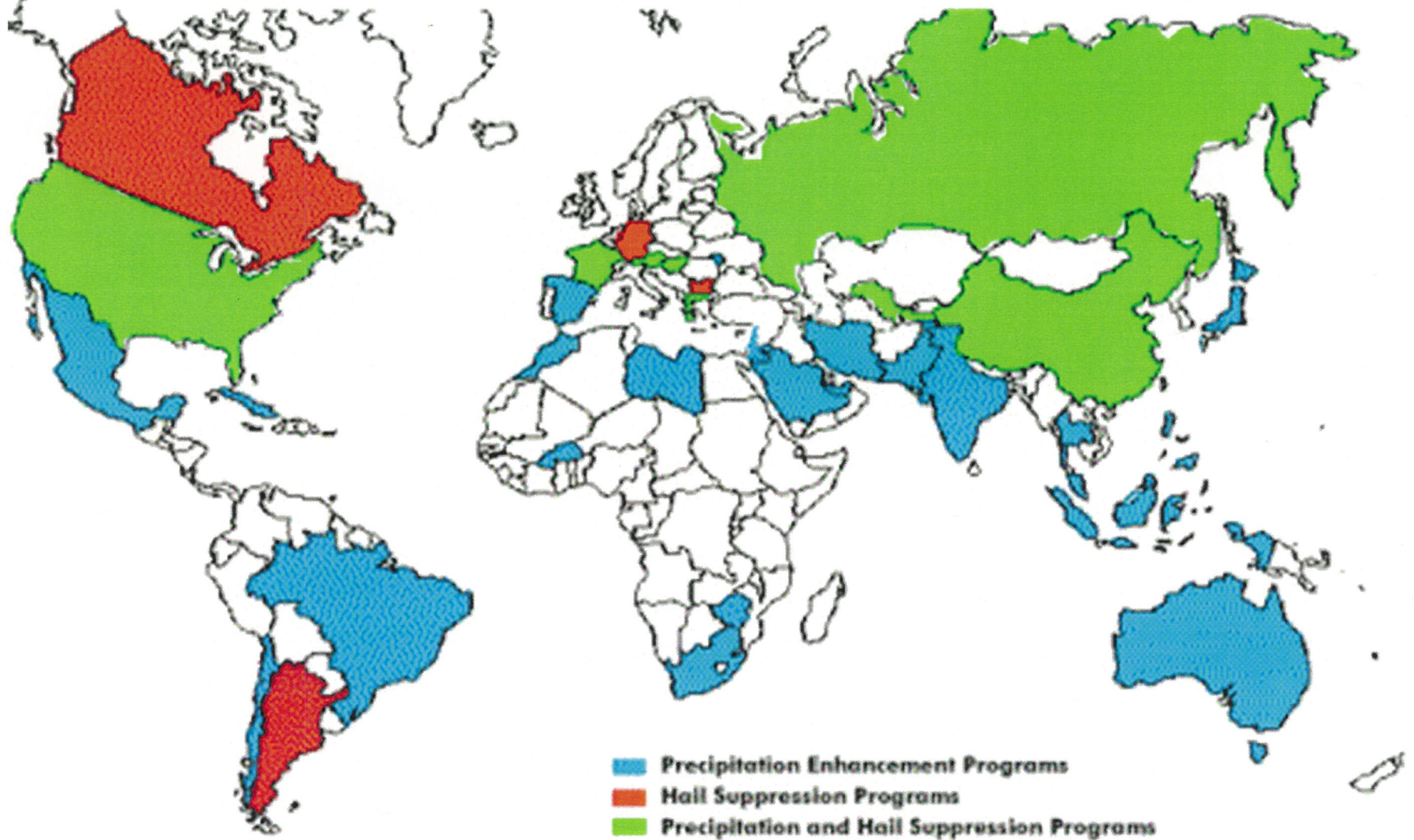




Roosevelt Soil and Water
Conservation District

Weather Modification Around the World



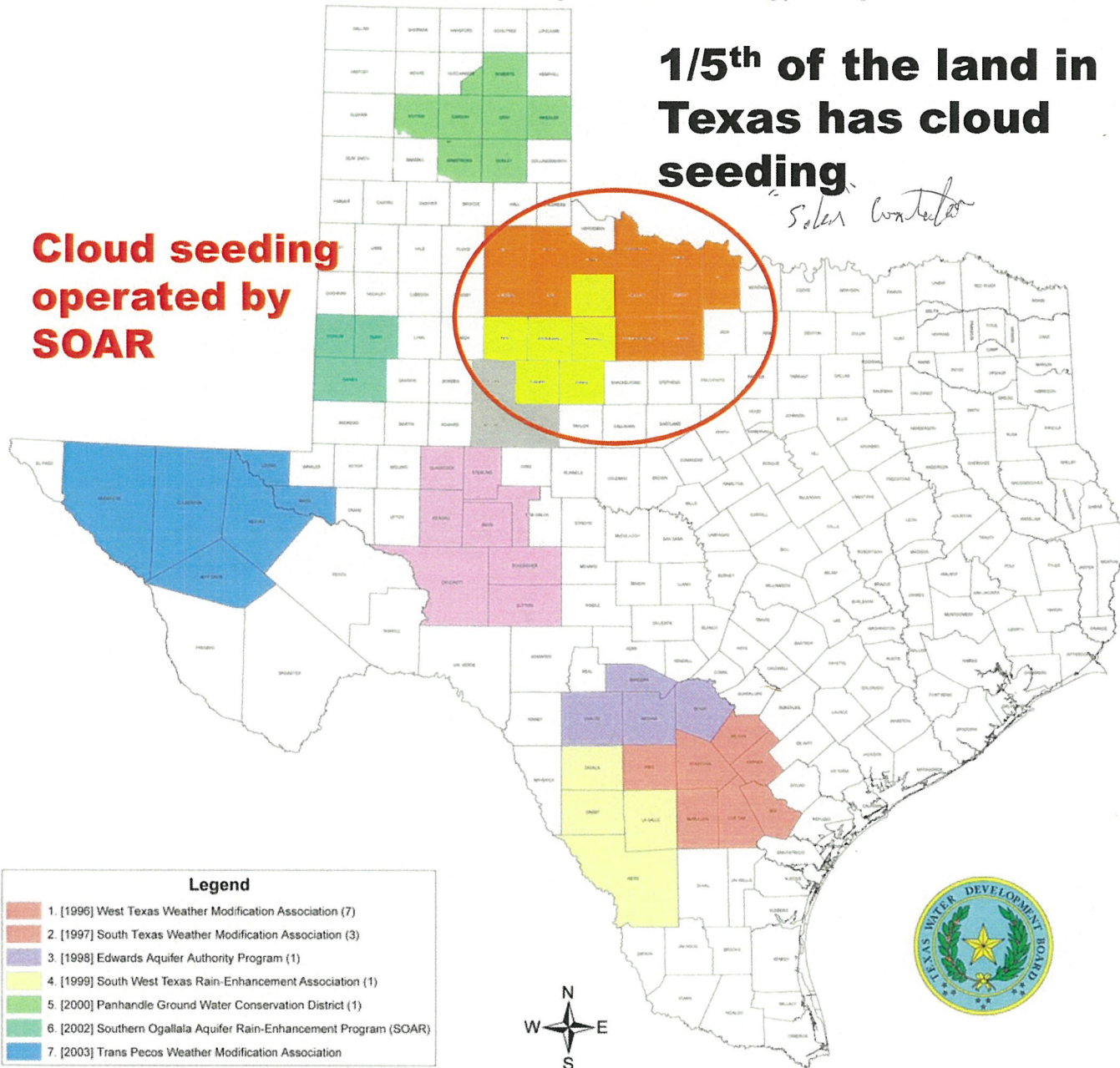
40+ countries; 66 operational programs in the USA

Texas Rain Enhancement (Cloud Seeding) Programs

1/5th of the land in Texas has cloud seeding.

Solar Contractor

Cloud seeding operated by SOAR



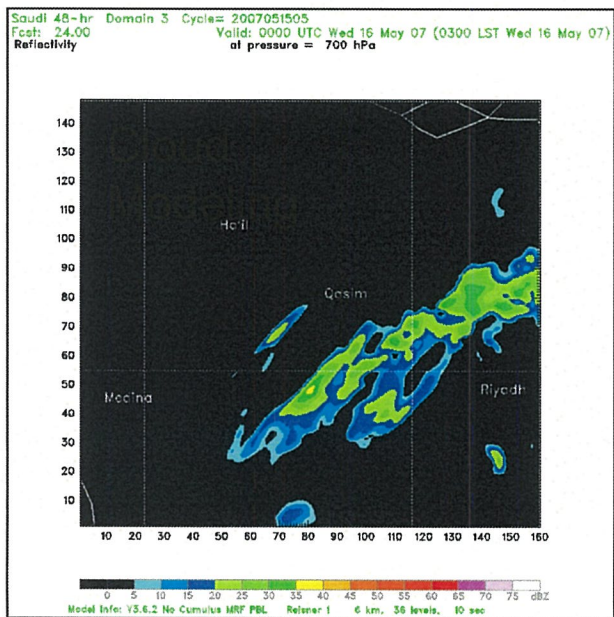
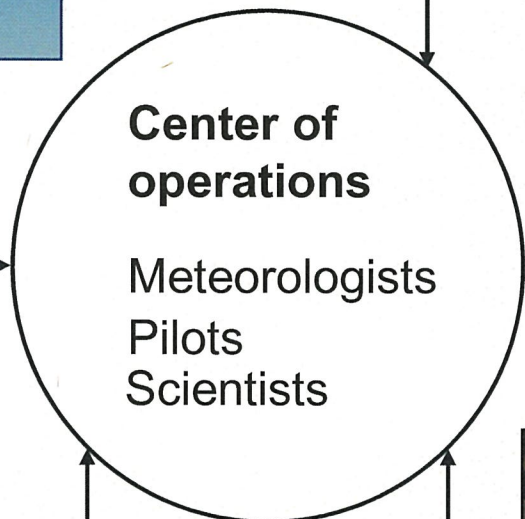
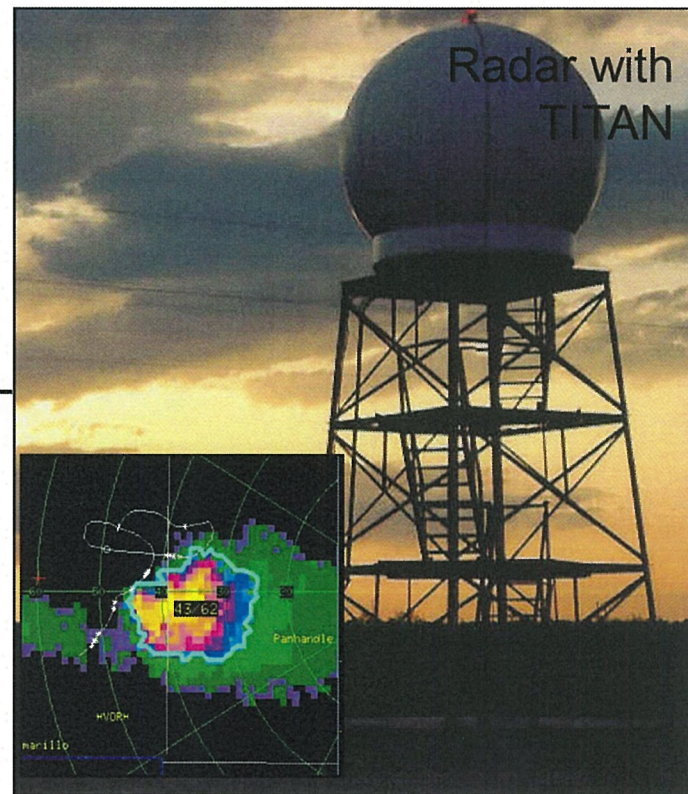
Legend

- 1. [1996] West Texas Weather Modification Association (7)
- 2. [1997] South Texas Weather Modification Association (3)
- 3. [1998] Edwards Aquifer Authority Program (1)
- 4. [1999] South West Texas Rain-Enhancement Association (1)
- 5. [2000] Panhandle Ground Water Conservation District (1)
- 6. [2002] Southern Ogallala Aquifer Rain-Enhancement Program (SOAR)
- 7. [2003] Trans Pecos Weather Modification Association

