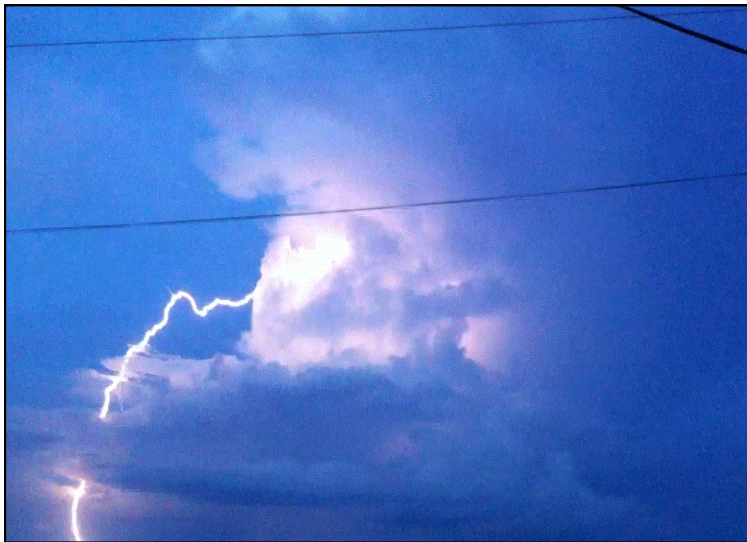


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The Texas Weather Modification COURIER

Possible Texas Research in Cloud Seeding



Pictures was taken August 13, 2011, of a seeded storm just east of Pleasanton, Texas. Picture taken by Todd Flanagan of South Texas Weather Modification Association.

By Stephanie Beall

Over the past year, momentum has been gaining with a possible research project that would take place over Texas. This research would test the efficacy of cloud seeding in Texas and would be conducted by the National Center for Atmospheric Science (NCAR) in cooperation with the Texas weather modification projects. The research is proposed to take place over a five year period. Each year of the research study will facilitate in further demonstrating how cloud

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Meet Meteorologist Jonathan Jennings and Pilot Fil Filburn

By Jonathan Jennings

This year the West Texas Weather Modification (WTWMA) welcomed a new Meteorologist Jonathan Jennings. Jennings received his degree in Meteorology from California University of Pennsylvania in December 2008. A Pennsylvania native, Jennings grew up 50 miles north of Pittsburgh, Pa, along the Ohio border in Sharon, Pa. Jennings has also lived in a northern suburb

of San Francisco, Calif., and spent two years in Orlando, Fla., before moving to San Angelo, Texas. His interest in atmospheric sciences was sparked early in his high school years when learning about the 1985 tornado outbreak that devastated western Pennsylvania. During his collegiate years, Jennings presented his research "*A Synoptic Climatology of Tornado Events in Western Pennsylvania and Eastern Ohio using the Miller's*

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Texas Project Updates 2012 Results

Southwest Texas Rain Enhancement Association

By Stephanie Beall

2011 will go down in the history books as one of the driest years that occurred in South Texas. This situation was mimicked over most of the state, as severe to exceptional drought conditions existed at one point across most locations over the state. The beginning of the season started out very slow and the association's first seeding flight did not occur until May, when typically the first seeding flight occurs in late March. Most of the spring yielded very dry, hot conditions and as a result, seeding activity was low. In June, activity started to pick up, but was still well below normal. Most of the flights for the 2011 season occurred during July and beyond, although precipitation totals were still relatively meager and did not put much of a dent in the drought that developed over the spring and early summer months. A total of 32 seeding flights occurred in 2011, while the average is about 63. Other interesting notes for the 2011 season include:

- Latest first seeding day in the SWTREA's history
- Only year since the inception of the program that hail suppression activities did not occur
- March through June time frame yielded only about nine percent of the total seeding flight activity of 2011; 91 percent occurred July through September
- September was the only near normal month during the season
- First time in SWTREA history that there were not any flights during October

See Table 1 for flight activity during the 2011 season.

