TEXAS HIPLEX MESOSCALE EXPERIMENT
SUMMER 1980 DATA TABULATIONS

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16. ABSTRACT

This report describes mesoscale experiment that was conducted in West Texas during the Summer of 1980 as part of the High Plains Cooperative Program (HIPLEX). Data are presented for sixteen surface stations and seven rawinsonde stations. The surface data consist of 10-min averages of temperature, relative humidity, and pressure for each hour on the hour for the period May 15 through June 30, 1980. Rawinsonde data are presented at 25-mb intervals for 22 operational days during the period May 15 through June 30, 1980. On each operational day soundings were made at 3-h intervals usually during a 12-h period beginning at 1500 GMT Soundings taken at Big Spring during July 1980 are also included. Radar-observed convective activity taken from Midland NWS radar data is presented for each day for the period May 15 through June 30, 1980.

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Special recognition is due the Texas A&M students who participated in the field program and assisted in the data reduction for this report.

Sincere appreciation is extended to the Atmospheric Science Division, National Aeronautics and Space Administration, Marshall Space Flight Center, Alabama, for providing five rawinsonde units for use in the field program. Without these units the sounding part of the field program would not have been possible. NASA also provided some components and spare parts necessary for the operation of the wind equipment provided by NCAR at the surface weather stations.

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DATA TABULATIONS

by

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1. INTRODUCTION

Mesoscale experiments were conducted during the summers of 1976, 1977, 1978, 1979, and 1980 in the Texas HIPLEX area. Data for the 1976, 1977, 1978, and 1979 experiments are given by Scoggins and Wilson (1976), Scoggins (1977), Reynolds, et al. (1978), and Williams, et al. (1980), respectively. The primary objective of the mesoscale experiments was to gather surface and upper air sounding data on a scale smaller than the usual synoptic scale for use in the analysis of the initiation, origin, growth, intensity, etc., of convective clouds, and to investigate interrelationships between convective clouds and their immediate environment.

This report contains the mesoscale data collected at sixteen manual surface stations and seven rawinsonde stations during the period 15 May through 30 June 1980, and a summary of radar-observed convective activity in the area of the National Weather Service (NWS) radar at Midland, Texas.

Seven rawinsonde stations were operated in the Texas HIPLEX area in 1980. Five GMD-1 rawinsonde units were loaned by the National Aeronautics and Space Administration (NASA). Texas A&M University provided one GMD-1 unit. An RD-65 rawinsonde unit provided by the Water and Power Resources Service (WPRS) was located at Big Spring.

Wind measurement equipment for the fourteen surface weather stations maintained by TAMU was loaned by the National Center for Atmospheric Research (NCAR). NASA provided some components and the spare parts needed to operate this equipment. TAMU supplied hygrothermographs, microbarographs, and instrument shelters for these stations.

2. DECLARATION OF MESOSCALE OPERATIONAL DAYS

The declaration of a mesoscale operational day was based upon expected weather conditions. Since cloud seeding and cloud physics measurements by aircraft were planned for each mesoscale operational day, a day was declared a mesoscale operational day only if convective clouds were forecast to penetrate the $-10^{o}C$ level within the target area (see Fig. 1). The data collection period for each mesoscale operational day usually began at 1500 GMT and concluded at 0300 GMT the following day (10 a.m. to 10 p.m. local time). On several days when convective activity was not expected throughout the day, a mesoscale operational day was declared; however, soundings were taken only during part of the period.

3. THE MEASUREMENT PROGRAM

3.1 Surface

A network of sixteen surface weather stations was located in an area bounded by Sterling City, Clairemont, Brownfield, Seminole, and Midland (Fig. 2). A list of these stations is given in Table 1. All stations except Big Spring and Midland were maintained by Texas A&M personnel. The Big Spring and Midland stations were operated by the TAMU Agricultural Extension Service and National Weather Service, respectively.

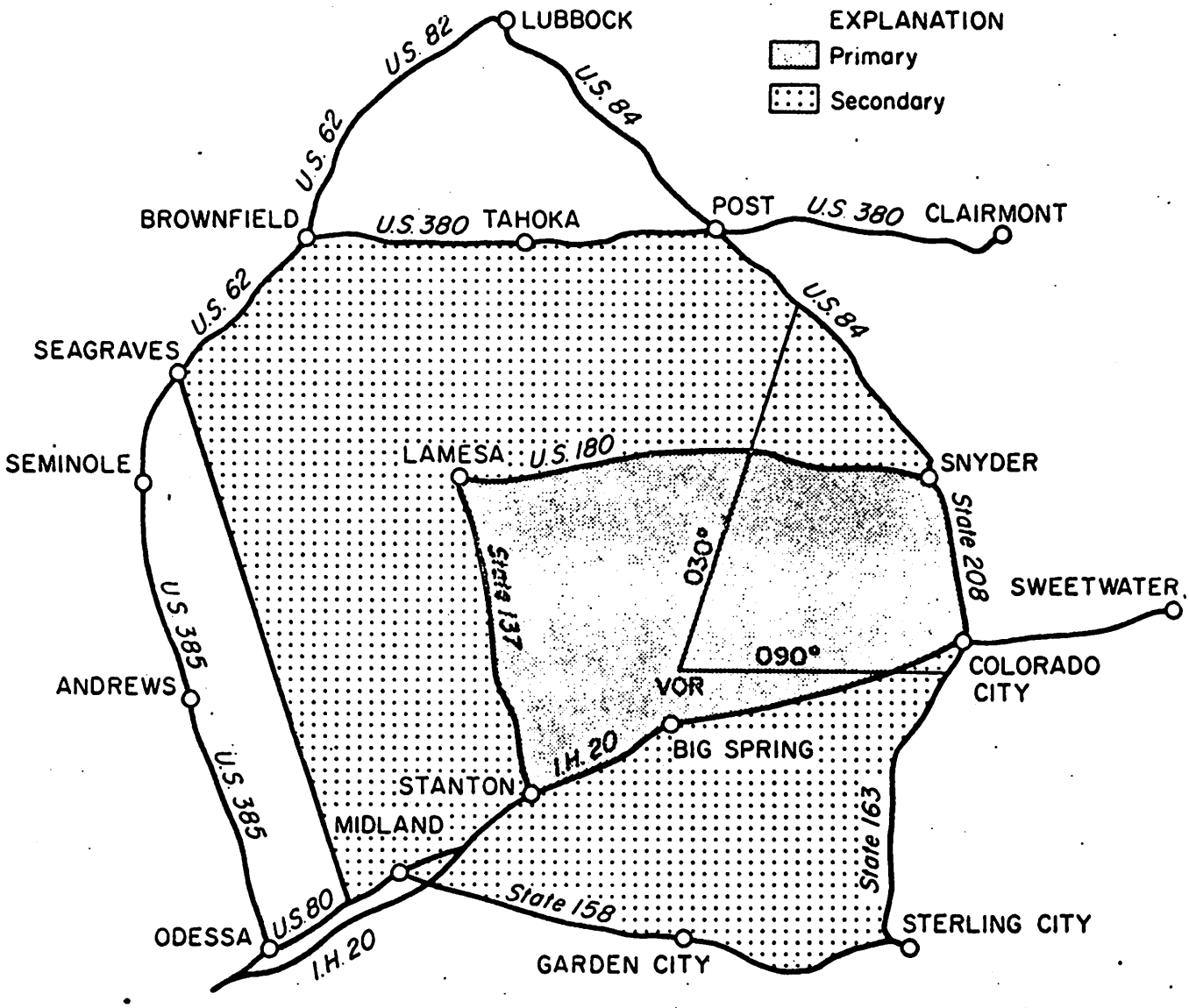


Fig. 1. Target-area for the 1980 Texas HIPLEX mesoscale experiment.

Table 1. Information on the 1980 Texas HIPLEX surface station network.

Name	ID	NO	North Latitude (deg)	West Longitude (deg)	Height (m)
Andrews	AN	9	32°19.0'	102°24.3'	935
Big Spring	BG	11	32°13.5'	101°31.9'	763
Brownfield	BR	1	33°11.0'	102°17.8'	1011
Clairmont	CL	4	33°09.5'	100°54.0'	663
Colorado City	CC	12	32°15.5'	100°59.0'	642
Gail	GA	7	32°46.4'	101°30.3'	800
Garden City	GC	15	31°52.2'	101°28.1'	804
Lamesa	LA	6	32°44.9'	101°54.8'	910
Midland	MA	13	31°56.6'	102°11.4'	873
Post	PO	3	33°12.1'	101°20.3'	772
Seminole	SE	5	32°42.6'	102°25.8'	963
Snyder	SN	8	32°42.0'	100°57.0'	742
Sprayberry	SP	14	31°55.3'	101°49.7'	803
Sterling City	SC	16	31°50.4'	101°00.5'	702
Tahoka	TA	2	33°10.7'	101°49.3'	949
Tarzan	TZ	10	32°18.4'	101°56.3'	866

Table 2. Information on the 1980 Texas HIPLEX rawinsonde station network.

Name	ID	NO	North Latitude (deg)	West Longitude (deg)	Height (m)
Big Spring	BG	770	32°13.6'	101°30.9'	784
Lamesa	LA	550	32°45.3'	101°54.9'	912
Midland	MA	265	31°56.6'	102°11.4'	873
Post	PO	330	33°12.1'	101°20.3'	772
Seagraves	SG	440	32°57.4'	102°32.3'	1025
Snyder	SN	660	32°42.0'	100°57.0'	742
Sterling City	SC	880	31°50.4'	101°00.6'	702

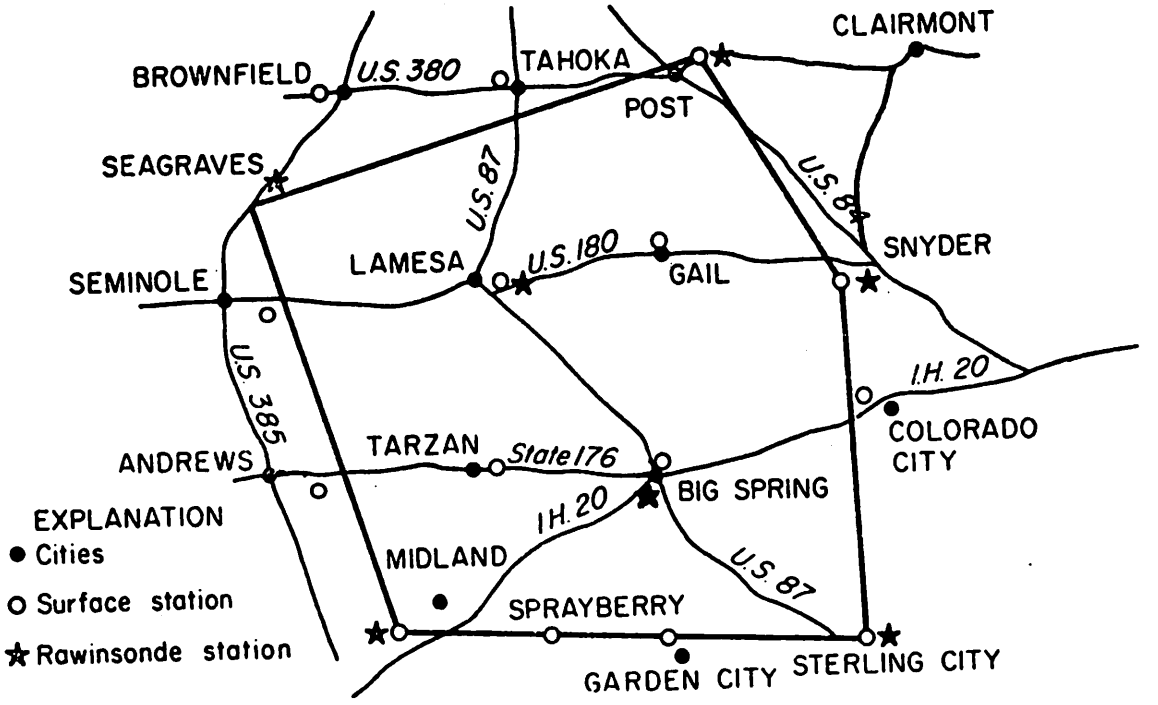


Fig. 2. Location of surface and rawinsonde stations in the 1980 Texas HIPLEX experiment.

