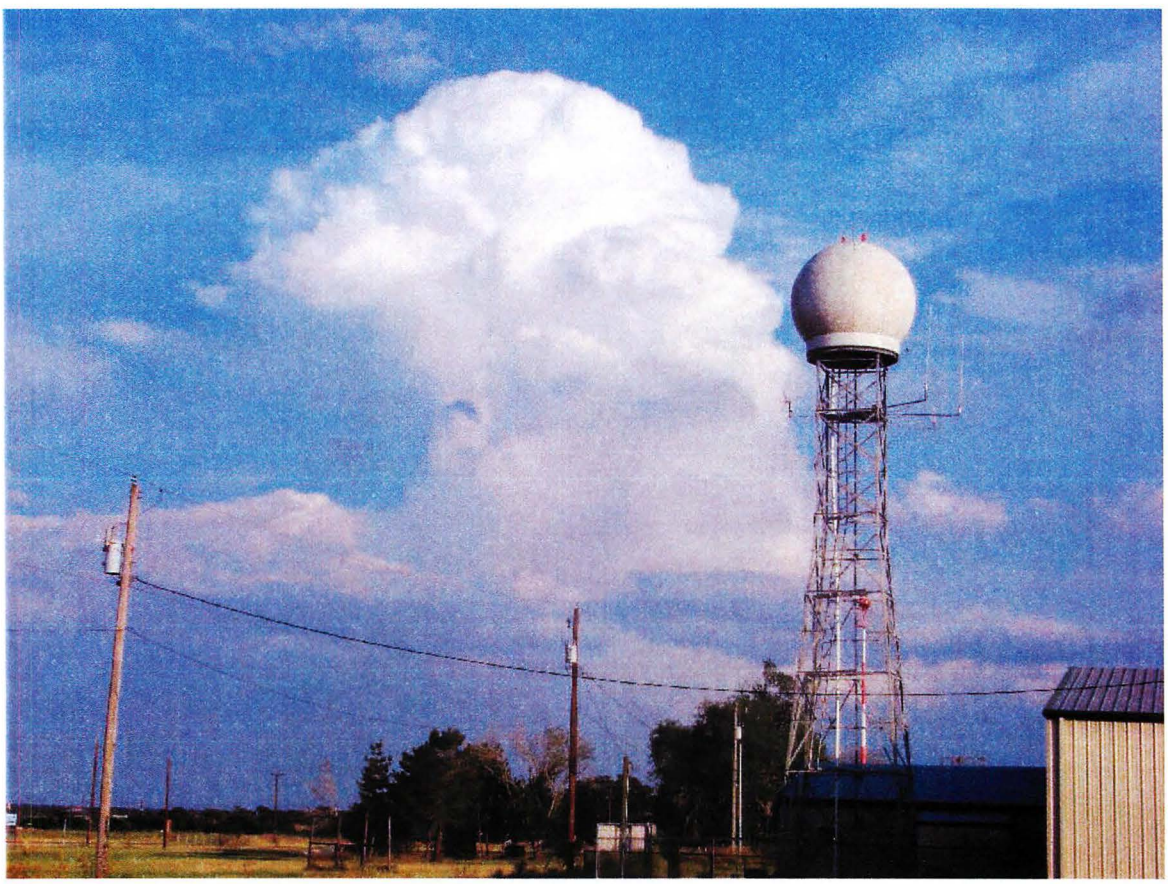
SOUTH TEXAS WEATHER MODIFICATION ASSOCIATION

EDWARDS AQUIFER AUTHORITY TARGET AREA



2008 REPORT

2008 FINAL REPORT

for the

SOUTH TEXAS WEATHER MODIFICATION ASSOCIATION

EDWARDS AQUIFER AUTHORITY TARGET AREA

by

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THE YEAR IN REVIEW

2008 marked year number seven in terms of cloud seeding operations for the STWMA in the EAA's tri-county area of Bandera, Bexar and Medina. The past year was a stark contrast from 2007, when we saw upwards of 150% of normal rainfall; in 2008, rainfall amounts in the EAA target area were between 25 and 50% of normal, with far southern Bexar County faring a little better, closer to 75% of normal rainfall. 2008 was comparable to 2006, which incidentally was also a very dry year. Cloud seeding operations took place on fourteen days during the season. This compares with 11 days in 2007, 14 days in 2006, 25 days in 2005, 20 days in 2004, 22 days in 2003, and 8 days in 2002.

May and June were quite dry, with 10% or less of the average monthly rains falling. The exception was central Bandera County in May, which saw near-normal rainfall. July turned out to be wetter than normal, with some help from the outer rainbands of Hurricane Dolly during the latter half of the month. August was the busiest month of the season, with seven days of seeding taking place. Most locations, with the exception of parts of Bandera County, saw above normal rainfall once again. By September, however, we were back into the dry pattern, with only one day of cloud seeding taking place and most locations seeing well below normal rains, the exception being a small area east of Utopia, where a heavy thunderstorm dropped several inches on the evening of the 9th.

Once the season concluded, radar data from the TITAN machine were sent to Archie Ruiz, who works for Active Influence performing radar evaluations for the Texas weather modification projects. At the time of this report, the evaluation had not been completed and will be furnished at a date in the near future.

At the request of the EAA, the STWMA continued with year two of a three-year experiment within the EAA target area where randomized seeding would take place. With a bit of guidance from the National Center for Atmospheric Research (NCAR), a randomization protocol was developed that would guide both the pilot and the meteorologist in conducting a randomized seeding experiment. The flight to the area of developing convection would take place and the pilot would determine if the activity was seedable based on cloud appearance, inflow strength and location. In the case of the last criterion -- location, if other clouds of similar size and structure were present within 25km, the cloud could not be considered a candidate. Once a seedable candidate was found, the randomized decision procedure would take place. This involves both the meteorologist and pilot opening an envelope, inside of which would be a card with either "SEED" or "NO SEED" written on it. The meteorologist would convey his envelope content to the pilot, but the pilot would not tell the meteorologist what was in his envelope. If both envelopes matched, the pilot would seed the cloud. He would continue the mission as usual, burning flares as long as conditions warranted. If the envelopes did not match, the pilot would continue to fly in the favorable location, but only "pretending" to burn flares as long as conditions warranted. By doing the randomization in this manner, only the pilot truly knows if the cloud or clouds were seeded. The cards and notes for each day were to be placed into separate manila envelopes for future analysis, the purveyor of which has yet to be determined. Radar data from each day was also to be saved, again for future analysis.

2008 was not cooperative in terms of providing cloud candidates for randomized seeding. Within the tri-county area of Bandera, Bexar and Medina, there were no candidates that presented themselves for randomization. Only one cloud in the 5 month season, in Uvalde County, satisfied the criteria for protocol enactment.

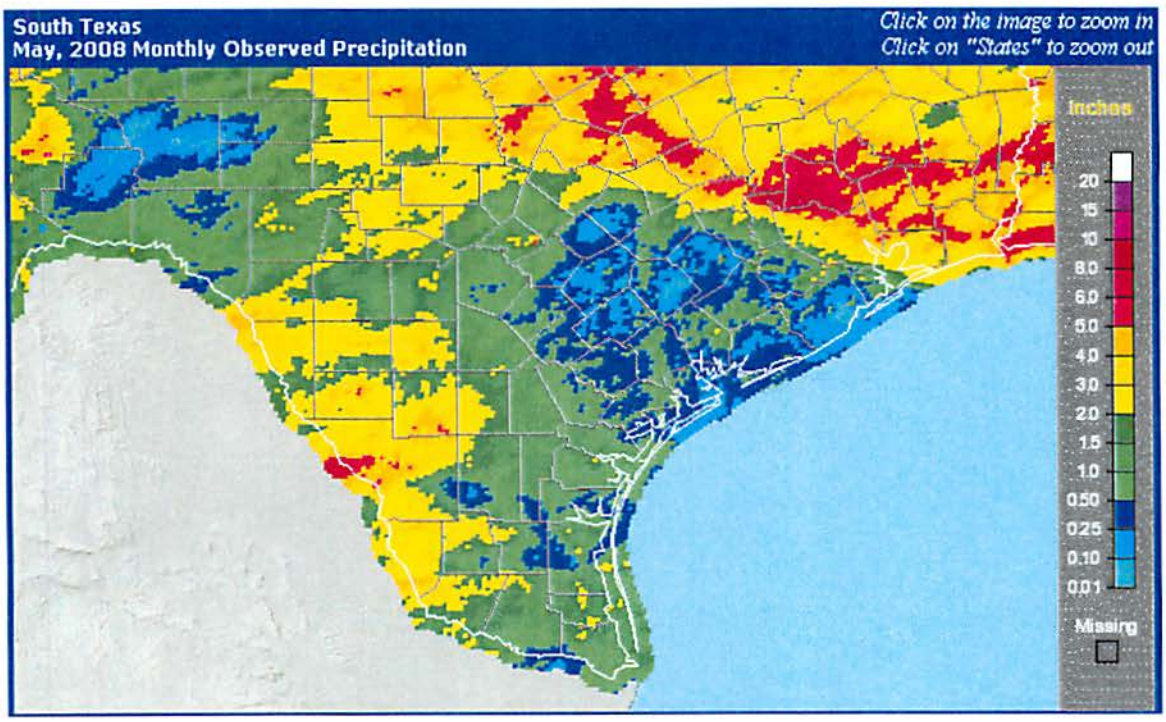
2008 Flight Log

Date	Plane	Flight No.	Take Off Time	Landing Time	Total Time	No. Flares Used	Amount of AgI (g)	Flare Locations
21-May	47P	1	0:05	1:40	1.6	12	480	Medina
8-Jun	47P	2	0:35	1:45	1.2	7	280	Medina
20-Jun	47P	3	23:25	0:15	0.8			Recon to Medina
21-Jun	47P	4	20:25	1:00	4.6	21	840	Medina
29-Jun	47P	5	21:40	23:55	2.3	10	400	Medina
1-Jul	60P	6	19:45	21:40	1.9	1	40	Bexar
2-Jul	47P	7	16:45	19:20	2.6	15	600	Bandera, Bexar, Medina
12-Aug	60P	8	15:50	16:55	1.1			Recon to Medina/Bexar
16-Aug	47P	9	19:55	23:30	3.6	4	160	Bandera
16-Aug	47P	10	0:05	0:55	0.8	11	440	Medina
19-Aug	47P	11	23:05	0:30	1.4	18	720	Bexar
20-Aug	7AA	12	18:45	20:15	1.5	8	320	Bexar, Medina
22-Aug	7AA	13	18:30	20:25	1.9	2	80	Medina
24-Aug	47P	14	20:05	22:05	2	12	480	Medina
25-Aug	47P	15	19:30	21:25	1.9	2	80	Bandera
27-Aug	70P	16	20:15	22:10	1.9	2	80	Medina
24-Sep	47P	17	22:00	23:40	1.7	2	80	Bexar
		17 flights			**32.8**	**127**	**5080**	**Bandera - 11; Bexar - 28; Medina - 88**

MAY 2008

May turned out to be a very warm month, particularly the latter half of the month when highs were consistently in the upper 90s. A few record highs were broken. May 2008 was the 5th warmest May on record at San Antonio. It was also very dry for much of the area, with a deficit of 2-4 inches from the monthly average. Bandera County managed to get a bit more rainfall compared to the rest of the target area as it was targeted more readily by incoming MCS activity, which occurred periodically during the month. Only one day presented seeding opportunities, none of which could utilize the randomization protocol.

For the month, one day of seeding occurred on the 21st. A total of 12 flares were used for seeding in Medina County, totaling 480g of AgI.



