ.0.AND.N.EQ.0) GO TO 51                              EXTRAD   341
             JA=0                                                         EXTRAD   342
             JB=0                                                         EXTRAD   343
             DO 31 I=1,4                                                  EXTRAD   344
             IREG=2**(I-1)                                                EXTRAD   345
             IF ((IREG.AND.N).NE.0) JA=JA+1                               EXTRAD   346
             IF ((IREG.AND.K).NE.0) JB=JB+1                               EXTRAD   347
        31   CONTINUE                                                     EXTRAD   348
             IF (JA.EQ.1.AND.JB.EQ.1) PRF=394.                            EXTRAD   349
             IF (JA.EQ.1.AND.JB.EQ.3) PRF=794.                            EXTRAD   350
             IF (JA.GE.3.AND.JB.LE.1) PRF=1613.                           EXTRAD   351
             IF (JA.GE.3.AND.JB.GE.3) PRF=3333.                           EXTRAD   352
             GO TO 51                                                     EXTRAD   353
        51   CONTINUE                                                     EXTRAD   354
             IREG=SHIFT(IN(2) .AND. AZMSK,24)                             EXTRAD   355
             AZMUTH(NA)=IREG*ENTODG                                       TEST2     19
             IREG=SHIFT(IN(2) .AND. ELMSK,0)                              EXTRAD   357
             ELEVAT=IREG*ENTODG                                           TEST2     20
             IF (ELEVAT.GT.180.) ELEVAT=ELEVAT-360.                       EXTRAD   359
        C                                                                 EXTRAD   360
        C             UNPACK THE DATA.                                    EXTRAD   361
        C             NSF IS SUBFRAME.                                    EXTRAD   362
        C                                                                 EXTRAD   363
             K=NSF*256+1                                                  EXTRAD   364
             KEEP=K                                                       EXTRAD   365
        C                                                                 EXTRAD   366
        C             UNPACK FIRST DATA WORD.                             EXTRAD   367
        C                                                                 EXTRAD   368
             MVP(1,K)=SHIFT(IN(3) .AND. MEANM1,-24)                       EXTRAD   369
             MVP(2,K)=SHIFT(IN(3) .AND. VARMSK1,-12)                      EXTRAD   370
             MVP(3,K)=SHIFT(IN(3) .AND. PWRMSK1,0)                        EXTRAD   371
             N=3                                                          EXTRAD   372
        C                                                                 EXTRAD   373
        C             UNPACK REMAINING DATA.                              EXTRAD   374
        C                                                                 EXTRAD   375
        61   DO 65 I=1,3                                                  EXTRAD   376
             N=N+1                                                        EXTRAD   377
             DO 63 J=1,5                                                  EXTRAD   378
             IF(I .EQ. 1 .AND. (J .EQ. 1 .OR. J .EQ. 4))K=K+1             EXTRAD   379
             IF(I .EQ. 1 .AND. (J .EQ. 1 .OR. J .EQ. 4))M=1               EXTRAD   380
             IF(I .EQ. 2 .AND. (J .EQ. 2 .OR. J .EQ. 5))K=K+1             EXTRAD   381
             IF(I .EQ. 2 .AND. (J .EQ. 2 .OR. J .EQ. 5))M=1               EXTRAD   382
             IF(I .EQ. 3 .AND. (J .EQ. 3))K=K+1                           EXTRAD   383
             IF(I .EQ. 3 .AND. (J .EQ. 3))M=1                             EXTRAD   384
             MVP(M,K)=SHIFT(IN(N) .AND. MVPMSK(J),IMVPSFT(J))             EXTRAD   385
             M=M+1                                                        EXTRAD   386
```

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        63   CONTINUE                                                        EXTRAD   387
        65   CONTINUE                                                        EXTRAD   388
             IF(N .LT. 155) GO TO 61                                         EXTRAD   389
        C                                                                    EXTRAD   390
        C           CLEAN OFF EXTRA BITS.                                    EXTRAD   391
        C                                                                    EXTRAD   392
             DO 71 I=KEEP,K                                                  EXTRAD   393
        C    IPAR1=SHIFT(MVP(1,I) .AND. IPARMSK,-11)                         EXTRAD   394
             IREG=SHIFT(MVP(1,I) .AND. ISGNMSK,-10)                          EXTRAD   395
             MVP(1,I)=MVP(1,I) .AND. MEANM2                                  EXTRAD   396
             IF (IREG.GT.0) MVP(1,I)=-MVP(1,I)                               EXTRAD   397
        C    IPAR2=SHIFT(MVP(2,I) .AND. IPARMSK,-11)                         EXTRAD   398
             MVP(2,I)=SHIFT(MVP(2,I) .AND. VPMSK,-3)                         EXTRAD   399
        C    IPAR3=SHIFT(MVP(3,I) .AND. IPARMSK,-11)                         EXTRAD   400
             MVP(3,I)=SHIFT(MVP(3,I) .AND. VPMSK,-3)                         EXTRAD   401
        71   CONTINUE                                                        EXTRAD   402
        C                                                                    EXTRAD   405
        C           GET NEXT TAPE RECORD.                                    EXTRAD   406
        C                                                                    EXTRAD   407
        81   BUFFER IN (1,1) (IN(1),IN(158))                                 EXTRAD   408
             IF (UNIT(1)) 91,111,201                                         EXTRAD   409
        201  WRITE(6,211)                                                    EXTRAD   410
        91   NC=SHIFT(IN(1).AND.NRCMSK,-3)                                   EXTRAD   411
             NP=SHIFT(IN(1).AND.NTPMSK,-9)                                   EXTRAD   412
             IF(NC.NE.NRC.OR.NP.NE.NTP)GOTO 121                              EXTRAD   413
             NS=SHIFT(IN(1).AND.NSMSK,-7)                                    EXTRAD   414
             IREG=SHIFT(IN(2) .AND. AZMSK,24)                                EXTRAD   415
             AZ=IREG*ENTODG                                                  TEST2     21
             IF((NS .GT. NSF .AND. NRC .GE. NST.OR. AZ .EQ. AZMUTH(NA)) GOTO 21 EXTRAD   417
             IREG=SHIFT(IN(2).AND.ELMSK,0)                                   TEST2     22
             EL=IREG*ENTODG                                                  TEST2     23
             IF(EL.GT.180.) EL=EL-360.                                       TEST2     24
        C  FINISHED RADIAL,TEST FOR END OF SCAN                              EXTRAD   418
             DAZ=AZ-AZMUTH(NA)                                               EXTRAD   419
             DELTAZ=DAZ                                                      EXTRAD   420
             IF (ABS(DAZ).GT.DAZT) GO TO 101                                 EXTRAD   421
             DAZS=SIGN(1.,DAZ)                                               EXTRAD   422
             IF(NA.EQ.1)DAZF=DAZS                                            EXTRAD   423
             IF (DAZF.EQ.DAZS) GO TO 141                                     EXTRAD   424
        101  AZ=AZ+360.*DAZF                                                 EXTRAD   425
             DAZ=AZ-AZMUTH(NA)                                               EXTRAD   426
             DELTAZ=DAZ                                                      EXTRAD   427
             IF (ABS(DAZ).GT.DAZT) GO TO 121                                 EXTRAD   428
             DAZS=SIGN(1.,DAZ)                                               EXTRAD   429
             IF (DAZF.NE.DAZS) GO TO 121                                     EXTRAD   430
        141  DAZE=AZ-AZMUTH(1)                                               EXTRAD   431
             IF(ABS(DAZE).GT.DAZT)IAZEND=0                                   EXTRAD   432
             DAZES=SIGN(1.,DAZE)                                             EXTRAD   433
             IF(ABS(DAZE).LT.DAZT.AND.IAZEND.EQ.0.AND.DAZES.EQ.DAZF)GO TO 122 EXTRAD  434
             DELTAZ=ABS(DELTAZ*RPD)                                          TEST2     25
             IF(ABS(EL-ELEVAT).GT.DELT)GO TO 121                             TEST2     26
             ELEV=ELEV+ELEVAT                                                TEST1     16
             CALL COMPZ                                                      EXTRAD   435
             CALL CONTOR                                                     TEST      76
        161  NA=NA+1                                                         EXTRAD   441
             IF(NA .GT. NUMR)GOTO 121                                        EXTRAD   442
             GOTO 12                                                         EXTRAD   443
```

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      C     FINISHED SCAN                                   EXTRAD    444
        122 ISCANF=+1                                       TEST2      27
            GO TO 131                                       EXTRAD    446
        111 IEOF=1                                          EXTRAD    447
        121 ISCANF=-1                                       EXTRAD    448
        131 IF(NA.LE.10)GO TO 132                           EXTRAD    449
            ISCANT=ISCANF                                   TEST1      18
            ISCANF=0                                        TEST1      19
            ELEV=ELEV+ELEVAT                                TEST1      20
            DELTAZ=ABS((AZMUTH(NA)-AZMUTH(NA-1)))*RPD       TEST2      28
            CALL COMPZ                                      TEST1      22
            CALL CONTOR                                     TEST1      23
            ISCANF=ISCANT                                   TEST1      24
            ELEVAT=ELEV/NA                                  TEST1      25
            CALL CONTRZ                                     TEST       77
        132 REWIND 4                                        EXTRAD    455
            REWIND 9                                        EXTRAD    456
            IF(COPLOT) WRITE(2)IDAY,IHHMM,IEND              TEST2      29
            IF (IEOF.EQ.1) GO TO 181                        EXTRAD    457
            IF (NA.GE.NUMR) RETURN                          EXTRAD    458
            GOTO 5                                          EXTRAD    459
        181 WRITE (6,191)                                   EXTRAD    460
            IFILE=IFILE+1                                   EXTRAD    461
            IF(IFILE .LT. NUMF+NFILE) GO TO2                EXTRAD    462
        191 FORMAT (19H EOF READ ON UNIT 1)                 EXTRAD    463
        211 FORMAT (21H PARITY ERR ON UNIT 1)               EXTRAD    464
        221 RETURN                                          EXTRAD    465
            END                                             EXTRAD    466
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      SUBROUTINE COMPZ                                                   EXTRAD   467
C$    DEBUG                                                              TEST      78
C$    ARRAYS                                                             TEST      79
C     ****************************************************************** EXTRAD   468
C     VERSION 2.0   LEVEL 761119                                         EXTRAD   469
C     JHW   AFGL   CDC6600                                               EXTRAD   470
C     COMPUTES DBZ.                                                      EXTRAD   471
C     ****************************************************************** EXTRAD   472
      INTEGER WM                                                         TEST1     26
      INTEGER W,V,VS,SV,VB,VSI                                           TEST      80
      INTEGER TL,VL,VAV,VAVA,VMX,VMD,VELFIN,VARMIN,SVTAB(512)            TEST      81
C     ------------------------------------------------------------------ EXTRAD   475
      COMMON /A1024/ MVP(3,1024)                                         EXTRAD   476
      COMMON /AZM/ AZMUTH(460),NA,ELEVAT,PRF,KEEP                        EXTRAD   479
      COMMON /VALMAX/ ZMAX,VMAX,AC(4),CALM,CALB,XCUT,CK,INC              EXTRAD   480
      COMMON /ADATA/ IDAY,IHOUR,IMIN,ISEC,NTP,NSF,NDD,NRC                EXTRAD   481
      COMMON/INSUB/ TL(2),LT,TDW,DN,STARTR,STOPR,RN(4),SCON,CELWTH(3)    TEST1     27
     1,ICOMP,VMIN,SVMIN,ESTART,DELT                                      TEST2     30
      COMMON /AZ2/ SINA,COSA,DELTAZ,ISCANF,NEF                           EXTRAD   484
      COMMON /VELPRM/ WAVEL                                              EXTRAD   485
      COMMON /FILTER/TATRMN,AREAMN,DAZM                                  TEST1     28
      COMMON /QUANTX/ VQUANT,SQUANT,RQUANT                               TEST      63
      COMMON/REFL/W(173),WI(173),VJ(173),HR(173),NCL,NID,NIDP,INCL       TEST2     31
     X,IMX,IMN                                                           TEST2     32
      COMMON /VEL/V(173),VB(173),VS(173),SV(173),VSI(173),               TEST      85
     +             SVI(173),HV(173),HS(173)                              TEST      86
C     ------------------------------------------------------------------ EXTRAD   489
C                                                                        EXTRAD   490
C             FETCH NUMBER OF RANGE CELLS (N).                           EXTRAD   491
C                                                                        EXTRAD   492
      IFLAG=0                                                            TEST1     29
      IF(NA.NE.1)GO TO 100                                               EXTRAD   494
      NPCL=0                                                             EXTRAD   495
      NTPL=0                                                             EXTRAD   496
      PRFL=0                                                             EXTRAD   497
  100 IF(NRCL.EQ.NRC.AND.NTP.EQ.NTPL.AND.PRF.EQ.PRFL)GO TO 5             EXTRAD   498
      VCON=(WAVEL/4.)*PRF/2047.                                          TEST1     30
      PRFL=PRF                                                           EXTRAD   500
      VCON2=(VCON*2047.)*(VCON*2047.)*0.2026/511*SQUANT*SQUANT           TEST1     31
      DO 1001 IX=1,512                                                   TEST      89
 1001 SVTAB(IX)=IFIX(SQRT(VCON2*FLOAT(IX-1)))                            TEST1     32
      VCON=VCON*VQUANT                                                   TEST      91
      VMX=VCON*1024                                                      EXTRAD   502
      VMD=VMX*2                                                          EXTRAD   503
      VELMIN=VMIN/VCON                                                   EXTRAD   504
      VARMIN=SVMIN/VCON2                                                 EXTRAD   505
      NN=RN(NRC+1)+1                                                     EXTRAD   506
      ISKP=6                                                             TEST2     33
      MM=STOPR*1000./(SCON*CELWTH(NTF+1))*FLOAT(ICOMP)+1+ISKP            TEST2     34
      MM=MIN0(MM,NN)-1                                                   TEST1     34
      N=(MM-ISKP)/ICOMP                                                  TEST2     35
      INCL=N+2                                                           TEST2     36
      IF(INCL.GT.NCL) INCL=NCL                                           TEST2     37
      IMX=N+1                                                            TEST2     38
C                                                                        EXTRAD   508
C   COMPRESS DATA BY ICOMP                                               EXTRAD   509
C                                                                        EXTRAD   510
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          ISTCL=1                                                      EXTRAD    512
          IDD3=ICOMP+ISKP                                              EXTRAD    513
          IF(STARTR .EQ. 0.) GO TO 5                                   EXTRAD    514
          ISTCL=(STARTR*1000./(SCON*CELWTH(NTP+1)))+1                  TEST1      36
          M=ISTCL                                                      TEST1      37
          IMN=M+1                                                      TEST2      39
          IDD3=ICOMP*ISTCL+ISKP                                        EXTRAD    516
    5     DO 3 K=IDD3,MM,ICOMP                                         EXTRAD    517
          J=(K-ISKP)/ICOMP                                             EXTRAD    518
          DO 3 I=1,3                                                   EXTRAD    519
          IREG=0                                                       EXTRAD    520
          IDD1=K-ICOMP+1                                               EXTRAD    521
          DO 1 IX=IDD1,K                                               EXTRAD    522
    1     IREG=IREG+MVP(I,IX)                                          EXTRAD    523
          MVP(I,J)=IREG/ICOMP                                          EXTRAD    524
    3     CONTINUE                                                     EXTRAD    525
    C                                                                  EXTRAD    528
    C              COMPUTE DBZ                                         EXTRAD    529
    C                                                                  EXTRAD    530
          IF(NTP.EQ.NTPL.AND.NRC.EQ.NRCL)GO TO 11                      EXTRAD    531
    C                                                                  EXTRAD    532
    C     BUILD LOOK UP TABLE FOR CALIBRATION ON CELL WIDTH CHANGE     EXTRAD    533
    C                                                                  EXTRAD    534
          DO 7 JX=M,N                                                  EXTRAD    535
    7     VJ(JX)=CK+20.*ALOG10((SCON*(FLOAT(JX)-.5))*CELWTH(NTP+1))+.5 EXTRAD    536
          NRCL=NRC                                                     EXTRAD    537
          NTPL=NTP                                                     EXTRAD    538
          DELR=SCON*CELWTH(NTP+1)                                      EXTRAD    539
          TATMWK=AREAMN*1.E06/DELR                                     EXTRAD    540
          NRCP=NRC+1                                                   EXTRAD    541
          WRITE(6,200)NRCP,DELR,PRF                                    EXTRAD    542
  200     FORMAT(10X,20HNO OF RECORDS/RADIAL,I3, 6X,10HCELL WIDTH,     EXTRAD    543
         *F7.1,2X,6HMETERS,6X,3HPRF,F8.1)                              EXTRAD    544
   11     VL=-999                                                      EXTRAD    545
          IVA=0                                                        EXTRAD    546
           IVS=0                                                       EXTRAD    547
          VAVA=0                                                       EXTRAD    548
          IF(NA .EQ. 1) VAS=0                                          EXTRAD    549
          VAV=VAS                                                      EXTRAD    550
          WM=0                                                         TEST1      38
          DO 41 J=M,N                                                  EXTRAD    551
          JP=J+1                                                       EXTRAD    552
          P=MVP(3,J)                                                   EXTRAD    553
          IF (P.LE.XCUT) GO TO 21                                      EXTRAD    554
    C                                                                  EXTRAD    555
    C              USE LINEAR CALIBRATION.                             EXTRAD    556
    C                                                                  EXTRAD    557
          P=P*CALM+CALB                                                EXTRAD    558
          GO TO 31                                                     EXTRAD    559
    C                                                                  EXTRAD    560
    C              USE NON LINEAR CALIBRATION.                         EXTRAD    561
    C                                                                  EXTRAD    562
   21     P=AC(1)+AC(2)*P+AC(3)*P**2+AC(4)*P**3                        EXTRAD    563
   31     W(J+1)=IFIX(P+VJ(J))*ROJANT                                  TEST       92
          WM=MAX0(WM,W(JP))                                            TEST1      39
          IF(W(J+1) .LT. TL(1))  W(J+1)=0                              EXTRAD    565
    C                                                                  EXTRAD    566
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C        COMPUTE V                                                      EXTRAD   567
C                                                                       EXTRAD   568
         IF(IABS(MVP(1,J)) .LT. VELMIN) W(JP)=0                         EXTRAD   569
         IF(IABS(MVP(2,J)) .LT. VARMIN) W(JP)=0                         EXTRAD   570
         IF(W(JP) .LE. TL(I)) GO TO 37                                  EXTRAD   571
         V(J+1)=IFIX(VCON*FLOAT(MVP(1,J)))                              EXTRAD   572
         IF(VL .EQ. -999) VL=VAV                                        EXTRAD   573
         IF(V(JP) -VL .GT. VMX) V(JP)= V(JP)-VMD                        EXTRAD   574
         IF(VL-V(JP) .GT.VMX) V(JP)=V(JP)+VMD                           EXTRAD   575
         IF(VB(JP) .EQ. -999 .OR. NA .EQ. 1)GO TO 37                    EXTRAD   576
         IF (V(JP) -VB(JP) .GT. VMX) V(JP)=V(JP) -VMD                   EXTRAD   577
         IF(VB(JP)-V(JP) .GT. VMX) V(JP)=V(JP)+VMD                      EXTRAD   578
         VAVA=VAVA + V(JP)                                              EXTRAD   579
         IVS=IVS+1                                                      EXTRAD   580
         GO TO 35                                                       EXTRAD   581
37       IF(IVS .LE. 10) GO TO  33                                      EXTRAD   582
         VAV=VAVA/IVS                                                   EXTRAD   583
         IF( IVA .EQ. 0) VAS =VAV                                       EXTRAD   584
         IVA =1                                                         EXTRAD   585
33       VAVA =0                                                        EXTRAD   586
         IVS=0                                                          EXTRAD   587
35       VL=V(JP)                                                       EXTRAD   588
         IF(V(JP) .EQ.-999) GOTO 41                                     EXTRAD   589
         IF(MVP(2,J).LT.0.OR.MVP(2,J).GT.511)GO TO 4111                 TEST1     40
         SV(JP)=SVTAB(MVP(2,J)+1)                                       TEST1     41
4111     IF(VB(J+1).EQ.-999.OR.NA.EQ.1)GO TO 41                         TEST      95
         R=SCON*(FLOAT(JP)-.5)*CELWTH(NTP+1)                            EXTRAD   592
         VS(JP)=(V(JP)-VB(JP))/R*1000./DELTAZ                           TEST1     42
41       CONTINUE                                                       EXTRAD   594
         DO 45 JP=3,N                                                   EXTRAD   595
         IF(V(JP-1) .EQ. -999 .OR. V(JP) .EQ. -999 .OR. V(JP+1) .EQ. -999)   EXTRAD   596
        1 GOTO 45                                                       EXTRAD   597
         IVMEAN=(V(JP+1)+V(JP-1))/2                                     EXTRAD   598
         IF(V(JP)-IVMEAN .GT. VMX) V(JP)=V(JP)-VMD                      EXTRAD   599
         IF(IVMEAN-V(JP) .GT. VMX) V(JP)=V(JP)+VMD                      EXTRAD   600
45       CONTINUE                                                       EXTRAD   601
         DO 51 J=1,NCL                                                  EXTRAD   602
51       VB(J)=V(J)                                                     EXTRAD   603
         IF(IFLAG.EQ.0.OR.WH.GT.70) RETURN                              TEST1     43
         WRITE(6,300)M,N,(W(J),V(J),VS(J),SV(J),J=M,N)                  EXTRAD   605
300      FORMAT(1X,2I4,/,(1X,20I5/))                                    EXTRAD   606
         RETURN                                                         EXTRAD   607
         END                                                            EXTRAD   608
```

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      SUBROUTINE CONTOR                                                 TEST      96
C     ***************************************************************** EXTRAD   614
C$    DEBUG                                                             EX2       24
C$    ARRAYS                                                            TEST      97
C     VERSION 2.0   LEVEL 761119                                        EXTRAD   615
C     JHW   AFGL   CDC6600                                              EXTRAD   616
C       FIXED CONTOURS, PEAK DETECTION, EVENT ASSOCIATION.              EXTRAD   617
C     ***************************************************************** EXTRAD   618
      LOGICAL PRINT1,PRINT2,PRINT3,COPLOT,CONTRZ,CONTRV,CONTRS,VOLTAP   TEST      98
      INTEGER W,WI,HR,TL,TV,TS                                          TEST2     40
      INTEGER V,VB,VS,SV,VSI,SVI,HV,HS                                  TEST     100
      REAL DI(22),HZ(2,15,22),VI(3,15,22),CI(3,22,2),DSI(120),          TEST     101
     +          ZH(12,15,1),CTR(22,2)                                   TEST2     41
C     ----------------------------------------------------------------- EXTRAD   633
      COMMON/INSUB/ TL(2),LT,TJW,JN,STARTR,STOPR,RN(4),SCON,CELWTH(3)   TEST1     44
     1,ICOMP,VPIN,SVMIN,ESTART,DELT                                     TEST2     42
      COMMON /PARM/ PRINT1,PRINT2,PRINT3,COPLOT,ICODES(36),A1,B1,A2,B2, TEST     104
     +              CONTRZ,CONTRV,CONTRS,NFILE,NUMF,NREC,NUMR,VOLTAP    TEST     105
      COMMON /A1024/ MVP(3,1024)                                        EXTRAD   639
      COMMON /AZM/ AZMUTH(460),NA,ELEVAT,PRF,KEEP                       EXTRAD   640
      COMMON /VALMAX/ ZMAX,VMAX,AC(4),CALM,CALB,XCUT,CK,INC             EXTRAD   641
      COMMON /ADATA/ IDAY,IHOUR,IMIN,ISEC,NTP,NSF,NDD,NRC               EXTRAD   642
      COMMON /MORED/ INPRF,SCALE,LDV,LTV,LSV                            EX2       29
      COMMON /STORE/ AE,AA,BB,SL,DL,TV,TSV                              EXTRAD   644
      COMMON /AZ2/SINA,COSA,DELTAZ,ISCANF,NEL                           EXTRAD   647
      COMMON /LOOKUP/ DBZARY(51),ZARY(61)                               TEST     106
      COMMON/FILTER/TATRMN,AREAMN,DAZM                                  TEST1     45
      COMMON /ERROR/ IERR                                               EXTRAD   650
      COMMON /QUANTX/ VQUANT,SQUANT,RQUANT                              TEST     107
      COMMON /FIXED/ IC(4,22,2),IB(4,22,2),NPA,IEMAX,NFC,ICVNT(2),      TEST     108
     +              IBVNT(2),ATR(5,120,2),IAT,NIDF,KDD(2),IDSLOT(120,2) TEST     109
      COMMON /VEL/ V(173),VB(173),VS(173),SV(173),VSI(173),SVI(173),    TEST     110
     +             HV(173),HS(173)                                      TEST     111
      COMMON /PRSTORE/ UP(200,3),NUP,TATR(70,29),NUMAX,IACT(70),        TEST     112
     +                 IDC(22),IPTB(22),TB(30,22),IPBNT(30,22),         TEST     113
     +                 IPRNG(60),IPB1(2640),IPB2(2640),IPB3(2640)       TEST     114
      COMMON /PVSTORE/ UV(200,7),NUV,VATR(70,23),NVMAX,IACV(70),        TEST     115
     +                 IDVC(22),IPTVB(22),TVB(30,22),IPBVNT(30,22),     TEST     116
     +                 IPVRNG(60),IPV1(2640),IPV2(2640),IPV3(2640)      TEST     117
      COMMON /PSSTORE/ US(200,5),NUS,SATR(70,17),NSMAX,IACS(70),        TEST     118
     +                 IDSC(22),IPTSB(22),TSB(30,22),IPBSNT(30,22),     TEST     119
     +                 IPSRNG(60),IPS1(2640),IPS2(2640),IPS3(2640)      TEST     120
      COMMON/REFL/W(173),WI(173),VJ(173),HR(173),NNCL,NID,NIDP,NCL      TEST2     43
     X,IMX,IMN                                                          TEST2     44
      COMMON /PWORK/ IPTC(22),TC(30,22),IPCNT(30,22),KMAX,T(50),        TEST1     46
     +               JMXDB,JMAX,IPC1(2640),IPC2(2640),IPC3(2640),       TEST1     47
     +               IAMAX,IR,JR,KR,IMXJMX                              TEST1     48
C     ----------------------------------------------------------------- EXTRAD   652
      DATA RPD/.017453/                                                 EXTRAD   653
      DATA IFUP/3000/,IPDN/2000/                                        EXTRAD   654
      DATA IVUP/4000/,ITUP/5000/,ISUP/6000/,ISSP/7000/                  EX2       33
      DATA NHZ/2/,NVI/3/,NZH/15/,NZP/12/,NPB/3/,NNE/1/                  TEST     122
C     ----------------------------------------------------------------- EXTRAD   656
C             NTP=CELL WIDTH 0,1,2  MEANING .5,1.042,2.                 EXTRAD   657
C             NSF=SUBFRAME 0,1,2,3                                      EXTRAD   658
C             NDD=FREQ. OF DUMP PULSES    ALT=0,ALL=1                   EXTRAD   659
C             NRC=NO. RANGE CELLS   0,1,2,3  MEANING 256,512,768,1024   EXTRAD   660
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      C     ------------------------------------------------------------- EXTRAD   661
            IFLAG=0                                                       TEST1     49
            IF(IFLAG.EQ.1)PRINT 7,(W(IX),IX=1,173)                        TEST     124
            RANG=SCON/ICOMP*(RN(NRC+1)-.5)/4.                             TEST1     50
            SCONC=SCON/RANG                                               TEST1     51
            RANG=RANG*CELWTH(NTP+1)/1000.                                 TEST1     52
      7     FORMAT(1X,20I5)                                               EXTRAD   664
            IF (.NOT.PRINT3) GO TO 1                                      EXTRAD   665
            IF (NA.EQ.1) CALL PRANG                                       EXTRAD   666
            CALL PRN2(1)                                                  EXTRAD   668
      1     CONTINUE                                                      EXTRAD   670
            IF(NA.EQ.1)WRITE(2)RN(NRC+1),CELWTH(NTP+1),ELEVAT             TEST     126
            AZNOW=AZMUTH(NA)                                              TEST1     53
            IF (NA.EQ.1) GO TO 11                                         EXTRAD   671
            TEMP=AZMUTH(NA-1)                                             EXTRAD   672
            TEMP=TEMP*RPD                                                 EXTRAD   675
            GO TO 61                                                      EXTRAD   676
      C                                                                   EXTRAD   677
      C                 INITIALIZE.                                       EXTRAD   678
      C                                                                   EXTRAD   679
      11    TEMP=0.0                                                      EXTRAD   680
            SL=SIN(ELEVAT*RPD)/1000.                                      EXTRAD   683
            CL=COS(ELEVAT*RPD)**2/A:/6.731E09                             EXTRAD   684
            NCEL=1                                                        EXTRAD   685
            NVCEL=1                                                       EXTRAD   686
            NSCEL=1                                                       EX2       34
            DO 312 J=1,NID                                                TEST     127
            DO 313 K=1,NUP                                                TEST     128
      313   UP(J,K)=0.0                                                   TEST     129
            DO 314 K=1,NUV                                                TEST     130
      314   UV(J,K)=0.0                                                   TEST     131
            DO 315 K=1,NUS                                                TEST     132
      315   US(J,K)=0.0                                                   TEST     133
      312   CONTINUE                                                      TEST     134
            DO 31 K=1,NIDF                                                TEST     135
            DSI(K)=0.                                                     EXTRAD   688
      31    CONTINUE                                                      EXTRAD   689
            DO 3111 J=1,NCL                                               TEST     136
            WI(J)=W(J)                                                    TEST     137
            VSI(J)=VS(J)                                                  TEST     138
      3111  SVI(J)=SV(J)                                                  TEST     139
            DO 32 J=1,NNE                                                 EXTRAD   690
            DO 32 L=1,NZH                                                 EXTRAD   691
            DO 32 K=1,NZP                                                 EXTRAD   692
      32    ZH(K,L,J)=0.0                                                 EXTRAD   693
            DO 41 K=1,NIDF                                                TEST     140
            DO 41 J=1,IAT                                                 EXTRAD   695
            DO 41 L=1,NFC                                                 EXTRAD   696
      41    ATR(J,K,L)=0.0                                                EXTRAD   697
            DO 51 K=1,NFC                                                 EXTRAD   698
            DO 51 L=1,IEMAX                                               EXTRAD   699
            CTR(L,K)=0.                                                   TEST2     45
            DO 51 J=1,NPA                                                 EXTRAD   700
            IB(J,L,K)=0                                                   EXTRAD   701
      51    IC(J,L,K)=0                                                   EXTRAD   702
            DO 52 J=1,NFC                                                 EXTRAD   703
            IBVHT(J)=0                                                    TEST1     54
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              ICVNT(J)=0                                           TEST2      46
              KDD(J)=0                                             EX1        17
              DO 52 K=1,NIDF                                       TEST      141
              IDSLOT(K,J)=0                                        EXTRAD    705
           52 CONTINUE                                             EXTRAD    706
              KNID=1                                               EXTRAD    707
      61      CONTINUE                                             EXTRAD    708
      C                                                            EXTRAD    709
              DO 71 K=1,IEMAX                                      EXTRAD    710
              DO 71 J=1,NZH                                        EXTRAD    711
              DO 71 L=1,NHZ                                        EXTRAD    712
      71      HZ(L,J,K)=0.0                                        EXTRAD    713
              DO 81 K=1,IEMAX                                      EXTRAD    714
              DO 81 J=1,NVI                                        EXTRAD    715
              DO 81 L=1,NZH                                        EXTRAD    716
      81      VI(J,L,K)=0.0                                        EXTRAD    717
              DO 91 K=1,IEMAX                                      EXTRAD    718
              DO 91 J=1,NFC                                        EXTRAD    719
              DO 91 L=1,NPB                                        EXTRAD    720
      91      CI(L,K,J)=0.0                                        EXTRAD    721
              DO 101 K=1,IEMAX                                     EXTRAD    722
              DI(K)=0.0                                            EXTRAD    723
              IDC(K)=0                                             EXTRAD    724
              IDVC(K)=0                                            EXTRAD    725
              IDSC(K)=0                                            EX2        35
      101     CONTINUE                                             TEST      142
              DO 102 J=1,JMAX                                      TEST      143
              IPRNG(J)=0                                           TEST      144
              IPVRNG(J)=0                                          TEST      145
              IPSRNG(J)=0                                          TEST      146
      102     CONTINUE                                             TEST      147
      111     CONTINUE                                             EXTRAD    732
              IPS=0                                                EX2        37
              IPV=0                                                EXTRAD    733
              IP=0                                                 EXTRAD    734
              IPB=0                                                EXTRAD    735
              IPVB=0                                               EXTRAD    736
              IPSB=0                                               EX2        38
      C                                                            EXTRAD    737
      C                    FIND EVENTS                             EXTRAD    738
      C                                                            EXTRAD    739
              DO 201 I=IMN,NCL                                     TEST2      47
              DO 231 K=1,NFC                                       EXTRAD    741
              IF (W(I).GT.TL(K)) GO TO 131                         EXTRAD    742
              GO TO 241                                            EXTRAD    743
      131     IF (W(I-1).LE.TL(K)) GO TO 141                       EXTRAD    744
              GO TO 151                                            EXTRAD    745
      141     ICVNT(K)=ICVNT(K)+1                                  EXTRAD    746
              IF(ICVNT(K).LE.IEMAX)GO TO 1411                      EX1        18
              WRITE(6,1412)IEMAX,K                                 EX1        19
      1412    FORMAT(1X,*EVENT COUNTER EXCEEDED MAX VALUE, IMAX=*,I6,5X,   EX1   20
             **K=*,I4)                                             EX1        21
              ICVNT(K)=IEMAX                                       EX1        22
      1411    IEVENT=ICVNT(K)                                      EX1        23
              IF (K.EQ.1) IE0=IEVENT                               EXTRAD    748
              IC(1,IEVENT,K)=I-1                                   EXTRAD    749
              IC(3,IEVENT,K)=IE0                                   EXTRAD    750
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      C                                                           EXTRAD  751
      C          TALLY ATTRIBUTES.                                EXTRAD  752
      C                                                           EXTRAD  753
  151 R=SCON*(FLOAT(I-1)-.5)*DELWTH(NTP+1)                        EXTRAD  754
      INDX=W(I)-YL(I)+1                                           EXTRAD  755
      IF(INDX.GT.61)INDX=61                                       TEST    148
      IF(INDX.LE.0) INDX=1                                        TEST2    48
      WR=R*ZARY(INDX)                                             EXTRAD  757
      IEVENT=ICVNT(K)                                             EXTRAD  758
      CI(1,IEVENT,K)=CI(1,IEVENT,K)+R                             EXTRAD  759
      CI(2,IEVENT,K)=CI(2,IEVENT,K)+WR                            EXTRAD  760
      CI(3,IEVENT,K)=CI(3,IEVENT,K)+R*WR                          EXTRAD  761
      IF (K.NE.1) GO TO 231                                       EXTRAD  762
      C                                                           EXTRAD  763
      C          PEAK DETECTION, LOCATE AND COUNT PEAKS.          EXTRAD  764
      C                                                           EXTRAD  765
      IF (W(I)-W(I-1)) 171,181,161                                EXTRAD  766
  161 IPB=I-1                                                     EXTRAD  767
      GO TO 181                                                   EXTRAD  768
  171 IF (IPB.EQ.0) GO TO 181                                     EXTRAD  769
      IP=IP+1                                                     EXTRAD  770
      IF(IP.LE.JMAX)GO TO 1711                                    EX1      24
      WRITE(6,1913)IP,IEVENT                                      EX1      25
      GO TO 181                                                   EX1      26
 1711 IPRNG(IP)=(I+IPB)/2                                         TEST    149
      IPB=0                                                       EXTRAD  772
  181 CONTINUE                                                    EXTRAD  773
      IF (VS(I).EQ.-999) GO TO 191                                EXTRAD  774
      IF (VS(I-1).EQ.-999) GO TO 201                              EXTRAD  775
      IF (IABS(VS(I))-IABS(VS(I-1))) 191,211,201                  EXTRAD  776
  191 IF (IPVB.EQ.0) GO TO 211                                    EXTRAD  777
      IPV=IPV+1                                                   EXTRAD  778
      IF(IPV.LE.JMAX)GO TO 1912                                   EX1      28
      WRITE(6,1913)IPV,IEVENT                                     EX1      29
 1913 FORMAT(1X,*NUMBER OF PEAKS EXCEEDS ARRAY SIZE*,2I6)         EX1      30
      GO TO 211                                                   EX1      31
 1912 IPVRNG(IPV)=(I+IPVB)/2                                      TEST    150
      IPVB=0                                                      EXTRAD  780
      GO TO 211                                                   EXTRAD  781
  201 IPVB=I-1                                                    EXTRAD  782
  211 CONTINUE                                                    EXTRAD  783
      IF(SV(I).EQ.-999)GO TO 1911                                 EX2      39
      IF(SV(I-1).EQ.-999)GO  TO 2011                              EX2      40
      IF(IABS(SV(I))-IABS(SV(I-1)))1911,2111,2011                 EX2      41
 1911 IF(IPSB.EQ.0)GO TO 2111                                     EX2      42
      IPS=IPS+1                                                   EX2      43
      IF(IPS.LE.JMAX)GO TO 1914                                   EX2      44
      WRITE(6,1913)IPS,IEVENT                                     EX2      45
      GO TO 2111                                                  EX2      46
 1914 IPSRNG(IPS)=(I+IPSB)/2                                      TEST    151
      IPSB=0                                                      EX2      48
      GO TO 2111                                                  EX2      49
 2011 IPSB=I-1                                                    EX2      50
 2111 CONTINUE                                                    EX2      51
      IH=IFIX(R*SL+R*R*CL)+1                                      EXTRAD  784
      IE1=IEVENT                                                  TEST1    55
      IF (IH.LE.0.OR.IH.GT.NZ4) GO TO 221                         EXTRAD  785
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      HZ(1,IH,IE1)=HZ(1,IH,IE1)+WR                                 EXTRAD  787
      HZ(2,IH,IE1)=HZ(2,IH,IE1)+R                                  EXTRAD  788
      IF (W(I).GT.TV.OR.SV(I).GT.TSV) GO TO 221                    EXTRAD  789
      IF (W(I).LT.TL(1).OR.V(I).EQ.-999) GO TO 221                 EXTRAD  790
      VI(1,IH,IE1)=VI(1,IH,IE1)+V(I)                               EXTRAD  791
      VI(2,IH,IE1)=VI(2,IH,IE1)+V(I)*V(I)                          EXTRAD  792
      VI(3,IH,IE1)=VI(3,IH,IE1)+1.0                                EXTRAD  793
  221 CONTINUE                                                     EXTRAD  794
      IF (REL.NE.1) GO TO 231                                      EXTRAD  795
      RAIN=DBZARY(INDX)                                            EXTRAD  796
      DI(IE1)=DI(IE1)+RAIN*R                                       EXTRAD  797
  231 CONTINUE                                                     EXTRAD  798
      GO TO 281                                                    EXTRAD  799
  241 DO 271 KL=K,NFC                                              EXTRAD  800
      IF (W(I-1).LE.TL(KL)) GO TO 281                              EXTRAD  801
      IEVENT=ICVNT(KL)                                             EXTRAD  802
      IC(2,IEVENT,KL)=I-1                                          EXTRAD  803
C                                                                  EXTRAD  804
C             KEEP COUNT OF PEAKS WITH EVENT.                      EXTRAD  805
C                                                                  EXTRAD  806
      IF (KL.NE.1) GO TO 271                                       EXTRAD  807
      IF (IPB.EQ.0) GO TO 251                                      EXTRAD  808
      IP=IP+1                                                      EXTRAD  809
      IPRNG(IP)=(I+IPB)/2                                          TEST    152
      IPB=0                                                        EXTRAD  811
  251 IDC(IEVENT)=IP                                               EXTRAD  812
      IF (IPVB.EQ.0) GO TO 261                                     EXTRAD  814
      IPV=IPV+1                                                    EXTRAD  815
      IPVRNG(IPV)=(I+IPVB)/2                                       TEST    153
      IPVB=0                                                       EXTRAD  817
  261 IDVC(IEVENT)=IPV                                             EXTRAD  818
      IF(IPSB.EQ.0)GO TO 2611                                      EX2      52
      IPS=IPS+1                                                    EX2      53
      IPSRNG(IPS)=(I+IPSB)/2                                       TEST    154
      IPSB=0                                                       EX2      55
 2611 IDSC(IEVENT)=IPS                                             EX2      56
  271 CONTINUE                                                     EXTRAD  820
  281 CONTINUE                                                     EXTRAD  821
  321 COST=COS(TEMP)                                               EXTRAD  830
      SINT=SIN(TEMP)                                               EXTRAD  831
      COSA=COS(AZNOW*RPD)                                          EXTRAD  832
      COSA2=COSA*COSA                                              EXTRAD  833
      SINA=SIN(AZNOW*RPD)                                          EXTRAD  834
      SINA2=SINA*SINA                                              EXTRAD  835
      SNACNA=SINA*COSA                                             EXTRAD  836
C                                                                  EXTRAD  839
C             PLOT FIXED CONTOURS.                                 EXTRAD  840
C                                                                  EXTRAD  841
      DO 611 K=1,NFC                                               EXTRAD  842
      JEM=IBVNT(K)                                                 TEST1    56
      IEM=ICVNT(K)                                                 TEST1    57
      IPU=IPUP+K                                                   EXTRAD  843
      IPD=IPDN+K                                                   EXTRAD  844
      KEVENT=1                                                     EXTRAD  845
      IEVENT=1                                                     EXTRAD  846
  331 IF (IB(2,IEVENT,K).EQ.0.AND.IC(2,KEVENT,K).EQ.0) GO TO 601   EXTRAD  847
      IF (IB(1,IEVENT,K).GT.IC(2,KEVENT,K)) GO TO 471              EXTRAD  848
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          IF (IB(2,IEVENT,K).LT.I?(1,KEVENT,K)) GO TO 471                 EXTRAD   849
      C                                                                   EXTRAD   850
      C             ASSOCIATED                                            EXTRAD   851
      C             LEFT SIDE PEN JP.                                     EXTRAD   852
      C                                                                   EXTRAD   853
          IID=IB(NPA,IEVENT,K)                                            EXTRAD   854
          IF(IID.NE.0) GO TO 3311                                         TEST2     49
     3312 GO TO 471                                                       TEST2     50
     3311 IC(NPA,KEVENT,K)=IID                                            TEST2     51
          IF(.NOT.COPLOT)GO TO 341                                        TEST     155
          X=FLOAT(IB(1,IEVENT,K))-1.0                                     EXTRAD   856
          R=SCONC*X                                                       TEST     156
          X=SCALE*(R*SINT+4.0)                                            EXTRAD   858
          Y=SCALE*(R*COST+4.0)                                            EXTRAD   859
          WRITE(2)X,Y,IPU                                                 EXTRAD   861
      C                                                                   EXTRAD   862
      C             LEFT SIDE PEN DOWN.                                   EXTRAD   863
      C                                                                   EXTRAD   864
          X=FLOAT(IC(1,KEVENT,K))-1.0                                     EXTRAD   865
          R=SCONC*X                                                       TEST     157
          X=SCALE*(R*SINA+4.0)                                            EXTRAD   867
          Y=SCALE*(R*COSA+4.0)                                            EXTRAD   868
          WRITE(2)X,Y,IPU                                                 EXTRAD   870
      341 IF(ISCANF.NE.0) GO TO 3311                                      TEST2     52
          ATR(1,IID,K)=ATR(1,IID,K)+DELTAZ*CI(1,KEVENT,K)                 TEST2     53
          ATR(2,IID,K)=ATR(2,IID,K)+DELTAZ*CI(2,KEVENT,K)                 EXTRAD   872
          ATR(3,IID,K)=ATR(3,IID,K)+SINA*DELTAZ*CI(3,KEVENT,K)            EXTRAD   873
          ATR(4,IID,K)=ATR(4,IID,K)+COSA*DELTAZ*CI(3,KEVENT,K)            EXTRAD   874
          IE1=IC(3,KEVENT,K)                                              EXTRAD   875
          IID1=IC(NPA,IE1,1)                                              EXTRAD   876
          IF(ATR(IAT,IID,K).EQ.0.)ATR(IAT,IID,K)=IDSLOT(IID1,1)           EXTRAD   881
          IF(IC(1,KEVENT,K).LT.IMV.OR.IC(2,KEVENT,K).GE.IMX)              TEST2     54
         XATR(IAT,IID,K)=-ABS(ATR(IAT,IID,K))                             TEST2     55
          IF(K.NE.1) GO TO 381                                            TEST2     56
          DO 361 IH=1,NZH                                                 EXTRAD   885
          IF (HZ(2,IH,KEVENT).LE.0) GO TO 361                             EXTRAD   886
          IF (VI(3,IH,KEVENT).LE.0) GO TO 351                             EXTRAD   887
          ZH(1,IH,NNE)=ZH(1,IH,NNE)+VI(1,IH,KEVENT)                       EXTRAD   888
          ZH(2,IH,NNE)=ZH(2,IH,NNE)+VI(2,IH,KEVENT)                       EXTRAD   889
          ZH(3,IH,NNE)=ZH(3,IH,NNE)+SINA*VI(1,IH,KEVENT)                  EXTRAD   890
          ZH(4,IH,NNE)=ZH(4,IH,NNE)+COSA*VI(1,IH,KEVENT)                  EXTRAD   891
          ZH(5,IH,NNE)=ZH(5,IH,NNE)+SINA2*VI(3,IH,KEVENT)                 EXTRAD   892
          ZH(6,IH,NNE)=ZH(6,IH,NNE)+COSA2*VI(3,IH,KEVENT)                 EXTRAD   893
          ZH(7,IH,NNE)=ZH(7,IH,NNE)+SNACNA*VI(3,IH,KEVENT)                EXTRAD   894
          ZH(8,IH,NNE)=ZH(8,IH,NNE)+SINA*VI(3,IH,KEVENT)                  EXTRAD   895
          ZH(9,IH,NNE)=ZH(9,IH,NNE)+COSA*VI(3,IH,KEVENT)                  EXTRAD   896
          ZH(10,IH,NNE)=ZH(10,IH,NNE)+VI(3,IH,KEVENT)                     EXTRAD   897
      351 ZH(11,IH,NNE)=ZH(11,IH,NNE)+HZ(1,IH,KEVENT)*DELTAZ              EXTRAD   898
          ZH(12,IH,NNE)=ZH(12,IH,NNE)+HZ(2,IH,KEVENT)*DELTAZ              EXTRAD   899
      361 CONTINUE                                                        EXTRAD   900
          DSI(IID)=DSI(IID)+DI(KEVENT)*DELTAZ                             EXTRAD   901
      381 IF(IEVENT.GE.JEM) GO TO 441                                     TEST1     58
          IF(IB(1,IEVENT+1,K).GT.IC(2,KEVENT,K)) GO TO 441                TEST1     59
      C                                                                   EXTRAD   905
      C             DRAW DOWN TO PRESENT AZMUTH.                          EXTRAD   906
      C                                                                   EXTRAD   907
          IF(.NOT.COPLOT)GO TO 6003                                       TEST     158
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      X=FLOAT(IB(2,IEVENT,K))-1.0                                       EXTRAD   908
      R=SCONC*X                                                         TEST     159
      X=SCALE*(R*SINT+4.0)                                              EXTRAD   910
      Y=SCALE*(R*COST+4.0)                                              EXTRAD   911
      WRITE(2)X,Y,IPU                                                   EXTRAD   913
      X=SCALE*(R*SINA+4.0)                                              EXTRAD   914
      Y=SCALE*(R*COSA+4.0)                                              EXTRAD   915
      WRITE(2)X,Y,IPD                                                   EXTRAD   917
      WRITE(2)X,Y,IPU                                                   EXTRAD   918
C                                                                       EXTRAD   919
C             DRAW OVER TO IEVENT+1                                     EXTRAD   920
C                                                                       EXTRAD   921
      X=FLOAT(IB(1,IEVENT+1,K))-1.0                                     EXTRAD   922
      R=SCONC*X                                                         TEST     160
      X=SCALE*(R*SINA+4.0)                                              EXTRAD   924
      Y=SCALE*(R*COSA+4.0)                                              EXTRAD   925
      WRITE(2)X,Y,IPD                                                   EXTRAD   927
      WRITE(2)X,Y,IPU                                                   EXTRAD   928
C                                                                       EXTRAD   929
C             DRAW UP TO PREVIOUS AZMUTH.                               EXTRAD   930
C                                                                       EXTRAD   931
      X=SCALE*(R*SINT+4.0)                                              EXTRAD   932
      Y=SCALE*(R*COST+4.0)                                              EXTRAD   933
      WRITE(2)X,Y,IPD                                                   EXTRAD   935
 6003 IEVENT=IEVENT+1                                                   TEST     161
      KID=IB(NPA,IEVENT,K)                                              EXTRAD   938
 3814 IF(KID.EQ.IID) GO TO 381                                          TEST2     57
      IF(KID.GT.0) GO TO 401                                            TEST2     58
      GO TO 381                                                         TEST2     59
  401 IF (ATR(IAT,KID,K).EQ.0.0.OR.ATR(IAT,IID,K).EQ.0.0) GO TO 381     EXTRAD   941
      IATT=IAT-1                                                        EXTRAD   942
      DO 411 J=1,IATT                                                   EXTRAD   943
  411 ATR(J,IID,K)=ATR(J,IID,K)+ATR(J,KID,K)                            EXTRAD   944
      IF (ATR(IAT,KID,K).LT.0.0.OR.ATR(IAT,IID,K).LT.0.0) ATR(IAT,IID,K) EXTRAD  945
     1=-ABS(ATR(IAT,IID,K))                                             EXTRAD   946
      DO 430 JE=1,JEM                                                   TEST1     61
      IF(IB(NPA,JE,K).EQ.KID) IB(NPA,JE,K)=IID                          TEST1     62
  430 CONTINUE                                                          TEST1     63
      DO 431 JE=1,KEVENT                                                TEST1     64
      IF(IC(NPA,JE,K).EQ.KID) IC(NPA,JE,K)=IID                          TEST1     65
  431 CONTINUE                                                          TEST1     66
      RKNIDT=ABS(ATR(IAT,IID,K))                                        TEST1     67
      RKNIDU=ABS(ATR(IAT,KID,K))                                        TEST1     68
      DO 412 J=1,IAT                                                    EXTRAD   950
  412 ATR(J,KID,K)=0.0                                                  EXTRAD   951
      IDSLOT(KID,K)=0                                                   EXTRAD   952
      DO 4112 JK=1,IEMI                                                 TEST2     60
      IF(ABS(CTR(JK,K)).EQ.RKNIDU) CTR(JK,K)=ATR(IAT,IID,K)             TEST2     61
 4112 CONTINUE                                                          TEST2     62
      IF(K.GT.1) GO TO 381                                              TEST1     69
      IF(RKNIDT.EQ.0.0.OR.RKNIDU.EQ.0.0) GO TO 421                      TEST1     70
      NUMP=2+9*LDV                                                      EX1       36
      NUMPV=2+7*LTV                                                     TEST1     71
      NUMPS=2+5*LSV                                                     TEST1     72
      DO 4131 J=1,NICP                                                  TEST1     73
      IF(J.GT.NMR.AND.J.GT.NMV.AND.J.GT.NMS)GO TO 4141                  TEST1     74
      IF(IACT(J).EQ.0)GO TO 413                                         EXTRAD   955
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              IF(TATR(J,NUMP).EQ.RKNIDU)TATR(J,NUMP)=RKNIDT                  TEST      162
          413 CONTINUE                                                       EXTRAD    957
              IF(IACV(J).EQ.0)GO TO 414                                      EXTRAD    960
              IF(VATR(J,NUMPV).EQ.RKNIDU)VATR(J,NUMPV)=RKNIDT                TEST1      75
          414 CONTINUE                                                       EXTRAD    962
              IF(IACS(J).EQ.0)GO TO 4131                                     TEST1      76
              IF(SATR(J,NUMPS).EQ.RKNIDU)SATR(J,NUMPS)=RKNIDT                TEST1      77
         4131 CONTINUE                                                       TEST1      78
         4141 DO 4161 J=1,NIC                                                TEST1      79
              IF(J.GT.NCEL.AND.J.GT.NVCEL.AND.J.GT.NSCEL) GO TO 4211         TEST1      80
              IF(UP(J,NUP).EQ.0.0)GO TO 415                                  TEST      166
              IF(UP(J,NUP).EQ.RKNIDU)JP(J,NJP)=RKNIDT                        TEST      167
          415 CONTINUE                                                       EXTRAD    966
              IF(UV(J,NUV).EQ.0.0)GO TO 416                                  TEST      168
              IF(UV(J,NUV).EQ.RKNIDU)JV(J,NUV)=RKNIDT                        TEST      169
          416 CONTINUE                                                       EXTRAD    970
              IF(US(J,NUS).EQ.0.0)GO TO 4161                                 TEST      170
              IF(US(J,NUS).EQ.RKNIDU)JS(J,NUS)=RKNIDT                        TEST      171
         4161 CONTINUE                                                       EX2        72
         4211 IF(NFC.EQ.1) GO TO 421                                         TEST1      81
              DO 4201 LK=2,NFC                                               TEST1      82
              NIDFK=KDD(LK)                                                  TEST2      63
              NIDFK=MAX0(1,NIDFK)                                            TEST2      64
              DO 4201 JK=1,NIDFK                                             TEST2      65
              IF(IDSLOT(JK,LK).EQ.0) GO TO 4201                              TEST1      84
              IF(ABS(ATR(IAT,JK,LK)).EQ.RKNIDU)ATR(IAT,JK,LK)=SIGN(RKNIDT,ATR(  TEST2   66
             X IAT,JK,LK))                                                   TEST2      67
         4201 CONTINUE                                                       TEST1      86
          421 CONTINUE                                                       EXTRAD    971
              DSI(IID)=DSI(IID)+DSI(KID)                                     EXTRAD    972
              DSI(KID)=0.0                                                   EX1        42
              GO TO 381                                                      EXTRAD    973
         3811 RKNIDU=ABS(CTR(KEVENT,K))                                      TEST2      68
              NIDFK=KDD(K)                                                   TEST2      69
              DO 3812 JK=1,NIDFK                                             TEST2      70
              IF(ABS(ATR(IAT,JK,K)).EQ.RKNIDU) GO TO 3813                    TEST2      71
         3812 CONTINUE                                                       TEST2      72
              GO TO 381                                                      TEST2      73
         3813 KID=JK                                                         TEST2      74
              GO TO 3814                                                     TEST2      75
          441 IF(KEVENT+1.GT.IEM) GO TO 451                                  TEST1      87
              IF(IC(1,KEVENT+1,K).GT.I3(2,IEVENT,K)) GO TO 451               TEST1      88
        C                                                                    EXTRAD    976
        C               DRAW LINE CONNECTING IC(N) TO IC(N+1).               EXTRAD    977
        C                                                                    EXTRAD    978
              IF(.NOT.COPLCT)GO TO 6001                                      TEST      172
              X=FLOAT(IC(2,KEVENT,K))-1.0                                    EXTRAD    979
              R=SCONC*X                                                      TEST      173
              X=SCALE*(R*SINA+4.0)                                           EXTRAD    981
              Y=SCALE*(R*COSA+4.0)                                           EXTRAD    982
              WRITE(2)X,Y,IPU                                                EXTRAD    984
              X=FLOAT(IC(1,KEVENT+1,K))-1.0                                  EXTRAD    985
              R=SCONC*X                                                      TEST1      89
              X=SCALE*(R*SINA+4.0)                                           EXTRAD    987
              Y=SCALE*(R*COSA+4.0)                                           EXTRAD    988
              WRITE(2)X,Y,IPD                                                EXTRAD    990
         6001 KEVENT=KEVENT+1                                                TEST      175
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      IF(IID.EQ.0) GO TO 3312                                  TEST2      76
      IC(NPA,KEVENT,K)=IID                                     EXTRAD    992
      GO TO 341                                                TEST1      92
C                                                              EXTRAD    998
C              RIGHT SIDE.                                     EXTRAD    999
C                                                              EXTRAD   1000
451   IF(.NOT.COPLOT)GO TO 6002                                TEST      176
      X=FLOAT(IB(2,IEVENT,K))-1.0                              TEST      177
      R=SCONC*X                                                TEST      178
      X=SCALE*(R*SINT+4.0)                                     EXTRAD   1003
      Y=SCALE*(R*COST+4.0)                                     EXTRAD   1004
      WRITE(2)X,Y,IPU                                          EXTRAD   1006
      X=FLOAT(IC(2,KEVENT,K))-1.0                              EXTRAD   1007
      R=SCONC*X                                                TEST1      93
      X=SCALE*(R*SINA+4.0)                                     EXTRAD   1009
      Y=SCALE*(R*COSA+4.0)                                     EXTRAD   1010
      WRITE(2)X,Y,IPU                                          EXTRAD   1012
6002  IEVENT=IEVENT+1                                          TEST      179
      KEVENT=KEVENT+1                                          EXTRAD   1015
      IF(KEVENT.GT.IEM.AND.IEVENT.GT.JEM) GO TO 601            TEST1      94
      IF(KEVENT.GT.IEM) GO TO 481                              TEST1      95
      IF(IEVENT.GT.JEM) GO TO 521                              TEST1      96
      GO TO 331                                                EXTRAD   1016
471   IF (IB(1,IEVENT,K).EQ.0) GO TO 521                       EXTRAD   1017
      IF (IC(1,KEVENT,K).EQ.0) GO TO 481                       EXTRAD   1018
C                                                              EXTRAD   1019
C              UNASSOCIATED.                                   EXTRAD   1020
C              ANGLE LINE ON IB                                EXTRAD   1021
C                                                              EXTRAD   1022
      IF (IC(2,KEVENT,K).LT.I3(1,IEVENT,K)) GO TO 511          EXTRAD   1023
481   IF(.NOT.COPLOT)GO TO 6004                                TEST      180
      X=FLOAT(IB(1,IEVENT,K))-1.0                              TEST      182
      R=SCONC*X                                                TEST1      97
      X=SCALE*(R*SINT+4.0)                                     EXTRAD   1026
      Y=SCALE*(R*COST+4.0)                                     EXTRAD   1027
      WRITE(2)X,Y,IPU                                          EXTRAD   1029
      X=SCALE*(R*SINA+4.0)                                     EXTRAD   1030
      Y=SCALE*(R*COSA+4.0)                                     EXTRAD   1031
      WRITE(2)X,Y,IPC                                          EXTRAD   1033
      WRITE(2)X,Y,IPU                                          EXTRAD   1034
      X=FLOAT(IB(2,IEVENT,K))-1.0                              EXTRAD   1035
      R=SCONC*X                                                TEST1      98
      X=SCALE*(R*SINT+4.0)                                     EXTRAD   1037
      Y=SCALE*(R*COST+4.0)                                     EXTRAD   1038
      WRITE(2)X,Y,IPD                                          EXTRAD   1040
6004  IID=IB(NPA,IEVENT,K)                                     TEST      184
      IEVENT=IEVENT+1                                          EXTRAD   1050
      IF(KEVENT.GT.IEM.AND.IEVENT.GT.JEM) GO TO 601            TEST1     101
      IF(IEVENT.GT.JEM) GO TO 521                              TEST1     102
      IF(KEVENT.GT.IEM) GO TO 481                              TEST1     103
      IF (IC(1,KEVENT,K).LE.I3(2,IEVENT,K)) GO TO 331          EXTRAD   1052
      IF (IC(2,KEVENT,K).NE.0) GO TO 501                       EXTRAD   1053
      GO TO 331                                                EXTRAD   1054
501   IF (IB(1,IEVENT,K).EQ.0) GO TO 521                       EXTRAD   1055
511   IF (IC(1,KEVENT,K).GT.I3(2,IEVENT,K)) GO TO 331          EXTRAD   1056
C                                                              EXTRAD   1057
C              UNASSOCIATED                                    EXTRAD   1056
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      C           STRAIGHT LINE ON IC.                                    EXTRAD   1059
      C                                                                   EXTRAD   1060
  521 IF (IC(1,KEVENT,K).EQ.0) GO TO 562                                  EXTRAD   1061
      DO 5522 IID=1,NIDF                                                  TEST      185
      IF(IDSLOT(IID,K).NE.0)GO TO 5522                                    EXTRAD   1064
      IDD=IID                                                             TEST      186
      IC(NPA,KEVENT,K)=IID                                                TEST      187
      IF(K.NE.1)GO TO 5521                                                EXTRAD   1065
      IDSLOT(IID,K)=KNID                                                  EXTRAD   1066
      KNID=KNID+1                                                         EXTRAD   1067
 5521 IE1=IC(3,KEVENT,K)                                                  TEST      188
      IID1=IC(NPA,IE1,1)                                                  TEST1     104
      IDSLOT(IID,K)=IDSLOT(IID1,1)                                        TEST      190
      GO TO 5523                                                          TEST1     105
 5522 CONTINUE                                                            EXTRAD   1072
C** NOTE                                                                  EXTRAD   1073
C**     WHEN ALL ID,S ARE USED,                                           EXTRAD   1074
C***      IC(NIDF,K) WILL BURDEN ALL OTHER CELLS                          TEST      191
      IC(NPA,KEVENT,K)=NIDF                                               TEST1     106
      IF(K.NE.1) GO TO 5524                                               TEST2      77
      KNID=KNID+1                                                         TEST2      78
      IDSLOT(IID,K)=KNID                                                  TEST2      79
 5524 IID=NIDF                                                            TEST2      80
      IDD=IID                                                             TEST2      81
      IERR=4                                                              EXTRAD   1077
 5523 KDD(K)=MAX0(KDD(K),IDD)                                             TEST2      82
      IID=IDD                                                             TEST2      83
  524 IF(.NOT.COPLOT.OR.NA.EQ.1) GO TO 527                                TEST2      84
      X=FLOAT(IC(1,KEVENT,K))-1.0                                         TEST      193
      R=SCONC*X                                                           TEST      194
      X=SCALE*(R*SINA+4.0)                                                EXTRAD   1084
      Y=SCALE*(R*COSA+4.0)                                                EXTRAD   1085
      WRITE(2)X,Y,IPU                                                     EXTRAD   1087
      X=FLOAT(IC(2,KEVENT,K))-1.0                                         EXTRAD   1088
      R=SCONC*X                                                           TEST      195
      X=SCALE*(R*SINA+4.0)                                                EXTRAD   1090
      Y=SCALE*(R*COSA+4.0)                                                EXTRAD   1091
      WRITE(2)X,Y,IPD                                                     EXTRAD   1093
  527 IF(ISCANF.NE.0) GO TO 531                                           TEST2      85
      ATR(1,IDD,K)=DELTAZ*CI(1,KEVENT,K)+ATR(1,IDD,K)                     TEST2      86
      ATR(2,IDD,K)=DELTAZ*CI(2,KEVENT,K)+ATR(2,IDD,K)                     TEST2      87
      ATR(3,IDD,K)=SINA*DELTAZ*CI(3,KEVENT,K)+ATR(3,IDD,K)                TEST2      88
      ATR(4,IDD,K)=COSA*DELTAZ*CI(3,KEVENT,K)+ATR(4,IDD,K)                TEST2      89
  531 IE1=IC(3,KEVENT,K)                                                  EXTRAD   1102
      IID1=IC(NPA,IE1,1)                                                  EXTRAD   1103
      ATR(IAT,IDD,K)=IDSLOT(IID1,1)                                       EXTRAD   1104
      IF (NA.EQ.1) ATR(IAT,IDD,K)=-ABS(ATR(IAT,IDD,K))                    EXTRAD   1105
      IF(IC(1,KEVENT,K).LT.IMN.OR.IC(2,KEVENT,K).GE.IMX)ATR(IAT,IDD,K)=-  TEST2      90
     1ABS(ATR(IAT,IDD,K))                                                 EXTRAD   1107
      IF (K.NE.1) GO TO 561                                               EXTRAD   1108
      DO 551 IH=1,NZH                                                     EXTRAD   1109
      IF (HZ(2,IH,KEVENT).LE.0.) GO TO 551                                EXTRAD   1110
      IF (VI(3,IH,KEVENT).EQ.0.) GO TO 541                                EXTRAD   1111
      ZH(1,IH,NNE)=VI(1,IH,KEVENT)                                        EXTRAD   1112
      ZH(2,IH,NNE)=VI(2,IH,KEVENT)                                        EXTRAD   1113
      ZH(3,IH,NNE)=SINA*VI(1,IH,KEVENT)                                   EXTRAD   1114
      ZH(4,IH,NNE)=COSA*VI(1,IH,KEVENT)                                   EXTRAD   1115
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                ZH(5,IH,NNE)=SINA2*VI(3,IH,KEVENT)                        EXTRAD   1116
                ZH(6,IH,NNE)=COSA2*VI(3,I4,KEVENT)                        EXTRAD   1117
                ZH(7,IH,NNE)=SNACNA*VI(3,I4,KEVENT)                       EXTRAD   1118
                ZH(8,IH,NNE)=SINA*VI(3,I4,KEVENT)                         EXTRAD   1119
                ZH(9,IH,NNE)=COSA*VI(3,I4,KEVENT)                         EXTRAD   1120
                ZH(10,IH,NNE)=VI(3,IH,KEVENT)                             EXTRAD   1121
            541 ZH(11,IH,NNE)=HZ(1,IH,KEVENT)*DELTAZ                      TEST1     109
                ZH(12,IH,NNE)=HZ(2,IH,KEVENT)*DELTAZ                      EXTRAD   1124
          551   CONTINUE                                                  EXTRAD   1125
                OSI(IOD)=OI(KEVENT)*DELTAZ                                EXTRAD   1126
            561 CONTINUE                                                  EXTRAD   1127
          562   KEVENT=KEVENT+1                                           EXTRAD   1128
                IF(KEVENT.GT.IEM.AND.IEVENT.GT.JEM) GO TO 601             TEST1     110
                IF(KEVENT.GT.IEM) GO TO 481                               TEST1     111
                IF(IEVENT.GT.JEM) GO TO 521                               TEST1     112
                GO TO 331                                                 EXTRAD   1130
            601 CONTINUE                                                  EXTRAD   1139
          611   CONTINUE                                                  EXTRAD   1140
                IF(ISCANF.NE.0) GO TO 871                                 TEST2      91
           8003 IF(.NOT.CONTRZ) GO TO 8000                                TEST2      92
                CALL PEAKO(W,LDV,TL(1),1,UP,NCEL,TATR,NUMAX,IACT,IDC,IPTB,TB,  TEST   197
               +          IPBNT,IPRNG,4R,NMR,IPB1,IPB2,IPB3)              TEST      198
           8000 IF(.NOT.CONTRV)GO TO 8001                                 TEST      199
                CALL PEAKO(VS,LTV,0,2,UV,NVCEL,VATR,NVMAX,IACV,IDVC,IPTVB,TVB, TEST   200
               +          IPBVNT,IPVRNG,HV,NMV,IPV1,IPV2,IPV3)            TEST      201
           8001 IF(.NOT.CONTRS)GO TO 800                                  TEST      202
                CALL PEAKO(SV,LSV,0,0,US,NSCEL,SATR,NSMAX,IACS,IDSC,IPTSB,TSB, TEST   203
               +          IPBSNT,IPSRNG,4S,NMS,IPS1,IPS2,IPS3)            TEST      204
          C                                                               EXTRAD   1150
          C            STORE PRESENT PARAMETERS IN PREVIOUS PARAMETERS.   EXTRAD   1151
          C                                                               EXTRAD   1152
          800   CONTINUE                                                  EXTRAD   1153
                IF(ISCANF.NE.0) GO TO 8004                                TEST2      93
                DO 801 K=1,NFC                                            EXTRAD   1154
                JEM=IBVNT(K)                                              TEST2      94
                IEM=ICVNT(K)                                              TEST2      95
                IBVNT(K)=ICVNT(K)                                         EXTRAD   1155
                ICVNT(K)=0                                                TEST2      96
                IF(JEM.EQ.0)GO TO 803                                     TEST2      97
                IEM1=MAX0(1,IEM)                                          TEST2      98
                DO 802 J=1,JEM                                            TEST2      99
                DO 8002 I=1,IEM1                                          TEST2     100
                IF(IB(NPA,J,K).EQ.IC(NPA,I,K))GO TO 802                   TEST2     101
           8002 CONTINUE                                                  TEST2     102
                IID=IB(NPA,J,K)                                           TEST2     103
                IF(IID.LE.0) GO TO 802                                    TEST2     104
                IF(ATR(1,IID,K).GE.TATR4V) GO TO 802                      TEST2     105
                ABAR=ATR(1,IID,K)*SCON*DELWTH(NTP+1)                      TEST2     106
                IDSLOT(IID,K)=0                                           TEST2     109
                DO 8005 I=1,IAT                                           TEST2     110
           8005 ATR(I,IID,K)=0.0                                          TEST2     111
            802 CONTINUE                                                  TEST2     112
            803 DO 801 IEVENT=1,IEMAX                                     TEST2     113
                DO 801 N=1,NPA                                            EXTRAD   1157
                IB(N,IEVENT,K)=IC(N,IEVENT,K)                             EXTRAD   1158
          801   IC(N,IEVENT,K)=0                                          EXTRAD   1159
          C         FREE UP ATTR SPACE IF POSSIBLE                        EXTRAD   1161
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      IF(NA.NE.1) GO TO 804                                 TEST2     114
      DO 805 K=1,NFC                                        TEST2     115
      IEM1=MAX0(1,IBVNT(K))                                 TEST2     116
      DO 805 J=1,IEM1                                       TEST2     117
      IID=IB(NPA,J,K)                                       TEST2     118
      IF(IID.LE.0) GO TO 805                                TEST2     119
      CTR(IID,K)=ATR(IAT,IID,K)                             TEST2     120
  805 CONTINUE                                              TEST2     121
  804 CONTINUE                                              TEST2     122
      RETURN                                                EXTRAD   1174
C                                                           EXTRAD   1175
C                                                           EXTRAD   1176
      ENTRY CONTR2                                          EXTRAD   1177
      IF(ISCANF.NE.1) ISCANF=-1                             TEST2     123
      GO TO 8003                                            TEST2     124
 8004 IF(ISCANF.GT.0) GO TO 831                             TEST2     125
      DO 821 K=1,NFC                                        EXTRAD   1179
      IE=IBVNT(K)                                           EXTRAD   1180
      IF(IE.LE.0)GO TO 821                                  TEST      206
      DO 822 I=1,IE                                         TEST      207
      IDD=IB(NPA,IE,K)                                      TEST2     126
  822 ATR(IAT,IDD,K)=-ABS(ATR(IAT,IDD,K))                   TEST2     127
      DO 823 I=1,IEM1                                       TEST2     128
      DO 823 J=1,NIDF                                       TEST2     129
      IF(ABS(CTR(I,K)).NE.ABS(ATR(IAT,J,K))) GO TO 823      TEST2     130
      ATR(IAT,J,K)=-ABS(ATR(IAT,J,K))                       TEST2     131
  823 CONTINUE                                              TEST2     132
  821 CONTINUE                                              TEST      210
C             PLOT FINAL RADIALS.                           EXTRAD   1184
      IF(.NOT.COPLOT)GO TO 871                              TEST      211
      X=SCALE*4.                                            TEST2     133
      Y=X                                                   TEST2     134
      WRITE(2)X,Y,IPU                                       EXTRAD   1188
      SCRA=SCONC/ICOMP                                      TEST1     117
      R=SCRA*(RN(NRC+1)-.5)                                 TEST      213
      X=SCALE*(R*SIN(AZMUTH(1)*RPD)+4.0)                    EXTRAD   1192
      Y=SCALE*(R*COS(AZMUTH(1)*RPD)+4.0)                    EXTRAD   1193
      WRITE(2)X,Y,IPD                                       EXTRAD   1195
      X=SCALE*(R*SIN(AZMUTH(NA)*RPD)+4.0)                   EXTRAD   1196
      Y=SCALE*(R*COS(AZMUTH(NA)*RPD)+4.0)                   EXTRAD   1197
      WRITE(2)X,Y,IPU                                       EXTRAD   1199
      X=SCALE*4.                                            TEST2     135
      Y=X                                                   TEST2     136
      WRITE(2)X,Y,IPD                                       EXTRAD   1203
      GO TO 871                                             EXTRAD   1204
  831 TEMP=AZMUTH(NA)*RPD                                   TEST2     137
      DELTAZ=ABS(AZMUTH(1)*RPD-TEMP)                        TEST2     138
      AZNOW=AZMUTH(1)                                       EXTRAD   1215
      DO 8611 IX=1,NCL                                      EXTRAD   1218
      W(IX)=WI(IX)                                          EXTRAD   1219
      SV(IX)=SVI(IX)                                        TEST      214
 8611 VS(IX)=VSI(IX)                                        EXTRAD   1220
      GO TO 61                                              TEST2     139
  871 DELR=SCON*CELWTH(NTP+1)                               EXTRAD   1222
      DACEL=DELR*DAZM*1.E-3                                 TEST1     118
      IF(IERR .EQ. 0) GOTO 8711                             EXTRAD   1223
      IF(IERR .EQ. 1) PRINT 8712,5HNCELL,5HPEAKD            EXTRAD   1224
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            IF(IERR .EQ. 2) PRINT 8712,5HIADDR,4HIUPK                           EXTRAD   1225
            IF(IERR .EQ. 3) PRINT 8712,5HIADDR,3HIPK                            EXTRAD   1226
            IF(IERR .EQ. 4) PRINT 8712,3HNID,5HCONTR                            EXTRAD   1227
     8712   FORMAT(2X,*ARRAY OVERFLOW*,2X,*VARIABLE*,2X,A5,2X,*IN*,2X,A5)       EXTRAD   1228
C                                                                               EXTRAD   1229
C           WRITE FIXED CONTOR ATRIBUTES                                        EXTRAD   1230
C                                                                               EXTRAD   1231
     8711   IF(KNID.LE.1)GO TO 1413                                             EX1        47
            CALL PAGE                                                           EX1        48
            WRITE(6,872)                                                        EXTRAD   1233
      872   FORMAT(1H ,* FIXED CONTOUR ATTRIBUTES*)                             EXTRAD   1234
            WRITE(6,945)IDAY,IHOUR,IMIN,ISEC,ELEVAT,AZMUTH(1),AZMUTH(NA)        TEST1     119
            WRITE(6,712)                                                        EXTRAD   1235
      712   FORMAT(/,28X,7HAVERAGE,7X,8HLOCATION,13X,4HAREA,8X,5HTOTAL,3X,      TEST1     120
           17HAVERAGE,6X,5HFIXED,/,5X,9HTHRESHOLD,5X,4HAREA,2X,12HREFLECTIVITY  TEST1     121
           2,1X,4HEAST,2X,5HNORTH,5X,5HRANGE,1X,10HRESOLUTION,2X,6HPRECIP,4X,   TEST1     122
           36HPRECIP,5X,6HCONTOR,/,2X,2HID,4X,5H(DBZ),4X,7H(KM**2),4X,5H(DBZ),  TEST1     123
           45X,4H(KM),3X,4H(KM),7X,4H(KM),1X,8HELEMENTS,2X,9H(TONS/HR),1X,     TEST1     124
           57H(MM/HR),4X,9HREFERENCE)                                           TEST1     125
            IF(.NOT.VOLTAP)GO TO 6019                                           TEST      215
            ITYPE=0                                                             EXTRAD   1241
            WRITE (3) ITYPE,ITYPE                                               EXTRAD   1242
            WRITE(3)ELEVAT,IDAY,IHOUR,IMIN,ISEC,AZMUTH(1),AZMUTH(NA)            TEST      216
           X,NEL                                                                TEST2     140
     6019   DO 931 K=1,NFC                                                      TEST      217
C CALAULATE NUMBER OF CONTOURS FOR LOWEST LEVEL                                 EXTRAD   1247
            NIDK=KCC(K)                                                         TEST1     126
            IF(.NOT.VOLTAP) GO TO 9333                                          TEST1     127
            ITYPE=K                                                             TEST1     128
            ICOUNT=0                                                            TEST1     129
            DO 9311 J=1,NIDK                                                    TEST      219
            IF(IDSLOT(J,K).NE.0)ICOUNT=ICOUNT+1                                 EXTRAD   1250
     9311   CONTINUE                                                            EXTRAD   1251
            IF(VOLTAP)WRITE(3)ITYPE,ICOUNT                                      TEST      220
     9333   CONTINUE                                                            EXTRAD   1253
     6020   DO 9312 J=1,NIDK                                                    TEST      221
            IF(IDSLOT(J,K).EQ.0)GO TO 9312                                      EXTRAD   1255
            KNIDO=ATR(IAT,J,K)                                                  EXTRAD   1259
            IDI=J                                                               EXTRAD   1260
            IF(ATR(1,J,K).LT.TATRMN) GO TO 9312                                 TEST2     141
            ABAR=DELR*ATR(1,J,K)                                                EXTRAD   1262
            ZBAR=ATR(2,J,K)*DELR/ABAR                                           EXTRAD   1263
            XBAR=ATR(3,J,K)*DELR/ABAR/ZBAR                                      EXTRAD   1264
            YBAR=ATR(4,J,K)*DELR/ABAR/ZBAR                                      EXTRAD   1265
            ABAR=ABAR/1000**2                                                   EXTRAD   1266
            XBAC=XBAR/1000.                                                     EXTRAD   1267
            YBAC=YBAR/1000.                                                     EXTRAD   1268
            RBAR=SQRT(XBAC*XBAC+YBAC*YBAC)                                      TEST1     130
            RCELLS=ABAR/(RBAR*DACEL)                                            TEST1     131
            ZBAR=10.*ALOG10(ZBAR)                                               EXTRAD   1269
            IF(K-1) 9313,9313,9315                                              TEST2     142
     9313   IF(NEL-1) 9314,9314,9315                                            TEST2     143
     9314   TPREC=ESI(J)*DELR                                                   TEST2     144
            AVPREC=TPREC/(ABAR*1000**2)                                         EXTRAD   1274
            TPREC=TPREC/10E05                                                   EXTRAD   1275
            WRITE(6,716) IDI,TL(K),ABAR,ZBAR,XBAC,YBAC,RBAR,RCELLS,TPREC,       TEST1     135
           XAVPREC,KNIDO                                                        TEST1     136
```