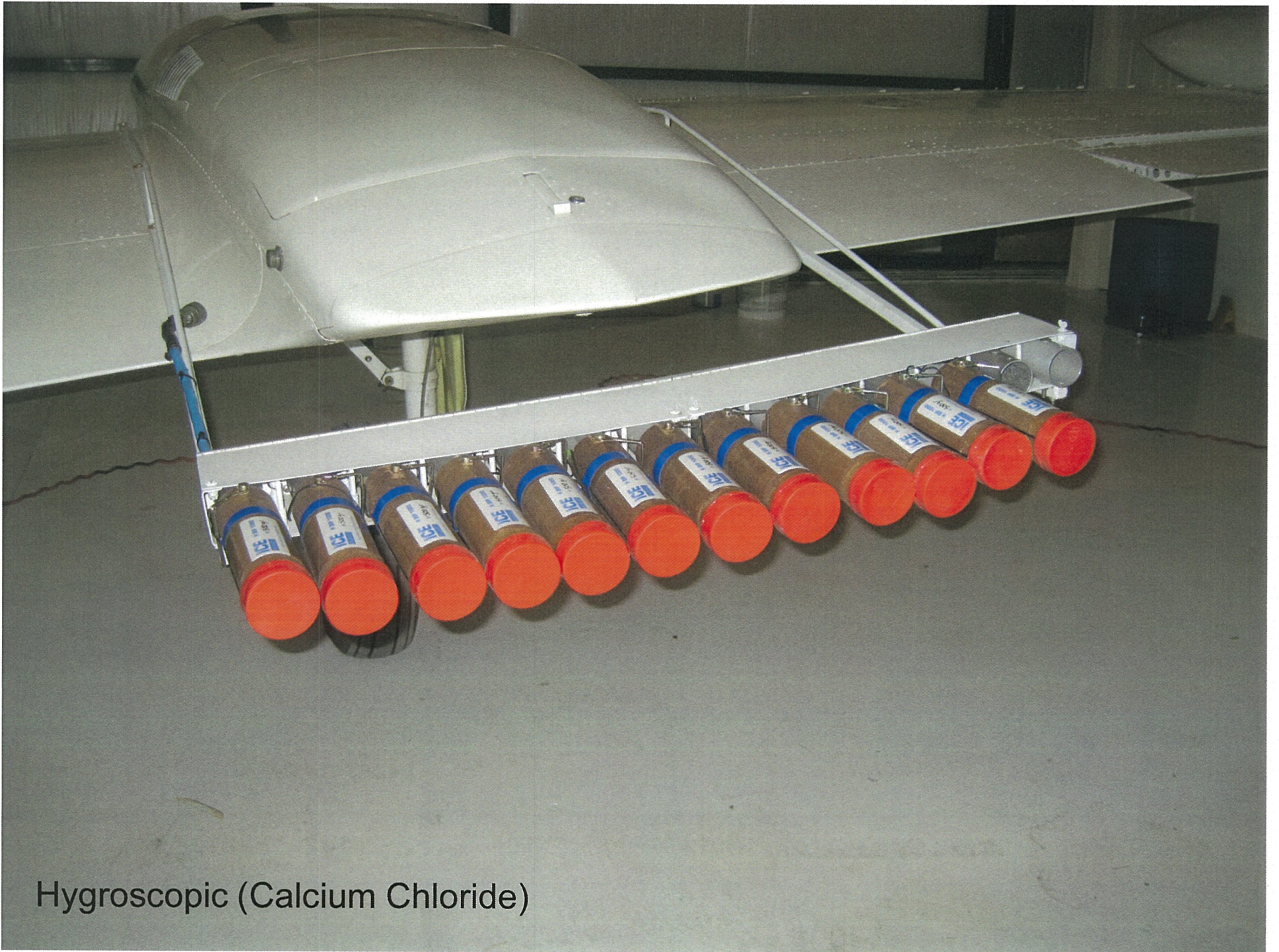
[] Year began operations
() Number of participating GCD's



Essential components



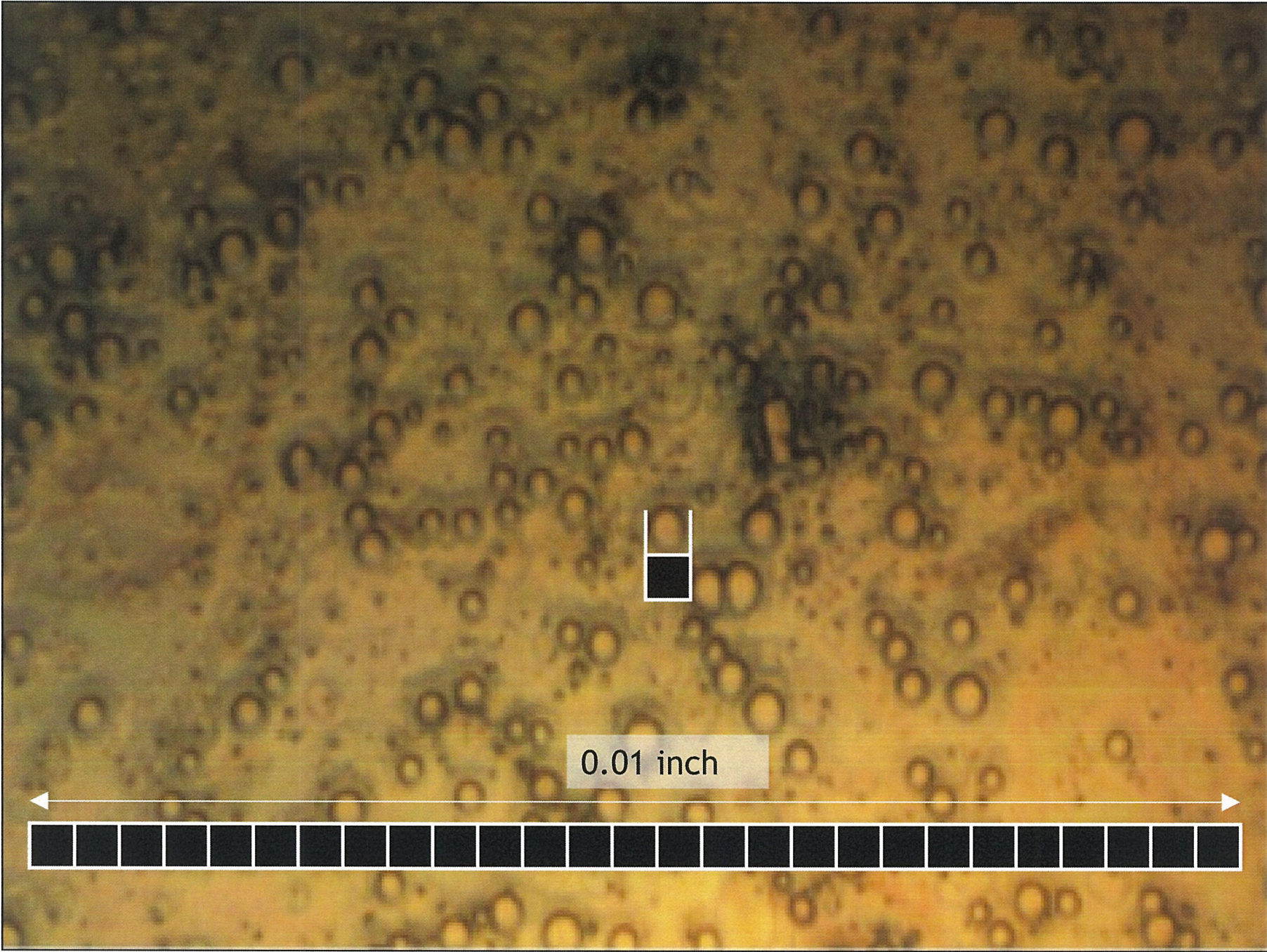




Hygroscopic (Calcium Chloride)



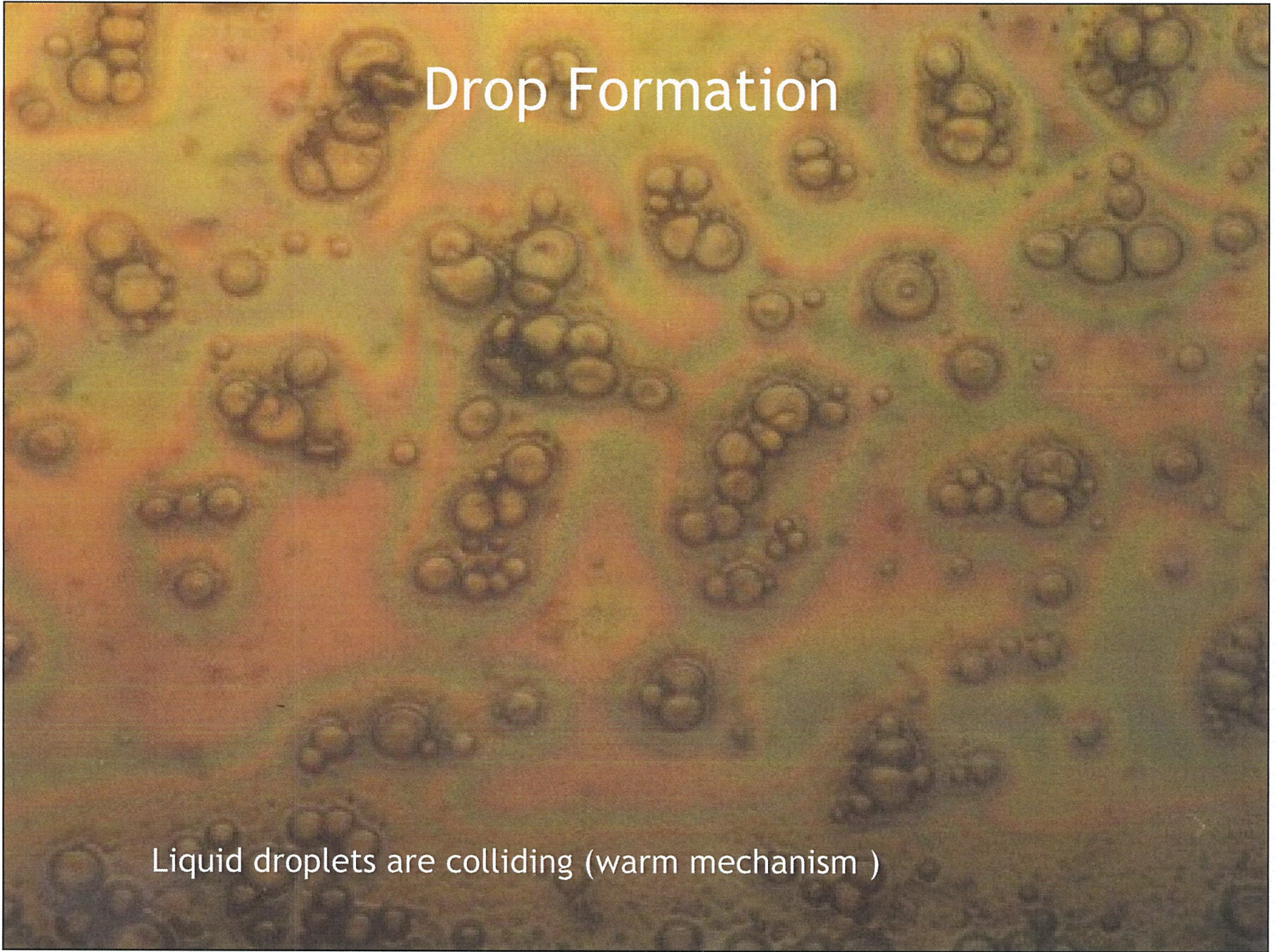
Glaciogenic (Silver Iodide)