West Texas Weather Modification

By Jonathan Jennings

Seeding operations began on April 20, 2011, lasting through the October 11, 2011. The 2011 season will be remembered for some time as 73 different records were broken, and intense heat and extremely dry conditions lasted through the spring and summer months. Despite six less operational days compared to 2010, 128 different clouds were seeded with 1,311 total flares, compared to 127 clouds in 2010. Pilots were asked to go airborne 72 times during the season with 11 reconnaissance flights. During those 72 flights, pilots were airborne for a total of 179.63 hours. Six pilots were available during the season. One pilot departed after August and another pilot moved on at the end of the season.

From April 20 through August 2, Meteorologist Robert Rhodes performed missions before Meteorologist-In-Training Jonathan Jennings took over. Jennings performed 18 missions under the training of Active Influence and Scientific Manager (AISM) Dr. Arquimedes Ruiz-Columbié, South Texas Weather Modification Association Meteorologist Todd Flanagan and Southwest Texas Rain Enhancement Association Meteorologist Stephanie Beall. Despite a mid-season change in meteorologist, performance in the final evaluation was graded as excellent.

The 2011 season was extremely dry with annual precipitation measured at 9.23 inches, 12.02 inches below normal. Along with the extreme drought the area also dealt with intense heat. Temperatures of 100 degrees or greater were recorded a record 100 times during the year. Among those 100 days, 37 days recorded temperatures of 105 degrees or greater, also a record. The annual average temperature for Mathis Field in San Angelo, Texas, was a record 69.3 degrees. The average temperature for August was 86.7 degrees, July was 89.6 degrees and June was 88.6 degrees, and

Month	Seeding Days	Seeding Flights	AgI Used (Glaciogenic) Grams	CaCl Used (Hygroscopic) Grams	Flight Time (Hours)
March	0	0	0	0	0
April	0	0	0	0	0.7
May	1	1	520	0	4
June	2	2	920	2,000	7.75
July	8	13	8,800	7,000	32.6
August	7	7	2,640	8,000	14.3
September	8	9	9,560	9,000	25.4
Totals	26	32	22,440	26,000	84.95

Table 1 shows the 2011 flight information for the Southwest Texas Rain Enhancement Association project.

Month	Seeding Days	Seeding Flights	AgI Used (Glaciogenic) Grams	CaCl Used (Hygroscopic) Grams	Flight Time (Hours)
April	2	3	1,976	0	7.4
May	2	2	988	0	10.1
June	4	8	4,940	0	20.38
July	9	16	10,244	4,000	46.9
August	8	13	11,908	6,000	44.75
September	10	16	12,922	4,000	48.1
October	1	2	364	0	2
Totals	36	60	43,422	14,000	179.63

Table 2 shows the 2011 flight information for the West Texas Weather Modification project.

they are now the three warmest months on record for San Angelo, Texas.

A total of 29 record high temperatures were recorded while 32 record high minimums, two record low maximums, six record low minimums, three record rainfalls and one record snowfall were also observed during the 2011 season. The hottest day of the year was May 28, 2011, with a high temperature of 110 degrees. The coldest day occurred on February 10, 2011 with a low of 12 degrees. Precipitation in the amount of 2.56 inches fell on October 9, 2011; one day after 1.24 inches was recorded. The total rainfall on those two days accounted for 41 percent of the annual precipitation.