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  716 FORMAT(1X,I3,5X,I2,4X,F3.2,4X,F5.1,4X,F6.1,1X,F6.1,2F10.1,        TEST1    137
     X1X,F8.2,2X,F6.2,4X,I6)                                            TEST1    138
      IF(VOLTAP) WRITE(3)K,TL(K),ABAR,ZBAR,XBAC,YBAC,TPREC,AVPREC,KNIDQ TEST1    139
      GO TO 9316                                                        TEST2    145
 9315 WRITE(6,720) ID1,TL(K),ABAR,ZBAR,XBAC,YBAC,RBAR,RCELLS,KNIDQ      TEST2    146
  720 FORMAT(1X,I3,5X,I2,4X,F3.2,4X,F5.1,4X,F6.1,1X,F6.1,2F10.1,21X,I6) TEST2    147
      IF(VOLTAP) WRITE(3) K,TL(K),ABAR,ZBAR,XBAC,YBAC,KNIDQ             TEST2    148
 9316 IF(.NOT.COPLOT) GO TO 9312                                        TEST2    149
      XBAR=XBAC/RANG+4.                                                 TEST1    141
      YBAR=YBAC/RANG+4.                                                 TEST1    142
      IPU=IVDP+ID1+(K-1)*10000                                          TEST2    150
      WRITE(2)XBAR,YBAR,IPU                                             EXTRAD  1283
 9312 CONTINUE                                                          EXTRAD  1284
  931 CONTINUE                                                          EXTRAD  1285
C                                                                       EXTRAD  1286
C         WRITE WIND DATA                                               EXTRAD  1287
C                                                                       EXTRAD  1288
      CALL PAGE                                                         EXTRAD  1289
      WRITE(6,711)                                                      EXTRAD  1290
  711 FORMAT(10H WIND DATA)                                             EXTRAD  1291
      WRITE(6,945)IDAY,IHOUR,IMIN,ISEC,ELEVAT,AZMUTH(1),AZMUTH(NA)      TEST1    143
      M=NNF                                                             EXTRAD  1292
      WRITE(6,713)                                                      EXTRAD  1293
      DO 921 I=1,NZH                                                    EXTRAD  1294
      IF(ZH(NZP,I,M).EQ.0)GO TO 921                                     EXTRAD  1295
      TZ=DELR*ZH(11,I,M)                                                EXTRAD  1296
      AVZ=ZH(11,I,M)/ZH(12,I,M)                                         EXTRAD  1297
      IF(AVZ.GT.0.)AVZ=10.*ALOG10(AVZ)                                  EX1       50
C               COMPUTE AVG WIND SPEED AND DIR.                         EXTRAD  1299
      DEL=ZH(5,I,M)*ZH(6,I,M)-ZH(7,I,M)*ZH(7,I,M)                       EXTRAD  1300
      IF (DEL.EQ.0.) GO TO 921                                          EXTRAD  1301
      VN=(ZH(4,I,M)*ZH(5,I,M)-ZH(3,I,M)*ZH(7,I,M))/DEL/VQUANT           EXTRAD  1302
      VE=(ZH(6,I,M)*ZH(3,I,M)-ZH(7,I,M)*ZH(4,I,M))/DEL/VQUANT           EXTRAD  1303
      VER=(ZH(2,I,M)+VN*VN*ZH(6,I,M)+VE*VE*ZH(5,I,M)+2.0*VN*VE*ZH(7,I,M) EXTRAD 1304
     1-2.0*VN*ZH(4,I,M)-2.0*VE*ZH(3,I,M))/ZH(10,I,M)/VQUANT/VQUANT      EXTRAD  1305
C     VF=ZH(5,I,M)/ZH(10,I,M)-(ZH(8,I,M)/ZH(10,I,M))                    EXTRAD  1306
C     VC=ZH(6,I,M)/ZH(10,I,M)-(ZH(9,I,M)/ZH(10,I,M))**2                 EXTRAD  1307
  713 FORMAT(1H0,10X,7HAVERAGE,6X,5HTOTAL,5X,7HAVERAGE,1X,7HAVERAGE,2X, EXTRAD  1308
     X8HVELOCITY/1X,6HHEIGHT,1X,12HREFLECTIVITY,1X,12HREFLECTIVITY,4X,  EXTRAD  1309
     X1HU,7X,1HV,5X,8HVARIANCE,14X,3HDEL/                               EXTRAD  1310
     X          2X,4H(KM),5X,5H(DBZ),6X,11H(DBZ.KM**2),1X,7H(M/SEC),1X, EXTRAD  1311
     X7H(M/SEC),1X,11H(M/SEC)**2))                                      EXTRAD  1312
      TZ=TZ/10E05                                                       EXTRAD  1313
      WRITE(6,717)I,AVZ,TZ,VE,VN,VER,DEL                                EXTRAD  1314
  717 FORMAT(I5,6X,F5.1,7X,F9.1,2X,F6.1,2X,F6.1,2X,F10.1,1X,E15.5)      EXTRAD  1315
  921 CONTINUE                                                          EXTRAD  1316
C                                                                       EXTRAD  1317
C         WRITE PEAK CELL ATTRIBUTES                                    EXTRAD  1318
C                                                                       EXTRAD  1319
      IF(.NOT.CONTRZ)GO TO 6010                                         TEST     228
      CALL PAGE                                                         EXTRAD  1320
      WRITE(6,932)                                                      EXTRAD  1321
  932 FORMAT(1H ,* PEAK DETECTED CELL ATTRIBUTES*)                      EXTRAD  1322
      WRITE(6,945)IDAY,IHOUR,IMIN,ISEC,ELEVAT,AZMUTH(1),AZMUTH(NA)      TEST1    144
      WRITE(6,714)                                                      EXTRAD  1323
  714 FORMAT(/,60X,7HAVERAGE,3X,7HAVERAGE,3X,7HAVERAGE,3X,7HAVERAGE,5X, TEST1    145
     X4HMEAN,/,32X,                                                     TEST1    146
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      1BHLOCATION,11X,4HAREA,5X,8HVELOCITY,2X,6HRADIAL,6X,10HTANGENTIAL,  TEST1    147
      22X,6HRADIAL,4X,5HFIXED,/,6X,12HREFLECTIVITY,3X,4HAREA,3X,4HEAST,   TEST1    148
      32X,5HNORTH,2X,5HRANGE,2X,10HRESOLUTION,2X,6HSPREAD,6X,5HSHEAR,5X,  TEST1    149
      45HSHEAR,7X,8HVELOCITY,2X,7HCONTOUR,/,2X,2HID,5X,5H(DBZ),5X,        TEST1    150
      57H(KM**2),2X,4H(KM),3X,4H(KM),3X,4H(KM),2X,8HELEMENTS,5X,5H(M/S),  TEST1    151
      65X,8H(M/S/KM),3X,8H(M/S/KM),4X,5H(M/S),5X,9HREFERENCE)             TEST1    152
       IF(.NOT.VOLTAP)GO TO 6021                                          TEST     229
       ITYPE=3                                                            TEST1    153
       ICOUNT=0                                                           EXTRAD  1331
C CALCULATE NUMBER OF PEAK RAIN CELLS                                     EXTRAD  1332
       DO 9333 IX=1,NCEL                                                  EXTRAD  1333
       IF(UP(IX,1).LE.0. .OR. JP(IX,2) .EQ. 0.)GO TO 9333                 TEST     230
       ICOUNT=ICOUNT+1                                                    EXTRAD  1335
 9333  CONTINUE                                                           EXTRAD  1336
       WRITE (3) ITYPE,ICOUNT                                             EXTRAD  1337
 6021  DO 933 N=1,NCEL                                                    TEST     231
       IF(UP(N,1).LE.0..OR.UP(N,2).EQ.0.)GO TO 933                        TEST     232
       UP(N,3)=UP(N,3)/UP(N,2)/10E02                                      TEST     233
       UP(N,4)=UP(N,4)/UP(N,2)/10E02                                      TEST     234
       UP(N,2)=UP(N,2)/UP(N,1)/RQUANT                                     TEST     235
       UP(N,5)=UP(N,5)/UP(N,1)/SQUANT                                     TEST     236
       UP(N,8)=UP(N,8)/UP(N,1)/VQUANT                                     TEST     237
       UP(N,6)=UP(N,6)/UP(N,1)/VQUANT                                     TEST     238
       UP(N,1)=UP(N,1)*DELR/1.E06                                         TEST     239
       RBAR=SQRT(UP(N,3)*UP(N,3)+UP(N,4)*UP(N,4))                         TEST1    154
       RCELLS=UP(N,1)/(RBAR*DAZEL)                                        TEST1    155
       UP(N,7)=UP(N,7)/UP(N,1)*1.0E-3/VQUANT                              TEST     240
       IUP=UP(N,9)                                                        TEST     241
       WRITE(6,718) N,UP(N,2),JP(N,1),UP(N,3),UP(N,4),RBAR,RCELLS,UP(N,5) TEST1    156
      X,UP(N,7),UP(N,6),UP(N,8),IUP                                       TEST1    157
       IF(VOLTAP)WRITE(3)UP(N,2),UP(N,1),UP(N,3),UP(N,4),UP(N,5),UP(N,7), TEST     244
      +UP(N,6),UP(N,8),IUP                                                TEST     245
       IF(.NOT.COPLOT)GO TO 933                                           TEST     246
       XREG=UP(N,3)/RANG+4.0                                              TEST1    158
       YREG=UP(N,4)/RANG+4.0                                              TEST1    159
       IPU=ITUP+N                                                         TEST     249
       WRITE(2)XREG,YREG,IPU                                              TEST     250
  718  FORMAT(I4,5X,F5.1,6X,F6.1,1X,F6.1,1X,F6.1,1X,F6.1,3X,F6.1,3X,F7.2, TEST1    160
      X3X,F7.2,3X,F7.2,5X,F7.2,3X,I4)                                     TEST1    161
  933  CONTINUE                                                           EXTRAD  1358
C                                                                         EXTRAD  1359
C         WRITE TANG SHEAR ATTRIBUTES                                     EXTRAD  1360
C                                                                         EXTRAD  1361
 6010  IF(.NOT.CONTRV)GO TO 6011                                          TEST     251
       CALL PAGE                                                          EXTRAD  1362
       WRITE(6,942)                                                       EXTRAD  1363
  942  FORMAT(1H ,* TANGENTIAL SHEAR MAXIMA ATTRIBUTES*)                  EXTRAD  1364
       WRITE(6,945)IDAY,IHOUR,IMIN,ISEC,ELEVAT,AZMUTH(1),AZMUTH(NA)       TEST     252
  945  FORMAT(/,1X,4H DAY,2X,4HHHMM,2X,2HSS,5X,3HELE,5X,5HAZM1 ,5X,       TEST     253
      +   5HAZM2 ,/,1X,I4,2X,2I2,1X,I3,2X,F6.1,5X,F5.1,5X,F5.1)           TEST     254
       WRITE(6,715)                                                       EXTRAD  1365
  715  FORMAT(/,60X,*AVERAGE*,15X,*FIXED*,/,7X,*MAGNITUDE*,15X,           TEST1    162
      X*LOCATION*,                                                        TEST1    163
      115X,*AREA*,2X,*VELOCITY*,3X,*AVERAGE*,4X,*CONTOUR*,/,              TEST1    164
      29X,*SHEAR*,6X,*AREA*,4X,*EAST*,3X,*NORTH*,3X,*RANGE*,2X,           TEST1    165
      3*RESOLUTION*,1X,*SPREAD*,5X,*SHEAR*,4X,*REFERENCE*,/,2X,*ID*,3X,   TEST1    166
      4*(M/S/KM)*,3X,7H(KM**2),3X,*(KM)*,4X,*(KM)*,4X,*(KM)*,4X,          TEST1    167
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          5*ELEMENTS*,1X,*(M/S)*,5X,8H(M/S/KM))                        TEST1     166
          IF(.NOT.VOLTAP)GO TO 6022                                    TEST      255
          ITYPE=4                                                      TEST1     169
          ICOUNT=0                                                     EXTRAD   1370
C CALCULATE NUMBER OF PEAK VELOCITY CELLS                              EXTRAD   1371
          DO 9943 IX=1,NVCEL                                           EXTRAD   1372
          IF(UV(IX,1).LE.0..OR.UV(IX,2).EQ.0.)GO TO 9943               TEST      256
          ICOUNT=ICOUNT+1                                              EXTRAD   1374
     9943 CONTINUE                                                     EXTRAD   1375
          WRITE (3) ITYPE,ICOUNT                                       EXTRAD   1376
     6022 DO 943 N=1,NVCEL                                             TEST      257
          IF(UV(N,1).LE.0.0.OR.UV(N,2).EQ.0.)GO TO 943                 TEST      258
          UV(N,4)=UV(N,4)/UV(N,2)/1.0E03                               TEST      259
          UV(N,3)=UV(N,3)/UV(N,2)/1.0E03                               TEST      260
          UV(N,2)=UV(N,2)/UV(N,1)/VQUANT                               TEST      261
          UV(N,5)=UV(N,5)/UV(N,1)/SQUANT                               TEST      262
          UV(N,6)=UV(N,6)/UV(N,1)/VQUANT                               TEST      263
          UV(N,1)=UV(N,1)*DELR/1.0E06                                  TEST      264
          RBAR=SQRT(UV(N,3)*UV(N,3)+UV(N,4)*UV(N,4))                   TEST1     170
          RCELLS=UV(N,1)/(RBAR*DAZE.)                                  TEST1     171
          IUV=UV(N,7)                                                  TEST      265
          WRITE(6,719) N,UV(N,2),JV(N,1),UV(N,3),UV(N,4),RBAR,RCELLS,  TEST1     172
         XUV(N,5),UV(N,6),IUV                                          TEST1     173
          IF(VOLTAP)WRITE(3)UV(N,2),JV(N,1),UV(N,3),UV(N,4),UV(N,5),UV(N,6), TEST 267
         +IUV                                                          TEST      268
          IF(.NOT.COPLOT)GO TO 943                                     TEST      269
          XREG=UV(N,3)/RANG+4.0                                        TEST1     174
          YREG=UV(N,4)/RANG+4.0                                        TEST1     175
          IPU=ISUP+N                                                   TEST      272
          WRITE(2)XREG,YREG,IPU                                        TEST      273
      719 FORMAT(1X,I4,2X,F7.1,3X,F7.1,1X,F7.1,1X,F7.1,3X,F7.1,F7.1,   TEST1     176
         X3X,F7.1,3X,F7.1,4X,I4)                                       TEST1     177
      943 CONTINUE                                                     EXTRAD   1391
C                                                                      EX2       110
C           OUTPUT SPREAD CELLS                                        EX2       111
C                                                                      EX2       112
     6011 IF(.NOT.CONTRS)GO TO 1413                                    TEST      275
          CALL PAGE                                                    EX2       113
          WRITE(6,9950)                                                EX2       114
     9950 FORMAT(1H ,*VELOCITY SPREAD MAXIMA ATTRIBUTES*)              EX2       115
          WRITE(6,945)IDAY,IHOUR,IMIN,ISEC,ELEVAT,AZMUTH(1),AZMUTH(NA) TEST      276
          WRITE(6,9951)                                                EX2       116
     9951 FORMAT(/,30X,*LOCATION*,13X,*AREA*,9X,*FIXED*,/,1X,          TEST1     178
         12HID,4X,*SPREAD*,5X,*AREA*,3X,*EAST*,3X,*NORTH*,3X,*RANGE*,  TEST1     179
         22X,*RESOLUTION*,5X,*CONTOUR*,/,7X,*(M/S)*,6X,*(KM2)*,2X,     TEST1     180
         3*(KM)*,3X,*(KM)*,4X,*(KM)*,3X,*ELEMENTS*,7X,*REFERENCE*)     TEST1     181
          IF(.NOT.VOLTAP)GO TO 6023                                    TEST      277
          ITYPE=5                                                      TEST1     182
          ICOUNT=0                                                     EX2       120
          DO 9944 IX=1,NSCEL                                           EX2       121
          IF(US(IX,1).LE.0..OR.US(IX,2).EQ.0)GO TO 9944                TEST      279
          ICOUNT=ICOUNT+1                                              EX2       123
     9944 CONTINUE                                                     EX2       124
          WRITE (3) ITYPE,ICOUNT                                       EX2       125
     6023 DO 944 N=1,NSCEL                                             TEST      280
          IF(US(N,1).LE.0..OR.US(N,2).EQ.0.)GO TO 944                  TEST      281
          US(N,4)=US(N,4)/US(N,2)/1.0E03                               TEST      282
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                 US(N,3)=US(N,3)/US(N,2)/1.0E03                              TEST     283
                 US(N,2)=US(N,2)/US(N,1)/SQUANT                              TEST     284
915              US(N,1)=US(N,1)*DELR/1.0E06                                 TEST     285
                 RBAR=SQRT(US(N,3)*US(N,3)+US(N,4)*US(N,4))                  TEST1    183
                 RCELLS=US(N,1)/(RBAR*DACEL)                                 TEST1    184
                 IUS=US(N,5)                                                 TEST     266
                 WRITE(6,721) N,US(N,2),JS(N,1),US(N,3),US(N,4),RBAR,RCELLS,IUS TEST1 185
920         721  FORMAT(I4,1X,F7.1,3X,F6.1,2X,F6.1,1X,F6.1,3X,F7.1,2X,F7.1,5X,I4) TEST1 186
                 IF(VOLTAP)WRITE(3)US(N,2),US(N,1),US(N,3),JS(N,4),IUS       TEST     289
                 IF(.NOT.COPLOT)GO TO 944                                    TEST     290
                 XREG=US(N,3)/RANG+4.0                                       TEST1    187
                 YREG=US(N,4)/RANG+4.0                                       TEST1    188
925              IPU=ISSP+N                                                  TEST     293
                 WRITE(2)XREG,YREG,IPU                                       TEST     294
            944  CONTINUE                                                    EX2      140
           1413  WRITE(6,950)KNID,NMR,NMV,NMS                                TEST     295
            950  FORMAT(1H0,10HTOTAL IUD=,4I6)                               TEST     296
930              ISCANF=0                                                    EXTRAD   1394
                 IF(PRINT2) CALL PRN2(2)                                     TEST1    189
                 RETURN                                                      EXTRAD   1398
                 END                                                         EXTRAD   1399
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      SUBROUTINE PEAKD(U,LDB,TM,ITY,UP,NCELL,TATR,NJMAX,IACT,IDC,IPT3,   TEST      298
     +TB,IPBNT,IPCRNG,MB,NMX,IPB1,IPB2,IPB3)                             TEST      299
C$    DEBUG                                                              EXTRAD   1403
C$    ARRAYS                                                             EX2       141
C     ****************************************************************** EXTRAD   1405
C     VERSION 1.0   LEVEL 770112                                         EXTRAD   1406
C     JMW   AFGL 6600                                                    EXTRAD   1407
C     DETERMINES PEAK VALUES AND THEIR ATTRIBUTES.                       EXTRAD   1408
C     ****************************************************************** EXTRAD   1409
      REAL UP(200,9),TATR(70,29)                                         TEST      300
      INTEGER U(173),MB(173),IACT(70),IDC(22),IPTB(22),TB(30,22),        TEST      301
     +IPBNT(30,22),IPCRNG(60),IPB1(2640),IPB2(2640),IPB3(2640),TM        TEST      302
      INTEGER W,WI,WR                                                    TEST      303
      INTEGER V,VB,VS,SV,VSI,SVI,HV,HS                                   TEST      304
      INTEGER TV,TSV,TL,T,TC                                             TEST1     190
      COMMON /PWORK/ IPTC(22),TC(30,22),IPCNT(30,22),KMAX,T(50),JMXDB,   TEST      306
     +JMAX,IPC1(2640),IPC2(2640),IPC3(2640),IAMAX,IR,JR,KR,IMXJMX        TEST      307
      COMMON/REFL/W(173),WI(173),WJ(173),WR(173),NNCL,NID,NIDP,NCL       TEST2     151
     X,IMX,IMN                                                           TEST2     152
      COMMON /VEL/ V(173),VB(173),VS(173),SV(173),VSI(173),SVI(173),     TEST      309
     +HV(173),HS(173)                                                    TEST      310
      COMMON /FIXED/ IC(4,22,2),IB(4,22,2),NPA,IEMAX,NFC,ICVNT(2),       TEST      311
     +               IBVNT(2),NTR(5,120,2),INT,NIDF,KDJ(2),IDSLOT(120,2) TEST      312
C     ------------------------------------------------------------------ EXTRAD   1420
      COMMON /STORE/ AE,AA,BB,SL,CL,TV,TSV                               EXTRAD   1421
      COMMON/INSUB/ TL(2),LT,IDW,DN,STARTR,STOPR,RN(4),SCON,CELWTH(3)    TEST1     191
     1,ICCMP,VMIN,SVMIN,ESTART,DELT                                      TEST2     153
      COMMON/AZM/ AZMUTH(460),NA,ELEVAT,PRF,KEEP                         EXTRAD   1425
      COMMON /ADATA/ IDAY,IHOUR,IMIN,ISEC,NTP,NSF,NDD,NRC                EXTRAD   1426
      COMMON /AZ2/SAZ,CAZ,DAZ,ISCANF,NEL                                 EXTRAD   1429
      COMMON/FILTER/TATRMN,AREANN,DAZM                                   TEST1     152
      COMMON  /ERROR/ IERR                                               EXTRAD   1432
      DATA IZERO/0/                                                      EXTRAD   1433
C     ------------------------------------------------------------------ EXTRAD   1434
C                                                                        EXTRAD   1435
C             IEM IS NO.OF EVENTS IN C RADIAL.                           EXTRAD   1436
C             INITIALIZE AND GENERATE HC ARRAY                           EXTRAD   1437
C                                                                        EXTRAD   1438
      SCONC=SCON*CELWTH(NTP+1)                                           EXTRAD   1439
      NAX=NA                                                             EXTRAD   1440
      IEM=ICVNT(1)                                                       EXTRAD   1441
      IFLAG=0                                                            TEST1     193
C                                                                        EX2       147
C        ITY = 0  HAVE NORMAL                                            EX2       148
C        ITY = 1   HAVE REFLECTIVITY + SHEAR + SPREAD                    EX2       149
C        ITY = 2   HAVE SHEAR + SPREAD                                   EX2       150
      LM=5                                                               EX2       151
      IF(ITY.EQ.1)LM=9                                                   EX2       152
      IF(ITY.EQ.2)LM=7                                                   TEST      314
      LMM=LM-1                                                           EXTRAD   1444
      IDX=LM+1                                                           EXTRAD   1445
      NCLM=NCL-1                                                         EXTRAD   1446
      LDMX=(NUMAX-2)/LM                                                  EXTRAD   1447
      IF (LDB.GT.LDMX) LDB=LD4X                                          EXTRAD   1448
      LDBM=LDB-1                                                         EXTRAD   1449
      NJMP=2+LM*LDB                                                      EXTRAD   1450
      LDX=NJMP-1                                                         EXTRAD   1451
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             IO2=I+(LOB-1)*LM                                               EXTRAD   1452
             IF(NA.NE.1.OR.ISCANF.NE.0)GO TO 2109                           EX1        59
       C                                                                    EXTRAD   1454
       C             ZERO ARRAYS                                            EXTRAD   1455
       C                                                                    EXTRAD   1456
             NMX=1                                                          EX1        60
             DO 2108 I=1,NICP                                               EX1        61
             IACT(I)=0                                                      EX1        62
             DO 2108 J=1,NUMAX                                              EX1        63
      2108   TATR(I,J)=0.                                                   TEST      315
      2109   NGM=0                                                          EX1        65
             DO 21 I=1,IEMAX                                                EXTRAD   1457
             IPTC(I)=0                                                      EXTRAD   1458
             DO 21 K=1,KMAX                                                 EXTRAD   1459
             IC(K,I)=0                                                      EXTRAD   1460
        21   IPCNT(K,I)=0                                                   EXTRAD   1461
             DO 22 J=1,IAMAX                                                EXTRAD   1462
             IPC1(J)=0                                                      EXTRAD   1463
             IPC2(J)=0                                                      EXTRAD   1464
        22   IPC3(J)=0                                                      EXTRAD   1465
       C                                                                    EXTRAD   1466
       C             OUTER C EVENT LOOP                                     EXTRAD   1467
       C                                                                    EXTRAD   1468
      1044 JEM=IBVNT(1)                                                     TEST1     194
             IF(IEM.LE.0) GO TO 952                                         TEST1     195
             IF(IEM.GT.KR)IEM=KR                                            EX1        66
             DO 951 IE=1,IEM                                                EXTRAD   1470
             IIO1=IC(NPA,IE,1)                                              EXTRAD   1471
             IF(IIO1.NE.0)GO TO 9510                                        TEST1     196
             WRITE(6,9511)IIO1                                              TEST1     197
      9511   FORMAT(* IIO1=*,I10)                                           TEST1     198
             GO TO 951                                                      TEST1     199
      9510   CONTINUE                                                       TEST1     200
             IF(NA .EQ. 1 .AND. ISCANF .EQ. 1) GO TO 940                    EXTRAD   1472
             IPL=0                                                          TEST1     201
             IF(IE.GT.1)IPL=IDC(IE-1)                                       TEST1     202
             IP=IDC(IE)                                                     EXTRAD   1474
             IF(IP.EQ.0.OR.IPL.EQ.IP) GO TO 951                             TEST1     203
             IF(IPL.LE.0) IPL=1                                             TEST1     204
             IF(IP.GT.JMAX)IP=JMAX                                          EX1        67
             JE1=0                                                          EXTRAD   1476
             JE2=0                                                          EXTRAD   1477
       C                                                                    EXTRAD   1478
       C             FIND B EVENTS ASSOCIATED WITH C EVENTS.                EXTRAD   1479
       C             JEM IS NO. OF EVENTS IN PREVIOUS RADIAL.               EXTRAD   1480
       C                                                                    EXTRAD   1481
             IF(JEM .EQ. 0) GO TO 41                                        EXTRAD   1483
             IF(JEM.GT.KR)JEM=KR                                            EX1        68
             DO 31 JE=1,JEM                                                 EXTRAD   1484
             IF(IB(2,JE,1) .LT. IC(1,IE,1)) GO TO 31                        EXTRAD   1485
             IF(IB(1,JE,1) .GT. IC(2,IE,1)) GO TO 41                        EXTRAD   1486
             JE2=JE                                                         EXTRAD   1487
             IF (JE1.EQ.0) JE1=JE                                           EXTRAD   1488
        31   CONTINUE                                                       EXTRAD   1489
       C                                                                    EXTRAD   1490
       C             FIND THRESHOLDS FOR IE EVENT                           EXTRAD   1491
       C                                                                    EXTRAD   1492
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      41  DO 51 J=1,JMXDB                                          EXTRAD   1493
      51  T(J)=0                                                   EXTRAD   1494
          NTHRES=1                                                 EX1        69
          IF(IP.LT.IPL) GO TO 951                                  TEST1     205
          DO 71 L=IPL,IP                                           EXTRAD   1495
          IR1=IPCRNG(L)                                            TEST      316
          IF(IR1.LE.0.OR.IR1.GE.NSL)GO TO 951                      TEST      317
          IF(IR1.LT.IC(1,IE,1))GO TO 71                            TEST      318
          IF(IR1.GT.IC(2,IE,1))GO TO 712                           TEST      320
          DO 711 K=1,LDB                                           TEST      321
          IT=IABS(U(IR1))-IM-K+1                                   EXTRAD   1499
          IF(IT.LE.0)GO TO 711                                     TEST      322
          IF(IT.GT.JMXDB)IT=JMXDB                                  EX1        71
          IF(T(IT).EQ.0)NTHRES=NTHRES+1                            EX1        72
          T(IT)=1                                                  EX1        73
     711  CONTINUE                                                 TEST      323
      71  CONTINUE                                                 TEST      324
     712  IPSRT=0                                                  TEST      325
          IF(NTHRES.GT.KMAX)IPSRT=NTHRES-KMAX                      EX1        75
          IPT=1                                                    EXTRAD   1502
          DO 91 L=1,JMXDB                                          EXTRAD   1503
          IF (T(L)) 91,91,81                                       EXTRAD   1504
       81 TC(IPT,IE)=L+IM-1                                        EXTRAD   1505
          IPSRT=IPSRT-1                                            EX1        76
          IF(IPSRT.GT.0)GO TO 91                                   EX1        77
          IPT=IPT+1                                                EXTRAD   1506
      91  CONTINUE                                                 EXTRAD   1507
          IPT=IPT-1                                                EXTRAD   1508
          IF(IPT.GE.JR)IPT=JR                                      EX1        78
          IPTC(IE)=IPT                                             EXTRAD   1509
          IF(IPT.LE.0)GO TO 951                                    EXTRAD   1510
      C                                                            EXTRAD   1511
      C          LOOP ON RANGE IN IE EVENT TO FIND CONTOUR         EXTRAD   1512
      C                                                            EXTRAD   1513
          IBGN=IC(1,IE,1)+1                                        EXTRAD   1514
          IND=IC(2,IE,1)+1                                         EXTRAD   1515
          DO 161 I=IBGN,IND                                        EXTRAD   1516
      C                                                            EXTRAD   1517
      C          LOOP ON THRESHOLD                                 EXTRAD   1518
      C                                                            EXTRAD   1519
     101  DO 131 K=1,IPT                                           EXTRAD   1520
          IF (U(I).EQ.-999) GO TO 141                              EXTRAD   1521
          IF (IABS(U(I)).GT.TC(K,IE)) GO TO 111                    EXTRAD   1522
          GO TO 141                                                EXTRAD   1523
     111  IF (U(I-1).EQ.-999) GO TO 121                            EXTRAD   1524
          IF (IABS(U(I-1)).LE.TC(K,IE)) GO TO 121                  EXTRAD   1525
          GO TO 131                                                EXTRAD   1526
      C                                                            EXTRAD   1527
      C          START RANGE FOR SEGMENT (CONTOUR)                 EXTRAD   1528
      C                                                            EXTRAD   1529
     121  IPCNT(K,IE)=IPCNT(K,IE)+1                                EXTRAD   1530
          IF(IPCNT(K,IE).LE.IMXJMX)GO TO 1211                      EX1        79
          WRITE(6,1212)ITY,K,IE                                    EX1        80
    1212  FORMAT(2X,*NUMBER OF SEGMENTS EXCEEDS IMX*,3I10)         EX1        81
    1211  IPE=IPCNT(K,IE)                                          EX1        82
          IREG=I-1                                                 EXTR/    1532
          CALL IPK(IPC1,IREG,IPE,K,IE,IR,JR)                       EXTRAD   1533
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      131 CONTINUE                                                       EXTRAD  1534
          GO TO 161                                                      EXTRAD  1535
      C                                                                  EXTRAD  1536
      C               END RANGE FOR SEGMENT                              EXTRAD  1537
      C                                                                  EXTRAD  1538
      141 DO 151 KL=K,IPT                                                EXTRAD  1539
          IF (U(I-1).EQ.-999) GO TO 161                                  EXTRAD  1540
          IF (IABS(U(I-1)).LE.TC(KL,IE)) GO TO 161                       EXTRAD  1541
          IPE=IPCNT(KL,IE)                                               EXTRAD  1542
          IREG=I-1                                                       EXTRAD  1543
          CALL IPK(IPC2,IREG,IPE,KL,IE,IR,JR)                            EXTRAD  1544
      151 CONTINUE                                                       EXTRAD  1545
      161 CONTINUE                                                       EXTRAD  1546
      C                                                                  EXTRAD  1547
      C               ASSOCIATE CELLS   LOOP ON THRESHOLD HIGHEST TO LOWEST EXTRAD 1548
      C                                                                  EXTRAD  1549
      940 DO 941 LC=1,IPT                                                EXTRAD  1550
          KC=IPT-LC+1                                                    EXTRAD  1551
          IF(KC.LE.0)GO TO 941                                           EXTRAD  1552
          NPC=IPCNT(KC,IE)                                               EXTRAD  1553
          IF(NPC.LE.0)GO TO 941                                          EXTRAD  1554
      C               LOOP ON SEGMENTS                                   EXTRAD  1555
          DO 931 IPE=1,NPC                                               EXTRAD  1556
          IHB=IUPK(IPC1,IPE,KC,IE,IR,JR)+1                               EX1       83
          IHBM=IHB-1                                                     TEST1    206
          IHD=IUPK(IPC2,IPE,KC,IE,IR,JR)                                 EX1       84
          K=KC+1                                                         EXTRAD  1557
          NPK=0                                                          EXTRAD  1558
          TATM=0.                                                        EXTRAD  1559
          IF (K.GT.IPT) GO TO 193                                        EXTRAD  1560
          LPE=IPCNT(K,IE)                                                EXTRAD  1561
          IF(LPE.LE.0)GO TO 193                                          EXTRA [ 1562
     192. DO 191 L=1,LPE                                                 EXTRAD  1563
          IF(IUPK(IPC2,L,K,IE,IR,JR).LT.IHBM) GO TO 191                  TEST1    207
          IF(IUPK(IPC1,L,K,IE,IR,JR).GT.IHD) GO TO 193                   TEST1    208
          NPCEL= IUPK(IPC3,L,K,IE,IR,JR)                                 EXTRAD  1568
          IF(NPCEL.EQ.0)GO TO 1911                                       EXTRAD  1569
          TATM=AMAX1(TATM,TATR(NPCEL,1))                                 TEST     327
          IF(TATM.EQ.TATR(NPCEL,1))NPK=NPCEL                             TEST     328
      C                                                                  EXTRAD  1572
      C               NPCEL IS FOR NEXT HIGHER (ENCLOSED) THRESHOLD ON C RADIAL EXTRAD 1573
      C                                                                  EXTRAD  1574
      231 IF(ABS(TATR(NPCEL,1)).GT.(TC(KC,IE)+LOB))GO TO 932             TEST     329
      191 CONTINUE                                                       EXTRAD  1576
          GO TO 193                                                      EXTRAD  1577
      932 NPK=-NPCEL                                                     EXTRAD  1578
          GO TO 193                                                      EXTRAD  1579
     1911 NPK=-(NIDP+1)                                                  EX1       85
      C                                                                  EXTRAD  1581
      C               ASSOCIATE CELLS ON B RADIAL, TOP DOWN              EXTRAD  1582
      C                                                                  EXTRAD  1583
      193 MPK=0                                                          EXTRAD  1584
          IF(NA.EQ.1)GO TO 361                                           EXTRAD  1586
          TATM=0.                                                        EXTRAD  1587
          IF (JE2.EQ.0) GO TO 361                                        EXTRAD  1594
          DO 261 JE=JE1,JE2                                              EXTRAD  1595
          IF(IB(2,JE,1).LT.IHBM) GO TO 261                               TEST1    209
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      IF(IB(1,JE,1).GT.IHD) GO TO 361                               TEST1    210
C                                                                   EXTRAD  1598
C            JE EVENT ON B RADIAL IS ASSOCIATED                     EXTRAD  1599
C                                                                   EXTRAD  1600
  271 IPB=IPTB(JE)                                                  EXTRAD  1601
      IF(IPB.LE.0)GO TO 261                                         EXTRAD  1602
      DO 291 LB=1,IPB                                               EXTRAD  1603
      KB=IPB-LB+1                                                   EXTRAD  1604
      NP1=IPBNT(KB,JE)                                              EXTRAD  1605
      IF(NP1.LE.0)GO TO 231                                         EXTRAD  1606
      DO 281 JPE=1,NP1                                              EXTRAD  1607
      IF(IUPK(IPB2,JPE,KB,JE,IR,JR).LT.IHBM) GO TO 281              TEST1    211
      IF(IUPK(IPB1,JPE,KB,JE,IR,JR).GT.IHD) GO TO 231               TEST1    212
      LPCEL=IUPK(IPB3,JPE,KB,JE,IR,JR)                              EXTRAD  1612
      IF(LPCEL.EQ.0)GO TO 281                                       EXTRAD  1614
      IF(TC(KC,IE) .LE. TB(KB,JE)) GO TO 282                        EXTRAD  1615
      IF(TB(KB,JE)+1.LT.TATR(LPCEL,1))GO TO 281                     TEST     330
  282 TATM=AMAX1(TATM,TATR(LPCEL,1))                                TEST1    213
      IF(TATM.NE.TATR(LPCEL,1))GO TO 281                            TEST     332
      MPK=LPCEL                                                     EXTRAD  1619
      KBM=KB                                                        EXTRAD  1620
      JBM=JE                                                        EXTRAD  1621
  281 CONTINUE                                                      EXTRAD  1622
  291 CONTINUE                                                      EXTRAD  1623
  261 CONTINUE                                                      EXTRAD  1624
      IF(MPK.NE.0)GO TO 3661                                        EX1       86
      DO 194 I=IHB,IHD                                              EX1       87
      IF(HB(I).EQ.-999)GO TO 194                                    EX1       88
      IF(IABS(HB(I)).GT.TC(KC,IE)+LDB)GO TO 934                     EX1       89
  194 CONTINUE                                                      EX1       90
      GO TO 361                                                     EX1       91
 3661 IF(ABS(TATR(MPK,1)).GT.TC(KC,IE)+LDB)MPK=-MPK                 TEST     333
      GO TO 361                                                     EXTRAD  1627
  934 MPK=-(NIDP+1)                                                 EX1       93
C                                                                   EXTRAD  1629
C            HAVE B COMPARE WITHIN RANGE                            EXTRAD  1630
C                                                                   EXTRAD  1631
  361 CONTINUE                                                      EXTRAD  1632
      IF(MPK.EQ.0.AND.NPK.EQ.0)GO TO 631                            EXTRAD  1633
C                                                                   EXTRAD  1634
C            MPK=0.AND.NPK=0 - NO COMPARE                           EXTRAD  1635
C            MPK=0.AND.NPK.NE.0 - NO B COMPARE                      EXTRAD  1636
C            NPK=0.AND.MPK.NE.0 - B COMPARE                         EXTRAD  1637
C            HIGHEST THIS RADIAL                                    EXTRAD  1638
C                                                                   EXTRAD  1639
      IF(MPK.EQ.0.AND.NPK.LT.0)GO TO 931                            EXTRAD  1640
      IF(MPK.NE.0)GO TO 421                                         EXTRAD  1641
C                                                                   EXTRAD  1642
C            NO PRIOR RADIA. FOR COMPARISON, INCREMENT NPCEL        EXTRAD  1643
C                                                                   EXTRAD  1644
  381 NPCEL=NPK                                                     EXTRAD  1645
      IF(NA .EQ. 1 .AND. ISCANF .EQ. 1) GO TO 392                   EXTRAD  1646
      IF(NA.EQ.1)GO TO 359                                          EXTRAD  1647
      DO 352 I=IHB,IHD                                              EXTRAD  1648
      IF(HB(I).EQ.-999)GO TO 352                                    EXTRAD  1649
      IF(HB(I) .GT. TC(KC,IE))GOTO 931                              EXTRAD  1650
  352 CONTINUE                                                      EXTRAD  1651
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 359  INDX=TATR(NPCEL,1)-TC(K2,IE)-1                                  TEST      334
 391  IF(INDX.GE.LDB.OR.INDX.LE.0)GOTO 366                            EXTRAD   1653
 392  IN=1+INDX*LM                                                    TEST      335
      INX=IDX+INDX*LM                                                 EXTRAD   1657
      IF(TATR(NPCEL,IN).NE.0..OR.NA.EQ.1)GO TO 3921                   TEST      336
      IF(TATR(NPCEL,IN-LMM).LE.0.)GO TO 931                           TEST      337
      MPC=NPCEL                                                       TEST      338
      NPCEL=TATR(NPCEL,IN-LMM)                                        TEST      339
      IF(MPC.EQ.NPCEL)GO TO 931                                       TEST      340
      GO TO359                                                        EXTRAD   1662
 3921 CALL IPK(IPC3,NPCEL,IPE,K2,IE,IR,JR)                            TEST      341
      IST=IHB                                                         TEST1     214
      ISP=IHD                                                         TEST1     215
      DO 411 I=IST,ISP                                                EXTRAD   1665
      R=SCONC*(FLOAT(I-1)-.5)                                         EXTRAD   1666
      RU=R*ABS(FLOAT(U(I)))                                           TEST      344
      TATR(NPCEL,IN+1)=TATR(NPCEL,IN+1)+DAZ*R                         TEST      345
      TATR(NPCEL,IN+2)=TATR(NPCEL,IN+2)+DAZ*RJ                        TEST      346
      TATR(NPCEL,IN+3)=TATR(NPCEL,IN+3)+DAZ*SAZ*R*RJ                  TEST      347
      TATR(NPCEL,IN+4)=TATR(NPCEL,IN+4)+DAZ*CAZ*R*RJ                  TEST      348
      IF(ITY.EQ.0)GO TO 411                                           EX2       154
      IF(SV(I).NE.-999)                                               TEST      349
     +TATR(NPCEL,IN+5)=TATR(NPCEL,IN+5)+DAZ*R*SV(I)                   TEST      350
      IF(ITY.GE.2)GO TO 401                                           TEST      351
      IF(V(I).EQ.-999)GO TO411                                        EXTRAD   1672
      TATR(NPCEL,IN+8)=TATR(NPCEL,IN+8)+DAZ*R*V(I)                    TEST1     216
      IF(V(I-1).EQ.-999)GO TO 401                                     EXTRAD   1674
      TATR(NPCEL,IN+7)=TATR(NPCEL,IN+7)+DAZ*R*(V(I)-V(I-1))           TEST      352
 401  IF (VS(I).EQ.-999) GO TO 411                                    EXTRAD   1676
      TATR(NPCEL,IN+6)=TATR(NPCEL,IN+6)+R*VS(I)*DAZ                   TEST      353
 411  CONTINUE                                                        EXTRAD   1678
 419  TATR(NPCEL,INX)=SIGN(FLOAT(NA),TATR(NPCEL,INX))                 TEST      354
      IF(NA.EQ.1)TATR(NPCEL,INX)=SIGN(TATR(NPCEL,INX),-1.0)           TEST      355
      IF(IST.LE.IMN.OR.ISP.GE.IMX) TATR(NPCEL,LDX)=-999.              TEST2     154
      IF(IST.LE.IMN.OR.ISP.GE.IMX) TATR(NPCEL,LDX)=-999.              TEST2     155
      GO TO 366                                                       EXTRAD   1682
 3662 NPCEL=-NPK                                                      EXTRAD   1683
      IF(NPCEL.GT.NIDP.OR.NPCEL.LE.0)GO TO 931                        EX1        94
 366  INDX=TATR(NPCEL,1)-TC(K2,IE)-1                                  TEST      357
C                                                                     EXTRAD   1686
C             COMBINE LPCEL WITH NPCEL AT THIS LEVEL                  EXTRAD   1687
C        COMBINE BY SETTING AREA AS POINTER AND IDX TO NA = 0         EXTRAD   1688
C                                                                     EXTRAD   1689
      DO 365 L=1,LPE                                                  EXTRAD   1690
      IF(IUPK(IPC2,L,K,IE,IR,JR).LT.IHBM) GO TO 365                   TEST1     217
      IF(IUPK(IPC1,L,K,IE,IR,JR).GT.IHD) GO TO 931                    TEST1     218
      LPCEL=IUPK(IPC3,L,K,IE,IR,JR)                                   EXTRAD   1695
 341  IF(LPCEL.EQ.0)GO TO 365                                         EXTRAD   1696
      IF(TATR(LPCEL,IDX).EQ.0.)GO TO 365                              TEST      358
 351  IF(NPCEL.EQ.LPCEL)GO TO 365                                     EXTRAD   1698
      INDX=TATR(LPCEL,1)-TC(K2,IE)-1                                  TEST      359
      IF(INDX.GE.LDB)GO TO 365                                        EXTRAD   1700
      IF(INDX.LE.0)INDX=0                                             EXTRAD   1701
      IND=IDX+INDX*LM                                                 EXTRAD   1702
      IF(TATR(LPCEL,IND).EQ.0.)GO TO 365                              TEST      360
      IND=INDX+1                                                      EXTRAD   1704
      IPG=0                                                           EXTRAD   1705
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              DO 3663 J=IND,LDB                                           EXTRAD   1706
              IN=(J-1)*LM+1                                               EXTRAD   1707
              IF(TATR(LPCEL,IN+LM).EQ.N4)IPG=IPG+1                        TEST      361
              DO 3663 I=1,LM                                              EXTRAD   1709
       3663   TATR(LPCEL,I+IN)=0.                                         TEST      362
              IF(IPG.EQ.0.OR.IE.LE.1)GO TO 3664                           EXTRAD   1711
              IET=IE-1                                                    EXTRAD   1712
              DO 3665 I=1,IET                                             EXTRAD   1713
              IPTT=IPTC(I)                                                EXTRAD   1714
              IF(IPTT.LE.0)GO TO 3665                                     EXTRAD   1715
              DO 3666 KT=1,IPTT                                           EXTRAD   1716
              NPCT=IPCNT(KT,I)                                            EXTRAD   1717
              IF(NPCT.LE.0)GO TO 3666                                     EXTRAD   1718
              DO 3667 LP=1,NPCT                                           TEST1     219
              IF(LPCEL.NE.IUFK(IPC3,LP,KT,I,IR,JR)) GO TO 3667            TEST1     220
              INDXT=TATR(NPCEL,1)-TC(KT,I)-1                              TEST      363
              IF(INDXT.LT.LDB)GO TO 3668                                  EXTRAD   1722
       3669   CALL IPK(IPC3,IZERO,LP,KT,I,IR,JR)                          TEST1     221
              GO TO 3667                                                  EXTRAD   1724
       3668   IF(IMDX.GE.LDB)GO TO 3669                                   EXTRAD   1725
              CALL IPK(IPC3,NPCEL,LP,KT,I,IR,JR)                          TEST1     222
       3667   CONTINUE                                                    EXTRAD   1727
       3666   CONTINUE                                                    EXTRAD   1728
       3665   CONTINUE                                                    EXTRAD   1729
              IPG=0                                                       EXTRAD   1730
       3664   IF(IMDX.GE.LDB)GO TO 365                                    EX1        95
              IACT(LPCEL)=-NPCEL                                          EXTRAD   1732
              TATR(LPCEL,2+INDX*LM)=NPCEL                                 TEST      364
              IF(INDX.NE.0)GO TO 365                                      EXTRAD   1734
              IACT(LPCEL)=-NIOP-1                                         EX1        96
              TATR(LPCEL,2)=0.                                            TEST      365
        365   CONTINUE                                                    EXTRAD   1737
              GO TO 931                                                   EXTRAD   1738
      C                                                                   EXTRAD   1739
      C               COMBINE NPCEL AND LPCEL, PEAK VALUES EQUAL          EXTRAD   1740
      C                                                                   EXTRAD   1741
      C                                                                   EXTRAD   1742
      C                COMBINE WITH 8 RADIAL CELLS                        EXTRAD   1743
      C                                                                   EXTRAD   1744
        421   IF(MPK.LE.0)GOTO 422                                        EX1        97
              IF(NPK.LT.0)GO TO 3662                                      EXTRAD   1746
              NGM=0                                                       EXTRAD   1747
              LPCEL=MPK                                                   EXTRAD   1748
              IF(TATR(LPCEL,IDX).EQ.N4.AND.NPK.EQ.0.AND.TC(KC,IE).GT.TB(KBM,J3M) TEST   366
             *)GO TO 485                                                  EXTRAD   1750
              INDX=TATR(LPCEL,1)-TC(KC,IE)-1                              TEST      367
              IMDX=INDX                                                   EXTRAD   1752
              IF(NPK.GT.0)IMDX=TATR(NPK,1)-TC(KC,IE)-1                    TEST      368
              IF(IMDX.LE.INDX)GO TO 4212                                  EXTRAD   1754
              NGM=1                                                       EXTRAD   1755
              NPCEL=NPK                                                   EXTRAD   1756
              IND=INDX                                                    EXTRAD   1757
              INDX=IMDX                                                   EXTRAD   1758
              IMDX=IND                                                    EXTRAD   1759
              GO TO 4213                                                  EXTRAD   1760
       4212   IF(INDX.LT.0)GO TO 481                                      EXTRAD   1761
              NPCEL=LPCEL                                                 EXTRAC   1762
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      C                                                                        EXTRAD   1763
      C               COMBINE WITH B - RADIAL, C-LEVEL LOWER                   EXTRAD   1764
      C                                                                        EXTRAD   1765
      4213  IF(INDX.GE.LOB)GO TO 4221                                          EXTRAD   1766
            IN=INDX*LM                                                         EXTRAD   1768
      512   IF(TATR(NPCEL,IN+IDX).NE.0.)GO TO 5311                             TEST      369
            IF(TATR(NPCEL,2+IN).LE.J..AND.NGM.EQ.0)GO TO 4221                  TEST      370
            IF(NGM.NE.1)GO TO 5312                                             EXTRAD   1771
      5314  IM=INDX*LM                                                         EXTRAD   1772
            IF(IM.LT.0) GO TO 5311                                             TEST1     223
            IF(LPCEL.LE.0.OR.LPCEL.GT.NMX) GO TO 931                           TEST1     224
            IF(TATR(LPCEL,IM+IDX).NE.0.)GO TO 5311                             TEST      371
            IF(TATR(LPCEL,2+IM).GT.J.)GO TO 5313                               TEST      372
            LPCEL=NPCEL                                                        EXTRAD   1775
            GO TO 4221                                                         EXTRAD   1776
      5313  LPCEL=TATR(LPCEL,2+IM)                                             TEST      373
            IF(LPCEL.EQ.NPCEL.OR.LPCEL.GT.NMX)GO TO 4221                       EXTRAD   1778
            INDX=TATR(LPCEL,1)-TC(KC,IE)-1                                     TEST      374
            GO TO 5314                                                         EXTRAD   1780
      5312  NPCEL=TATR(NPCEL,2+IN)                                             TEST      375
            IF(NPCEL.LE.0.OR.NPCEL.GT.NMX)GO TO 4221                           EX1        99
            INDX=TATR(NPCEL,1)-TC(KC,IE)-1                                     TEST      376
            GO TO 4213                                                         EXTRAD   1783
      5311  CALL IPK(IPC3,NPCEL,IPE,KC,IE,IR,JR)                               TEST      377
            IST=IHB                                                            TEST1     225
            ISP=IHD                                                            TEST1     226
            DO 531 I=IST,ISP                                                   EXTRAD   1786
            R=SCONC*(FLOAT(I-1)-.5)                                            EXTRAD   1787
            RU=R*ABS(FLOAT(U(I)))                                              TEST      379
            TATR(NPCEL,2+IN)=TATR(NPCEL,2+IN)+DAZ*R                            TEST      380
            TATR(NPCEL,3+IN)=TATR(NPCEL,3+IN)+DAZ*RU                           TEST      381
            TATR(NPCEL,4+IN)=TATR(NPCEL,4+IN)+DAZ*SAZ*R*RU                     TEST      382
            TATR(NPCEL,5+IN)=TATR(NPCEL,5+IN)+DAZ*CAZ*R*RU                     TEST      383
            IF(ITY.EQ.0)GO TO 531                                              EX2       161
            IF(SV(I).NE.-999)                                                  TEST      384
           +TATR(NPCEL,6+IN)=TATR(NPCEL,6+IN)+DAZ*R*SV(I)                      TEST      385
            IF(ITY.GE.2)GO TO 521                                              TEST      386
            IF(V(I) .EQ. -999)GO TO 531                                        EXTRAD   1794
            TATR(NPCEL,9+IN)=TATR(NPCEL,9+IN)+DAZ*R*V(I)                       TEST      387
            IF(V(I-1) .EQ. -999)GO TO 521                                      EXTRAD   1796
            TATR(NPCEL,8+IN)=TATR(NPCEL,8+IN)+DAZ*R*(V(I)-V(I-1))              TEST      388
      521   IF (VS(I).EQ.-999) GO TO 531                                       EXTRAD   1798
            TATR(NPCEL,7+IN)=TATR(NPCEL,7+IN)+DAZ*R*VS(I)                      TEST      389
      531   CONTINUE                                                           EXTRAD   1800
            TATR(NPCEL,IN+IDX)=SIGN(FLOAT(NA),TATR(NPCEL,IN+IDX))              TEST      390
            IF(NA.EQ.1)TATR(NPCEL,IN+IDX)=SIGN(TATR(NPCEL,IN+IDX),-1.0)        TEST      391
            LPCEL=NPCEL                                                        EXTRAD   1804
            GO TO 4221                                                         EXTRAD   1805
      C                                                                        EXTRAD   1806
      C               COMBINE WITH B-RADIAL, C-LEVEL HIGHER                    EXTRAD   1807
      C                                                                        EXTRAD   1808
      C               IF FIRST COMBINE, AREA=0, IF SECOND OR HIGHER, AREA=-1.  EXTRAD   1809
      C               TEST AREA TO ESTABLISH NEW NUMBERS                       EXTRAD   1810
      C                                                                        EXTRAD   1811
        481 INDX=-INDX                                                         EXTRAD   1812
            IND=NUMP-1                                                         EXTRAD   1813
            INDP=LOB                                                           EXTRAD   1814
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AD-A057 153 ENVIRONMENTAL RESEARCH AND TECHNOLOGY INC CONCORD MASS F/G 4/2
DEVELOPMENT OF TECHNIQUES FOR SHORT-RANGE PRECIPITATION FORECAS--ETC(U)
DEC 77 R K CRANE F19628-77-C-0058
UNCLASSIFIED AFGL-TR-78-0005 NL