MAY 21

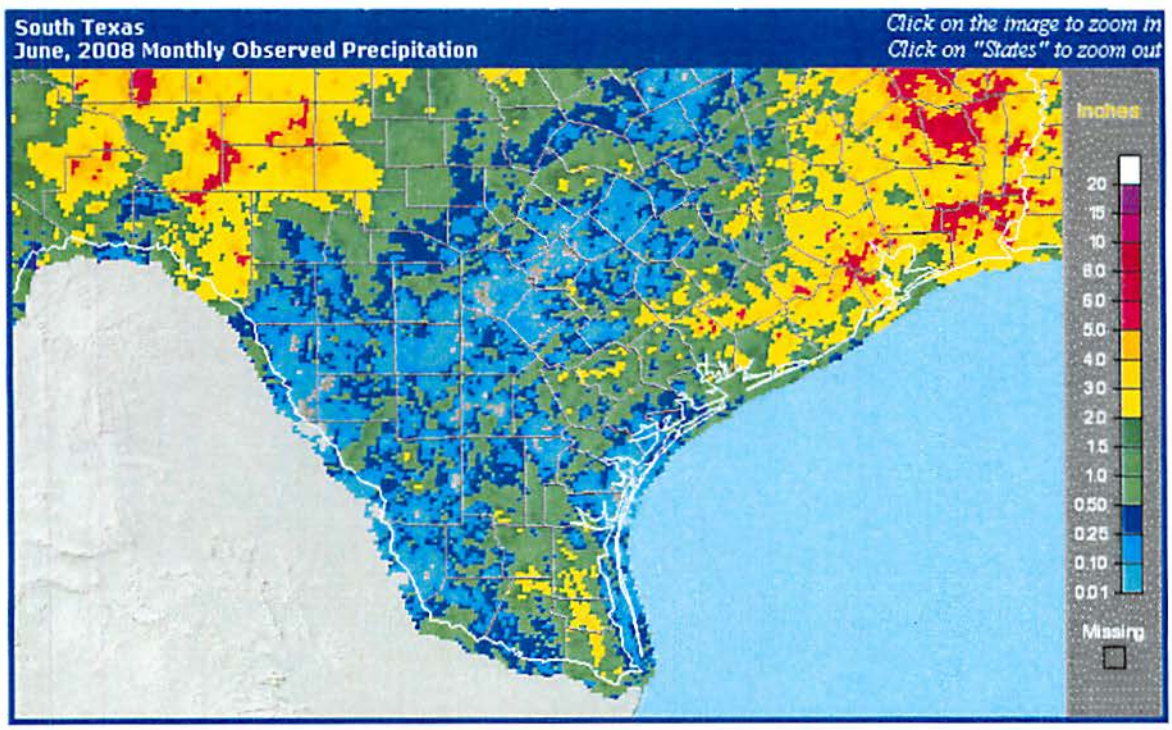
A hot and humid airmass was located over southern Texas. Temperatures approached the 100°F across the target area, with highs even exceeding 100°F near the Rio Grande. A small upper level low was near Laredo in the afternoon, rotating northeast into the evening. The morning soundings indicated the potential for isolated convection late in the day, but it was anticipated that the upper low would enhance the seabreeze boundary moving inland. This was not to be the case; instead, the cold pool associated with the low appeared to destabilize the airmass over the Rio Grande Plains between Laredo and Cotulla, well ahead of the seabreeze front. Moisture increased through the day which may have helped with the eventual blossoming of convection roughly along the I-35 corridor southwest of San Antonio after 2300 UTC. After seeding a large cloud in Frio County (south of Hondo), the pilot moved north into Medina County to investigate more developing clouds near Hondo. Due to the close proximity of other large clouds around, the randomization protocol was not able to be enacted. However, good inflow was found and seeding commenced. With the approach of darkness, the pilot returned to base. The convection lasted well into the night as the upper low approached San Antonio. Flash Flood Warnings were eventually issued for Medina County.
12 flares were used for seeding in Medina County, totaling 480g of AgI.

Flight track not available.

JUNE 2008

The dry weather pattern that had plagued the area over the past several months continued into June, although we began to see a more active weather pattern develop, especially during the second half of the month. One seeding mission was conducted during the first half of the month as moisture surged north from deep south Texas. A few MCS' affected the area around mid-month, but in all cases these systems were in the decaying stage as they were entering the target area. Toward the end of the month, richer moisture began to enter the area and scattered convection developed more readily, with two more seeding days being realized. The randomized protocol was never enacted in the tri-county area of Bandera, Bexar and Medina as the criterion of isolated cells never materialized.

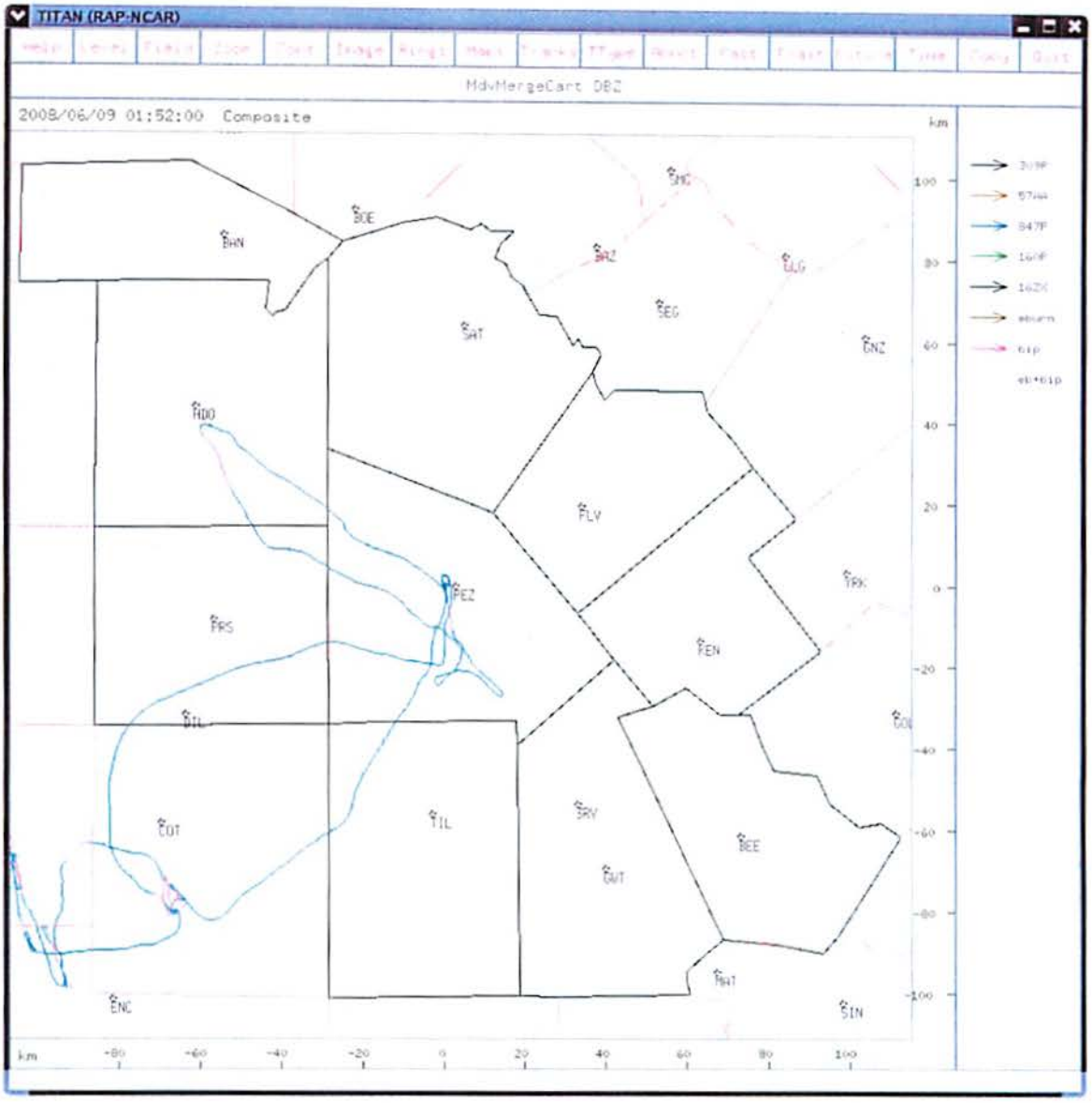
For the month, there were three days on which seeding took place. Four flights were logged, one of which was a reconnaissance only on the 20th. A total of 38 flares were used for seeding, all of which were burned in Medina County. This amounted to 1520g of AgI.



JUNE 8

An area of higher moisture was moving north from deep south Texas. Along the leading edge of this, convection had developed southwest of an Alice-Tilden line and was pushing rapidly north. Convection was seeded near Cotulla in LaSalle County. This cell continued to fare quite well while moving north through Frio County, so a plane was sent to investigate it as it crossed the Medina County line. Good inflow was found, and seeding commenced. The randomization protocol was not put into effect as the cell had already been seeded. The cell tracked north into Bandera County by sunset.

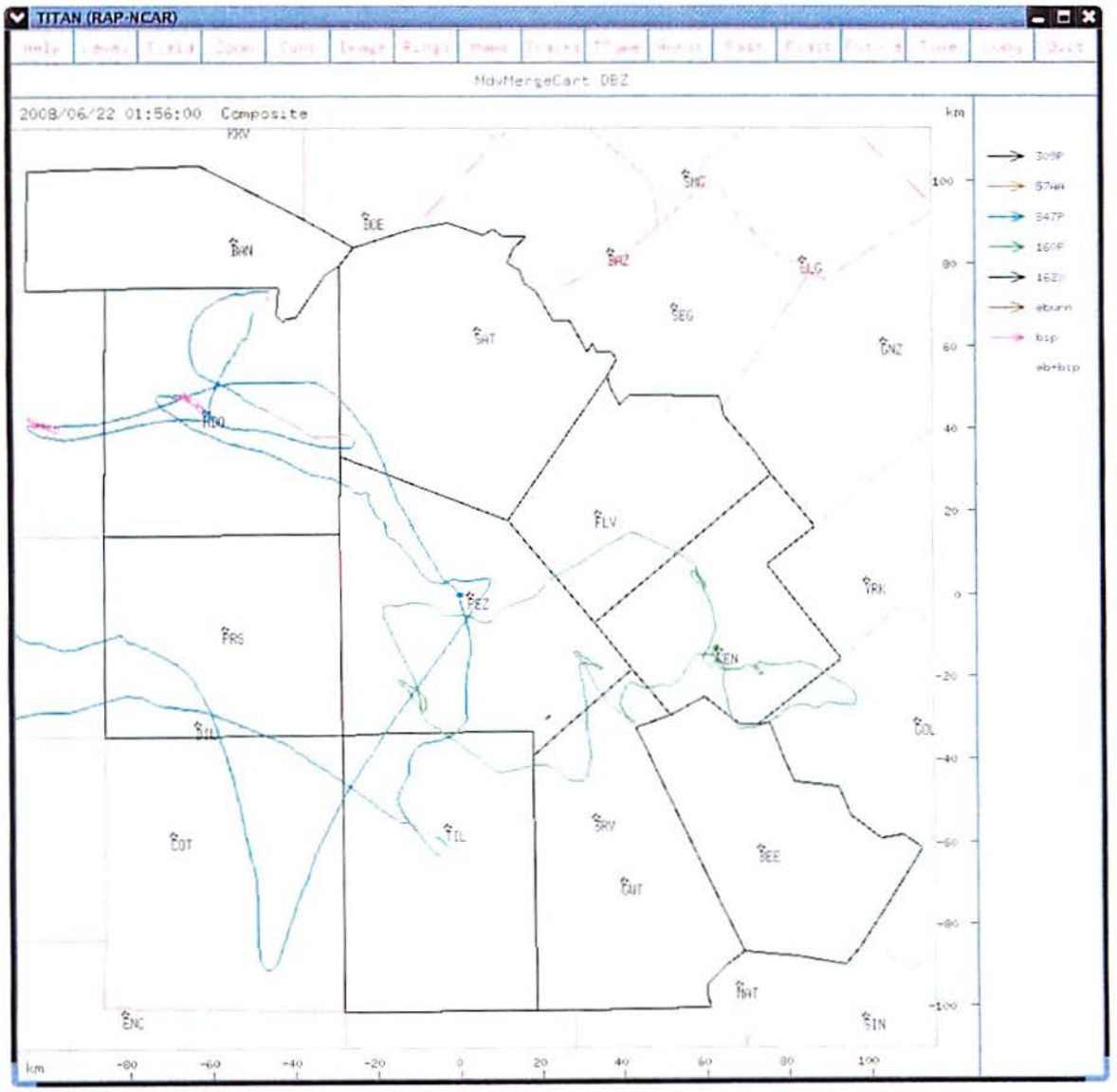
Seven flares totaling 280g of AgI were used for seeding in Medina County.