The final evaluation report completed by AISM stated that 13 operations days qualified as those with excellent performance. Another 14 days were evaluated as very good, five with good and one day with only fair performance. Only one missed opportunity was found on the June 30 over Sterling County. Of the 128 clouds seeded, 87 were categorized as small. An increase of lifetime by 63 percent was found as well as increases in volume of 43 percent and in area of 40 percent. Precipitation mass increased 97 percent while clouds were targeted with 85 percent timing. Moving onto the 19 large clouds that were seeded, lifetime increased by 23 percent, area by 26 percent and volume by 25 percent were also found. Precipitation mass increased by 54 percent with timing of 98 percent. A total of 22 Type B clouds were seeded with a timing of 93 percent. Lifetime was increased by 3 percent, area by 5 percent and volume by 4 percent while precipitation mass increased 8 percent. Percent increase of rainfall area wide ranged from 19 percent in Sterling County to 25 percent in Regan and Schleicher Counties. The area saw an increase of precipitation by 23 percent on average, a total of 1.11 inches or 603,400 acre-feet. Along with glaciogenic seeding the West Texas Weather Modification also conducted four cases of hygroscopic seeding. Although still experimental, these four cases showed a 44 percent increase in lifetime, 59 percent in area and 25 percent in volume.

See Table 2 for flight activity during the 2011 season.

South Texas Weather Modification Association

By Todd Flanagan

2011 will be remembered across the state of Texas for the intense drought that broke temperature and precipitation records in many areas. No part of the state escaped the effects, including South Texas.

Normally, the first day of weather modification operations occurs in either April or May with one out of four years seeing the first day taking place in March. In 2011, reconnaissance flights occurred in May but suitable clouds were not found. It was not until June 4 that seeding operations took place as a disturbance moved into northeastern Mexico bringing sufficient moisture and ideal building cumulus over the eastern target area. Seeding operations also took place on June 6, 23 and 30. On each of these days only spotty convection occurred and most areas did not see much, if any rainfall. Operations on June 6 appeared to be the most successful with three seeded clouds in Wilson County merging into one cluster that produced a radar-estimated two inches of rain.

In spite of the drought, operations in July were more typical of an average year with seeding operations occurring on eight days during the month. Rainfall amounts were spotty and many locations once again saw less than a half inch of rain or about 25 percent of normal rainfall. Tropical moisture associated with the remnants of Tropical Storm Arlene provided fuel for convective development on July 1 and 2 with the most activity occurring on the latter day. The air mass began to dry out on the July 3, but isolated convection did develop over northern Bee County which was treated. Seeding occurred on July 6 over the southeastern target area as isolated sea-breeze convection developed and moved inland. On July 10 a tropical upper tropospheric trough moved across the target area bringing lift and precipitable water values in excess of two inches. These ingredients allowed for scat-

STWMA Continues on Page 4

STWMA Continued from Page 3

tered convection to develop over the eastern half of the target area with several large clouds seeded. Some of these seeded clouds merged into clusters with eastern and northeastern areas receiving one to two inches of rain. July 19 was the busiest day of the season as a tropical wave approached from the east. Abundant moisture, lift and strong heating allowed for the development of numerous showers and thunderstorms, many of which were treated with both silver iodide and calcium chloride. Only portions of the southeastern target area did not receive rain on this day. The tropical wave continued westward with additional convection being seeded on July 20. The last day of seeding for the month was on July 29 as Tropical Storm Don approached the lower Texas coast bringing scattered convection to the eastern half of the target area.

Precipitation amounts in August were quite dismal with the vast majority of the target area receiving 5 percent or less of the average August rainfall. The exceptional heat wave continued into and peaked in August, with late-month temperatures exceeding 110 degrees in most areas. For the South Texas Weather Modification Association, seeding operations occurred on four days during the month. On August 13 a sea-breeze boundary pushed into the eastern counties generating convection which was seeded. These clouds produced a half inch to nearly two inches of rainfall. Sea-breeze convection occurred on August 22 with three clouds receiving treatment. On August 25 a fast-moving shortwave produced strong convection over the southern target area with some of these clouds receiving treatment with silver iodide. The final day of seeding in August occurred on the 28, which happened to be the hottest day of the year for South Texas as temperatures peaked at 111 degrees in several locations. High-based thunderstorms erupted over the northwestern target area with three cells receiving treatment.