Each TAMU surface site consisted of a hygrothermograph and microbarograph housed in a standard instrument shelter, a tower supporting a three cup anemometer and wind vane, and two battery powered wind recorders. The instruments at each site were calibrated and checked every three days. Hygrothermographs were calibrated using an aspirated psychrometer. Microbarographs were calibrated using an aneroid barometer that was checked daily using a mercurial barometer. Testing was done before the field season to calibrate wind speed recorders.

3.2 Rawinsonde soundings

Atmospheric soundings were made on 22 mesoscale operational days during the period 15 May through 30 June 1980 at all locations. Additional soundings were made at Big Spring until July 30. A list of the rawinsonde stations is given in Table 2, and their locations are shown in Fig. 2. Soundings were made at 3-h intervals. On most days the

first observation was at 1500 GMT, and on half of the days the last observation was at 0300 GMT. On some of the operational days the decision to operate was deferred or cancelled because of weather or other conditions, so observations started later than 1500 GMT or terminated before 0300 GMT. On these days less than five soundings were made at each station. An attempt was made to release all soundings within twenty minutes before the hour when possible, but in some cases the release was later. However, most soundings were released within 30 minutes of the scheduled time.

Equipment problems were encountered with all of the rawinsonde equipment which resulted in some missing data. In most cases the entire sounding was lost, but in a few cases only portions of the thermodynamic and/or wind data were lost. In some cases low elevation angles of the sonde above the horizon resulted in lost or unusable data.

3.3 Other

In addition to surface and rawinsonde data, rainfall, radar, aircraft, and teletype/facsimile data were collected during the experiment period. These include rainfall and teletype/facsimile data collected by the Colorado River Municipal Water District (CRMWD), radar data collected by Texas Tech University (TTU), aircraft data collected by NCAR and CRMWD, radar data collected by the NWS in Midland, and teletype/facsimile data collected by TAMU. The rainfall data were processed by TTU. Data discussed here do not appear in this document but are available.

4. DATA PROCESSING PROCEDURES

4.1 Surface

The surface data consisting of wind direction and speed, temperature, relative humidity, and pressure were extracted from the strip charts as 10-min averages, centered on each hour. Hourly data were then keypunched and checked for accuracy using a centered difference technique. Original charts were checked to correct possible errors.

4.2 Rawinsonde soundings

All soundings were processed at TAMU by extracting ordinate data for each pressure contact and angle data at 30-sec intervals. These data were then keypunched and processed by use of the computer program developed by Fuelberg (1974). (This program is also given in Appendix C of TWDB Report No. 76-12 by Scoggins and Wilson (1976) and includes information on its accuracy). These data were subjected to a number of error analysis schemes and all questionable data points checked and corrected as necessary.

Time cross sections of temperature, relative humidity, geopotential height, wind direction and speed, and balloon rise rate were computer plotted and analyzed to insure continuity at each station. Deviations of geopotential height and temperature from a daily mean were also plotted as time cross sections. Constant pressure charts at several levels for temperature, dewpoint depression, wind, and geopotential height were plotted and analyzed to check for spatial consistency. All questionable data points were examined and some corrections made. Only obviously incorrect data were changed or deleted since it is difficult to determine whether or not a slight error in the data exists. The data

were found to be remarkably continuous in space and time. After all final corrections were applied, sounding data for each contact and interpolated to 25-mb intervals were produced.

In addition to the TAMU method of sounding processing, all sounding data were coded in the WPRS format, and a magnetic tape prepared and sent to WPRS for processing and archiving.

4.3 Radar

Arrangements were made to obtain all radar data including plan-position indicator (PPI) traces with corresponding radar logs from the NWS at Midland, Texas. These data were manually digitized on a grid of 15.8 km, computer plotted, and contoured. These plots were then cross checked against the original data for accuracy.

5. PRESENTATION OF DATA

5.1 Radar

Computer contoured radar plots of the Texas HIPLEX area are presented in Appendix A for each hour on each day during the operational period (1000-2200 CDT) on which echoes were observed. The code used on the plots is:

0 - no echoes

1 - tops less than 6.1 km (20K ft)

2 - tops between 6.1 and 9.1 km (20 - 30K ft)

3 - tops exceeding 9.1 km (30K ft)

The no-echo (0) category is shown as blank on the plots. The two letter identifiers represent surface station locations. "Missing data" denotes times when data were not available, or when equipment

problems were experienced, and "no echoes" denotes times when no echoes were observed within the Texas HIPLEX area. These data are presented only for the purpose of showing the general nature and extent of the convective activity.

5.2 Surface

All surface data are presented in tabular form in Appendix B. The data are presented by day and local time within each day. Metric units are used in the presentation of all data. Surface pressure is in millibars, temperature in ^{o}C, relative humidity in percent, wind direction in degrees from which the wind was blowing measured clockwise from true north, and wind speed in m s^{-1}. A series of nines indicates missing data.

An inventory of missing data showed that 87% of the data were recovered. Most of the missing data were wind data. A list of missing data with a percentage of data recovered from each station is presented in Table 3. In addition to the tables presented in Appendix B, the surface data have been recorded on magnetic tape and are available to researchers on a need basis.

5.3 Rawinsonde

All rawinsonde data processed at TAMU are given in Appendix C, presented at 25-mb intervals. Table 4 contains a list of all these soundings. All data are presented in metric units, and a listing of column headings of tabulated data is included in the appendix. The soundings are presented by time and station number sequence.

A list of soundings which may have entered thunderstorms is shown in Table 5. The criteria used as a basis for this classification included primarily variations in balloon rise rate and saturation through a depth of 5.0 km.

Table 3. Surface station inventory for the period 15 May through 30 June for the 1980 Texas HIPLEX mesoscale experiment.

Operational Period: May 15 - June 30, 1980.

Station	ID	Missing Data*	% Data Recovery
Brownfield	BR	051501-052014 (wind) 052104-052312 (wind) 052407-052914 (wind) 053008-060215 (wind) 060308-060615 (wind) 060711-061619 (wind)	84%
Tahoka	TA	051501-061618 (wind) 062106-062217 (wind)	82%
Post	PO	051518-051813 (wind) 052612-052714 (RH) 052704-052714 (wind) 060922-060924 (wind) 061221-061413 (wind) 061906-062012 (wind)	96%
Clairemont	CL	051501-051515 (wind) 051519-051520 (RH) 051521-051523 (Temp & RH) 051524-051811 (Temp, RH, & Press) 052117-052206 (wind) 052216-052223 (wind) 052310-052320 (wind) 052504-060122 (wind) 060314-060716 (wind) 060812-063024 (wind)	76%
Seminole	SM	All wind data missing 051514-051517 (RH) 060213-060217 (Press)	75%
Lamesa	LA	051501-051709 (wind) 051804-052010 (wind) 052023-052310 (wind) 052404-052412 (wind) 053004-060213 (wind) 060218-060612 (wind) 060701-061310 (wind) 061409-061620 (wind) 061709-061921 (wind) 062005-062220 (wind) 062524-062912 (wind) 062923-063024 (wind)	82%

Table 3 (continued), Surface station inventory.

Station	ID	Missing Data*	% Data Recovery
Gail	GA	051501-051518 (Press & Wind)	80%
		051519-051713 (wind)	
		051714-051814 (Temp, RH, & wind)	
		051919-051921 (wind)	
		052002-052008 (wind)	
		052113-052114 (wind)	
		052509-052717 (wind)	
		052809-060315 (wind)	
		060508-060713 (wind)	
		060805-061014 (wind)	
		061017-061416 (wind)	
		061512-061714 (RH)	
		061819-062016 (wind)	
		062105-062314 (wind)	
		062404-062714 (wind)	
		062808-063024 (wind)	
Snyder	SN	051508-051510 (Temp & RH)	89%
		051511-051514 (Temp, RH, wind)	
		052304-052409 (wind)	
		052624-052711 (wind)	
		052909-053010 (wind)	
		060114-060311 (wind)	
		060708-060717 (wind)	
		060817-061010 (wind)	
		061112-061410 (wind)	
		062213-062310 (wind)	
		062313-062711 (wind)	
		062712-062724 (Press & wind)	
		062801-063012 (wind)	
		063013-063024 (Press & wind)	
Andrews	AN	051501-051713 (Press & wind)	77%
		051714-060220 (wind)	
		060408-060709 (wind)	
		060716-060722 (wind)	
		060723-061313 (Press & wind)	
		061314-061518 (wind)	
		061820-061822 (wind)	
		061901-061905 (wind)	
		062204-062212 (wind)	
		062508-062908 (wind)	
		062924-063007 (wind)	

Table 3 (continued), Surface station inventory.

Station	ID	Missing Data*	% Data Recovery
Tarzan	TZ	051715-052020 (wind) 052317-052617 (Press) 052903-052917 (wind) 060223-060710 (Press) 061106-061314 (wind) 061512-061611 (wind) 061707-061712 (wind) 061724-061801 (wind) 062604-062611 (wind) 062616-062617 (wind) 062816-062817 (wind)	92%
Big Spring	BG	052607-052611 (Temp & RH) 063010-063011 (Temp & RH) 063011-063024 (Temp, RH, Press)	99%
Colorado City	CC	051501-051616 (wind) 052516-060804 (wind) 061116-061118 (wind) 061121-061123 (wind) 061207-061210 (wind) 061723-061813 (wind) 062401-062412 (wind)	91%
Midland	MA	none	100%
Sprayberry	SP	051515-051524 (wind) 051601-051612 (Press & wind) 051615-051912 (wind) 052516-052811 (wind) 052815-060121 (wind) 060308-060414 (wind) 060610-060812 (wind) 060819-061214 (wind) 062109-062116 (wind) 062210-062408 (wind) 062713-062721 (Press) 062813-062815 (Press)	89%

Table 3 (continued), Surface station inventory.

Station	ID	Missing Data*	& Data Recovery
Garden City	GC	051501-051603 (wind)	82%
		051911-051912 (wind)	
		051916-052214 (wind)	
		052502-052511 (wind)	
		052512-052701 (Press)	
		052702-052812 (Press & wind)	
		052713-060120 (wind)	
		060210-060416 (wind)	
		060509-060813 (wind)	
		060819-061215 (wind)	
		061310-061515 (wind)	
		061921-062115 (wind)	
		062209-062409 (wind)	
		062611-062714 (wind)	
		062715-062801 (Press & wind)	
		062802-062810 (wind)	
		062811-062814 (Press & wind)	
		062815-063014 (wind)	
Sterling City	SE	052614-052814 (wind)	97%
		052821-052824 (wind)	
		061024-061213 (wind)	
		062224-062304 (wind)	
		062814-063024 (wind)	
TOTAL			87%

*Missing data code expressed as Mo Mo Da Da Hr Hr

Table 4. Rawinsonde Sounding Inventory for 1980 Texas HIPLEX.

PO - Post
SG - Seagraves
LA - Lamesa
SN - Snyder
BG - Big Spring
MA - Midland
SE - Sterling City

May 15-16	PO	80051515	80051518	80051521	80051600	missing
	SG	"	"	"	"	80051603
	LA	missing	"	missing	missing	"
	SN	"	missing	"	"	missing
	BG	80051515	80051518	80051521	80051600	80051603
	MA	"	"	"	"	"
	SE	"	"	missing	"	"
May 19-20	PO	80051915	80051918	80051921	missing	missing
	SG	"	"	"	"	"
	LA	"	missing	"	"	"
	SN	"	80051918	"	"	"
	BG	"	"	"	"	"
	MA	"	"	"	"	"
	SE	"	"	missing	"	"
May 21-22	PO	missing	80052118	80052121	missing	missing
	SG	"	"	"	"	"
	LA	"	missing	"	"	"
	SN	"	80052118	"	"	"
	BG	"	"	"	"	"
	MA	"	"	"	"	"
	SE	"	"	"	"	"
May 23-24	PO	80052315	80052318	80052321	missing	missing
	SG	missing	"	"	"	"
	LA	80052315	"	"	"	"
	SN	"	"	"	"	"
	BG	"	"	"	"	"
	MA	"	"	"	"	"
	SE	"	"	"	"	"
May 26-27	PO	80052615	80052618	missing	missing	missing
	SG	"	"	80052621	80052700	80052703
	LA	missing	"	"	"	"
	SN	80052615	"	"	"	"
	BG	"	"	"	"	"
	MA	"	"	"	"	"
	SE	"	"	"	"	"

Table 4 (cont'd), Rawinsonde Sounding Inventory.