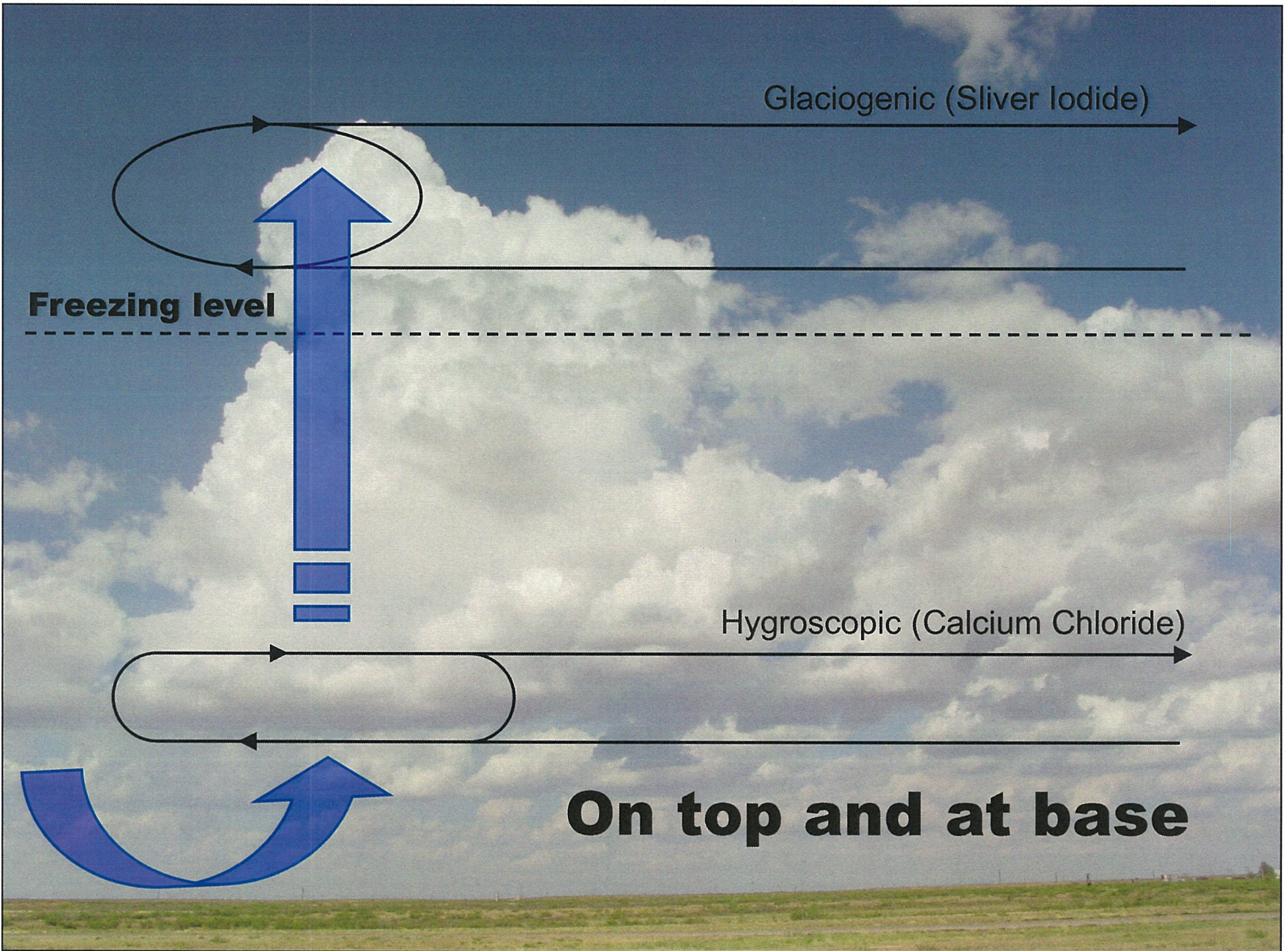


0.01 inch

Drop Formation

Liquid droplets are colliding (warm mechanism)





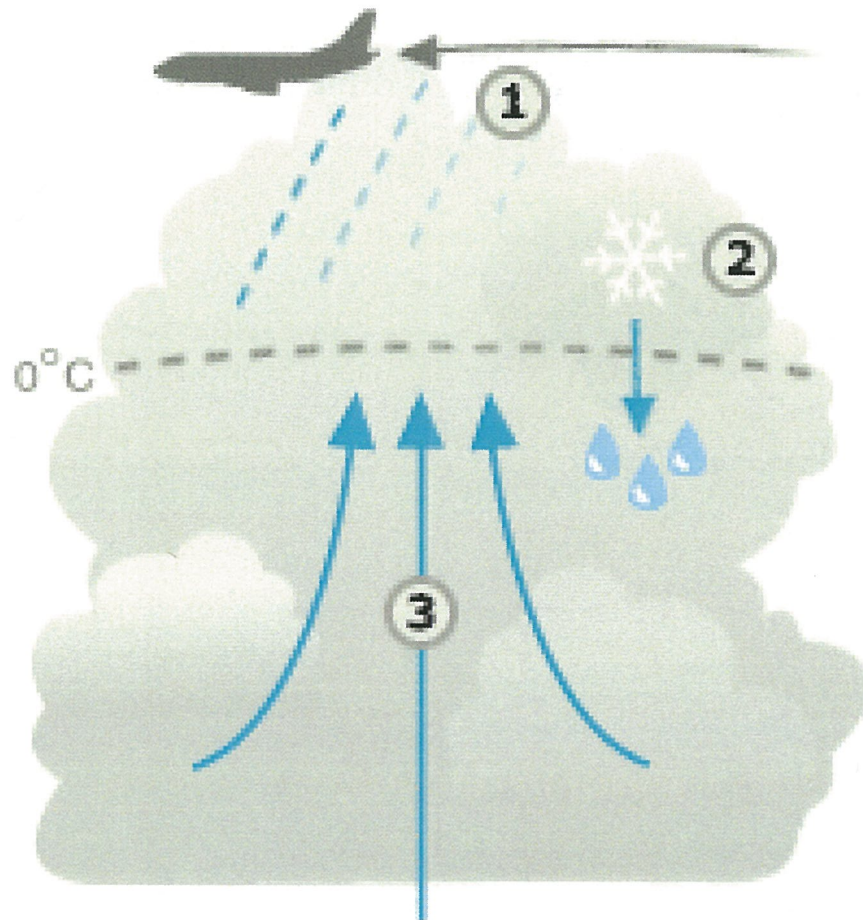
Glaciogenic (Silver Iodide)

Freezing level

Hygroscopic (Calcium Chloride)

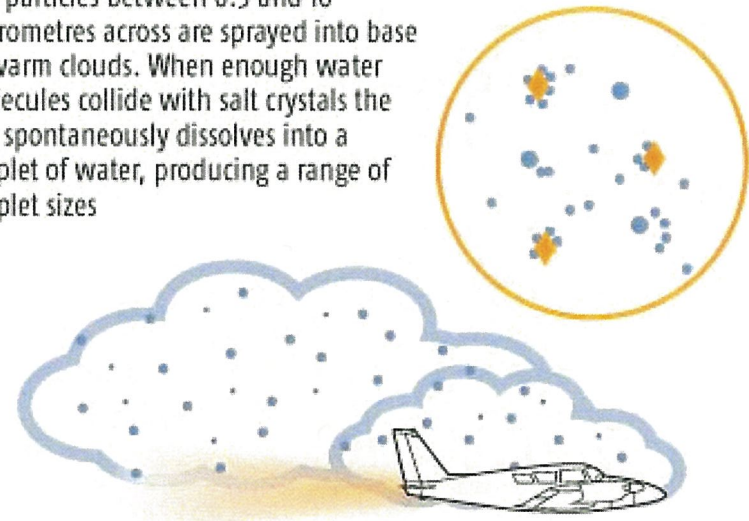
On top and at base

Cloud top seeding



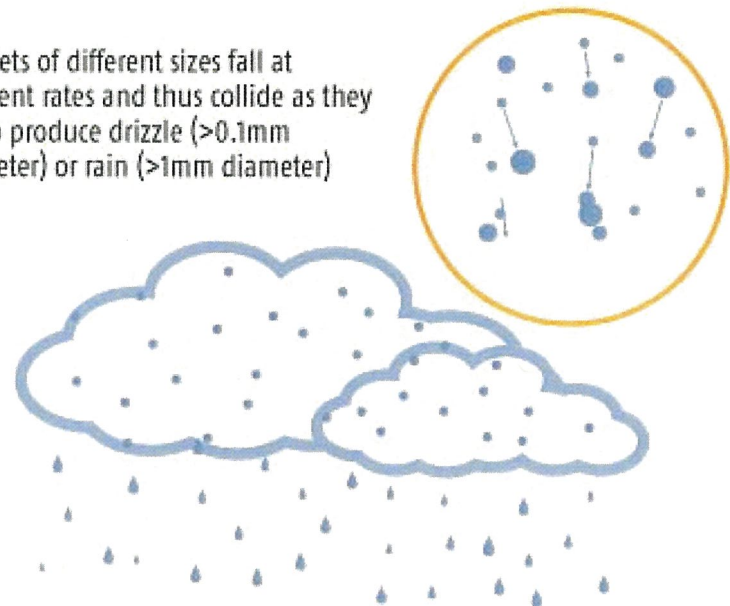
Seeding

Salt particles between 0.5 and 10 micrometres across are sprayed into base of warm clouds. When enough water molecules collide with salt crystals the salt spontaneously dissolves into a droplet of water, producing a range of droplet sizes

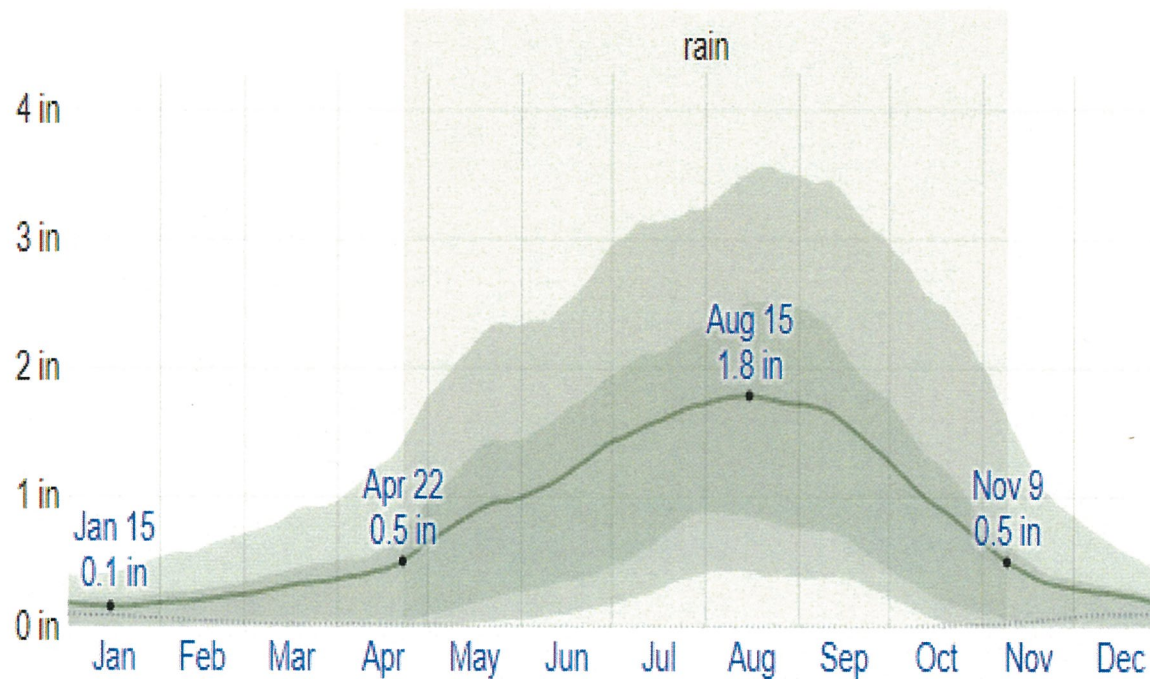


Rain

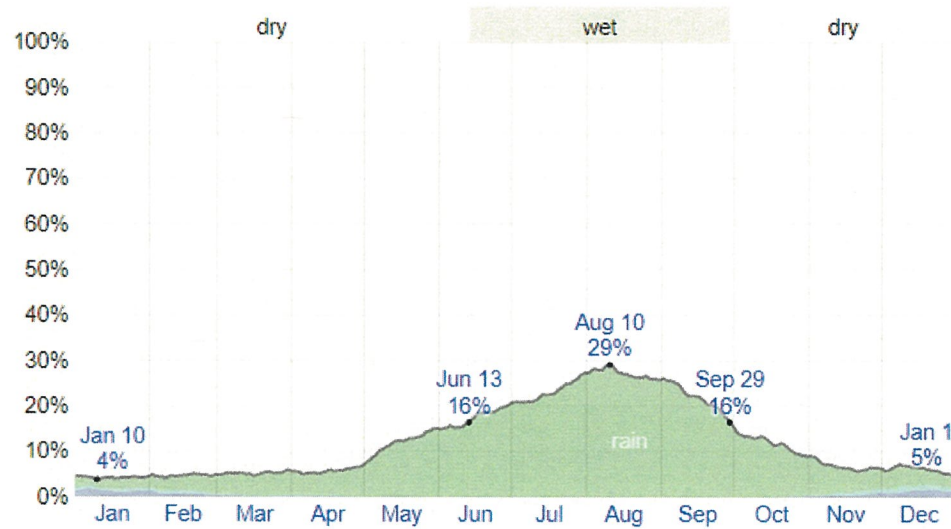
Droplets of different sizes fall at different rates and thus collide as they fall to produce drizzle ($>0.1\text{mm}$ diameter) or rain ($>1\text{mm}$ diameter)