September started out hot and dry with the drought persisting. At mid-month, however, the weather pattern changed and convection became a

more common occurrence. All activity for the month of September occurred between the 16 and 29, with seeding operations occurring on nine days. A widespread rain event occurred on the 17 as a decaying meso-scale convective system (MCS) approached the target area from the west and interacted with a very moist and unstable air mass over the eastern half of South Texas; heavy showers and thunderstorms developed, several of which were treated. Amounts ranged from 1 to 3 inches. On September 18 convection developed in a moist and very unstable environment over the central and southern target area with seeding taking place in this area. Late in the day convection along a cold front approached the northern target area and this was also seeded. On September 19 intense convection developed over southern Bee County which was treated with silver iodide; this area merged into a cluster which propagated south towards Corpus Christi. An MCS affected the northwestern target area on the 21st with seeding taking place in Kerr & Bandera counties. Isolated convection was seeded on the 22nd with more substantial convective events on the 27th, 28th and 29th, which was to be the last day that seeding operations took place in 2011.

A radar analysis of 57 seeded clouds in the STWMA target area was performed by Active Influence & Scientific Management once the season ended. Results indicate a radar-derived increase of 190,782 acre-feet of water in and near the target area, or about 8 percent.

See Table 3 for flight activity during the 2011 season.

Panhandle Groundwater Conservation District

By Jennifer Wright Puryear

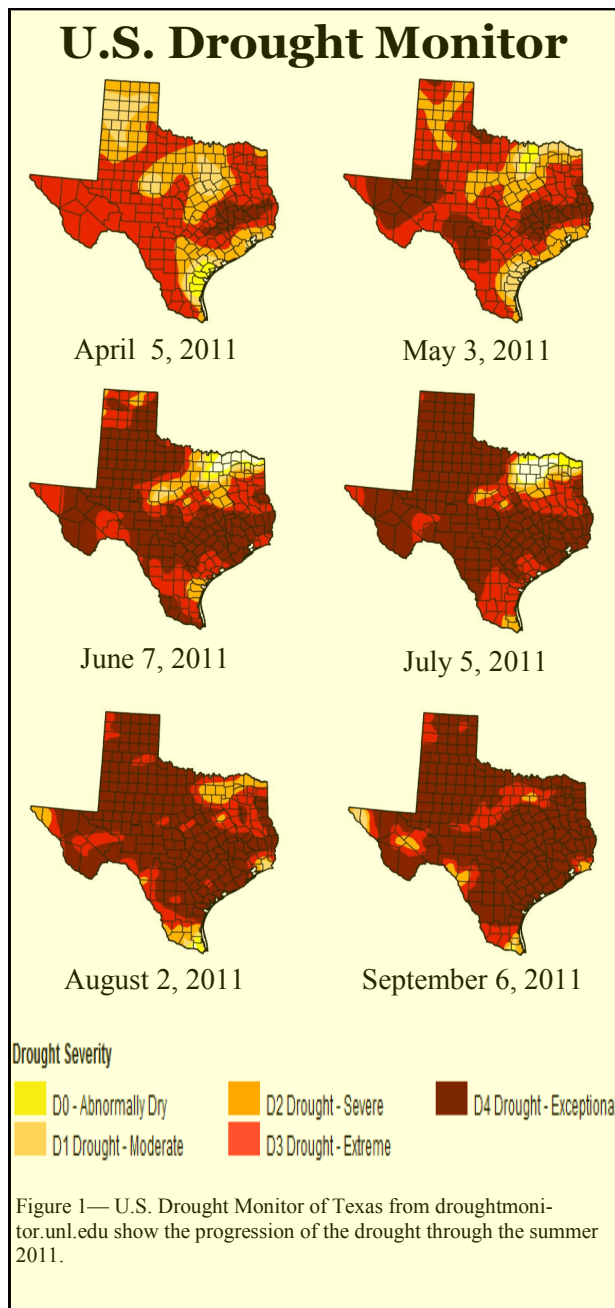
The conclusion of the Panhandle Groundwater Conservation District's (PGCD) 2011 Precipitation Enhancement Program marked the twelfth year of cloud seeding in the Texas Panhandle. The 2011 season began on April 25 and concluded on September 3. This