May	PO	missing	missing	80052721	80052800	80052803
27-28	SG	80052715	80052718	"	"	"
	LA	"	"	"	"	"
	SN	"	"	"	"	"
	BG	"	"	"	"	"
	MA	"	"	"	"	"
	SE	"	"	"	"	"
May	PO	80052815	80052818	80052821	missing	missing
28-29	SG	"	"	"	80052900	"
	LA	"	"	"	missing	"
	SN	"	"	"	80052900	"
	BG	"	missing	"	"	"
	MA	"	80052818	"	"	"
	SE	"	"	"	"	"
May	PO	80052915	80052918	missing	missing	missing
29-30	SG	"	"	"	"	"
	LA	"	"	"	"	"
	SN	"	"	"	"	"
	BG	"	"	"	"	"
	MA	"	"	"	"	"
	SE	"	"	"	"	"
June	PO	80060115	80060118	80060121	80060200	80060203
1-2	SG	"	"	"	"	"
	LA	"	"	"	"	"
	SN	"	"	"	"	"
	BG	"	"	"	"	"
	MA	"	"	"	"	"
	SE	"	"	"	"	"
June	PO	80060215	80060218	80060221	80060300	missing
2-3	SG	"	"	"	"	"
	LA	"	"	"	"	"
	SN	"	"	"	"	"
	BG	"	"	"	"	"
	MA	"	"	"	"	"
	SE	"	"	"	"	"
June	PO	80060315	missing	missing	missing	missing
3-4	SG	"	"	"	"	"
	LA	"	"	"	"	"
	SN	"	"	"	"	"
	BG	"	"	"	"	"
	MA	"	"	"	"	"
	SE	"	"	"	"	"

Table 4 (cont'd), Rawinsonde Sounding Inventory.

June	PO	80060815	80060818	80060821	80060900	80060903
8-9	SG	"	"	"	"	"
	LA	"	"	"	"	"
	SN	"	"	"	"	"
	BG	"	"	"	"	"
	MA	missing	missing	missing	"	"
	SE	80060815	80060818	80060821	"	"
June	PO	missing	80060918	80060921	80061000	80061003
9-10	SG	80060915	"	"	"	"
	LA	"	"	"	"	"
	SN	"	"	"	"	"
	BG	"	"	"	"	"
	MA	"	"	"	"	"
	SE	"	"	"	"	"
June	PO	missing	80061018	80061021	80061100	80061103
10-11	SG	"	"	"	"	"
	LA	"	"	"	"	"
	SN	"	"	"	"	"
	BG	80061015	"	"	"	"
	MA	missing	"	"	"	"
	SE	"	"	"	"	"
June	PO	80061415	80061418	80061421	missing	missing
14-15	SG	"	"	"	80061500	"
	LA	"	"	"	"	"
	SN	"	"	"	"	"
	BG	"	"	"	"	"
	MA	"	"	"	"	"
	SE	"	"	"	"	"
June	PO	80061715	80061718	80061721	80061800	80061803
17-18	SG	"	"	"	"	"
	LA	"	"	"	"	"
	SN	"	"	"	"	"
	BG	"	"	"	"	"
	MA	"	"	"	"	"
	SE	missing	missing	missing	"	"
June	PO	missing	80061818	80061821	80061900	80061903
18-19	SG	"	"	"	"	"
	LA	"	"	"	"	"
	SN	"	"	"	"	"
	BG	"	"	"	"	"
	MA	"	"	"	"	"
	SE	"	"	"	missing	"

Table 4 (cont'd), Rawinsonde Sounding Inventory.

June	PO	missing	80061918	80061921	80062000	80062003
19-20	SG	"	"	"	"	"
	LA	"	"	"	"	"
	SN	"	"	"	"	"
	BG	"	"	"	"	"
	MA	"	"	"	"	"
	SE	"	"	"	"	missing
June	PO	80062015	80062018	80062021	80062100	80062103
20-21	SG	"	"	"	"	"
	LA	"	"	"	"	"
	SN	"	"	"	missing	missing
	BG	"	"	"	80062100	80062103
	MA	"	"	"	"	"
	SE	"	"	"	"	"
June	PO	80062115	80062118	80062121	80062200	80062203
21-22	SG	"	"	"	"	"
	LA	"	"	"	"	"
	SN	missing	"	"	"	"
	BG	80062115	"	"	"	"
	MA	"	"	"	"	"
	SE	"	"	"	"	missing
June	PO	missing	80062218	80062221	80062300	80062303
22-23	SG	"	missing	"	"	"
	LA	"	80062218	"	"	"
	SN	"	"	"	"	"
	BG	80062215	"	"	"	"
	MA	missing	"	"	"	"
	SE	"	missing	"	"	"
June	PO	80062915	80062918	missing	missing	missing
29-30	SG	"	"	"	"	"
	LA	"	"	"	"	"
	SN	"	"	"	"	"
	BG	"	"	"	"	"
	MA	"	"	"	"	"
	SE	"	"	"	"	"

Table 4 (concluded), Rawinsonde Sounding Inventory.

Non Mesoscale Soundings taken at Big Spring

80051900
80052000
80053015

Soundings taken after June 30, 1980 at Big Spring

80070115
80070214
80070218
80070221
80070921
80071218
80071617
80072021
80072118
80072121
80072215
80072218
80072221
80072300
80072518
80072523
80072600
80072618
80072621
80072718

The sounding data appearing in Appendix C were recorded on magnetic tape and are available from the Texas Department of Water Resources, Austin, Texas.

Table 5. Soundings that may have entered thunderstorms during the 1980 Texas HIPLEX mesoscale experiment.

Date/time (GMT)	Station	Criteria
5/28/0000	Post	Variation in balloon rise rate
6/2/0000	Post	Variation in balloon rise rate; saturated through 5.1 km
6/19/2100	Seagraves	Variation in balloon rise rate
6/20/0000	Seagraves	Variation in balloon rise rate
6/20/0000	Lamesa	Variation in balloon rise rate; saturated from 3.1 to 9.1 km
6/20/0300	Midland	Variation in balloon rise rate
6/21/0000	Post	Variation in balloon rise rate
6/22/0300	Post	Variation in balloon rise rate
6/22/0300	Snyder	Variation in balloon rise rate; saturated from 3.5 to 8.5 km

Soundings taken at Big Spring on days other than operational days and after June 30 have also been included. They are distinguished from other data by the added prefix '10' to the station number (e.g. '10770'). These soundings are listed at the end of Appendix C.

6. COMMENTS REGARDING THE 1980 TEXAS HIPLEX MESOSCALE EXPERIMENT

The mesoscale experiment conducted in the Summer of 1980 in the Texas HIPLEX area provided data which should be useful in the study of cloud formation, growth, intensity, movement, etc., and in the interrelationships between convective activity and the environment. Although 1980 was an exceptionally dry year, without many exceptional convective cases, the data collected by the seven station rawinsonde network (the same as that used in 1979) and the sixteen manual surface weather stations still provides a significant contribution to the growing data base for mesoscale research in the Texas HIPLEX area.

7. REFERENCES

Fuelberg, H.E., 1974: Reduction and error analysis of the AVE II pilot experiment data. NASA CR-120496, NASA Marshall Space Flight Center, Huntsville, Alabama.

Reynolds, P.G., M.L. Gerhard, G.S. Wilson, and J.R. Scoggins, 1978: Texas HIPLEX Mesoscale Experiment - Summer 1978, Data Tabulations. TDWR Report LP-80, Texas Department of Water Resources, Austin, Texas, 9 pp. plus 4 Appendices.

Scoggins, J.R., 1977: Texas HIPLEX Mesoscale Experiment - Summer 1977, Data Tabulations. TDWR Report LP-10, Texas Department of Water Resources, Austin, Texas, 9 pp. plus 4 Appendices.

_____, and G.S. Wilson, 1976: Texas HIPLEX Mesoscale Experiment - Summer 1976, Data Tabulations. TWDB 76-12, Texas Water Development Board, Austin, Texas, 33 pp. plus 3 Appendices.

Williams, S.F., M.L. Gerhard, and J.R. Scoggins, 1980: Texas HIPLEX Mesoscale Experiment - Summer 1979, Data Tabulations. TDWR Report LP-118, Texas Department of Water Resources, Austin, Texas, 16 pp. plus 3 Appendices.

APPENDIX A

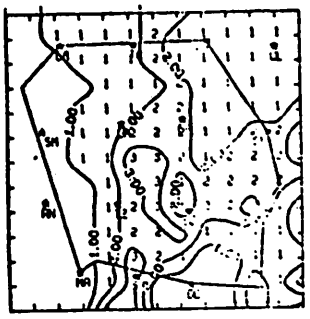
Radar Echo Data - Summer 1980

Data Source: National Weather Service, Midland, Texas

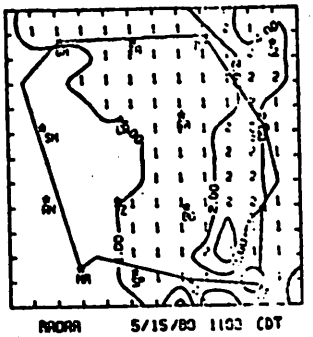
Code 1 - tops less than 6.1 km (20K ft)

2 - tops between 6.1 to 9.1 km (20 - 30K ft)

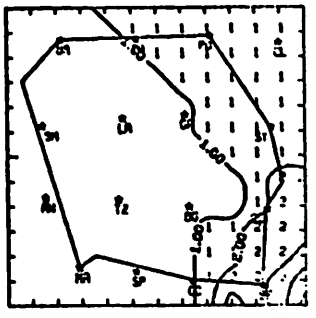
3 - tops exceeding 9.1 km (30K ft)



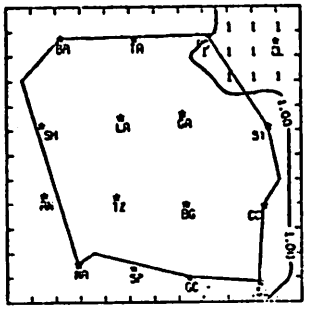
RADAR 5/15/80 1000 CDT



RADAR 5/15/80 1100 CDT



RADAR 5/15/80 1200 CDT



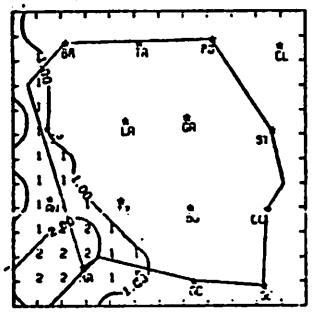
RADAR 5/15/80 1300 CDT

NO ECHOES

RADAR 5/15/80 1400 CDT

NO ECHOES

RADAR 5/15/80 1500 CDT



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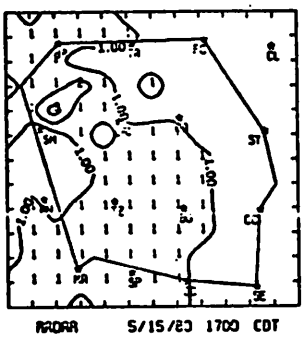

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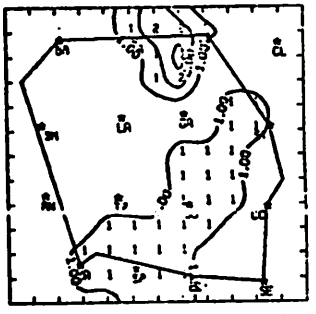

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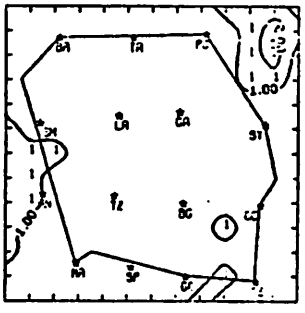

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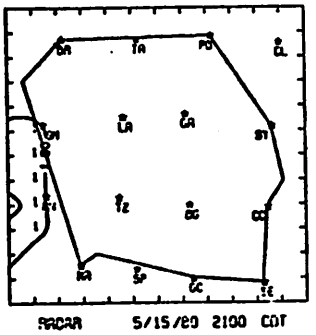
NO ECHOES

