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MINI SUPERCELL INTERACTION: THE FEBRUARY 13, 1995 MESA TORNADO

G. Douglas Green - NWSFO Phoenix

DeWayne Mitchell - NOAA/ERL/National Severe Storms Laboratory
Norman, OK.

Jesus A. Haro - NWSFO Phoenix

Introduction

Tornado occurrences over the Phoenix metropolitan area are rather infrequent. However, during the afternoon of 13 February 1995, a tornado rated F1 on the Fujita-Pearson scale struck the General Motors Desert Proving Ground (DPG) in Mesa, Arizona, causing about $200,000 worth of damage (James I. Gutting, Manager of General Motors DPG, personal communication). The tornado appeared to be associated with one of two "mini" supercell storms (Burgess et al. 1995; Kennedy et al. 1993; Grant and Prentice 1996) in the area at that time. The tornado passed within 10 meters of a weather station at the DPG, and occurred within 7.5 km (4 nmi) of the KIWA WSR-88D (Fig. 1). This Technical Attachment will briefly focus on three areas of interest: 1) synoptic and mesoscale environments, 2) storm evolution and interactions, and 3) storm detection and warning capability.

Motivation

During the period 1955-1995, confirmed tornadoes occurred on only 37 calendar days in what now constitutes the Phoenix metropolitan area, which corresponds to slightly less than one "tornado day" per year (Schmidli and Jamison 1996; Storm Data 1991-1995). Sixteen of the 37 tornado days occurred during the period July-September, the time during which the Mexican Monsoon exerts its greatest influence and thunderstorm frequency peaks over the Phoenix metropolitan area (Stensrud et al. 1995; Douglas et al. 1993). Only 5 tornado days occurred in the Phoenix metropolitan area during the six-month period November-April from 1955 through 1991; however, tornadoes have occurred on 7 calendar days during January and February 1992-1995, resulting in a secondary tornado frequency maximum during the winter. The DPG event provided an opportunity to re-examine synoptic and mesoscale conditions favoring tornado formation over the Phoenix metropolitan area under a moderate vertical shear/low CAPE environment.

The DPG tornado was the first to occur within 30 km of the KIWA WSR-88D, which became operational in March 1993. This event provided a rare opportunity to study a tornadic storm at close proximity to a WSR-88D and a surface observation station. Since the radar was so close to the tornadic storm, a number of elevation cuts dissected the storm from 100 m AGL to 3.5 km AGL (12 kft). The storm cells were extremely small compared to other supercells observed by the WSR-88D (Fig. 2). As a result, the mini supercells were not adequately identified by the WSR-88D Storm Series Algorithm. This made the task of identifying the threat posed by these storms all the more difficult.

None of the SPC severe weather outlooks for the afternoon and evening of 13 February indicated that convective storms were expected over south-central Arizona (not shown). The Phoenix NWSFO had forecast the likelihood for light rain or rain showers and a possible thunderstorm over south-central Arizona, with more significant convection expected the following day. Very light rain associated with mainly stratiform cloudiness was observed over much of south-central Arizona on 13 February and, as expected, only a few convective cells were observed. Several convective storms formed on the periphery of the area affected by the light showers. They were characterized by extremely small horizontal extents of 2-3 km (1-1.5 nmi), and extended upward to approximately 7-8 km (23-26 kft) MSL. At least two of the storms possessed a rotating updraft, and one of these storms produced a damaging tornado. The National Lightning Detection Network (NLDN) failed to detect any cloud-to-ground strikes from these storms (David Bright, NWSFO Tucson, personal communication), and no reports of lightning/thunder were received at NWSFO Phoenix.

Synoptic Overview

The 1200 UTC 13 February 1995 NGM run exhibited superior initial analyses of the observed moisture and wind fields over south-central Arizona during the time of supercell evolution. It was not immediately apparent that the environment could support severe weather on this day.

Strong zonal flow was apparent at the 500 mb level with a deep trough over the Pacific Northwest at 1200 UTC on 13 February 1995 (Fig. 3). Of considerable significance was a strong westerly 130 kt jet streak approaching the southwest U.S. at the 200 mb level (Fig. 4). The six hour forecasts of 700 mb relative humidity and vertical velocity (Fig. 5) also supported the forecast of showers and thunderstorms, especially the relatively strong upward vertical motion expected that afternoon over southwest and south-central Arizona.

Static stability forecasts for the afternoon of 13 February were not particularly impressive, despite the presence of the aforementioned features. The lifted index forecast for 0000 UTC 14 February 1995 (Fig. 6) barely hinted at the possibility of thunderstorms. However, a time-height cross-section of equivalent potential temperature, relative humidity and wind speeds over Phoenix (Fig. 7) did show decreasing equivalent potential temperature with height between 1800 UTC 13 February 1995 and 0000 UTC 14 February 1995, and hence some potential instability.

The 1200 UTC 13 February 1995 Q-G model runs underestimated the effect the jet streak and its associated secondary circulations would have on the low-level wind fields over south-central Arizona. A forecast cross-section (Fig. 8) valid at 1800 UTC 13 February 1995 shows a veering wind profile across much of the forecast area (Phoenix is located at approximately 33°N 112°W). However, at this time, south winds at the surface and the lower levels were underestimated. Surface reports from across southern Arizona (not shown) indicated that relatively strong south winds 5 to 10 m s^{-1} (8 to 18 kts) were occurring. The forecast cross-section indicated these winds would be from the southwest (around 220°) at 5 m s^{-1} (10 kts).

Most likely, ageostrophic circulations associated with the approaching 200 mb jet streak (Fig. 9) served to enhance the southerly low level flow (note the pronounced divergence/convergence couplet near 33° N 112° W). The vertical wind profile from the 1200 UTC 13 February Tucson sounding (Fig. 10) exhibited directional and speed shear. For a storm motion of 263°/21 m s^{-1}, storm-relative helicity in the 0-3 km AGL layer was 169 m^2 s^{-2}. A forecast sounding (not shown) using a forecast surface temperature of 15.5°C (60°F) indicated that convection was possible, with cloud bases around 1 km (3 kft) AGL, cloud tops around 4 km (13 kft) AGL, and a CAPE of 149 J kg^{-1}.

The southerly low level flow also helped advect unseasonably moist air into central Arizona. By 2005 UTC, surface temperatures were 15-17°C (60-63°F) and surface dew point temperatures were 13-14°C (56-58°F) in the Phoenix metropolitan area (Fig. 11). These dew point temperatures were remarkably high for February, and are similar to what is normally observed during July and August (Schmidli and Jamison 1996). To further highlight how moist the airmass was, 850 mb dew points (not shown) over northern Mexico had reached 8°C (46°F) by 1200 UTC 13 February.

Radar Analysis

During the late morning and early afternoon of 13 February, widespread mid-level cloudiness had overspread much of south-central Arizona. Very light rain was scattered throughout much of the Phoenix metropolitan area. By 2125 UTC (1425 MST), two storms developed over mainly open country at the extreme eastern periphery of the mid-level cloud deck. The evolution of the two storms is depicted as two reflectivity cells (labeled Cell 1 and Cell 2) in a 4-panel reflectivity image at the 6° elevation angle (Fig. 12). These cells were quite small, with diameters of 3 km (1.5 nmi) and maximum echo tops of 8 km (26 kft) AGL. Furthermore, these cells passed within 10 km (6 nmi) of the KIWA WSR-88D, but were somewhat masked by ground clutter. Since the maximum magnification on the Principal User Position (PUP) workstation was 8X, it was difficult to ascertain features pertinent to the storms. Nevertheless, within minutes of cell initiation, updraft rotation was observed on radar.

A vertical shear profile supportive of supercell development rapidly evolved between 2100 and 2200 UTC, as depicted on the WSR-88D VAD Wind Profile (Fig. 13). Note the significant increase in 0-2 km (0-6 kft) AGL shear between 2112 UTC and 2159 UTC. It is not certain whether this was a local phenomenon, or resulted from a large-scale adjustment, but the apparent passage of an upper-level jet maximum is detectable in the VWP. It is possible that the storms themselves may have affected the low level wind profile. Whatever the case, the increased low level shear and increase in cyclonic turning of the shear vector with height appears to have been a contributing factor to the rapid observed evolution to supercell storms.

Close inspection of the reflectivity data at 2159 UTC reveals that both storms possessed WERs and strong low-level reflectivity gradients. Due to their small size, neither of these cells was identified as a storm by the WSR-88D Storm Series Algorithm until completion of the volume scan which began at 2159 UTC; even then, only Cell 1 was identified, and only for that one volume scan. However, an offline version of the WSR-88D Build 9 Storm Cell Identification and Tracking Algorithm was run using these data, and both storms were identified and tracked prior to and during the tornado.

Examination of a four-panel base velocity display at 2159 UTC (Fig. 14) reveals the presence of a relatively deep cyclonic circulation within both cells. The circulation appears to be stronger in Cell 1. Both circulations possessed diameters of approximately 1 km (0.5 nmi), and were collocated with cell updrafts, based on their location relative to the WERs and low-level reflectivity gradients. This correlation of rotation with updraft is more easily observed by examining 6° base reflectivity and base velocity displays at 2211 UTC (Figs. 15 and 16). The rotation in Cell 1 becomes more apparent in the reflectivity data as a well-defined pendant-shaped echo extending toward the SSW of the reflectivity core.

Reflectivity and velocity images depict the correlation between pendant echo and rotational couplet. Time-height displays of rotational velocity for both storms commencing at 2153 UTC (Figs. 17 and 18) reveal that 1) maximum rotational velocity occurred around 1.5 km (5 kft) AGL with both cells; 2) slightly higher rotational velocities were associated with Cell 2, especially in the lowest 1 km AGL; 3) rotation extended from near the surface to at least 3 km AGL (Note that rotation may have extended higher into the storm, but the close proximity of the storms to the radar precluded the sampling of the upper portions of the storms.); 4) rotational velocities for both storms remained in the "weak shear" category as defined by mesocyclone recognition criteria (Andra et al. 1994); and 5) rotation persisted in both storms for at least 40 minutes (possibly as long as 1 hour, based on the depth of the rotation observed at 2153 UTC).

Although both storms possessed relatively deep, persistent rotating updrafts with similar intensities, neither appeared likely to produce a tornado. However, the southern storm (Cell 1) produced a tornado at 2203 UTC which attained F1 intensity and lasted until at least 2208 UTC.

Tornadogenesis Discussion

Two rapidly-developing, very small storms acquired cyclonic rotation and maintained it for at least 40 minutes as they moved northeast over Mesa, Arizona, and the surrounding area. It is uncertain why one storm became tornadic while the other did not. Both storm cells were quite small, and seemed to best be defined as mini supercells. The tornado appeared to have been produced by one of the two mini supercells.

The proximity of the two mini supercells to each other may have been important with respect to tornadogenesis. It appears that Cell 1 interacted with the outflow produced by Cell 2 prior to tornadogenesis. The importance of boundary layer interactions with respect to tornadogenesis has been well-documented (Weaver and Nelson 1982; Weaver et al. 1984; Weaver and Purdom 1995). An analysis of consecutive volume scans of the base reflectivity and velocity data at the 1.5° elevation angle from 2124 UTC to 2159 UTC (Fig. 19) reveal that 1) Cell 2 apparently generated a well-defined outflow, with forward flank downdraft (FFD) and rear flank downdraft (RFD) gust fronts clearly defined at 2124 UTC; 2) the FFD gust front from Cell 1 appears to merge with the RFD gust front from Cell 2 by 2136 UTC; and 3) Cell 1 tracked toward the northeast along the RFD/FFD gust front from 2136 UTC through 2159 UTC (just prior to the tornado). We surmise that the interaction of the RFD and FFD gust fronts served to enhance low level baroclinically-generated horizontal vorticity thus leading to tornadogenesis (Klemp 1987). This evidence is compelling, yet certainly not conclusive. Note that the tornado lasted fewer than 10 minutes, while the mesocyclone persisted for over one hour, and that the storm with the stronger mesocyclone (Cell 2) failed to produce a tornado.

Operational Considerations

A critical aspect of any severe storm detection and warning program centers on the ability to correctly assess the potential for severe weather. Once this assessment is made, forecasters understand which radar products must be examined in order to effectively warn the public of potentially hazardous weather.

Supercell development is rarely observed over south-central Arizona compared to most locations in the United States. On this day, the primary threat was determined to be locally heavy rain; supercell development was not expected. The severe weather outlooks from SPC indicated that general (non-severe) thunderstorms were possible west and south of Phoenix by the evening of 13 February, but that no thunderstorms were expected over the Phoenix metropolitan area.