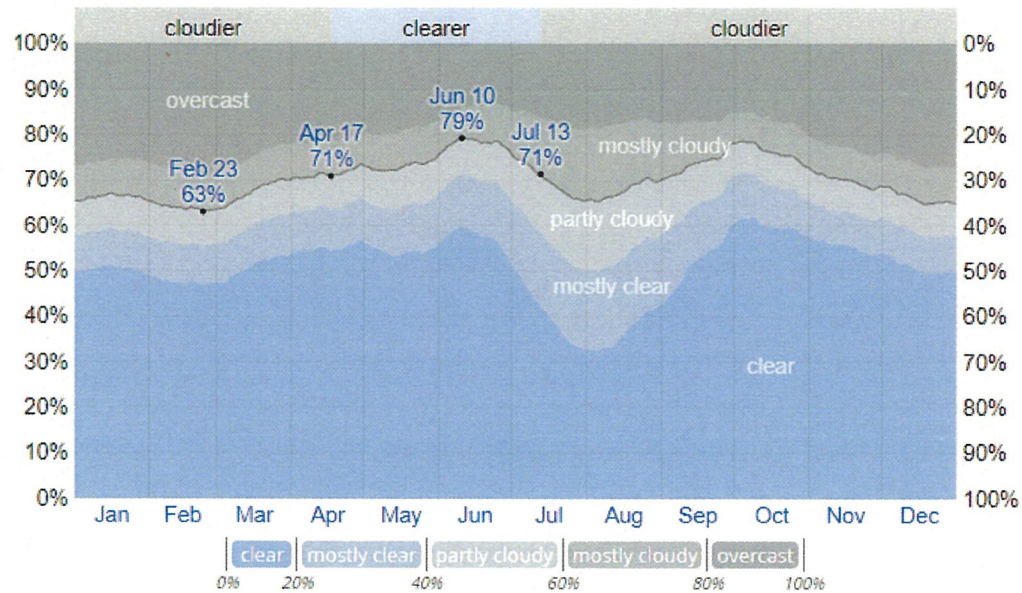
Normal Monthly Rainfall ROSWELL NM



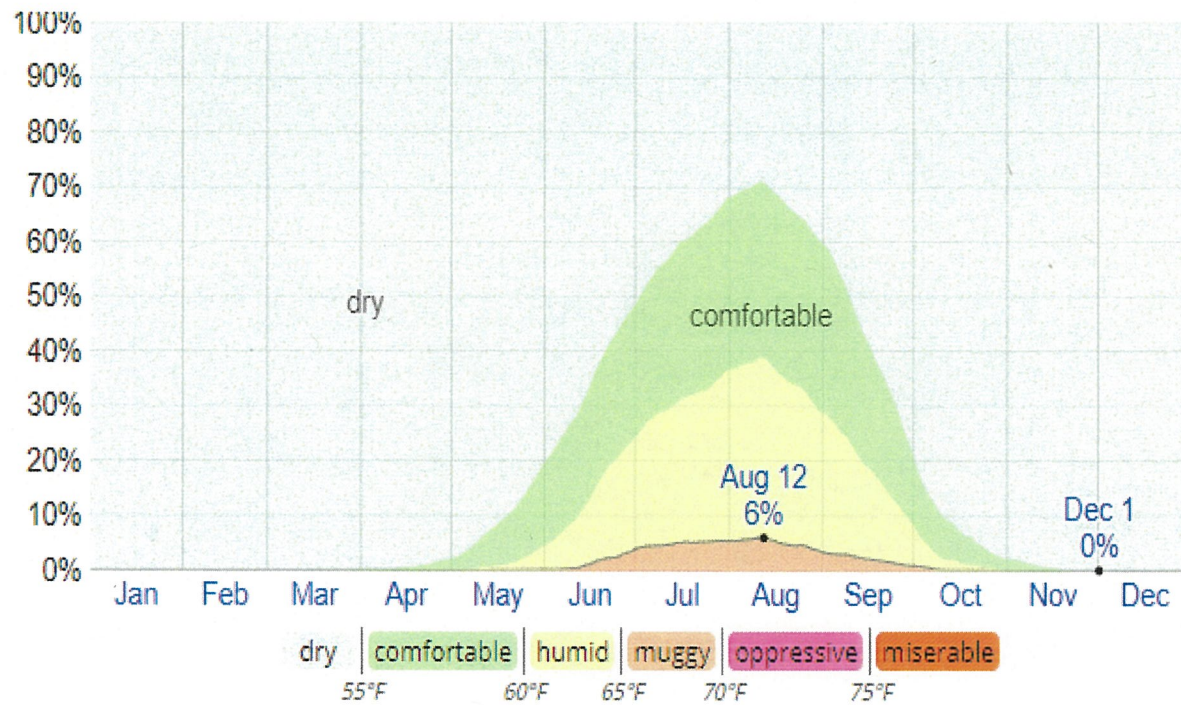
Daily Chance of Rainfall ROSWELL NM



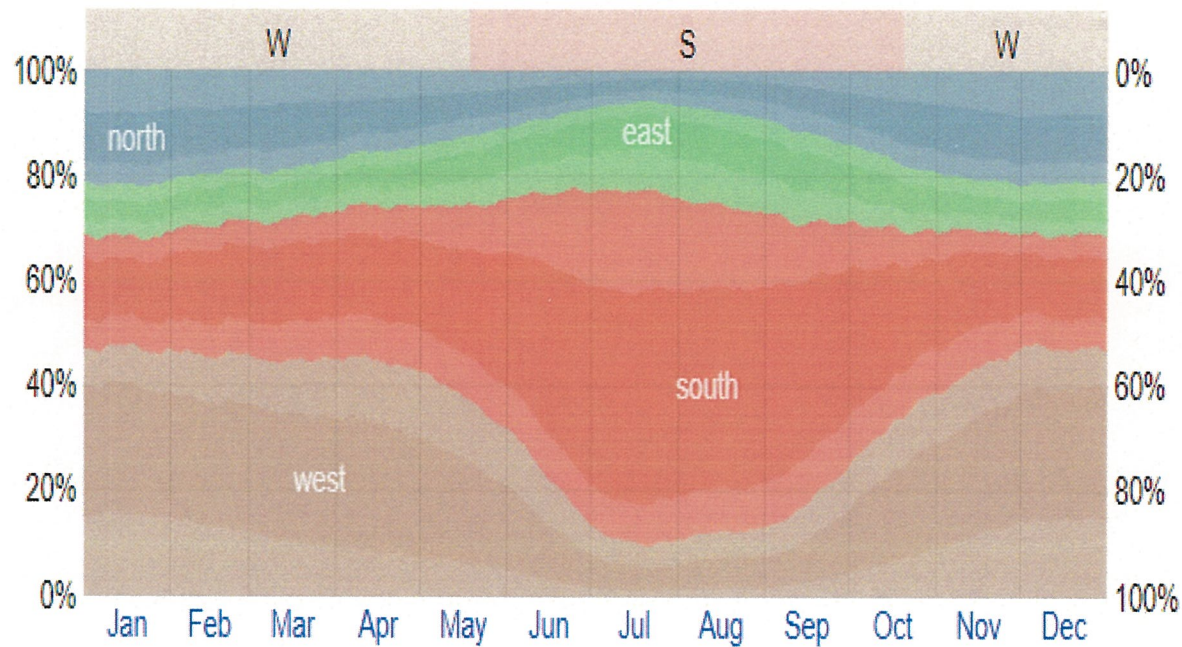
Average Cloud Cover ROSWELL NM

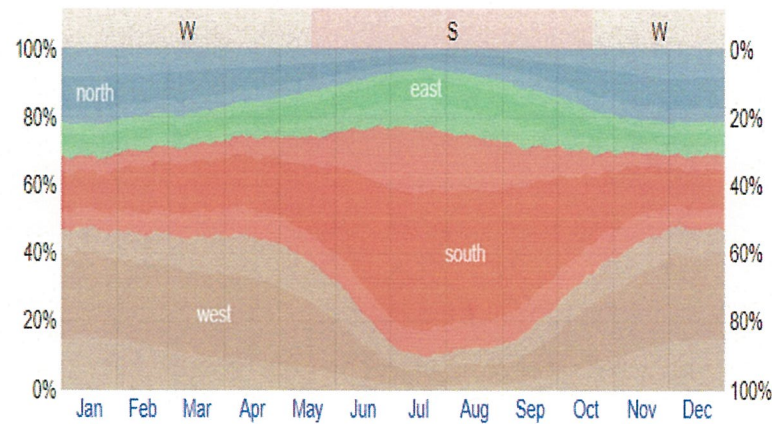
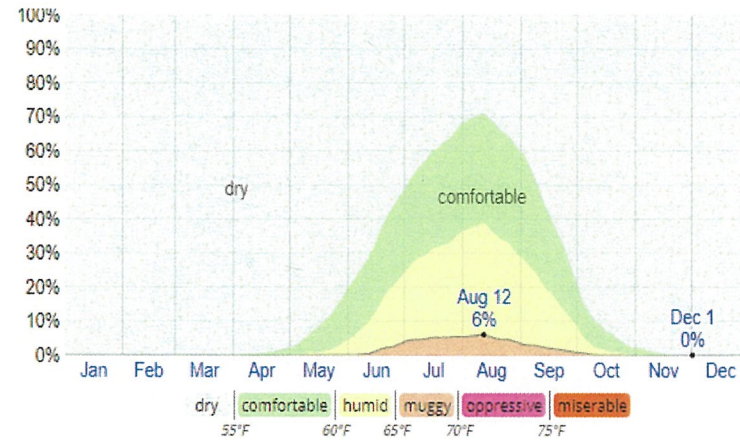
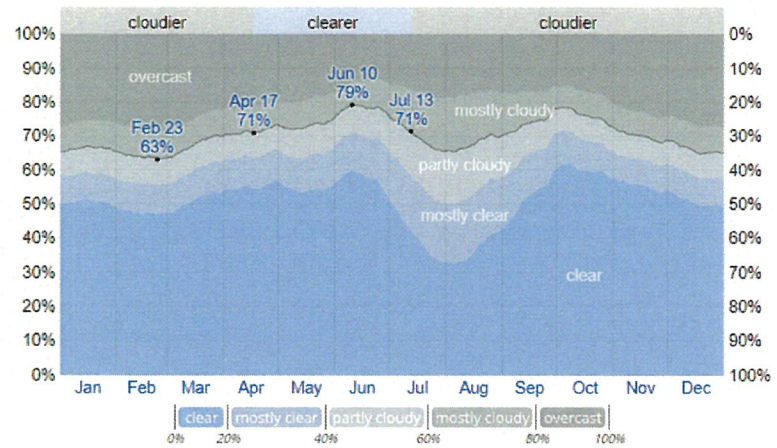
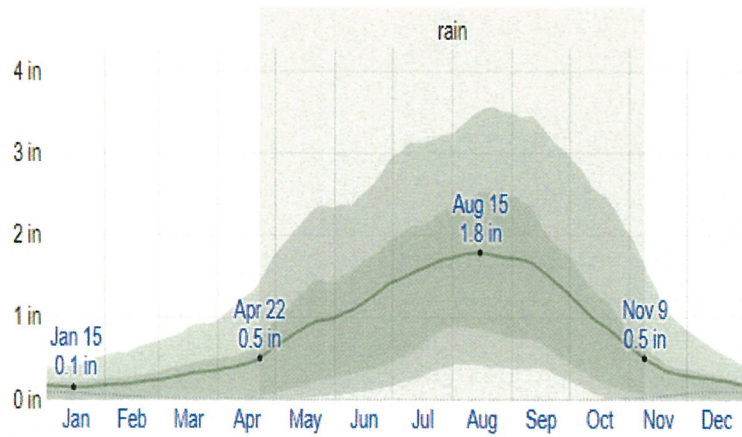