2 OF 2
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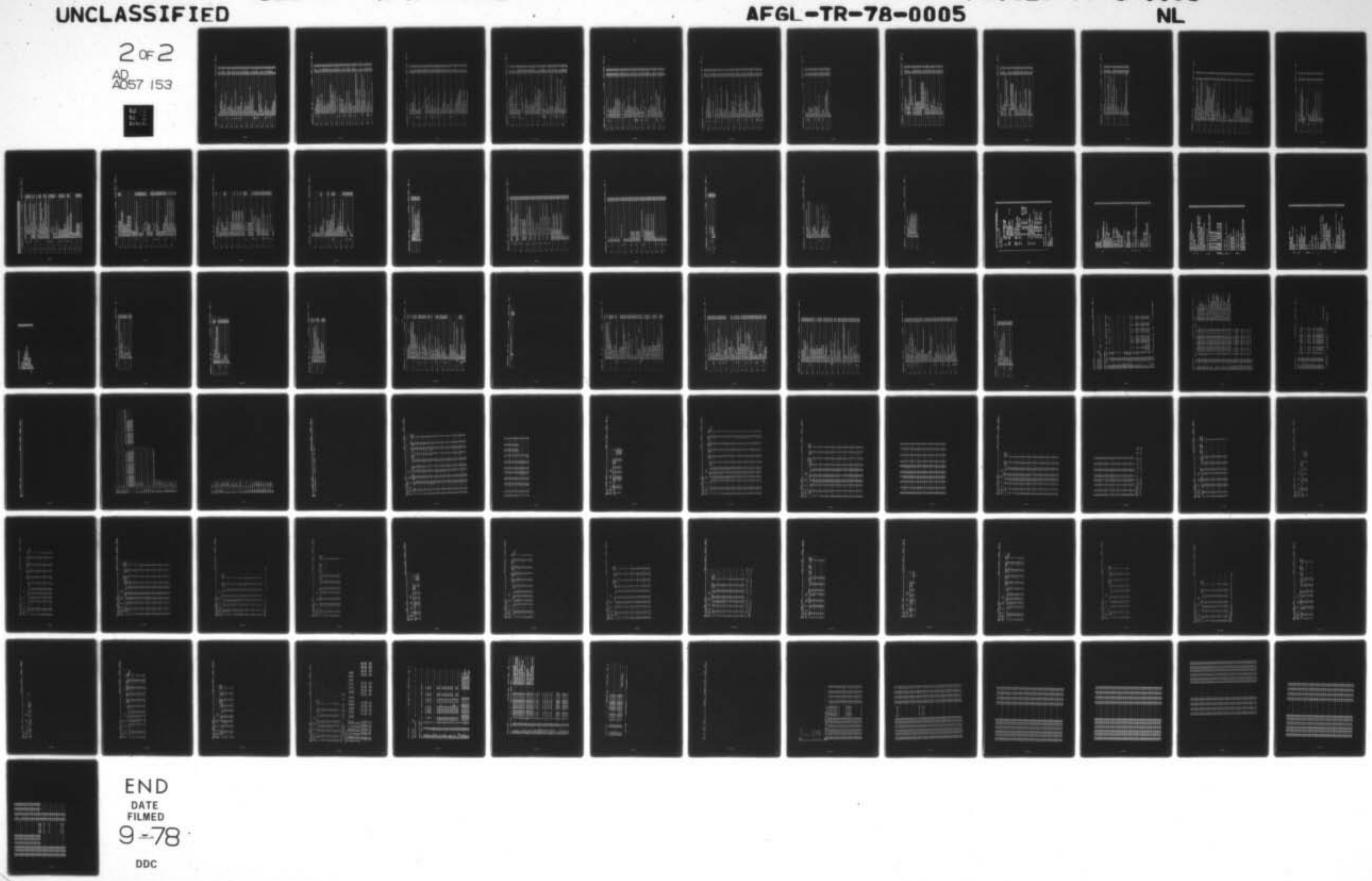

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            INS=2                                                   EXTRAD  1815
            IPG=0                                                   EXTRAD  1816
            TATR(LPCEL,1)=TC(KC,IE)+1                               TEST     393
            TATR(LPCEL,NUMP)=ABS(ATR(IAT,IID1,1))                   TEST1    227
            IF(INDX.GE.LDB)GO TO 482                                EXTRAD  1819
            IND=LDB-INDX                                            EXTRAD  1820
            DO 4832 I=INDX,LDBM                                     EXTRAD  1821
            IF(TATR(LPCEL,IDX+I*LM).EQ.NA)IPG=IPG+1                 TEST     395
      4832  CONTINUE                                                EX1      100
            DO 483 I=1,IND                                          EXTRAD  1824
            DO 483 J=1,LM                                           EXTRAD  1825
            IN=1+J+(LDB-I)*LM                                       EXTRAD  1826
            IM=1+J+(IND-I)*LM                                       EXTRAD  1827
       483  TATR(LPCEL,IN)=TATR(LPCEL,IM)                           TEST     396
            IND=INDX*LM+1                                           EXTRAD  1829
            INDP=INDX                                               EXTRAD  1830
       482  DO 4835 I=1,LDB                                         EXTRAD  1831
            IF(TATR(LPCEL,IDX+(I-1)*LM).EQ.NA)IPG=IPG+1             TEST     397
      4835  CONTINUE                                                EXTRAD  1833
            DO 484 I=INS,IND                                        EXTRAD  1834
       484  TATR(LPCEL,I)=0.                                        TEST     398
            DO 4841 I=1,INDP                                        EXTRAD  1836
      4841  TATR(LPCEL,I*LM+1)=NA                                   TEST     399
            IF(IPG.EQ.0.OR.IE.LE.1)GO TO 488                        EXTRAD  1838
            IET=IE-1                                                EXTRAD  1839
            IPTT=IPTC(I)                                            EXTRAD  1840
            IF(IPTT.LE.0)GO TO 4831                                 EXTRAD  1841
            DO 4833 KT=1,IPTT                                       EXTRAD  1842
            NPCT=IPCNT(KT,I)                                        EXTRAD  1843
            IF(NPCT.LE.0)GO TO 4833                                 EXTRAD  1844
            DO 4834 LP=1,NPCT                                       TEST1    228
            IF(LPCEL.NE.IUFK(IPC3,LP,KT,I,IR,JR)) GO TO 4834        TEST1    229
            INDXT=TATR(LPCEL,1)-TC(KT,I)-1                          TEST     400
            IF(INDXT.LT.LDB)GO TO 4834                              EXTRAD  1846
            CALL IPK(IPC3,IZERO,LP,KT,I,IR,JR)                      TEST1    230
      4834  CONTINUE                                                EXTRAD  1850
      4833  CONTINUE                                                EXTRAD  1851
      4831  CONTINUE                                                EXTRAD  1852
            IPG=0                                                   EXTRAD  1853
       488  IN=0                                                    EXTRAD  1854
            IF(LPCEL.LE.0.OR.LPCEL.GT.NMX)GO TO 931                 EX1      101
            TATR(LPCEL,IDX)=NA                                      TEST     401
            CALL IPK(IPC3,LPCEL,IPE,KC,IE,IR,JR)                    EXTRAD  1856
            NPCEL=LPCEL                                             EXTRAD  1857
            NGH=0                                                   EX1      102
            GO TO 512                                               EXTRAD  1858
       485  DO 486 I=1,NIOP                                         EX1      103
            IF(IACT(I).EQ.0)GO TO 487                               EXTRAD  1860
       486  CONTINUE                                                EXTRAD  1861
            WRITE(6,644)                                            EXTRAD  1862
            GO TO 931                                               EXTRAD  1863
       487  LPCEL=I                                                 EXTRAD  1864
            IACT(I)=1                                               EXTRAD  1865
            NMX=MAX0(NMX,I+1)                                       EXTRAD  1866
            IF(NMX.GT.NIOP)NMX=NIOP                                 EX1      104
            TATR(LPCEL,1)=TC(KC,IE)+1                               TEST     402
            TATR(LPCEL,NUMP)=ABS(ATR(IAT,IID1,1))                   TEST1    231
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SUBROUTINE PEAKD        74/74    OPT=2                     FTN 4.6+428          05/04/78  21.36.09       PAGE    10