During real-time operations, the ongoing weather did not appear to present a significant threat to the public. Spotters had not been put on alert, as the synoptic situation had not seemed favorable enough to expect severe thunderstorms, much less tornadic ones. Upon detection of the storms by the radar operator, a special weather statement (SPS) focusing on the potential for brief heavy rain was issued (Fig. 20). The tornado occurred within 20 minutes of SPS issuance. Several eyewitnesses observed a funnel cloud and contacted the Phoenix forecast office by 2215 UTC, well after the tornado had struck DPG.

Since these storms were quite small and passed within 10 km (6 nmi) of the KIWA WSR-88D, it was difficult for the radar meteorologist to properly assess their significance. A complete vertical examination of the cells was difficult due to the "cone of silence". As such, volume products such as echo tops (ET), vertically integrated liquid (VIL), and layer reflectivity maximum (LRM) were not useful.

Four-panel user functions were not effective since subtle yet important features were not easily detectable even at 8X magnification. The operator needed to use full screen displays with 8X magnification, in this instance, but this limits the ability to perform a thorough storm analysis. At the 0.5° and 1.5° elevation angles, data quality was degraded by inclusion of ground clutter. The WSR-88D Storm Series Algorithm was not able to identify either cell as a storm, so potentially valuable information (e.g., mesocyclone, TVS detection, VIL, etc.) was unavailable. The first time a storm was identified occurred during the time the tornado was causing damage (volume scan beginning at 2159 UTC). When storms move within 10 km (6 nmi) range of the RDA site, the cell tracking algorithm may have difficulty. This may have contributed to the lack of cell information in this case. Rotational velocity computations indicate that each of these storms possessed "weak shear" mesocyclones (Andra et al. 1994). As a "rule of thumb", a severe thunderstorm warning is not warranted when a meso-circulation of such low magnitude is detected. A tornado warning may be issued if spotter information or environmental conditions or local topography and climatology are coupled with the observance of at lease a "minimal" mesocyclone. In this case, neither type of warning was issued. This, along with evidence presented by Burgess et al. (1995), suggests that lower rotational velocity thresholds may be necessary when making a determination of whether to issue a tornado warning in association with a mini supercell storm.

Conclusions

Two mini supercells were observed in an environment not perceived as being supportive of supercell development. Rotational velocities with the storms remained in the "weak shear" category, and would have been less impressive had the storms been at a greater range from the radar. Nevertheless, one supercell became tornadic. Subtle features which may have contributed to tornadogenesis were identified. It is hoped that this investigation may help operational forecasters in their task of effectively warning the public of the potential for hazardous weather associated with mini supercells..

Acknowledgments: Thanks to Joan O'Bannon for carefully crafting one of the figures, to David Bright for providing NLDN information, and to James I. Gutting for providing detailed information about the storm damage at DPG. Thanks is also extended to those who gave constructive criticism of this manuscript.

References

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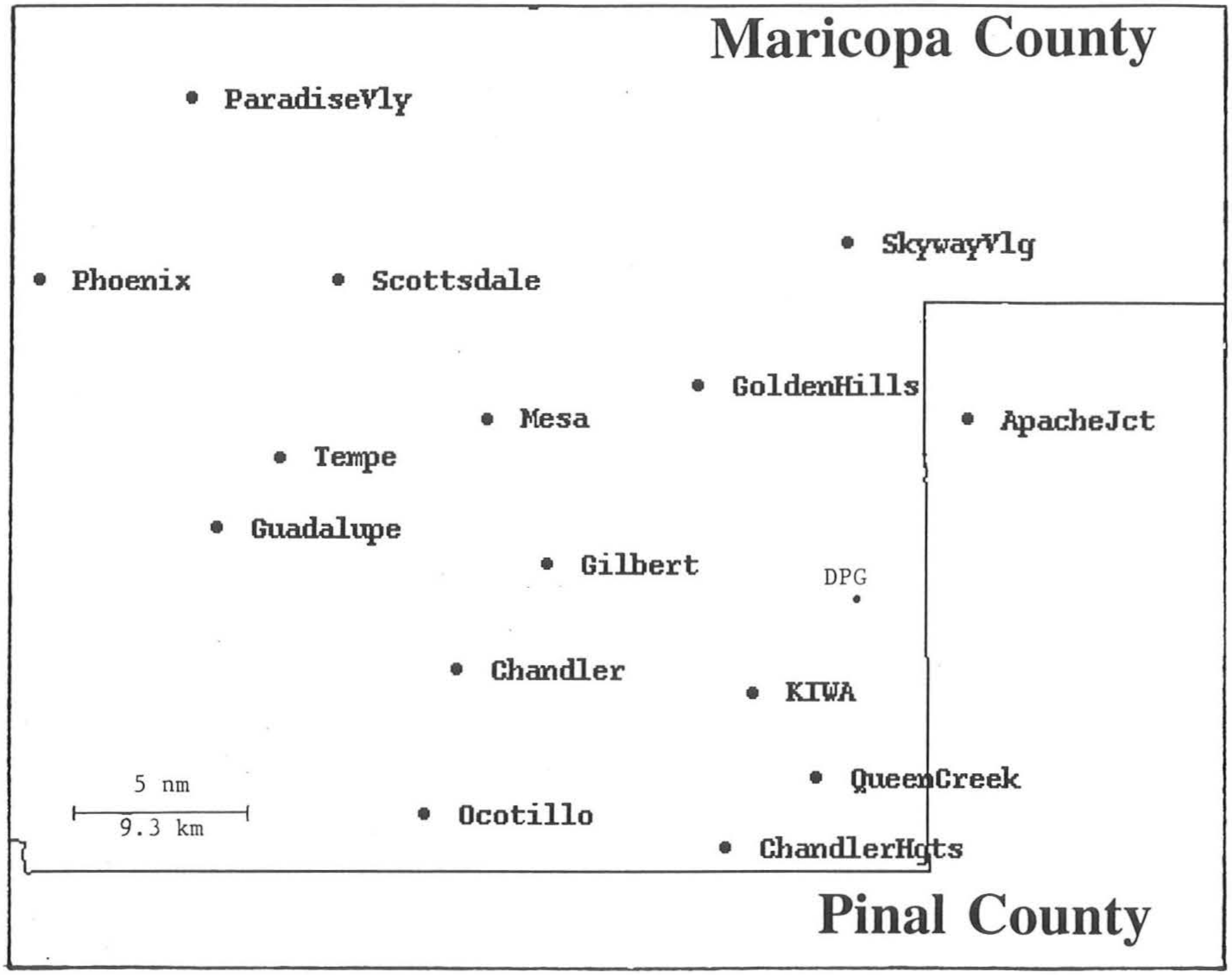
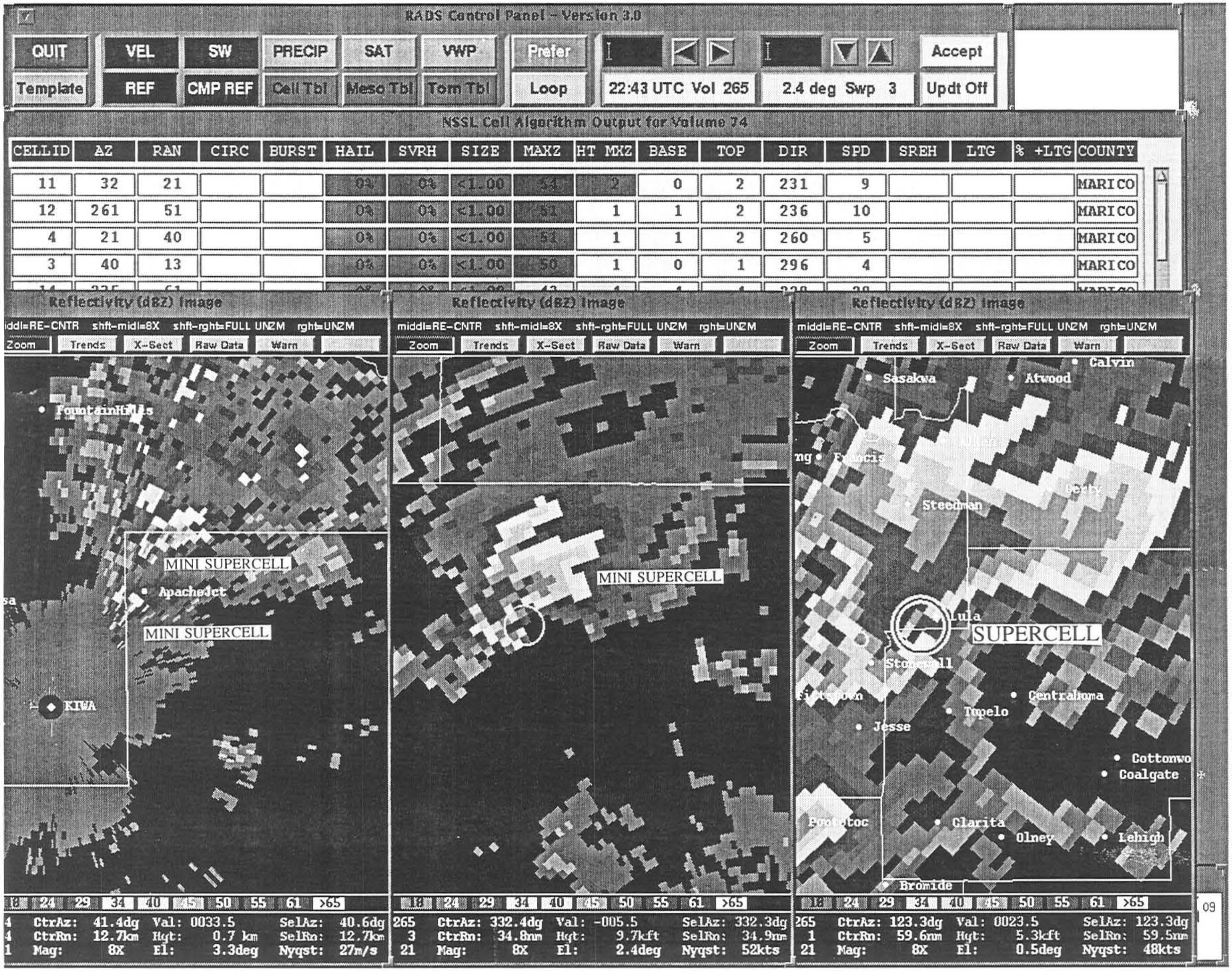


Fig 1 Schematic depicting Maricopa and Pinal Counties, pertinent cities and the location of the DPG relative to the KIWA WSR-88D.



NSSL Cell Algorithm Output for Volume 74

CELLID	AZ	RAN	CIRC	BURST	HAIL	SVRH	SIZE	MAXZ	HT MXZ	BASE	TOP	DIR	SPD	SREH	LTG	% +LTG	COUNTY
11	32	21			0%	0%	<1.00	54	2	0	2	231	9				MARICO
12	261	51			0%	0%	<1.00	51	1	1	2	236	10				MARICO
4	21	40			0%	0%	<1.00	51	1	1	2	260	5				MARICO
3	40	13			0%	0%	<1.00	50	1	0	1	296	4				MARICO

```
4  CtrAz:  41.4dg  Val: 0033.5    SelAz:  40.6dg
4  CtrRn:  12.7km  Hgt:   0.7 km  SelRn:  12.7km
1  Mag:       8X   El:    3.3deg  Nyqst:  27m/s
```

```
265  CtrAz: 332.4dg  Val: -005.5    SelAz: 332.3dg
  3  CtrRn:  34.8nm  Hgt:   9.7kft  SelRn:  34.9nm
 21  Mag:       8X   El:    2.4deg  Nyqst:  52kts
```

```
265  CtrAz: 123.3dg  Val: 0023.5    SelAz: 123.3dg
  1  CtrRn:  59.6nm  Hgt:   5.3kft  SelRn:  59.5nm
 21  Mag:       8X   El:    0.5deg  Nyqst:  48kts
```

Fig 2 Radar reflectivity images of four supercells viewed at 8X magnification from three different WSR-88D radars: a) two mini supercells viewed from KIWA on 13 Feb 1995 b) a mini supercell viewed from KPUX on 22 June 1995 and c) a southern Plains variety supercell viewed from KOUN on 11 May 1991.