JUNE 21

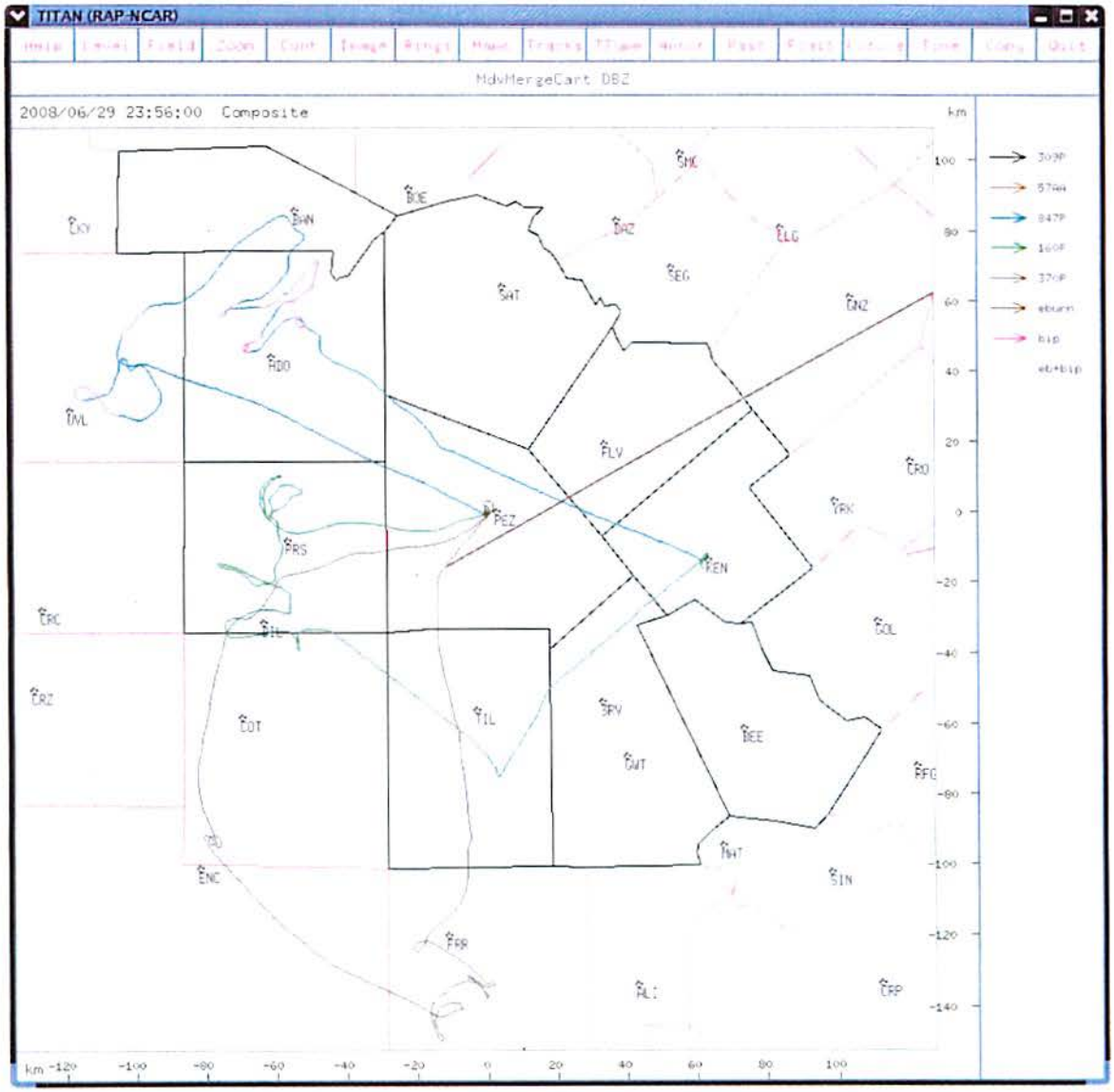
In the morning hours, a surface boundary was initiating convection over north and central Texas. As this feature moved south into south-central Texas during the afternoon hours, it interacted with the moist, unstable, uncapped airmass over the area and convection initiated along the northern edge of the target area. A flight was dispatched to western Bexar County to intercept the developing convection, which did not fit the randomized protocol. This activity could not be seeded as it was located within the San Antonio International Airport's approach airspace. The plane went to Uvalde County where a randomized case was found (this will be reported by SWTREA). The plane then moved to Medina County as the Bexar County convection was pushing slowly southwest into the Medina Lake area. Seeding of these cells commenced, with seeding taking place over northern Medina County along the boundary. The activity continued to develop as it pushed south and southwest through the rest of the EAA target area, while the Uvalde County cell remained isolated.

21 flares were used for seeding in Medina County, totaling 840g of AgI.



JUNE 29

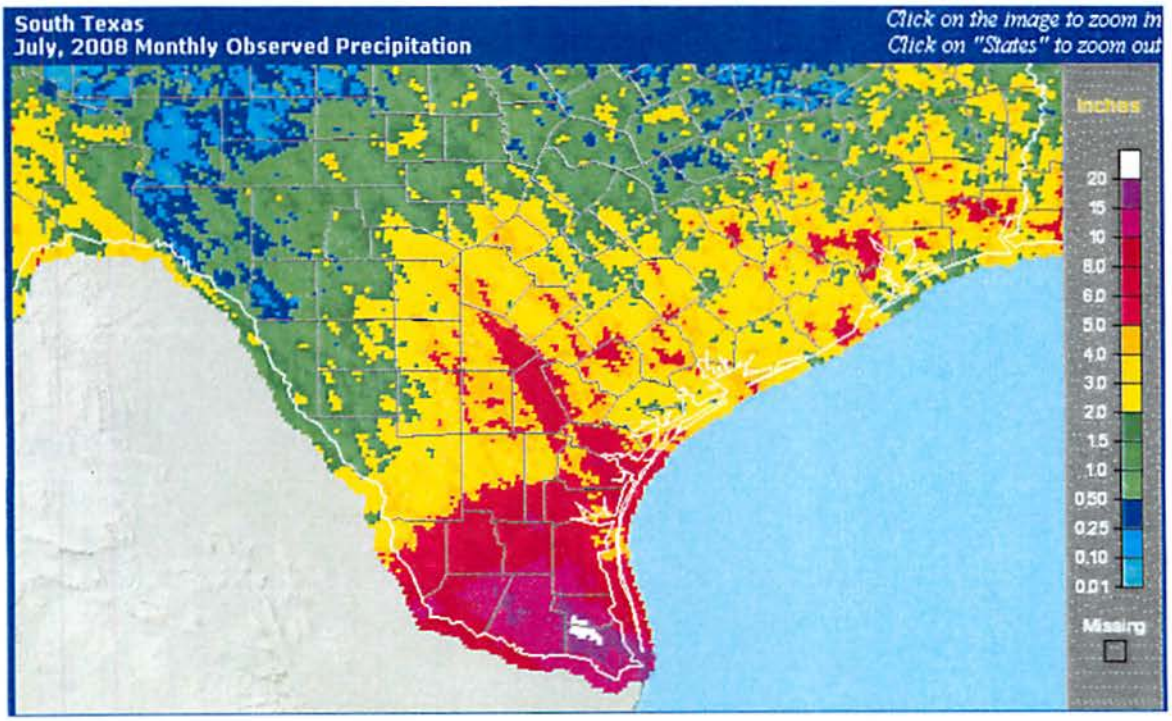
Moisture levels were on the increase over south Texas as an upper low northwest of the area was helping to enhance the flow off the Gulf. Our location between the upper low to the northwest and a weakening tropical wave off the lower Texas coast was resulting in confluent flow aloft and weak ridging over the area. For this reason, convection did not occur over the eastern portions of the target area. With daytime heating, convection began to form mainly west of US 281, closer to the upper low. Most of the convection was rather short-lived. Several clouds along and west of a Fowlerton to Medina Lake line were seeded during the late afternoon hours.
10 flares were used for seeding in Medina County, totaling 400g of AgI.



JULY 2008

After a rather dry June across south Texas, July's weather pattern turned wetter, with several days of moderate to locally heavy convection occurring over the area. The first two weeks of the month were the wettest, with convection occurring on an almost daily basis. In some instances the cloud profiles were almost purely tropical, a situation that does not lend itself to effective seeding with silver iodide. As such, the seeding days were limited to the first two days of the month. In addition, the randomized seeding protocol was not enacted at any point during the month as one of the criteria dealing with proximity of one seedable cloud to another was never fulfilled. The biggest weather event of the month was when outer rainbands from Hurricane Dolly moved across the EAA target area on the 24th, with a tornado being reported south of downtown San Antonio.