Month	Seeding Days	Seeding Flights	AgI Used (Glaciogenic) Grams	CaCl Used (Hygroscopic) Grams	Flight Time (Hours)
March	0	0	0	0	0
April	0	0	0	0	0
May	0	3	0	0	3
June	4	5	1,196	4,000	9
July	8	15	6,682	5,000	28.8
August	4	8	1,352	2,000	12.6
September	9	12	4,550	15,000	34.6
Totals	25	43	13,858	26,000	88.0

Table 3 shows the 2011 flight information for the South Texas Weather Modification Association project.

Month	Seeding Days	Seeding Flights	AgI Used (Glaciogenic) Grams	CaCl Used (Hygroscopic) Grams	Flight Time (Hours)
March	0	0	0	0	0
April	1	1	120	0	3.1
May	0	0	0	0	0
June	0	0	0	0	2.4
July	10	14	16,800	0	38.7
August	12	12	14,040	0	41.7
September	2	2	1,200	0	5.4
Totals	24	29	32,160	0	91.3

Table 4 shows the 2011 flight information for the Panhandle Groundwater Conservation District project.



year was a hard year in the Texas Panhandle, since rainfall was very limited due to the extreme drought most of Texas experienced along with other states in the United States. Figure 1 shows the progression of the drought monitor in Texas from April 5, 2011, until September 6, 2011. In May 2010, the sea surface temperatures (SSTs) anomalies plunged from a positive El Niño to negative SSTs anomalies resulting in a La Niña that remained strong through the 2010 winter and 2011 spring. La Niña taking affect at the beginning of the precipitation enhancement season did not provide many favorable conditions for cloud seeding, and there was only one seeding event from April through June. In May 2011, SSTs began to drift towards ENSO neutral and remained there through August. The ENSO neutral allowed for some dynamics across the Texas Panhandle to provide some favorable opportunities for cloud seeding. During July there were 10 seeding days and during August there were 12 days. In August, SSTs anomalies began to move back towards negative, and models began to suggest La Niña would be the main dominating feature for the 2011 winter and 2012 spring. Table 4 shows the number of days flows, seeding flights, AgI used, CaCl used and hours flown per month throughout the 2011 season.

PGCD Continues on Page 6

April– September Rainfall Averages
Comparing 2010-2011 in Inches

	2010	2011	Difference
Armstrong	22.83	4.75	-18.08
Carson	24.04	5.69	-18.35
Donley	27.09	3.38	-23.71
Gray	23.13	4.83	-18.30
Potter	17.76	2.98	-14.78
Roberts	18.42	4.97	-13.45
Wheeler	25.54	4.79	-20.75

Table 5 shows the comparison of the 2010—2011 rainfall in inches along with the difference for the counties within the Panhandle Groundwater Conservation District.

PGCD Continued from Page 5

The rainfall amounts in 2011 were in most cases below anything the Texas Panhandle has ever seen. During 2009 and 2010, most counties were above the district normal, and there were significant increases in rainfall from 2009 to 2010. However, when comparing the 2011 rainfall to those years it is evident that this year's rainfall was severely hindered by La Niña with most counties seeing less than five inches of rainfall from April through September. Table 5 shows the rainfall values for the District counties for 2010-2011 and their differences.

This year's seeding season was still considered very successful, providing on average a 20 percent rainfall increase per county according to Active Influence and Scientific Management. This increase was calculated using real-time rain gauge measurement collected throughout the District, and by comparing the radar data of the seeded clouds to the non-seeded clouds. This increase calculated out to an average of 0.89 inches of additional rainfall per county within the PGCD target area. Active Influence and Scientific Management analyzed a total of 38 clouds in 24 opera-

tional days. The results were evaluated as excellent with timing of seeding at 93 percent and no seeding opportunities missed.