RADAR 5/15/80 2000 CDT



RADAR 5/15/80 2100 CDT

NO ECHOES

RADAR 5/15/80 2200 CDT

NO ECHOES

NO ECHOES

NO ECHOES

RADAR 5/18/80 1000 CDT

NO ECHOES

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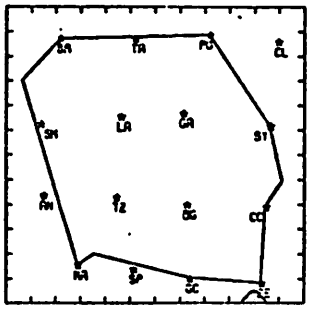

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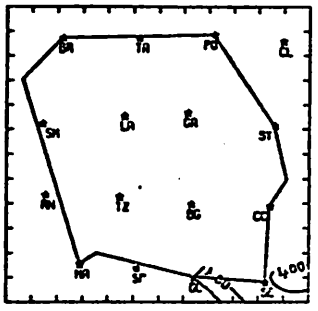

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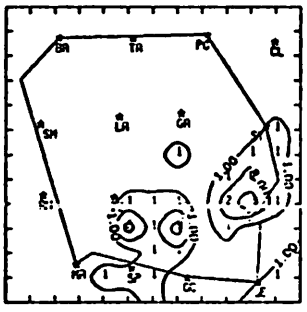

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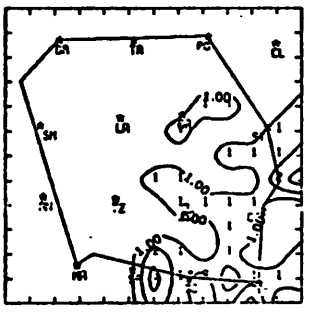

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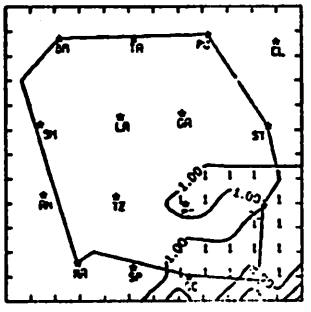
RADAR 5/18/80 1600 CDT

RADAR 5/18/80 1700 CDT



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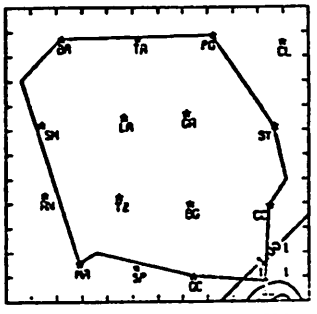

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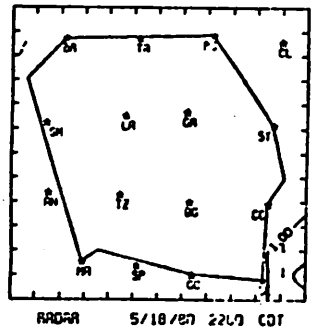


RADAR 5/18/80 2000 CDT

RADAR 5/18/80 2100 CDT

RADAR 5/18/80 2200 CDT

NO ECHOES

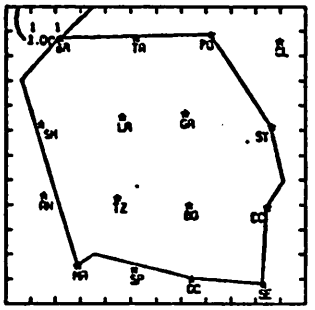
RADAR 5/20/80 1000 CDT

NO ECHOES

RADAR 5/20/80 1100 CDT

NO ECHOES

RADAR 5/20/80 1200 CDT



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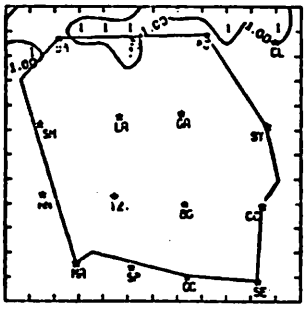

NO ECHOES

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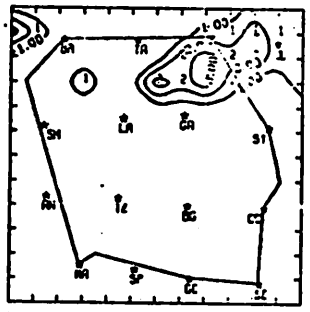

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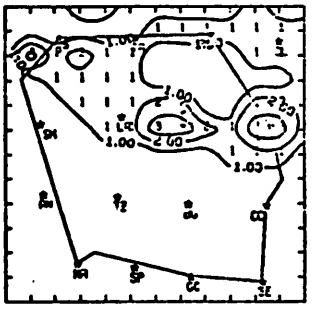

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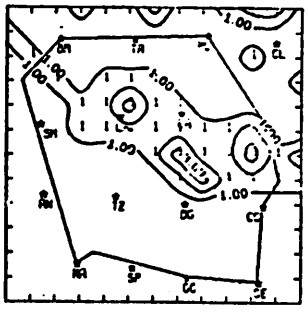

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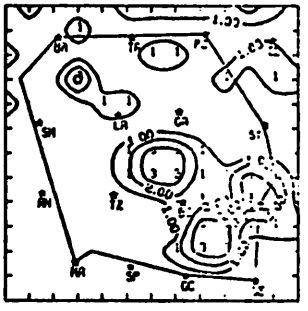

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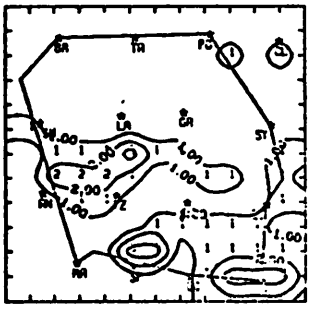

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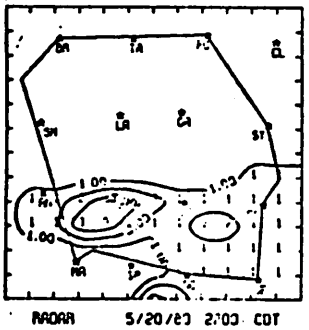


RADAR 5/20/80 2000 CDT

RADAR 5/20/80 2100 CDT

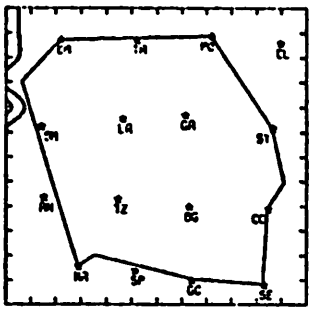
RADAR 5/20/80 2200 CDT

NO ECHOES

RADAR 5/26/80 1000 CDT

NO ECHOES

RADAR 5/26/80 1100 CDT



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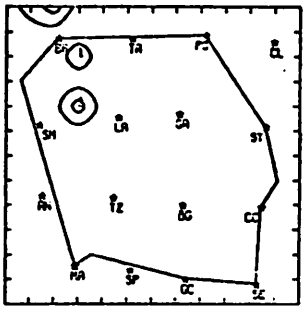

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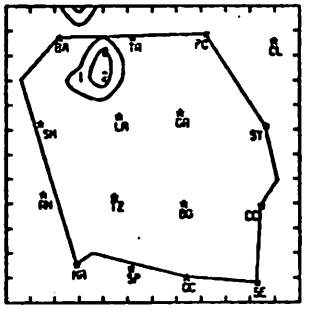

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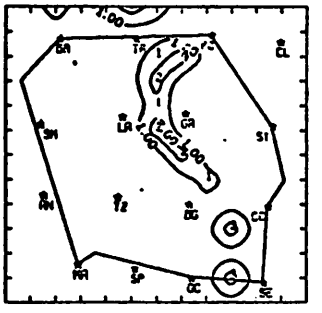

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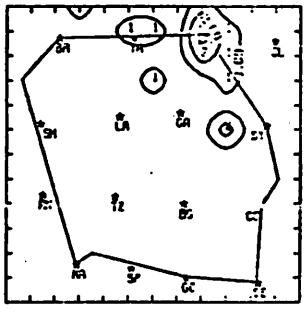

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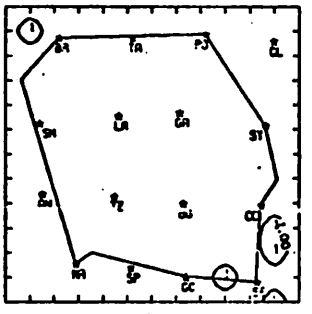

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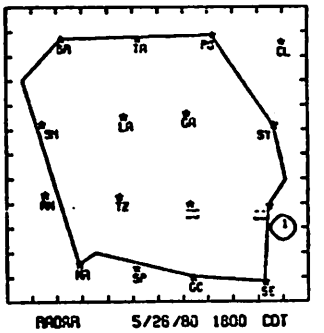

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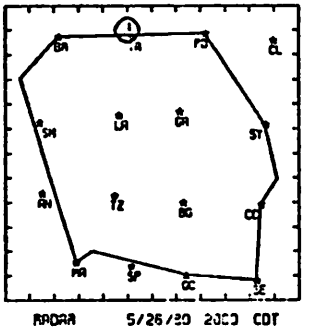