              GO TO 400                                                          EXTRAD   1870
          422 LPCEL=IABS(MPK)                                                    EXTRAD   1871
              IF(LPCEL.GT.NIELP)GO TO 931                                        EX1       105
         4221 INDX=TATR(LPCEL,1)-TC(KC,IE)-1                                     TEST      404
              IF(INDX.LT.0)GO TO 931                                             EX1       106
              DO 441 JE=JE1,JE2                                                  EXTRAD   1874
              IF(IB(2,JE,1).LT.IHBM) GO TO 441                                   TEST1     232
              IF(IB(1,JE,1).GT.IHD) GO TO 632                                    TEST1     233
              IPB=IPTB(JE)                                                       EXTRAD   1877
              IF(IPB.LE.0)GO TO 441                                              EXTRAD   1878
              DO 471 LB=1,IPB                                                    EXTRAD   1879
              KB=IPB-LB+1                                                        EXTRAD   1880
              MPB=IPBNT(KB,JE)                                                   EXTRAD   1881
              IF(MPB.LE.0)GO TO 471                                              EXTRAD   1882
              DO 461 JPE=1,MPB                                                   EXTRAD   1883
              IF(IUPK(IPE2,JPE,KB,JE,IR,JR).LT.IHBM) GO TO 461                   TEST1     234
              IF(IUPK(IPB1,JPE,KB,JE,IR,JR).GT.IHDT GO TO 632                    TEST1     235
              NPCEL=IUPK(IPB3,JPE,KB,JE,IR,JR)                                   EXTRAD   1888
              IF(NPCEL.LE.0.OR.NPCEL.GT.NNX)GO TO 461                            EX1       107
              IF(LPCEL.EQ.NPCEL)GO TO 461                                        EXTRAD   1890
              IF(TB(KB,JE) .NE. TC(KC,IE))GO TO 461                              EXTRAD   1891
C                                                                                EXTRAD   1892
C         COMBINE AT TB=TC LEVEL                                                 EXTRAD   1893
C                                                                                EXTRAD   1894
  502         INDX=TATR(NPCEL,1)-TC(KC,IE)-1                                     TEST      405
              IF(INDX.GE.LDB)GO TO 461                                           EXTRAD   1896
              IF(INDX.LE.0)GO TO 8511                                            EX1       108
              IF(INDX.LT.LDB)GO TO 861                                           EX1       109
  851         ND=1+INDX*LM                                                       EXTRAD   1899
              DO 852 I=1,LM                                                      EXTRAD   1900
  852         TATR(NPCEL,ND+I)=0.                                                TEST      406
              CALL IPK(IPB3,IZERO,JPE,KB,JE,IR,JR)                               EXTRAD   1902
              GO TO 461                                                          EXTRAD   1903
 8511         CALL IPK(IPB3,IZERO,JPE,KB,JE,IR,JR)                               EXTRAD   1904
              DO 8512 J=2,NUMP                                                   EXTRAD   1905
 8512         TATR(NPCEL,J)=0.                                                   TEST      407
              IACT(NPCEL)=-(NIDP+1)                                              EX1       110
              GO TO 461                                                          EXTRAD   1908
  861         LD=1+INDX*LM                                                       EXTRAD   1909
              ND=1+INDX*LM                                                       EXTRAD   1910
              IF(TATR(LPCEL,LD+LM).NE.0..AND.TATR(NPCEL,ND+LM).NE.0.)GO TO 8911  TEST      408
              IF(TATR(LPCEL,LD+LM).EQ.0. .AND.TATR(LPCEL,LD+1).LE.0.)GO TO 851   TEST      409
              IF(TATR(LPCEL,LD+LM).GT.0.)GO TO 8912                              TEST      410
              LPCEL=TATR(LPCEL,LD+1)                                             TEST      411
              IF(LPCEL.LE.0.OR.LPCEL.GT.NNX)GO TO 931                            EX1       111
              GO TO 4221                                                         EXTRAD   1915
 8912         IF(TATR(NPCEL,ND+LM).EQ.0..AND.TATR(NPCEL,ND+1).LE.0.)GO TO 8913   TEST      412
              NPCEL=TATR(NPCEL,ND+1)                                             TEST1     236
              IF(NPCEL.LE.0.OR.NPCEL.GT.NNX.OR.NPCEL.EQ.LPCEL)GO TO 461          EX1       112
              CALL IPK(IPB3,NPCEL,JPE,KB,JE,IR,JR)                               EXTRAD   1918
              GO TO 502                                                          EXTRAD   1919
 8913         DO 8914 I=1,LM                                                     EXTRAD   1920
 8914         TATR(LPCEL,LD+I)=0.                                                TEST      414
              CALL IPK(IPB3,IZERO,JPE,KB,JE,IR,JR)                               EXTRAD   1922
              GO TO 4221                                                         EXTRAD   1923
 8911         DO 891 I=1,LMM                                                     EXTRAD   1924
              TATR(LPCEL,LD+I)=TATR(NPCEL,ND+I)+TATR(LPCEL,LD+I)                 TEST1     237
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             TATR(NPCEL,ND+I)=0.                                  TEST      416
      891    CONTINUE                                             EXTRAD   1927
             TATR(NPCEL,ND+LM)=0.                                 TEST      417
             TATR(NPCEL,ND+1)=LPCEL                               TEST      418
             IACT(NPCEL)=-LPCEL                                   EXTRAD   1930
             CALL IPK(IPB3,LPCEL,JPE,<3,JE,IR,JR)                 EXTRAD   1931
      461    CONTINUE                                             EXTRAD   1932
      471    CONTINUE                                             EXTRAD   1933
      441    CONTINUE                                             EXTRAD   1934
      632    IF(NPK.LE.0)GO TO 3662                               EXTRAD   1935
             NPCEL=LPCEL                                          EXTRAD   1936
             GO TO 366                                            EXTRAD   1937
      C                                                           EXTRAD   1938
      C              UNASSOCIATED                                 EXTRAD   1939
      C                                                           EXTRAD   1940
      631    IF(NA .EQ. 1 .AND. ISCANF .EQ. 0) GO TO 639          EXTRAD   1941
             IF (NA .EQ. 1) GO TO 630                             EXTRAD   1942
             DO 641 I=IHB,IHD                                     EXTRAD   1943
             IF (HB(I).EQ.-999) GO TO 641                         EXTRAD   1944
             IF(HB(I) .GT. TC(KC,IE))GOTO 931                     EXTRAD   1945
      641    CONTINUE                                             EXTRAD   1946
      639    DO 642 J=1,NIDP                                      EX1       113
             IF(IACT(J).EQ.0)GO TO 643                            EXTRAD   1948
      642    CONTINUE                                             EXTRAD   1949
             WRITE(6,644)                                         EXTRAD   1950
      644    FORMAT(5X,* TOO MANY CE__S*)                         EXTRAD   1951
             GO TO 931                                            EXTRAD   1952
      630    NCELT=NCELT+1                                        EXTRAD   1953
             CALL IPK(IPC3,NCELT,IPE,<J,IE,IR,JR)                 EXTRAD   1954
             GO TO 931                                            EXTRAD   1955
      643    NPCEL=J                                              EXTRAD   1956
             IACT(J)=1                                            EXTRAD   1957
             NMX=MAX0(NMX,J+1)                                    EXTRAD   1958
             IF(NMX.GT.NIDP)NMX=NIDP                              EX1       114
             CALL IPK(IPC3,NPCEL,IPE,<J,IE,IR,JR)                 EXTRAD   1960
             IN1=LM+1                                             EXTRAD   1961
             IN=(LDB-1)*LM+IN1                                    EXTRAD   1962
             DO 671 I=IN1,IN                                      EXTRAD   1963
             TATR(NPCEL,I)=0.0                                    TEST      419
      671    CONTINUE                                             EXTRAD   1965
      591    TATR(NPCEL,1)=TC(KC,IE)+1                            TEST      420
             TATR(NPCEL,NUMP)=ABS(ATR(IAT,IID1,1))                TEST1     238
             IST=IHE                                              TEST1     239
             ISP=IHC                                              TEST1     240
             DO 621 I=IST,ISP                                     EXTRAD   1971
             R=SCONC*(FLOAT(I-1)-.5)                              EXTRAD   1972
             RU=R*ABS(FLOAT(U(I)))                                TEST      422
             TATR(NPCEL,2)=DAZ*R+TATR(NPCEL,2)                    TEST      423
             TATR(NPCEL,3)=DAZ*RU+TATR(NPCEL,3)                   TEST      424
             TATR(NPCEL,4)=DAZ*SAZ*R*RJ+TATR(NPCEL,4)             TEST      425
             TATR(NPCEL,5)=TATR(NPCE_,5)+DAZ*CAZ*R*RJ             TEST1     241
             IF(ITY.EQ.0)GO TO 621                                EX2       168
             IF(SV(I).NE.-999)                                    TEST      427
            +TATR(NPCEL,6)=TATR(NPCE_,5)+DAZ*R*SV(I)              TEST      428
             IF(ITY.GE.2)GO TO 601                                TEST      429
             IF(V(I).EQ.-999)GO TO 621                            EXTRAD   1978
             TATR(NPCEL,9)=TATR(NPCEL,9)+DAZ*R*V(I)               TEST      430
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            IF(V(I-1) .EQ. -999)GO TO 601                                   EXTRAD  1980
            TATR(NPCEL,8)=TATR(NPCEL,8)+DAZ*R*(V(I)-V(I-1))                 TEST     431
      601   IF (VS(I).EQ.-999) GO TO 621                                    EXTRAD  1982
            TATR(NPCEL,7)=TATR(NPCEL,7)+DAZ*R*VS(I)                         TEST     432
      621   CONTINUE                                                        EXTRAD  1984
      939   TATR(NPCEL,IDX)=NA                                              TEST     433
            IF(NA.EQ.1)TATR(NPCEL,IDX)=-TATR(NPCEL,IDX)                     TEST     434
            IF(IST.LE.IMN.OR.ISP.GE.IMX) TATR(NPCEL,LDX)=-999.              TEST2    156
      931   CONTINUE                                                        EXTRAD  1988
      941   CONTINUE                                                        EXTRAD  1989
      951   CONTINUE                                                        EXTRAD  1990
      C                                                                     EXTRAD  1991
      C        CLEAN UP TATR AND IC ARRAYS  -  REMOVE IC POINTER            EXTRAD  1992
      C        TO DELETED ARRAYS                                            EXTRAD  1993
      C                                                                     EXTRAD  1994
            DO 9512 I=1,NMX                                                 EXTRAD  1995
            IF(IACT(I).EQ.0)GO TO 9512                                      EXTRAD  1996
            IF(IACT(I).GE.0)GO TO 9611                                      EXTRAD  1997
            DO 9613 IE=1,IEM                                                EXTRAD  1998
            IPT=IPTC(IE)                                                    EXTRAD  1999
            IF(IPT.LE.0)GO TO 9613                                          EXTRAD  2000
            DO 9618 KC=1,IPT                                                EXTRAD  2001
            NPC=IPCNT(KC,IE)                                                EXTRAD  2002
            IF(NPC.LE.0)GO TO 9618                                          EXTRAD  2003
            DO 9619 IPE=1,NPC                                               EXTRAD  2004
            IF(I.NE.IUPK(IPC3,IPE,KC,IE,IR,JR))GO TO 9619                   EXTRAD  2005
            IF(IACT(I).LT.-NIDP)GO TO 9614                                  EXI      115
            INDX=TATR(I,1)-TC(KC,IE)-1                                      TEST     436
            IF(TATR(I,IDX+INDX*LM).NE.0.)GO TO 9619                         TEST     437
            IF(TATR(I,2+INDX*LM).NE.-IACT(I))GO TO 9614                     TEST     438
            CALL IPK(IPC3,-IACT(I),IPE,KC,IE,IR,JR)                         EXTRAD  2010
            GO TO 9619                                                      EXTRAD  2011
     9614   CALL IPK(IPC3,IZERO,IPE,KC,IE,IR,JR)                            EXTRAD  2012
     9619   CONTINUE                                                        EXTRAD  2013
     9618   CONTINUE                                                        EXTRAD  2014
     9613   CONTINUE                                                        EXTRAD  2015
            IF(IACT(I).GE.-NIDP)GO TO 9517                                  EXI      116
            IACT(I)=0                                                       EXTRAD  2017
            TATR(I,1)=0.                                                    TEST     439
            GO TO 9512                                                      EXTRAD  2019
     9517   DO 9513 J=1,LUB                                                 EXTRAD  2020
            IF(TATR(I,2+(J-1)*LM).EQ.-IACT(I).AND.TATR(I,IDX+(J-1)*LM).EQ.0.)  TEST  440
           +   GO TO 9514                                                   EXTRAD  2022
     9513   CONTINUE                                                        EXTRAD  2023
            GO TO 9611                                                      EXTRAD  2024
     9514   TATR(I,2+(J-1)*LM)=0.                                           TEST     441
     9611   DO 9612 K=2,LUB                                                 EXTRAD  2026
            IF(TATR(I,IDX+(K-1)*LM).NE.0..AND.TATR(I,2+(K-1)*LM).EQ.0.)     TEST     442
           +   TATR(I,IDX+(K-1)*LM)=0.                                      TEST     443
     9612   CONTINUE                                                        EXTRAD  2029
            IF(IFLAG.EQ.1)WRITE(6,998)I,IACT(I),(TATR(I,J),J=1,NUMP)        TEST     444
            IACT(I)=1                                                       EXTRAD  2031
     9512   CONTINUE                                                        EXTRAD  2032
            IF(NA.EQ.1.AND.ISCANF.EQ.0)GO TO 1030                           EXTRAD  2033
            IF (NA .EQ. 1 .AND. ISCANF .EQ. 1) GO TO 959                    EXTRAD  2034
            GO TO 952                                                       EXTRAD  2035
      C                                                                     EXTRAD  2036
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      C     COMBINE LAST TO FIRST CELL ATTR.                              EXTRAD   2037
      C                                                                   EXTRAD   2038
      959   DO 9591 IE=1,IEM                                              EXTRAD   2039
            IPT=IPTC(IE)                                                  EXTRAD   2040
            DO 9591 LC=1,IPT                                              EXTRAD   2041
            KC=IPT-LC+1                                                   EXTRAD   2042
            NPC=IPCNT(KC,IE)                                              EXTRAD   2043
            DO 9591 IPE=1,NPC                                             EXTRAD   2044
            NPCEL=IUPK(IPC3,IPE,KC,IE,IR,JR)                              EXTRAD   2045
            IF(NPCEL .LE. 0) GO TO 9591                                   EXTRAD   2046
            LPCEL=IUPK(IPB3,IPE,KC,IE,IR,JR)                              EXTRAD   2047
            IF(LPCEL .LE. 0) GO TO 9591                                   EXTRAD   2048
            INDX=TATR(LPCEL,1)-TATR(NPCEL,1)                              TEST      445
            IF(INDX .LT. 0) GO TO 958                                     EXTRAD   2050
      C                                                                   EXTRAD   2051
      C   PEAK LPCEL .GE. PEAK NPCEL                                      EXTRAD   2052
      C                                                                   EXTRAD   2053
            IF(INDX .GE. LDB) GO TO 955                                   EXTRAD   2054
            IND=LDB-INDX                                                  EXTRAD   2055
            DO 9592 I=1,IND                                               EXTRAD   2056
            IM=1+LMM*(IND-I)*LM                                           EXTRAD   2057
            IF(TATR(NPCEL,IM).GE.0.)GO TO 9592                            TEST      446
            IN=1+LMM*(LDB-I)*LM                                           EXTRAD   2059
            TATR(LPCEL,IN)=NAX-1                                          TEST      447
            DO 9593 J=1,LMM                                               EXTRAD   2061
            IN=1+J+(LDB-I)*LM                                             EXTRAD   2062
            IM=1+J+(IND-I)*LM                                             EXTRAD   2063
      9593  TATR(LPCEL,IN)=TATR(NPCEL,IM)+TATR(LPCEL,IN)                  TEST      448
      9592  CONTINUE                                                      EXTRAD   2065
      9693    DO 9694 I=1,NUMP                                            EXTRAD   2066
      9694  TATR(NPCEL,I)=0.                                              TEST      449
            IACT(NPCEL)=0                                                 EXTRAD   2068
            GO TO 9591                                                    EXTRAD   2069
      955   TATR(LPCEL,LDX)=NAX-1                                         TEST      450
            GO TO 9591                                                    EXTRAD   2071
      958   INDX=-INDX                                                    EXTRAD   2072
            IF(INDX .GE. LDB) GO TO 9591                                  EXTRAD   2073
      C                                                                   EXTRAD   2074
      C PEAK NPCEL .GT. LPCEL                                             EXTRAD   2075
      C                                                                   EXTRAD   2076
            IND=LDB-INDX                                                  EXTRAD   2077
            DO 9691 I=1,IND                                               EXTRAD   2078
            IN=1+LMM*(LDB-I)*LM                                           EXTRAD   2079
            IF(TATR(NPCEL,IN).GE.0.)GO TO 9691                            TEST      451
            TATR(NPCEL,IN)=NAX-1                                          TEST      452
            DO 9692 J=1,LMM                                               EXTRAD   2082
            IN=1+J+(LDB-I)*LM                                             EXTRAD   2083
            IM=1+J+(IND-I)*LM                                             EXTRAD   2084
      9692  TATR(NPCEL,IN)=TATR(LPCEL,IM)+TATR(NPCEL,IN)                  TEST      453
      9691  CONTINUE                                                      EXTRAD   2086
            CALL IPK(IPB3,NPCEL,IPE,KC,IE,IR,JR)                          EXTRAD   2087
            TATR(NPCEL,NUMP)=TATR(LPCEL,NUMP)                             TEST      454
            NPCEL=LPCEL                                                   EXTRAD   2089
            GO TO 9693                                                    EXTRAD   2090
      9591  CONTINUE                                                      EXTRAD   2091
      C                                                                   EXTRAD   2092
      C             END OF ASSOCIATION LOOPS                              EXTRAD   2093
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      C                                                        EXTRAD   2094
  952 DO 991 I=1,NMX                                           EXTRAD   2095
      IF(IACT(I).EQ.0)GO TO 991                                EXTRAD   2096
      IF(TATR(I,LOX).EQ.-999.)GO TO 9982                       TEST      455
  961 IF(TATR(I,LOX).EQ.0.)GO TO 9912                          TEST      456
      IF(ABS(TATR(I,LOX)).EQ.MAX-1)GO TO 971                   TEST      457
      GO TO 991                                                EXTRAD   2100
      C                                                        EXTRAD   2101
      C   CHECK BACKROUND COMING DOWN                          EXTRAD   2102
      C                                                        EXTRAD   2103
  971 INBR=0                                                   EXTRAD   2104
      DO 9716 J=1,LOBM                                         EXTRAD   2105
      IF(TATR(I,I+(J-1)*LM).LE.0.)GO TO 9982                   TEST      458
 9716 CONTINUE                                                 EXTRAD   2107
      DO 9711 J=1,JEM                                          EXTRAD   2108
      IID1=IB(NPA,J,1)                                         EXTRAD   2109
      IF(TATR(I,NUMP).NE.ABS(TR(IAT,IID1,1))) GO TO 9711       TEST1     242
 9712 IPB=IPTB(J)                                              EXTRAD   2111
      DO 9713 K=1,IPB                                          EXTRAD   2112
      NP=IPBNT(K,J)                                            EXTRAD   2113
      DO 9713 N=1,NP                                           EXTRAD   2114
      IF(I .NE. IUPK(IPB3,N,K,J,IR,JR)) GO TO 9713             EXTRAD   2115
      IF((TATR(I,I)-TB(K,J)).EQ.LOB)GO TO 9714                 TEST      460
 9713 CONTINUE                                                 EXTRAD   2117
      GO TO 9711                                               EXTRAD   2118
 9714 INBR=INBR+1                                              EXTRAD   2119
      IST=IUPK(IPB1,N,K,J,IR,JR)                               EXTRAD   2120
      ISP=IUPK(IPB2,N,K,J,IR,JR)+1                             EXTRAD   2121
      DO 9715 L=IST,ISP                                        EXTRAD   2122
      IF(U(L).EQ.-999)GO TO 9715                               EX1       117
      IF(IABS(U(L)) .GT. TB(K,J)) GO TO 9982                   EXTRAD   2123
 9715 CONTINUE                                                 EXTRAD   2124
 9711 CONTINUE                                                 EXTRAD   2125
      IF(INBR.EQ.0)GO TO 9982                                  EXTRAD   2126
      IF(TATR(I,LOX).LT.0.)GO TO 991                           TEST      461
      IF(TATR(I,ID2+1).LE.TATRMN)GO TO 9982                    TEST      462
      DO 981 J=1,LMM                                           EXTRAD   2129
      UP(NCELL,J)=TATR(I,ID2+J)                                TEST1     243
  981 CONTINUE                                                 EXTRAD   2131
      UP(NCELL,LM)=TATR(I,NUMP)                                TEST1     244
      IF(IFLAG.EQ.1)WRITE(6,9910)NCELL,(UP(NCELL,J),J=1,LM)    TEST1     245
 9910 FORMAT(1X,2HCC,I4,4X,9F13.2)                             EX2       175
      NCELL=NCELL+1                                            EXTRAD   2135
      IF(NCELL.LE. NID)GO TO9982                               EXTRAD   2136
      NCELL=NID                                                EXTRAD   2137
      GO TO 9982                                               EXTRAD   2138
 9912 DO 9913 J=1,LOE                                          EXTRAD   2139
      INDP1=1+J*LM                                             EXTRAD   2140
      IF(ABS(TATR(I,INDP1)).EQ.NA)GO TO 991                    TEST      465
      IF(TATR(I,INDP1).LT.0..AND.TATR(I,INDP1).NE.-999.)GO TO 991   TEST      466
 9913 CONTINUE                                                 EXTRAD   2143
 9982 CONTINUE                                                 EXTRAD   2144
      IF(IFLAG.EQ.1)WRITE(6,999)I,IACT(I),( TATR(I,J),J=1,NUMP)   TEST      467
  999 FORMAT(1X,2HXX,I4,I6,F7.2,8F13.2,/,(20X,8F13.2))         EXTRAD   2146
  998 FORMAT(3X,I4,I6,F7.2,8F13.2,/,(20X,8F13.2))              EXTRAD   2147
      DO 982 J=1,NUMP                                          EXTRAD   2148
  982 TATR(I,J)=0.                                             TEST      468
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              IACT(I)=5                                           EXTRAD   2150
       991    CONTINUE                                            EXTRAD   2151
     * 1030   CONTINUE                                            TEST      469
       1031   DO 1041 I=1,IEMAX                                   EXTRAD   2160
              IPTB(I)=IPTC(I)                                     EXTRAD   2161
              DO 1041 K=1,KMAX                                    EXTRAD   2162
              TB(K,I)=TC(K,I)                                     EXTRAD   2163
              IPBNT(K,I)=IPCNT(K,I)                               EXTRAD   2164
       1041   CONTINUE                                            EXTRAD   2165
              DO 1042 IX=1,IAMAX                                  EXTRAD   2166
              IPB1(IX)=IPC1(IX)                                   EXTRAD   2167
              IPB2(IX)=IPC2(IX)                                   EXTRAD   2168
       1042   IPB3(IX)=IPC3(IX)                                   EXTRAD   2169
       9720   IF(ISCANF.NE.1.OR.NA.EQ.1)GO TO 1040                EXTRAD   2181
              NA =1                                               EXTRAD   2182
              NCELT=1                                             EXTRAD   2183
              GO TO 1044                                          EXTRAD   2184
       1040   DO 1 I=2,NCLM                                       EXTRAD   2185
              MM=-999                                             EXTRAD   2186
              IF (U(I-1).NE.-999) MM=IABS(U(I-1))                 EXTRAD   2187
              IF (U(I).NE.-999) MM=MAX0(MM,IABS(U(I)))            EXTRAD   2188
              IF (U(I+1).NE.-999) MM=MAX0(MM,IABS(U(I+1)))        EXTRAD   2189
       1      MB(I)=MM                                            EXTRAD   2190
              RETURN                                              EXTRAD   2191
              END                                                 EXTRAD   2192
```

```
      FUNCTION IUPK(IARY,I,J,K,IR,JR)                            EXTRAD  2193
C              RECALL FROM ARRAY                                 EXTRAD  2194
      DIMENSION IARY(1)                                          EXTRAD  2195
      DIMENSION ISF(6)                                           TEST1    246
      COMMON /MSKVAL/ VALMSK(5)                                  EXTRAD  2196
      COMMON /PWORK/ IPTC(22),TC(30,22),IPCNT(30,22),KMAX,T(50),JMXDB,  TEST  473
     +               JMAX,IPC1(2640),IPC2(2640),IPC3(2640),IAMAX,       TEST  474
     +                IR1,JR1,KR1,IMR                                   TEST  475
      COMMON /ERROR/ IERR                                        EXTRAD  2198
      DATA IBYT /6/                                              EXTRAD  2199
      DATA VALMSK /77774000000000000000B,                        EXTRAD  2200
     1000377600000000000B,                                       EXTRAD  2201
     2000000177770000000B,                                       EXTRAD  2202
     4000000000077774000000B,                                    EXTRAD  2203
     50000000000000037760000B,                                   EXTRAD  2204
     6000000000000000017777B/                                    EXTRAD  2205
      DATA ISF/00000000000000000001B,00000000000000000200000B,  TEST1  247
     X         0000000000000040000000B,000000000100000000000B,  TEST1  248
     X         000000200000000000000B,00040000000000000000000B/ TEST1  249
      IADDR=1+((I-1)/IBYT)+(J-1+(K-1)*JR)*IR                     EXTRAD  2206
      IF(I.LE.IMR.AND.J.LE.JR1.AND.K.LE.KR1)GO TO 1              EXTRAD  2207
      WRITE(6,100)I,J,K                                          EXTRAD  2208
  100 FORMAT(10X,21HARRAY OVERFLOW -I,J,K,3I10)                  EXTRAD  2209
      IADDR=IAMAX                                                EXTRAD  2210
      IERR=2                                                     EXTRAD  2211
    1 IPOS=I-(I-1)/IBYT*IBYT                                     EXTRAD  2212
      IVAL=IARY(IADDR)                                           EXTRAD  2213
      ITWO=IBYT-IPOS                                             TEST1    250
      JOTA=IVAL .AND. VALMSK(IPOS)                               EXTRAD  2215
      IF(IPOS .GT. 2) GO TO 10                                   EXTRAD  2216
      ISFT=10*ITWO                                               TEST1    251
      ISFT=60-ISFT                                               EXTRAD  2217
      IUPK=SHIFT(JOTA,ISFT)                                      EXTRAD  2218
      GO TO 12                                                   EXTRAD  2219
   10 ITWO=ITWO+1                                                TEST1    252
      IUPK=JOTA/ISF(ITWO)                                        TEST1    253
   12 RETURN                                                     EXTRAD  2221
      END                                                        EXTRAD  2222
```

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          SUBROUTINE IPK(IARY,IDTA,I,J,K,IR,JR)                        EXTRAD  2223
          DIMENSION IARY(1)                                            EXTRAD  2224
          DIMENSION ISF(6)                                             TEST1    254
C                STUFF ARRAY                                           EXTRAD  2225
          COMMON /MSKVAL/ VALMSK(5)                                    EXTRAD  2226
          COMMON /PWORK/ IPTC(22),TC(30,22),IPCNT(30,22),KMAX,T(50),JMXDB,  TEST  476
     +                  JMAX,IPC1(2640),IPC2(2640),IPC3(2640),IAMAX,   TEST     477
     +                   IR1,JR1,KR1,IMR                               TEST     478
          COMMON /ERROR/ IERR                                          EXTRAD  2228
          DATA IBYT /6/                                                EXTRAD  2229
          DATA ISF/00000000000000000001B,00000000000000000200000B,     TEST1    255
     X           000000000000040000000B,00000000010000000000B,         TEST1    256
     X           00000020000000000000000B,00040000000000000000000B/    TEST1    257
          IDTA=IDTA.AND.VALMSK(6)                                      EXTRAD  2230
          IADDR=1+((I-1)/IBYT)+(J-1+(K-1)*JR)*IR                       EXTRAD  2231
          IF(I.LE.IMR.AND.J.LE.JR1.AND.K.LE.KR1) GO TO 1               EXTRAD  2232
          IADDR=IAMAX                                                  EXTRAD  2233
          IERR=3                                                       EXTRAD  2234
          WRITE(6,100)I,J,K                                            EXTRAD  2235
100       FORMAT(10X,21HARRAY OVERFLOW -I,J,K, 3I10)                   EXTRAD  2236
1         IPOS=I-(I-1)/IBYT*IBYT                                       EXTRAD  2237
          ITWO=IBYT-IPOS                                               TEST1    258
          IF(IPOS .GT. 2) GO TO 10                                     EXTRAD  2239
          ISFT=ITWO*10                                                 TEST1    259
          IARY(IADDR)=IARY(IADDR) .AND..N. VALMSK(IPOS)                EXTRAD  2240
          IARY(IADDR)=IARY(IADDR) .OR. SHIFT(IDTA,ISFT)                EXTRAD  2241
          GO TO 12                                                     EXTRAD  2242
10        ITWO=ITWO+1                                                  TEST1    260
          IARY(IADDR)=IARY(IADDR).AND..N.VALMSK(IPOS)                  TEST1    261
          IARY(IADDR)=IARY(IADDR).OR.(IDTA*ISF(ITWO))                  TEST1    262
12        RETURN                                                       EXTRAD  2245
          END                                                          EXTRAD  2246
```