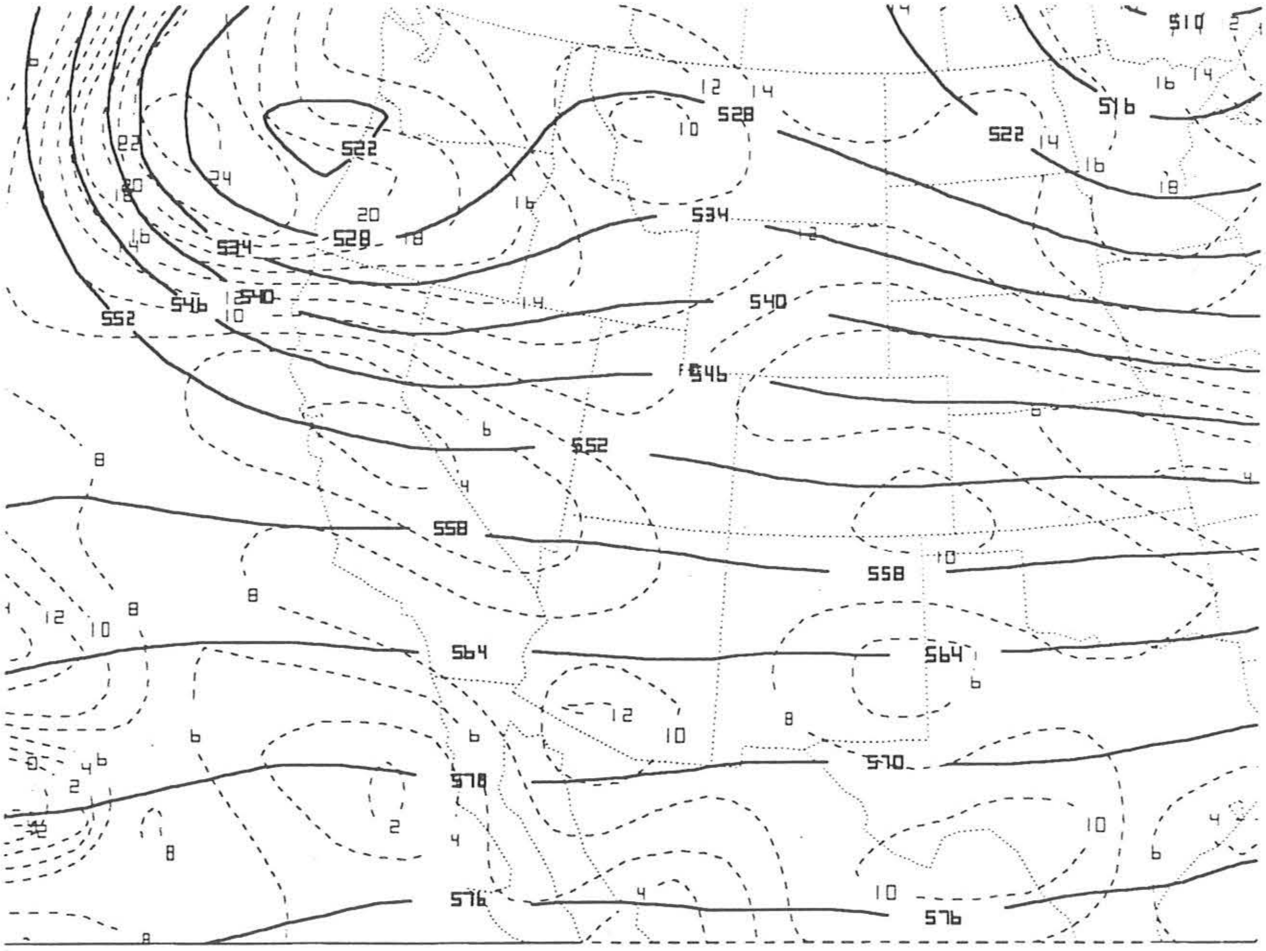


Fig 3 Initial analysis of 500 mb geopotential heights (dam) and vorticity valid at 1200 UTC 13 February 1995.

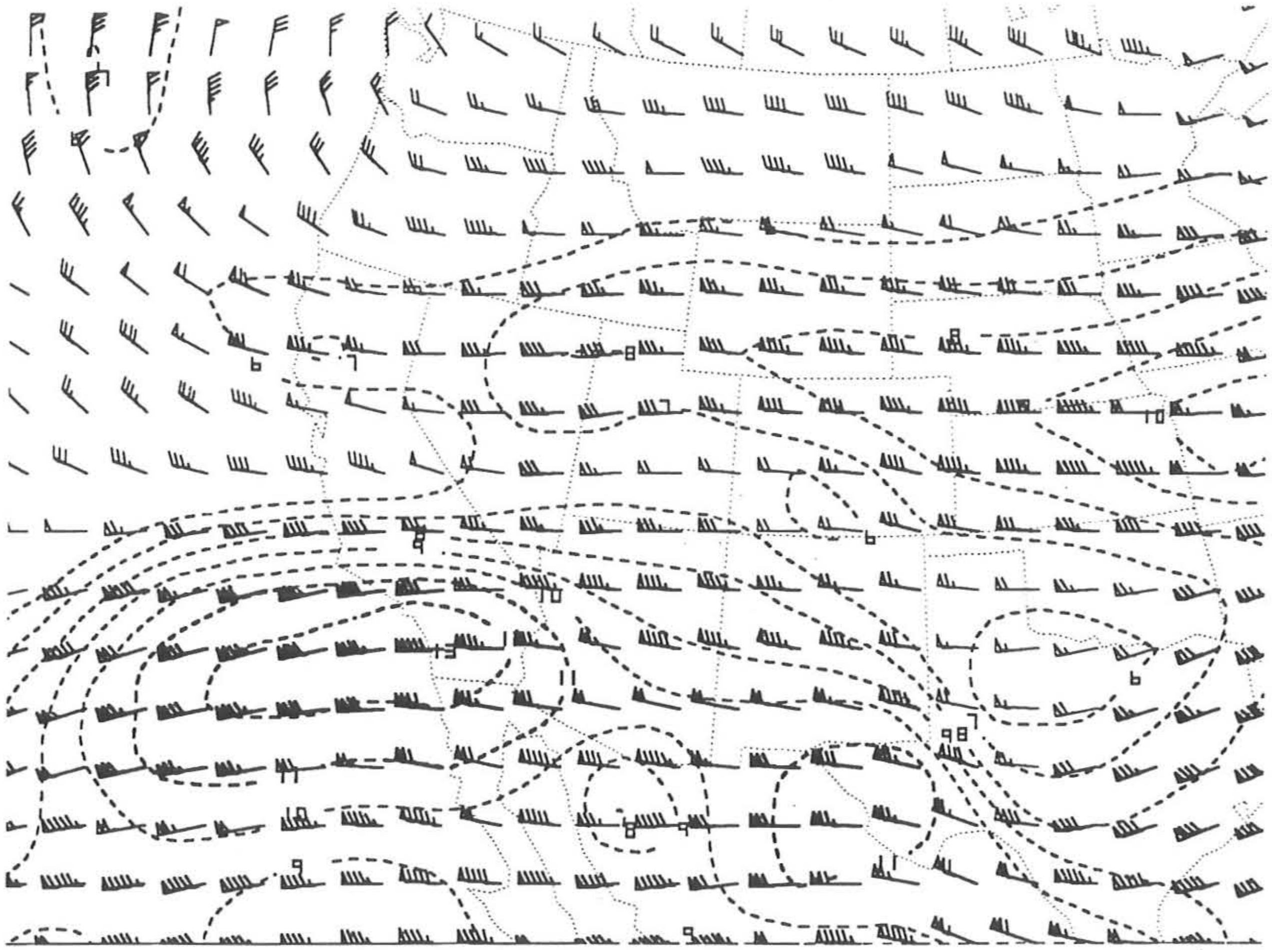


Fig 4 Initial analysis of wind speed (kts) at the 200 mb level valid 1200 UTC 13 February 1995.

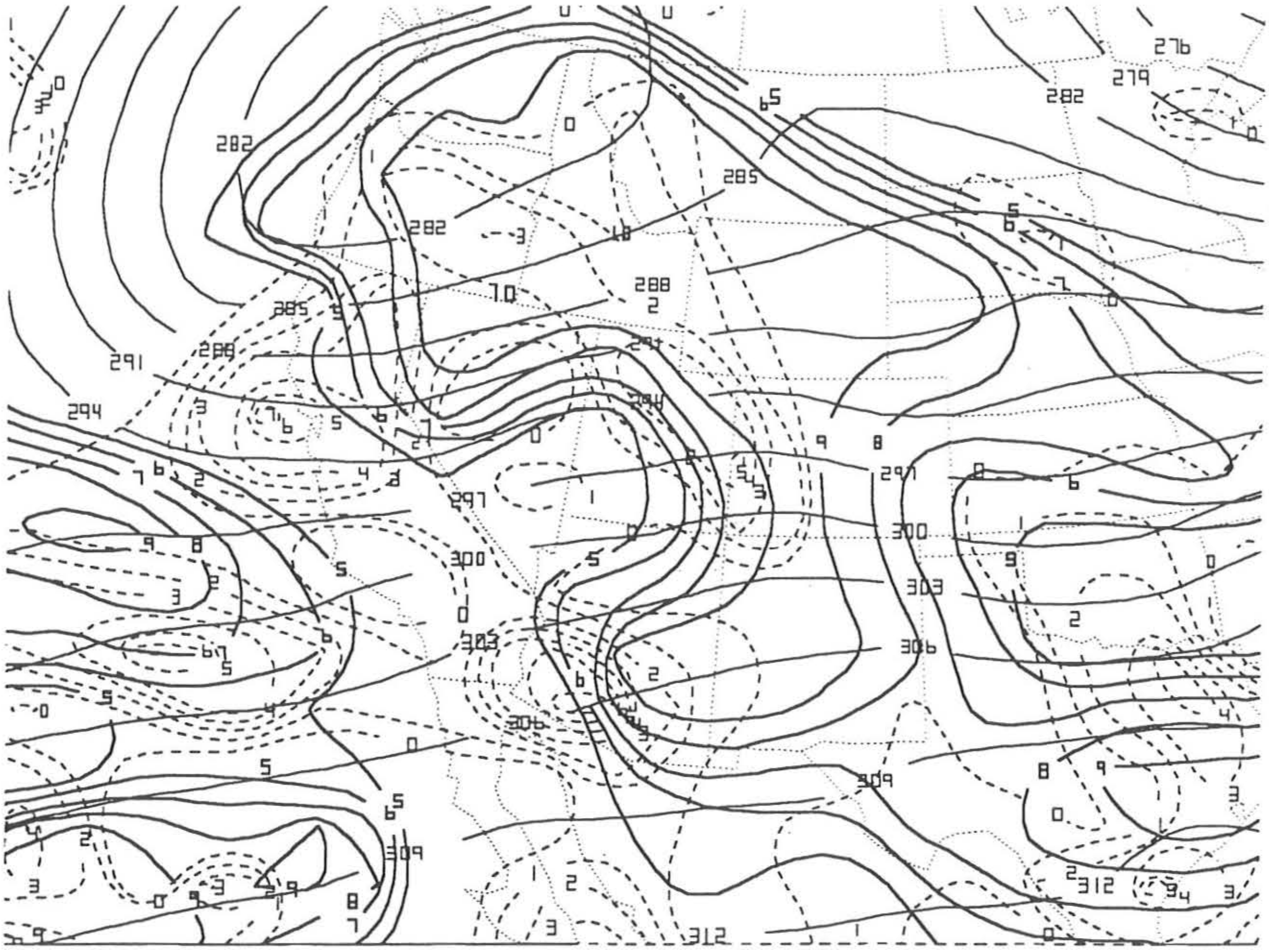


Fig 5 Six hour forecast of 700 mb geopotential heights (dam), relative humidity (%) and omega ($\mu b\ s^{-1}$) valid at 1800 UTC 13 February 1995.