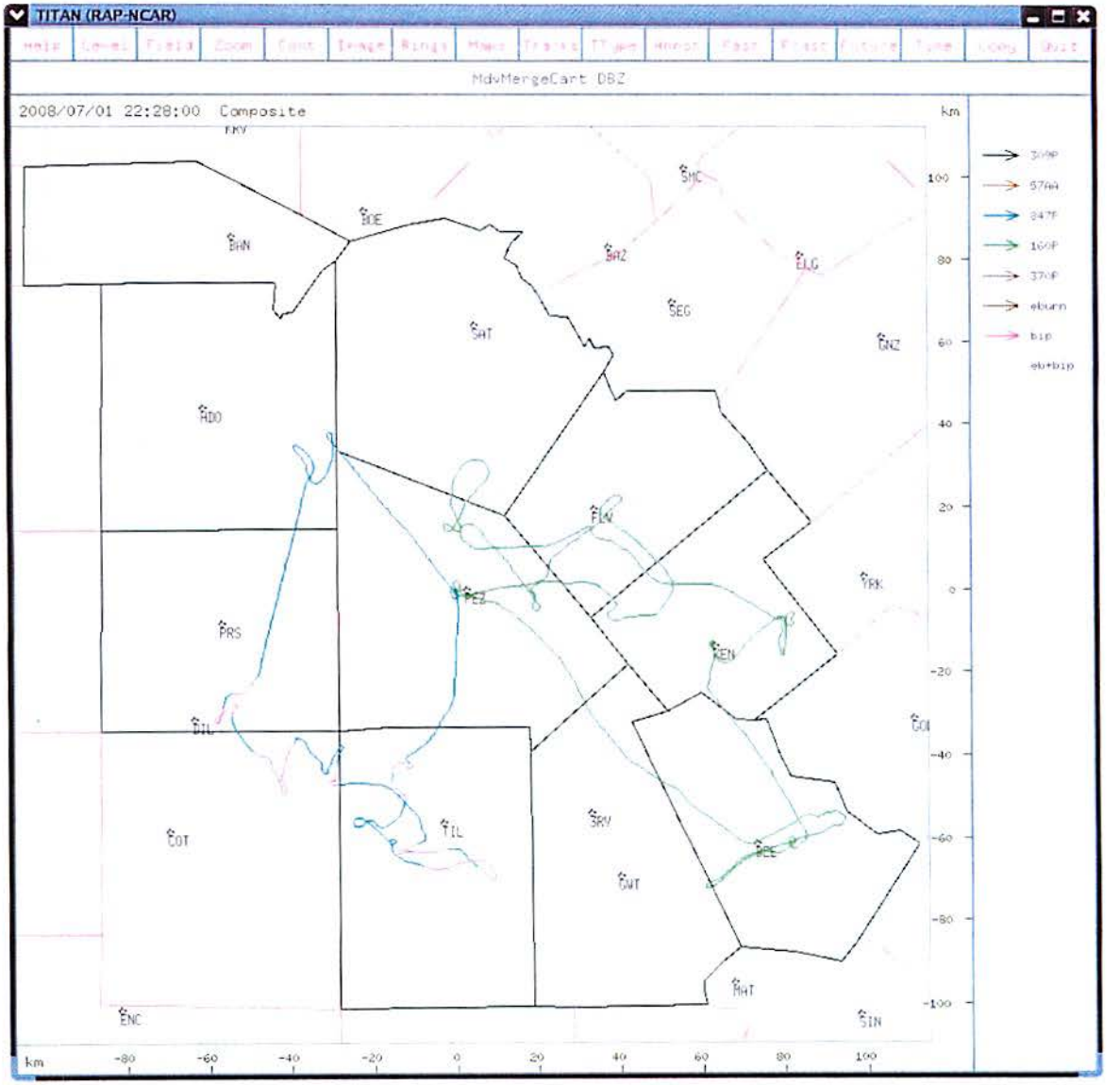
For July, seeding within the EAA tri-county area took place on two days. A total of two flights were logged, with a total of 16 flares (Bandera – 5, Bexar – 4; Medina – 7) used for seeding, amounting to 640g of AgI.



JULY 1

The upper low to our west continued to slowly move south and east along the Rio Grande. Convective temperatures were once again in the mid 80s. Despite the high cloudiness over the area, enough heating took place to allow convection to develop earlier than past days. Convection formed along the stationary boundary over the northeastern target area from northeastern Bexar County into Wilson County. A flight was launched to investigate the different clouds in these areas with one cloud in Bexar County receiving treatment. The abundance of convection did not allow the randomized protocol to go into effect. The activity continued to push west through the remainder of the afternoon.

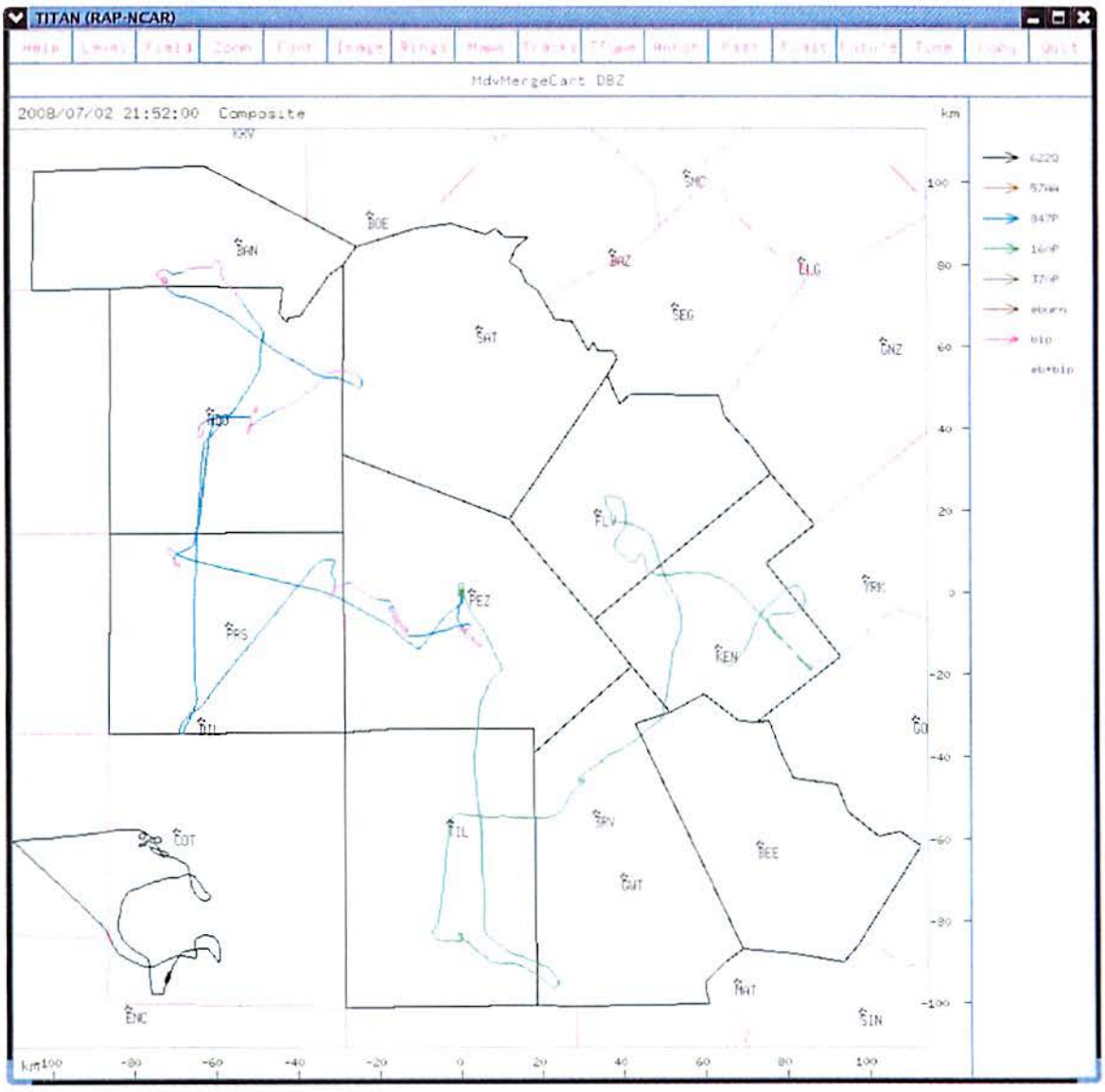
One flare was used for seeding in Bexar County, totaling 40g of AgI.



JULY 2

Once again the upper low over south Texas was responsible for the outbreak of convection across the area. Convective temperatures were in the mid 80s, and this was reached during the late morning hours. Scattered to numerous showers and thunderstorms developed across the area, with a flight taking place to investigate and treat several clouds with silver iodide. Seeding took place in all three EAA counties, with the randomized protocol not enacted due to the abundance of convective clouds in close proximity to each other. One problem with operations today was the short-lived nature of the clouds; it appeared as if they would build up quite rapidly, then drop very heavy showers of rain only to dissipate within 30 minutes. This is a pattern typical of tropical convection.

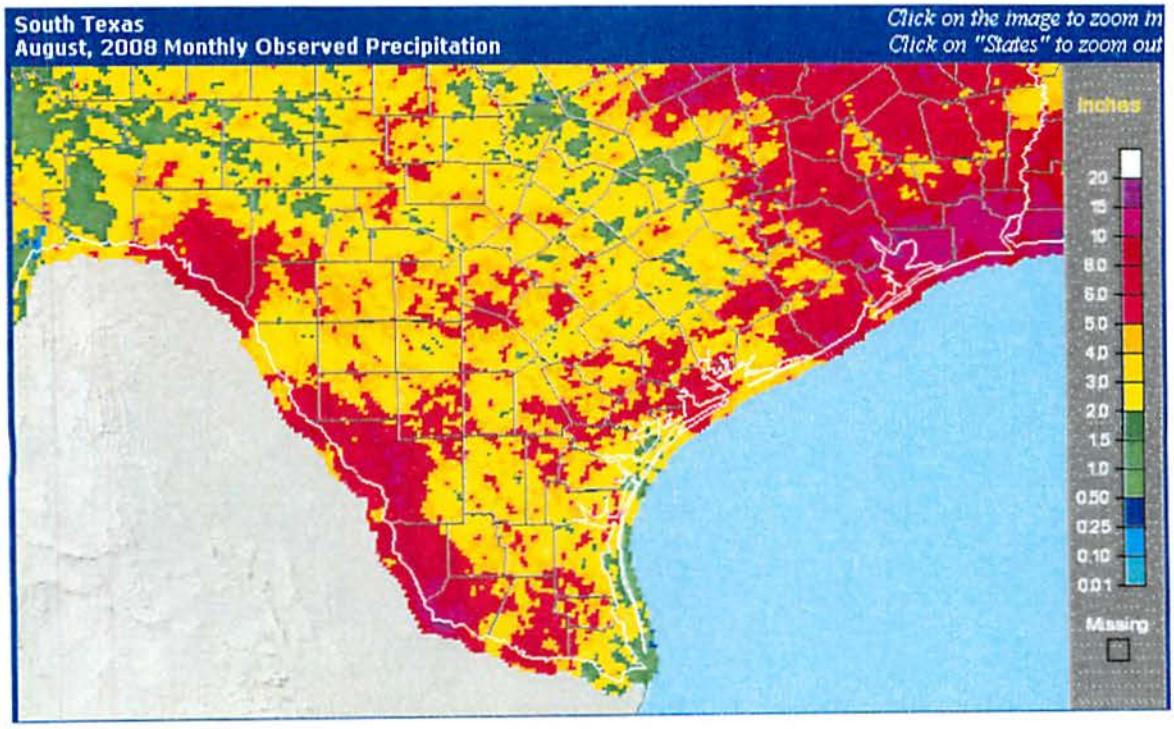
15 flares were used for seeding in Bandera (5), Bexar (3) and Medina (7) counties, totaling 600g of AgI.



AUGUST 2008

August turned out to be a rather wet month for south Texas, with some locations receiving in excess of six inches of rainfall. Convection developed on at least half of the days of the month, with the latter half of the month being particularly busy. The presence of upper lows and the transporting of deep tropical moisture across the area resulted in several days of convective activity. In one instance at mid-month, an MCS affected the northwestern half of the EAA target area.