Average Humidity Levels ROSWELL NM



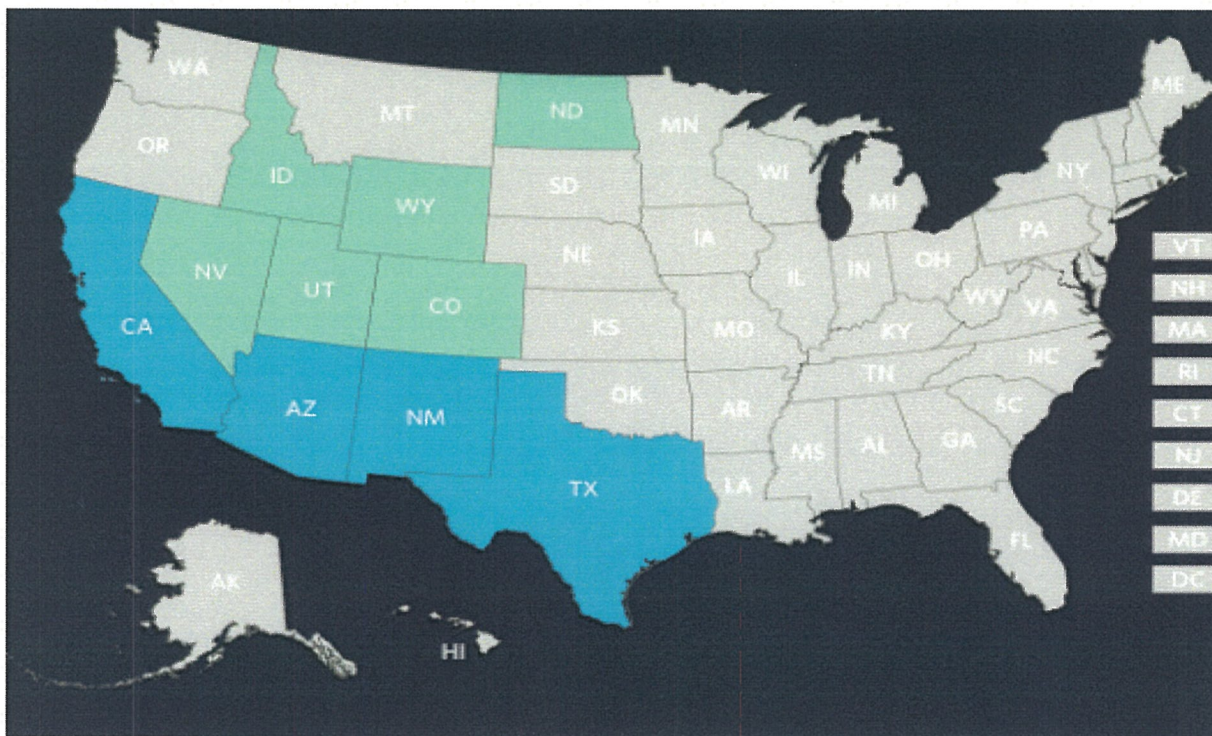
Average Wind Direction ROSWELL NM



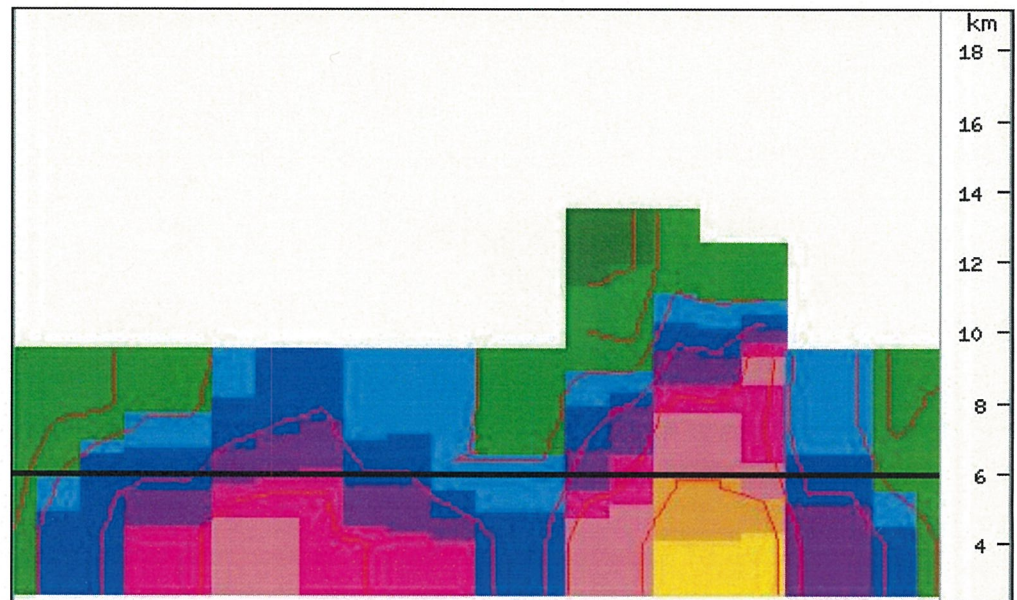
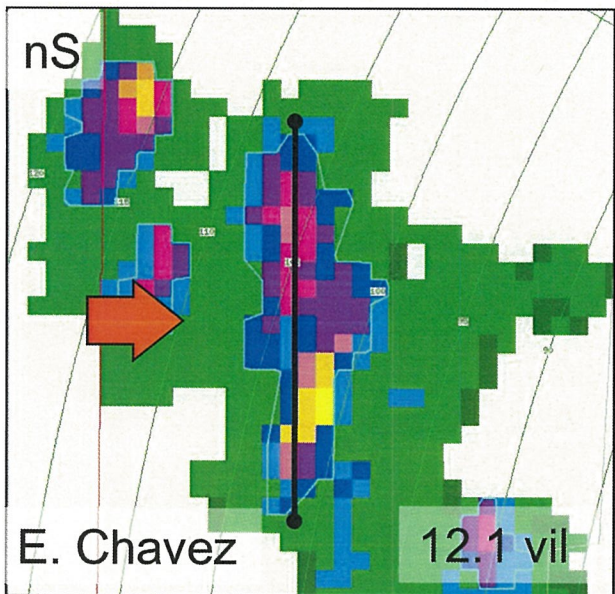
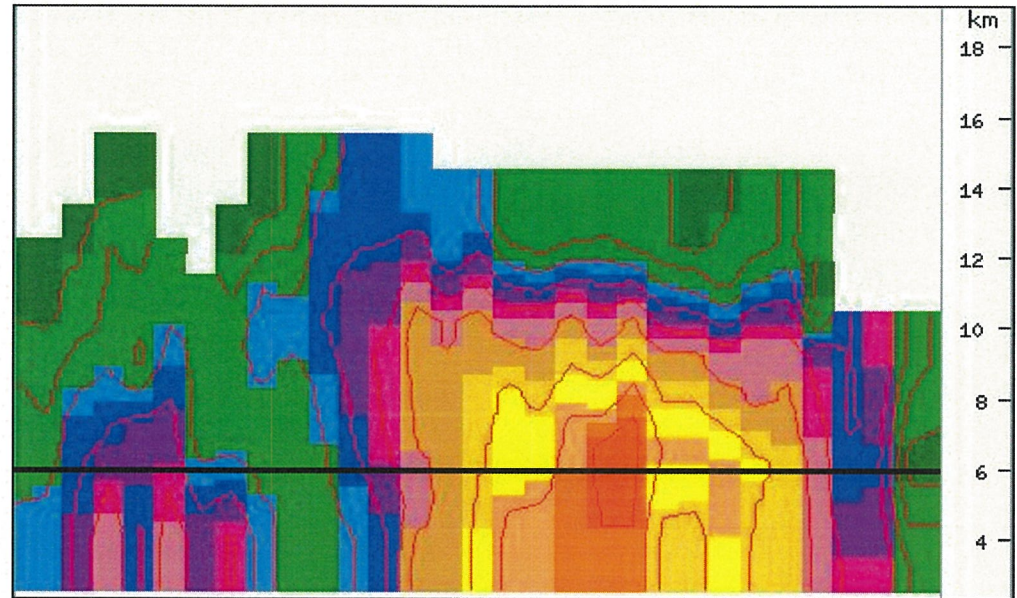
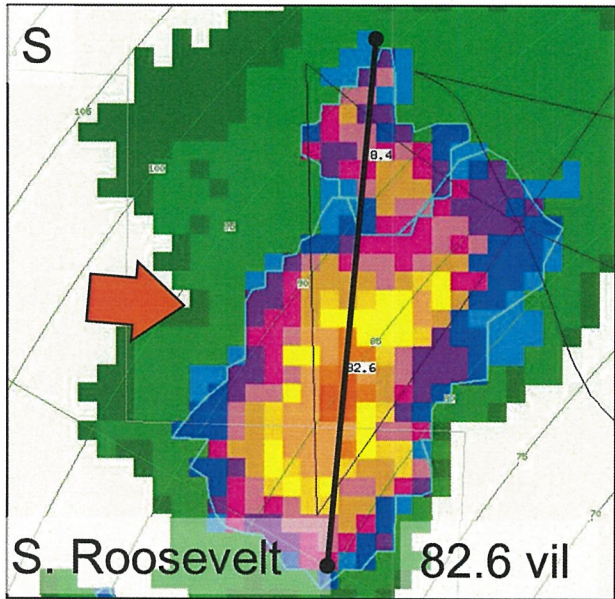