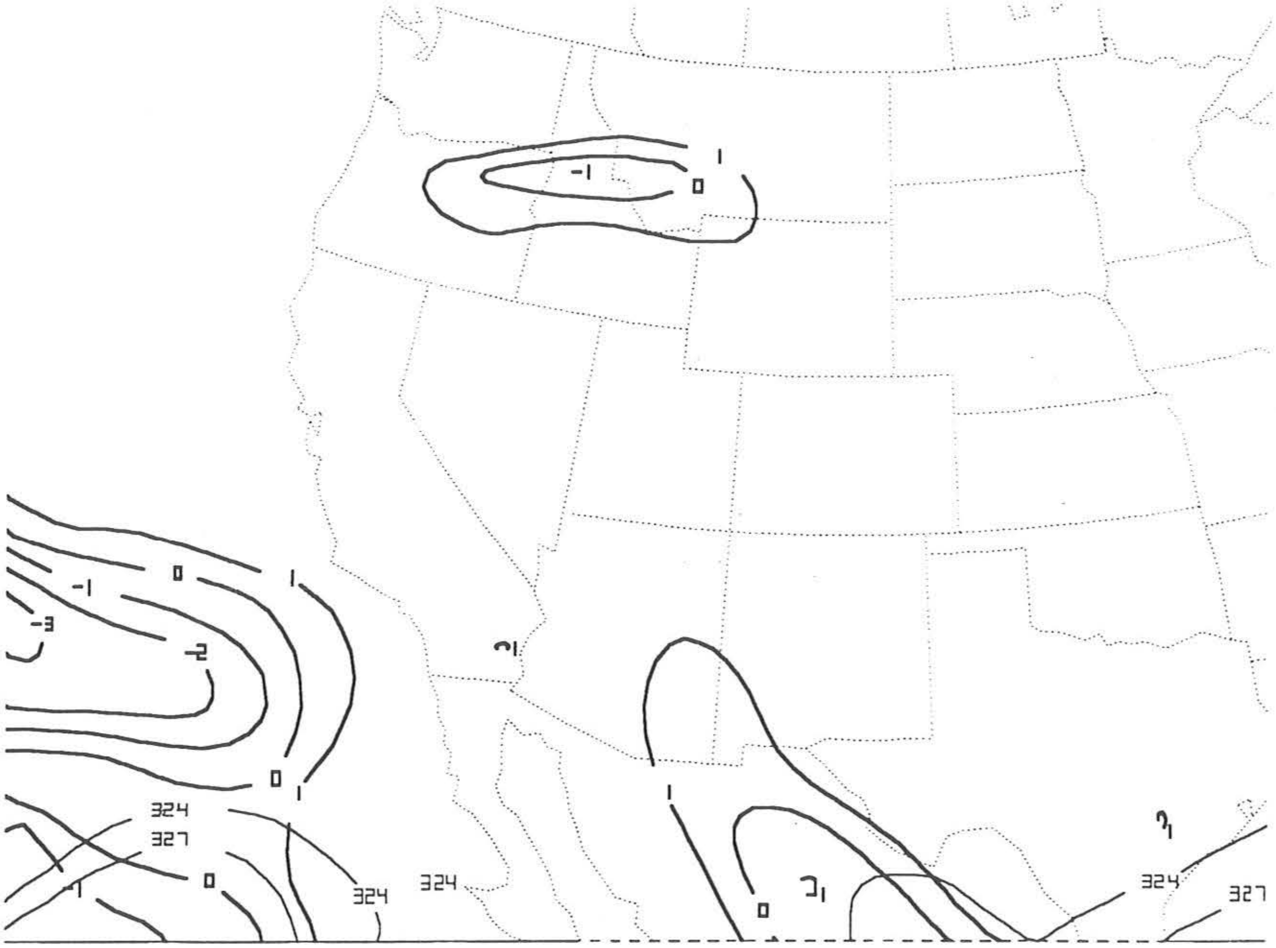


Fig 6 Twelve hour Lifted Index and equivalent potential temperature (K) forecast valid at 0000 UTC 14 February 1995.

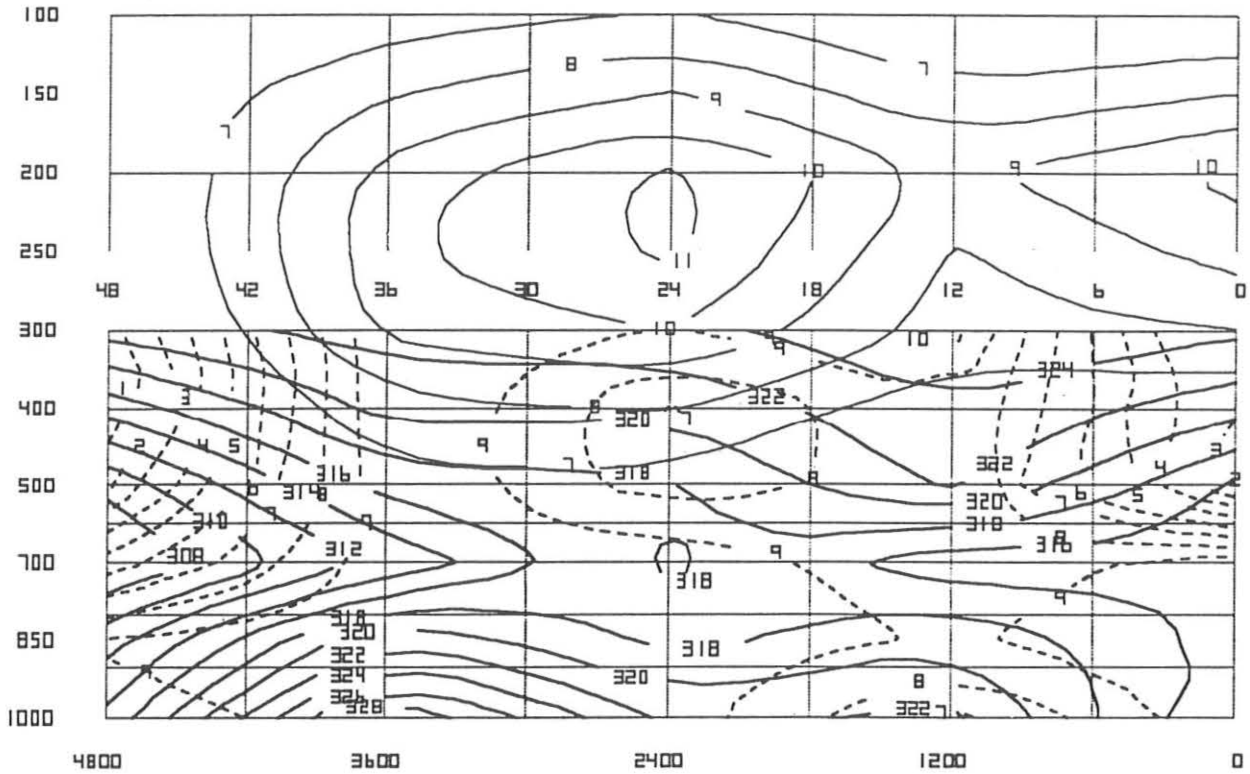


Fig 7 Time-height cross-section over Phoenix (33°N 112°W) of equivalent potential temperature (K), relative humidity (%) and wind speed (kts) from the 1200 UTC 13 February NGM model run.

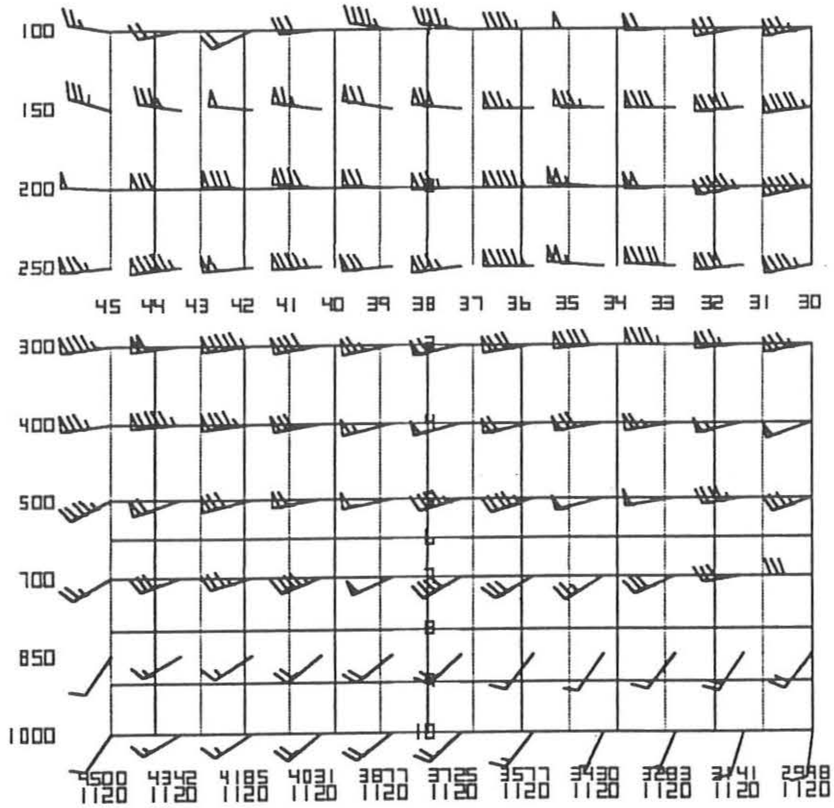


Fig 8 Cross-section from 45°N 112°W to 30°N 112°W showing six hour forecast of wind speed (kts) valid 1800 UTC 13 February 1995.

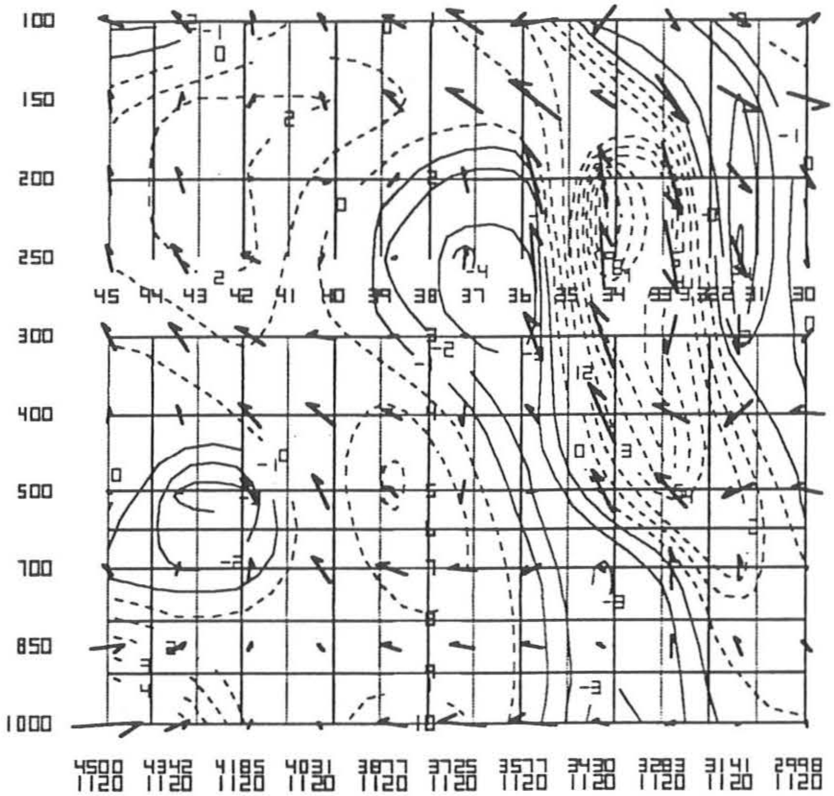


Fig 9 Cross-section from 45°N 112°W to 30°N 112°W showing six hour forecast of the ageostrophic circulation (arrows) and divergence of these winds (negative divergence is solid) valid at 1800 UTC 13 February 1995.