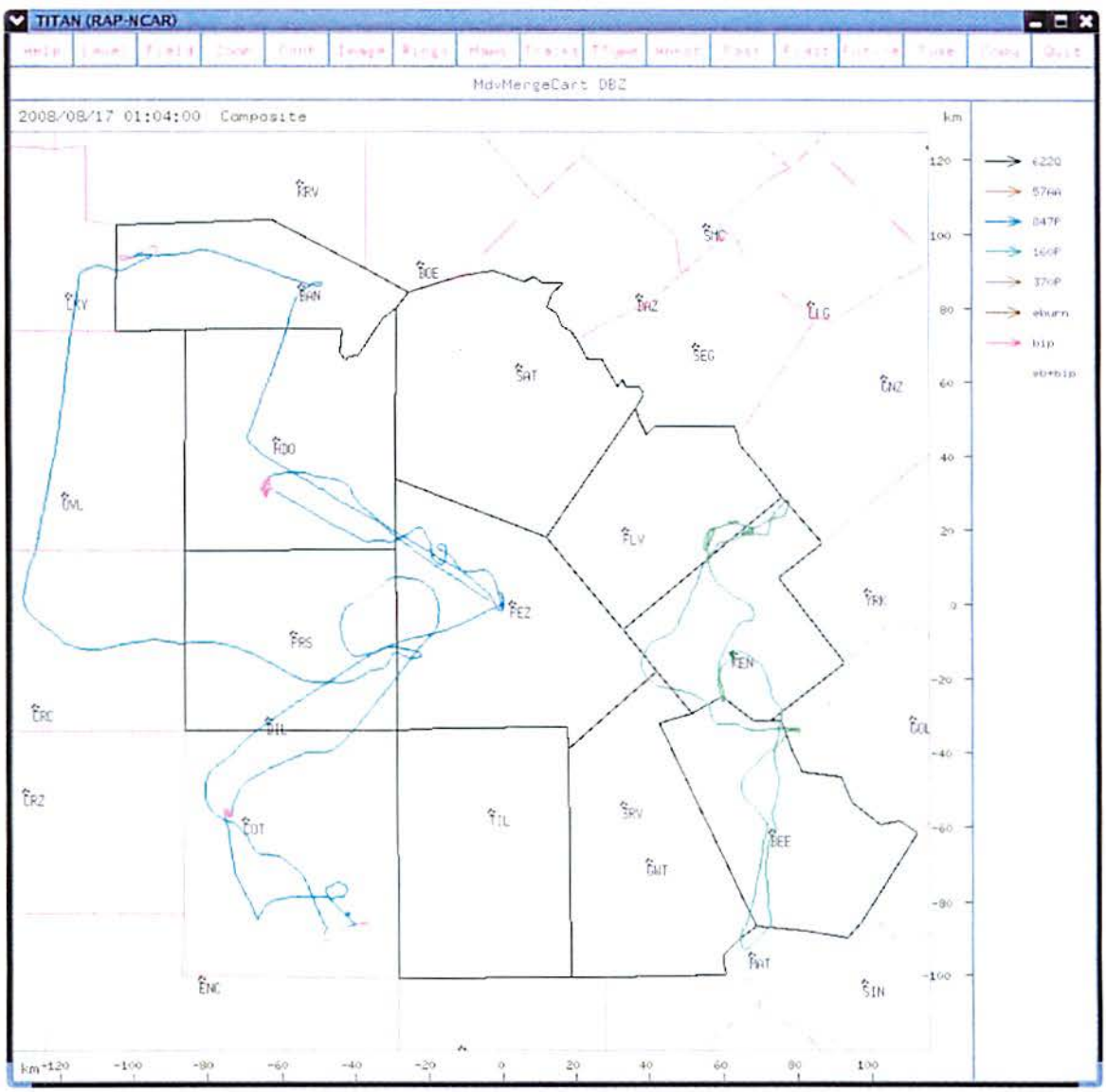
For the month, there were seven days on which seeding took place. Nine flights were logged during the month. A total of 59 flares were used for seeding (Bandera – 6; Bexar – 22; Medina – 31), totaling 1240g of AgI.



AUGUST 16

A moist, unstable airmass resided over south Texas. A frontal boundary was located just south of the target area and was not moving much. Over west-central Texas, an MCS was moving southeastward toward the northwestern target area. Convective temperatures were in the mid and upper 80s, and this was easily reached around the noon hour. A plane was sent to the northwestern target area where convection associated with the MCS' outflow boundary was beginning to impact these counties. A few flares were burned here but effectiveness is questionable. Late in the afternoon, the seabreeze boundary and the outflow boundary met up over the northern target area and a few more cells developed, with another flight launched to this area to treat developing activity. The randomized protocol was not enacted in the EAA target area as criteria were not met.

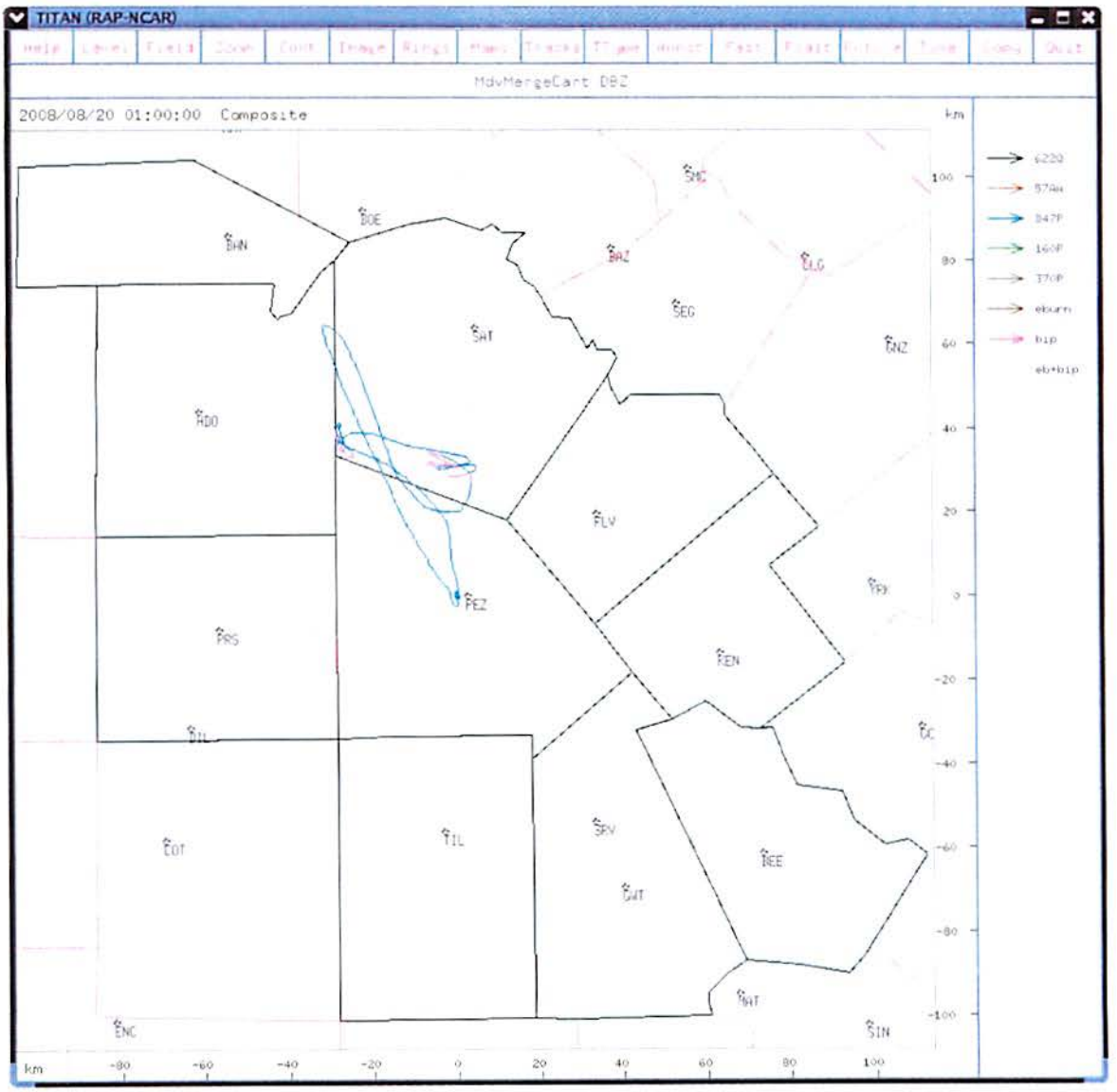
15 flares were used for seeding in Bandera (4) and Medina (11) counties, totaling 600g of AgI.



AUGUST 19

An upper level low that had originated in southern Saskatchewan several days ago was now sitting over northern Texas. A weak disturbance was rotating around the low and moving across central Texas. Convective temperatures were in the low 90s, and this was reached at mid afternoon. With the coinciding of peak heating and the approach of the disturbance, convection began developing over the northern target area towards the latter part of the afternoon. A plane was dispatched to investigate the activity, with some seeding done. Some of the activity was inaccessible as it was in San Antonio International approach airspace. Also, the randomization protocol was not able to be enacted as the convective cells were too close to each other. A severe t-storm warning and flood advisory were issued with a cell over southern Bexar County as it moved southward.

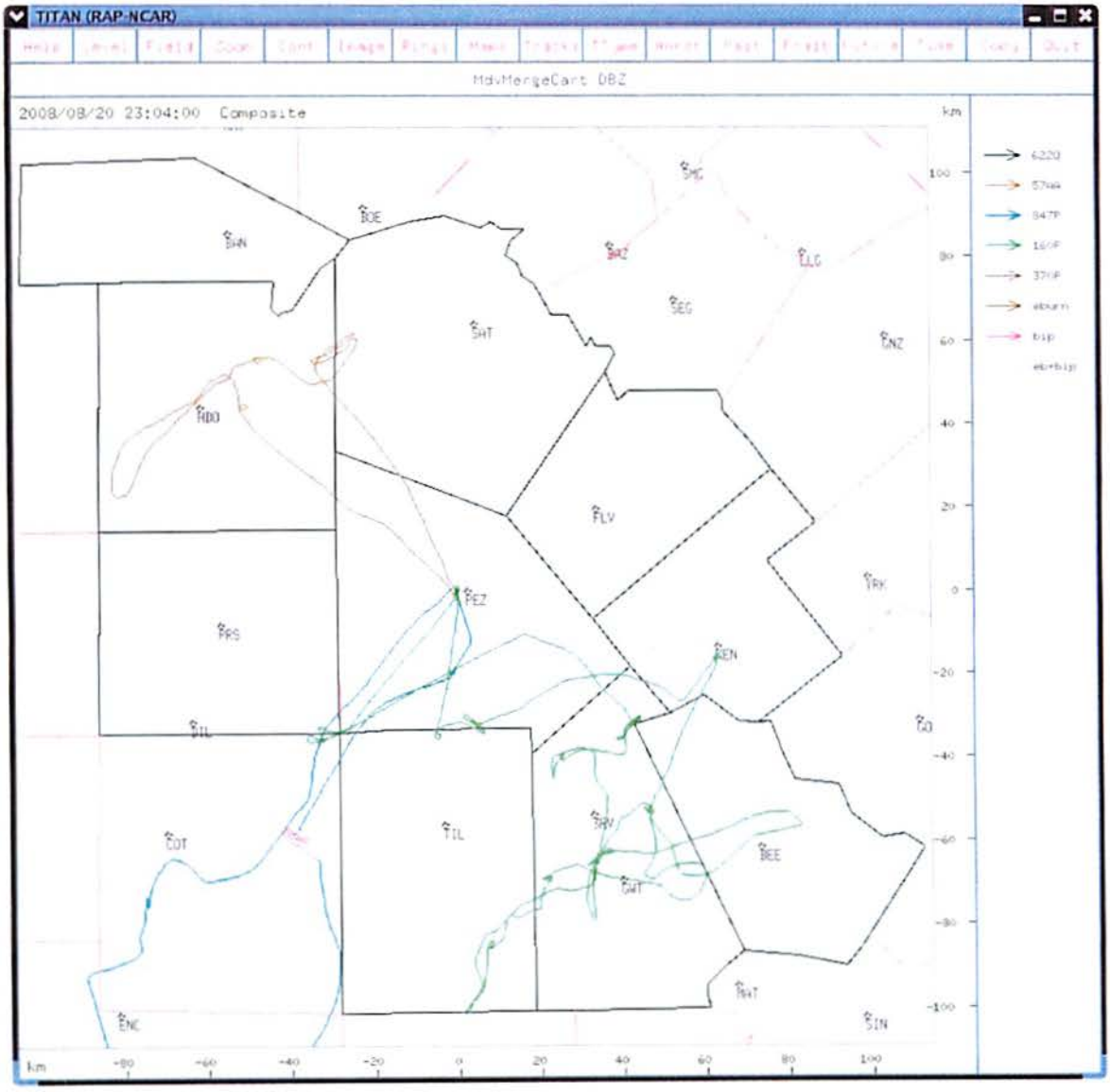
18 flares were used for seeding in Bexar County, totaling 720g of AgI.