States with Cloud-Seeding Histories

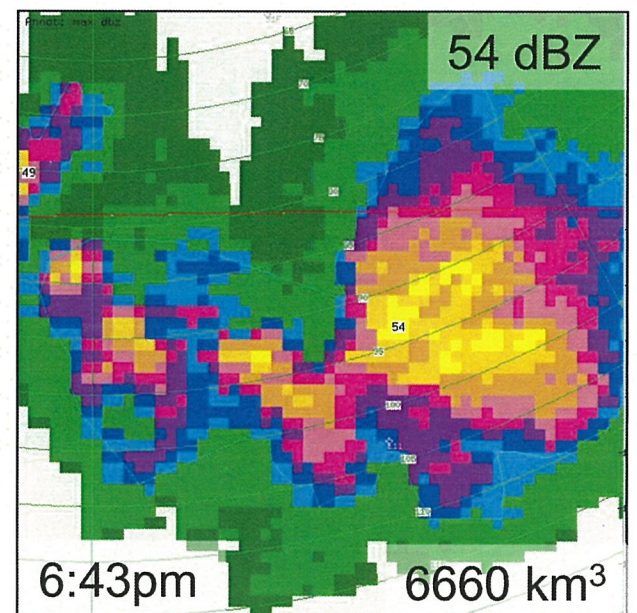
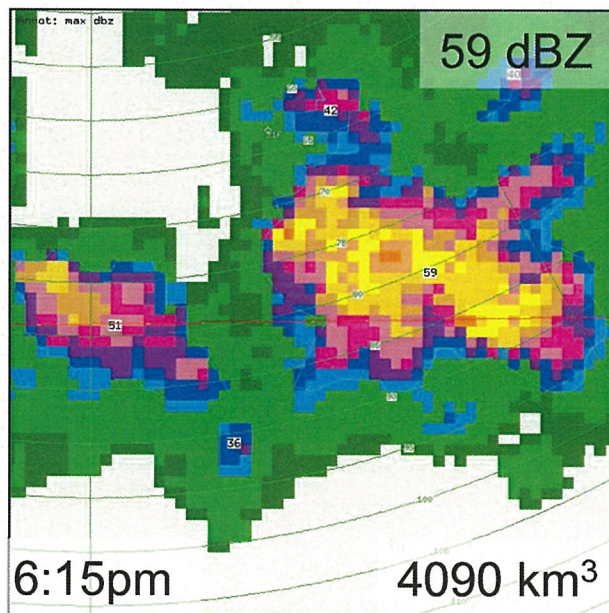
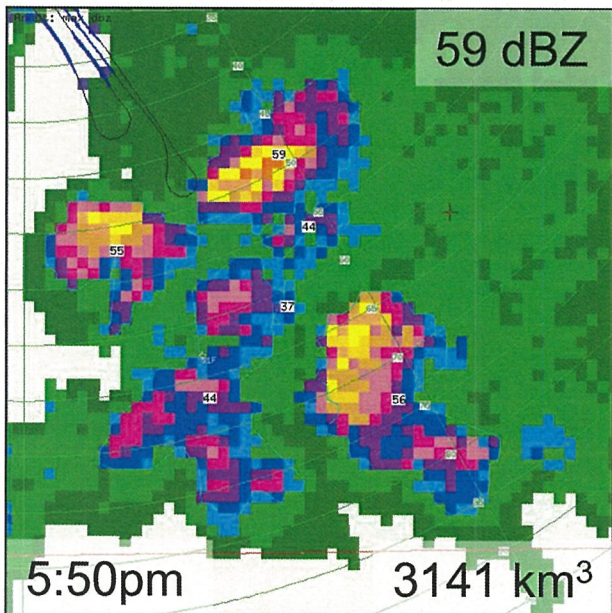
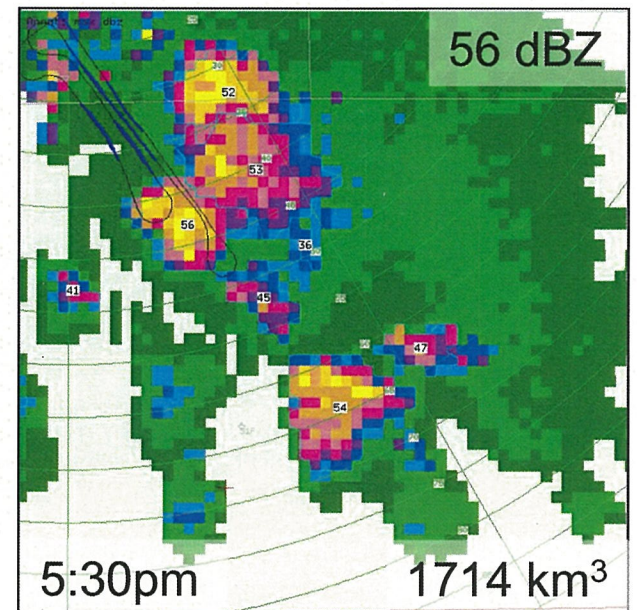
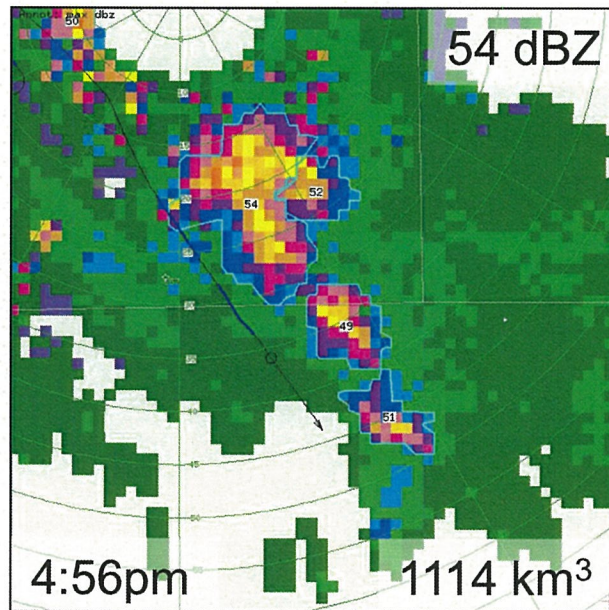
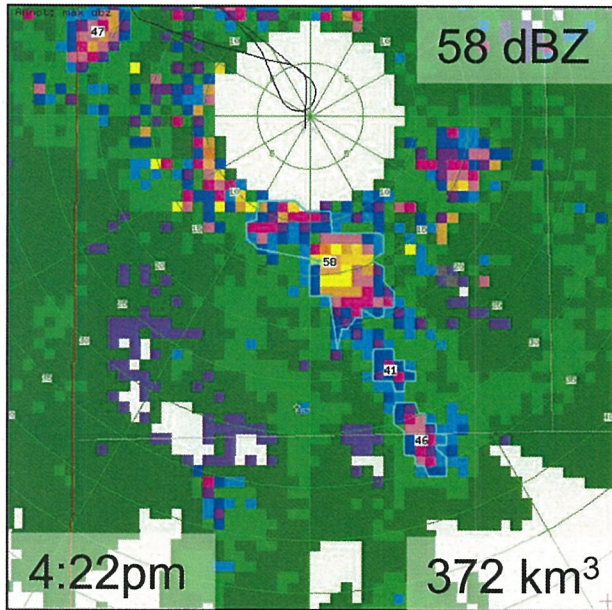
Green Wintery
Blue Best

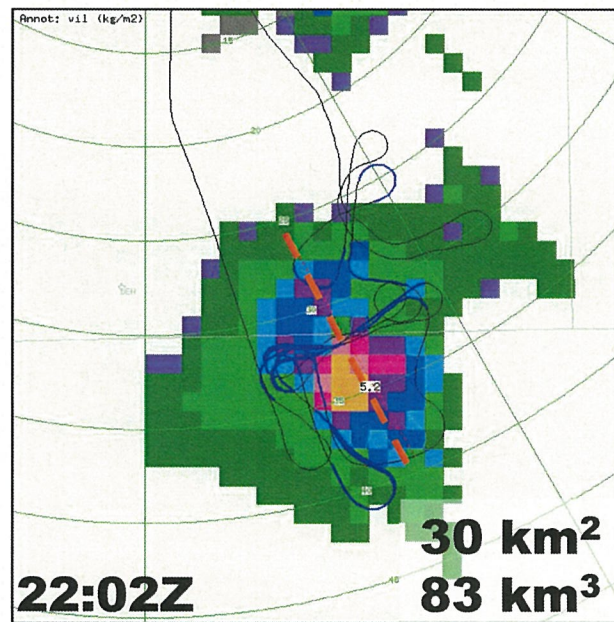
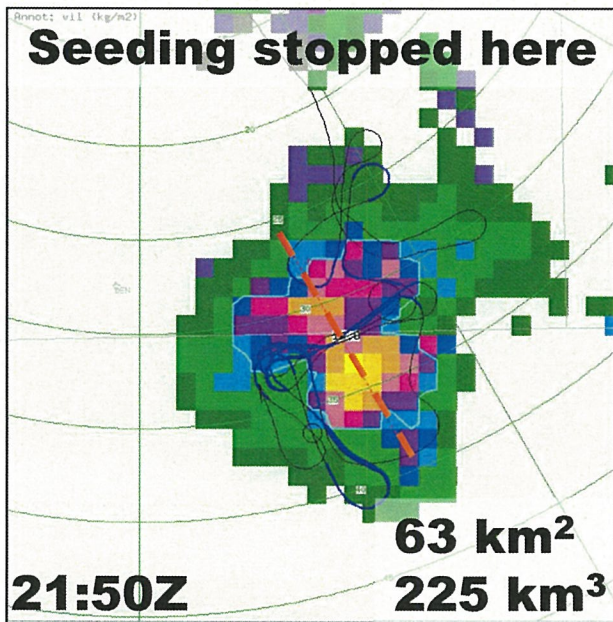
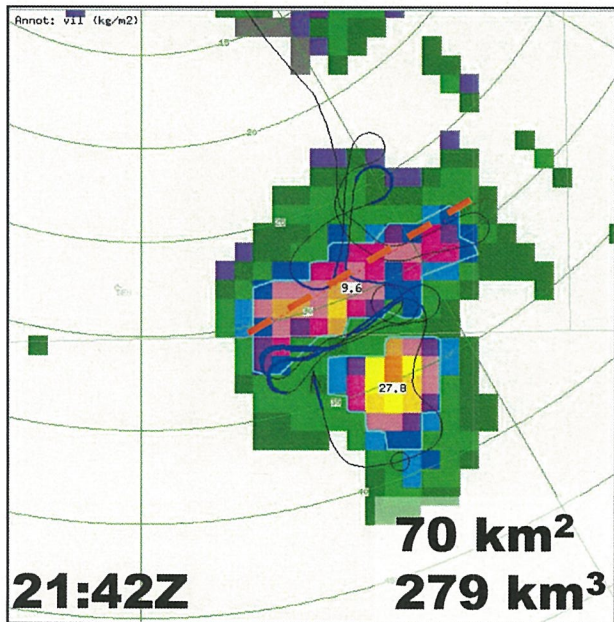
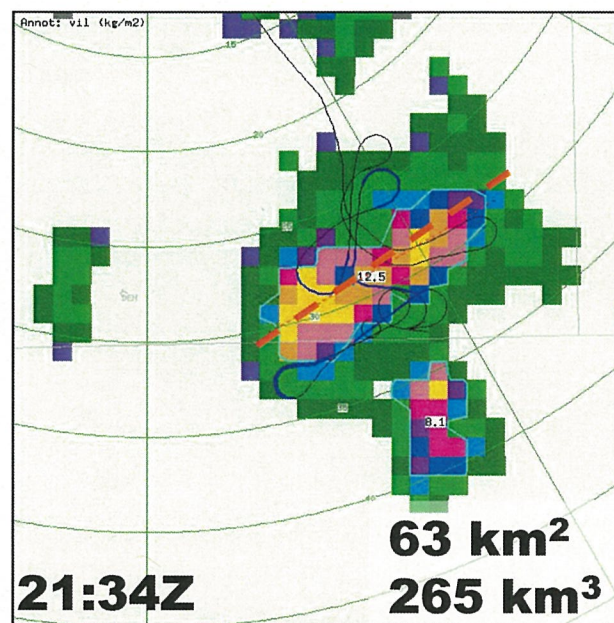
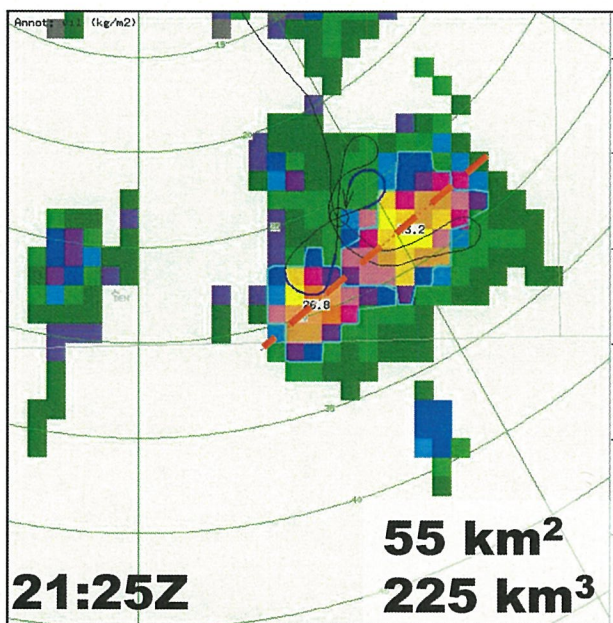
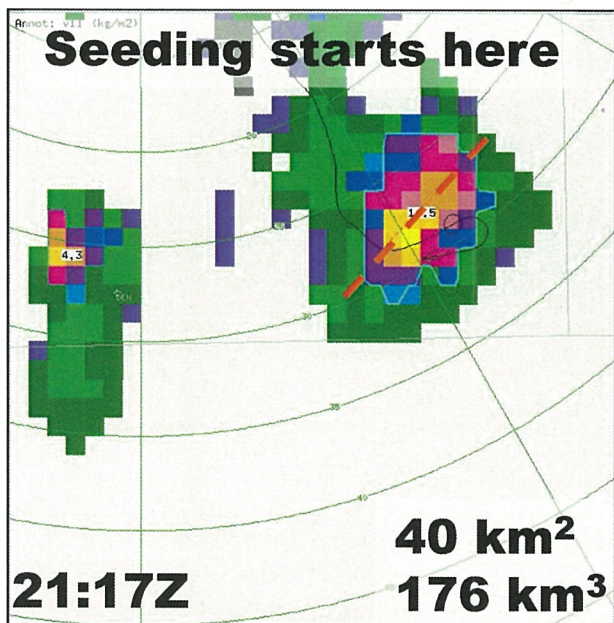