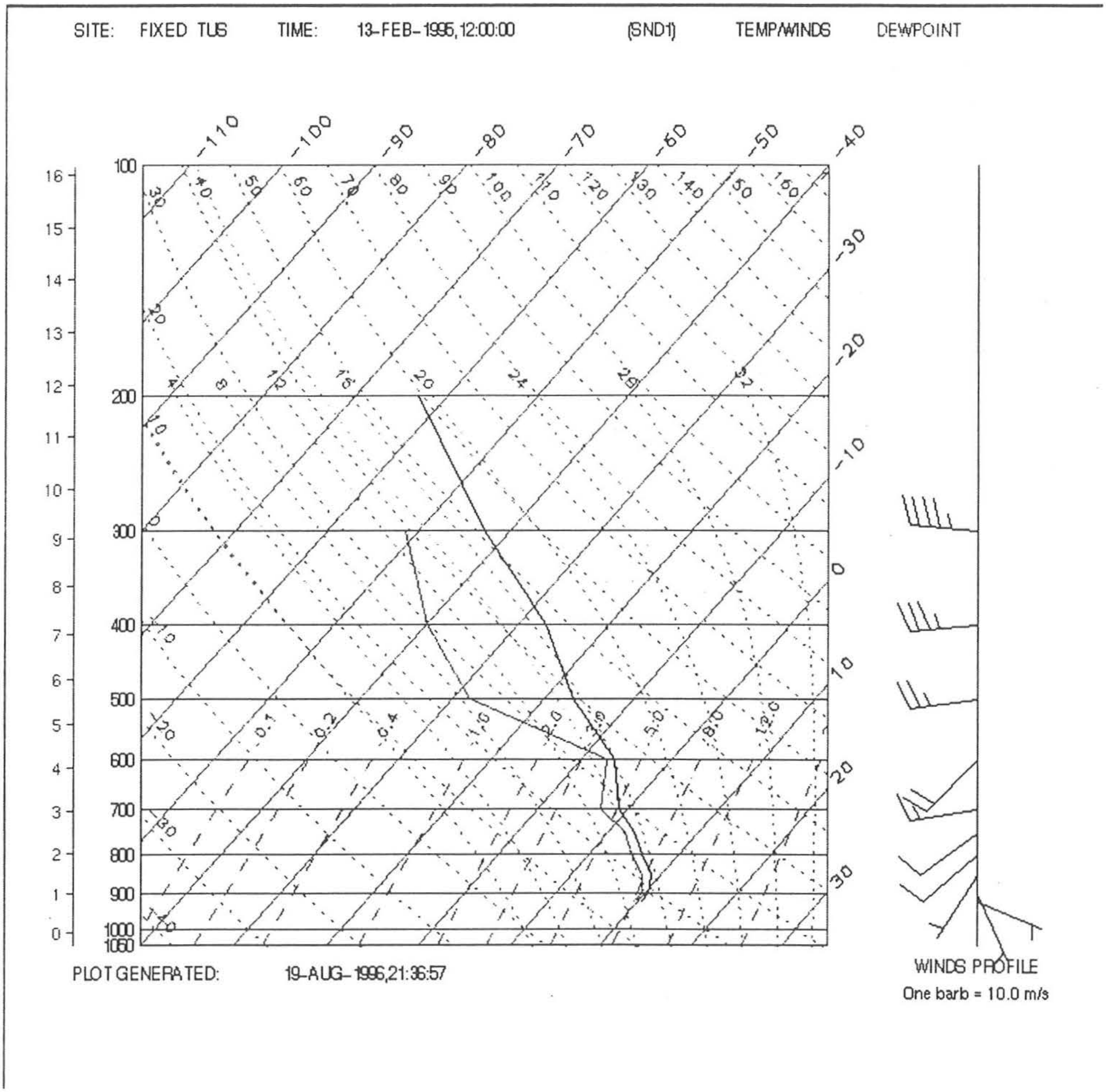


Fig 10 Skew-T diagram of TUS sounding at 1200 UTC 13 February 1995. Wind speed is expressed in m s^{-1}.

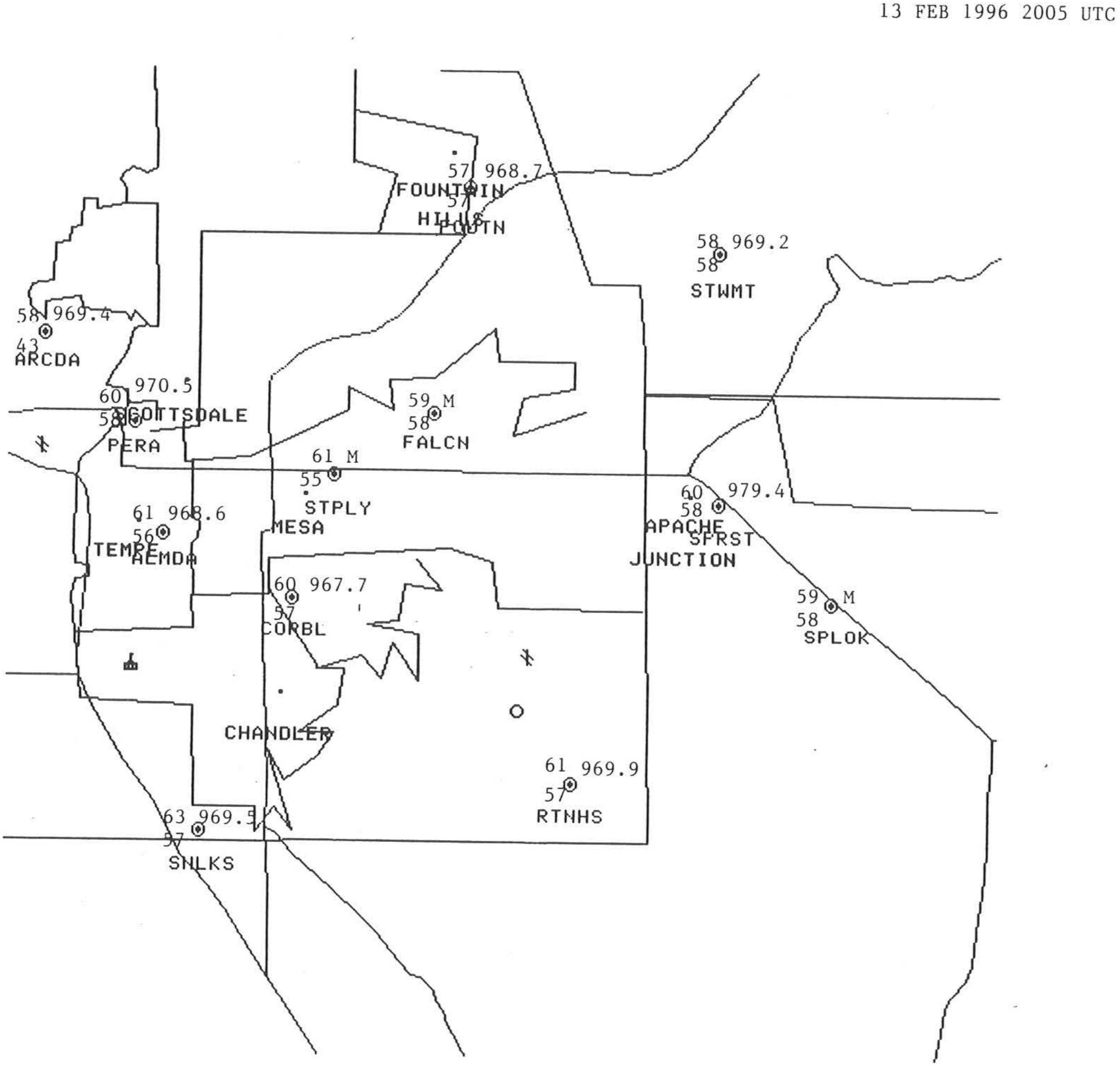
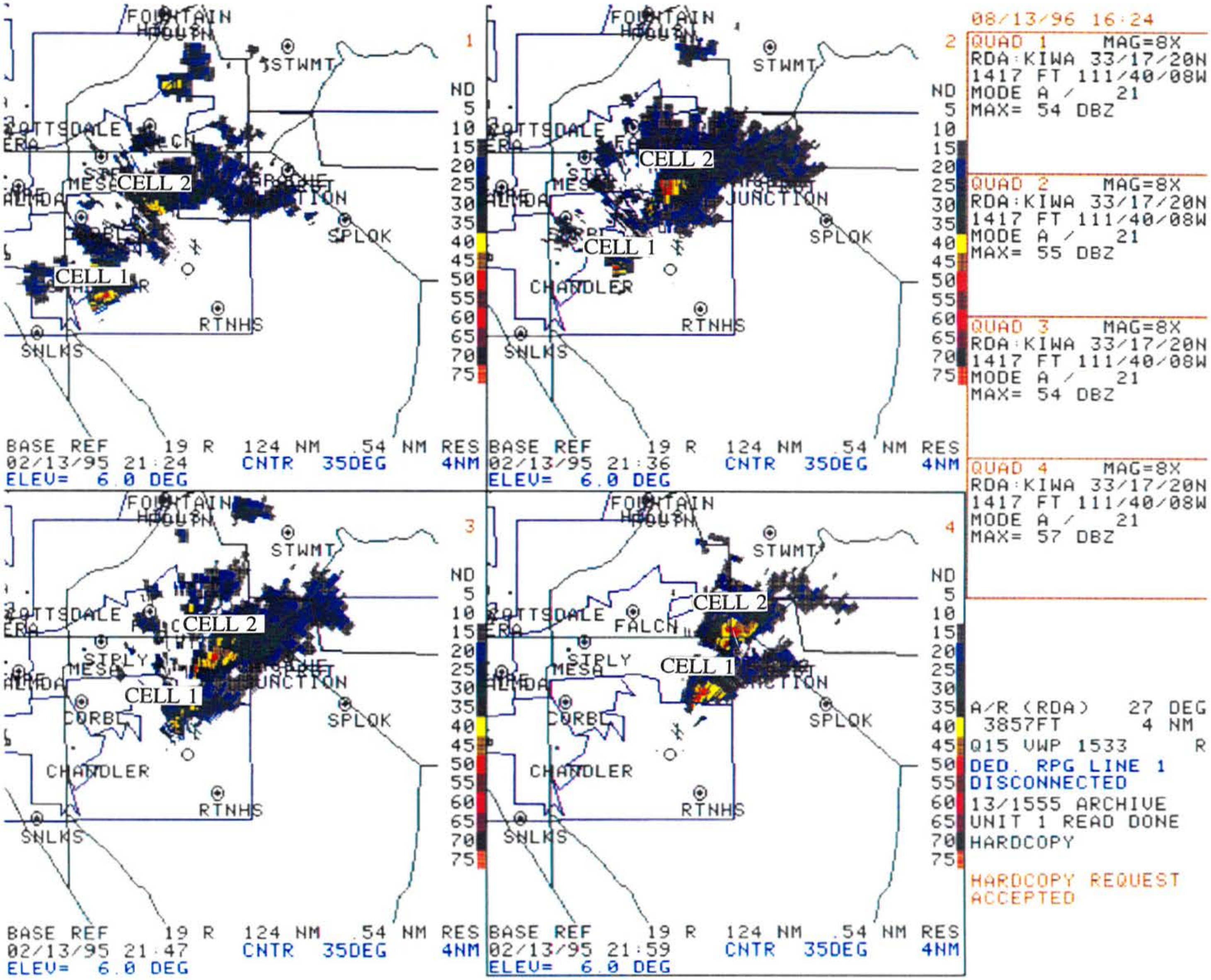


Fig 11 Temperature, dew point temperature (°F), and station pressure (mb) measured near the Phoenix metropolitan area by the Phoenix Realtime Instrumented Surface Meso-meteorological System (PRISMS) at 2105 UTC.



```
BASE REF      19 R   124 NM   .54 NM RES
02/13/95 21:24       CNTR  35DEG    4NM
ELEV=  6.0 DEG

BASE REF      19 R   124 NM   .54 NM RES
02/13/95 21:36       CNTR  35DEG    4NM
ELEV=  6.0 DEG

BASE REF      19 R   124 NM   .54 NM RES
02/13/95 21:47       CNTR  35DEG    4NM
ELEV=  6.0 DEG

BASE REF      19 R   124 NM   .54 NM RES
02/13/95 21:59       CNTR  35DEG    4NM
ELEV=  6.0 DEG
```

```
08/13/96 16:24
QUAD 1       MAG=8X
RDA:KIWA  33/17/20N
1417 FT  111/40/08W
MODE A /      21
MAX=  54 DBZ

QUAD 2       MAG=8X
RDA:KIWA  33/17/20N
1417 FT  111/40/08W
MODE A /      21
MAX=  55 DBZ

QUAD 3       MAG=8X
RDA:KIWA  33/17/20N
1417 FT  111/40/08W
MODE A /      21
MAX=  54 DBZ

QUAD 4       MAG=8X
RDA:KIWA  33/17/20N
1417 FT  111/40/08W
MODE A /      21
MAX=  57 DBZ

A/R (RDA)     27 DEG
 3857FT        4 NM
Q15 VWP 1533        R
DED. RPG LINE 1
DISCONNECTED
13/1555 ARCHIVE
UNIT 1 READ DONE
HARDCOPY

HARDCOPY REQUEST
ACCEPTED
```

Fig 12 Four-panel radar reflectivity at the 6.0° elevation angle viewed from the KIWA WSR-88D at (from left to right and top to bottom) 2124 UTC, 2136 UTC, 2147 UTC, and 2159 UTC 13 February 1995.