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      SUBROUTINE PRANG                                                  EXTRAD  2247
C     ****************************************************************** EXTRAD  2248
C     VERSION 2.0   LEVEL 761119                                        EXTRAD  2249
C     JHW   CDC6600                                                     EXTRAD  2250
C     COMPUTES RANGES AND PRINTS THEM OUT FOR BSCAN MAPS.               EXTRAD  2251
C     ****************************************************************** EXTRAD  2252
      DIMENSION RSAVE(8)                                                EXTRAD  2253
      COMMON /INSUB/ TL(2),LT,TDW,DN,STARTR,DELTR,RN(4),SCON,CELWTH(3)  TEST     479
     1,ICOMP,VMIN,SVMIN,ESTART,DELT                                     TESTZ    157
      COMMON/ADATA/IDAY,IHOUR,IMIN,ISEC,NTP,NSF,NOD,NRC                 EXTRAD  2256
C     ------------------------------------------------------------------ EXTRAD  2257
      SCRA=SCON/ICOMF                                                   EXTRAD  2258
      RMAX=SCRA*(RN(NRC+1)-.5)*CELWTH(NTP+1)/1000.                      EXTRAD  2259
      D=RMAX/8.0                                                        EXTRAD  2260
      RSAVE(8)=RMAX                                                     EXTRAD  2261
      J=7                                                               EXTRAD  2262
      DO 10 I=1,7                                                       EXTRAD  2263
      RSAVE(J)=RSAVE(J+1)-D                                             EXTRAD  2264
      J=J-1                                                             EXTRAD  2265
   10 CONTINUE                                                          EXTRAD  2266
      WRITE(6,99)RSAVE                                                  EXTRAD  2267
   99 FORMAT(1H0,31X,20HRANGE SCALE (  KM  )/                           EXTRAD  2268
     X6X,2HAZ,4X,2HEL,1X,3HDAY,1X,6HHHMM,1X,2HSS,6X,8F8.1,10H       PRF) EXTRAD  2269
      RETURN                                                            EXTRAD  2270
      END                                                               EXTRAD  2271
```

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      SUBROUTINE PRN2(MODE)                                              EX2     207
C     * **************************************************************** EX2     208
C     PRINTS OUT DATA IN CODED MAP FORM AZIMUTH BY AZIMUTH.              EX2     209
C     VERSION 1.0   LEVEL 760920.                                        EX2     210
C     JHW   CDC 6600   AFGL                                              EX2     211
C     ****************************************************************** EX2     212
      LOGICAL PRINT1,PRINT2,PRINT3,COPLOT,CONTRZ,CONTRV,CONTRS,VOLTAP    TEST    481
      DIMENSION IC(64),IUNIT(3)                                          EX2     214
      DIMENSION TYPE(3)                                                  EX2     215
C     ------------------------------------------------------------------ EX2     216
      INTEGER W,V,VS,SV,VB,VJ,WI,VSI,NCL                                 TEST    487
      COMMON /PARM/ PRINT1,PRINT2,PRINT3,COPLOT,ICODES(36),A1,B1,A2,B2,  TEST    463
     +         CONTRZ,CONTRV,CONTRS,NFILE,NUMF,NREC,NUMR,VOLTAP          TEST    484
      COMMON /REFL/ W(173),WI(173),VJ(173),HR(173),NCL,NID,NIDP          TEST    485
      COMMON /VEL/ V(173),VB(173),VS(173),SV(173),VSI(173),              TEST    486
     +             SVI(173),HV(173),HS(173)                              TEST    487
      COMMON/AZM/ AZMUTH(650),NA,ELEVAT,PRF,KEEP                         EX2     222
      COMMON/ADATA/IDAY,IHOUR,IMIN,ISEC,NTP,NSF,NDD,NRC                  EX2     223
      COMMON/INSUB/ TL(2),LT,TJW,DN,STARTR,STOPR,RN(4),SCON,CELWTH(3)    TEST1   263
     1,ICOMP,VMIN,SVMIN                                                  TEST1   264
C     ------------------------------------------------------------------ EX2     226
      DATA IUNIT/6,9,4/                                                  EX2     227
      DATA TYPE/4HMEAN,3HVEL,5HPOWER/                                    EX2     228
C     ------------------------------------------------------------------ EX2     229
      IF(MODE.GT.1)GO TO 30                                              EX2     230
      DO 40 I=1,64                                                       TEST1   265
   40 IC(I)=1H                                                           TEST1   266
      I=0                                                                TEST1   267
      NCOL=RN(NRC+1)/ICOMP                                               EX2     231
      INT=(NCOL-1)/64+1                                                  TEST    489
      DO 20 K=1,3                                                        EX2     233
      I=1                                                                EX2     234
      L=1                                                                EX2     235
      IU=IUNIT(K)                                                        EX2     236
    5 IV=0                                                               EX2     237
      IV1=0                                                              EX2     238
      IP2=0                                                              EX2     239
      IP=0                                                               EX2     240
      DO 10 N=1,INT                                                      EX2     241
      L=L+1                                                              EX2     242
      IF(L.GT.NRC.OR.L.GT.NCOL) GO TO 10                                 TEST1   268
      IF(K .EQ. 1)IV2= V(L)                                              EX2     243
      IF(K .EQ. 2)IV2= SV(L)                                             EX2     244
      IF(K .EQ. 3)IV2= W(L)                                              EX2     245
      IF(IV2 .EQ. -999)IV1=IV1+IV2                                       EX2     246
      IF(IV2 .EQ. -999) GOTO 10                                          EX2     247
      IV=IV+IV2                                                          EX2     248
      IP2=IP2+1                                                          EX2     249
   10 IP=IP+1                                                            EX2     250
      IV1=IV1/IP                                                         EX2     251
      IF(IV1 .EQ. -999) IC(I)=14                                         EX2     252
      IF(IV1 .EQ. -999) GOTO 5                                           EX2     253
      IV=IV/IP2                                                          EX2     254
      IF(K .EQ. 1)IY=A2*IV+B2                                            EX2     255
      IF(K .GT. 1)IY=A1*IV+B1                                            EX2     256
      IF(IY .LE. 0) IY=1                                                 EX2     257
      IF(IY .GT. 36) IY=36                                               EX2     258
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SUBROUTINE PRN2        74/74    OPT=2                    FTN 4.6+428        05/04/78  21.36.09        PAGE    2

            5 IC(I)=ICODES(IY)                                                   EX2        259
        6     I=I+1                                                              EX2        260
              IF(L.LT.NCOL.AND.L.LT.NRC.AND.I.LT.64) GO TO 3                     TESTI      269
              WRITE(IU,100)AZMUTH(NA),ELEVAT,IDAY,IHOUR,IMIN,ISEC,IC             EX2        262
          100 FORMAT(1X,F5.1,F6.1,I4,1X,2I2,I3,5X,64A1)                          EX2        263
           20 CONTINUE                                                           EX2        264
              RETURN                                                             EX2        265
        C                                                                        EX2        266
        C               REWIND 2,3, AND PRINT V AND P                            EX2        267
        C                                                                        EX2        268
        30    DO 35 K=2,3                                                        EX2        269
              IU=IUNIT(K)                                                        EX2        270
        31    REWIND IU                                                          EX2        271
              CALL PAGE                                                          EX2        272
              WRITE(6,101)TYPE(K)                                                EX2        273
        101   FORMAT(9H0 MAP OF ,A10)                                            EX2        274
              CALL PFANG                                                         EX2        275
           34 READ(IU,100)AZMUT2,ELEVAT,IDAY,IHOUR,IMIN,ISEC,IC                  EX2        276
              IF(EOF(IU))35,355,35                                               EX2        277
          355 CONTINUE                                                           EX2        278
              WRITE(6,100)AZMUT2,ELEVAT,IDAY,IHOUR,IMIN,ISEC,IC                  EX2        279
              GOTO 34                                                            EX2        280
           35 CONTINUE                                                           EX2        281
              RETURN                                                             EX2        282
              END                                                                EX2        283
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        PROGRAM EXPAND     74/74    OPT=1                FTN 4.6+428     05/03/78  10.00.13       PAGE    1

                 PROGRAM EXPAND(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,TAPE2)
          C*********************************************************************000110
          C             PROGRAM EXPAND  ERT NO. 175.                            000120
          C             AFGL  CDC 6600                                          000130
          C             R. DAESEN                                               000140
          C             EXPANDS AND DISPLAYS GIVEN AREAS OF RADAR IMAGERY.      000150
          C*********************************************************************000160
                 DIMENSION PROGID(3),JSY4(4)
                 COMMON/HEAD/TITLE(6),ICODE,VERS,LEVEL,DAT,IRUN,NPAGE,NLOG      000180
                 COMMON/EXPAN/X1,X2,Y1,Y2,XMIN,XMAX,YMIN,YMAX                   000190
                 EQUIVALENCE (IXA,XA),(IYA,YA),(IXB,XB),(IYB,YB),(IXR,XBAR),
                X            (IYR,YBAR)
          C---------------------------------------------------------------------000200
                 LOGICAL IPLT(4)
                 LOGICAL Z1,Z2,Z3,Z4,LS,LK                                      000210
                 DATA LS/.FALSE./,Z1/.TRUE./,Z2/.TRUE./,Z3/.TRUE./,Z4/.TRUE./   000220
                 DATA LK/.FALSE./,XK1/-320.0/,XK2/320.0/,YK1/-320.0/,YK2/320.0/ 000230
                 DATA PROGID/7HCOLLINS,1H ,1H /,CSIZ/.07/,SSIZ/.05/
                 DATA JSYM/1RC,1R.,1R+,1RX/
                 DATA XTHET2/-180.0/,YTHET2/-90.0/                              000250
                 DATA SCON/149.8962/,NCX/3/,XTIT/3H KM/,NSUBX/5/,XTHETA/0.0/    000260
                 DATA XSIZ/0.2/,NCY/3/,YTIT/3H KM/,NSUBY/5/,YTHETA/90.0/,YSIZ/0.2/  000270
                 DATA IPLT/4*.FALSE./
                 NAMELIST /INPUT/ IPLT,Z1,Z2,Z3,Z4,LS,XK1,XK2,YK1,YK2,LK
          C---------------------------------------------------------------------000290
          C                                                                     000300
          C             INITIALIZE                                              000310
          C                                                                     000320
                 CALL TIME(TITLE(5))                                            000330
                 CALL DAY                                                       000340
                 CALL PAGE                                                      000350
                 CALL PLTID3(PROGID,100.,11.,1.)
                 GO TO 1
          3      CALL PLOT(12.0,0.0,-3)
          1      READ(5,INPUT)                                                  000360
                 IF(EOF(5))999,10                                               000370
          10     WRITE(6,INPUT)                                                 000380
                 XLEN=XMAX-XMIN                                                 000400
                 YLEN=YMAX-YMIN                                                 000410
                 READ(2)RN,CELWTH,ELEVAT                                        000430
                 IF(EOF(2))999,2
          2      WRITE(6,90)RN,CELWTH,ELEVAT
          90     FORMAT(1X,* RANGE=*,F6.0,* CELLWIDTH=*,F6.3,* ELEVATION=*,F6.2)  000450
                 RANG=(SCON*(RN-.5)*CELWTH/1000.)/4.                            000460
                 IF(.NOT.LS)GO TO 8                                             000470
                 CALL NUSCAL(XK1,XK2,XLEN,XSTART,XEND,DELX)
                 CALL NUSCAL(YK1,YK2,YLEN,YSTART,YEND,DELY)
                 XK1=XSTART
                 XK2=XEND
                 YK1=YSTART
                 YK2=YEND
                 X1=XK1/RANG+.5*XLEN+XMIN                                       000480
                 X2=XK2/RANG+.5*XLEN+XMIN                                       000490
                 Y1=YK1/RANG+.5*YLEN+YMIN                                       000500
                 Y2=YK2/RANG+.5*YLEN+YMIN                                       000510
                 GO TO 9                                                        000520
          8      XK1=(X1-.5*XLEN-XMIN)*RANG                                     000530
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      XK2=(X2-.5*XLEN-XMIN)*RANG                                    000540
      YK1=(Y1-.5*YLEN-YMIN)*RANG                                    000550
      YK2=(Y2-.5*YLEN-YMIN)*RANG                                    000560
      CALL NUSCAL(XK1,XK2,XLEN,XSTART,XEND,DELX)
      CALL NUSCAL(YK1,YK2,YLEN,YSTART,YEND,DELY)
      XDIFF1=ABS(XSTART-XK1)
      XDIFF2=ABS(XEND-XK2)
      YDIFF1=ABS(YSTART-YK1)
      YDIFF2=ABS(YEND-YK2)
      XDIFF1=XDIFF1/((XEND-XSTART)/XLEN)
      XDIFF2=XDIFF2/((XEND-XSTART)/XLEN)
      YDIFF1=YDIFF1/((YEND-YSTART)/YLEN)
      YDIFF2=YDIFF2/((YEND-YSTART)/YLEN)
      XK1=XSTART
      XK2=XEND
      YK1=YSTART
      YK2=YEND                                                      000570
    9 WRITE(6,95)XK1,YK1,XK2,YK2                                    000580
   95 FORMAT(1X,* X1(KM)=*,F6.0,* Y1(KM)=*,F6.0,* X2(KM)=*,F6.0,    000590
     1* Y2(KM)=*,F6.0)                                              000600
      XI1=X1                                                        000610
      XI2=X2                                                        000620
      YI1=Y1                                                        000630
      YI2=Y2                                                        000640
      IF(.NOT.LS)GO TO 16                                           000650
C                                                                   000660
C             EXPAND THE FRAME                                      000670
C
      SFX=(XMAX-XMIN)/(X2-X1)
      SFY=(YMAX-YMIN)/(Y2-Y1)
      X2=SFX*(X2-X1)+XMIN
      Y2=SFY*(Y2-Y1)+YMIN                                           000740
      X1=XMIN                                                       000750
      Y1=YMIN                                                       000760
C                                                                   000770
C             PLOT THE FRAME                                        000780
C                                                                   000790
   16 WRITE(6,98)X1,Y1,X2,Y2                                        000800
   98 FORMAT(1X,* X1(IN)=*,F6.2,* Y1(IN)=*,F6.2,* X2(IN)=*,F6.2,    000810
     1* Y2(IN)=*,F6.2)                                              000820
      BEGX=XK1                                                      000830
      BEGY=YK1                                                      000840
      ENDX=XK2                                                      000850
      ENDY=YK2                                                      000860
C     DELX=ABS(ENDX-BEGX)/5.                                        000870
C     DELY=ABS(ENDY-BEGY)/5.                                        000880
C     IF(DELX.LT.1.)DELX=ABS(ENDX-BEGX)                             000890
C     IF(DELY.LT.1.)DELY=ABS(ENDY-BEGY)
      CALL LINLOG(XMIN,YMIN,XTIT,NCX,XLEN,NSUBX,XSTART,XEND,DELX,-1,
     1XTHETA,XSIZ,0.,0.,1)                                          000910
      CALL LINLOG(XMIN,YMIN,YTIT,NCY,YLEN,NSUBY,YSTART,YEND,DELY,-1,
     1YTHETA,YSIZ,0.,0.,-1)                                         000930
      CALL LINLOG(XMIN,YMAX,XTIT,0,XLEN,NSUBX,XSTART,XEND,DELX,-2,
     1XTHET2,XSIZ,0.,0.,1)                                          000950
      CALL LINLOG(XMAX,YMIN,YTIT,0,YLEN,NSUBY,YSTART,YEND,DELY,-2,
     1YTHET2,YSIZ,0.,0.,-1)                                         000970
   12 READ(2)XA,YA,KA                                               000980
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      IF(EOF(2))999,11                                      000990
   11 IF(KA.NE.-999) GO TO 31
      CALL LABEL(IXA,IYA,ELEVAT,XSIZ)
      GO TO 3
   31 CONTINUE
      IF(XA.GT.1000.)BACKSPACE 2
      IF(XA.GT.1000.)GO TO 10
      IF(KA.GE.4000)GO TO 50
      READ(2)XB,YB,KB                                       001010
      IF(EOF(2))999,13                                      001020
   13 IF(KB.NE.-999) GO TO 32
      CALL LABEL(IXB,IYB,ELEVAT,XSIZ)
      GO TO 3
   32 CONTINUE
      IF(KB.GE.4000)GO TO 500
      XAS=XA-4.+.5*XLEN+XMIN
      IF(XA.LT.5.0)XAS=XA-4.+.5*XLEN+XMIN+XDIFF1
      IF(XA.GT.5.0)XAS=XA-4.+.5*XLEN+XMIN-XDIFF2
      XBS=XB-4.+.5*XLEN+XMIN                                001040
      IF(XB.LT.5.0)XBS=XB-4.+.5*XLEN+XMIN+XDIFF1
      IF(XB.GT.5.0)XBS=XB-4.+.5*XLEN+XMIN-XDIFF2
      YAS=YA-4.+.5*YLEN+YMIN                                001050
      IF(YA.LT.5.0)YAS=YA-4.+.5*YLEN+YMIN+YDIFF1
      IF(YA.GT.5.0)YAS=YA-4.+.5*YLEN+YMIN-YDIFF2
      YBS=YB-4.+.5*YLEN+YMIN                                001060
      IF(YB.LT.5.0)YBS=YB-4.+.5*YLEN+YMIN+YDIFF1
      IF(YB.GT.5.0)YBS=YB-4.+.5*YLEN+YMIN- YDIFF2
      IF(.NOT.LS)GO TO 18                                   001070
C                                                           001080
C              EXPAND THE LINE                              001090
C                                                           001100
      XAS=(XAS-XI1)*SFX+XMIN
      XBS=(XBS-XI1)*SFX+XMIN
      YAS=(YAS-YI1)*SFY+YMIN
      YBS=(YBS-YI1)*SFY+YMIN
   18 WRITE(6,100)XA,YA,KA,XB,YB,KB,XAS,YAS,XBS,YBS         001150
  100 FORMAT(1X,2(2F7.3,I5),T50,4F8.3)                      001160
C                                                           001170
C              PLOT THE LINE IF POSSIBLE                    001180
C                                                           001190
      IF(Z1.AND.KA.EQ.3001)GO TO 19                         001200
      IF(Z2.AND.KA.EQ.3002)GO TO 19                         001210
      IF(Z3.AND.KA.EQ.3003)GO TO 19                         001220
      IF(Z4.AND.KA.EQ.3004)GO TO 19                         001230
      GO TO 20                                              001240
   19 CALL EXPAN1(XAS,YAS,XBS,YBS),RETURNS(20,12,40)        001250
   20 WRITE(6,101)                                          001260
  101 FORMAT(1H+,40X,*OUTSIDE PLOT AREA*)                   001270
      GO TO 12                                              001280
   40 WRITE(6,102)                                          001290
  102 FORMAT(1H+,40X,*ERROR, SKIP PLOT*)                    001300
      GO TO 12                                              001310
C                                                           001320
C              PLOT THE CENTROID IF POSSIBLE                001330
C                                                           001340
   50 IF(.NOT.LK)GO TO 3
      XBAR=XA
```

```
      YBAR=YA
      ID=KA
      GO TO 53
  500 IF(.NOT.LK)GO TO 3
      XBAR=XB
      YBAR=YB
      ID=KB
      GO TO 53
   51 READ(2)XBAR,YBAR,ID                                            001360
      IF(EOF(2))999,52                                               001370
   52 IF(ID.NE.-999) GO TO 53
      CALL LABEL(IXR,IYR,ELEVAT,XSIZ)
      GO TO 3
   53 CONTINUE
      XBARS=XBAR-4.+.5*XLEN+X4IN
      YBARS=YBAR-4.+.5*YLEN+Y4IN                                     001400
      IF(.NOT.LS)GO TO 60                                            001410
      XBARS=(XBARS-XI1)*SFX+X4IN
      YBARS=(YBARS-YI1)*SFY+Y4IN
   60 WRITE(6,103)XBAR,YBAR,ID,XBARS,YBARS                           001440
  103 FORMAT(1X,2F7.3,I5,T60,2F9.3)                                  001450
      IF(XBARS.LT.X1.OR.XBARS.GT.X2.OR.YBARS.LT.Y1.OR.YBARS.GT.Y2)   001460
     1GO TO 61                                                       001470
      IJKID=ID/1000
      JINDEX=IJKID-3
      IF(.NOT.IPLT(JINDEX))GO TO 51
      ISYM=JSYM(JINDEX)
      CALL SYMBOL(XBARS,YBARS,SSIZ,ISYM,XTHETA,0)
      IF(JINDEX.GE.3) GO TO 51
      FID=ID-IJKID*1000
      CALL NUMBER(XBARS+.5*CSIZ,YBARS-.5*CSIZ,CSIZ,FID,XTHETA,-1)    001500
      GO TO 51                                                       001510
   61 WRITE(6,101)                                                   001520
      GO TO 51                                                       001530
C                                                                    001540
C              TERMINATE PLOT                                        001550
C                                                                    001560
  999 CALL ENDPLT                                                    001570
      STOP                                                           001580
      END                                                            001590
```

```
BLOCK DATA BLKDAT.     74/74    OPT=1                    FTN 4.6+420        05/03/78  10.00.13        PAGE      1

                   BLOCK DATA                                                          001600
                   COMMON/HEAD/TITLE(6),ICODE,VERS,LEVEL,DAT,IRUN,NPAGE,NLOG          001610
                   COMMON/LINUM/LINE                                                   001620
                   COMMON/EXPAN/X1,X2,Y1,Y2,XMIN,XMAX,YMIN,YMAX                        001630
                   DATA X1/1.0/,X2/9.0/,Y1/1.0/,Y2/9.0/                                001640
                   DATA XMIN/1.0/,XMAX/9.0/,YMIN/1.0/,YMAX/9.0/                        001650
                   DATA TITLE/7HPROGRAM,7H EXPAND,1H ,1H ,1H ,1H /,                    001660
                  1IRUN/0/,NPAGE/ 0/,ICODE/175/,VERS/1.0/,LEVEL/770331/               001670
                   END                                                                 001680
```

```
      SUBROUTINE EXPAN1(XA,YA,XB,YB),RETURNS(N1,N2,N3)                 001690
C*********************************************************************001700
C             VERSION 1.0  LEVEL 77783317                              001710
C             AFGL  CDC6600                                            001720
C             SPECIAL EXPANDED IMAGE PLOTTING.                         001730
C*********************************************************************001740
      COMMON/EXPAN/X1,X2,Y1,Y2,XMIN,XMAX,YMIN,YMAX                     001750
C---------------------------------------------------------------------001760
C                                                                      001770
C             TEST IF LINE IS IN THE AREA                              001780
C                                                                      001790
      IF(XA.LT.X1.AND.XB.LT.X1)RETURN N1                               001800
      IF(XA.GT.X2.AND.XB.GT.X2)RETURN N1                               001810
      IF(YA.LT.Y1.AND.YB.LT.Y1)RETURN N1                               001820
      IF(YA.GT.Y2.AND.YB.GT.Y2)RETURN N1                               001830
C                                                                      001840
C             TEST IF LINE IS TOTALLY IN THE AREA                      001850
C                                                                      001860
      IF(XA.GE.X1.AND.XA.LE.X2.AND.XB.GE.X1.AND.XB.LE.X2.AND.         001870
     1YA.GE.Y1.AND.YA.LE.Y2.AND.YB.GE.Y1.AND.YB.LE.Y2)GO TO 49         001880
C                                                                      001890
C             TEST IF SLOPE IS INFINITE                                001900
C                                                                      001910
      IF((XB-XA).EQ.0.0)GO TO 17                                       001920
C                                                                      001930
C             TEST IF SLOPE IS ZERO                                    001940
C                                                                      001950
      IF((YB-YA).EQ.0.0)GO TO 18                                       001960
C                                                                      001970
C             TEST IF POINT A IS IN THE AREA                           001980
C                                                                      001990
      IF(XA.GE.X1.AND.XA.LE.X2.AND.YA.GE.Y1.AND.YA.LE.Y2)GO TO 20      002000
C                                                                      002010
C             TEST IF POINT B IS IN THE AREA                           002020
C                                                                      002030
      IF(XB.GE.X1.AND.XB.LE.X2.AND.YB.GE.Y1.AND.YB.LE.Y2)GO TO 10      002040
C                                                                      002050
C             RESET POINTS TO CLOSEST SIDES                            002060
C                                                                      002070
      SLOPB=(YB-YA)/(XB-XA)                                            002080
      B=YB-SLOPB*(XB-X1)                                               002090
      IF(B.GE.Y1.AND.B.LE.Y2.AND.XB.LT.X1)GO TO 4                      002100
      IF(B.GE.Y1.AND.B.LE.Y2.AND.XA.LT.X1)GO TO 5                      002110
      B=YB-SLOPB*(XB-X2)                                               002120
      IF(B.GE.Y1.AND.B.LE.Y2.AND.XB.GT.X2)GO TO 8                      002130
      IF(B.GE.Y1.AND.B.LE.Y2.AND.XA.GT.X2)GO TO 9                      002140
      SLOPA=1.0/SLOPB                                                  002150
      A=XB-SLOPA*(YB-Y1)                                               002160
      IF(A.GE.X1.AND.A.LE.X2.AND.YB.LT.Y1)GO TO 6                      002170
      IF(A.GE.X1.AND.A.LE.X2.AND.YA.LT.Y1)GO TO 7                      002180
      RETURN N3                                                        002190
    4 XB=X1                                                            002200
      YB=B                                                             002210
      GO TO 10                                                         002220
    5 XA=X1                                                            002230
      YA=B                                                             002240
      GO TO 20                                                         002250
```

```
      6    YB=Y1                                                         002260
           XB=A                                                          002270
           GO TO 10                                                      002280
      7    YA=Y1                                                         002290
           XA=A                                                          002300
           GO TO 20                                                      002310
      8    XB=X2                                                         002320
           YB=B                                                          002330
           GO TO 10                                                      002340
      9    XA=X2                                                         002350
           YA=B                                                          002360
           GO TO 20                                                      002370
      C                                                                  002380
      C             SWITCH POINTS A AND B                                002390
      C                                                                  002400
      10   XS=XA                                                         002410
           YS=YA                                                         002420
           XA=XB                                                         002430
           YA=YB                                                         002440
           XB=XS                                                         002450
           YB=YS                                                         002460
           GO TO 20                                                      002470
      17   IF(YA.LT.Y1)YA=Y1                                             002480
           IF(YB.LT.Y1)YB=Y1                                             002490
           IF(YA.GT.Y2)YA=Y2                                             002500
           IF(YB.GT.Y2)YB=Y2                                             002510
           GO TO 49                                                      002520
      18   IF(XA.LT.X1)XA=X1                                             002530
           IF(XB.LT.X1)XB=X1                                             002540
           IF(XA.GT.X2)XA=X2                                             002550
           IF(XB.GT.X2)XB=X2                                             002560
           GO TO 49                                                      002570
      C                                                                  002580
      C             TEST FOR SIDE POINT A TO POINT B INTERSECTS          002590
      C                                                                  002600
      20   SLOPB=(YB-YA)/(XB-XA)                                         002610
           B=YB-SLOPB*(XB-X1)                                            002620
           IF(B.GE.Y1.AND.B.LE.Y2.AND.XB.LT.X1)GO TO 22                  002630
           B=YB-SLOPB*(XB-X2)                                            002640
           IF(B.GE.Y1.AND.B.LE.Y2.AND.XB.GT.X2)GO TO 24                  002650
           SLOPA=1.0/SLOPB                                               002660
           A=XB-SLOPA*(YB-Y1)                                            002670
           IF(A.GE.X1.AND.A.LE.X2.AND.YB.LT.Y1)GO TO 26                  002680
           A=XB-SLOPA*(YB-Y2)                                            002690
           IF(A.GE.X1.AND.A.LE.X2.AND.YB.GT.Y2)GO TO 28                  002700
           RETURN N3                                                     002710
      22   YB=B                                                          002720
           XB=X1                                                         002730
           GO TO 49                                                      002740
      24   YB=B                                                          002750
           XB=X2                                                         002760
           GO TO 49                                                      002770
      26   XB=A                                                          002780
           YB=Y1                                                         002790
           GO TO 49                                                      002800
      28   XB=A                                                          002810
           YB=Y2                                                         002820
```

```
      C                                                                    002030
      C           PLOT THE LINE                                            002040
      C                                                                    002050
   49 CALL PLOT(XA,YA,3)                                                   002060
      CALL PLOT(XB,YB,2)                                                   002070
      RETURN N2                                                            002080
      END                                                                  002090
```

```
      SUBROUTINE NUSCAL(X1,X2,XLEN,XSTART,XEND,DELX)
      DIMENSION DELTA(15)
      DATA DELTA /1.,2.,5.,10.,20.,25.,40.,50.,75.,100.,150.,200.,
     *250.,350.,500./
      XMAX=X2
      XMIN=X1
      IF(X2.LT.X1)XMAX=X1
      IF(X2.LT.X1)XMIN=X2
      DIFF=(XMAX-XMIN)/XLEN
      DIFF=ABS(DIFF)
      DO 10 J=2,15
      IF(DIFF.GT.DELTA(J-1).AND.DIFF.LE.DELTA(J))GO TO 20
   10 CONTINUE
      J=15
   20 DELX=DELTA(J)
      ISTART=XMIN/DELX
      XSTART=ISTART*DELX
      IF(XMIN.LT.0.0)XSTART=(ISTART-1)*DELX
      IEND=XMAX/DELX
      XEND=(IEND+1)*DELX
      IF(XMAX.LT.0.0)XEND=IEND*DELX
      RETURN
      END
```

```
      SUBROUTINE LABEL(IX,IY,ELEVAT,XSIZ)
      DIMENSION LABL(3)
      DATA LABL/4HDAY ,6HTIME,4HEL  /
      CALL SYMBOL(.5,.01,XSIZ,LABL(1),0.,4)
      CALL NUMBER(2.0,0.01,XSIZ,IX,0.,-1)
      CALL SYMBOL(4.0,0.01,XSIZ,LABL(2),0.,4)
      CALL NUMBER (5.5,0.01,XSIZ,IY,0.,-1)
      CALL SYMBOL(7.0,0.01,XSIZ,LABL(3),0.,4)
      CALL NUMBER(8.5,0.01,XSIZ,ELEVAT,0.,1)
      RETURN
      END
```

```
      SUBROUTINE LINLOG (X,Y,BCD,N,PLTLEN,NUMSUB,BEGNUM,ENDNUM,
     *                   DEL   , NUMDEC, THETA, BCDSIZ,DRAW,XMOD,ITYPE)
C
C     PLOT LABELED LINEAR OR LOG AXIS
C
C     INPUT PARAMETERS
C
C        X         X CORD OF POINT BEGNUM IN INCHES
C        Y         Y CORD OF POINT BEGNUM IN INCHES
C        BCD       TITLE                NA10 FORMAT
C        N         NUMB. CHARACTERS IN BCD
C                       0=SUPRESS TITLE
C        PLTLEN    LENGTH IN INCHES ENTIRE AXIS
C        NUMSUB    NUMB. SUBDIV. BETWEEN MAJOR DIV.          (N.A. LOG)
C                      <2=NO SUBDIVISIONS
C                       2=DIVIDE MAJOR DIV. IN 1/2
C                       3=DIVIDE MAJOR DIV. IN 1/3
C                         ETC
C        BEGNUM    VALUE AT AXIS ORIGIN
C        ENDNUM    VALUE AT AXIS END
C        DEL       ABS OF DELTA VALUE BETWEEN MAJOR DIV.
C                       -DEL = START DIVISIONS AT ENDNUM
C        NUMDEC    NUMB. PLACES AFTER DEC. PT.
C                       .LT. -1   =   SUPRESS NUMBERS
C        THETA     AXIS ANGLE
C                         0       X-AXIS   BOTTOM         LEFT  TO RIGHT
C                      -180       X-AXIS   TOP            LEFT  TO RIGHT
C                      +180       X-AXIS   USED AS Y      LEFT  TO RIGHT
C                        90       Y-AXIS   LEFT            BOT  TO TOP
C                       -90       Y-AXIS   RIGHT           BOT  TO TOP
C                       270       Y-AXIS   USED AS X       BOT  TO TOP
C        BCDSIZ    LETTER SIZE IN INCHES
C                       CLEARANCE NEEDED 3.1 *BCDSIZ
C        DRAW      LENGTH IN INCHES OF MAJOR DIVISION LINES
C                       0.0=SUPRESS LINES
C        XMOD      MODULO VALUE FOR MAJOR DIVISION
C                       0.0=NON-CYCLICAL
C        ITYPE      1= LINEAR AXIS NORMAL TITLE              DEFALT=1
C                   2= LOG    AXIS NORMAL TITLE  EXP ONLY
C                   3= LOG    AXIS NORMAL TITLE  BASE 10 & EXP
C                   4= LOG    AXIS NORMAL TITLE  BASE  E & EXP
C                  -1= LINEAR AXIS VERT   TITLE
C                  -2= LOG    AXIS VERT   TITLE  EXP ONLY
C                  -3= LOG    AXIS VERT   TITLE  BASE 10 & EXP
C                  -4= LOG    AXIS VERT   TITLE  BASE  E & EXP
C
      DIMENSION BCD(1)
C
C     SET ORIENTATION AND SIZE PARAMETERS
C
      ISPEC=0
      IF(DEL .LT. 0.0) ISPEC=1
      KIND=ITYPE
      IF((IABS(ITYPE) .LT. 1) .OR.  (IABS(ITYPE) .GT. 4)) KIND=1
      DELNUM=ABS(DEL)
```

```
      ON =BEGNUM
      OFF=ENDNUM
      IF(BEGNUM .LT. ENDNUM) GO TO 5
      ON =ENDNUM
      OFF=BEGNUM
      DELNUM=-DELNUM
C
5      NUMDIV=ABS((ENDNUM-BEGNUM)/DELNUM)
      DIVLEN=PLTLEN/   ABS((ENDNUM-BEGNUM)/DELNUM)
      HEIGHT=BCDSIZ*0.75
      VRTSIZ=BCDSIZ+(0.25*BCDSIZ)
      SUPER=HEIGHT/2.0   $   SIZTEN=HEIGHT*0.75
      SINANG=SIN(THETA/57.2958)
      COSANG=COS(THETA/57.2958)
      SIN1=ABS(SINANG)
      COS1=ABS(COSANG)
      THET2=THETA
      IF(THETA .EQ. -180.0) THET2= 0.0
      IF(THETA .EQ.  270.0) THET2=90.0
      SIGNER=1.0
      IF(THETA .LE.   45.0) SIGNER=-1.0
      IF(THETA .EQ.  -90.0) SIGNER=1.0
      TICANG=THETA+(90.0*SIGNER)
      TICSIZ =(0.20 * HEIGHT)+ .10
      SIZTIC =0.50 * TICSIZ
      XEND=X+(PLTLEN*COS1)
      YEND=Y+(PLTLEN*SIN1)
C
      IF(IABS(KIND) .GE. 2) GO TO 10
C
      SUBDIV = 0
      IF(NUMSUB .LE. 0) GO TO 99
      SUBDIV=DIVLEN/FLOAT(NUMSUB)
      SUBNUM=DELNUM/FLOAT(NUMSUB)
      GO TO 99
C
10    NUMTIC=1
      IF(DIVLEN .LT. 1.0) NUMTIC=2
C
99    DIVOFF=HEIGHT*((1.25*SIGNER)-0.5)
      IF((THETA .EQ. -180.) .OR. (THETA .EQ. 270.)) DIVOFF=DIVOFF+HEIGHT
C
C     CYCLING LOOP
C
      N1=NUMDIV +1
      DO 999 I=1,N1
      CYCLES=I-1
      DIVTIC = CYCLES * DIVLEN
      TICX = X +(DIVTIC * COS1)
      TICY = Y +(DIVTIC * SIN1)
      IF(ISPEC .EQ. 1) TICX=XEND-(DIVTIC*COS1)
      IF(ISPEC .EQ. 1) TICY=YEND-(DIVTIC*SIN1)
C
C     DRAW DIVISION NUMBERS
C
```

```
      IF(NUMDEC .LT. (-1)) GO TO 301
      DIVNUM = BEGNUM +(CYCLES * DELNUM)
      IF(ISPEC .EQ. 1) DIVNUM=ENDNUM-(CYCLES*DELNUM)
      IF(XMOD .EQ. 0.0) GO TO 102
101   IF(DIVNUM .LT. XMOD) GO TO 102
      DIVNUM=DIVNUM-XMOD
      GO TO 101
102   PLACES = 0.
      IF (DIVNUM .NE. 0.)  PLACES = AINT (ALOG10 (ABS (DIVNUM)))
      OFFSET = -.50 * HEIGHT * (PLACES + FLOAT (NUMDEC) + 1.25)
      IF((THETA.EQ.-180.).OR.(THETA.EQ. 270.)) OFFSET=-OFFSET
      XP=TICX+(OFFSET*COSANG)-(DIVOFF*SINANG)
      YP=TICY+(OFFSET*SINANG)+(DIVOFF*COSANG)
      IF(IABS(KIND) .GT. 2) GO TO 201
      CALL NUMBER (XP,YP,HEIGHT,DIVNUM,THET2,NUMDEC)
      GO TO 301
C
C     SPECIAL LABEL LOG BASE 10 OR E & EXP
C
201   IF(IABS(KIND) .EQ. 3) CALL NUMBER (XP,YP,SIZTEN,10.,THET2,-1)
      IF(IABS(KIND) .EQ. 4) CALL SYMBOL (XP,YP,SIZTEN,1HE,THET2, 1)
      IF(THETA .EQ.    0.0) GO TO 202
      IF(THETA .EQ. -180.0) GO TO 202
      IF(THETA .EQ.   90.0) GO TO 203
      IF(THETA .EQ.  270.0) GO TO 203
      IF(THETA .EQ.  180.0) GO TO 204
      IF(THETA .EQ. - 90.0) GO TO 205
202   XPS=XP+HEIGHT  $  YPS=YP+HEIGHT  $  GO TO 299
203   XPS=XP-HEIGHT  $  YPS=YP+HEIGHT  $  GO TO 299
204   XPS=XP-HEIGHT  $  YPS=YP-HEIGHT  $  GO TO 299
205   XPS=XP+HEIGHT  $  YPS=YP-HEIGHT  $  GO TO 299
299   CALL NUMBER (XPS,YPS,SUPER,DIVNUM,THET2,NUMDEC)
C
C
C     DRAW DIVISION TICS
C
301   CALL SYMBOL (TICX, TICY, TICSIZ, 13, THETA, -1)
C
C     DRAW MAJOR DIVISION LINES
C
      IF( DRAW .EQ. 0.0) GO TO 302
      XXXX=TICX+(DRAW*SINANG)
      YYYY=TICY+(DRAW*COSANG)
      IF(THETA .EQ. 180.0) YYYY=TICY+DRAW
      CALL PLOT (XXXX,YYYY,2)
C
302   IF(IABS(KIND) .GE. 2) GO TO 304
C
C     DRAW SUBDIVISION TICS LINEAR AXIS
C
      IF (NUMSUB .LE. 1) GO TO 999
      DO 303  J = 2, NUMSUB
      TEST=(BEGNUM+(CYCLES*DELNUM)) + (FLOAT(J-1)*SUBNUM)
      IF((TEST  .LT. ON) .OR. (TEST .GT. OFF)) GO TO 303
      SUBTIC = SUBDIV * FLOAT (J - 1)
```

```
      IF(ISPEC .EQ. 1) SUBTIC=-SUBTIC
      XS=TICX+(SUBTIC*COS1)
      YS=TICY+(SUBTIC*SIN1)
      CALL SYMBOL (XS,YS,SIZTIC,15,TICANG,-1)
303   CONTINUE
      GO TO 999
C
C     DRAW SUBDIVISION TICS LOG    AXIS
C
304   IF(I .GE. N1) GO TO 999
      DO 305 J=2,9,NUMTIC
      TICLOG=DIVLEN*ALOG10(FLOAT(J))
      IF(DELNUM .LT. 0) TICLOG=      -TICLOG
      XS=TICX+(TICLOG*COS1)
      YS=TICY+(TICLOG*SIN1)
      CALL SYMBOL (XS,YS,SIZTIC,15,TICANG,-1)
305   CONTINUE
C
999   CONTINUE
C
C     DRAW AXIS LINE
C
      CALL PLOT (XEND,YEND,3)
      CALL PLOT (X   ,Y   ,2)
C
      IF (N .EQ. 0)  RETURN
      IF(KIND .LT. 0) GO TO 1001
C
C     CENTER NORMAL TITLE
C
      SIGN1=1.0
      IF((THETA .EQ. 0.0) .OR. (THETA .EQ. 270.0)) SIGN1=-1.0
      SIGN2=-SIGN1
      IF((THETA .LT. 0.0) .OR. (THETA .EQ. 270.0)) SIGN2=SIGN1
      BCDOFF=(HEIGHT*((3.25*SIGN1)-0.5))*SIGN2
      OFFCEN=0.5*(PLTLEN-(FLOAT(N)-0.5)*BCDSIZ)
      IF((THETA .EQ. 180.) .OR. (THETA .EQ. -90.))
     *              OFFCEN=OFFCEN+(BCDSIZ*FLOAT(N))
      XC=X+(OFFCEN*COS1)+(BCDOFF*SIN1)
      YC=Y+(OFFCEN*SIN1)+(BCDOFF*COS1)
      CALL SYMBOL (XC,YC,BCDSIZ,BCD,THET2,N)
      RETURN
C
C     CENTER VERT. TITLE
C
1001  THET3=90.0
      IF((ABS(THETA) .EQ. 90.0) .OR. (THETA .EQ. 270.0)) THET3= 0.0
      SIN3=SIN(THET3/57.2958)
      COS3=COS(THET3/57.2958)
      OFFCEN=(0.5*(PLTLEN-(FLOAT(N)*VRTSIZ)))+BCDSIZ
      OFFCEN=OFFCEN+(COS3*(FLOAT(N-2)*VRTSIZ))
      SIGN3=1.0
      IF((THETA .GE. 0.0) .AND. (THETA .LT. 270.0)) SIGN3=-1.0
      BCDOFF= HEIGHT*((3.25*SIGN3)-0.5)
      YC=Y+(OFFCEN*COS3)+(BCDOFF*SIN3)
```

```
      XC=X+(OFFCEN*SIN3)+(BCDOFF*COS3)
C
      II=1
      DO 1002 I=1,N
      JCH=MOD(I,10)
      IF(JCH .EQ. 0) JCH=10
      IRIGHT=MXGETX (BCD(II),JCH ,1)
      LEFT  =MXPUTX (IRIGHT ,LEFT,1)
      CALL SYMBOL (XC,YC,BCDSIZ,LEFT,THET3,1)
      IF(MOD(I,10) .EQ. 0) II=II+1
      XC=XC+(VRTSIZ*SIN3)
      YC=YC-(VRTSIZ*COS3)
 1002 CONTINUE
      RETURN
      END
```

PROGRAM ASOCCL   74/74   OPT=1   FTN 4.6+428   04/28/78 12.58.52   PAGE 1

```
      PROGRAM ASOCCL (INPUT,OUTPUT,TAPE1,TAPE2,TAPE5=INPUT,TAPE6=OUTPUT)000100
      LOGICAL PR1,PR2,PR3,PR4                                          000110
       COMMON /FLGS/ ITYPE,PR1,PR2,PR3,PR4,ISTOP                       000120
      COMMON /INPUT1/ IDEV1,IDEV2                                      000125
      CALL INIT                                                        000131
    5 CALL PRM                                                         000136
      IF(ISTOP .EQ. 1) STOP                                            000137
      CALL INPUT                                                       000140
      CALL TRACK                                                       000143
      IF(ITYPE.NE.6) GO TO 5
      REWIND IDEV2                                                     000147
      GOTO 5                                                           000148
      END                                                              000149
```

```
      SUBROUTINE INIT                                                     000170
      LOGICAL PR1,PR2,PR3,PR4                                             000173
      COMMON /FLGS/ ITYPE,PR1,PR2,PR3,PR4,ISTOP                           000176
      COMMON /CNTRS/ IELSCN,IVLSCN,IATR(5),MATR,IVCLMX,IMDMX,ICMPMX
      COMMON /DATA/ VCL(13,100,3),ECL(10,200),IMVCL(25),ICMPRL(10)
      IF(PR4) PRINT 100                                                   000185
100   FORMAT(1X,*INIT*)                                                   000188
      ISTOP=0                                                             000191
      IELSCN=0                                                            000194
      IVLSCN=0                                                            000197
      DO 10 IX=1,3                                                        000200
      DO 10 JX=1,100                                                      000203
      DO 10 KX=1,13                                                       000206
10    VCL(KX,JX,IX)=0.                                                    000209
      RETURN                                                              000210
      END                                                                 000212
```

```
      BLOCK DATA                                                        000270
      LOGICAL PR1,PR2,PR3,PR4                                           000280
      COMMON /DATA/ VCL(13,100,3),ECL(10,200),IHVCL(25),ICMPRL(10)
      COMMON/PNTRS/ IVCLS,IHVCLS,IECLM,IVCLP,IVCLC,ICMPRS               000300
      COMMON /CNTRS/ IELSCN,IVLSCN,IATR(5),MATR,IVCLMY,IHDMX,ICMPMX
      COMMON/ANCIL/ ELANG,IDAY,IHR,MIN,ISEC                             000320
      COMMON /FLGS/ ITYPE,PR1,PR2,PR3,PR4,ISTOP                         000330
      COMMON /INPUT1/ IDEV1,IDEV2                                       000335
      DATA IATR/9,7,9,7,5/
      DATA ITYPE/1/,IVCLMX/100/,IHDMX/25/
      DATA PR1/.F./,PR2/.F./,PR3/.F./                                   000350
      DATA IDEV1/1/,IDEV2/1/,ISTOP/1/                                   000355
      DATA ICMPMX/10/                                                   000357
      END                                                               000360
```

```
      SUBROUTINE INPUT                                                  000370
      DIMENSION IECL(10,200)
      LOGICAL PR1,PR2,PR3,PR4                                           000380
      COMMON /DATA/ VCL(13,100,3),ECL(10,200),IWVCL(25),ICMPRL(10)
      COMMON /PNTRS/ IVCLS,IHVCLS,IECLM,IVCLP,IVCLC,ICMPPS              000400
      COMMON /CNTRS/ IELSCN,IVLSCN,IATR(5),MATR,IVCLMX,IHDMX,ICMPMX
      COMMON /ANCIL/ ELANG,IDAY,IHR,MIN,ISEC                            000420
      COMMON /FLGS/ ITYPE,PR1,PR2,PR3,PR4,ISTOP                         000430
      COMMON /INPUT1/ IDEV1,IDEV2                                       000440
      EQUIVALENCE(IECL(10,200),ECL(10,200))
      ILIMIT=0                                                          000445
   20  READ (IDEV2) ITYPE,IECLM                                         000480
      IF(EOF(IDEV2)) 12,3                                               000490
    3 N=1                                                               000500
      IF(PR1) PRINT 220,N,ITYPE,IECLM                                   000510
    5 IF(ITYPE .NE. 0) GOTO 7                                           000520
C    INPUT EL. ANG. AND TIME                                            000530
      READ (IDEV1) ELANG,IDAY,IHR,MIN,ISEC                              000540
     X,AZMUTH1,AZMUTH2
      IF(EOF(IDEV1)) 12,6                                               000550
    6 N=2                                                               000560
      IF(PR1) PRINT 205,N,ELANG,IDAY,IHR,MIN,ISEC                       000570
     X,AZMUTH1,AZMUTH2
      GOTO 20                                                           000580
    7 IF(IECLM.LE.200) GO TO 9
      IECLR=IECLM-200
      IECLM=200
C   GET NUMBER OF ATTRIBUTES FOR RECORD TYPE                            000660
    9 MATR=IATR(ITYPE)                                                  000670
      DO 10 IX=1,IECLM                                                  000680
      READ(IDEV2)(IECL(JX,IX),JX=1,MATR)
      IF(EOF(IDEV2)) 12,10                                              000700
   10 CONTINUE                                                          000710
      IF(ILIMIT .EQ. 0) GOTO 23                                         000711
      DO 13 IX=1,IECLR                                                  000712
      READ (IDEV2)                                                      000713
      IF(EOF(IDEV2)) 12,13                                              000714
   13 CONTINUE                                                          000715
   23  N=3                                                              000720
      M=MATR-1
      L=M-2
      IF(ITYPE.NE.3) GO TO 15
      IF(PR1) PRINT 210,N,MATR
      DO 30 JX=1,IECLM
      IF(ITYPE.GT.2) GO TO 31
      IF(PR1) PRINT 211,((IECL(IX,JX),IX=1,2),L,(ECL(IX,JX),IX=3,M),
     X(IECL(MATR,JX)))
      GO TO 30
   31 IF(PR1) PRINT 212,M,(ECL(IX,JX),IX=1,M),IECL(MATR,JX)
   30 CONTINUE
      GOTO 15                                                           000740
   12 PRINT 230                                                         000750
  220 FORMAT(1X,I2,1X,I3,2X,I4)                                         000760
  205 FORMAT(1X,I2,2X,F6.3,2X,I3,2X,I2,2X,I3,2X,I3,2F10.2)
  210 FORMAT(1X,2I10)
  211 FORMAT(1X,2I10,=(1X,F8.2),I10)
  212 FORMAT(1X,=(1X,F8.2),I10)
```

```
      230  FORMAT(2X,*EOF REACHED ON TAPE1*)          000790
      15   RETURN                                     000800
           END                                        000810
```

```
      SUBROUTINE TRACK                                                  000820
      COMMON /DATA/ VOL(13,100,3),ECL(13,200),IHVCL(25),ICMPRL(10)
      COMMON /PNTRS/ IVCLS,IHVCLS,IECLM,IVCLP,IVCLC,ICMPRS               000840
      COMMON /CNTRS/ IELSCN,IVLSCN,IATR(5),MATR,IVCLMX,IHDMX,ICMPMX
      COMMON /ANCIL/ ELANG,IDAY,IHR,MIN,ISEC                             000860
      COMMON /FLGS/ ITYPE,PR1,PR2,PR3                                    000870
      LOGICAL PR1,PR2,PR3,PR4                                            000880
      DATA RPD/.017453/                                                  000890
      PRINT 400,ITYPE                                                    000900
      IF(ITYPE .NE. 3) RETURN
  400 FORMAT(1X,*TRACK*,I7)                                              000920
      IF(IVLSCN .EQ. 0 .AND. IELSCN .EQ. 0) ELANGP=0.                    000930
C ASSUME VEL=30 M/SEC
      VEL=.03
      SINEL=SIN(ELANG*RPD)
      TANEL=TAN(ELANG*RPD)                                               000940
      COSPHI=COS(ELANG*RPD)                                              000950
      COSPHI2=COSPHI*COSPHI                                              000960
      PRINT 410,TANEL,COSPHI,COSPHI2,ELANG,ELANGP,IELSCN,IVLSCN          000970
  410 FORMAT(1X,3(1X,F10.6),1X,2(1X,F7.3),2I6)                           000980
      IF(ELANGP .GT. ELANG) IELSCN=0                                     000990
      IF(ELANGP .GT. ELANG) GOTO 45                                      001000
    3 IELSCN=IELSCN+1                                                    001010
      IF(IELSCN .EQ. 1 .AND. IVLSCN .EQ. 0) GOTO 5                       001020
      IF(IELSCN .EQ. 1) GOTO 15                                          001030
      GOTO 25                                                            001040
C    INITIALIZE VOL. CELL TABLE POINTERS                                 001050
    5 IVCLS=1                                                            001060
      IHVCLS=1                                                           001070
      IVCLP=1                                                            001080
      IVCLC=1                                                            001090
C    ENTRY FOR FIRST SCAN OF NEW VOLUME SCAN                             001100
      PRINT 420,IECLM                                                    001110
  420 FORMAT(1X,*TRACK1                             IECLM=*,I6)          001120
   15 DO 13 JX=1,IECLM                                                   001130
C  INITIAL CELLS                                                         001140
C  CALCULATE SURFACE COORDINATES                                         001150
      T1=((IDAY*24+IHR)*60+IMIN)*60+ISEC
      XS=ECL(3,JX)*COSPHI                                                001160
      YS=ECL(4,JX)*COSPHI                                                001170
      RS=SQRT((XS*XS)+(YS*YS))                                           001180
      HT=RS*TANEL                                                        001510
      VOL(1,IVCLS,ITYPE)=XS                                              001200
      VOL(2,IVCLS,ITYPE)=YS                                              001210
      VOL(3,IVCLS,ITYPE)=RS
      VOL(4,IVCLS,ITYPE)=HT                                              001230
      VOL(5,IVCLS,ITYPE)=ECL(2,JX)
      VOL(6,IVCLS,ITYPE)=IDAY                                            001250
      VOL(7,IVCLS,ITYPE)=IHR                                             001260
      VOL(8,IVCLS,ITYPE)=MIN                                             001270
      VOL(9,IVCLS,ITYPE)=ISEC                                            001280
      VOL(10,IVCLS,ITYPE)=ECL(2,JX)*COSPHI
      VOL(11,IVCLS,ITYPE)=ECL(1,JX)
      VOL(12,IVCLS,ITYPE)=ECL(7,JX)                                      001310
      N=1                                                                001320
      IF(PR2) PRINT 306,JX,IVCLS,(VOL(KX,IVCLS,ITYPE),KX=1,13)           001330
C    CHECK FOR OVERFLOW OF VOL                                           001340
```

```
      IVCLS=IVCLS+1                                                      001350
      IF(IVCLS .LE. IVCLMX) GOTO 13                                      001360
      PRINT 310                                                          001370
      IVCLS=IVCLMX                                                       001380
  310 FORMAT(2X,*VCL LIMIT REACHED*)                                     001390
   13 CONTINUE                                                           001400
C     MOVE UP  VCL SEGMENT PNTR(END)                                     001410
      IVCLC=IVCLS-1                                                      001420
      ELANGP=ELANG                                                       001421
      IF(PR22) PRINT 430,IVCLS,IVCLC,IVCLP                               001422
  430 FORMAT(1X,*INIT. VOL. CELLS*/*IVCLS=*,I4,2X,*IVCLC=*               001424
     1,I4,2X,*IVCLP=*,I4)                                                001426
      GOTO 100                                                           001430
C   ASSOCIATE ELEV. CELLS TO BUILD VOL CELLS                             001440
   25 PRINT 435                                                          001442
  435 FORMAT(1X,*ASSOC. EL. CELLS*)                                      001444
      DO 40 JX=1,IECLM                                                   001450
C  GET SURFACE PARAMETERS OF 2REV. ELEV. CELL                            001460
      T2=((IDAY*24+IHR)*60+IMIN)*60+ISEC
      DT=T2-T1
      ELXS=ECL(3,JX)*COSPHI
      ELYS=ECL(4,JX)*COSPHI
      RS=SQRT((ELXS*ELXS)+(ELYS*ELYS))                                   001500
      HT=RS*TANEL                                                        001190
      AREAS=ECL(2,JX)*COSPHI
      ICMPRS=1                                                           001514
      DO 305 IX=1,ICMPMX                                                 001516
  305 ICMPRL(IX)=0                                                       001518
      IF(PR3) PRINT 450,2HEL,JX,ELYS,ELXS,RS,HT,AREAS                    001523
  450 FORMAT(1X,A2,1X,*CELL*,1X,I3,1X,5E12.4)                            001524
      DO 30 IX=IVCLP,IVCLC                                               001525
      VCLDIS=SQRT(VCL(10,IX,ITYPE))+SQRT(AREAS)*1.+VEL *DT
      XS2=VCL(1,IX,ITYPE)+VCLDIS                                         001540
      XS1=VCL(1,IX,ITYPE)-VCLDIS                                         001550
      YS2=VCL(2,IX,ITYPE)+VCLDIS                                         001560
      YS1=VCL(2,IX,ITYPE)-VCLDIS                                         001570
      IF(PR4) PRINT 500,IX,VCLDIS,XS2,XS1,YS2,YS1                        001572
  500 FORMAT(1X,I4,1X,5E12.4)                                            001574
      IF(ELXS .LT. XS1 .OR. ELXS .GT. XS2) GOTO 30                       001580
      IF(ELYS .LT. YS1 .OR. ELYS .GT. YS2) GOTO 30                       001590
C   COMPARE-INSERT VCL INDEX INTO ICMPRL LIST                            001591
      ICMPRL(ICMPRS)=IX                                                  001593
      ICMPRS=ICMPRS+1                                                    001595
      IF(ICMPRS .LE. ICMPMX)GOTO 301                                     001597
      IERR=2                                                             001599
      ICMPRS=ICMPMX                                                      001601
  301 CONTINUE                                                           001603
   30 CONTINUE                                                           001610
      KX2=2                                                              001611
      IF(ICMPRL(1) .EQ. 0) GOTO 33                                       001612
      IX=ICMPRL(1)                                                       001614
      IF(ICMPRL(2) .NE. 0) GOTO 3301                                     001613
      GOTO 35                                                            001615
 3301 CONTINUE
  332 INEW=ICMPRL(KX2)                                                   001617
      X1=VCL(1,ICMPR,ITYPE)                                              001618
      Y1=VCL(2,ICMPR,ITYPE)                                              001619
```

```
            X2=VCL(1,INEW,ITYPE)                                      001620
            Y2=VCL(2,INEW,ITYPE)                                      001621
            DIS1=SQRT((ELXS-X1)**2+(ELYS-Y1)**2)                      001622
            DIS2=SQRT((ELXS-X2)**2+(ELYS-Y2)**2)                      001623
            IF(DIS2 .LT. DIS1) ICMPR=INEW                             001624
            KX2=KX2+1                                                 001625
            IF(ICMPRL(KX2) .EQ. 0) GOTO 35                            001626
            GOTO 333                                                  001627
      C  NEW VOL. CELL-ADD TO LIST                                    001628
      33    IF(P23) PRINT 460,2HVL,IX,VCLDIS,XS1,XS2,YS1,YS2          001629
            VCL(1,IVCLS,ITYPE)=ELXS                                   001630
            VCL(2,IVCLS,ITYPE)=ELYS                                   001640
            VCL(3,IVCLS,ITYPE)=RS
            VCL(4,IVCLS,ITYPE)=HT                                     001660
            VCL(5,IVCLS,ITYPE)=ECL(2,JX)
            VCL(6,IVCLS,ITYPE)=IDAY                                   001680
            VCL(7,IVCLS,ITYPE)=IHR                                    001690
            VCL(8,IVCLS,ITYPE)=MIN                                    001700
            VCL(9,IVCLS,ITYPE)=ISEC                                   001710
            VCL(10,IVCLS,ITYPE)=AREAS                                 001720
            VCL(11,IVCLS,ITYPE)=ECL(1,JX)
            VCL(12,IVCLS,ITYPE)=ECL(7,JX)                             001740
            IVCLS=IVCLS+1                                             001750
      C    CHECK FOR OVERFLOW OF VCL                                  001760
            IF(IVCLS .LE. IVCLMX) GOTO 40                             001770
            PRINT 310                                                 001780
            IVCLS=IVCLMX                                              001790
            GOTO  40                                                  001800
      C  ELEV. CELLS COMPARE UPDATE ATTRIBUTES                        001810
      C  REPLACE WITH NEW HEIGHT                                      001820
         35 CONTINUE
            IF(P23) PRINT 460,IX,JX,HT,AREAS                          001822
      460   FORMAT(1X,*UPDATE VCL*,1X,I4,1X,*WITH ECL.*,1X,I4         001824
           1,2X,2E12.4)                                               001826
            VCL(3,IX,ITYPE)=RS
            IF(AREAS .LE. VCL(3,IX,ITYPE)) GOTO 40                    001840
            VCL(4,IX,ITYPE)=HT                                        001850
            VCL(5,IX,ITYPE)=AREAS                                     001860
      40    CONTINUE                                                  001870
            N=2                                                       001880
            IF(P22) PRINT 320,N,IVCLS,((VCL(IX,JX,ITYPE),IX=1,10),JX=1,IVCLS) 001890
      C  AFTER COMPARING ALL NEW ELEV. CELLS MOVE UP SEGMENT END PNTR  001900
            IVCLC=IVCLS-1                                             001910
            ELANGP=ELANG                                              001915
            GOTO 100                                                  001920
      C  PROCESS VOL TRACK BEFORE PROCESSING NEW ELEVATION CELLS      001930
      45    IVLSCN=IVLSCN+1                                           001940
            IF(IVLSCN .GT. 1) GOTO 50                                 001950
      C   CREATE VOL LIST HEAD TABLE                                  001960
            IVCLC1=IVCLC                                              001970
            IF(IVCLC .LE. IHDMX) GOTO 48                              001980
            PRINT 330,IHDMX                                           001990
      330   FORMAT(2X,*IVCLC .GT.*,2X,I5)                             002000
            IVCLC1=IHDMX                                              002010
      48    DO 47 IX=1,IVCLC1                                         002020
      47    IHVCL(IX)=IX                                              002030
            IHVCLS=IVCLC1+1                                           002040
```