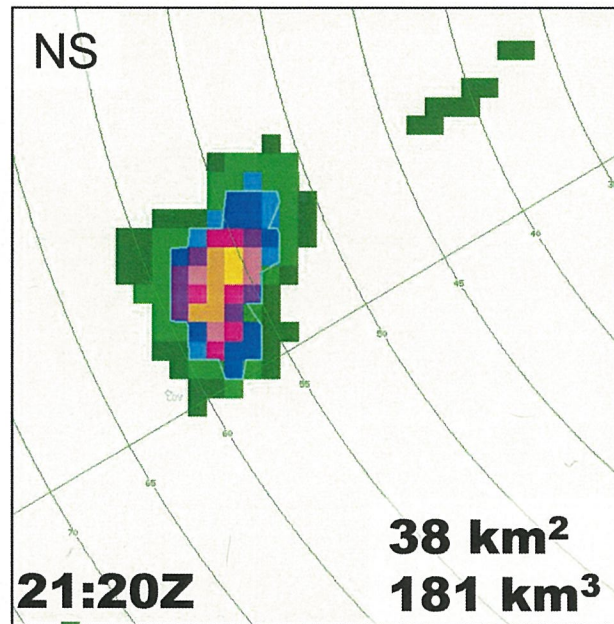
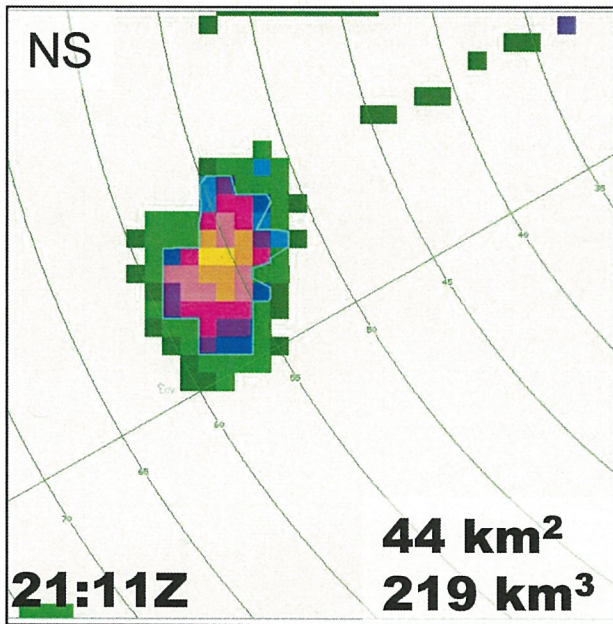
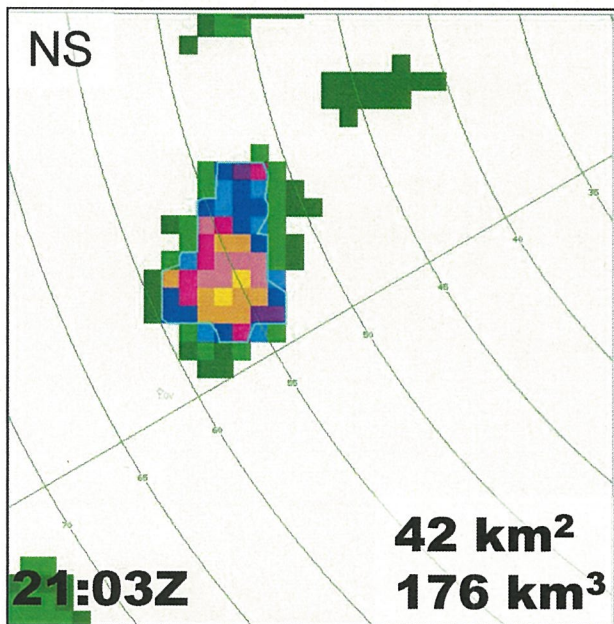
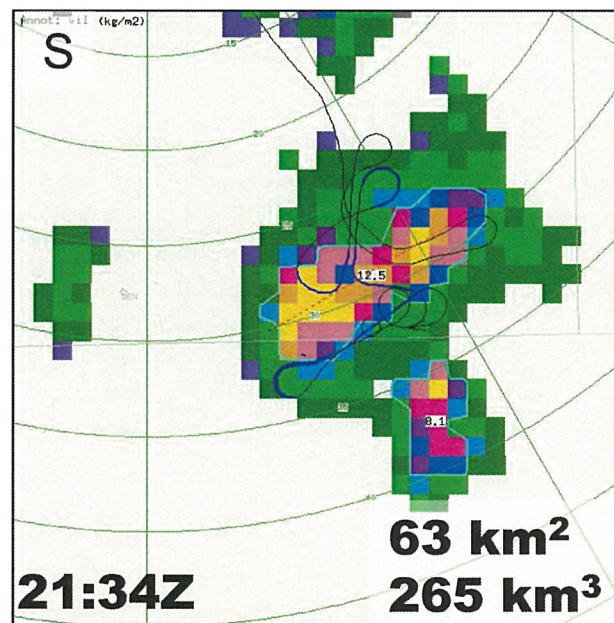
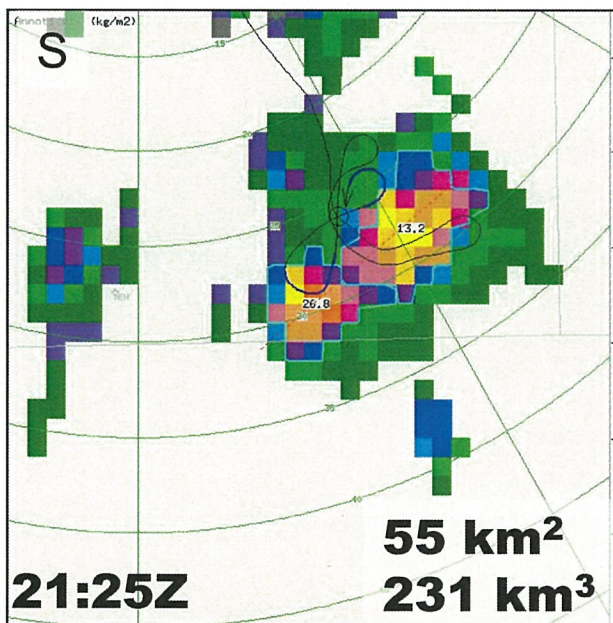
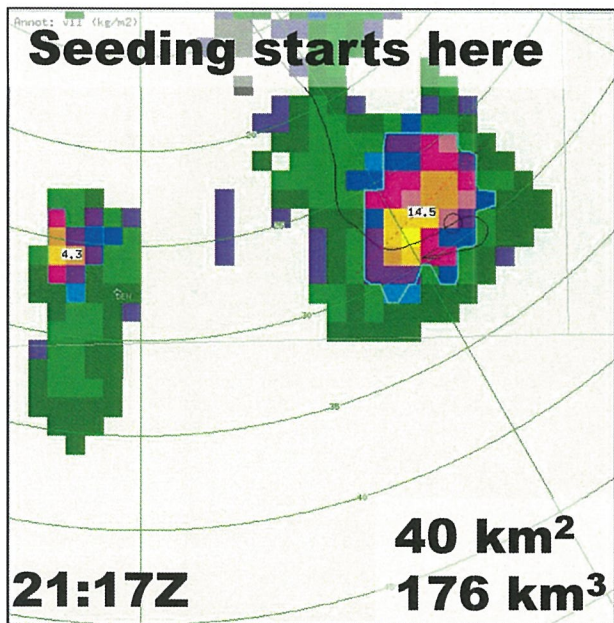
Seeded vs non-Seeded



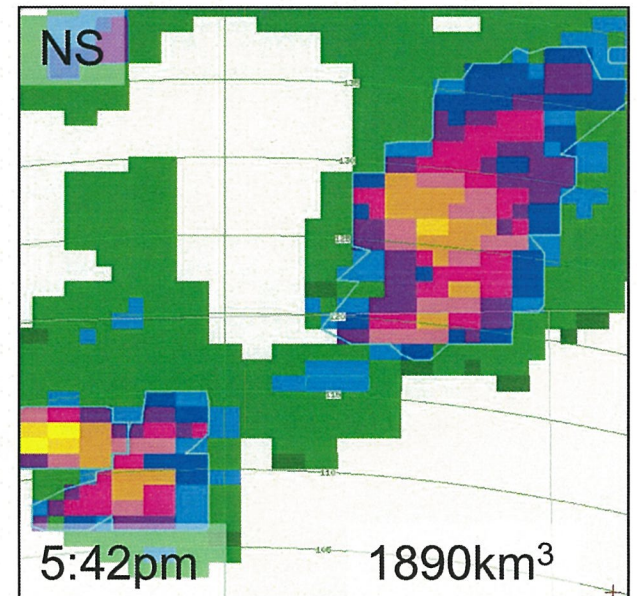
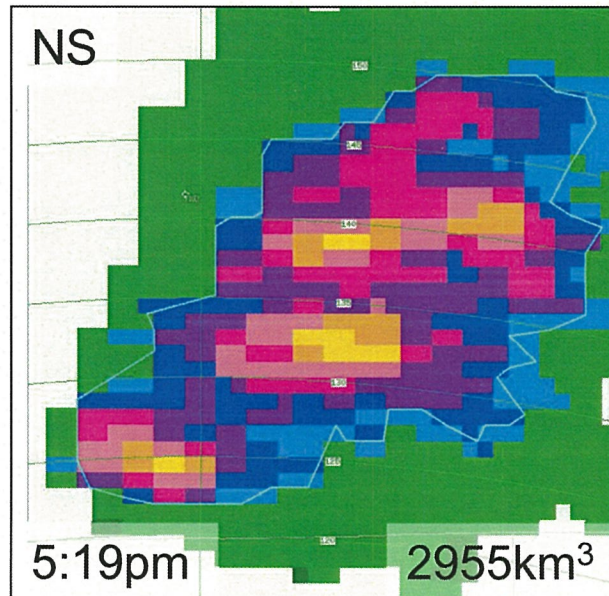
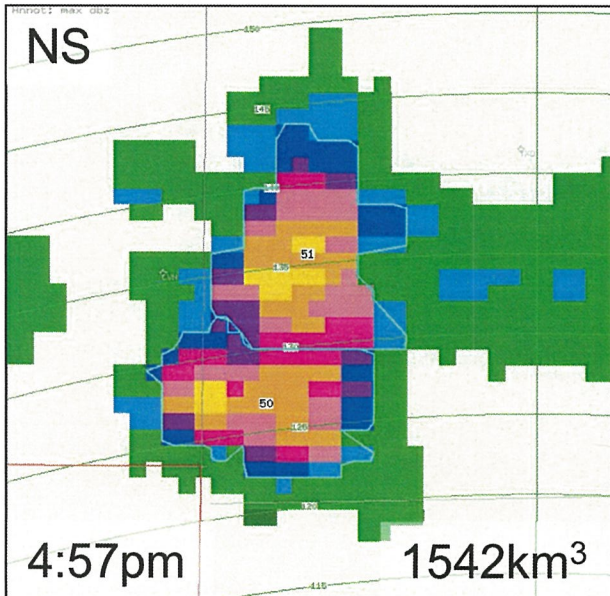
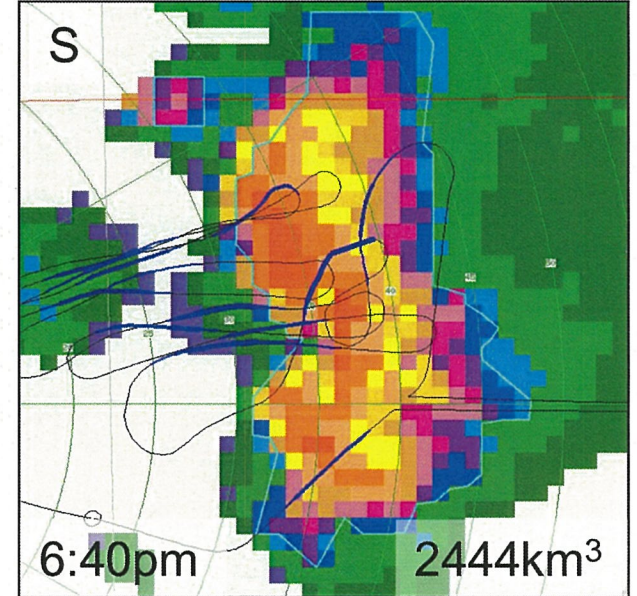
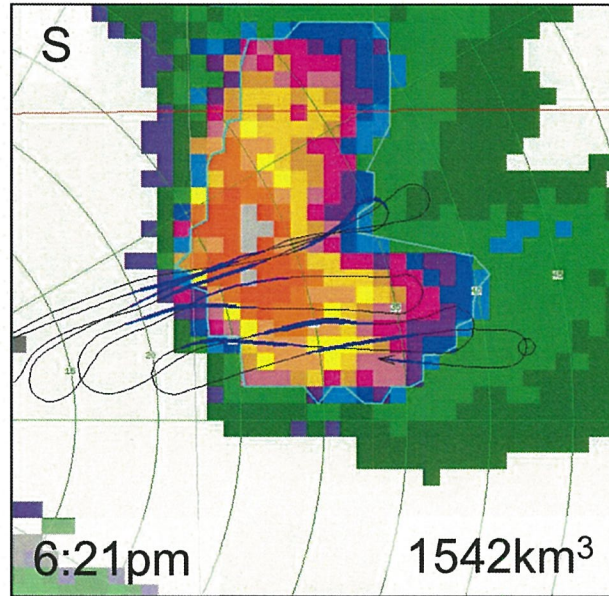
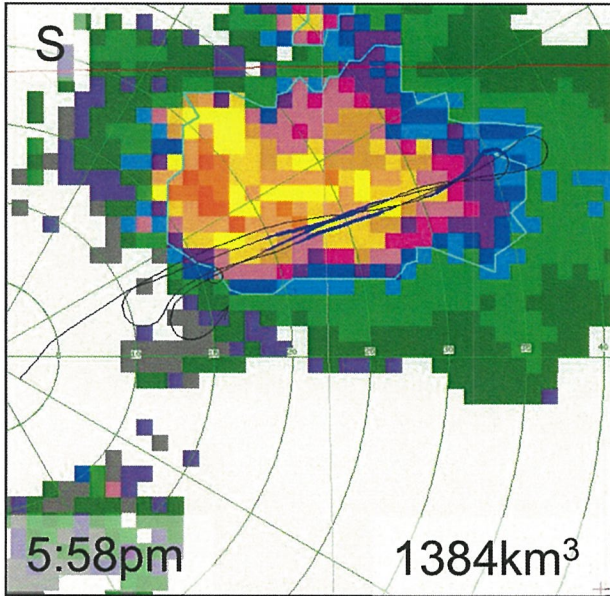
Lifetime of a seeded cloud