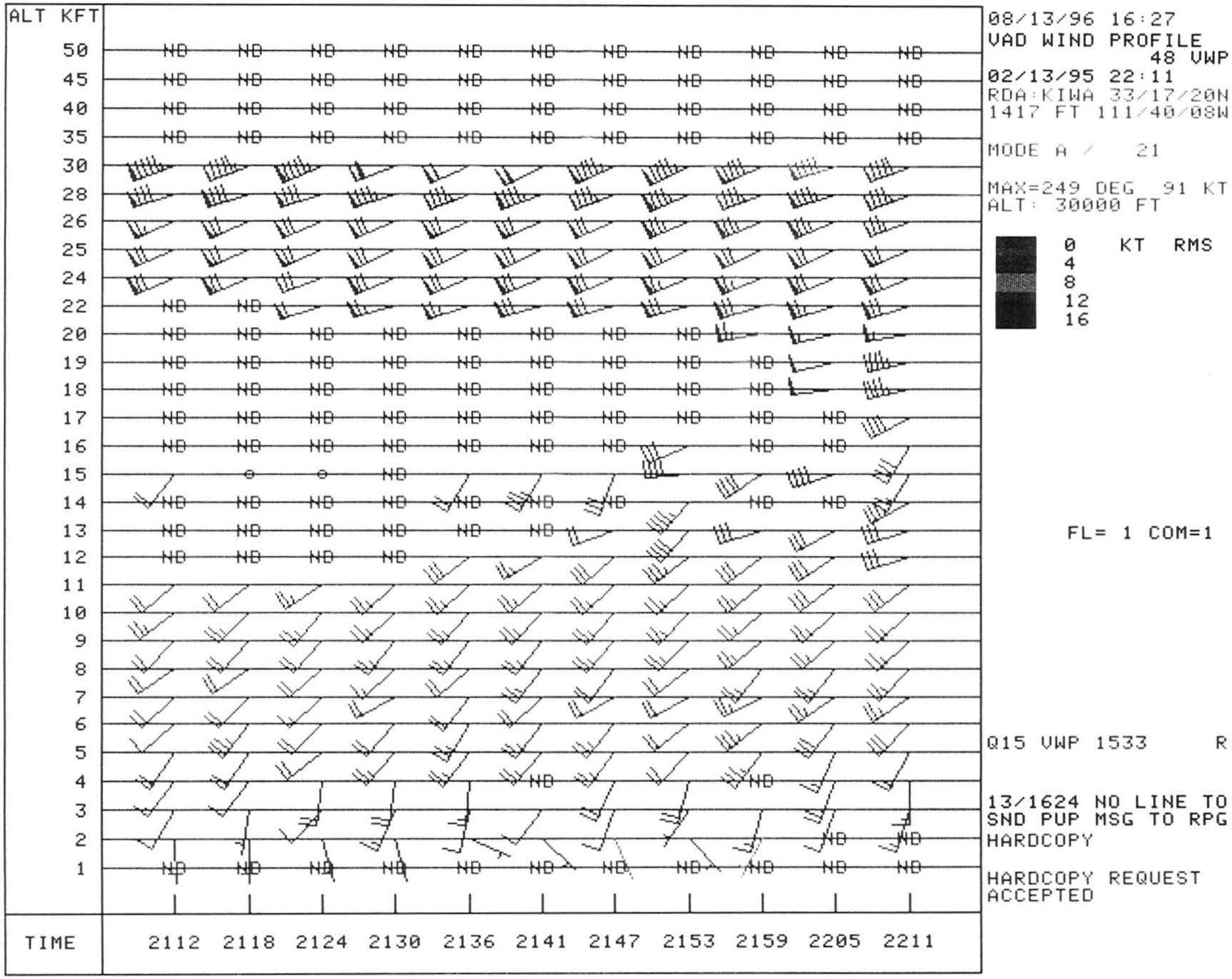
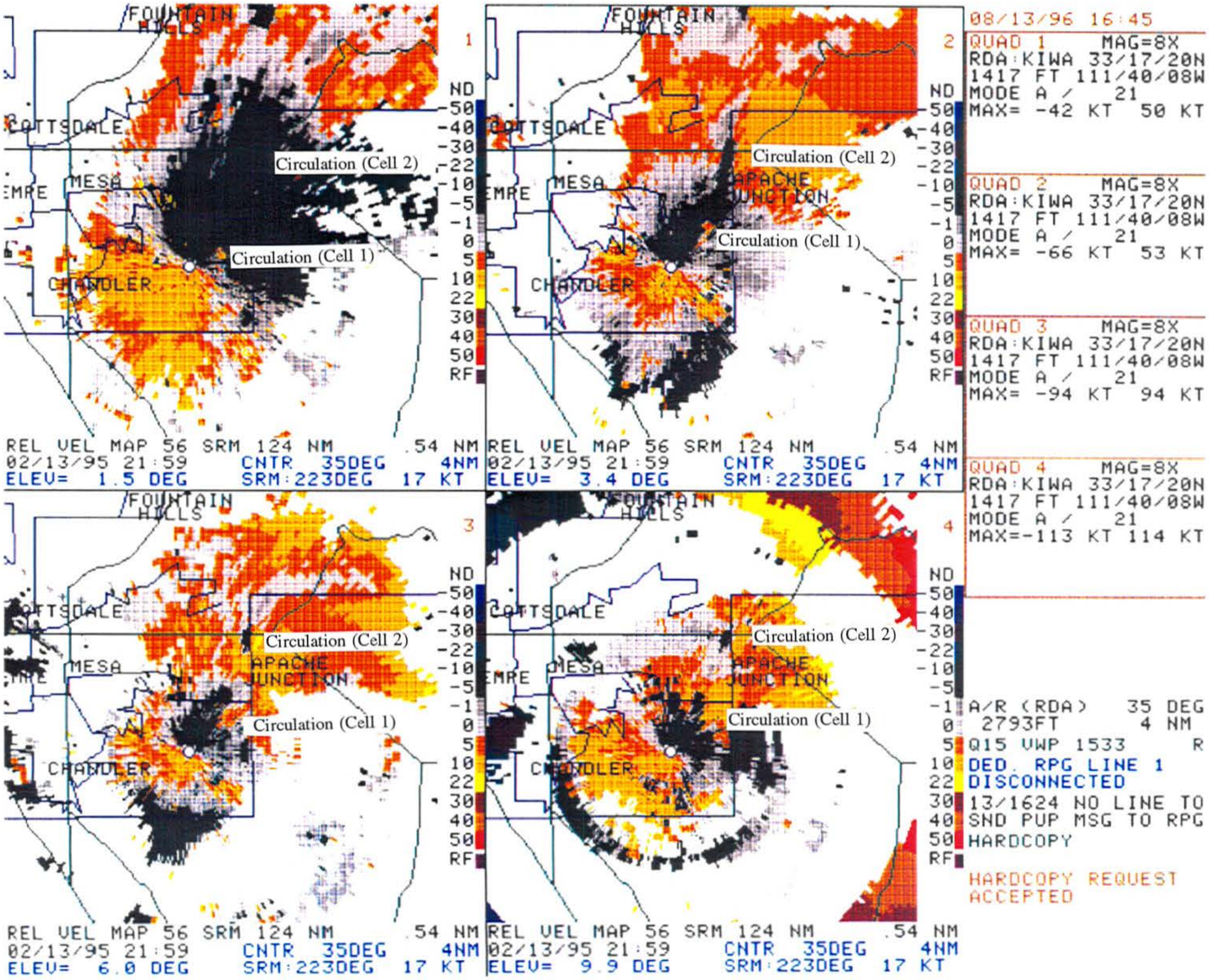


Fig 13 KIWA WSR-88D VAD Wind Profile (VWP) valid at 2211 UTC 13 February 1995.



```
REL VEL MAP 56 SRM 124 NM        .54 NM
02/13/95 21:59      CNTR  35DEG     4NM
ELEV=  1.5 DEG      SRM:223DEG   17 KT

REL VEL MAP 56 SRM 124 NM        .54 NM
02/13/95 21:59      CNTR  35DEG     4NM
ELEV=  3.4 DEG      SRM:223DEG   17 KT

REL VEL MAP 56 SRM 124 NM        .54 NM
02/13/95 21:59      CNTR  35DEG     4NM
ELEV=  6.0 DEG      SRM:223DEG   17 KT

REL VEL MAP 56 SRM 124 NM        .54 NM
02/13/95 21:59      CNTR  35DEG     4NM
ELEV=  9.9 DEG      SRM:223DEG   17 KT
```

```
08/13/96 16:45
QUAD 1        MAG=8X
RDA:KIWA  33/17/20N
1417 FT  111/40/08W
MODE A /      21
MAX= -42 KT   50 KT

QUAD 2        MAG=8X
RDA:KIWA  33/17/20N
1417 FT  111/40/08W
MODE A /      21
MAX= -66 KT   53 KT

QUAD 3        MAG=8X
RDA:KIWA  33/17/20N
1417 FT  111/40/08W
MODE A /      21
MAX= -94 KT   94 KT

QUAD 4        MAG=8X
RDA:KIWA  33/17/20N
1417 FT  111/40/08W
MODE A /      21
MAX=-113 KT  114 KT

A/R (RDA)     35 DEG
 2793FT        4 NM
Q15 UWP 1533        R
DED. RPG LINE 1
DISCONNECTED
13/1624 NO LINE TO
SND PUP MSG TO RPG
HARDCOPY

HARDCOPY REQUEST
ACCEPTED
```

Fig 14 Four-panel display of velocity at the 1.5°, 3.4°, 6.0°, and 9.9° elevation angles from the KIWA WSR-88D at 2159 UTC 13 February 1995 depicting mesocyclone circulations associated within Cell 1 and Cell 2.