RADAR 5/26/80 2000 CDT

NO ECHOES

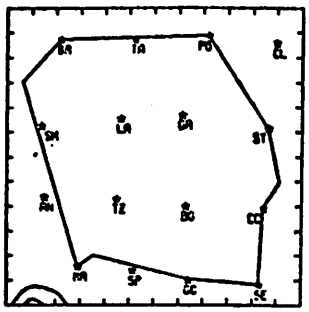
RADAR 5/26/80 1900 CDT

NO ECHOES

RADAR 5/26/80 2100 CDT

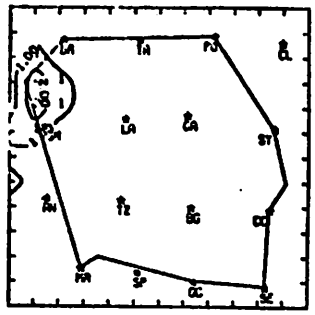
NO ECHOES

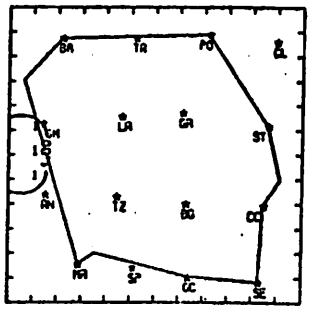
RADAR 5/26/80 2200 CDT



NO ECHOES

RADAR 5/27/80 1100 CDT



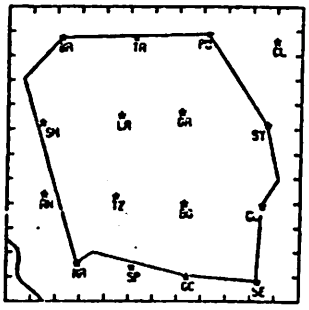


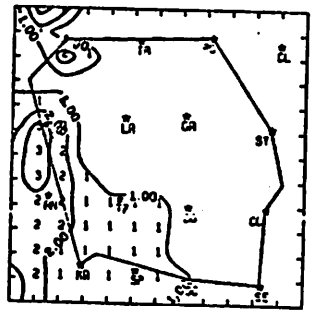
NO ECHOES

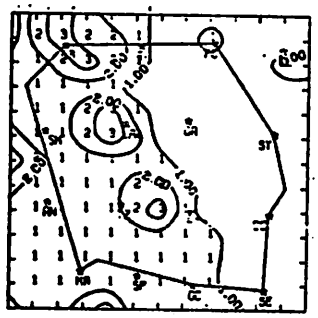
RADAR 5/27/80 1400 CDT

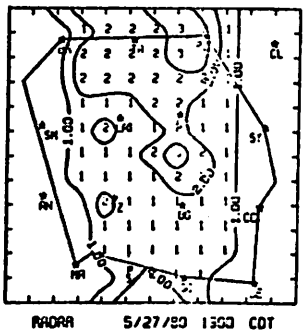
NO ECHOES

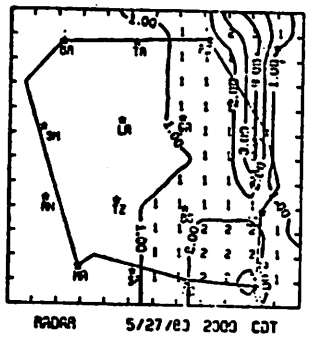
RADAR 5/27/80 1500 CDT

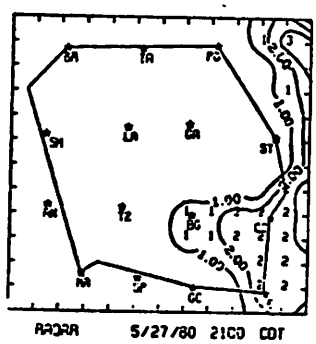


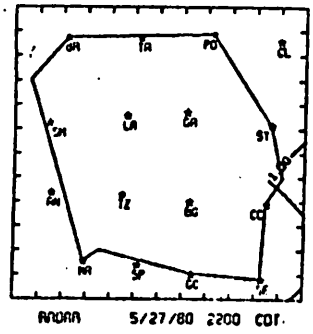












NO ECHOES

RADAR 5/28/80 1000 CDT

NO ECHOES

RADAR 5/28/80 1100 CDT

NO ECHOES

RADAR 5/28/80 1200 CDT

NO ECHOES

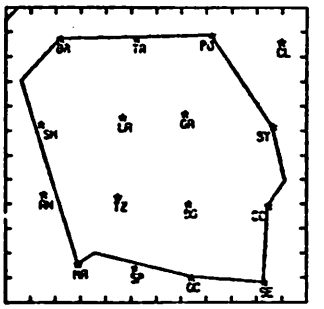
RADAR 5/28/80 1300 CDT

NO ECHOES

RADAR 5/28/80 1400 CDT

NO ECHOES

RADAR 5/28/80 1500 CDT



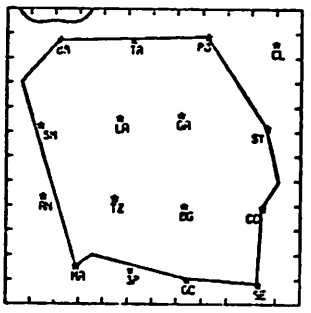
RADAR 5/28/80 1600 CDT

NO ECHOES

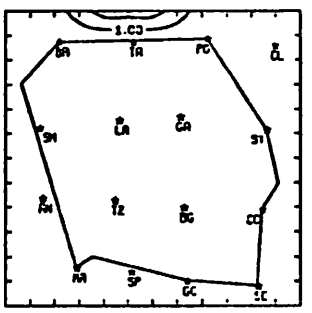
RADAR 5/28/80 1700 CDT

NO ECHOES

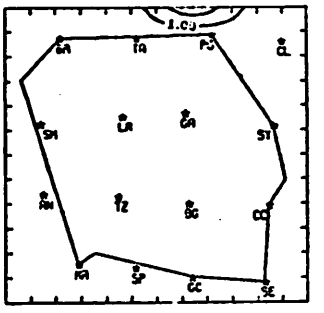
RADAR 5/28/80 1800 CDT



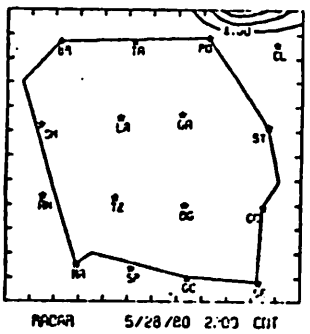
RADAR 5/28/80 1900 CDT



RADAR 5/28/80 2000 CDT



RADAR 5/29/80 2100 CDT



RADAR 5/28/80 2200 CDT

NO ECHOES

RADAR 5/29/80 1000 CDT

NO ECHOES

RADAR 5/29/80 1100 CDT

NO ECHOES

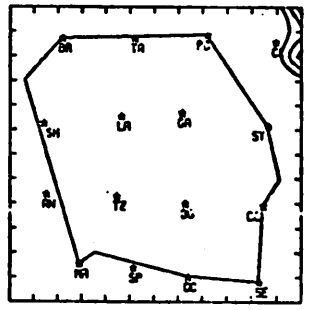
RADAR 5/29/80 1200 CDT

NO ECHOES

RADAR 5/29/80 1300 CDT

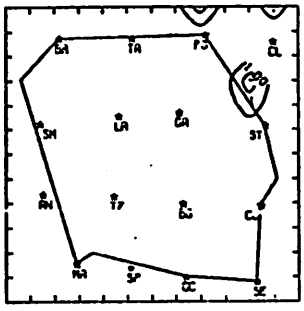
NO ECHOES

RADAR 5/29/80 1400 CDT



NO ECHOES

RADAR 5/29/80 1500 CDT



RADAR 5/29/80 1600 CDT

RADAR 5/29/80 1700 CDT

NO ECHOES

RADAR 5/29/80 1800 CDT

NO ECHOES

RADAR 5/29/80 1900 CDT

NO ECHOES

RADAR 5/29/80 2000 CDT

NO ECHOES

RADAR 5/29/80 2100 CDT

NO ECHOES

RADAR 5/29/80 2200 CDT

NO ECHOES

RADAR 5/31/80 1000 CDT

NO ECHOES

RADAR 5/31/80 1100 CDT

NO ECHOES

RADAR 5/31/80 1200 CDT

NO ECHOES

RADAR 5/31/80 1300 CDT

NO ECHOES

RADAR 5/31/80 1400 CDT

NO ECHOES

RADAR 5/31/80 1500 CDT

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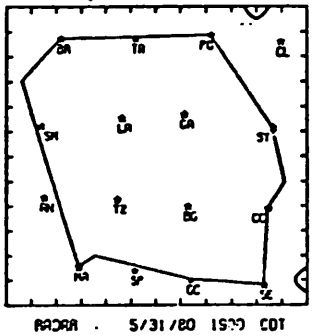
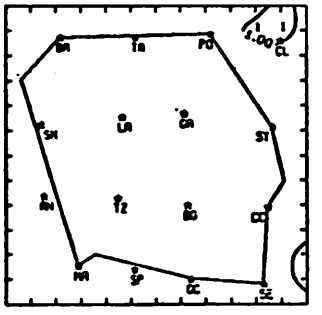
NO ECHOES