Meet Continued from Page 1

Guide [TR-200] Classification Scheme" at various conferences, including the annual National Weather Association (NWA) Conference. Jennings also served as the President of the Three Rivers Chapter of the NWA and the Southwest Pennsylvania Chapter of the American Meteorological Society (AMS). During his term, the chapter won its first NWA Chapter of the Year and was noted as Honorable Mention for the AMS.

When Jennings is not in the office performing cloud seeding operations, he can be found watching the Michigan Wolverines college football team on Saturdays or the St. Louis Rams NFL team on Sundays. Jennings is also very active in health and fitness where he spends seven days a week working out in the local gym.

Although not new to the West Texas Weather Modification Association (WTWMA), project Pilot Fil



Left is Meteorologist Jonathan Jennings, and right is Pilot Fi Fiburn from WTWMA.

Filburn has been assigned duties as chief pilot for San Angelo operation. Filburn is a San Angelo native but was raised in the military. He is a graduate of Texas A&M University with a Bachelors of Science and Masters of Science in Aerospace Engineering and has a second Masters of Science in Systems Engineering from University of California, Los Angeles. Prior to graduation from Air Force Undergraduate Pilot Training in 1972, he was a flight test engineer at the Air Force Flight Test Center. He flew the F-4 Phantom operationally in the Air Force. In 1980 he graduated from the United States Air Force Test Pilot School and worked on various test programs at the Air Force Flight Test Center at Edwards Air Force Base in California. He was the Commander of the Air Launched Anti Satellite Test Program and launched the first Anti Satellite Missile in 1984 from an F-15 Eagle over the Pacific Missile Test Range. Filburn retired from the Air Force in 1988 and worked for E-Systems in Greenville, Texas, as an experimental test pilot in the development of a high altitude reconnaissance aircraft for the Air Force. In 2000, he retired from E-Systems and moved back to San Angelo where he flew Cessna Caravans for FED-EX until 2008 when he retired again to spend time with his family and to build an experimental aircraft. Filburn has accumulated over 14,000 flying hours in 72 different aircraft ranging from B-52's to gliders and hot air balloons. Filburn likes to fly. He has lived in Germany, Spain, England, Turkey, and Japan. In 2010 he began flying for WTWMA as a project pilot. Filburn is married to his high school sweetheart of 46 years, has two children, and six grandchildren

When not occupied flying or building airplanes, Filburn enjoys fishing, golfing, grandkids, and travel.

Texas Continued from Page 1

Airborne survey studies will include aerosol sampling and clouds sampling over parts of Texas in order to better understand the composition of the atmosphere over Texas. This will be important to know, as in year two, because knowing the type of particulates and aerosols in the atmospheric will determine what seeding material is most suitable for a particular area. The randomized experiment, which is a double-blind experiment, will be conducted in years two through four. This research will not only provide valuable data for cloud seeding operations but will potentially have implications beyond cloud seeding, including:

1. Improved operational quantitative rainfall estimation and forecasting.
2. Improved water resource management tools (beyond cloud seeding).
3. Improving understanding of severe weather events, and development of high impact weather detection and forecasting.
4. Air quality and pollution monitoring and characterization.
5. This will be the first time that dual-polarization radar will be available to a project of this kind in the United States.
6. Increased understanding of the influence of cross-border pollution on clouds and rainfall in Texas.

Year	Tasks
Year 1	-Climatological studies and preparation of program -Airborne survey studies -Develop science overview and operations plan
Year 2	-Experimental seeding and radar measurements -Start of a randomized seeding experiment with operational aircraft
Year 3	-Analyses, interpretation and publication of previous years data -Continuation of randomized experiment -Inclusion of upgraded dual polarization data from National Weather Service WSR-88D radars and assessment of cloud seeding effects
Year 4	-Continuation of randomized cloud seeding experiment with research aircraft
Year 5	-Analyses, interpretations and publication of results of the program and recommendation for future operational cloud seeding programs

Table 6 shows the yearly plan for he proposed research in Texas.