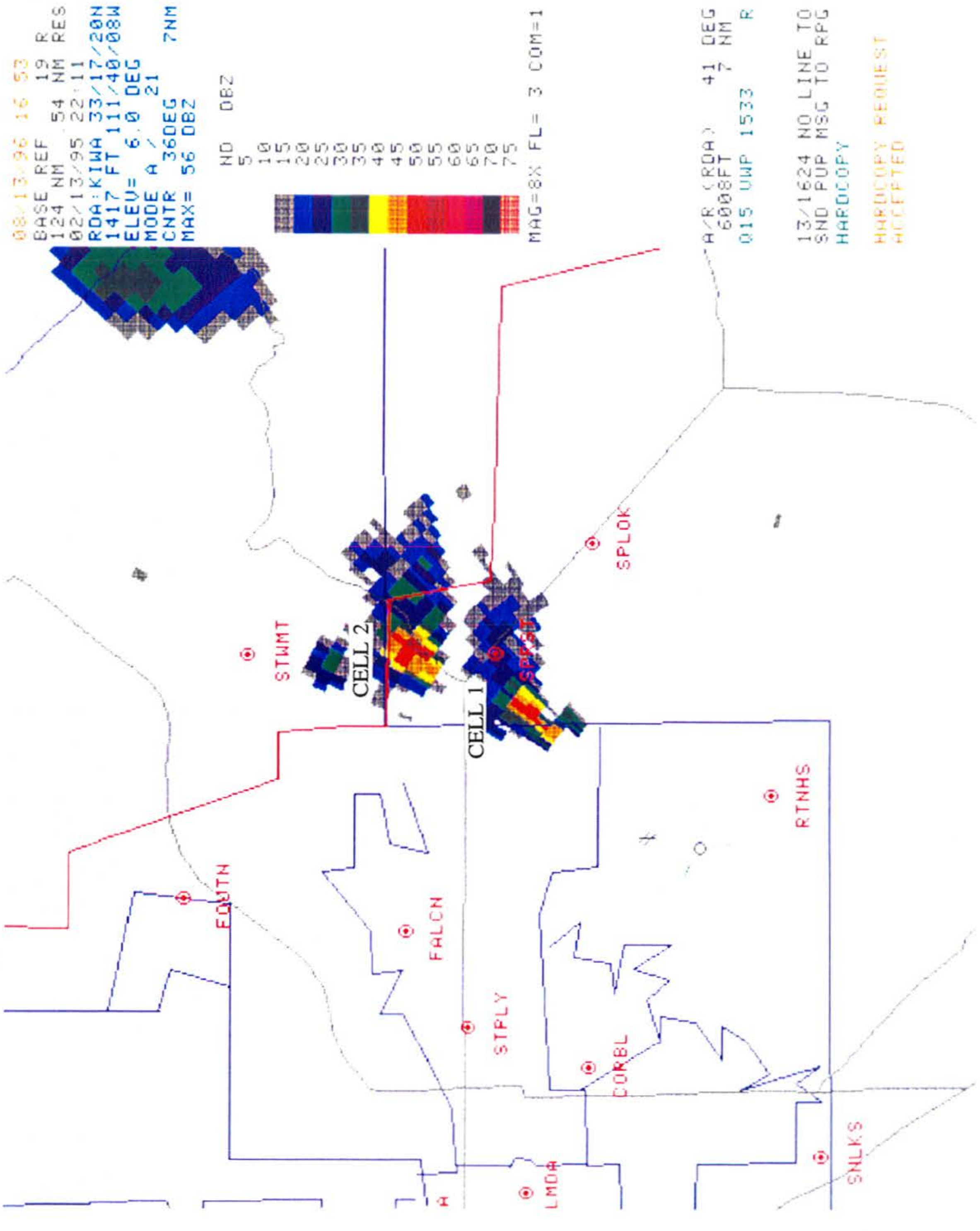
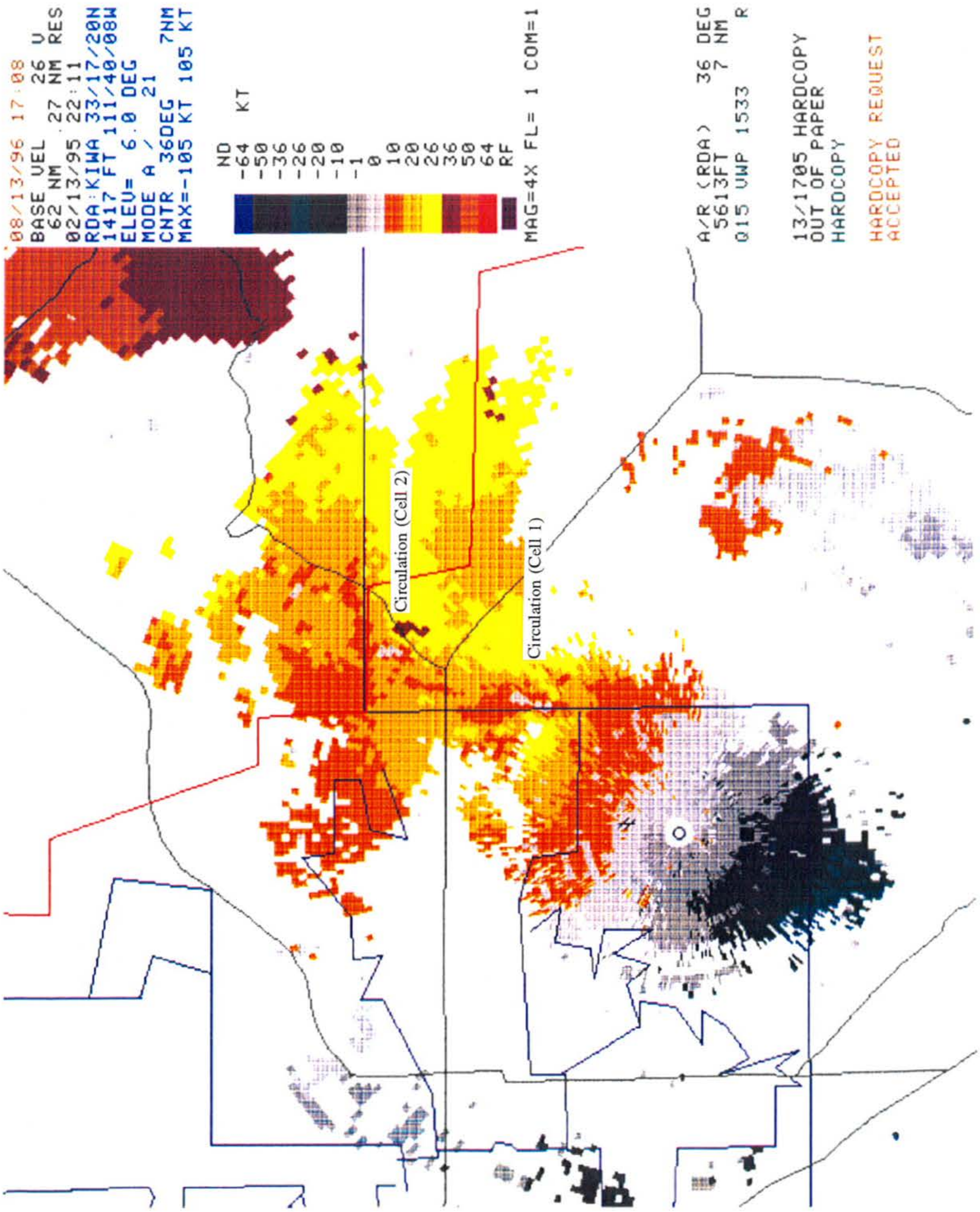


Fig 15 Display of reflectivity at 8X magnification from the KIWA WSR-88D at 2211 UTC 13 February 1996 depicting a hook echo associated with Cell 1.