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          IF(IHVCLS .LE. IHDMX)GOTO 52                                      002050
          PRINT 340,IHDMX                                                   002060
    340   FORMAT(2X,*IHVCLS .GT.*,2X,I5)                                    002070
          IHVCLS=IHDMX                                                      002080
    C     MOVE UP VOL CELL SEGMENT POINTER(BEGINNING)                       002090
    52    IVCLP=IVCLC+1                                                     002100
          IF(PR3) PRINT 350,IHVCLS,(IHVCL(IX),IX=1,IHVCLS)                  002110
    C     GO PROCESS FIRST EL. SCAN OF NEW VOL SCAN                         002120
          GO TO 15                                                          002130
    C     MAX  IHVCL FOR TRACK COMPARE                                      002140
    50    IHVCLM=IHVCLS-1                                                   002150
          DO 60 JX=IVCLE,IVCLC                                              002160
          DO 55 IX=1,IHVCLM                                                 002170
          IXCEL=IHVCL(IX)                                                   002180
    C     POINTER TO VOL. CELL                                              002190
          XS=VCL(1,IXCEL,ITYPE)                                             002200
          YS=VCL(2,IXCEL,ITYPE)                                             002210
          VCLDIS=SQRT(VCL(10,IXCEL,ITYPE))+SQRT(AREAS)+1.+VEL*DT
          XS1=XS-VCLDIS                                                     002230
          XS2=XS+VCLDIS                                                     002240
          YS1=YS-VCLDIS                                                     002250
          YS2=YS+VCLDIS                                                     002260
          XS3=VCL(1,JX,ITYPE)                                               002270
          YS3=VCL(2,JX,ITYPE)                                               002280
          IF(XS3 .LT. XS1 .OR. XS3 .GT. XS2) GOTO 55                        002290
          IF(YS3 .LT. YS1 .OR. YS3 .GT. YS2) GOTO 55                        002300
          GOTO 57                                                           002310
    55    CONTINUE                                                          002320
    C     NEW HEAD VOL. CELL                                                002330
          IHVCL(IHVCLS)=JX                                                  002340
          IHVCLS=IHVCLS+1                                                   002350
          IF(IHVCLS .LE. IHDMX) GOTO 60                                     002360
          PRINT 360,IHDMX                                                   002370
          IHVCLS=IHDMX                                                      002380
    360   FORMAT(2X,*IHVCLS .GT. *,2X,I5)                                   002390
          GOTO 60                                                           002400
    C     TRACK ASSOCIATED-LINK CELLS                                       002410
    57    LINK=IHVCL(IX)                                                    002420
          VCL(13,JX,ITYPE)=LINK                                             002430
          IHVCL(IX)=JX                                                      002440
    60    CONTINUE                                                          002450
    C     MOVE UP SEGMENT BEGINNING PNTR.                                   002460
          IVCLP=IVCLC+1                                                     002470
          ELANGP=ELANG                                                      002480
          IF(PR3) PRINT 370 ,IVCLS,IHVCLS,(IHVCL(IX),IX=1,IHVCLS)           002490
    350   FORMAT(2X,5(F10.5))                                               002500
    300   FORMAT(1X,2I4,13(1X,E8.2))                                        002510
      320 FORMAT(1X,I2,1X,I3,/,(13F9.2))
    370   FORMAT(2X,20(I5))                                                 002530
    100   RETURN                                                            002540
          END                                                               002550
```

```
      SUBROUTINE PRM                                        002560
      LOGICAL PR1,PR2,PR3,PR4                               002570
      COMMON /FLGS/ ITYPE,PR1,PR2,PR3,PR4,ISTOP             002580
      COMMON /INPUT1/ IDEV1,IDEV2                           002590
      NAMELIST /PARAM/ PR1,PR2,PR3,PR4,IDEV1,IDEV2,ISTOP    002600
      PRINT 100                                             002610
100   FORMAT(1X,*INPUT...PR1,PR2,PR3,PR4,IDEV1,IDEV2,ISTOP*) 002620
      READ(5,PARAM)                                         002640
      IF(EOF(5))15,3                                        002650
3     WRITE(6,PARAM)                                        002660
      GOTO 20                                               002670
15    PRINT 110                                             002680
110   FORMAT(1X,*EOF ON UNIT 5*)                            002690
20    RETURN                                                002700
      END                                                   002710
```

FWA OF THE LOAD 111
LWA+1 OF THE LOAD 227071

TRANSFER ADDRESS -- EXTRAD 14574

PROGRAM AND BLOCK ASSIGNMENTS.

BLOCK	ADDRESS	LENGTH	FILE	DATE	PROCSSR	VER LEVEL	HARDWARE	COMMENTS
/PARM/	111	64						
EXTRAD	175	14506	LGO	05/04/78	FTN	4.6 428	666X I	OPT=2
/INSUB/	14703	24						
/AZM/	14727	720						
/AI024/	15647	6000						
/VALMAX/	23647	13						
/ADATA/	23662	10						
/HEAD/	23672	15						
/LINUM/	23707	1						
/MORED/	23710	5						
/STORE/	23715	7						
/EXPAN/	23724	10						
/ERROR/	23734	1						
/FILTER/	23735	3						
/VELPRM/	23740	1						
/QUANTX/	23741	3						
/PWORK/	23744	22150						
/FIXED/	46114	3413						
/PESTORE/	51527	31676						
/PVSTORE/	103425	30212						
/PSSTORE/	133537	26526						
/REFL/	162365	1272						
BLKDAT.	163657	0	LGO	05/04/78	FTN	4.6 428	666X I	OPT=2
/LOOKUP/	163657	172						
INPARM	164051	460	LGO	05/04/78	FTN	4.6 428	666X I	OPT=2
/VEL/	164531	2550						
/AZ2/	167301	5						
EXTRAT	167306	1136	LGO	05/04/78	FTN	4.6 428	666X I	OPT=2
COMPZ	170444	1555	LGO	05/04/78	FTN	4.6 428	666X I	OPT=2
CONTOR	172221	11303	LGO	05/04/78	FTN	4.6 428	666X I	OPT=2
PEAKD	203524	4270	LGO	05/04/78	FTN	4.6 428	666X I	OPT=2
/MSKVAL/	210014	6						
IUPK	210022	103	LGO	05/04/78	FTN	4.6 428	666X I	OPT=2
IPK	210125	104	LGO	05/04/78	FTN	4.6 428	666X I	OPT=2
PRANG	210231	60	LGO	05/04/78	FTN	4.6 428	666X I	OPT=2
PRN2	210311	362	LGO	05/04/78	FTN	4.6 428	666X I	OPT=2
PAGE	210673	33	UL-ERTLIB	02/16/78	FTN	4.6 428	666X I	OPT=1
LINES	210726	44	UL-ERTLIB	02/16/78	FTN	4.6 428	666X I	OPT=1
DAY	210772	10	UL-ERTLIB	02/16/78	FTN	4.6 428	666X I	OPT=1
ERRX	211002	25	UL-ERTLIB	02/16/78	FTN	4.6 428	666X I	OPT=1
INE	211027	125	UL-ERTLIB	02/16/78	FTN	4.6 428	666X I	OPT=1
/STP.END/	211154	1						
/FCL.C./	211155	23						
/Q8.IO./	211200	133						
Q8NTRY=	211333	0	SL-FORTRAN	08/12/77	COMPASS	3. 3-428		FCL INITIALIZATION ROUTINE.

BLOCK	ADDRESS	LENGTH	FILE	DATE	PROCSSR	VER	LEVEL	HARDWARE	COMMENTS
BUFIN=	211333	46	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		BUFFERED INPUT PROCESSOR.
FECMSK=	211401	41	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		INITIALIZE CONSTANTS.
FLTOUT=	211442	311	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMMON FLOATING OUTPUT CODE
FORSYS=	211753	603	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		FORTRAN OBJECT LIBRARY UTILITIES.
INCOM=	212556	276	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMMON INPUT FORMATTING CODE
INPC=	213054	160	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		FORMATTED READ FORTRAN RECORD.
KODER=	213234	456	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		OUTPUT FORMAT INTERPRETER.
NAMOUT=	213712	274	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		NAMELIST OUTPUT ROUTINE.
/IO.BUF./	214206	227							
OUTB=	214435	203	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		BINARY WRITE FORTRAN RECORD.
OUTCOM=	214640	154	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMMON OUTPUT CODE
REWIND=	215014	37	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		POSITION FILE AT BEGINNING-OF-INFORMATION.
UNIT	215053	50	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		STATUS OF BUFFER I/O FILE.
CLOCK=	215123	31	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		ACCESS SYSTEM CLOCKS FOR FORTRAN.
GOTOER=	215154	14	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMPUTED GO TO ERROR PROCESSOR.
ALOG	215170	73	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMPUTE COMMON AND NATURAL LOGARITHMS. OPT=ALL.
EXP	215263	75	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		EXPONENTIAL FUNCTION. E TO POWER X. OPT=ALL.
ITOJ=	215360	16	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		INTEGER TO INTEGER EXPONENTIATION.
SINCOS=	215376	66	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		TRIGONOMETRIC SINE OR COSINE OF X. OPT=ALL.
SYSAID=	215464	1	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		LINK BETWEEN SYS=AID AND INITIALIZATION CODE.
BUFIO=	215465	125	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMMON SET-UP ROUTINE FOR BUFIN=/BUFOUT=
COMIC=	215612	64	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMMON CODED I/O ROUTINES AND CONSTANTS.
EOF	215676	16	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		TEST FOR END OF FILE STATUS.
FLTIN=	215714	154	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMMON FLOATING INPUT CONVERTER.
FMTAP=	216070	352	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		CRACK APLIST AND FORMAT FOR KODER/KRAKER.
FORUTL=	216442	16	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		FCL MISC. UTILITIES.
GETFIT=	216460	42	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		LOCATE AN FIT GIVEN A FILE NAME.
KRAKER=	216522	406	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		PROCESS FORMATTED FORTRAN INPUT.
NAMIN=	217130	523	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		NAMELIST INPUT ROUTINE.
OUTC=	217653	172	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		FORMATTED WRITE FORTRAN RECORD.
SQRT	220045	43	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMPUTE THE SQUARE ROOT OF X. OPT=ALL.
SYS=1ST	220110	62	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		MATH LIBRARY LINK TO ERROR MESSAGE PROCESSOR.
XTOY=	220172	7	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		REAL TO REAL EXPONENTIATION.
SBF.SQ	220201	2	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/CON.RM/	220203	6							
CIO.RM	220211	40	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/AOB.RM/	220251	10							
MOVE.RM	220261	64	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
MCT.RM	220345	233	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
CHEK.RM	220600	107	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
OSUB.RM	220707	71	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/JMPS.RM/	221000	11							
/OPEN.FO/	221011	7							
OPEN.SQ	221020	254	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
OPEX.SQ	221274	14	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/PUT.RT/	221310	11							
FLEQ.RM	221321	42	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/CLSF.FO/	221363	7							
CLSF.SQ	221372	134	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/CLSV.FO/	221526	7							
CLSV.SQ	221535	137	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/REW.FO/	221674	7							
REW.SQ	221703	33	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/TERM.RM/	221736	1							
/GET.FO/	221737	7							

```
LOAD MAP - EXTRAD                                      CYBER LOADER 1.1-428      05/04/78  21.56.39.      PAGE     3

/GET.BT/      221746        5
/GET.RT/      221753       11
GET.SQ        221764     1134  SL-SYSIO     09/03/76 COMPASS   3. 2-414
Z.SQ          223120      101  SL-SYSIO     09/03/76 COMPASS   3. 2-414
FSU.SQ        223221      106  SL-SYSIO     09/03/76 COMPASS   3. 2-414
/SKFL.FO/     223327        7
/SKSF.FO/     223336        1
SKSF.SQ       223337       50  SL-SYSIO     09/03/76 COMPASS   3. 2-414
/SKBL.FO/     223407        7
/SKSB.FO/     223416        1
SKSB.SQ       223417      101  SL-SYSIO     09/03/76 COMPASS   3. 2-414
ERR.RM        223520      404  SL-SYSIO     09/03/76 COMPASS   3. 2-414
CHWR.SQ       224124        7  SL-SYSIO     09/03/76 COMPASS   3. 2-414
/MEMC.RM/     224133        3
/OPES.FO/     224136        1
OPEN.RM       224137      237  SL-SYSIO     09/03/76 COMPASS   3. 2-414
OPES.SQ       224376      121  SL-SYSIO     09/03/76 COMPASS   3. 2-414
/PUT.FO/      224517        7
PUT.SQ        224526     1400  SL-SYSIO     09/03/76 COMPASS   3. 2-414
WAR.SQ        226126      260  SL-SYSIO     09/03/76 COMPASS   3. 2-414
CLSF.RM       226406       25  SL-SYSIO     09/03/76 COMPASS   3. 2-414
GTWR.SQ       226433       41  SL-SYSIO     09/03/76 COMPASS   3. 2-414
BTPT.SQ       226474      115  SL-SYSIO     09/03/76 COMPASS   3. 2-414
WEOX.SQ       226611      150  SL-SYSIO     09/03/76 COMPASS   3. 2-414
SKFL.SQ       226761       51  SL-SYSIO     09/03/76 COMPASS   3. 2-414
SYS.RM        227032       37  SL-NUCLEUS   04/15/77 COMPASS   3. 2-414               PROCESS SYSTEM REQUEST.

      1.348 CP SECONDS              2437003 CM STORAGE USED                  129 TABLE MOVES
```

```
162      8     PROGRAM    EXTRAD                                                     VERSION   2.0  (780501)       05/04/78       PAGE   1
-----------------------------------------------------------------------------------------------------------------------------------------
PARA
```

```
$INPUT
PRINT1  = F,
PRINT2  = F,
PRINT3  = F,
COPLOT  = T,
ICODES  = -3294061441733848 50, 3088182601625482 9, 4889622452573681 3,          6691062303521879 7, 8492502154470078 1, 1029394200541827 65
,
          1209533185636647 49, 1389682170731467 33, 1569826155826287 17,          1749970140921107 01, 1930114126015926 85,
          2110258111110746 69, 2290402096205566 53, 2470546081300386 37,          2650690066395206 21, 2830834051490026 05,
          3010978036584845 89, 3191122021679665 73, 3371266006774485 57,          3551409991869305 41, 3731553976964125 25,
          3911697962058945 09, 4091841947153764 93, 4271985932248584 77,          4452129917343404 61, 4632273902438224 45,
          4812417887533044 29, 5172705857722683 97, 5352849842817503 81,          5532993827912323 65, 5713137813007143 49,
          -5635933247966506 42, -5455789262871686 33, -5275645277776866 74,       -5095501292682046 90, -4915357307587227 06,
A1      = .443E+00,
B1      = .56E+00,
A2      = .86E+00,
B2      = .186E+02,
CONTRZ  = T,
CONTRV  = T,
CONTRS  = T,
NFILE   = 0,
NUMF    = 30,
AC      = -.10776555E+03, .19767838E+01, -.94297523E-01, .18226318E-03,
CALM    = .332E+00,
CALB    = -.983E+02,
XCUT    = .1E+02,
CK      = .1E+02,
ZMAX    = 0.0,
VMAX    = 0.0,
NREC    = 1,
NUMR    = 99999,
IRUN    = 0,
INC     = 0,
T1      = [illegible],
```

```
TDW    = 0.0,
DN     = 0.0,
STARTR = .2E+02,
STOPR  = .15E+03,
INPRF  = 794,
SCALE  = .1E+01,
AE     = .121E+01,
AA     = .4E+03,
BB     = .14E+01,
X1     = 0.0,
X2     = .8E+01,
Y1     = 0.0,
Y2     = .8E+01,
TV     = 35,
TSV    = 1000000,
LDV    = 3,
LTV    = 3,
LSV    = 3,
ICOMP  = 6,
VMIN   = 0.0,
SVMIN  = 0.0,
AREANN = .1E+01,
WAVEL  = .542E-01,
VQUANT = .1E+02,
SQUANT = .6E+01,
RQUANT = .1E+01,
VOLTAP = T,
DAZM   = .1E+01,
ESTART = .15E+01,
DELT   = .5E+00,
$END
```