AUGUST 20

An upper level low continued to spin over northern Texas while moving slowly east. At the surface, a trough was located from Dallas to the Rio Grande near Eagle Pass. The airmass continued to be moist and unstable with relatively low convective temperatures. These were easily reached around the noon hour and convection began to blossom over the northwestern part of the target area in the vicinity of the trough axis. A plane was dispatched early in the afternoon to look at the convection, with seeding taking place.

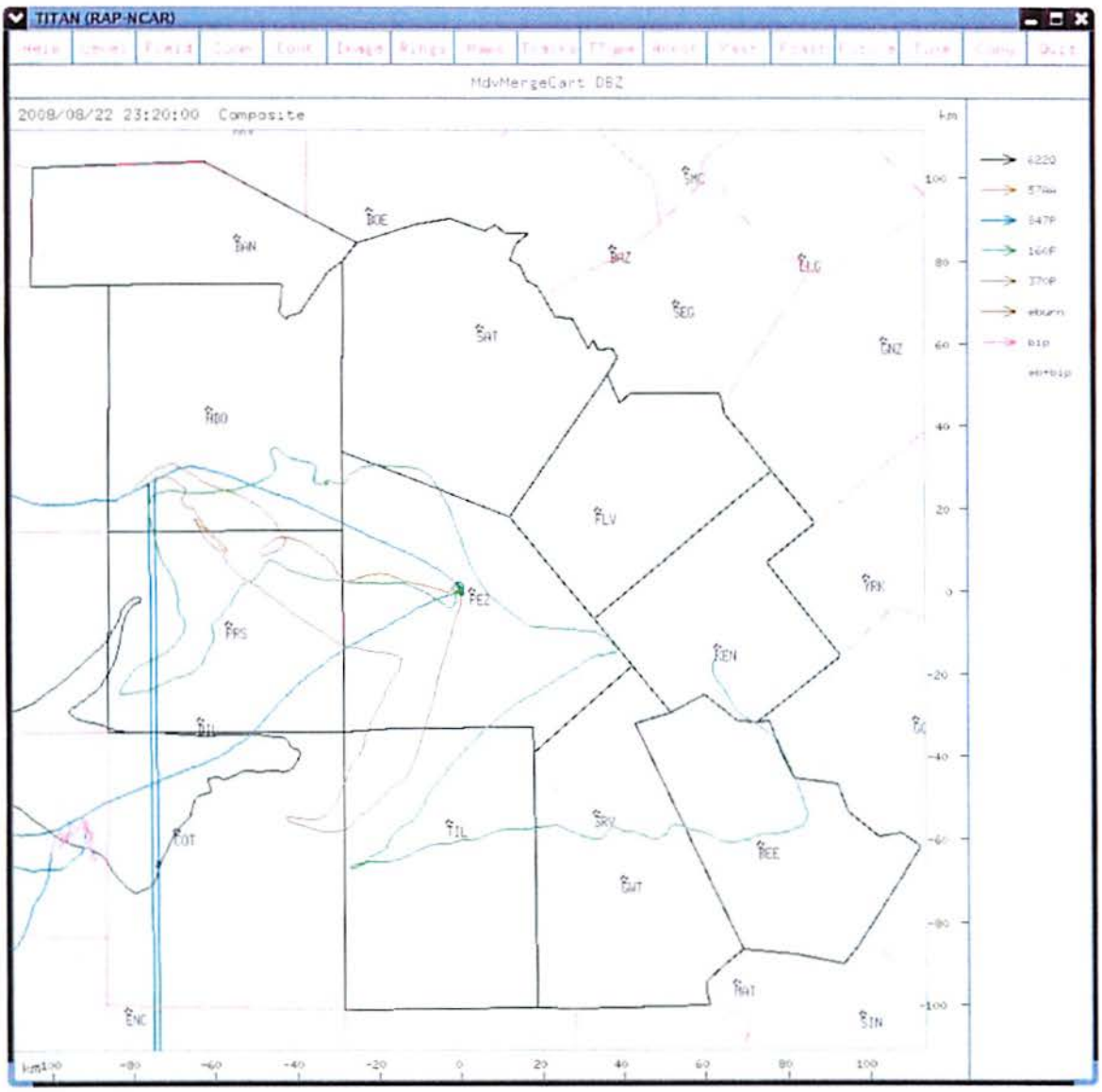
Eight flares were used for seeding (Bexar – 4; Medina – 4), totaling 320g of AgI.



AUGUST 22

An upper level low had developed over northern Mexico, just south of the Big Bend. This feature worked in tandem with a surface high over the Gulf to bring in a deep and very moist airmass to southern Texas, with PW values approaching 2 inches over the northwestern target area. Convection developed early over deep south Texas and was moving north toward the southern target area early in the afternoon. Two planes were dispatched to the leading edge of this activity, with seeding taking place as the activity moved north through the target area. High rainfall rates over already wet ground resulted in flood advisories being issued.

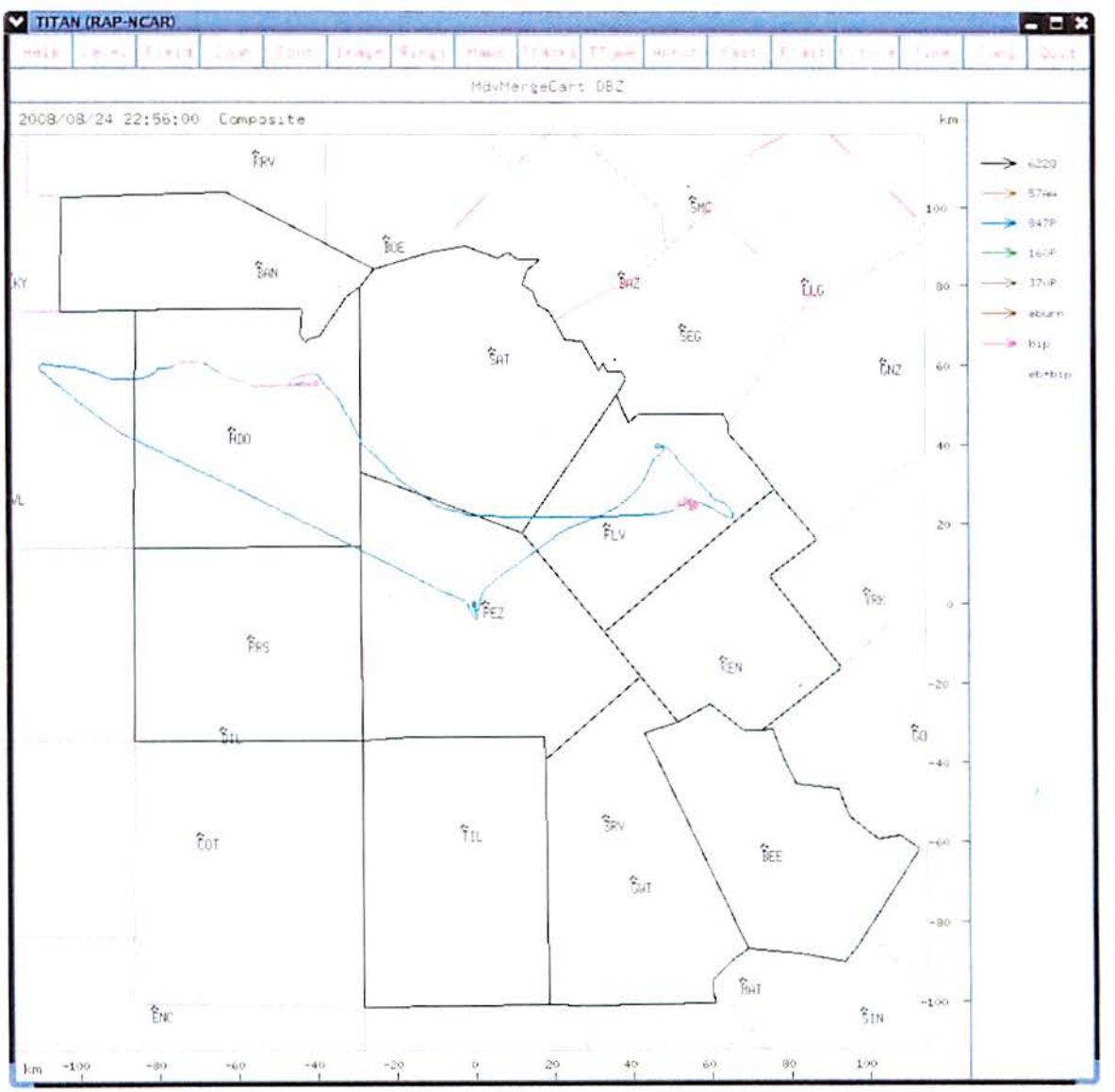
Two flares were used for seeding in Medina County, totaling 80g of AgI.