Fig. 16



```
08/13/96 17:08
BASE VEL     26 U
 62 NM  .27 NM RES
02/13/95  22:11
RDA:KIWA 33/17/20N
1417 FT 111/40/08W
ELEV=  6.0 DEG
MODE A /   21
CNTR  36DEG    7NM
MAX=-105 KT 105 KT

 ND
-64  KT
-50
-36
-26
-20
-10
 -1
  0
 10
 20
 26
 36
 50
 64
 RF

MAG=4X FL= 1 COM=1

A/R (RDA)    36 DEG
 5613FT       7 NM
015 UWP 1533       R

13/1705 HARDCOPY
OUT OF PAPER
HARDCOPY

HARDCOPY REQUEST
ACCEPTED
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Fig 16 Display of velocity at 8X magnification from the KIWA WSR-88D at 2221 UTC 13 February 1995 depicting mesocyclone circulations associated with Cell 1 and Cell 2.

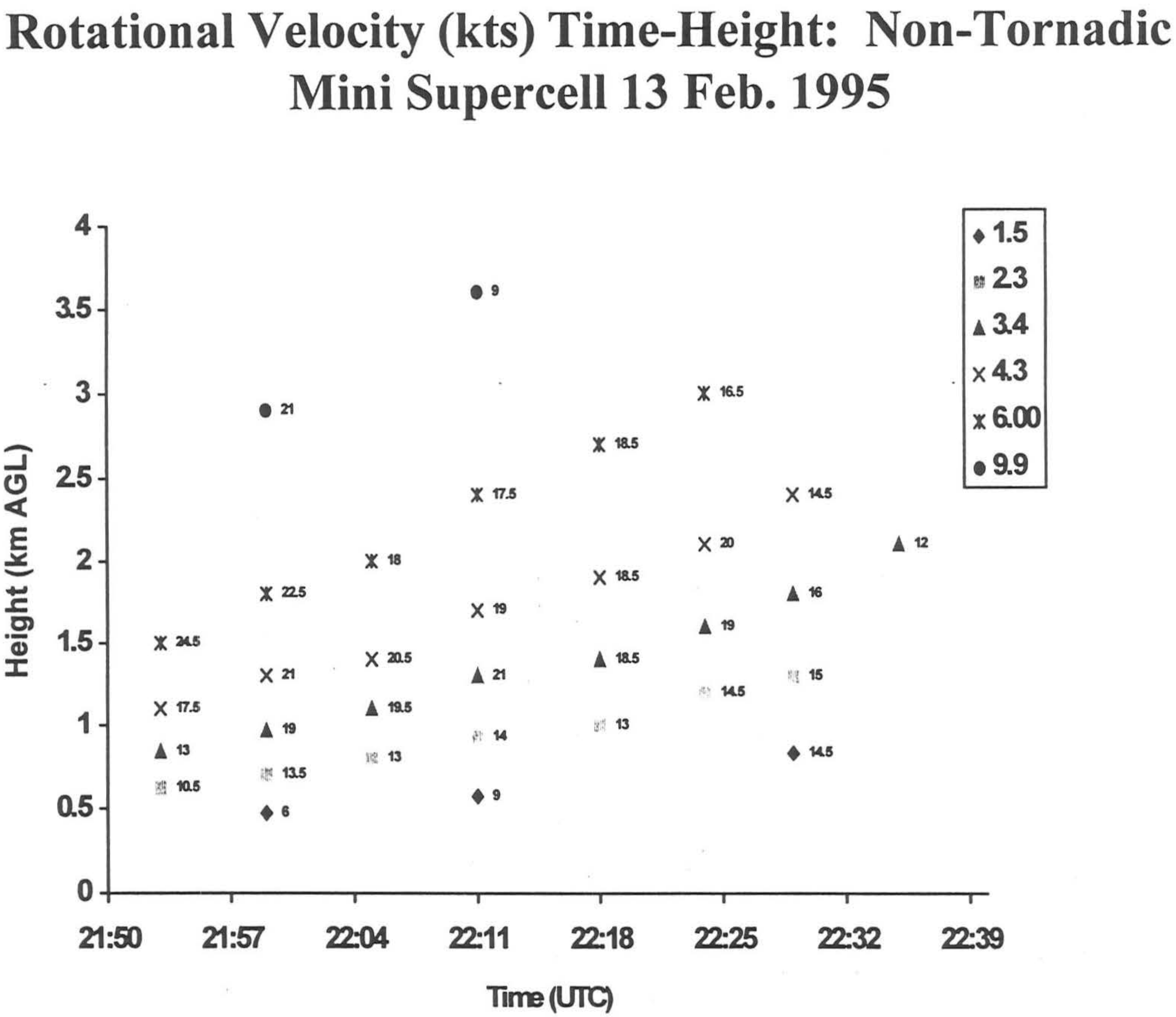
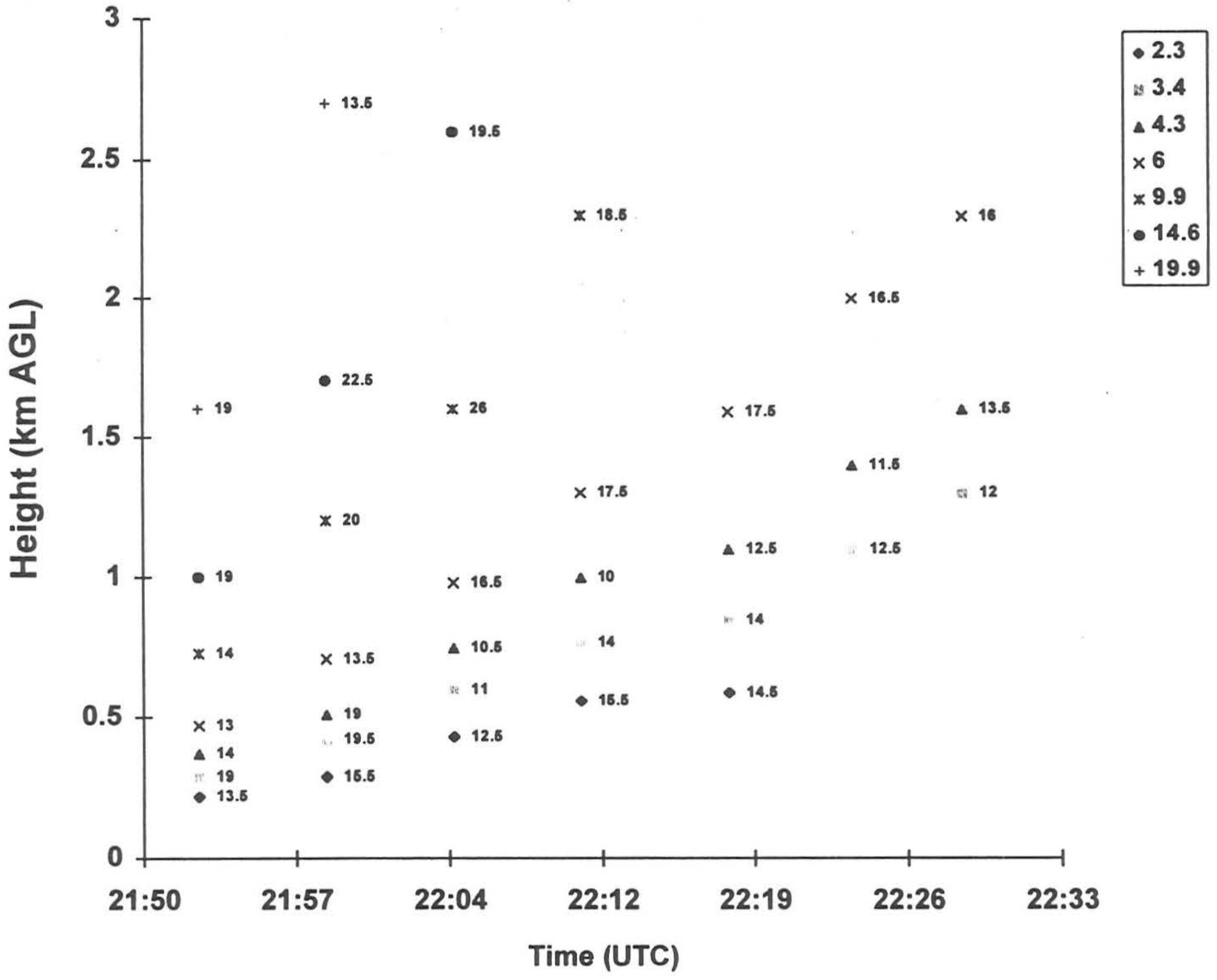

Rotational Velocity (kts) Time-Height: Non-Tornadic Mini Supercell 13 Feb. 1995

Fig 17 Time-height cross-section of rotational velocity associated with the non-tornadic mini supercell (Cell 2) on 13 February 1995. The height is expressed in km AGL and the time is in UTC.



Rotational Velocity (kts) Time-Height: Tornadic Mini Supercell
13 Feb. 1995

Fig 18 Same as Figure 17 except tornadic mini supercell (Cell 1).

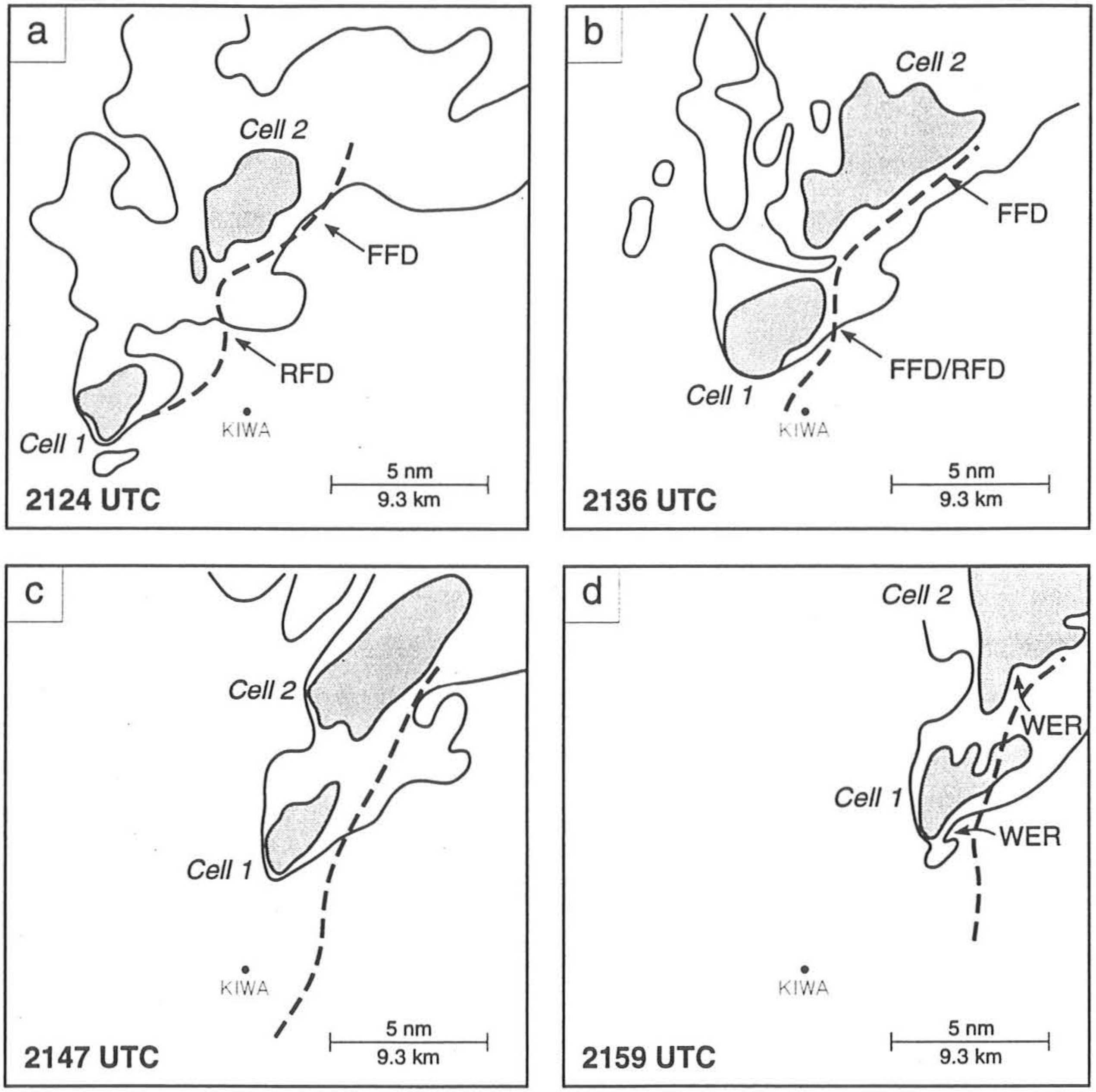
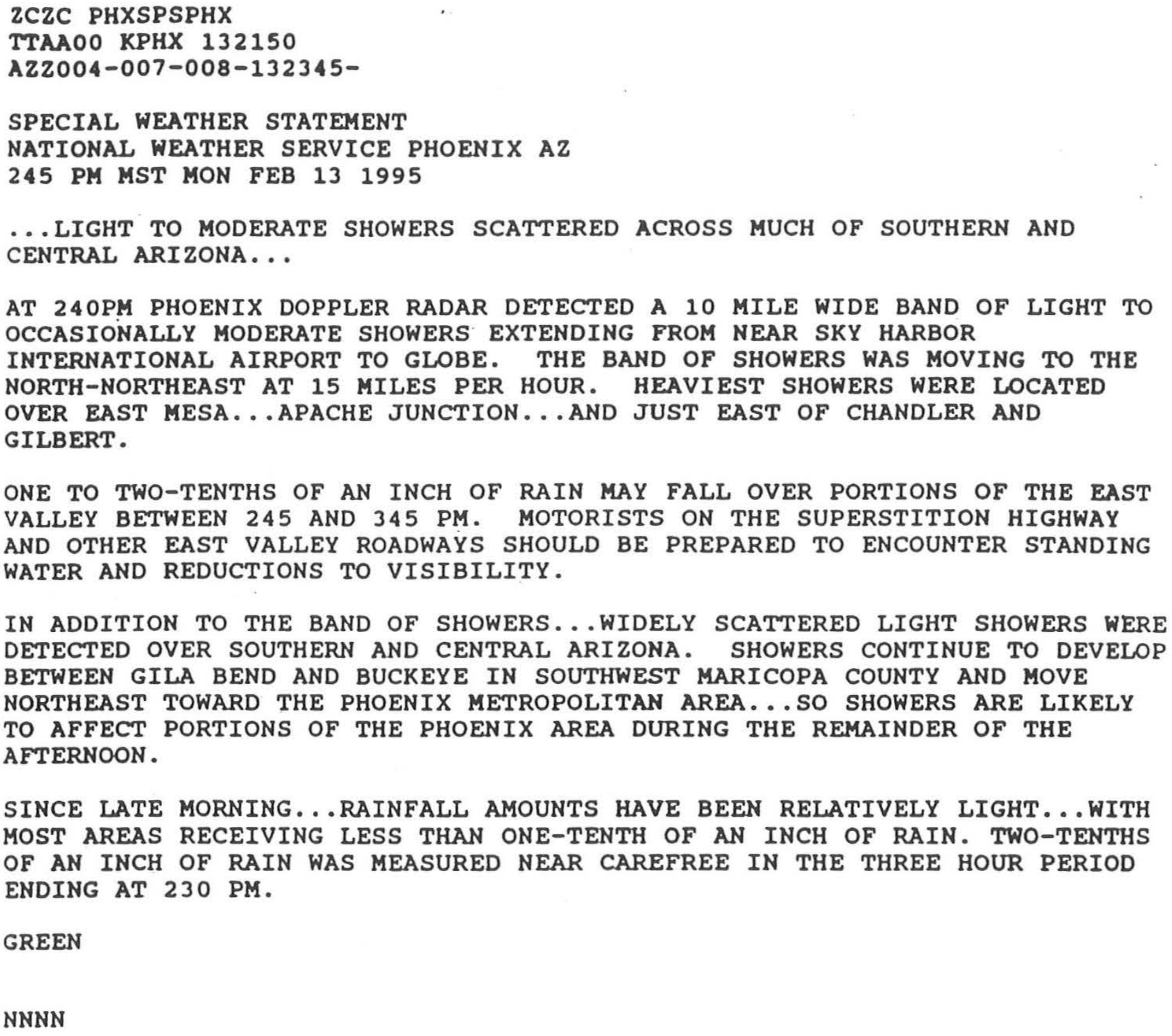


Fig 19 Composite analysis at a) 2124 UTC, b) 2136 UTC, c) 2147 UTC, and d) 2159 UTC of Cell 1, Cell 2, and outflow boundaries at the 1.5° elevation angle. Shading depicts reflectivities > 30 dBZ and unshaded contour depicts reflectivities > 20 dBZ. Heavy dashed line depicts outflow boundaries.



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ZCZC PHXSPSPHX
TTAA00 KPHX 132150
AZZ004-007-008-132345-

SPECIAL WEATHER STATEMENT
NATIONAL WEATHER SERVICE PHOENIX AZ
245 PM MST MON FEB 13 1995

...LIGHT TO MODERATE SHOWERS SCATTERED ACROSS MUCH OF SOUTHERN AND
CENTRAL ARIZONA...

AT 240PM PHOENIX DOPPLER RADAR DETECTED A 10 MILE WIDE BAND OF LIGHT TO
OCCASIONALLY MODERATE SHOWERS EXTENDING FROM NEAR SKY HARBOR
INTERNATIONAL AIRPORT TO GLOBE.  THE BAND OF SHOWERS WAS MOVING TO THE
NORTH-NORTHEAST AT 15 MILES PER HOUR.  HEAVIEST SHOWERS WERE LOCATED
OVER EAST MESA...APACHE JUNCTION...AND JUST EAST OF CHANDLER AND
GILBERT.

ONE TO TWO-TENTHS OF AN INCH OF RAIN MAY FALL OVER PORTIONS OF THE EAST
VALLEY BETWEEN 245 AND 345 PM.  MOTORISTS ON THE SUPERSTITION HIGHWAY
AND OTHER EAST VALLEY ROADWAYS SHOULD BE PREPARED TO ENCOUNTER STANDING
WATER AND REDUCTIONS TO VISIBILITY.

IN ADDITION TO THE BAND OF SHOWERS...WIDELY SCATTERED LIGHT SHOWERS WERE
DETECTED OVER SOUTHERN AND CENTRAL ARIZONA.  SHOWERS CONTINUE TO DEVELOP
BETWEEN GILA BEND AND BUCKEYE IN SOUTHWEST MARICOPA COUNTY AND MOVE
NORTHEAST TOWARD THE PHOENIX METROPOLITAN AREA...SO SHOWERS ARE LIKELY
TO AFFECT PORTIONS OF THE PHOENIX AREA DURING THE REMAINDER OF THE
AFTERNOON.

SINCE LATE MORNING...RAINFALL AMOUNTS HAVE BEEN RELATIVELY LIGHT...WITH
MOST AREAS RECEIVING LESS THAN ONE-TENTH OF AN INCH OF RAIN. TWO-TENTHS
OF AN INCH OF RAIN WAS MEASURED NEAR CAREFREE IN THE THREE HOUR PERIOD
ENDING AT 230 PM.

GREEN

NNNN
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Fig 20 Special Weather Statement issued by the Phoenix NWSFO at 2145 UTC 13 February 1995.