```
162    8      PROGRAM     EXTRAD                                          VERSION    2.0  (780501)        05/04/78        PAGE   2
=================================================================================================================================
EXEC
           NO OF RECORDS/RADIAL   4       CELL WIDTH  937.2  METERS       PRF   794.0
```

FIXED CONTOUR ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1933	40	1.2	118.2	116.2

ID	THRESHOLD (DBZ)	AREA (KM**2)	AVERAGE REFLECTIVITY (DBZ)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	TOTAL PRECIP (TONS/HR)	AVERAGE PRECIP (MM/HR)	FIXED CONTOR REFERENCE
1	20	1.27	26.1	12.6	-15.7	20.1	3.3	1.22	.96	-4
2	20	1.85	32.3	15.8	-19.3	27.7	4.1	4.72	2.56	2
3	20	2.34	35.9	14.6	-18.3	23.9	6.0	10.48	4.49	5
4	20	1.85	29.6	22.3	-33.1	39.9	2.8	3.06	1.66	6
5	20	3.85	21.0	-36.7	-47.0	60.5	3.9	1.69	.44	10
6	20	8.68	21.6	-37.9	-53.7	65.7	8.1	4.22	.49	9
7	20	3.30	36.0	-18.4	-13.7	23.0	8.8	13.00	3.93	11
8	20	3.41	38.3	-16.8	-9.7	21.1	9.9	5.86	1.72	-12
9	20	14.93	25.5	-132.1	-67.3	148.5	6.1	13.15	.88	-13
10	20	6.48	29.4	-36.7	-3.5	36.9	10.8	9.68	1.49	26
11	20	8.14	34.0	-35.1	-10.3	36.6	13.6	26.21	3.22	19
12	20	1.40	21.0	-84.5	-26.5	88.5	1.0	.61	.44	21
13	20	926.20	36.0	-127.6	-44.5	135.1	419.0	3540.07	3.82	-18
14	20	2.89	30.6	-37.0	.5	37.0	4.8	5.26	1.82	29
15	20	2.15	21.0	-147.8	-22.5	149.5	.9	.94	.44	-27
16	20	326.32	24.8	-67.3	11.5	68.3	292.0	259.34	.79	34
17	20	25.33	26.1	-132.3	6.7	132.4	11.7	23.86	.94	31
18	20	397.33	41.7	-25.4	22.1	33.7	721.0	4351.89	10.95	36
19	20	10.10	41.0	-33.3	8.4	34.4	16.0	94.26	9.34	35
20	20	2.08	21.0	-54.5	11.7	55.8	2.3	.91	.44	37
21	20	9.11	24.7	-102.7	24.5	105.6	5.3	7.04	.77	38
22	20	2.29	21.0	-128.7	31.3	132.6	1.1	1.00	.44	39
23	20	2.50	21.0	-140.6	34.7	144.8	1.1	1.09	.44	40
24	20	3.53	21.0	-124.7	34.2	129.3	1.7	1.55	.44	41
25	20	9.42	22.7	-136.6	40.1	142.4	4.0	5.44	.58	42
26	20	2.80	24.0	-133.4	39.3	139.2	1.2	2.01	.72	43
27	20	1.49	21.0	-63.8	26.0	68.9	1.3	.65	.44	44
28	20	1.06	37.6	-26.6	12.3	29.5	2.2	6.39	6.02	45
29	20	4.30	21.5	-114.1	96.5	149.5	1.8	2.03	.47	-46
30	20	2.24	22.0	-83.2	73.5	111.1	1.2	1.15	.52	47
31	20	2.09	27.4	-51.3	51.4	72.6	1.8	2.61	1.25	48
32	20	4.19	21.0	-76.4	76.3	108.0	2.6	1.84	.44	49
33	20	4.28	21.0	-84.1	123.0	149.0	1.8	1.88	.44	-51
34	20	1.04	24.0	-32.6	50.9	60.4	1.1	.75	.72	52
35	20	31.27	24.2	-75.1	126.8	146.7	13.0	22.54	.72	-53
36	20	8.94	22.0	-43.2	78.3	90.0	6.1	4.55	.51	54
37	20	9.05	23.2	-49.1	88.8	101.5	5.4	5.63	.62	55
38	20	1.65	22.0	-45.8	84.4	96.1	1.1	.86	.52	56
39	20	118.95	29.7	-34.0	89.1	95.4	76.3	185.98	1.56	57
40	20	2.51	21.5	-36.2	79.3	87.2	1.5	1.20	.48	58
41	20	34.69	32.4	-27.4	70.7	75.8	28.0	88.01	2.54	59
42	20	1.33	21.8	-7.2	18.9	20.1	4.0	.66	.50	-60
43	20	1.52	21.6	-24.3	92.3	96.1	1.0	.67	.44	61
44	20	77.46	25.0	-4.7	38.0	38.3	123.9	63.75	.32	62
45	20	1.30	21.5	-3.2	19.9	20.1	4.0	.62	.48	-63
46	20	14.45	21.7	-9.0	62.3	63.4	13.9	7.03	.49	64
47	20	8.95	23.4	-16.2	93.0	94.4	5.8	5.78	.65	65
48	20	5.75	22.1	-14.5	89.3	91.0	3.9	3.01	.52	66
49	20	3.97	21.8	-3.3	62.7	62.8	3.9	1.97	.50	67
50	20	1.55	29.5	-.3	23.2	23.2	4.1	2.75	1.77	68
51	20	2.98	21.6	3.8	22.5	22.8	8.0	1.45	.49	70

52	20	2.33	22.0	5.3	19.3	20.5	6.1	1.04	.31	72
53	20	7.26	24.4	12.2	39.3	40.9	10.3	5.43	.75	73
54	20	4.47	22.1	17.3	54.7	57.6	4.7	2.33	.52	74
55	20	12.50	21.7	39.7	71.3	82.1	9.3	6.10	.49	81
56	20	1.59	21.0	38.3	90.1	97.9	1.1	.74	.44	76
57	20	11.62	22.0	37.2	64.3	74.8	9.5	5.95	.51	82
58	20	241.59	23.2	49.1	97.4	109.1	135.4	149.88	.62	78
59	20	1.12	21.0	44.8	64.2	78.3	.9	.49	.44	83
60	20	2.79	21.8	52.1	71.1	88.2	1.9	1.22	.44	84
61	20	590.31	32.3	59.5	63.7	87.2	413.8	1315.98	2.23	85
62	20	1.12	26.6	17.7	12.3	21.9	3.1	1.20	1.87	95
63	20	4.59	22.0	88.8	114.3	145.3	1.9	2.37	.52	87
64	20	1.27	28.6	17.3	10.4	20.1	3.3	1.83	1.44	-96
65	20	85.83	29.1	100.4	109.1	147.5	35.6	125.63	1.46	-98
66	20	3.30	33.8	36.1	-6.3	36.8	6.3	10.53	2.77	99
1	40	13.52	43.1	-124.7	-49.5	134.2	6.2			18
2	40	13.01	41.7	-101.3	-36.3	107.8	7.4			18
3	40	3.99	41.5	-130.0	-48.3	138.6	1.8			18
4	40	33.70	47.2	-134.3	-46.4	142.1	13.2			18
5	40	2.19	41.0	-133.2	-36.3	138.2	1.0			18
6	40	2.11	42.8	-142.8	-36.7	146.7	.9			18
7	40	2.59	46.1	-33.2	8.9	34.4	4.6			35
8	40	184.75	46.3	-27.6	20.4	34.3	186.7			36
9	40	33.51	43.0	-15.5	28.5	32.6	62.9			36
10	40	16.50	42.9	55.3	60.7	82.1	12.5			85

WIND DATA

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1933	40	1.2	118.2	118.2

HEIGHT (KM)	AVERAGE REFLECTIVITY (DBZ)	TOTAL REFLECTIVITY (DBZ.KM**2)	AVERAGE U (M/SEC)	AVERAGE V (M/SEC)	VELOCITY VARIANCE (M/SEC)**2)	DEL
1	22.0	67.3	0.0	0.0	112.4	-.44409E-15
2	27.1	9200.0	12.6	-10.1	60.3	.57497E+00
3	35.0	671779.4	5.1	-10.1	61.0	.39223E+01
4	31.0	219615.2	-38.6	26.4	76.6	.21589E-01
5	23.4	21683.5	-5.0	-8.5	69.9	.80601E+01
6	28.1	75385.5	-7.1	-7.9	91.0	.54502E+00

PEAK DETECTED CELL ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1933	40	1.2	118.2	118.2

ID	REFLECTIVITY (DBZ)	AREA (KM**2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	AVERAGE VELOCITY SPREAD (M/S)	AVERAGE RADIAL SHEAR (M/S/KM)	AVERAGE TANGENTIAL SHEAR (M/S/KM)	AVERAGE RADIAL VELOCITY (M/S)	MEAN FIXED CONTOUR REFERENCE
1	32.5	4.8	-110.9	-44.6	119.5	2.8	1.93	-.27	.06	-4.64	18
2	44.0	6.9	-124.3	-48.8	133.6	3.2	2.45	-.21	.20	-3.13	18
3	51.5	4.5	-135.2	-47.9	143.4	1.9	1.94	-.27	-1.35	-4.10	18
4	41.6	13.0	-101.3	-36.8	107.7	7.4	1.60	-.32	.09	-3.46	18
5	48.0	2.4	-131.9	-44.3	139.2	1.1	1.83	-.64	.20	-4.50	18
6	37.6	1.8	-35.1	-11.8	37.0	3.0	1.34	.14	0.00	0.00	19
7	40.0	8.3	-132.6	-35.6	137.3	3.7	2.07	.38	.51	-1.78	18
8	41.0	4.2	-142.4	-36.9	147.1	1.8	1.58	.16	.45	.35	18
9	37.8	5.6	-139.3	-34.5	143.5	2.8	1.90	.34	.28	-.41	18
10	33.5	5.8	-143.2	-29.6	146.2	2.1	.92	-.64	-.05	-2.35	18
11	30.1	14.6	-129.4	-23.7	131.5	6.8	1.81	.01	.13	-3.17	18
12	25.0	2.1	-134.5	2.5	134.5	1.0	0.00	1.92	0.00	0.00	31
13	32.9	2.7	-132.4	6.9	132.6	1.2	.50	.11	0.00	-2.30	31
14	27.0	3.6	-102.6	24.4	105.4	2.1	.33	-.37	.90	-2.50	36
15	27.5	35.1	-68.1	14.6	69.6	31.7	1.20	-.15	-.02	-3.45	34
16	22.6	9.4	-136.7	40.0	142.4	4.0	.75	.02	.55	-1.15	42
17	24.8	2.8	-133.4	39.8	139.2	1.2	.17	0.00	0.00	-.50	43
18	49.5	1.6	-35.6	13.2	38.0	2.5	2.20	-1.02	.45	-3.69	36
19	48.0	1.3	-34.4	15.4	37.7	3.2	1.54	.44	-.14	-2.79	36
20	49.6	9.8	-26.0	20.0	33.5	17.8	1.74	-.95	-.13	-.26	36
21	27.4	2.1	-51.3	51.4	72.6	1.8	.49	0.00	0.00	0.00	48
22	50.0	1.7	-23.2	25.6	34.5	3.1	1.50	-1.81	-.22	-3.43	36
23	27.0	6.3	-74.2	125.5	145.7	2.9	.61	.39	-.07	-9.03	53
24	24.5	3.7	-49.4	88.9	101.7	2.2	.08	0.00	-.19	-9.73	55
25	24.0	1.4	-39.5	79.3	88.6	1.0	.67	0.00	-.20	-9.80	54
26	46.0	1.6	-12.3	30.6	33.0	3.0	.78	-.64	-.17	-9.92	36
27	38.0	2.4	-28.0	70.6	75.3	1.3	.92	.18	-.40	-10.25	55
28	38.4	4.8	-32.9	88.9	94.8	3.1	1.21	-.63	.04	-10.16	57
29	29.5	1.1	-8.7	32.1	33.3	1.9	1.08	-.27	0.00	-11.40	36
30	25.5	2.4	-10.1	36.6	38.0	3.9	.75	-.16	-.10	-12.13	36
31	24.3	6.0	-16.3	93.0	94.4	3.3	.38	.08	.03	-11.57	65
32	22.0	5.7	-14.5	89.8	90.9	3.9	.29	-.32	.12	-11.35	66
33	28.3	9.4	-5.6	40.3	40.7	14.2	1.05	.05	-.10	-12.74	62
34	25.9	6.0	-4.5	40.2	40.5	9.1	1.37	.02	-.05	-12.23	62
35	28.0	1.1	13.4	39.5	41.7	1.7	1.65	-.51	-1.31	-15.13	73
36	25.5	13.4	49.0	106.2	116.9	7.2	.68	.13	-.00	-6.93	78
37	26.8	7.3	43.7	87.4	97.7	4.6	1.35	.31	-.10	-6.61	78
38	24.8	6.3	47.8	91.8	103.5	3.7	1.35	-.22	.12	-7.23	76
39	21.6	12.5	39.7	71.8	82.1	9.3	1.61	1.60	.66	1.21	81
40	25.8	22.4	54.7	97.0	111.4	12.3	1.26	-.04	-.01	-7.06	78
41	21.9	11.6	37.2	64.9	74.8	9.5	1.13	3.43	-.36	1.42	82
42	37.0	1.1	48.7	56.4	74.5	.9	1.67	-.53	-1.00	2.40	85
43	37.5	6.9	45.1	53.7	70.2	6.0	1.67	5.12	.97	-6.13	85
44	43.8	7.7	54.5	60.4	81.3	5.8	2.19	-1.49	.23	-2.70	65
45	38.0	2.3	101.9	106.7	147.6	1.0	2.63	-.11	-.30	-11.70	90
46	25.5	3.9	88.5	86.4	123.7	1.9	1.83	-.74	-.30	-9.15	85
47	39.5	6.3	71.3	68.5	98.9	3.9	2.79	1.09	.60	-7.37	85
48	22.9	29.7	97.0	93.0	134.4	13.5	1.56	-.55	.44	-11.67	85

.62 0 PROGRAM EXTRAD VERSION 2.3 (780501) 05/04/78 PAGE 6

TANGENTIAL SHEAR MAXIMA ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1933	40	1.2	118.2	118.2

ID	MAGNITUDE SHEAR (M/S/KM)	AREA (KM**2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	AVERAGE VELOCITY SPREAD (M/S)	AVERAGE SHEAR (M/S/KM)	FIXED CONTOUR REFERENCE
1	.7	2.3	-132.0	-57.1	143.3	1.0	1.0	.7	18
2	1.6	2.1	-125.2	-51.6	135.4	1.0	2.3	1.6	18
3	1.8	4.4	-126.9	-53.6	137.7	1.9	2.4	-1.8	18
4	1.5	1.9	-111.3	-45.9	120.4	1.0	1.8	1.5	18
5	1.8	6.8	-129.5	-53.4	140.1	3.0	2.7	.5	18
6	2.6	1.6	-101.5	-37.7	108.2	.9	1.3	-2.6	18
7	2.7	1.6	-105.8	-39.0	112.0	.9	2.0	-2.7	18
8	2.4	3.3	-107.2	-39.9	114.4	1.8	2.0	-.1	18
9	1.0	3.6	-117.7	-43.8	125.5	1.8	.5	1.0	18
10	.5	9.4	-97.6	-35.4	103.3	5.5	1.2	.5	18
11	2.0	2.2	-132.9	-47.1	141.0	1.0	1.8	2.0	18
12	1.2	4.7	-128.0	-42.9	135.0	2.1	1.5	1.2	18
13	1.5	1.7	-102.3	-32.3	107.3	1.0	1.2	1.5	18
14	.5	1.6	-95.2	-30.0	99.3	1.0	2.3	.5	18
15	1.9	2.2	-134.5	-42.4	141.0	1.0	3.2	1.9	18
16	2.2	1.8	-100.2	-29.7	104.5	1.1	0.0	2.2	18
17	1.1	2.3	-129.8	-38.5	135.4	1.1	2.3	-1.1	18
18	1.3	4.4	-134.6	-37.3	139.7	1.9	2.5	1.3	18
19	1.9	1.5	-90.8	-25.1	94.2	1.0	0.8	1.9	18
20	1.1	2.1	-139.3	-36.0	143.9	.9	1.7	1.1	18
21	.8	2.3	-142.2	-31.9	145.7	1.0	2.7	-.8	18
22	.3	11.7	-137.4	-29.1	140.5	5.1	1.5	.3	18
23	.8	2.0	-124.8	-23.4	127.0	1.0	1.5	.8	18
24	.9	4.6	-143.7	-27.0	146.2	1.9	0.0	.9	18
25	.5	7.8	-131.4	-20.6	133.0	3.6	2.5	.5	18
26	.9	2.2	-128.6	-17.7	129.9	1.1	0.0	.9	18
27	.9	2.2	-125.8	-17.3	127.0	1.1	0.0	.9	18
28	.5	4.0	-66.1	3.4	66.2	3.7	1.7	.5	34
29	1.0	6.2	-131.4	9.7	131.7	2.9	0.0	1.0	31
30	.4	3.1	-69.2	5.4	69.4	2.7	1.4	.2	34
31	.3	3.4	-60.4	5.4	60.5	3.4	1.7	-.2	34
32	.4	6.7	-67.5	8.8	68.0	6.0	1.4	-.3	34
33	.8	1.0	-57.3	10.0	58.2	1.1	1.8	.8	34
34	.3	2.0	-75.4	13.2	76.5	1.6	1.3	.3	34
35	.3	3.2	-68.9	12.6	70.1	2.8	1.1	-.2	34
36	.9	1.0	-57.8	14.3	59.5	1.1	1.7	.9	34
37	1.8	1.8	-102.4	25.3	105.4	1.1	.7	1.8	38
38	.3	12.3	-67.4	18.0	69.9	10.7	1.3	-.3	34
39	.9	5.7	-136.5	40.7	142.4	2.5	0.0	.9	42
40	.6	2.0	-76.2	76.9	108.2	1.1	.3	-.6	49
41	.3	4.7	-76.5	127.7	148.9	1.9	.3	-.3	53
42	1.1	1.1	-17.2	29.0	33.7	1.9	.4	-1.1	36
43	.2	7.7	-72.4	126.0	145.3	3.3	.7	-.2	53
44	.4	3.5	-48.3	89.8	101.2	2.1	.5	-.4	55
45	.5	2.7	-19.5	37.6	42.3	3.9	.8	-.5	36
46	.6	2.4	-27.6	69.7	75.0	1.9	1.1	-.6	59
47	.7	1.6	-32.9	87.2	93.2	1.1	.8	.7	57
48	.5	1.5	-30.1	89.2	94.2	1.0	.8	-.5	57
49	.2	7.3	-23.7	72.8	76.5	5.8	1.5	-.2	59
50	.5	1.4	-13.7	89.4	90.4	1.8	0.8	.5	66

51	.4	1.0	-7.6	64.7	65.1	1.0	1.0	-.4	64
52	.6	1.4	-.4	41.2	41.2	2.1	.8	-.6	62
53	.8	2.1	.1	34.8	34.9	3.7	1.7	-.8	62
54	2.4	1.7	39.0	91.9	99.8	1.1	0.0	-2.4	78
55	1.6	1.8	39.8	93.6	101.7	1.1	.5	-1.6	78
56	.9	1.5	42.3	94.5	103.6	.9	1.3	-.9	78
57	1.5	1.6	46.1	103.1	112.9	.9	.5	-1.5	78
58	.8	3.4	48.6	95.1	106.3	1.9	1.0	-.8	78
59	.8	1.4	47.6	88.9	100.7	.9	1.3	-.8	78
60	.9	1.7	56.6	106.3	120.4	.9	.7	-.9	78
61	.9	3.6	54.6	104.7	118.1	1.8	1.0	-.9	78
62	2.1	2.9	44.6	85.6	96.5	1.8	1.3	-2.1	78
63	3.1	1.4	39.6	71.8	82.9	1.1	1.5	3.1	81
64	1.1	2.1	53.1	92.1	106.4	1.2	.2	-1.1	78
65	2.7	1.3	56.6	93.4	109.2	.7	0.0	-2.7	78
66	2.5	1.3	57.5	95.0	111.1	.7	0.0	-2.5	78
67	3.3	1.1	48.1	50.1	64.2	1.1	2.7	-3.3	85
68	3.6	1.3	46.0	57.4	73.6	1.1	1.7	3.6	85
69	2.9	1.1	38.9	48.7	62.5	1.1	0.0	2.9	85
70	2.8	1.4	52.4	63.1	82.0	1.1	2.7	-2.8	85
71	3.4	1.3	48.2	58.0	75.4	1.1	1.7	-3.4	85
72	3.9	1.0	45.6	52.9	69.3	.9	2.0	-3.9	85
73	1.2	1.6	55.8	62.7	83.3	1.1	1.3	-1.2	85
74	.7	5.4	96.5	108.5	145.2	2.3	1.8	-.7	90
75	.9	2.7	64.3	69.4	94.5	1.8	2.5	-.9	85
76	4.4	1.0	48.1	51.9	70.9	.9	0.0	4.4	85
77	1.2	2.9	68.1	73.6	100.3	1.8	1.5	-1.2	85
78	1.2	1.1	50.6	54.7	74.5	.9	2.2	1.2	85
79	1.0	1.5	69.7	75.3	102.5	.9	1.0	-1.0	85
80	3.5	1.3	56.6	59.3	82.1	1.0	2.3	3.5	85
81	.5	6.7	61.5	65.6	90.1	4.6	1.2	-.5	85
82	3.1	1.3	55.0	55.7	78.3	1.1	0.0	-3.1	85
83	2.8	1.3	53.7	54.3	76.4	1.1	1.0	-2.8	85
84	1.1	3.2	67.6	69.5	97.0	2.0	2.8	-1.1	85
85	2.9	1.3	60.7	59.2	84.5	1.0	1.0	-2.9	85
86	1.1	1.7	76.1	74.3	106.4	1.0	2.5	1.1	85
87	1.1	5.6	84.9	82.8	118.5	2.9	.9	-1.1	85
88	1.8	1.4	63.7	60.1	87.5	1.0	.8	-1.8	85
89	1.5	1.5	67.8	64.0	93.2	1.0	0.0	-1.5	85
90	1.8	4.0	92.0	86.8	126.5	1.9	0.0	-1.8	85
91	1.9	2.0	93.7	88.4	128.9	1.0	0.0	-1.9	85
92	1.7	2.1	96.5	91.0	132.6	1.0	0.0	1.7	85
93	1.7	2.2	99.2	93.6	136.4	1.0	1.0	1.7	85
94	2.8	1.6	75.8	69.1	102.6	1.0	2.3	-2.8	85
95	2.3	1.6	73.1	66.6	98.3	1.0	1.0	-2.3	85

VELOCITY SPREAD MAXIMA ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1933	40	1.2	118.2	118.2

ID	SPREAD (M/S)	AREA (KM2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	FIXED CONTOUR REFERENCE
1	1.2	1.6	14.1	-19.3	23.9	4.0	5
2	.7	1.5	-36.1	-51.4	62.8	1.6	9
3	.9	2.8	-38.5	-53.7	66.0	2.5	9
4	1.3	2.5	-131.9	-68.2	148.5	1.1	13
5	2.2	1.9	-122.4	-57.9	135.4	.9	18
6	1.5	4.5	-117.7	-53.5	129.3	2.1	18
7	2.9	8.9	-129.0	-55.8	140.5	3.9	18
8	1.8	2.0	-115.7	-50.0	126.0	1.0	18
9	2.2	1.8	-103.5	-42.7	112.0	1.0	18
10	1.3	1.5	-98.1	-38.6	105.4	1.1	18
11	2.8	9.3	-131.6	-51.1	141.2	4.0	18
12	2.8	3.3	-108.0	-48.2	115.3	1.8	18
13	2.4	13.9	-112.8	-43.7	121.0	7.0	18
14	2.1	14.5	-95.8	-30.8	100.6	8.8	18
15	3.1	6.6	-133.6	-42.1	140.1	2.9	18
16	2.3	17.5	-101.7	-34.5	107.4	10.0	18
17	2.8	21.6	-136.8	-45.9	144.3	9.1	18
18	1.8	1.8	-34.7	-10.7	36.4	3.0	19
19	2.7	4.6	-139.1	-38.5	144.3	1.9	18
20	1.6	7.5	-123.7	-31.5	127.6	3.6	18
21	2.6	19.2	-132.4	-30.7	135.9	8.6	18
22	2.6	15.2	-141.0	-32.3	144.6	6.9	18
23	2.7	5.7	-130.2	-19.9	131.7	2.6	18
24	1.9	1.9	-37.0	-2.6	37.1	3.1	25
25	2.2	6.3	-133.1	4.0	133.2	2.9	31
26	1.3	2.5	-130.6	6.8	130.7	1.2	31
27	1.7	4.7	-67.1	8.1	67.6	4.2	34
28	1.7	2.1	-54.5	11.7	55.8	2.3	37
29	.6	5.5	-103.1	24.9	106.0	3.2	38
30	1.6	4.5	-74.8	19.3	77.2	3.8	34
31	.8	1.7	-124.0	35.1	128.9	.8	41
32	1.9	3.7	-137.1	38.6	142.5	1.6	42
33	2.7	1.1	-37.2	13.0	39.4	1.7	36
34	1.4	5.5	-69.3	24.7	73.5	4.7	34
35	1.1	1.1	-26.7	12.6	29.5	2.2	45
36	1.9	6.9	-33.6	17.1	37.7	11.2	36
37	2.5	3.5	-30.6	20.5	37.0	5.8	36
38	1.2	2.2	-83.2	73.6	111.1	1.2	47
39	1.1	2.2	-76.7	75.7	107.7	1.2	49
40	.7	1.4	-51.1	51.6	72.6	1.1	48
41	2.3	1.3	-21.9	25.7	33.8	2.3	36
42	2.0	2.6	-18.7	24.8	31.0	5.2	36
43	2.2	7.0	-76.8	125.0	146.7	2.9	53
44	1.6	3.0	-15.5	25.4	29.8	6.2	35
45	1.0	1.7	-46.0	88.6	100.7	1.1	55
46	.7	1.4	-39.5	79.3	88.6	1.0	54
47	.7	1.2	-36.0	78.9	86.7	.9	58
48	2.0	3.3	-12.1	27.4	29.9	6.8	36
49	1.2	2.6	-30.5	71.1	77.3	2.0	59
50	1.8	3.1	-35.0	65.9	92.8	2.0	57
51	1.7	7.5	-31.5	82.8	88.5	5.2	57

52	1.4	7.4	-24.0	63.2	67.6	6.7	60
53	1.6	4.5	-9.9	30.3	31.9	8.7	36
54	1.7	9.7	-24.4	73.1	77.0	7.7	59
55	1.7	1.0	-8.1	30.8	31.8	1.9	36
56	.6	2.9	-14.5	90.2	91.4	1.9	66
57	2.2	1.5	-14.3	93.1	94.2	1.0	65
58	1.8	1.0	-7.6	64.7	65.1	1.0	64
59	1.3	6.4	-8.5	62.6	63.2	8.1	64
60	1.3	2.0	-3.4	63.2	63.3	1.9	67
61	1.7	1.2	-.4	23.6	23.6	3.1	68
62	2.0	1.1	.3	25.7	25.7	2.7	69
63	1.9	3.0	3.8	22.5	22.8	6.0	70
64	2.4	1.8	12.1	39.7	40.5	2.7	73
65	.9	4.5	17.7	54.8	57.5	4.7	74
66	.7	1.4	37.6	92.4	99.8	.9	78
67	.9	1.7	36.3	90.1	97.9	1.1	76
68	1.7	5.9	44.5	104.7	113.8	3.2	78
69	1.8	1.4	38.8	86.8	95.1	.9	78
70	1.7	1.7	48.8	109.1	119.5	.9	78
71	1.8	3.4	52.1	106.0	118.1	1.6	78
72	1.5	5.6	49.2	104.5	115.5	4.6	78
73	1.9	7.8	45.0	88.0	98.9	4.8	78
74	2.2	3.0	48.4	91.0	103.1	1.8	78
75	2.3	3.1	40.9	72.2	82.9	2.3	81
76	1.7	25.3	52.9	98.2	111.5	13.9	78
77	1.7	3.3	38.5	65.1	75.7	2.6	82
78	1.0	1.1	44.8	64.2	78.3	.9	83
79	1.0	2.8	52.2	71.0	88.1	1.9	84
80	3.0	1.1	42.1	54.5	68.9	1.0	85
81	3.0	2.1	40.1	50.8	64.7	2.0	85
82	2.9	12.7	96.1	111.4	147.1	5.3	90
83	2.6	12.4	51.2	62.0	80.5	9.4	85
84	1.9	3.9	68.5	77.0	103.1	2.3	85
85	2.7	2.6	57.6	60.3	83.4	1.9	85
86	2.5	2.3	100.0	104.7	144.8	1.0	90
87	2.4	12.6	85.7	86.7	121.9	6.3	85
88	2.8	4.9	73.4	71.7	102.6	2.9	85
89	2.9	8.4	94.6	92.3	132.1	3.9	85
90	2.5	2.0	90.9	88.7	127.0	1.0	85
91	2.5	2.0	92.2	90.0	126.9	1.0	85

TOTAL IDD= 101 15 29 28

EOF READ ON UNIT 1

NO OF RECORDS/RADIAL 4 CELL WIDTH 937.2 METERS PRF 794.0

TOTAL IDD= 1 1 1 1

NO OF RECORDS/RADIAL 4 CELL WIDTH 937.2 METERS PRF 794.0

FIXED CONTOUR ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1934	38	6.1	160.1	111.0

ID	THRESHOLD (DBZ)	AREA (KM**2)	AVERAGE REFLECTIVITY (DBZ)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	TOTAL PRECIP (TONS/HR)	AVERAGE PRECIP (MM/HR)	FIXED CONTOR REFERENCE
1	20	17.32	21.4	-31.0	-50.1	59.0	18.0			1
2	20	2.94	21.0	-34.6	-45.0	56.8	3.2			3
3	20	1.10	21.0	-50.7	6.0	51.1	1.3			4
4	20	542.48	43.0	-25.8	21.2	33.3	1005.8			7
5	20	31.69	22.1	1.6	22.3	22.3	86.8			-1(
6	20	1.16	21.0	-3.5	66.3	67.0	1.1			15
7	20	12.57	21.1	-6.9	67.0	67.4	11.4			12
8	20	1.47	21.5	-4.1	42.4	42.6	2.1			13
9	20	11.22	21.1	-1.9	64.0	64.0	10.7			14
10	20	15.17	21.9	6.1	47.4	47.8	20.7			17
11	20	1.50	21.5	6.4	25.1	25.9	3.5			18
12	20	2.61	21.3	10.2	20.3	22.7	7.0			20
13	20	11.93	22.9	22.0	43.5	48.9	14.9			21
14	20	2.19	21.8	14.5	21.9	26.2	5.1			23
15	20	111.17	28.3	70.4	67.9	97.8	69.5			27
16	20	20.35	22.3	65.4	75.7	100.3	12.4			28
17	20	341.36	34.3	44.9	53.3	70.1	297.8			26
18	20	1.05	21.0	22.2	20.9	30.5	2.1			33
19	20	15.07	22.7	34.9	38.5	52.1	17.7			30
20	20	2.13	22.0	98.8	91.2	134.5	1.0			34
21	20	87.00	26.6	73.9	76.3	108.0	49.2			32
1	40	148.21	48.1	-27.0	20.1	33.6	269.5			7
2	40	11.12	46.0	-10.9	31.4	33.2	20.4			7
3	40	9.74	45.8	41.0	50.1	64.8	9.2			28

WIND DATA

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1934	38	6.1	160.1	111.0

HEIGHT (KM)	AVERAGE REFLECTIVITY (DBZ)	TOTAL REFLECTIVITY (DBZ.KM**2)	AVERAGE U (M/SEC)	AVERAGE V (M/SEC)	VELOCITY VARIANCE (M/SEC)**2)	DEL
4	22.0	78.7	0.0	0.0	.1	-.88818E-15
5	21.5	209.2	-2.7	-7.1	4.8	.76765E-01
7	21.6	1151.1	0.0	1.6	.3	-.35527E-14
9	33.3	25*537.7	6.4	0.0	11.2	-.35527E-14

PEAK DETECTED CELL ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1934	38	6.1	160.1	111.0

ID	REFLECTIVITY (DBZ)	AREA (KM**2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	AVERAGE VELOCITY SPREAD (M/S)	AVERAGE RADIAL SHEAR (M/S/KM)	AVERAGE TANGENTIAL SHEAR (M/S/KM)	AVERAGE RADIAL VELOCITY (M/S)	MEAN FIXED CONTOUR REFERENCE
1	21.4	16.4	-31.1	-50.2	59.0	16.9	1.41	-.09	-.76	-2.13	1
2	53.9	4.3	-32.9	16.0	36.6	5.3	2.15	-1.55	-.03	-.29	7
3	33.0	2.8	-35.4	22.9	42.2	4.0	1.20	.02	-.45	-2.23	7
4	32.3	2.3	-32.6	24.0	40.4	3.5	1.12	-.42	-.13	-3.56	7
5	54.5	3.6	-25.2	21.7	33.3	6.7	2.01	1.74	-.03	2.33	7
6	52.0	2.0	-19.5	24.0	30.9	3.9	1.59	-2.02	2.29	.50	7
7	50.0	1.9	-16.2	21.8	27.2	4.3	1.05	-.58	-.40	.29	7
8	49.0	1.6	-10.3	31.6	33.3	3.0	1.94	-6.07	-.49	-7.89	7
9	22.8	2.2	3.3	47.9	48.0	2.8	.95	-.27	-.26	-4.00	17
10	21.4	1.5	6.4	25.2	26.0	3.5	.78	-.06	-.12	-5.73	1c
11	22.5	18.9	2.1	22.5	22.6	51.0	1.11	-.37	-.33	-3.12	10
12	23.7	5.6	21.9	43.5	48.7	7.0	.92	-.08	.00	1.38	21
13	21.7	2.2	14.4	21.9	26.3	5.1	.88	0.00	-.11	2.13	23
14	49.1	1.8	40.3	50.0	64.2	1.8	2.59	1.01	-.28	2.77	26
15	39.0	2.8	52.6	62.3	81.5	2.1	2.67	-1.61	1.05	6.99	26
16	24.9	6.8	60.6	70.4	92.9	4.5	2.04	-.57	-.75	5.83	27
17	23.6	5.7	66.0	74.3	99.3	3.5	1.55	2.14	-.81	6.47	28
18	23.6	8.3	34.5	38.2	51.5	9.8	.77	.00	-.10	-.76	30
19	33.6	6.3	48.5	51.3	70.6	5.4	2.20	.31	.78	.53	26
20	31.3	7.6	75.4	77.4	108.1	4.4	2.71	1.49	.59	2.30	32
21	32.7	9.9	58.3	56.8	81.4	7.5	1.20	.04	-.31	.32	26
22	35.8	8.3	70.6	68.2	98.1	5.2	2.94	.41	.67	6.18	27

TANGENTIAL SHEAR MAXIMA ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1934	38	5.1	168.1	111.0

ID	MAGNITUDE SHEAR (M/S/KM)	AREA (KM**2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	AVERAGE VELOCITY SPREAD (M/S)	AVERAGE SHEAR (M/S/KM)	FIXED CONTOUR REFERENCE
1	3.2	1.5	-31.1	-48.0	57.2	1.6	2.1	-3.2	1
2	1.4	1.0	-25.5	25.5	36.1	1.8	1.1	-1.4	7
3	.9	2.5	-15.5	36.7	39.9	3.9	.9	-.9	7
4	.5	1.4	-10.9	26.2	28.3	3.0	.8	-.5	7
5	1.9	2.1	-12.2	30.7	33.0	4.0	1.2	-.9	7
6	.7	1.8	-9.4	26.5	28.2	3.9	.7	-.7	7
7	1.1	1.3	-12.8	39.2	41.2	1.9	1.2	-1.1	7
8	.6	1.5	-6.2	28.3	29.0	3.1	1.1	-.6	7
9	1.7	1.2	-6.5	36.9	37.5	1.9	1.5	-1.7	7
10	1.7	1.8	-4.6	37.7	38.0	2.9	1.3	-1.7	7
11	.4	1.2	-5.1	69.6	69.9	1.1	1.0	-.4	12
12	.2	2.3	-6.2	66.7	67.0	2.1	1.4	-.2	12
13	.8	1.2	-1.2	63.2	63.3	1.1	.7	-.8	14
14	.4	3.2	-.8	64.8	64.9	3.0	1.0	-.4	14
15	.9	1.1	1.2	22.9	22.9	3.0	1.2	-.9	10
16	.8	1.1	2.4	22.3	22.4	3.0	1.3	-.8	10
17	.3	1.7	4.7	24.0	24.5	4.2	1.0	-.3	10
18	1.5	1.1	48.7	65.9	62.0	.6	1.6	-1.5	26
19	.9	1.2	39.4	51.6	65.1	1.1	2.3	.9	26
20	3.2	1.1	50.9	64.3	82.0	.8	2.3	3.2	26
21	3.4	1.1	42.6	50.5	66.1	1.1	2.2	-3.4	26
22	1.6	1.8	66.2	78.4	102.6	1.1	2.7	1.6	26
23	3.5	1.1	65.2	74.4	98.3	.7	.8	-3.5	28
24	2.3	1.8	52.5	59.9	79.7	1.4	2.5	.1	26
25	3.0	1.2	70.7	80.7	107.3	.7	1.8	-3.0	32
26	2.6	1.9	72.9	81.2	109.2	1.1	3.0	2.6	32
27	1.7	3.0	48.9	55.2	73.7	2.5	2.2	-1.7	26
28	1.2	1.5	56.7	63.1	84.9	1.1	2.3	1.2	26
29	3.0	1.6	62.3	69.4	93.2	1.1	2.2	-3.0	27
30	2.5	1.9	77.0	82.6	112.9	1.1	3.0	-2.5	32
31	1.0	2.8	56.2	60.3	82.4	2.1	2.1	-1.0	26
32	1.4	1.4	53.1	54.9	76.4	1.1	2.0	-1.4	26
33	.9	1.8	66.1	68.4	95.1	1.1	2.8	-.9	27
34	.8	3.8	57.6	57.2	81.1	2.9	1.1	-.8	26
35	.9	1.3	60.2	59.8	84.9	1.0	1.5	-.9	26
36	1.8	3.7	76.5	74.6	106.9	2.1	1.1	-1.8	32
37	.9	1.3	61.6	56.9	83.9	1.0	1.6	-.9	26
38	1.9	1.6	73.3	67.7	99.9	1.0	2.9	-1.9	27
39	.3	5.1	59.7	54.8	81.1	3.9	1.4	.3	26
40	3.1	1.5	73.1	65.2	97.9	1.0	2.6	3.1	27
41	.8	1.6	77.0	66.4	101.7	1.0	2.7	-.6	27
42	.7	1.6	76.7	63.9	99.9	1.0	2.2	.7	27

162 0 PROGRAM EXTRAD VERSION 2.0 (780501) 05/04/78 PAGE 12

VELOCITY SPREAD MAXIMA ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1334	36	6.1	160.1	111.0

ID	SPREAD (M/S)	AREA (KM2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	FIXED CONTOUR REFERENCE
1	2.0	6.2	-30.7	-49.1	57.9	6.5	1
2	2.2	1.1	-34.3	-46.3	57.6	1.1	3
3	1.2	1.1	-50.7	6.0	51.1	1.3	4
4	2.4	3.5	-33.8	13.9	36.5	6.0	7
5	2.7	3.8	-32.2	19.0	37.4	6.2	7
6	2.2	3.5	-27.6	17.6	32.7	6.8	7
7	2.4	2.7	-28.5	21.0	35.4	4.7	7
8	1.4	6.3	-34.7	24.3	42.4	9.1	7
9	2.2	1.1	-25.1	21.9	33.3	2.1	7
10	1.8	4.5	-25.6	28.9	35.5	7.8	7
11	2.6	1.1	-15.7	29.3	33.3	2.0	7
12	2.3	1.1	-14.2	30.1	33.3	1.9	7
13	1.2	2.3	-16.5	40.9	44.1	4.0	7
14	1.9	3.2	-10.4	31.8	33.4	5.9	7
15	2.1	1.1	-7.9	32.3	33.3	1.9	7
16	1.5	7.3	-5.6	36.1	36.5	12.1	7
17	1.1	1.5	-4.1	42.4	42.6	2.1	13
18	1.3	1.2	-3.5	66.9	67.0	1.1	15
19	1.2	11.7	-3.4	30.6	30.6	23.2	7
20	1.4	5.4	-.5	23.7	23.8	13.8	10
21	1.1	2.2	2.8	47.8	47.9	2.8	17
22	1.2	3.4	7.3	47.4	48.0	12.0	17
23	.8	1.5	6.3	25.1	25.9	3.5	19
24	1.1	7.3	22.5	43.5	48.9	9.8	21
25	1.0	1.6	10.4	20.3	22.8	4.3	20
26	.9	2.2	14.5	22.0	26.3	5.1	23
27	2.7	4.6	50.2	66.0	83.0	3.4	26
28	2.5	3.7	43.9	56.3	71.4	2.7	26
29	2.7	1.8	66.2	78.4	102.6	1.1	28
30	3.0	1.8	68.6	81.3	106.4	1.1	32
31	2.6	10.0	42.3	50.3	65.7	9.3	25
32	2.2	3.5	67.0	74.6	100.3	2.1	28
33	2.6	11.6	53.5	61.5	81.5	8.7	26
34	.9	3.5	37.1	39.9	54.4	4.0	30
35	3.0	33.4	75.3	80.3	110.1	16.5	32
36	.8	1.1	22.2	20.9	30.5	2.1	33
37	2.9	16.3	71.2	67.4	98.0	10.2	27

TOTAL IDD= 36 11 16 17

EOF READ ON UNIT 1

NO OF RECORDS/RADIAL 4 CELL WIDTH 937.2 METERS PRF 794.0

FIXED CONTOUR ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1935	38	7.0	115.0	115.0

ID	THRESHOLD (DBZ)	AREA (KM**2)	AVERAGE REFLECTIVITY (DBZ)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	TOTAL PRECIP (TONS/HR)	AVERAGE PRECIP (MM/HR)	FIXED CONTOR REFERENCE
1	20	2.29	21.0	-27.7	-47.3	54.9	2.5			1
2	20	575.39	42.5	-24.9	21.3	32.7	1074.8			7
3	20	1.44	22.0	-3.3	38.3	38.4	2.3			9
4	20	1.27	21.0	-24.3	-32.1	40.3	1.9			5
5	20	2.04	21.5	.6	20.3	20.3	6.2			-11
6	20	23.35	23.6	15.3	22.2	27.0	53.8			19
7	20	11.33	22.1	4.5	46.9	47.0	14.7			13
8	20	14.93	23.0	22.8	42.3	48.1	19.0			20
9	20	18.75	22.1	8.9	45.4	46.2	24.6			16
10	20	4.51	22.6	26.2	38.3	45.9	5.7			21
11	20	31.19	23.1	5.1	24.3	24.8	76.7			-18
12	20	144.52	33.0	44.2	53.3	69.3	127.5			22
13	20	61.71	25.9	55.2	60.9	82.1	46.0			23
14	20	4.35	22.6	35.5	37.0	52.3	5.2			25
15	20	1.72	21.0	38.2	39.7	54.4	1.9			26
1	40	144.10	48.0	-25.9	20.1	32.8	268.5			7
2	40	8.66	45.9	-10.4	31.5	33.2	15.9			7
3	40	2.53	44.6	42.1	58.3	65.6	2.5			22

WIND DATA

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1935	38	7.3	115.0	115.0

HEIGHT (KM)	AVERAGE REFLECTIVITY (DBZ)	TOTAL REFLECTIVITY (DBZ.KM**2)	AVERAGE U (M/SEC)	AVERAGE V (M/SEC)	VELOCITY VARIANCE (M/SEC)**2)	DEL
5	21.8	1037.8	3.2	0.0	1.5	-.85819E-15
6	22.8	554.5	1.5	-4.3	11.8	.59763E-01
7	21.0	216.4	0.0	1.6	1.1	-.88818E-15
10	31.2	122873.5	215.6	-155.9	27.6	.34153E-02

PEAK DETECTED CELL ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1935	38	7.0	115.0	115.0

ID	REFLECTIVITY (DBZ)	AREA (KM**2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	AVERAGE VELOCITY SPREAD (M/S)	AVERAGE RADIAL SHEAR (M/S/KM)	AVERAGE TANGENTIAL SHEAR (M/S/KM)	AVERAGE RADIAL VELOCITY (M/S)	MEAN FIXED CONTOUR REFERENCE
1	52.7	3.1	-32.3	13.0	34.6	5.4	2.21	-.34	-.50	-2.06	7
2	52.4	2.0	-32.0	18.6	37.0	3.3	2.33	-1.32	.36	.23	7
3	52.0	6.2	-25.8	18.6	32.6	11.5	2.20	2.12	-1.07	-.53	7
4	54.5	2.0	-24.1	21.6	32.3	3.8	1.72	2.38	1.43	2.06	7
5	50.4	3.6	-18.8	24.6	31.0	7.1	1.71	.85	1.27	1.93	7
6	50.0	1.1	-11.1	31.4	33.3	2.0	1.43	2.21	.41	1.44	7
7	22.7	6.9	4.6	47.0	47.2	8.9	.98	-.19	-.29	-4.28	13
8	22.1	18.7	8.8	45.3	46.2	24.8	1.02	-.11	-.21	-6.99	16
9	25.5	2.4	6.2	24.9	25.7	5.8	.62	-.15	-.35	-6.53	16
10	24.0	7.8	23.1	42.2	48.1	9.9	.70	-.13	.08	1.01	20
11	22.7	4.5	26.2	38.8	46.8	5.9	.76	-.02	-.11	.87	21
12	36.6	3.0	46.0	56.4	72.8	2.5	2.56	-.30	2.07	1.64	22
13	25.5	6.0	16.4	22.4	27.6	13.2	.63	-.28	-.26	.74	19
14	33.5	2.8	52.9	62.1	81.5	2.1	2.25	.42	-2.50	-4.00	23
15	27.3	4.1	56.8	64.2	85.7	2.9	2.23	-.96	-.00	-8.18	23
16	22.6	4.3	35.4	37.0	51.2	5.2	1.02	.12	-.15	-.62	25
17	24.3	14.0	59.3	56.1	61.7	10.5	1.81	.16	-.33	-9.21	23

TANGENTIAL SHEAR MAXIMA ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1935	38	7.0	115.0	115.0

ID	MAGNITUDE SHEAR (M/S/KM)	AREA (KM**2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	AVERAGE VELOCITY SPREAD (M/S)	AVERAGE SHEAR (M/S/KM)	FIXED CONTOUR REFERENCE
1	.8	1.9	-33.4	23.3	40.7	2.6	.9	-.8	7
2	.7	2.8	-29.7	25.8	39.4	4.4	.8	.7	7
3	.9	2.6	-26.5	26.8	37.7	4.2	.9	-.9	7
4	3.6	1.6	-19.3	24.3	31.1	3.2	1.6	3.6	7
5	2.4	1.1	-17.5	25.2	30.9	2.1	2.1	-.3	7
6	.7	2.0	-23.6	35.2	42.4	2.9	1.1	-.7	7
7	.9	1.3	-21.2	35.4	41.2	1.9	1.5	-.9	7
8	2.0	1.1	-18.3	30.0	35.1	1.9	1.5	.1	7
9	2.1	1.5	-11.9	30.1	32.4	2.9	1.3	-2.1	7
10	.7	1.4	-10.7	26.5	28.5	3.1	1.1	-.7	7
11	.9	7.4	-14.2	36.1	38.7	11.7	1.1	-.9	7
12	.9	1.2	-11.8	36.5	38.4	1.9	1.1	-.9	7
13	1.8	1.3	-6.4	36.0	36.5	2.1	1.2	1.6	7
14	.9	1.1	-4.4	33.0	33.3	2.0	1.3	.9	7
15	.6	1.6	1.1	24.1	24.1	4.0	.8	-.6	18
16	.7	1.1	7.1	24.5	25.5	2.7	.8	-.7	18
17	.5	1.8	14.5	22.8	27.1	4.0	.5	-.5	19
18	.3	1.5	27.0	36.3	46.1	1.9	1.0	-.3	21
19	.7	1.6	16.6	22.7	28.1	3.9	.7	-.7	19
20	3.1	1.1	45.0	58.2	73.5	.9	2.3	-3.1	22
21	2.5	1.3	41.8	52.6	67.3	1.1	2.0	2.5	22
22	2.7	1.4	53.2	62.4	82.0	1.1	2.3	-2.7	23
23	2.3	1.0	43.1	48.8	65.1	1.0	2.3	-2.3	22
24	1.8	1.3	52.5	59.3	79.2	1.0	2.5	-1.8	23
25	.8	1.3	56.2	63.5	84.9	1.0	1.8	.8	23
26	3.3	1.3	45.9	50.1	67.9	1.1	2.2	3.3	22
27	2.1	1.3	48.4	52.9	71.7	1.1	2.2	-2.1	22
28	.3	1.0	19.6	21.3	29.1	2.2	1.0	-.0	19
29	1.1	1.3	56.3	57.0	80.1	1.0	1.7	-1.1	23
30	.4	1.6	36.1	36.6	51.4	1.9	1.3	-.4	25
31	1.9	1.1	49.7	50.3	70.9	1.0	2.2	1.9	22
32	1.0	1.2	60.2	57.0	82.3	.9	1.8	-1.0	23

VELOCITY SPREAD MAXIMA ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1935	38	7.0	115.0	115.0

ID	SPREAD (M/S)	AREA (KM2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	FIXED CONTOUR REFERENCE
1	1.7	1.6	-28.1	-47.6	55.3	1.8	1
2	2.6	3.3	-33.6	13.6	36.3	6.4	7
3	2.5	2.9	-28.4	18.2	33.7	5.2	7
4	2.6	3.3	-30.1	20.4	36.4	5.6	7
5	2.4	4.7	-25.2	20.3	32.4	9.0	7
6	2.0	1.5	-23.9	23.1	33.3	2.6	7
7	2.0	7.0	-20.9	24.5	32.2	13.3	7
8	1.4	7.9	-26.9	34.0	43.3	11.2	7
9	1.8	7.5	-19.3	29.8	35.5	12.9	7
10	2.0	1.0	-14.3	29.6	32.8	1.9	7
11	1.8	6.1	-9.4	32.3	33.7	11.1	7
12	1.5	1.4	-3.3	38.3	38.4	2.3	9
13	1.8	1.6	-3.0	29.1	29.2	3.2	7
14	1.3	2.2	5.7	46.0	46.4	2.9	13
15	1.0	3.3	3.0	25.5	25.6	7.6	18
16	1.1	4.5	8.3	43.2	43.9	6.3	16
17	1.0	1.6	6.8	24.4	25.3	3.9	18
18	1.0	2.5	8.6	25.6	27.0	5.6	18
19	1.0	5.6	23.7	41.7	48.0	7.2	20
20	1.0	2.8	12.8	21.6	25.1	6.9	19
21	1.0	1.1	14.3	21.4	25.7	2.6	19
22	1.0	1.5	27.0	38.3	46.9	1.9	21
23	2.7	5.5	46.4	57.8	74.1	4.6	22
24	2.6	2.9	56.8	65.5	86.7	2.0	23
25	2.7	14.1	44.1	51.0	67.5	12.7	22
26	2.5	14.9	53.1	61.2	81.0	11.3	23
27	1.2	3.4	35.9	37.0	51.6	4.0	25
28	.7	1.7	38.2	38.6	54.3	1.9	26
29	2.5	2.6	58.9	57.7	82.4	1.9	23

TOTAL IDD= 29 8 10 12

NO OF RECORDS/RADIAL 4 CELL WIDTH 937.2 METERS PRF 794.0

TOTAL IDD= 1 1 1 1

EOF READ ON UNIT 1

NO OF RECORDS/RADIAL 4 CELL WIDTH 937.2 METERS PRF 794.0

FIXED CONTOUR ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1936	41	8.0	147.2	132.1

ID	THRESHOLD (DBZ)	AREA (KM**2)	AVERAGE REFLECTIVITY (DBZ)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	TOTAL PRECIP (TONS/HR)	AVERAGE PRECIP (MM/HR)	FIXED CONTOR REFERENCE
1	20	1.87	21.0	-24.6	-45.3	52.0	2.2			1
2	20	1.01	21.0	-25.9	-47.2	53.9	1.1			2
3	20	589.18	42.5	-23.2	22.0	32.0	1126.2			5
4	20	13.18	21.7	-22.9	-33.3	40.5	19.9			4
5	20	2.38	21.8	-.2	36.9	36.8	4.0			9
6	20	2.35	21.4	2.5	28.5	28.7	6.3			-13
7	20	23.51	23.5	4.9	23.3	24.3	59.1			12
8	20	39.84	22.5	8.5	43.0	43.8	55.6			14
9	20	15.19	22.7	13.2	21.5	25.2	36.8			17
10	20	5.24	22.3	25.8	40.5	48.0	6.7			18
12	20	96.90	30.6	44.0	53.2	69.8	85.9			20
1	40	147.07	48.0	-23.8	21.2	31.9	281.9			5
2	40	8.01	43.1	-9.1	31.3	33.1	14.8			5

162 0 PROGRAM EXTRAD VERSION 2.0 (780501) 05/04/78 PAGE 19

WIND DATA

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1936	41	8.0	147.2	132.1

HEIGHT (KM)	AVERAGE REFLECTIVITY (DBZ)	TOTAL REFLECTIVITY (DBZ.KM**2)	AVERAGE U (M/SEC)	AVERAGE V (M/SEC)	VELOCITY VARIANCE (M/SEC)**2)	DEL
4	22.7	2826.0	-8.6	-5.5	34.3	.78157E+00
7	22.3	889.4	-2.0	-10.7	24.0	.92030E-01

PEAK DETECTED CELL ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1936	41	5.0	147.2	132.1

ID	REFLECTIVITY (DBZ)	AREA (KM**2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	LOCATION RANGE (KM)	AREA RESOLUTION ELEMENTS	AVERAGE VELOCITY SPREAD (M/S)	AVERAGE RADIAL SHEAR (M/S/KM)	AVERAGE TANGENTIAL SHEAR (M/S/KM)	AVERAGE RADIAL VELOCITY (M/S)	MEAN FIXED CONTOUR REFERENCE
1	21.6	13.2	-22.9	-33.3	40.4	19.9	1.30	-.22	-.38	-.96	4
2	49.6	5.0	-30.9	13.7	33.9	9.1	1.97	-.16	.15	-1.18	5
3	28.9	4.9	-35.8	23.7	42.9	7.0	1.02	.30	-.06	-4.17	5
4	53.8	2.3	-26.6	18.6	32.4	4.4	2.35	3.15	1.35	3.05	5
5	57.0	1.1	-25.2	18.7	31.4	2.1	2.06	2.52	-1.15	2.14	5
6	55.6	1.3	-22.5	23.2	32.3	2.4	1.77	2.02	-1.90	.59	5
7	44.9	2.2	-9.7	31.3	32.8	4.1	1.21	-3.94	-.53	-10.50	5
8	21.7	2.4	-.1	36.8	36.8	4.0	.93	-.11	-.13	-2.55	9
9	25.8	2.0	2.0	24.6	24.7	4.9	.80	.69	3.76	-3.02	12
10	22.8	30.2	8.4	42.9	43.7	42.2	1.04	-.53	.33	-5.78	14
11	22.2	5.2	25.8	40.5	48.0	6.7	.85	.02	-.06	-9.46	18
12	40.6	2.9	42.5	51.4	66.7	2.6	2.22	1.36	1.21	-6.72	20
13	32.9	2.2	47.0	57.3	74.1	1.8	2.62	.23	1.21	-9.05	20
14	25.6	3.5	47.0	51.1	69.5	3.1	2.17	-1.61	-.05	-7.94	20

TANGENTIAL SHEAR MAXIMA ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1936	41	6.0	147.2	132.1

ID	MAGNITUDE SHEAR (M/S/KM)	AREA (KM**2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	AVERAGE VELOCITY SPREAD (M/S)	AVERAGE SHEAR (M/S/KM)	FIXED CONTOUR REFERENCE
1	1.4	1.2	-33.0	17.7	37.5	1.9	.7	-1.4	5
2	.4	1.3	-36.6	25.3	44.5	1.8	1.2	-.4	5
3	5.3	1.2	-25.3	28.9	38.4	1.5	1.4	-.3	5
4	2.1	1.4	-27.2	31.6	41.7	2.0	1.2	.1	5
5	7.3	2.4	-22.3	28.9	36.5	4.0	.9	7.3	5
6	5.0	1.1	-18.7	24.7	31.0	2.1	1.8	5.0	5
7	2.5	1.1	-18.5	27.9	33.7	1.9	1.7	-2.5	5
8	.9	1.5	-22.4	35.7	42.1	2.1	1.2	-.9	5
9	2.2	1.1	-16.3	27.4	31.3	2.0	1.7	-2.2	5
10	1.0	1.1	-13.2	34.1	36.5	1.6	.3	-1.0	5
11	.6	1.8	-15.0	38.9	41.7	2.6	1.2	-.6	5
12	.9	1.1	-10.6	36.9	36.4	1.6	1.3	-.9	5
13	1.3	1.1	-6.8	35.9	36.5	1.8	.9	-1.3	5
14	1.1	1.1	11.3	45.4	46.3	1.4	1.2	-1.1	14
15	.9	1.0	6.4	22.4	23.3	2.6	.7	-.9	12
16	2.2	2.6	44.5	60.0	75.0	2.1	2.3	-2.2	20
17	3.8	1.2	43.3	53.6	68.3	1.1	2.8	-3.8	20

VELOCITY SPREAD MAXIMA ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1936	41	9.0	147.2	132.1

ID	SPREAD (M/S)	AREA (KM2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	FIXED CONTOUR REFERENCE
1	2.0	1.9	-24.6	-45.8	52.0	2.2	1
2	2.2	1.0	-25.9	-47.2	53.9	1.1	2
3	1.8	4.2	-22.6	-35.2	42.0	6.1	4
4	2.7	4.1	-33.9	15.2	37.1	6.7	5
5	1.9	1.4	-35.1	17.5	39.2	2.1	5
6	2.2	1.7	-28.0	16.9	32.7	3.3	5
7	2.7	1.0	-26.4	18.0	31.9	1.9	5
8	2.6	9.6	-26.6	20.6	33.7	17.4	5
9	2.2	1.3	-17.3	31.1	35.6	2.3	5
10	1.7	1.6	-14.2	28.7	32.0	3.0	5
11	2.4	1.0	-10.6	29.5	31.4	2.0	5
12	1.4	16.1	-12.9	38.5	40.6	24.3	5
13	1.8	8.6	-8.7	32.0	33.1	15.6	5
14	1.9	3.9	-6.1	33.4	33.9	7.1	5
15	1.3	1.9	-3.9	28.3	28.6	4.0	5
16	1.1	1.8	.1	36.7	36.7	3.1	9
17	.9	2.7	2.2	20.5	20.6	7.9	13
18	.9	5.4	2.9	24.9	25.0	15.7	12
19	1.1	2.2	7.2	21.8	22.9	5.9	12
20	1.1	2.8	11.9	21.1	24.2	6.9	17
21	1.1	1.8	27.1	39.9	48.3	2.3	19
22	1.0	1.8	15.6	21.7	26.7	4.2	17
23	2.6	11.4	44.3	52.0	68.3	10.2	20
24	2.6	18.9	48.0	56.4	74.0	15.6	20

TOTAL IDD= 21 6 9 9
EOF READ ON UNIT 1
NO OF RECORDS/RADIAL 4 CELL WIDTH 937.2 METERS PRF 794.0

FIXED CONTOUR ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1937	37	9.0	135.2	112.9

ID	THRESHOLD (DBZ)	AREA (KM**2)	AVERAGE REFLECTIVITY (DBZ)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	TOTAL PRECIP (TONS/HR)	AVERAGE PRECIP (MM/HR)	FIXED CONTOR REFERENCE
1	20	39.07	22.0	-20.7	-33.1	39.0	61.3			1
2	20	645.71	43.5	-22.6	22.0	31.6	1256.9			2
3	20	4.78	22.3	3.5	20.3	21.2	13.8			-7
4	20	5.70	21.8	7.5	19.3	21.3	16.8			-12
5	20	2.13	21.0	6.1	44.4	44.8	2.9			9
6	20	1.60	21.8	10.1	19.3	22.2	4.4			13
7	20	25.41	28.6	43.8	51.4	67.6	23.0			14
8	20	2.36	22.0	48.5	56.5	74.5	1.3			15
1	40	4.79	43.2	-8.0	32.0	33.0	8.9			2
2	40	137.15	49.9	-22.9	21.5	31.5	266.5			2

WIND DATA

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1937	37	3.0	135.2	112.9

HEIGHT (KM)	AVERAGE REFLECTIVITY (DBZ)	TOTAL REFLECTIVITY (DBZ.KM**2)	AVERAGE U (M/SEC)	AVERAGE V (M/SEC)	VELOCITY VARIANCE (M/SEC)**2)	DEL

PEAK DETECTED CELL ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1937	37	9.0	135.2	112.9

ID	REFLECTIVITY (DBZ)	AREA (KM**2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	LOCATION RANGE (KM)	AREA RESOLUTION ELEMENTS	AVERAGE VELOCITY SPREAD (M/S)	AVERAGE RADIAL SHEAR (M/S/KM)	AVERAGE TANGENTIAL SHEAR (M/S/KM)	AVERAGE RADIAL VELOCITY (M/S)	PEAK FIXED CONTOUR REFERENCE
1	22.3	26.8	-20.7	-33.5	39.4	61.6	1.56	-.42	-.41	-.85	1
2	43.8	1.3	-33.6	17.7	38.0	2.1	2.53	3.41	-3.08	-2.22	2
3	48.0	1.2	-30.7	18.9	36.1	2.0	2.11	-2.42	3.37	.70	2
4	59.7	2.1	-24.4	18.8	30.9	4.2	2.21	3.30	.25	-6.19	2
5	47.6	2.8	-27.2	23.2	35.7	4.7	2.33	-.67	3.48	-5.49	2
6	58.9	1.0	-20.6	24.9	32.3	1.9	1.65	-1.27	-.54	-1.85	2
7	53.0	1.9	-15.2	23.5	29.8	3.9	1.83	-.36	-.52	-1.23	2
8	51.4	1.4	-16.6	25.6	30.5	2.9	1.83	1.49	-.13	2.11	2
9	23.2	8.8	-11.7	39.0	40.7	13.3	1.05	-.28	-.17	.07	2
10	44.2	2.1	-8.2	31.5	32.5	3.9	1.29	1.12	-.19	.44	2
11	24.5	2.5	5.8	37.7	38.2	4.0	.95	3.50	3.91	-4.03	2
12	22.8	3.0	3.8	21.1	21.4	8.6	.77	-1.10	1.68	-4.47	7
13	21.8	5.7	7.5	19.9	21.3	15.3	.83	-.31	.06	-7.30	12
14	21.7	1.6	10.2	19.8	22.3	4.4	1.94	-.14	-.26	-8.10	13
15	33.0	4.3	43.7	51.4	67.5	3.9	2.24	-.81	-1.65	-8.82	14

TANGENTIAL SHEAR MAXIMA ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1937	37	9.0	135.2	112.9

	MAGNITUDE		LOCATION						
ID	SHEAR (M/S/KM)	AREA (KM**2)	EAST (KM)	NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	AVERAGE VELOCITY SPREAD (M/S)	AVERAGE SHEAR (M/S/KM)	FIXED CONTOUR REFERENCE
1	1.3	1.3	-24.8	32.9	41.3	1.9	1.4	-1.3	2
2	4.7	1.1	-18.0	25.2	30.9	2.1	2.1	4.7	2
3	2.1	1.5	-14.9	25.9	29.9	3.2	1.5	-.7	2
4	1.0	1.4	-17.7	36.2	40.3	2.1	1.8	-1.0	2
5	.9	1.8	-15.5	34.6	37.9	2.9	1.3	.4	2
6	.6	4.1	-14.1	39.2	41.7	6.0	1.0	-.6	2
7	1.6	1.5	-5.9	29.6	30.1	3.0	1.6	-1.6	2
8	3.8	1.1	-6.3	33.2	33.7	1.9	2.2	-3.8	2
9	1.6	1.1	-4.3	31.6	31.9	2.0	1.2	-1.6	2
10	.9	1.1	.1	34.2	34.2	1.9	1.1	-.9	2

VELOCITY SPREAD MAXIMA ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1937	37	9.0	135.2	112.9

ID	SPREAD (M/S)	AREA (KM2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	FIXED CONTOUR REFERENCE
1	2.4	2.8	-20.0	-36.6	41.9	4.0	1
2	1.6	3.1	-23.7	-29.5	37.8	5.1	1
3	2.8	2.5	-33.1	17.3	37.4	4.0	2
4	2.6	2.6	-30.8	19.7	36.6	4.4	2
5	2.6	13.8	-25.9	21.3	33.5	19.7	2
6	1.9	5.3	-23.5	28.3	36.8	10.0	2
7	2.7	1.1	-18.6	26.3	32.3	2.1	2
8	2.5	1.3	-20.9	32.2	38.4	2.1	2
9	2.0	1.1	-17.9	28.7	33.8	1.9	2
10	2.1	3.5	-16.6	30.8	35.0	6.1	2
11	2.0	6.1	-15.3	27.2	31.2	12.0	2
12	1.8	7.0	-17.1	37.4	41.2	10.5	2
13	1.9	1.1	-10.9	32.0	33.8	2.0	2
14	2.0	4.3	-5.9	33.2	33.7	7.6	2
15	1.0	4.2	4.6	31.6	32.8	7.9	7
16	1.3	13.6	7.0	38.9	39.5	21.0	2
17	1.0	3.4	7.8	19.9	21.4	9.7	12
18	1.9	1.5	10.2	19.8	22.3	4.4	13
19	1.2	1.1	49.1	56.0	74.5	.9	15
20	2.3	14.3	44.5	51.5	68.1	12.6	14

TOTAL IDD= 16 5 9 8

NO OF RECORDS/RADIAL 4 CELL WIDTH 937.2 METERS PRF 794.0
NO OF RECORDS/RADIAL 4 CELL WIDTH 937.2 METERS PRF 794.0
NO OF RECORDS/RADIAL 4 CELL WIDTH 937.2 METERS PRF 794.0

EOF READ ON UNIT 1
EOF READ ON UNIT 1

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P   227034  A0  004303  B0  000000
RA  076500  A1  000001  B1  000001   C(A1)=  0102 2420 0000 0000 0000   C(B1)=  0102 2420 0000 0000 0000
FL  227100  A2  223551  B2  000000   C(A2)=  3232 3232 3205 0600 0025   C(B2)=  0000 0000 0000 0000 0000
EM  000700  A3  170060  B3  000115   C(A3)=  1000 0000 0000 0017 0407   C(B3)=  5555 5555 5555 5555 5555
RE  000000  A4  215607  B4  000000   C(A4)=  0000 0000 0000 0000 0000   C(B4)=  0000 0000 0060 0000 0000
FE  000000  A5  004315  B5  000000   C(A5)=  2000 0000 0300 0001 6023   C(B5)=  0000 0100 0000 0000 0000
MA  001400  A6  100001  B6  211373   C(A6)=  0102 2420 0000 0000 0000   C(B6)=  0400 2113 4761 0004 6000
            A7  000001  B7  227100   C(A7)=  0102 2420 0000 0000 0000   C(B7)=
X0  4000  0000  0000  0000  0115
X1  0000  0000  0000  0000  0000
X2  0311  1720  0000  0000  0000
X3  0000  0000  0000  0022  3565
X4  0000  0000  0000  0000  0000
X5  0000  0000  0020  0000  0003
X6  0102  2420  0000  0000  0000
X7  0311  1720  0000  0022  3551

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00004  24012 00540 00000 00175   24012 00541 00000 02240   24012 00534 00000 04303   24012 00535 00000 04344
00010  24012 00544 00000 06407   04050 22507 00000 02240   24012 00536 00000 10452   24012 00537 00000 12515
00014  00000 00000 00000 00000
00054  56110 03110 00054 54710   51100 00001 03110 00055   64550 02550 00000 46000   15230 70000 01000 00070
00060  15051 52000 00000 00061   00002 27100 00000 00001   07040 00060 51600 00001   04000 00063 00000 00021
00064  14071 70000 00000 00000   00000 00000 00002 27071   40000 00000 00000 00111   00000 00000 40000 00000
00070  14071 75755 55555 50000   00000 06060 00000 00000
00100  54000 03000 31000 00001

226734  04002 26744 61000 46000   50100 00001 43770 20146   15117 62217 77767 46000   04202 26744 66530 43771
226740  50100 00001 20146 15117   62217 77773 05202 26745   50100 00014 43744 20130   15117 63513 66554 46000
226744  66334 46000 61000 46000   50100 00020 43752 20166   11771 76130 12771 20706   54710 50100 00015 43752
226750  11771 76150 12771 54710   50100 00015 43744 20152   11771 20722 54710 46000   50100 00015 76710 20763
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FWA OF THE LOAD 111
LWA+1 OF THE LOAD 34170

TRANSFER ADDRESS -- EXPAND 6315

PROGRAM AND BLOCK ASSIGNMENTS.

BLOCK	ADDRESS	LENGTH	FILE	DATE	PROCSSR	VER LEVEL	HARDWARE	COMMENTS
/HEAD/	111	15						
/EXPAN/	126	10						
EXPAND	136	7463	LGO	05/03/78	FTN	4.6 428	666X I	OPT=1
/LINUM/	7621	1						
BLKDAT.	7622	0	LGO	05/03/78	FTN	4.6 428	666X I	OPT=1
EXPAN1	7622	343	LGO	05/03/78	FTN	4.6 428	666X I	OPT=1
NUSCAL	10165	77	LGO	05/03/78	FTN	4.6 428	666X I	OPT=1
LABEL	10264	125	LGO	05/03/78	FTN	4.6 428	666X I	OPT=1
/NAME/	10411	6						
/NAMIT/	10417	1						
/CHEXP/	10420	1						
/TAGIT/	10421	1						
/SAVORG/	10422	5						
PLTIO3	10427	171	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
BLOXIT	10620	54	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
PLOT	10674	325	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
ENDPLT	11221	160	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
CHEXIT	11401	11	UL-PEN	10/14/76	COMPASS	3. 2-414		
FACTOR	11412	16	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
SYMBOL	11430	307	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
PLOTUQ	11737	432	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
PLOCODE	12371	425	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
DOTX	13016	41	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
PLOTTX	13057	23	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
WHERE	13102	52	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
ERXPLT	13154	235	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
NUMBER	13411	233	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
NEWPEN	13644	66	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
PLOTS	13732	75	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
BUFF	14027	467	UL-PEN	10/14/76	COMPASS	3. 2-414		
ABORTS	14516	4	UL-PEN	10/14/76	COMPASS	3. 2-414		
LINLOG	14522	1115	UL-LIB	02/16/78	FTN	4.6 428	666X I	OPT=1
DAY	15637	10	UL-LIB	02/16/78	FTN	4.6 428	666X I	OPT=1
PAGE	15647	33	UL-LIB	02/16/78	FTN	4.6 428	666X I	OPT=1
/STP.END/	15702	1						
/FCL.C./	15703	23						
/Q8.IO./	15726	133						
Q8NTRY=	16061	0	SL-FORTRAN	08/12/77	COMPASS	3. 3-428		FCL INITIALIZATION ROUTINE.
FECMSK=	16061	41	SL-FORTRAN	08/12/77	COMPASS	3. 3-428		INITIALIZE CONSTANTS.
FLTOUT=	16122	311	SL-FORTRAN	08/12/77	COMPASS	3. 3-428		COMMON FLOATING OUTPUT CODE
FORSYS=	16433	603	SL-FORTRAN	08/12/77	COMPASS	3. 3-428		FORTRAN OBJECT LIBRARY UTILITIES.
INCOM=	17236	276	SL-FORTRAN	08/12/77	COMPASS	3. 3-428		COMMON INPUT FORMATTING CODE
NAMOUT=	17534	274	SL-FORTRAN	08/12/77	COMPASS	3. 3-428		NAMELIST OUTPUT ROUTINE.
OUTC=	20030	172	SL-FORTRAN	08/12/77	COMPASS	3. 3-428		FORMATTED WRITE FORTRAN RECORD.
SYSTEMC	20222	407	SL-FORTRAN	08/12/77	COMPASS	3. 3-428		EXTENDED ERROR HANDLING OPTION.

BLOCK	ADDRESS	LENGTH	FILE	DATE	PROCSSR	VER	LEVEL	HARDWARE	COMMENTS
CLOCK=	20631	31	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		ACCESS SYSTEM CLOCKS FOR FORTRAN.
GOTOER=	20662	14	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMPUTED GO TO ERROR PROCESSOR.
ALOG	20676	73	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMPUTE COMMON AND NATURAL LOGARITHMS. OPT=ALL.
SINCOS=	20771	66	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		TRIGONOMETRIC SINE OR COSINE OF X. OPT=ALL.
SYSAID=	21057	1	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		LINK BETWEEN SYS=AID AND INITIALIZATION CODE.
BACKSP=	21060	56	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		BACKSPACE LOGICAL RECORD.
CONIO=	21136	64	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMMON CODED I/O ROUTINES AND CONSTANTS.
EOF	21222	16	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		TEST FOR END OF FILE STATUS.
FLTIN=	21240	154	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMMON FLOATING INPUT CONVERTER.
FMTAP=	21414	352	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		CRACK APLIST AND FORMAT FOR KODER/KRAKER.
FORUTL=	21766	16	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		FCL MISC. UTILITIES.
GETFIT=	22004	42	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		LOCATE AN FIT GIVEN A FILE NAME.
/IO.BUF./	22046	227							
INPB=	22275	314	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		BINARY READ FORTRAN RECORD.
KODER=	22611	456	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		OUTPUT FORMAT INTERPRETER.
NAMIN=	23267	523	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		NAMELIST INPUT ROUTINE.
OUTCOM=	24012	154	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMMON OUTPUT CODE
SYSTEM	24166	21	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		USER CALLABLE ERROR PROCESSOR.
SYS=1ST	24207	62	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		MATH LIBRARY LINK TO ERROR MESSAGE PROCESSOR.
XTOI=	24271	10	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		REAL TO INTEGER EXPONENTIATION.
/CON.RM/	24301	6							
CIO.RM	24307	40	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/ADB.RM/	24347	10							
MOVE.RM	24357	64	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
MCT.RM	24443	233	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/JMPS.RM/	24676	11							
/MEMC.RM/	24707	3							
/OPES.FO/	24712	1							
/OPEN.FO/	24713	7							
OPEN.RM	24722	237	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/PUT.RT/	25161	11							
PLEQ.RM	25172	42	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/CLSF.FO/	25234	7							
CLSF.SQ	25243	134	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/CLSV.FO/	25377	7							
CLSV.SQ	25406	137	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/REW.FO/	25545	7							
REW.SQ	25554	33	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/TERM.RM/	25607	1							
/GET.FO/	25610	7							
/GET.BT/	25617	5							
/GET.RT/	25624	11							
GET.SQ	25635	1134	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
Z.SQ	26771	101	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
W.SQ	27072	50	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
FSU.SQ	27142	106	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/SKBL.FO/	27250	7							
/SKSB.FO/	27257	1							
SKSB.SQ	27260	101	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
ERR.RM	27361	404	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
CHWR.SQ	27765	7	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
OSUB.RM	27774	71	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
OPEN.SQ	30065	254	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
OPEX.SQ	30341	14	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/PUT.FO/	30355	7							

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PUT.RM      30364      2  SL-SYSIO    09/03/76 COMPASS  3. 2-414
PUT.SQ      30366   1400  SL-SYSIO    09/03/76 COMPASS  3. 2-414
WAP.SQ      31766    268  SL-SYSIO    09/03/76 COMPASS  3. 2-414
CLSF.RM     32246     25  SL-SYSIO    09/03/76 COMPASS  3. 2-414
BTRT.SQ     32273    115  SL-SYSIO    09/03/76 COMPASS  3. 2-414
WFOX.SQ     32410    150  SL-SYSIO    09/03/76 COMPASS  3. 2-414
/SKFL.FO/   32560      7
SKFL.SQ     32567     51  SL-SYSIO    09/03/76 COMPASS  3. 2-414
SKBL.SQ     32640   1026  SL-SYSIO    09/03/76 COMPASS  3. 2-414
MXGET       33666     33  SL-NUCLEUS  02/05/74 COMPASS  3. 73269
MXPUT       33721     22  SL-NUCLEUS  02/05/74 COMPASS  3. 73269
RECOVR      33743    166  SL-NUCLEUS  04/15/77 COMPASS  3. 2-414      REPRIEVE INTERFACE
SYS.RM      34131     37  SL-NUCLEUS  04/15/77 COMPASS  3. 2-414      PROCESS SYSTEM REQUEST.

     1.058 CP SECONDS          474033 34 STORAGE USED          105 TABLE MOVES
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$INPUT
IPLT   = T, T, T, T,
Z1     = T,
Z2     = F,
Z3     = F,
Z4     = F,
LS     = T,
XK1    = -.7E+02,
XK2    = .1E+02,
YK1    = -.1E+02,
YK2    = .7E+02,
LK     = T,
$END
RANGE=  512. CELLWIDTH= 1.042 ELEVATION= 10.02
X1(KM)=   -80.  Y1(KM)=   -20.  X2(KM)=    20.  Y2(KM)=    60.
X1(IN)=  1.00  Y1(IN)=  1.00  X2(IN)=  9.00  Y2(IN)=  9.00
  3.153  2.817 3001  3.126  2.779 2001  OUTSIDE PLOT AREA    6.047    .710   6.004    .649
  3.153  2.817 3001  3.125  2.838 2001  OUTSIDE PLOT AREA    6.047    .710   6.001    .744
  3.126  2.779 3001  3.068  2.763 2001  OUTSIDE PLOT AREA    6.004    .649   5.911    .624
  3.125  2.838 3001  3.110  2.849 2001  OUTSIDE PLOT AREA    6.001    .744   5.979    .761
  3.068  2.763 3001  3.024  2.738 2001  OUTSIDE PLOT AREA    5.911    .624   5.841    .583
  3.110  2.849 3001  3.023  2.799 2001  OUTSIDE PLOT AREA    5.979    .761   5.839    .680
  3.024  2.738 3001  2.994  2.762 2001  OUTSIDE PLOT AREA    5.841    .583   5.792    .622
  3.023  2.799 3001  3.014  2.806 2001  OUTSIDE PLOT AREA    5.833    .680   5.825    .692
  3.014  2.806 3001  2.994  2.762 2001  OUTSIDE PLOT AREA    5.825    .692   5.792    .622
  3.144  3.066 3001  3.112  3.032 2001                       6.032   1.108   5.981   1.053
  3.080  2.997 3001  3.048  2.963 2001  OUTSIDE PLOT AREA    5.930    .998   5.879    .943
  3.144  3.066 3001  3.160  3.115 2001                       6.032   1.108   6.058   1.186
  3.112  3.032 3001  3.096  3.047 2001                       5.981   1.053   5.955   1.077
  3.080  2.997 3001  3.063  3.013 2001                       5.930    .998   5.903   1.023
  3.063  3.013 3001  3.048  2.963 2001                       5.903   1.023   5.879    .943
  3.160  3.115 3001  3.145  3.129 2001                       6.058   1.185   6.034   1.209
  3.145  3.129 3001  3.096  3.047 2001                       6.034   1.209   5.955   1.077
  2.159  2.125 3001  2.126  2.091 2001  OUTSIDE PLOT AREA    4.453   -.396   4.406   -.450
  2.094  2.058 3001  2.028  1.991 2001  OUTSIDE PLOT AREA    4.354   -.503   4.249   -.610
  2.159  2.125 3001  2.128  2.156 2001  OUTSIDE PLOT AREA    4.453   -.396   4.409   -.346
  2.128  2.156 3001  2.126  2.091 2001  OUTSIDE PLOT AREA    4.409   -.346   4.406   -.450
  2.094  2.058 3001  2.061  2.090 2001  OUTSIDE PLOT AREA    4.354   -.503   4.302   -.451
  2.061  2.090 3001  2.028  1.991 2001  OUTSIDE PLOT AREA    4.302   -.451   4.249   -.610
  3.013  3.063 3001  2.979  3.031 2001                       5.823   1.103   5.769   1.052
  3.013  3.063 3001  3.033  3.110 2001                       5.823   1.103   5.856   1.178
  2.979  3.031 3001  2.999  3.078 2001                       5.769   1.052   5.800   1.127
  3.033  3.110 3001  3.020  3.125 2001                       5.856   1.178   5.834   1.202
  2.999  3.078 3001  2.985  3.094 2001                       5.800   1.127   5.776   1.152
  3.020  3.125 3001  3.004  3.143 2001                       5.834   1.202   5.808   1.231
  2.985  3.094 3001  2.968  3.113 2001                       5.778   1.152   5.752   1.182
  3.004  3.143 3001  2.990  3.160 2001                       5.808   1.231   5.786   1.258
  2.968  3.113 3001  2.917  3.100 2001                       5.752   1.152   5.670   1.162
  2.087  2.410 3001  2.051  2.381 2001  OUTSIDE PLOT AREA    4.344    .060   4.266    .012
```