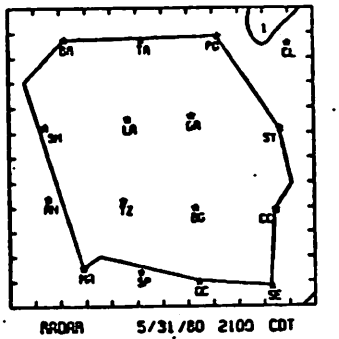
RADAR 5/31/80 1800 CDT



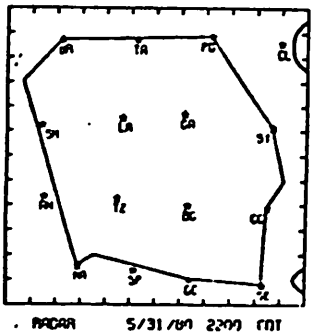
RADAR 5/31/80 1900 CDT



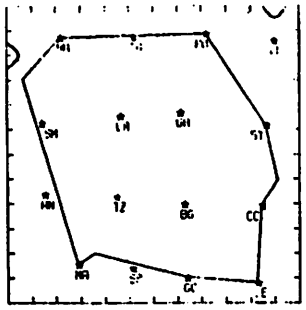
RADAR 5/31/80 2000 CDT

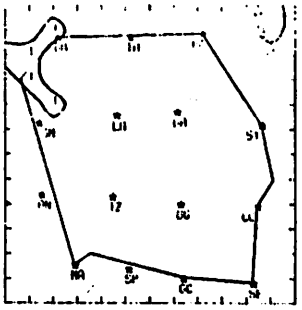


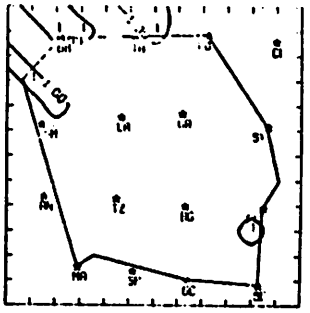
RADAR 5/31/80 2100 CDT

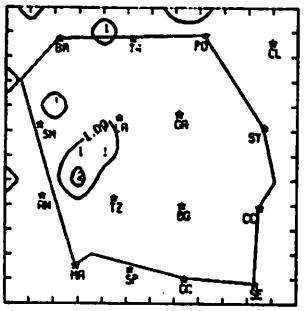


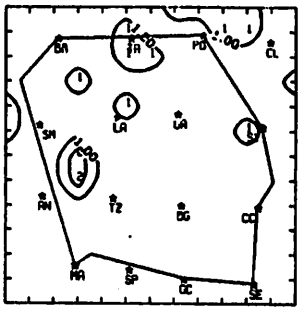
RADAR 5/31/80 2200 CDT

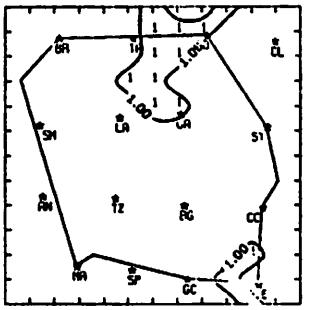

RADAR 6/1 /80 1200 CDT

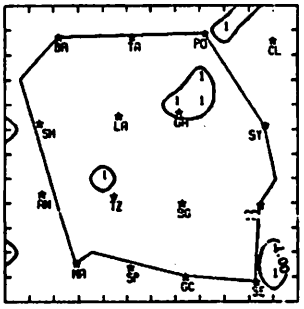

RADAR 6/1 /80 1300 CDT

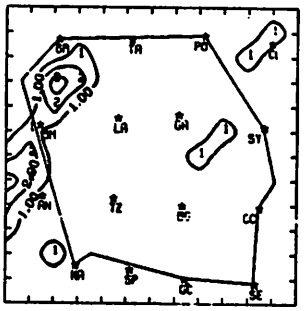

RADAR 6/1 /80 1200 CDT

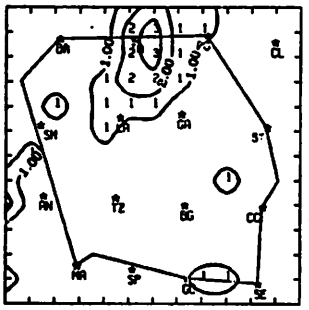

RADAR 6/1 /80 1300 CDT

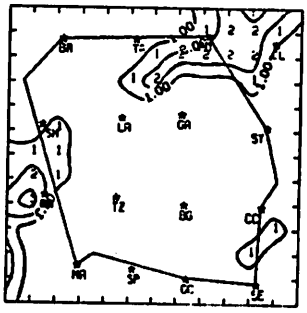

RADAR 6/1 /80 1400 CDT

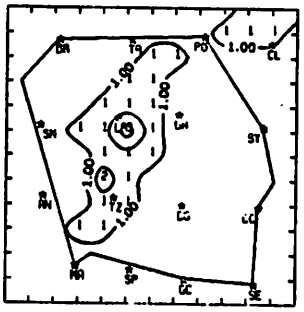

RADAR 6/1 /80 1500 CDT

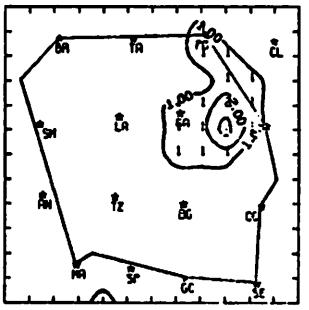

RADAR 6/1 /80 1600 CDT

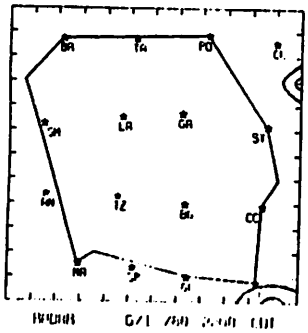

RADAR 6/1 /80 1700 CDT


RADAR 6/1 /80 1800 CDT


RADAR 6/1 /80 1900 CDT

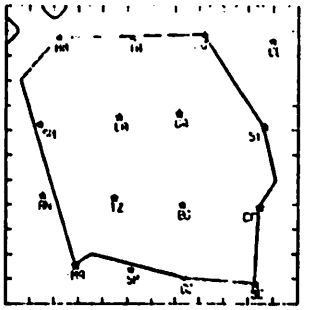

RADAR 6/1 /80 2000 CDT


RADAR 6/1 /80 2100 CDT

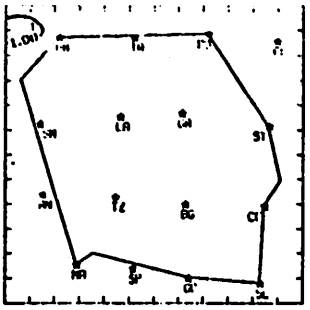

RADAR 6/1 /80 2200 CDT

NO ECHOES

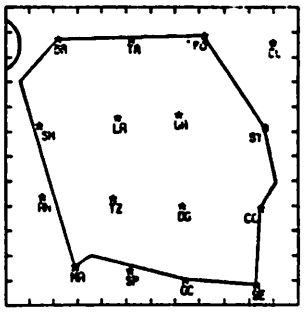
RADAR 6/2 /80 1000 CDT



RADAR 6/2 /80 1100 CDT



RADAR 6/2 /80 1200 CDT



RADAR 6/2 /80 1300 CDT

NO ECHOES

RADAR 6/2 /80 1400 CDT

NO ECHOES

RADAR 6/2 /80 1500 CDT

NO ECHOES

RADAR 6/2 /80 1600 CDT

NO ECHOES

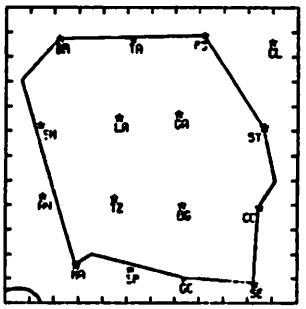
RADAR 6/2 /80 1700 CDT

NO ECHOES

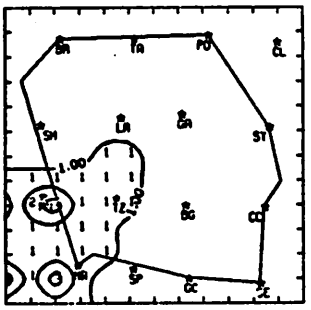
RADAR 6/2 /80 1800 CDT

NO ECHOES

RADAR 6/2 /80 1900 CDT



RADAR 6/2 /80 2000 CDT



RADAR 6/2 /80 2100 CDT

MISSING DATA

RADAR 6/2 /80 2200 CDT

NO ECHOES

RADAR 6/7 /80 1000 CDT

NO ECHOES

RADAR 6/7 /80 1100 CDT

NO ECHOES

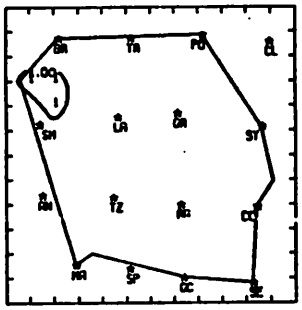
RADAR 6/7 /80 1200 CDT

NO ECHOES

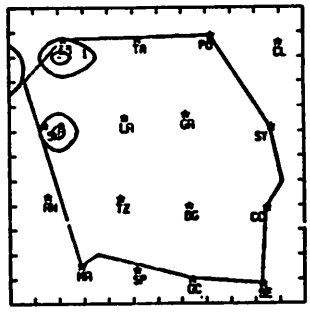
RADAR 6/7 /80 1300 CDT

NO ECHOES

RADAR 6/7 /80 1400 CDT

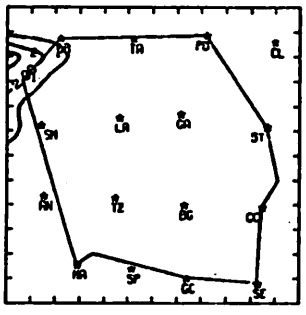


RADAR 6/7 /80 1500 CDT

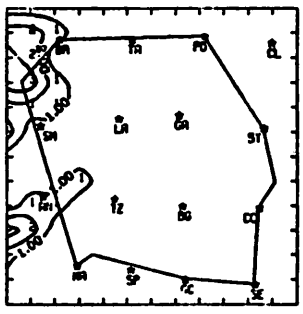


NO ECHOES

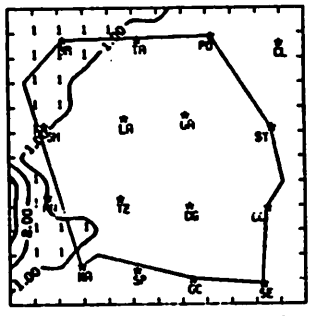
RADAR 6/7 /80 1600 CDT



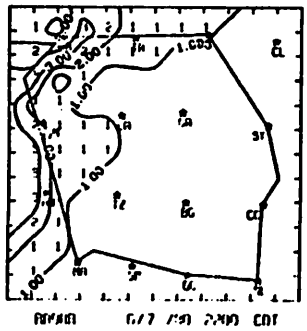
RADAR 6/7 /80 1700 CDT



RADAR 6/7 /80 1800 CDT



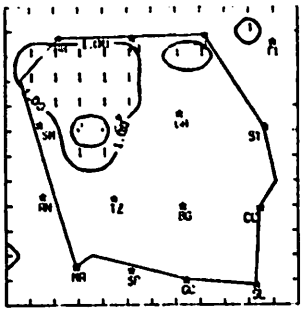
RADAR 6/7 /80 1900 CDT

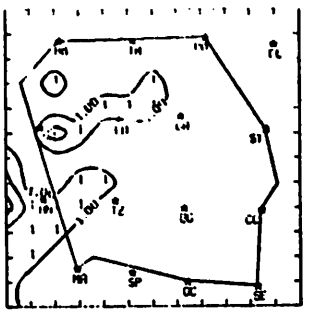


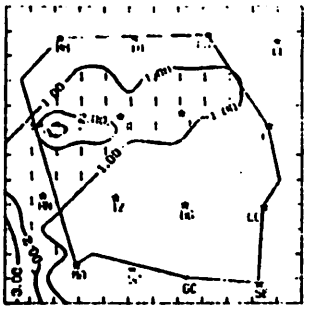
RADAR 6/7 /80 2000 CDT

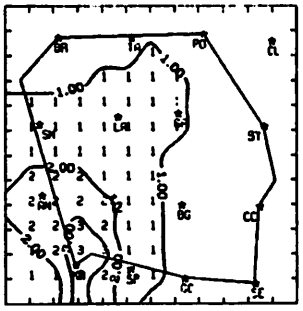
RADAR 6/7 /80 2100 CDT

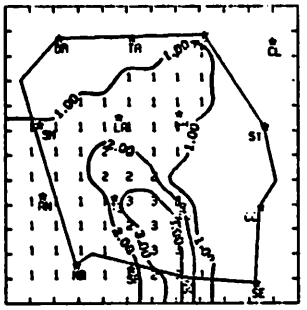
RADAR 6/7 /80 2200 CDT

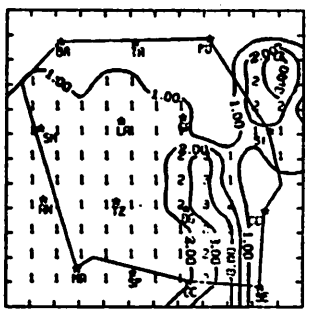

RADAR 6/8 /80 1000 CDT

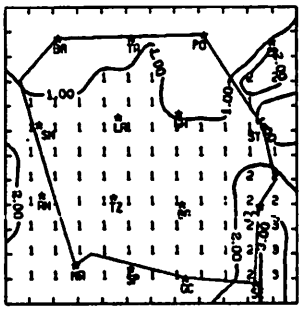

RADAR 6/8 /80 1100 CDT

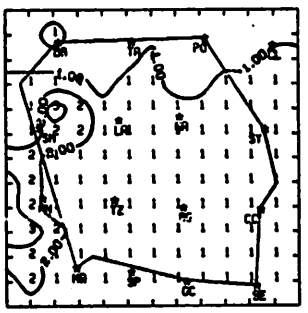

RADAR

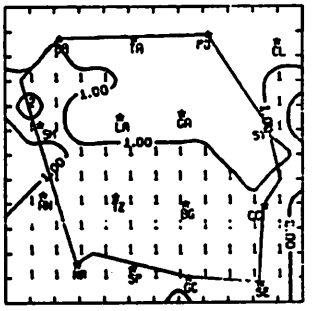

RADAR 6/8 /80 1300 CDT

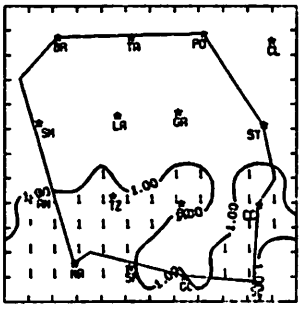

RADAR 6/8 /80 1400 CDT

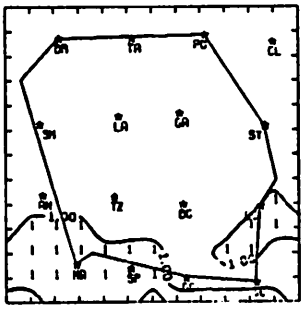

RADAR 6/8 /80 1500 CDT

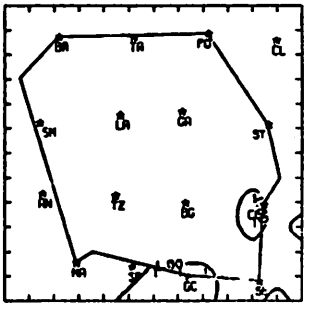

RADAR 6/8 /80 1600 CDT

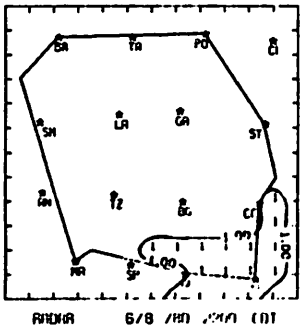

RADAR 6/8 /80 1700 CDT

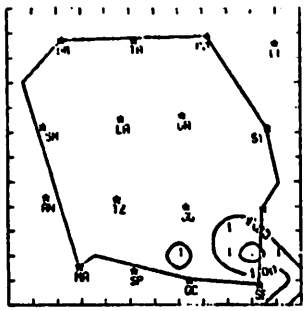

RADAR 6/8 /80 1800 CDT


RADAR 6/8 /80 1900 CDT

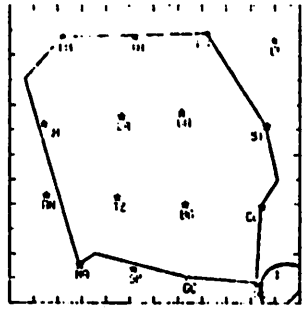

RADAR 6/8 /80 2000 CDT


RADAR 6/8 /80 2100 CDT


RADAR



RADAR 6/9 /80 1000 CDT



RADAR 6/9 /80 1100 CDT

NO ECHOES

RADAR 6/9 /80 1200 CDT

NO ECHOES

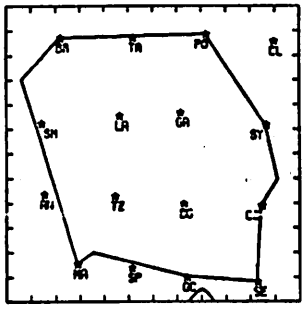
RADAR 6/9 /80 1300 CDT

NO ECHOES

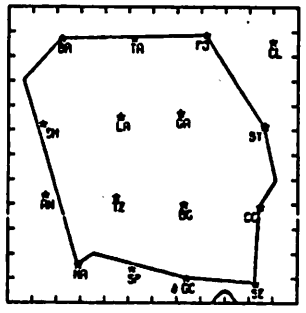
RADAR 6/9 /80 1400 CDT

NO ECHOES

RADAR 6/9 /80 1500 CDT



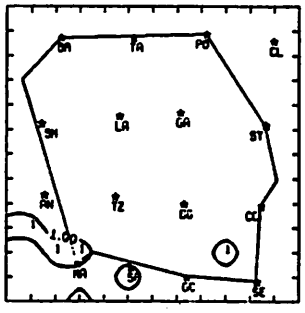