General Comments on the 2011 Cloud Seeding in Texas

By Dr. Arquímedes Ruiz Columbié
Active Influence & Scientific Management

2011 brought to Texas the strongest one year drought in recorded history, since 1985. According to the Office of the Texas State Climatologist, the extreme dry period began in the last quarter of year 2010 when most of the state suffered a relatively dry fall and later a dry winter as well. Those dry conditions became widespread in March 2011, affecting any single human activity. Cloud seeding operations were not an exception, as this article will illustrate.

Cloud seeding operations 2011 began over Texas weather modification target area in April. West Texas Weather Modification Association (WTWMA) had the first operational day on April 20, and the last operational day on October 11. The following projects recorded data for evaluations and quality control: Panhandle Groundwater Conservation District at White Deer, Trans-Pecos at Pecos City, WTWMA at San Angelo, South Texas Weather Modification Association at Pleasanton, and Southwest Texas Rain Enhancement Association at Carrizo Springs. A total of 288 clouds were seeded and identified by TITAN (Thunderstorm Identification, Tracking, Analysis and Nowcasting) in 124 target area operational days. The most active period was July through September with 85 percent or 106 operational days. Of the 288 seeded clouds, 154 of those were small clouds, 58 large clouds, and 72 type-b clouds.

During its first half, Season 2011 was affected by La Niña conditions which may explain why only six operational days took place between April and June. ENSO neutral conditions dominated during the summer when most of the operational days occurred. As La Niña conditions reappeared in October, only one more operational day came about. General figures for the last seven campaigns are shown in Table 7. It is clear from the table that cloud seeding campaigns concomitant with La Niña conditions tended to have less clouds seeded clouds with less operational days. Averages are shown in Table 8 to support such conclusion.

Moving back to the 2011 cloud seeding campaign, the exceptional drought conditions, especially during the spring appeared to inhibit the formation of storms with the subsequent shortage of seedable clouds and severe weather. No hail suppression operations were developed in South and West Texas during the 2011 season.

The 2011 evaluation resulted in the following estimated increase in precipitation by radar calculations:

Small Clouds (154): $\Delta = 154 \times 1.03 \times 858.1 \text{ kton} = 136,112 \text{ kton} = 110,387 \text{ ac-ft}$

Large Clouds (58): $\Delta = 58 \times 0.51 \times 48,345 \text{ kton} = 1,430,045 \text{ kton} = 1,159,767 \text{ ac-ft}$

Type B Clouds (72): $\Delta = 72 \times 0.13 \times 71,236 \text{ kton} = 666,769 \text{ kton} = 540,750 \text{ ac-ft}$

Total Increase: $\Delta = \Delta_1 + \Delta_2 + \Delta_3 = 1,810,904 \text{ ac-ft}$

The corresponding results for the previous campaigns are:

2005 Total Increase: $\Delta = \Delta_1 + \Delta_2 + \Delta_3 = 3,504,476 \text{ ac-f}$

2006 Total Increase: $\Delta = \Delta_1 + \Delta_2 + \Delta_3 = 3,322,671 \text{ ac-f}$

2007 Total Increase: $\Delta = \Delta_1 + \Delta_2 + \Delta_3 = 3,245,424 \text{ ac-f}$

2008 Total Increase: $\Delta = \Delta_1 + \Delta_2 + \Delta_3 = 2,355,599 \text{ ac-f}$

2009 Total Increase: $\Delta = \Delta_1 + \Delta_2 + \Delta_3 = 3,766,098 \text{ ac-f}$

2010 Total Increase: $\Delta = \Delta_1 + \Delta_2 + \Delta_3 = 4,760,542 \text{ ac-f}$

Notice that the minimum estimated increase took place in 2011. This analysis illustrates how sensitive cloud seeding operations are to environmental conditions of relatively large scale which are capable to restraint performance and final results. More research should be done in order to determine the concrete mechanisms nature uses to make these constraints.