2.990	3.160	3001	3.012	3.207	2001		5.785	1.258	5.822	1.333
2.917	3.100	3001	2.976	3.177	2001		5.670	1.162	5.763	1.266
2.087	2.410	3001	2.061	2.443	2001	OUTSIDE P_OT AREA	4.344	.060	4.302	.112
2.061	2.443	3001	2.051	2.381	2001	OUTSIDE P_OT AREA	4.302	.112	4.286	.012
3.012	3.207	3001	2.963	3.193	2001		5.822	1.333	5.743	1.311
2.976	3.177	3001	2.926	3.164	2001		5.763	1.286	5.684	1.265
2.963	3.193	3001	2.988	3.237	2001		5.743	1.311	5.783	1.382
2.926	3.164	3001	2.913	3.181	2001		5.684	1.265	5.664	1.291
2.988	3.237	3001	2.976	3.255	2001		5.783	1.332	5.763	1.409
2.913	3.181	3001	2.900	3.199	2001		5.664	1.291	5.642	1.321
2.976	3.255	3001	2.963	3.272	2001		5.763	1.409	5.743	1.437
2.900	3.199	3001	2.886	3.218	2001		5.642	1.321	5.621	1.351
2.963	3.272	3001	2.990	3.316	2001		5.743	1.437	5.786	1.507
2.886	3.218	3001	2.873	3.237	2001		5.621	1.351	5.600	1.381
2.990	3.316	3001	2.981	3.330	2001		5.785	1.507	5.771	1.529
2.873	3.237	3001	2.863	3.253	2001		5.600	1.381	5.583	1.406
2.981	3.330	3001	2.968	3.349	2001		5.771	1.529	5.752	1.560
2.863	3.253	3001	2.849	3.274	2001		5.583	1.406	5.561	1.440
2.968	3.349	3001	2.917	3.342	2001		5.752	1.560	5.670	1.543
2.849	3.274	3001	2.877	3.318	2001		5.561	1.440	5.606	1.510
2.917	3.342	3001	2.947	3.384	2001		5.670	1.543	5.717	1.616
2.877	3.318	3001	2.825	3.313	2001		5.606	1.510	5.523	1.502
2.947	3.384	3001	2.937	3.402	2001		5.717	1.616	5.701	1.644
2.825	3.313	3001	2.814	3.333	2001		5.523	1.502	5.505	1.534
2.078	2.919	3001	2.037	2.896	2001	OUTSIDE P_OT AREA	4.329	.872	4.264	.836
2.937	3.402	3001	2.844	3.375	2001		5.701	1.644	5.553	1.602
2.814	3.333	3001	2.803	3.353	2001		5.505	1.534	5.487	1.566
2.078	2.919	3001	2.060	2.951	2001	OUTSIDE P_OT AREA	4.329	.872	4.300	.924
2.060	2.951	3001	2.037	2.896	2001	OUTSIDE P_OT AREA	4.300	.924	4.264	.836
2.844	3.375	3001	2.834	3.395	2001		5.553	1.602	5.537	1.633
2.803	3.353	3001	2.792	3.373	2001		5.487	1.566	5.470	1.599
2.126	3.027	3001	2.084	3.006	2001		4.405	1.046	4.339	1.012
2.834	3.395	3001	2.865	3.437	2001		5.537	1.633	5.586	1.701
2.792	3.373	3001	2.781	3.396	2001		5.470	1.599	5.452	1.634
2.126	3.027	3001	2.150	3.083	2001		4.405	1.046	4.445	1.135
2.084	3.006	3001	2.066	3.041	2001		4.339	1.012	4.310	1.068
1.982	3.000	3001	1.940	2.979	2001		4.176	1.002	4.109	.968
2.941	3.495	3001	2.899	3.475	2001		5.708	1.793	5.641	1.761
2.865	3.437	3001	2.856	3.455	2001		5.586	1.701	5.573	1.729
2.781	3.396	3001	2.729	3.394	2001		5.452	1.634	5.370	1.632
2.150	3.083	3001	2.136	3.111	2001		4.445	1.135	4.422	1.180
2.136	3.111	3001	2.066	3.041	2001		4.422	1.180	4.310	1.068
1.982	3.000	3001	2.009	3.051	2001		4.176	1.002	4.219	1.083
1.940	2.979	3001	1.967	3.031	2001		4.109	.968	4.152	1.051
2.941	3.495	3001	2.933	3.513	2001		5.708	1.793	5.695	1.822
2.933	3.513	3001	2.899	3.475	2001		5.695	1.822	5.641	1.761
2.856	3.455	3001	2.847	3.474	2001		5.573	1.729	5.558	1.760
2.729	3.394	3001	2.762	3.435	2001		5.370	1.632	5.422	1.697
2.293	3.221	3001	2.207	3.182	2001		4.672	1.355	4.535	1.293
2.009	3.051	3001	2.122	3.143	2001		4.219	1.083	4.399	1.231
1.967	3.031	3001	1.994	3.085	2001		4.152	1.051	4.194	1.137
2.847	3.474	3001	2.840	3.492	2001		5.558	1.760	5.546	1.788
2.762	3.435	3001	2.754	3.454	2001		5.422	1.697	5.408	1.728
2.293	3.221	3001	2.281	3.247	2001		4.672	1.355	4.653	1.397
2.207	3.182	3001	2.195	3.210	2001		4.535	1.293	4.516	1.337
2.195	3.210	3001	2.109	3.172	2001		4.516	1.337	4.378	1.277
2.109	3.172	3001	2.122	3.143	2001		4.378	1.277	4.399	1.231
2.066	3.153	3001	2.023	3.134	2001		4.310	1.247	4.241	1.217
1.994	3.085	3001	1.937	3.097	2001		4.194	1.137	4.103	1.157
2.840	3.492	3001	2.831	3.512	2001		5.546	1.788	5.532	1.819
2.754	3.454	3001	2.745	3.475	2001		5.408	1.728	5.394	1.762
2.281	3.247	3001	2.268	3.276	2001		4.653	1.397	4.633	1.444
2.182	3.240	3001	2.136	3.222	2001		4.495	1.386	4.425	1.357
2.066	3.153	3001	2.052	3.186	2001		4.310	1.247	4.287	1.299
2.052	3.186	3001	2.009	3.168	2001		4.287	1.299	4.218	1.270
2.009	3.168	3001	2.023	3.134	2001		4.218	1.270	4.241	1.217

1.937	3.097	3001	2.009	3.168	2001	4.103	1.157	4.218	1.270
2.831	3.512	3001	2.823	3.531	2001	5.532	1.619	5.519	1.551
2.745	3.475	3001	2.692	3.479	2001	5.394	1.762	5.310	1.768
2.344	3.340	3001	2.300	3.323	2001	4.753	1.546	4.684	1.518
2.268	3.276	3001	2.256	3.306	2001	4.633	1.444	4.614	1.491
2.182	3.240	3001	2.169	3.271	2001	4.495	1.386	4.475	1.435
2.169	3.271	3001	2.126	3.254	2001	4.475	1.435	4.405	1.407
2.126	3.254	3001	2.138	3.222	2001	4.405	1.407	4.425	1.357
2.009	3.168	3001	1.995	3.201	2001	4.213	1.270	4.196	1.324
2.823	3.531	3001	2.816	3.549	2001	5.519	1.651	5.508	1.880
2.692	3.479	3001	2.684	3.499	2001	5.310	1.768	5.296	1.600
2.344	3.340	3001	2.334	3.366	2001	4.753	1.546	4.737	1.587
2.300	3.323	3001	2.290	3.349	2001	4.684	1.518	4.667	1.560
2.256	3.306	3001	2.246	3.332	2001	4.614	1.491	4.597	1.533
1.995	3.201	3001	1.983	3.232	2001	4.196	1.324	4.177	1.373
2.816	3.549	3001	2.809	3.569	2001	5.506	1.680	5.496	1.912
2.684	3.499	3001	2.632	3.506	2001	5.298	1.800	5.214	1.810
2.334	3.366	3001	2.323	3.394	2001	4.737	1.587	4.721	1.632
2.290	3.349	3001	2.279	3.378	2001	4.667	1.560	4.650	1.606
2.246	3.332	3001	2.235	3.362	2001	4.597	1.533	4.580	1.581
2.058	3.298	3001	2.014	3.282	2001	4.298	1.479	4.227	1.453
1.983	3.232	3001	1.926	3.251	2001	4.177	1.373	4.086	1.402
2.809	3.569	3001	2.801	3.590	2001	5.496	1.912	5.485	1.944
2.713	3.559	3001	2.668	3.544	2001	5.343	1.896	5.272	1.871
2.632	3.506	3001	2.624	3.529	2001	5.214	1.810	5.201	1.847
2.446	3.468	3001	2.402	3.453	2001	4.917	1.750	4.847	1.726
2.323	3.394	3001	2.313	3.422	2001	4.721	1.632	4.705	1.677
2.279	3.378	3001	2.269	3.407	2001	4.650	1.606	4.634	1.653
2.269	3.407	3001	2.224	3.392	2001	4.634	1.653	4.563	1.629
2.224	3.392	3001	2.235	3.362	2001	4.563	1.629	4.580	1.581
2.180	3.377	3001	2.136	3.362	2001	4.492	1.604	4.421	1.580
2.058	3.298	3001	2.047	3.331	2001	4.298	1.479	4.279	1.531
2.014	3.282	3001	1.958	3.301	2001	4.227	1.453	4.137	1.483
1.926	3.251	3001	1.914	3.266	2001	4.086	1.402	4.066	1.459
2.801	3.590	3001	2.751	3.594	2001	5.485	1.944	5.404	1.951
2.713	3.559	3001	2.706	3.579	2001	5.343	1.896	5.332	1.927
2.706	3.579	3001	2.661	3.565	2001	5.332	1.927	5.261	1.904
2.661	3.565	3001	2.668	3.544	2001	5.261	1.904	5.272	1.871
2.624	3.529	3001	2.617	3.550	2001	5.201	1.847	5.190	1.881
2.446	3.468	3001	2.483	3.506	2001	4.917	1.750	4.976	1.811
2.402	3.453	3001	2.394	3.477	2001	4.847	1.726	4.833	1.765
2.394	3.477	3001	2.304	3.448	2001	4.833	1.765	4.691	1.719
2.304	3.448	3001	2.313	3.422	2001	4.691	1.719	4.705	1.677
2.260	3.434	3001	2.215	3.419	2001	4.620	1.695	4.548	1.672
2.180	3.377	3001	2.171	3.405	2001	4.492	1.604	4.477	1.649
2.171	3.405	3001	2.126	3.390	2001	4.477	1.649	4.406	1.626
2.126	3.390	3001	2.136	3.362	2001	4.406	1.626	4.421	1.580
2.047	3.331	3001	2.037	3.361	2001	4.279	1.531	4.263	1.579
1.958	3.301	3001	1.992	3.347	2001	4.137	1.483	4.192	1.556
1.914	3.286	3001	1.948	3.332	2001	4.066	1.459	4.120	1.533
3.013	3.697	3001	2.968	3.683	2001	5.823	2.116	5.751	2.094
2.751	3.594	3001	2.799	3.628	2001	5.404	1.951	5.465	2.006
2.617	3.550	3001	2.609	3.573	2001	5.190	1.881	5.178	1.918
2.483	3.506	3001	2.475	3.532	2001	4.976	1.811	4.963	1.852
2.430	3.518	3001	2.385	3.505	2001	4.891	1.830	4.820	1.808
2.260	3.434	3001	2.251	3.463	2001	4.620	1.695	4.605	1.742
2.251	3.463	3001	2.206	3.450	2001	4.605	1.742	4.533	1.720
2.206	3.450	3001	2.215	3.419	2001	4.533	1.720	4.548	1.672
2.206	3.450	3001	2.161	3.436	2001	4.533	1.720	4.461	1.698
2.037	3.361	3001	2.026	3.394	2001	4.263	1.573	4.246	1.633
2.026	3.394	3001	1.981	3.381	2001	4.246	1.633	4.175	1.611
1.981	3.381	3001	1.992	3.347	2001	4.175	1.611	4.192	1.556
1.948	3.332	3001	1.981	3.381	2001	4.120	1.533	4.175	1.611
1.443	3.216	3001	1.398	3.202	2001	3.315	1.347	3.243	1.325
3.013	3.697	3001	3.053	3.728	2001	5.823	2.116	5.867	2.166
2.968	3.683	3001	2.918	3.690	2001	5.751	2.094	5.670	2.104

2.789	3.628	3001	2.737	3.638	2001	5.465	2.006	5.382	2.021
2.609	3.573	3001	2.557	3.586	2001	5.178	1.918	5.094	1.939
2.475	3.532	3001	2.466	3.560	2001	4.963	1.852	4.950	1.897
2.430	3.518	3001	2.421	3.547	2001	4.891	1.830	4.878	1.877
2.385	3.505	3001	2.376	3.534	2001	4.820	1.808	4.806	1.856
2.286	3.509	3001	2.196	3.483	2001	4.661	1.815	4.517	1.773
2.206	3.450	3001	2.196	3.483	2001	4.533	1.720	4.517	1.773
2.196	3.483	3001	2.151	3.470	2001	4.517	1.773	4.445	1.753
2.151	3.470	3001	2.161	3.436	2001	4.445	1.753	4.461	1.698
1.981	3.381	3001	1.925	3.405	2001	4.175	1.611	4.085	1.649
1.443	3.216	3001	1.429	3.263	2001	3.315	1.347	3.292	1.422
1.429	3.263	3001	1.398	3.202	2001	3.292	1.422	3.243	1.325
3.053	3.728	3001	3.048	3.744	2001	5.887	2.166	5.879	2.192
2.918	3.690	3001	2.912	3.708	2001	5.670	2.104	5.662	2.133
2.737	3.638	3001	2.731	3.659	2001	5.382	2.021	5.373	2.055
2.557	3.586	3001	2.550	3.611	2001	5.094	1.939	5.083	1.978
2.550	3.611	3001	2.459	3.586	2001	5.083	1.978	4.938	1.939
2.459	3.586	3001	2.466	3.560	2001	4.938	1.939	4.950	1.897
2.421	3.547	3001	2.414	3.574	2001	4.878	1.877	4.866	1.919
2.414	3.574	3001	2.369	3.562	2001	4.866	1.919	4.793	1.900
2.369	3.562	3001	2.376	3.534	2001	4.793	1.900	4.806	1.856
2.286	3.509	3001	2.278	3.538	2001	4.661	1.815	4.649	1.661
2.278	3.538	3001	2.187	3.513	2001	4.649	1.861	4.504	1.822
2.187	3.513	3001	2.196	3.483	2001	4.504	1.822	4.517	1.773
1.925	3.405	3001	1.961	3.452	2001	4.085	1.649	4.142	1.725
3.048	3.744	3001	3.044	3.761	2001	5.879	2.192	5.873	2.217
2.912	3.708	3001	2.953	3.738	2001	5.662	2.133	5.727	2.181
2.731	3.659	3001	2.726	3.681	2001	5.373	2.055	5.364	2.090
2.407	3.601	3001	2.362	3.589	2001	4.855	1.962	4.782	1.944
1.961	3.452	3001	1.997	3.498	2001	4.142	1.725	4.200	1.798
3.044	3.761	3001	2.995	3.764	2001	5.873	2.217	5.794	2.224
2,953	3.738	3001	2.949	3.754	2001	5.727	2.181	5.721	2.207
2.726	3.681	3001	2.675	3.690	2001	5.364	2.090	5.283	2.104
2.407	3.601	3001	2.401	3.625	2001	4.855	1.962	4.845	2.001
2.362	3.589	3001	2.355	3.615	2001	4.782	1.944	4.772	1.984
1.997	3.498	3001	1.990	3.529	2001	4.200	1.798	4.188	1.847
2.995	3.764	3001	3.037	3.791	2001	5.794	2.224	5.861	2.267
2.949	3.754	3001	2.991	3.781	2001	5.721	2.207	5.788	2.251
2.675	3.690	3001	2.716	3.722	2001	5.283	2.104	5.348	2.156
2.401	3.625	3001	2.395	3.652	2001	4.845	2.001	4.835	2.045
2.395	3.652	3001	2.349	3.642	2001	4.835	2.045	4.762	2.029
2.349	3.642	3001	2.355	3.615	2001	4.762	2.029	4.772	1.984
2.120	3.593	3001	2.074	3.583	2001	4.396	1.949	4.323	1.933
1.990	3.529	3001	2.028	3.573	2001	4.188	1.847	4.249	1.918
3.037	3.791	3001	3.034	3.808	2001	5.861	2.257	5.856	2.293
2.991	3.781	3001	2.988	3.799	2001	5.788	2.251	5.782	2.278
2.716	3.722	3001	2.711	3.744	2001	5.348	2.156	5.341	2.190
2.120	3.593	3001	2.113	3.625	2001	4.396	1.949	4.385	2.000
2.113	3.625	3001	2.067	3.615	2001	4.385	2.000	4.312	1.985
2,067	3.615	3001	2.074	3.583	2001	4.312	1.985	4.323	1.933
2.028	3.573	3001	2.067	3.615	2001	4.249	1.918	4.312	1.985
3.034	3.808	3001	3.031	3.821	2001	5.856	2.293	5.852	2.314
2.988	3.799	3001	2.985	3.813	2001	5.782	2.278	5.778	2.300
2,711	3.744	3001	2.662	3.753	2001	5.341	2.190	5.262	2.205
2.067	3.615	3001	2.108	3.651	2001	4.312	1.985	4.377	2.042
3.031	3.821	3001	3.028	3.837	2001	5.852	2.314	5.847	2.340
2.985	3.813	3001	2.982	3.830	2001	5.778	2.300	5.773	2.328
2.662	3.753	3001	2.612	3.768	2001	5.262	2.205	5.182	2.229
2.519	3.752	3001	2.473	3.745	2001	5.034	2.204	4.960	2.192
2.149	3.690	3001	2.103	3.683	2001	4.442	2.105	4.368	2.093
2.108	3.651	3001	2.010	3.667	2001	4.377	2.042	4.220	2.068
3.028	3.837	3001	3.026	3.854	2001	5.847	2.340	5.843	2.366
2.982	3.830	3001	2.933	3.840	2001	5.773	2.328	5.695	2.344
2.612	3.768	3001	2.654	3.798	2001	5.182	2.229	5.250	2.278
2.608	3.791	3001	2.562	3.784	2001	5.176	2.266	5.102	2.255
2.519	3.752	3001	2.515	3.777	2001	5.034	2.204	5.027	2.244

2.515	3.777	3001	2.469	3.770	2001	5.027	2.244	4.953	2.233
2.469	3.770	3001	2.473	3.745	2001	4.953	2.233	4.960	2.192
2.376	3.756	3001	2.330	3.749	2001	4.805	2.211	4.731	2.200
2.237	3.736	3001	2.130	3.729	2001	4.583	2.177	4.506	2.166
2.149	3.690	3001	2.144	3.722	2001	4.442	2.105	4.434	2.155
2.103	3.683	3001	2.098	3.715	2001	4.368	2.093	4.360	2.144
2.098	3.715	3001	2.010	3.667	2001	4.360	2.144	4.220	2.068
3.026	3.854	3001	3.023	3.870	2001	5.843	2.366	5.839	2.393
2.933	3.840	3001	2.977	3.864	2001	5.635	2.344	5.765	2.383
2.654	3.798	3001	2.605	3.815	2001	5.250	2.279	5.170	2.304
2.608	3.791	3001	2.605	3.815	2001	5.176	2.266	5.170	2.304
2.605	3.815	3001	2.558	3.809	2001	5.170	2.304	5.096	2.294
2.558	3.809	3001	2.562	3.784	2001	5.036	2.294	5.102	2.255
2.558	3.809	3001	2.512	3.802	2001	5.096	2.294	5.022	2.284
2.376	3.756	3001	2.372	3.784	2001	4.805	2.211	4.799	2.255
2.372	3.784	3001	2.326	3.778	2001	4.799	2.255	4.724	2.245
2.326	3.778	3001	2.330	3.749	2001	4.724	2.245	4.731	2.200
2.237	3.736	3001	2.233	3.765	2001	4.583	2.177	4.576	2.225
2.233	3.765	3001	2.186	3.759	2001	4.576	2.225	4.502	2.215
2.186	3.759	3001	2.190	3.729	2001	4.502	2.215	4.508	2.166
2.144	3.722	3001	2.093	3.747	2001	4.434	2.155	4.353	2.195
3.023	3.870	3001	3.021	3.887	2001	5.839	2.393	5.836	2.419
2.977	3.864	3001	2.928	3.876	2001	5.765	2.383	5.687	2.402
2.695	3.849	3001	2.648	3.844	2001	5.315	2.359	5.240	2.350
2.605	3.815	3001	2.602	3.838	2001	5.170	2.304	5.166	2.342
2.558	3.809	3001	2.555	3.833	2001	5.096	2.294	5.091	2.333
2.512	3.802	3001	2.508	3.828	2001	5.022	2.284	5.017	2.324
2.093	3.747	3001	2.089	3.779	2001	4.353	2.195	4.346	2.247
3.021	3.887	3001	3.019	3.903	2001	5.836	2.419	5.833	2.446
2.928	3.876	3001	2.973	3.899	2001	5.687	2.402	5.759	2.438
2.695	3.849	3001	2.693	3.871	2001	5.315	2.359	5.311	2.394
2.693	3.871	3001	2.648	3.844	2001	5.311	2.394	5.240	2.350
2.602	3.838	3001	2.599	3.862	2001	5.166	2.342	5.162	2.379
2.555	3.833	3001	2.552	3.857	2001	5.091	2.333	5.087	2.372
2.552	3.857	3001	2.506	3.853	2001	5.087	2.372	5.012	2.365
2.506	3.853	3001	2.508	3.828	2001	5.012	2.365	5.017	2.324
2.089	3.779	3001	2.086	3.811	2001	4.346	2.247	4.341	2.298
1.805	3.784	3001	1.759	3.779	2001	3.893	2.254	3.819	2.247
3.019	3.903	3001	3.018	3.917	2001	5.833	2.446	5.831	2.467
3.018	3.917	3001	2.973	3.899	2001	5.831	2.467	5.759	2.438
2.599	3.862	3001	2.597	3.881	2001	5.162	2.379	5.159	2.410
2.504	3.873	3001	2.457	3.869	2001	5.009	2.398	4.935	2.391
2.270	3.854	3001	2.223	3.850	2001	4.636	2.366	4.561	2.360
2.086	3.811	3001	2.036	3.834	2001	4.341	2.298	4.262	2.334
1.990	3.830	3001	1.943	3.826	2001	4.185	2.328	4.113	2.322
1.896	3.822	3001	1.849	3.818	2001	4.038	2.315	3.964	2.309
1.805	3.784	3001	1.803	3.814	2001	3.893	2.254	3.889	2.303
1.803	3.814	3001	1.759	3.779	2001	3.899	2.303	3.819	2.247
2.597	3.881	3001	2.596	3.905	2001	5.159	2.410	5.156	2.448
2.504	3.873	3001	2.502	3.899	2001	5.009	2.398	5.006	2.438
2.502	3.899	3001	2.455	3.895	2001	5.006	2.438	4.932	2.433
2.455	3.895	3001	2.457	3.869	2001	4.932	2.433	4.935	2.391
2.270	3.854	3001	2.268	3.883	2001	4.636	2.366	4.632	2.413
2.268	3.883	3001	2.221	3.880	2001	4.632	2.413	4.556	2.408
2.221	3.880	3001	2.223	3.850	2001	4.558	2.408	4.561	2.360
2.036	3.834	3001	2.034	3.867	2001	4.262	2.334	4.258	2.387
2.034	3.867	3001	1.987	3.864	2001	4.258	2.387	4.184	2.382
1.987	3.864	3001	1.990	3.830	2001	4.184	2.382	4.186	2.328
1.943	3.826	3001	1.940	3.861	2001	4.113	2.322	4.109	2.377
1.940	3.861	3001	1.893	3.857	2001	4.109	2.377	4.034	2.372
1.893	3.857	3001	1.896	3.822	2001	4.034	2.372	4.038	2.315
1.849	3.818	3001	1.800	3.651	2001	3.964	2.309	3.884	2.362
2.596	3.905	3001	2.594	3.931	2001	5.156	2.448	5.154	2.483
1.600	3.651	3001	1.844	3.894	2001	3.884	2.362	3.955	2.431
2.594	3.931	3001	2.546	3.953	2001	5.156	2.483	5.077	2.525
2.406	3.948	3001	2.359	3.947	2001	4.852	2.518	4.777	2.515

1.844	3.894	3001	1.796	3.929	2001	3.955	2.431	3.878	2.486
2.546	3.953	3001	2.593	3.976	2001	5.077	2.525	5.151	2.562
2.406	3.948	3001	2.405	3.973	2001	4.852	2.518	4.851	2.557
2.405	3.973	3001	2.358	3.972	2001	4.851	2.557	4.776	2.556
2.358	3.972	3001	2.359	3.947	2001	4.776	2.556	4.777	2.515
2.030	3.967	3001	1.983	3.966	2001	4.252	2.547	4.177	2.545
1.796	3.929	3001	1.795	3.963	2001	3.878	2.486	3.877	2.540
2.593	3.976	3001	2.545	3.998	2001	5.151	2.562	5.076	2.596
2.030	3.967	3001	2.029	3.997	2001	4.252	2.547	4.251	2.595
2.029	3.997	3001	1.982	3.997	2001	4.251	2.595	4.176	2.595
1.982	3.997	3001	1.983	3.966	2001	4.176	2.595	4.177	2.545
1.795	3.963	3001	1.795	3.996	2001	3.877	2.540	3.876	2.594
2.639	4.023	3001	2.593	4.024	2001	5.226	2.637	5.151	2.638
2.545	3.998	3001	2.499	4.025	2001	5.076	2.596	5.001	2.640
1.795	3.996	3001	1.842	4.036	2001	3.876	2.594	3.952	2.658
2.639	4.023	3001	2.687	4.038	2001	5.226	2.637	5.302	2.661
2.593	4.024	3001	2.593	4.041	2001	5.151	2.638	5.152	2.665
2.499	4.025	3001	2.546	4.042	2001	5.001	2.640	5.077	2.668
1.842	4.036	3001	1.796	4.064	2001	3.952	2.658	3.878	2.702
2.687	4.038	3001	2.641	4.073	2001	5.302	2.661	5.229	2.717
2.593	4.041	3001	2.594	4.075	2001	5.152	2.665	5.154	2.721
2.594	4.075	3001	2.548	4.078	2001	5.154	2.721	5.079	2.725
2.548	4.078	3001	2.546	4.042	2001	5.079	2.725	5.077	2.668
1.796	4.064	3001	1.845	4.116	2001	3.878	2.702	3.956	2.785
2.641	4.073	3001	2.596	4.095	2001	5.229	2.717	5.156	2.752
2.549	4.098	3001	2.502	4.101	2001	5.081	2.757	5.006	2.762
1.845	4.116	3001	1.893	4.142	2001	3.956	2.785	4.034	2.827
2.596	4.095	3001	2.597	4.119	2001	5.156	2.752	5.159	2.789
2.549	4.098	3001	2.551	4.122	2001	5.081	2.757	5.084	2.796
2.502	4.101	3001	2.504	4.126	2001	5.006	2.762	5.009	2.802
1.893	4.142	3001	1.943	4.174	2001	4.034	2.827	4.113	2.878
2.597	4.119	3001	2.646	4.135	2001	5.159	2.789	5.237	2.816
2.551	4.122	3001	2.553	4.145	2001	5.084	2.796	5.087	2.831
2.553	4.145	3001	2.506	4.149	2001	5.087	2.831	5.013	2.839
2.506	4.149	3001	2.504	4.126	2001	5.013	2.839	5.009	2.882
2.506	4.149	3001	2.459	4.154	2001	5.013	2.839	4.938	2.846
1.943	4.174	3001	1.946	4.205	2001	4.113	2.878	4.118	2.928
2.646	4.135	3001	2.602	4.166	2001	5.237	2.816	5.166	2.865
2.556	4.171	3001	2.509	4.177	2001	5.092	2.874	5.018	2.883
2.506	4.149	3001	2.509	4.177	2001	5.013	2.839	5.018	2.883
2.509	4.177	3001	2.462	4.182	2001	5.018	2.883	4.943	2.891
2.462	4.182	3001	2.459	4.154	2001	4.943	2.891	4.938	2.846
1.946	4.205	3001	1.950	4.243	2001	4.118	2.928	4.124	2.988
2.602	4.166	3001	2.651	4.181	2001	5.166	2.865	5.245	2.889
2.605	4.187	3001	2.558	4.193	2001	5.171	2.899	5.097	2.909
2.556	4.171	3001	2.558	4.193	2001	5.092	2.874	5.097	2.909
2.558	4.193	3001	2.512	4.200	2001	5.097	2.909	5.022	2.919
2.512	4.200	3001	2.509	4.177	2001	5.022	2.919	5.018	2.883
2.465	4.206	3001	2.419	4.212	2001	4.948	2.929	4.874	2.939
1.950	4.243	3001	2.000	4.268	2001	4.124	2.988	4.205	3.029
2.651	4.181	3001	2.608	4.209	2001	5.245	2.889	5.176	2.933
2.605	4.187	3001	2.608	4.209	2001	5.171	2.899	5.176	2.933
2.608	4.209	3001	2.562	4.216	2001	5.176	2.933	5.102	2.944
2.562	4.216	3001	2.558	4.193	2001	5.102	2.944	5.097	2.909
2.465	4.206	3001	2.469	4.229	2001	4.948	2.929	4.953	2.967
2.469	4.229	3001	2.422	4.236	2001	4.953	2.967	4.879	2.978
2.422	4.236	3001	2.419	4.212	2001	4.879	2.978	4.874	2.939
2.000	4.268	3001	2.051	4.292	2001	4.205	3.029	4.286	3.067
2.608	4.209	3001	2.474	4.260	2001	5.176	2.933	4.961	3.015
2.051	4.292	3001	2.104	4.323	2001	4.286	3.067	4.370	3.116
2.474	4.260	3001	2.478	4.283	2001	4.961	3.015	4.968	3.053
2.104	4.323	3001	2.109	4.352	2001	4.370	3.116	4.378	3.162
2.478	4.283	3001	2.484	4.314	2001	4.968	3.053	4.977	3.101
2.109	4.352	3001	2.254	4.361	2001	4.378	3.162	4.610	3.177
2.070	4.399	3001	2.024	4.409	2001	4.316	3.238	4.243	3.253
2.009	4.265	3001	2.763	4.276	2001	5.497	3.024	5.424	3.040

[illegible]	4.314	3001	2.584	4.327	2001		5.132	3.106	5.050	3.122
[illegible]	4.314	3001	2.347	4.357	2001		4.977	3.101	4.839	3.171
[illegible]	4.301	3001	2.319	4.378	2001		4.610	3.177	4.692	3.203
[illegible]	4.299	3001	2.077	4.429	2001		4.316	3.238	4.327	3.205
[illegible]	4.429	3001	2.324	4.439	2001		4.327	3.205	4.263	3.253
[illegible]	4.265	3001	2.415	4.291	2001		5.497	3.024	5.587	3.065
[illegible]	4.291	3001	2.763	4.276	2001		5.587	3.065	5.424	3.040
2.724	4.313	3001	2.633	4.336	2001		5.361	3.131	5.216	3.136
2.608	4.324	3001	2.587	4.347	2001		5.132	3.106	5.147	3.154
2.587	4.347	3001	2.534	4.327	2001		5.143	3.154	5.050	3.122
2.397	4.357	3001	2.405	4.392	2001		4.839	3.171	4.852	3.226
2.409	4.392	3001	2.305	4.378	2001		4.852	3.226	4.692	3.203
2.724	4.313	3001	2.726	4.321	2001		5.461	3.101	5.366	3.113
2.633	4.336	3001	2.598	4.355	2001		5.216	3.136	5.146	3.160
2.726	4.321	3001	2.824	4.325	2001		5.366	3.113	5.521	3.120
2.734	4.350	3001	2.643	4.375	2001		5.377	3.160	5.232	3.203
2.900	4.355	3001	2.598	4.388	2001		5.165	3.160	5.165	3.226
2.824	4.325	3001	2.831	4.349	2001		5.521	3.120	5.532	3.157
2.700	4.362	3001	2.761	4.375	2001		5.450	3.179	5.380	3.233
2.734	4.350	3001	2.696	4.389	2001		5.377	3.160	5.316	3.221
2.643	4.375	3001	2.651	4.402	2001		5.232	3.200	5.245	3.243
2.651	4.402	3001	2.590	4.388	2001		5.245	3.243	5.160	3.228
1.527	4.730	3001	1.482	4.751	2001		3.449	3.770	3.377	3.800
1.392	4.770	3001	1.247	4.791	2001		3.233	3.843	3.161	3.864
4.000	4.000	3002	4.172	.004	2002	OUTSIDE PLOT AREA	7.400	2.600	7.675	-3.755
.167	5.143	3002	4.100	4.000	2002	OUTSIDE PLOT AREA	1.275	4.427	7.400	2.600
3.070	2.790	4001				OUTSIDE PLOT AREA	5.926	.667		
3.120	3.070	4002					6.006	1.114		
2.700	4.340	4003					5.323	3.156		
2.062	2.026	4004				OUTSIDE PLOT AREA	4.304	-.554		
2.187	3.047	4005					4.375	1.870		
2.994	3.002	4006					5.792	2.204		
2.303	3.002	4007					4.605	2.204		
1.370	4.704	4009					3.137	3.053		
3.001	2.794	5001				OUTSIDE PLOT AREA	5.932	.672		
2.922	3.279	5002					5.677	1.447		
1.943	4.063	5003					3.954	2.703		
2.441	4.043	5004					4.910	2.663		
2.575	4.122	5005					5.122	2.736		
2.349	4.223	5006					4.762	2.956		
2.600	4.331	5007					5.291	3.129		
2.245	3.241	6001					4.596	1.307		
2.060	3.237	6002					4.300	1.330		
2.312	3.726	6003					4.733	2.162		
2.523	3.779	6004					5.039	2.247		
2.100	3.947	6005					4.364	2.515		
3.001	2.796	7001				OUTSIDE PLOT AREA	5.931	.676		
3.120	3.070	7002					6.005	1.114		
2.062	2.025	7003				OUTSIDE PLOT AREA	4.303	-.555		
2.106	3.045	7004					4.374	1.074		
2.909	3.733	7005					5.752	2.174		