RADAR 6/9 /80 1600 CDT



RADAR 6/9 /80 1700 CDT

NO ECHOES

RADAR 6/9 /80 1800 CDT



RADAR 6/9 /80 1900 CDT

NO ECHOES

RADAR 6/9 /80 2000 CDT

NO ECHOES

RADAR 6/9 /80 2100 CDT

NO ECHOES

RADAR 6/9 /80 2200 CDT

NO ECHOES

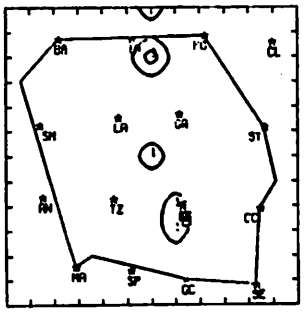
RADAR 6/10/80 1000 CDT

NO ECHOES

RADAR 6/10/80 1100 CDT

NO ECHOES

RADAR 6/10/80 1200 CDT



RADAR 6/10/80 1300 CDT

NO ECHOES

RADAR 6/10/80 1400 CDT

NO ECHOES

RADAR 6/10/80 1500 CDT

NO ECHOES

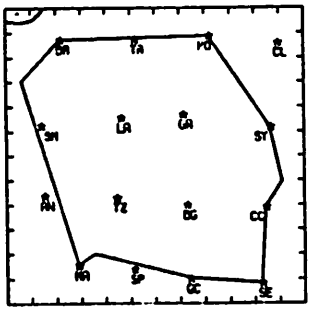
RADAR 6/10/80 1600 CDT

NO ECHOES

RADAR 6/10/80 1700 CDT

NO ECHOES

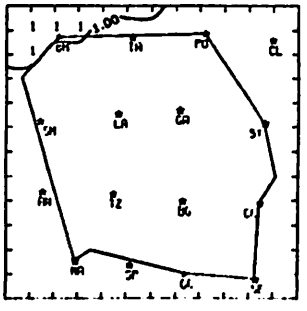
RADAR 6/10/80 1800 CDT



RADAR 6/10/80 2100 CDT

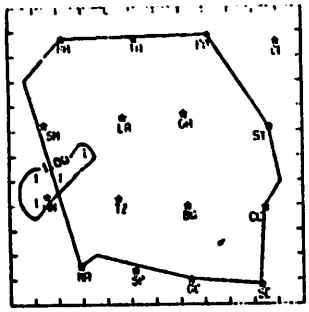
NO ECHOES

RADAR 6/10/80 1900 CDT



NO ECHOES

RADAR 6/10/80 2000 CDT



RADAR 6/11/80 1000 CDT

NO ECHOES

RADAR 6/11/80 1100 CDT

NO ECHOES

RADAR 6/11/80 1200 CDT

NO ECHOES

RADAR 6/11/80 1300 CDT

NO ECHOES

RADAR 6/11/80 1400 CDT

NO ECHOES

RADAR 6/11/80 1500 CDT

NO ECHOES

RADAR 6/11/80 1600 CDT

NO ECHOES

RADAR 6/11/80 1700 CDT

NO ECHOES

RADAR 6/11/80 1800 CDT

NO ECHOES

RADAR 6/11/80 1900 CDT

NO ECHOES

RADAR 6/11/80 2000 CDT

NO ECHOES

RADAR 6/11/80 2100 CDT

NO ECHOES

RADAR 6/11/80 2200 CDT

NO ECHOES

RADAR 6/16/80 1000 CDT

NO ECHOES

RADAR 6/16/80 1100 CDT

NO ECHOES

RADAR 6/16/80 1200 CDT

NO ECHOES

RADAR 6/16/80 1300 CDT

NO ECHOES

RADAR 6/16/80 1400 CDT

NO ECHOES

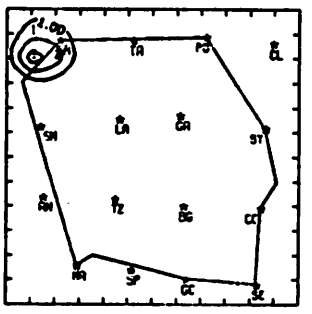
RADAR 6/16/80 1500 CDT

NO ECHOES

RADAR 6/16/80 1600 CDT

NO ECHOES

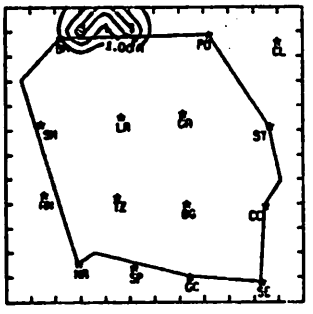
RADAR 6/16/80 1700 CDT



RADAR 6/16/80 2000 CDT

NO ECHOES

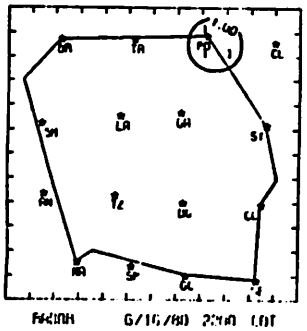
RADAR 6/16/80 1800 CDT



RADAR 6/16/80 2100 CDT

NO ECHOES

RADAR 6/16/80 1900 CDT



RADAR 6/16/80 2200 CDT

NO ECHOES

RADAR 6/17/80 1000 CDT

NO ECHOES

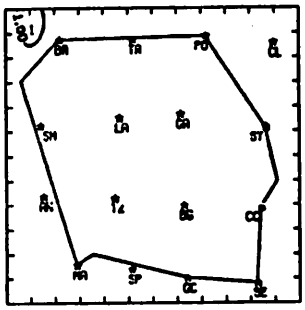
RADAR 6/17/80 1100 CDT

NO ECHOES

RADAR 6/17/80 1200 CDT

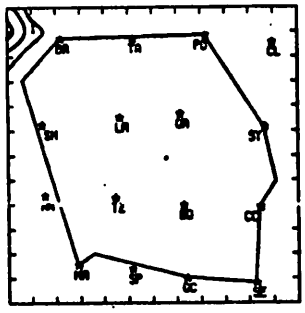
NO ECHOES

RADAR 6/17/80 1300 CDT



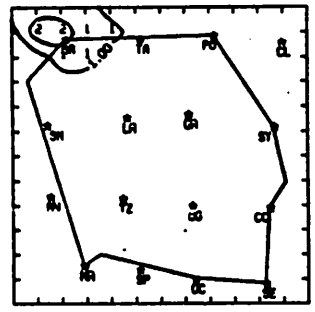
NO ECHOES

RADAR 6/17/80 1400 CDT

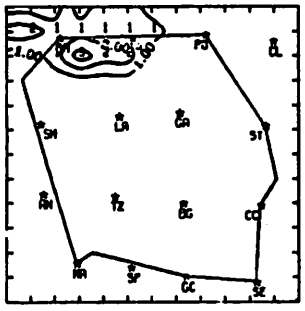


NO ECHOES

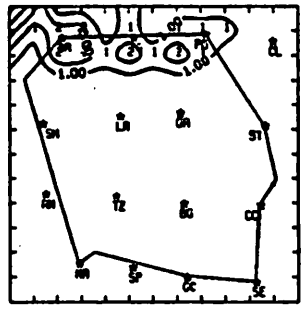
RADAR 6/17/80 1500 CDT



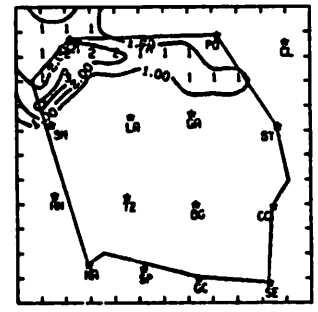
RADAR 6/17/80 1600 CDT



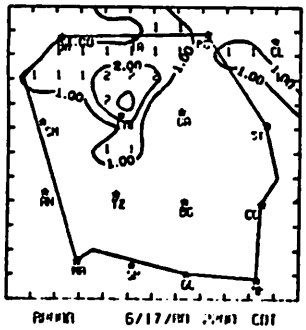
RADAR 6/17/80 1700 CDT



RADAR 6/17/80 1800 CDT



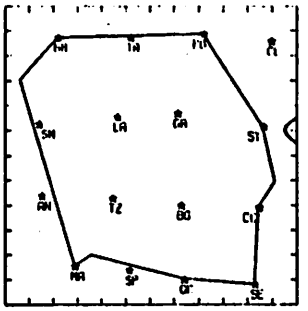
RADAR 6/17/80 1900 CDT

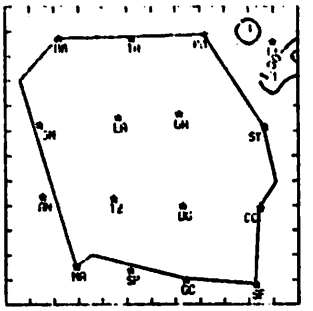


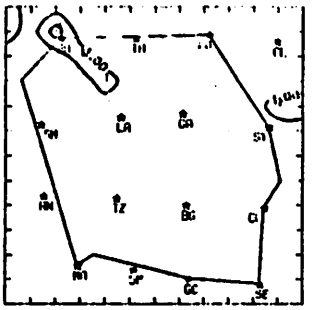
RADAR 6/17/80 2000 CDT

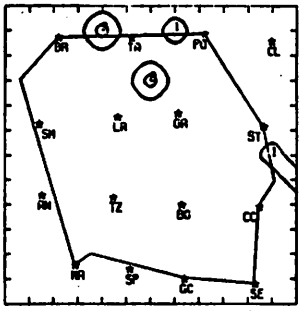
RADAR 6/17/80 2100 CDT

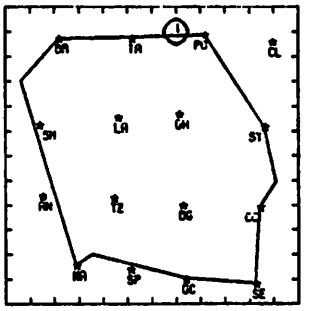
RADAR 6/17/80 2200 CDT

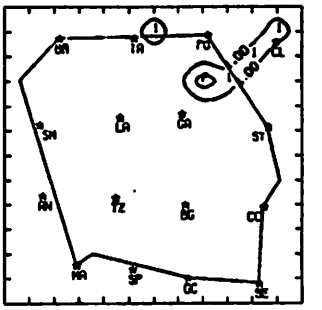










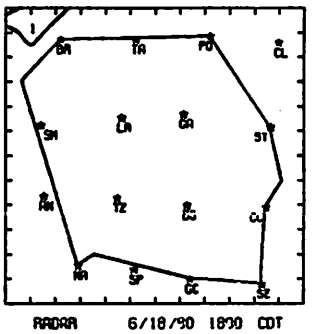


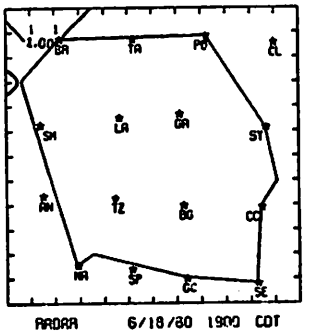
NO ECHOES

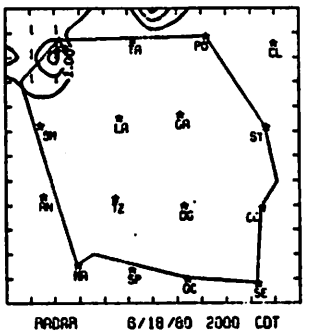
RADAR 6/18/80 1600 CDT

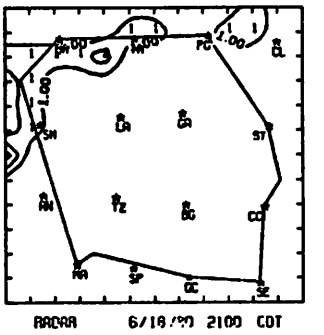
NO ECHOES

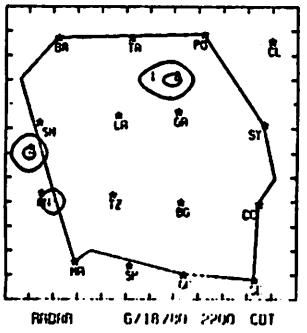
RADAR 6/18/80 1700 CDT

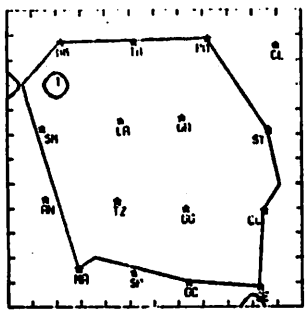


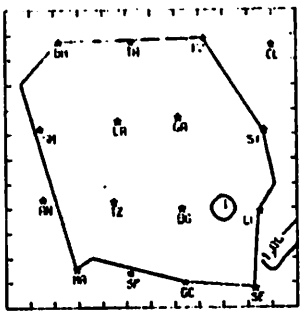


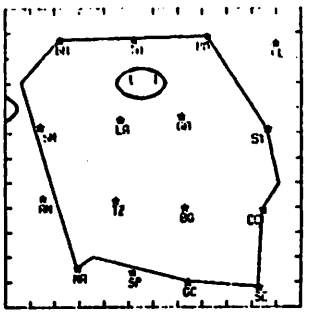


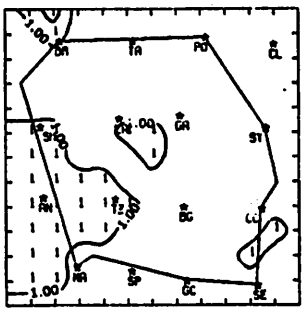


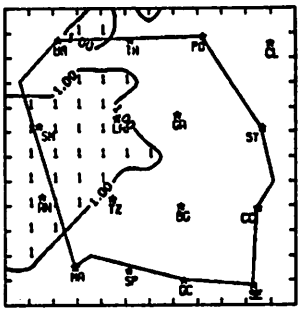


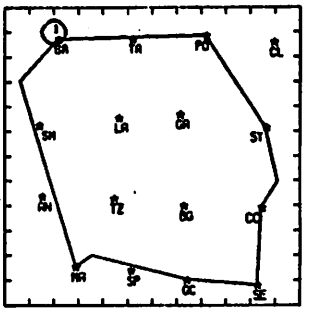

RADAR 6/19/80 1000 CDT

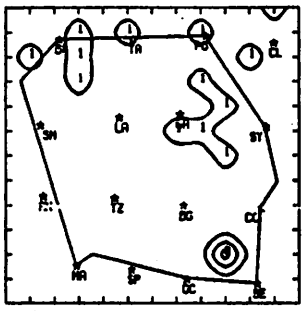

RADAR 6/19/80 1100 CDT

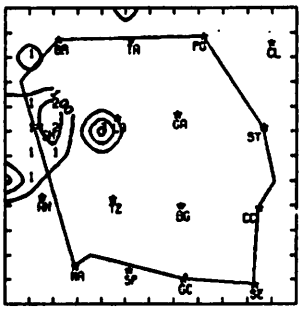

RADAR 6/19/80 1200 CDT

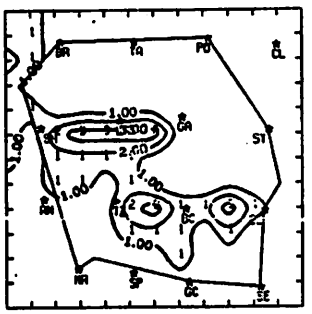

RADAR 6/19/80 1300 CDT

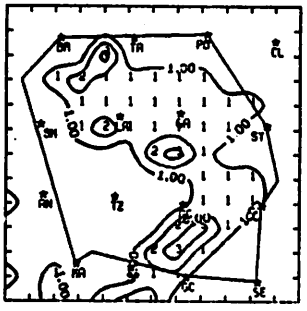

RADAR 6/19/80 1400 CDT