References:

1. John W. Nielsen-Gammon, October 31, 2011: **The 2011 Texas Drought**, <http://atmo.tamu.edu/osc/>

2. A. Ruiz-Columbié: **2011 Annual Evaluation Report State of Texas**, www.texasweathermodification.com
3. A Ruiz-Columbié: **Annual Evaluation Reports**, www.texasweathermodification.com

Year	# of Seeded Clouds	# of Target Operational Days	ENSO Conditions During Campaign
2005	494	184	Neutral
2006	551	218	Neutral Early, El Niño Later
2007	228	110	Neutral Early, El Niño Later
2008	233	124	Neutral
2009	466	171	El Niño
2010	399	166	Neutral Early, La Niña Later
2012	288	124	La Niña, Neutral, La Niña

Table 7 shows a synoptic comparison of Texas cloud seeding campaigns from 2005-2011.

ENSO Conditions	Average # of Seeded Clouds	Averaged # of Target Area Operational Days
Neutral (2005 and 2008)	363.5	154
El Niño (2006 and 2009)	508.5	194.5
La Niña (2007, 2010 and 2011)	305	133.3

Table 8 shows averages of number of seeded clouds compared to averaged number of target area operational days during neutral, El Niño and La Niña dominated campaigns.

TWMA Workshop 2011 in Pleasanton, Texas

By Stephanie Beall

The Texas Weather Modification Association held its annual fall workshop November 11-12, 2011, in Pleasanton, Texas. For those who are not familiar with the workshop, it serves as an educational time for project meteorologists in the state. In addition to meteorologists, others affiliated with the projects and weather modification is invited to attend. The two day workshop focuses primarily on weather modification issues going on in the state and beyond. The location moves around year to year, so that each project may host. The first day of the workshop included: project updates, a potential research project in Texas, a discussion about ensemble model forecasting and how this would help daily convection forecasting, additional information about weather modification in general and a history of cloud seeding in Texas, including past research conducted. Day two of the workshop included: developing a weather modification education program, hygroscopic seeding, and a continued emphasis on possible research in Texas. More about this research can be found in this issue of the Texas Weather Modification Courier.

TWMA at the Annual WMA Meeting

By Jonathan Jennings

From April 24 through April 28, 2012, members of the Texas Weather Modification Association (TWMA) attended the annual Weather Modification Association meeting in Las Vegas, NV. Meteorologist Stephanie Beall (SWTREA), Todd Flanagan (STWMA) and Jonathan Jennings (WTWMA) joined Project Managers Craig Funke (WTWMA) and Tommy Shearer (SWTWMA) in Las Vegas. Active Influence and Scientific Management Archie Ruiz also made the trip to give two presentations on the impacts of dust on weather modification operations and an update on hygroscopic seeding in the state of Texas.

He was followed up by Jonathan Jennings who presented an update on the TWMA operations in 2011 and also gave a proposal to begin warm cloud seeding in West Texas. Scientist from Wyoming, California and North Dakota shared the stage with others who traveled from Greece, Japan, Canada and even France to present updates on programs across the world. A more in-depth update on the events that took place in Las Vegas can be found in the next edition of the TWMA Courier.

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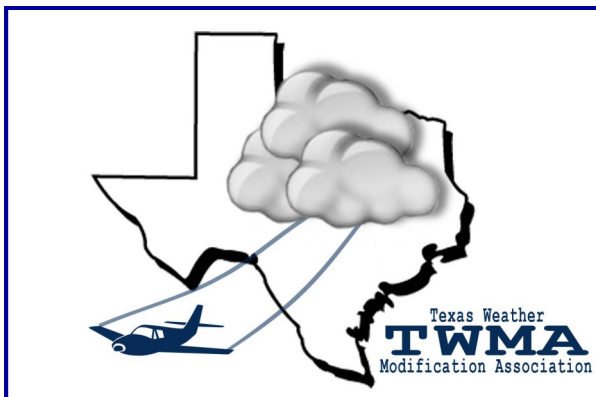
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