AUGUST 24

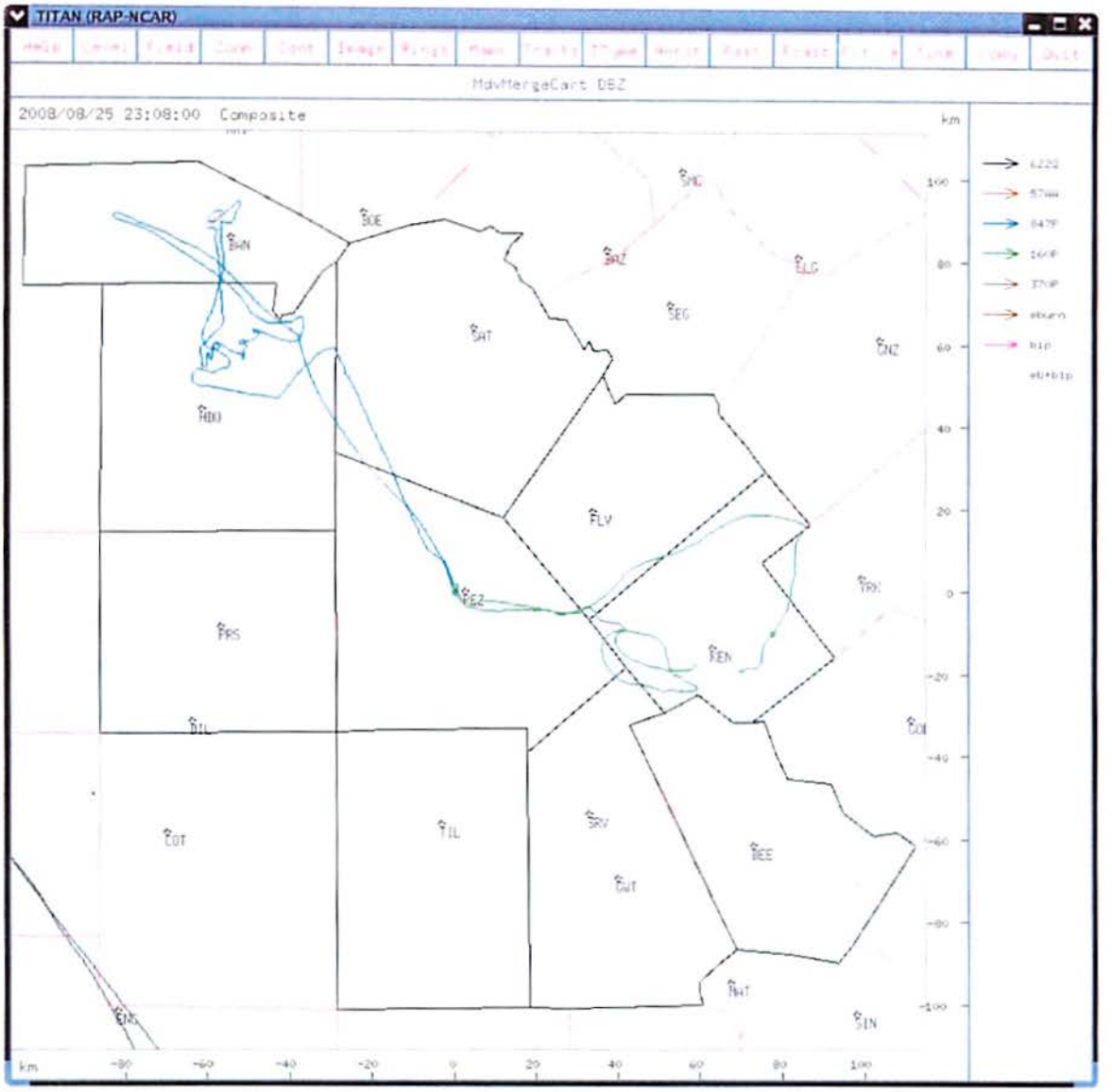
Convection started during the afternoon hours as daytime heating was reaching its peak. A line of convection formed a couple hours before the seeding flight north/northeast of the target area. As this line moved south, a seeding flight was launched into the northern parts of the target area. Upon encountering the line of convection, the pilot reported very weak inflow and strong to severe turbulence. Eventually, the pilot did find inflow and commenced seeding. Convection in Bexar County could not be seeded due to a flash flood warning being issued, but activity in Medina County was treated with AgI. During the mission, the pilot reported well defined shelf clouds and lots of lightning.

12 flares were used for seeding in Medina County, totaling 480g of AgI.



AUGUST 25

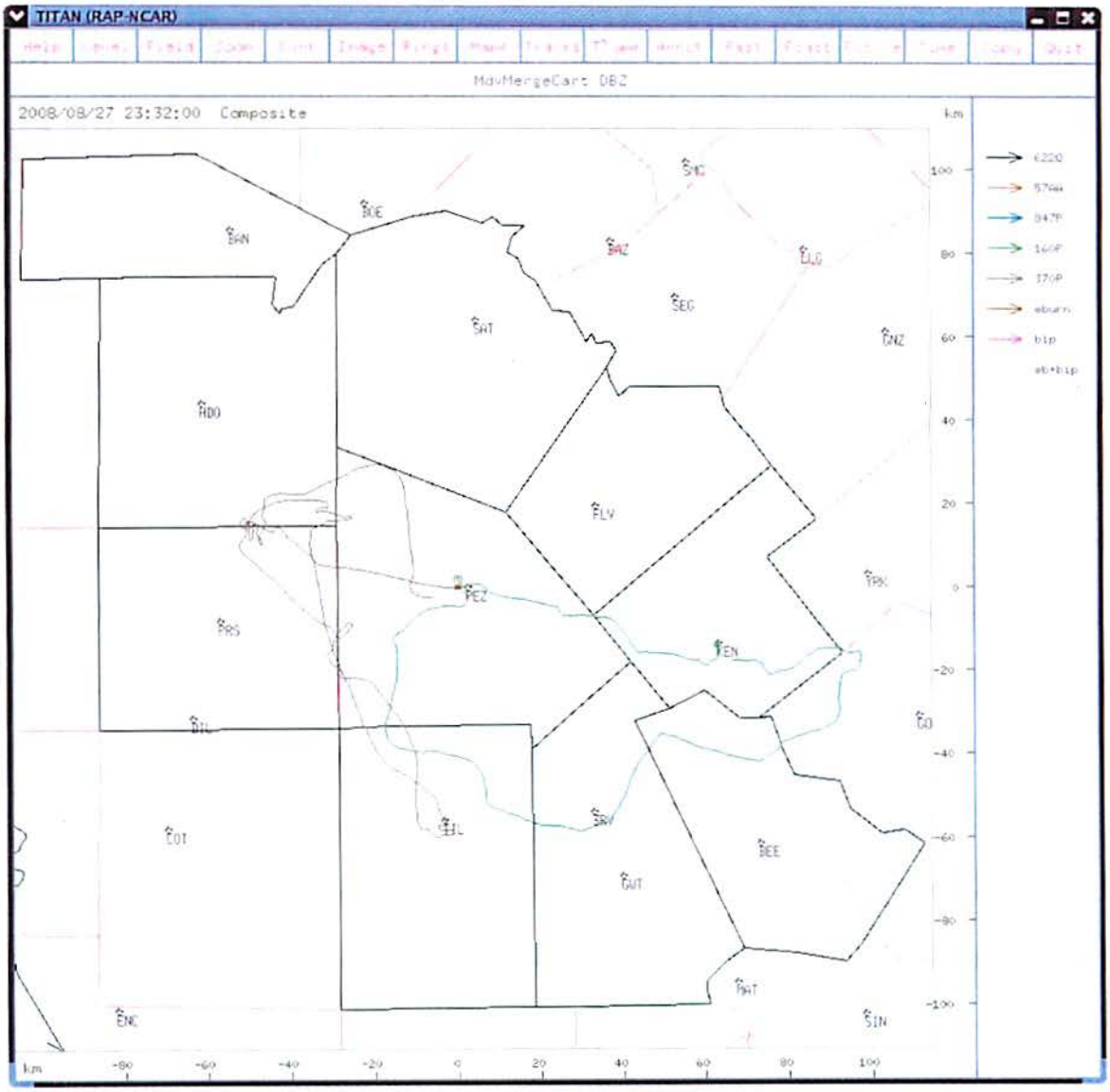
Aside from a weak trough at 250mb over the southern target area, there were no real discernable features impacting the target area today. The airmass continued to be moist and unstable, and with some daytime heating, popcorn-type showers developed along the Balcones Escarpment. A flight was launched to activity in Bandera County. Activity today had short life spans of 20-40 minutes.
Two flares were used for seeding in Bandera County, totaling g80g of AgI.



AUGUST 27

As has been the case for much of the month, a very moist and unstable airmass continued to reside over the area. Deep southerly flow was transporting in plenty of moisture across the area. With daytime heating as the primary mechanism, convection developed during the afternoon hours once the convective temperatures were reached. This activity initiated south and southwest of the tri-county area and a plane was dispatched to investigate, with seeding taking place just south of the target area as well as in southern Medina County as the activity moved to the north and northwest.

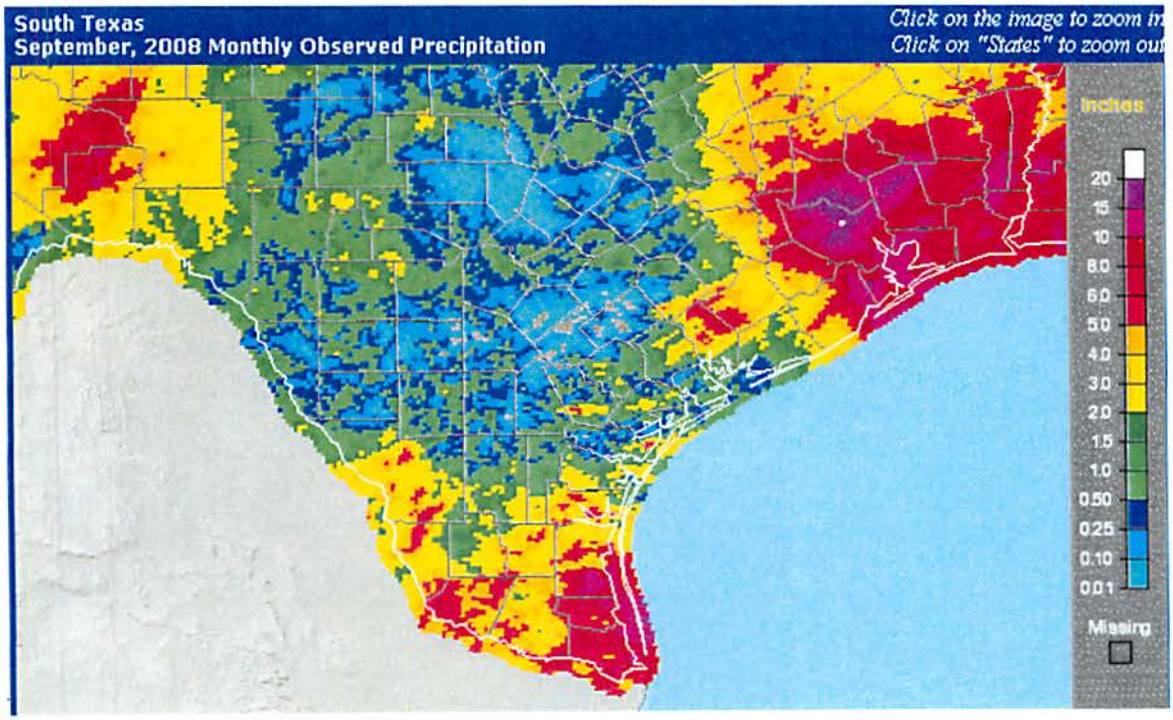
Two flares were used for seeding in Medina County, totaling 80g of AgI.