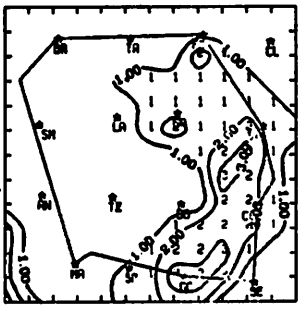

RADAR 6/19/80 1500 CDT

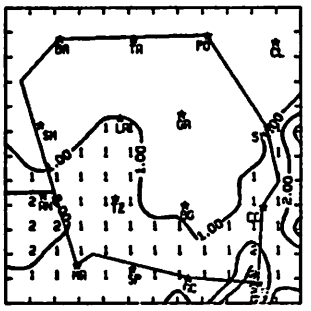

RADAR 6/19/80 1600 CDT

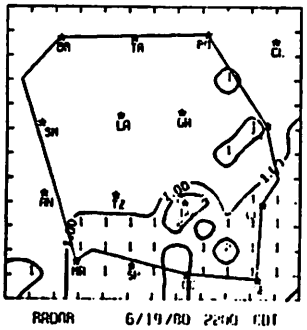

RADAR 6/19/80 1700 CDT


RADAR 6/19/80 1800 CDT


RADAR 6/19/80 1900 CDT


RADAR 6/19/80 2000 CDT


RADAR 6/19/80 2100 CDT

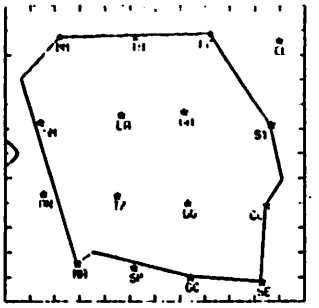

RADAR 6/19/80 2200 CDT

NO ECHOES

RADAR 6/20/80 1000 CDT

NO ECHOES

RADAR 6/20/80 1100 CDT



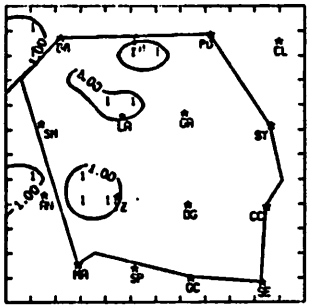
RADAR 6/20/80 1200 CDT

NO ECHOES

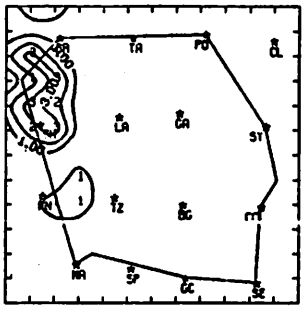
RADAR 6/20/80 1300 CDT

NO ECHOES

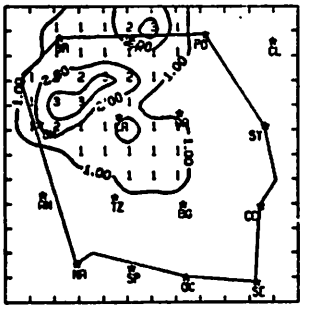
RADAR 6/20/80 1400 CDT



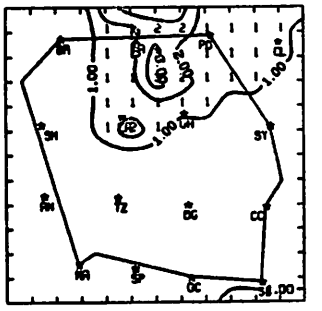
RADAR 6/20/80 1500 CDT



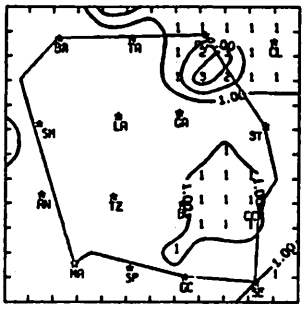
RADAR 6/20/80 1600 CDT



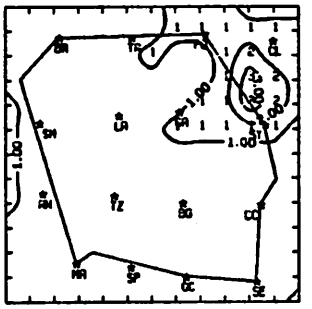
RADAR 6/20/80 1700 CDT



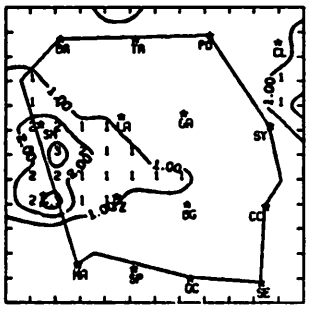
RADAR 6/20/80 1800 CDT



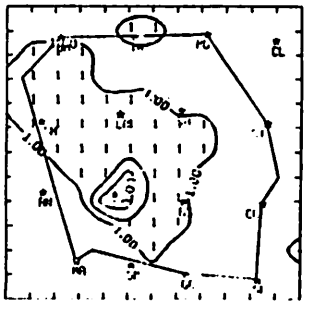
RADAR 6/20/80 1900 CDT



RADAR 6/20/80 2000 CDT



RADAR 6/20/80 2100 CDT

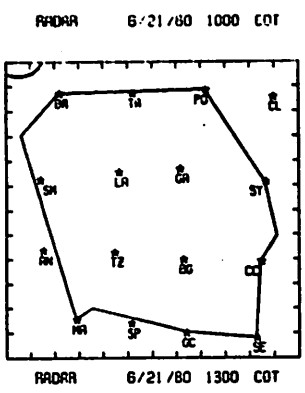


RADAR 6/20/80 2200 CDT

NO ECHOES

NO ECHOES

NO ECHOES



NO ECHOES

RADAR 6/22/80 1000 CDT

NO ECHOES

RADAR 6/22/80 1100 CDT

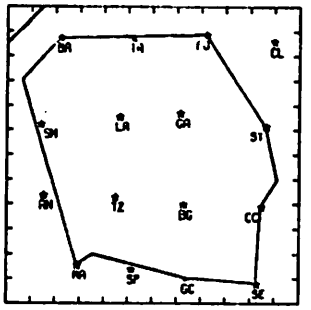
NO ECHOES

RADAR 6/22/80 1200 CDT

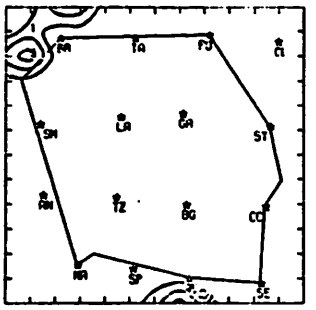
NO ECHOES

RADAR 6/22/80 1300 CDT

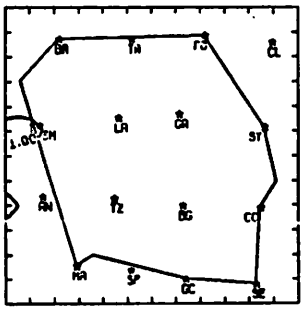
RADAR 6/22/80 1400 CDT



RADAR 6/22/80 1500 CDT



RADAR 6/22/80 1600 CDT



RADAR 6/22/80 1700 CDT

NO ECHOES

RADAR 6/22/80 1800 CDT

NO ECHOES

RADAR 6/22/80 1900 CDT

NO ECHOES

RADAR 6/22/80 2000 CDT

NO ECHOES

RADAR 6/22/80 2100 CDT

NO ECHOES

RADAR 6/22/80 2200 CDT

APPENDIX B

Data for Sixteen Special Surface Stations - Summer 1980

Station No.	Station Name
1	Brownfield
2	Tahoka
3	Post
4	Clairemont
5	Seminole
6	Lamesa
7	Gail
8	Snyder
9	Andrews
10	Tarzan
11	Big Spring
12	Colorado City
13	Midland
14	Sprayberry
15	Garden City
16	Sterling City

Identification of column headings

STAT NO.	Station Number
PRES MB	Pressure in millibars
TEMP DG C	Temperature in degrees Celsius
RH PCT	Relative humidity in percent
DIR DG	Direction from which wind is blowing in degrees measured clockwise from north
SPEED M/SEC	Wind speed in meters per second

APPENDIX C

Rawinsonde Data - Summer 1980

Identification of Column Headings in Data Tables

TIME (MIN)	Time after balloon release.
CNTCT	Contact number.
HEIGHT (GPM)	Height of corresponding pressure surface in geopotential meters.
PRES (MB)	Pressure in millibars.
TEMP (DG C)	Ambient temperature in degrees Celsius. NOTE: An asterisk indicates that time from release and/or temperature were linearly interpolated.
DEW PT (DG C)	Dew point temperature in degrees Celsius.
DIR (DG)	Wind direction measured clockwise from true north and is the direction from which the wind is blowing.
SPEED (M/SEC)	Scalar wind speed in meters per second. NOTE: An asterisk indicates that wind quantities are based on an elevation angle that is less than 9^{o}.
U COMP (M/SEC)	The E-W wind component, positive toward the east and negative toward the west.
V COMP (M/SEC)	The N-S wind component, positive toward the north and negative toward the south.
POT T (DG K)	Potential temperature in degrees Kelvin.
E POT T (DG K)	Equivalent potential temperature in degrees Kelvin.
MX RTO (GM/KG)	Mixing ratio in grams per kilogram.
RH (PCT)	Relative humidity in percent.
RANGE (KM)	Distance balloon is from release point along a radius vector.
AZ (DG)	Direction toward balloon measured clockwise from true north.