SEPTEMBER 2008

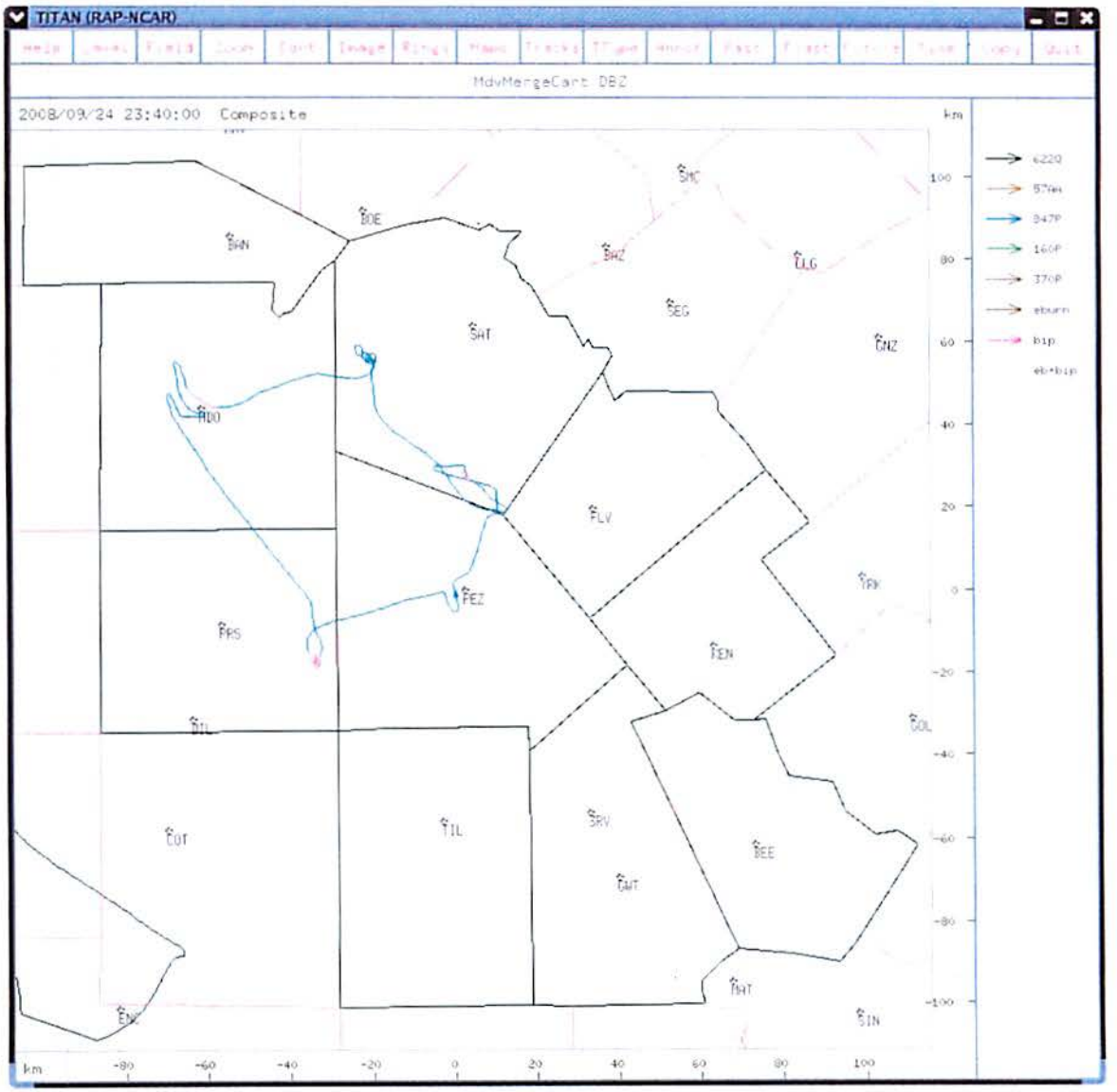
The wet pattern of the mid summer came to an end over south-central Texas in September, with many areas seeing well below normal rainfall for the month. The exception appeared to be the northwestern corner of Medina County and southwestern Bandera County, where rainfall amounts for the month were close to normal. There were a few days on which convective activity developed, but it was only on the 24th of the month where seedable clouds presented themselves in the EAA target area, and this was the only day in September on which seeding took place.

One day of seeding took place, with one flight logged. A total of 2 flares were used for seeding in Bexar County, totaling 80g of AgI.



SEPTEMBER 24

Moist air continued to reside over south Texas, with soundings indicating precipitable water values between 1.5" and 2.0", sufficient for scattered convection. A mid-level shortwave was moving south across the state and began to impinge on the area in the afternoon. The combination of daytime heating, ample moisture and weak lift from the shortwave resulted in scattered, popcorn-type convection across the target area with movement to the southwest. Much of the activity was low-topped and barely reaching the freezing level. A flight was dispatched toward the latter part of the afternoon as clouds appeared to be growing above the freezing level, mainly over the northern target area. Some seeding took place in Bexar County, where the abundance of clouds did not allow the randomized protocol to be put into effect. Additional showers developed over Medina County, but inflow was not found.
Two flares were used for seeding in Bexar County, totaling 80g of AgI.



ACKNOWLEDGEMENTS

2008 marked year number seven of cloud seeding within the Edwards Aquifer Authority target area. The success of the project comes about through the hard work of many people, and it is here where gratitude must be expressed.

Our two "heads of state", if you will, Tommy Shearrer and Mike Mahoney, continue to do many hours of work to ensure that the project gets past any red tape and runs as smoothly and efficiently as possible. Many thanks go their way, as the project would likely be lost without them. Thanks also go to the board members who regularly meet to discuss purchases, improvements, seeding methods, and any other factors that affect the way the program is run. Their input in the past has helped run a successful program, and we hope they will continue their good work. We certainly couldn't have the great planes and the successful flights without the hard work of our pilots: Craig Funke, Larry Dement and Robert "Butch" Card. We must also thank Craig for completing the annuals on our planes. Thanks must also go out to Candi Gonzales, who handles much of the laborious paperwork for the project, and to Larry Akers, who keeps our radar in tip-top shape. Speaking of radars, we must thank the crew at WDT, Inc. for providing us with the NEXRAD feed. The cloud seeding projects may not be here had it not been for George Bomar, who works with the projects and the Department of Licensing and Regulations – thank you. Thanks also to Rick Illgner and the EAA for working with us this year and in the years to come. The crew at SWTREA deserves thanks for working together with the STWMA to make weather modification operations run more smoothly. Finally, thanks go out to the public, most of who continue to believe in our project and our mission. Without your approval, our project would cease to exist. Thank you all!

Rainfall maps for 2008 came from the following website:
http://www.srh.noaa.gov/rfcshare/precip_analysis_new.php

ANNUAL EVALUATION REPORT 2008 **EAA**

Arquímedes Ruiz-Columbié
Active Influence & Scientific Management

Cloud seeding operations 2008 began over EAA target area in April. This annual report serves as a summary of results. A total of **18 clouds** were seeded and identified by TITAN in **15 operational days**. Table 1 in page 1 summarizes the general figures:

Table 1: Generalities

First operational day: **April 17th 2008 (on a storm seeded for hail mitigation over Uvalde County)**

Last operational day: **September 24th 2008**

Number of operational days: 15
(two in April, two in May, three in June, one in July, six in August, and one in September)

According to the daily reports operational days were qualified as:

Six with excellent performance
Eight with very good performance
One with fair performance

Three with lost of data

Number of seeded clouds: 18
(9 small seeded clouds, 5 large seeded clouds, 3 type B seeded clouds, 1 npf)

Missed Opportunities: none (with lifetime longer than 45 minutes)

Small Clouds

Evaluations were done using TITAN and NEXRAD data.

Table 2 shows the results from the classic TITAN evaluation for the 8 small seeded clouds which obtained proper control clouds.

Table 2: Seeded Sample versus Control Sample (9 couples, averages)

Variable	Seeded Sample	Control Sample	Simple Ratio	Increases (%)
Lifetime	55 min	40 min	1.38	38 (**25**)
Area	116.3 km^2	50.7 km^2	2.29	129 (**12**)
Volume	465.6 km^3	183.8 km^3	2.53	153 (**20**)
Top Height	8.1 km	7.7 km	1.05	5 (**2**)
Max dBz	49.2	49.2	1.00	0 (**- 1**)
Top Height of max dBz	4.6 km	4.8 km	0.96	- 4 (**- 4**)
Volume Above 6 km	44.7 km^3	9.3 km^3	4.80	380 (**120**)
Prec.Flux	756.1 m^3/s	329.5 m^3/s	2.29	129 (**23**)
Prec.Mass	3626.8 kton	1024.3 kton	3.54	254 (**164**)
CloudMass	414.7 kton	171.7 kton	2.42	142 (**27**)
η	8.7	6.0	1.45	45 (**107**)

Bold values in parentheses are modeled values, whereas η is defined as the quotient of Precipitation Mass divided by Cloud Mass, and is interpreted as efficiency. A total of 78 flares were used in this sub-sample with a perfect timing (**100 %**) for an effective dose about **85 ice-nuclei per liter**. The seeding operations lasted in average about 18 minutes.

An excellent increase of **164 %** in precipitation mass together with an increase of 27 % in cloud mass illustrates that the seeded clouds grew at expenses of the environmental moisture (they are open systems) and used only a fraction of this moisture for their own maintenance. The increases in lifetime (25 %), area (12 %), volume (20 %), volume above 6 km (120 %), and precipitation flux (23 %) are noticeable but affected by the small size of the sample, which implies a great variability. There was a slight decrease in maximum reflectivity (- 1 %), and a slight increase in top height (2 %). The seeded sub-sample seemed 107 % more efficient than the control sub-sample. Results are evaluated as **excellent**.

An increase of 164 % in precipitation mass for a control value of 1024.3 kton in 8 cases means:

Δ_1 = 9 x 1.64 x 1024.3 kton = 15 119 kton = 12 261 ac-f

Large Clouds

The sub-sample of 5 large seeded clouds received a synergetic analysis. In average, the seeding operations on these large clouds affected 40 % of their whole volume; with a perfect timing (100 % of the material went to the clouds in their first half-lifetime). A total of 74 flares were used in this sub-sample for an effective dose about **130 ice-nuclei per liter**.

Also in average, large clouds were 48 minutes old when the operations took place; the operation lasted about 65 minutes, and the large seeded clouds lived 180 minutes.

Table 3 shows the corresponding results:

Table 3: Large Seeded Sample versus Virtual Control Sample (5 couples, averages)

Variable	Seeded Sample	Control Sample	Simple Ratio	Increases (%)
Lifetime	180 min	155 min	1.16	16
Area	225 km^2	215 km^2	1.05	5
Prec.Mass	18 251 kton	13 723 kton	1.33	33

An increase of 33 % in precipitation mass for a control value of 13 723 kton in 5 cases may mean:

Δ_2 = 5 x 0.33 x 13 723 kton = 22 643 kton = 18 363 ac-f

Type B Clouds

Three type B clouds over EAA target area were seeded during the season. In average, the seeding operations on these type B clouds affected 20 % of their whole volume; with an excellent timing (75 % of the material went to the clouds in their first half-lifetime). A total of 40 flares were used in this sub-sample for an effective dose about **170 ice-nuclei per liter**.

Also in average, large clouds were 115 minutes old when the operations took place; the operation lasted about 30 minutes, and the large seeded clouds lived 245 minutes.

Table 4: Large Seeded Sample versus Virtual Control Sample (3 couples, averages)

Variable	Seeded Sample	Control Sample	Simple Ratio	Increases (%)
Lifetime	245 min	235 min	1.04	4
Area	443 km^2	422 km^2	1.05	5
Prec.Mass	88 414 kton	78 242 kton	1.13	13

Δ_3 = 3 x 0.13 x 78 242 kton = 30 514 kton = 24 747 ac-f

The total increase: $\Delta = \Delta_1 + \Delta_2 + \Delta_3$ = 55 371 ac-f

Micro-regionalization

Increases in precipitation mass were analyzed county by county in an attempt to better describe the performance and corresponding results. **Table 5** below offers the details:

County Seeding	Initial Seeding	Extended (increase)	Acre-feet (increase)	Inches (increase)	Rain gage (season value)	% (increase)
Uvalde	**4**	**5**	**47 400**	**0.57**	**9.09 in**	**6.3**

Bandera	**1**	**1**	**1 200**	**0.03**	**9.90 in**	**0.3**
Medina	**4**	**8**	**12 300**	**0.17**	**12.15 in**	**1.4**
Bexar	**3**	**4**	**10 000**	**0.15**	**9.16 in**	**1.6**
Total	**12**	**18**	**70 900**			
Average				**0.23**	**10.08 in**	**2.4**

(**Initial seeding** means the number of clouds seeded when the operations began; whereas **extended seeding** means the counties favored by seeding after the initial operations took place.

Final Comments

1) Results are evaluated as **very good**; data corresponding to three operational days were lost;

2) The micro-regionalization analysis showed increases per county; different zones received downwind benefits; the average increase in precipitation, referred to rain gage seasonal value, is **2.4 %**;

3) Radar estimations of precipitation should be considered as measurements of trend. Nevertheless, seeding operations appeared to improve the dynamics of seeded clouds;