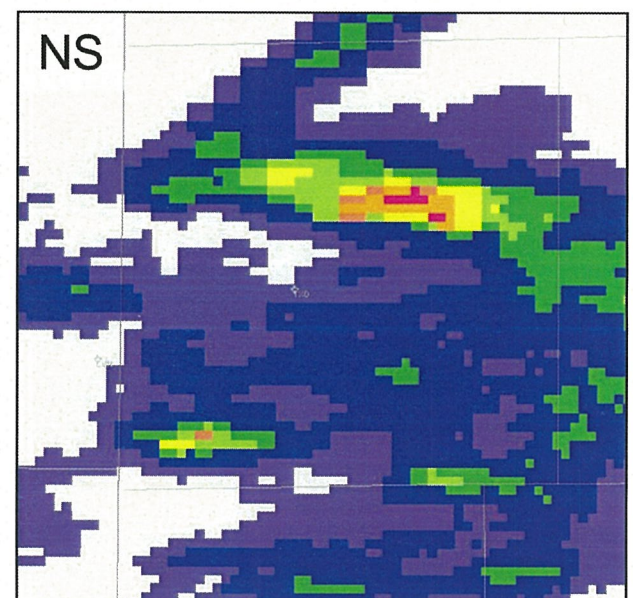
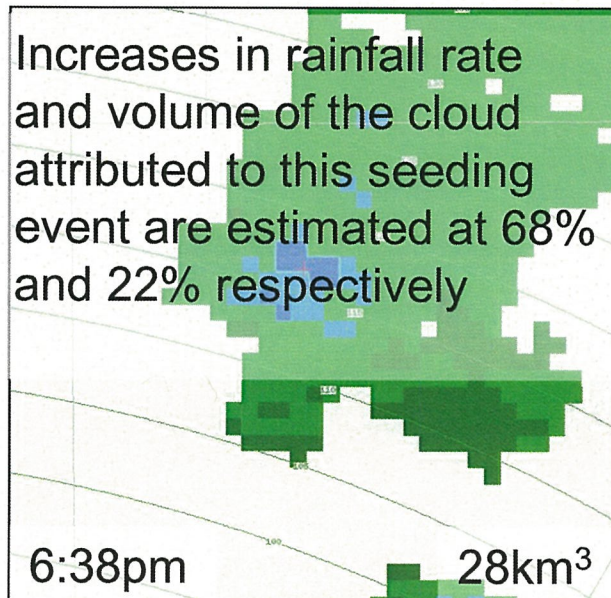
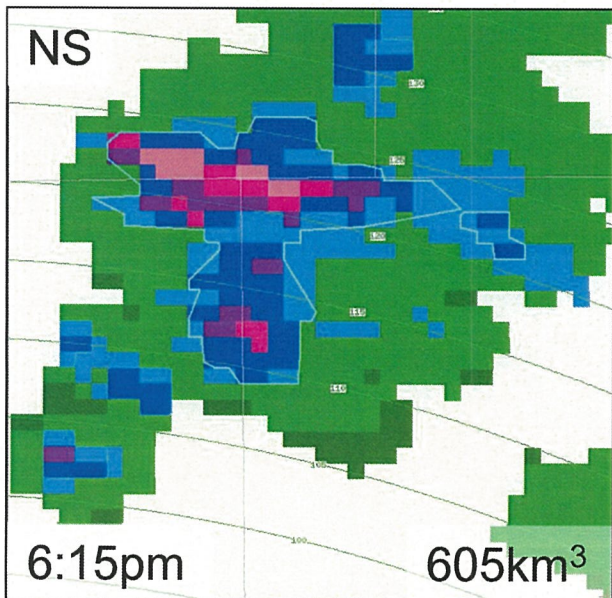
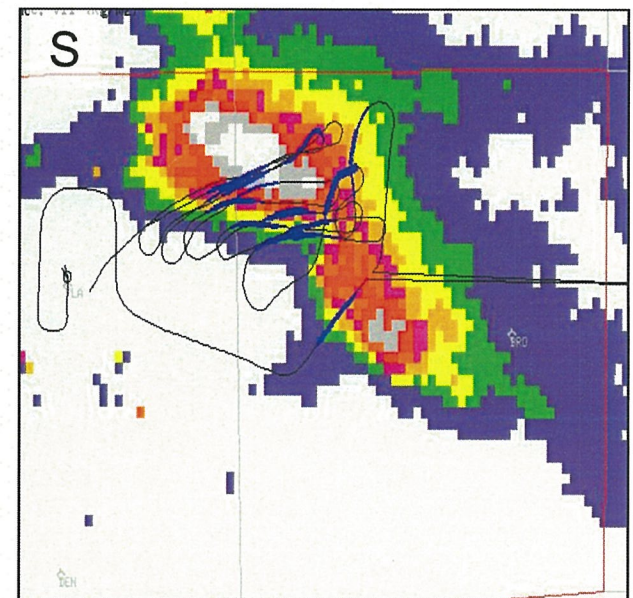
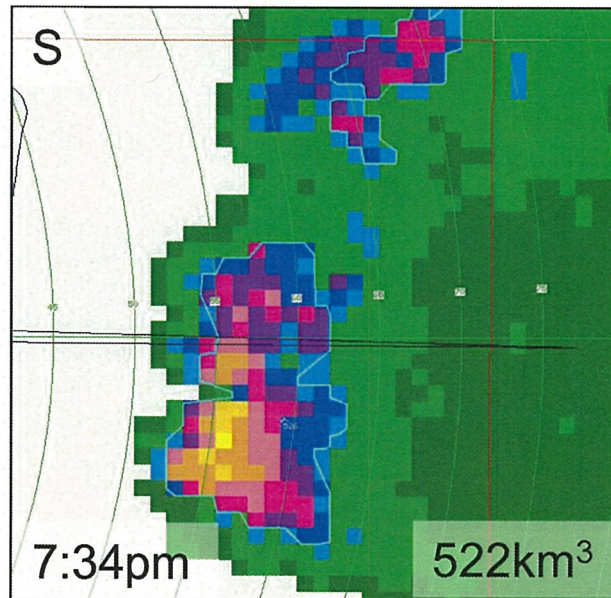
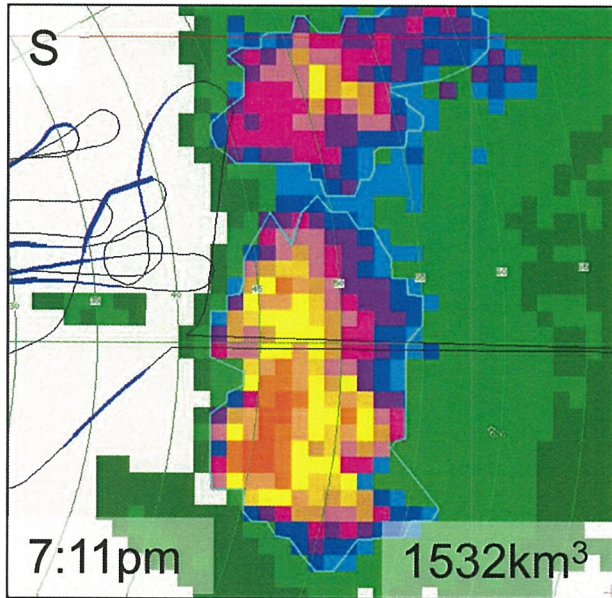




Seeded vs non seeded ... 1

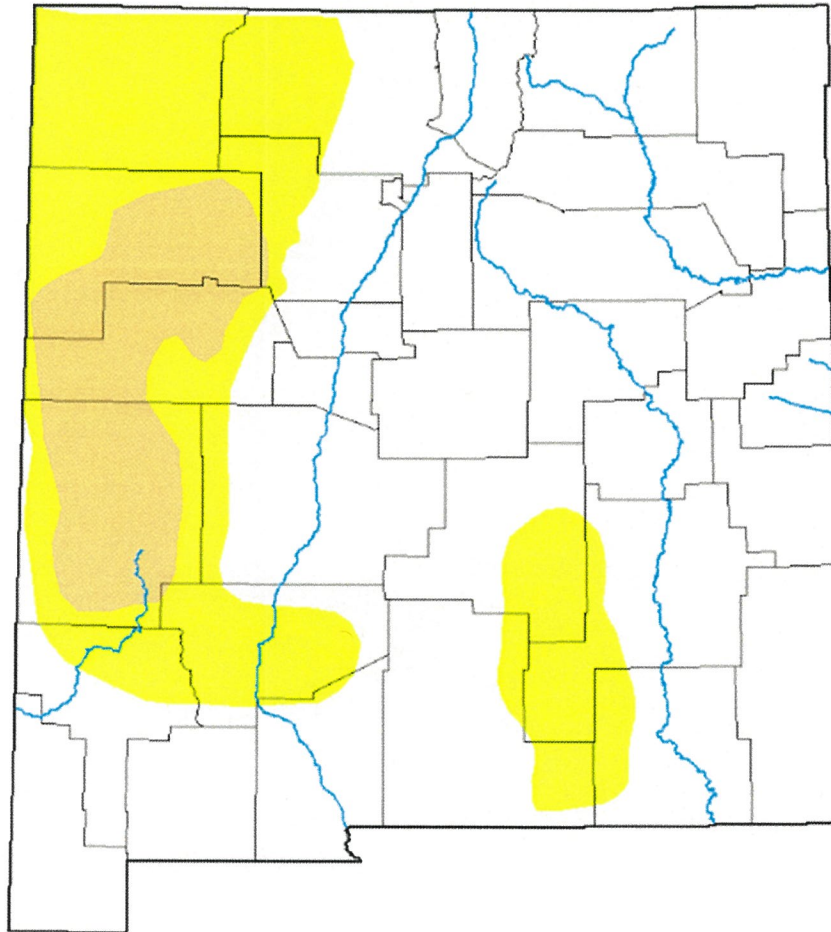


Seeded vs non seeded ... 2



Drought Monitor New Mexico

August 1, 2019

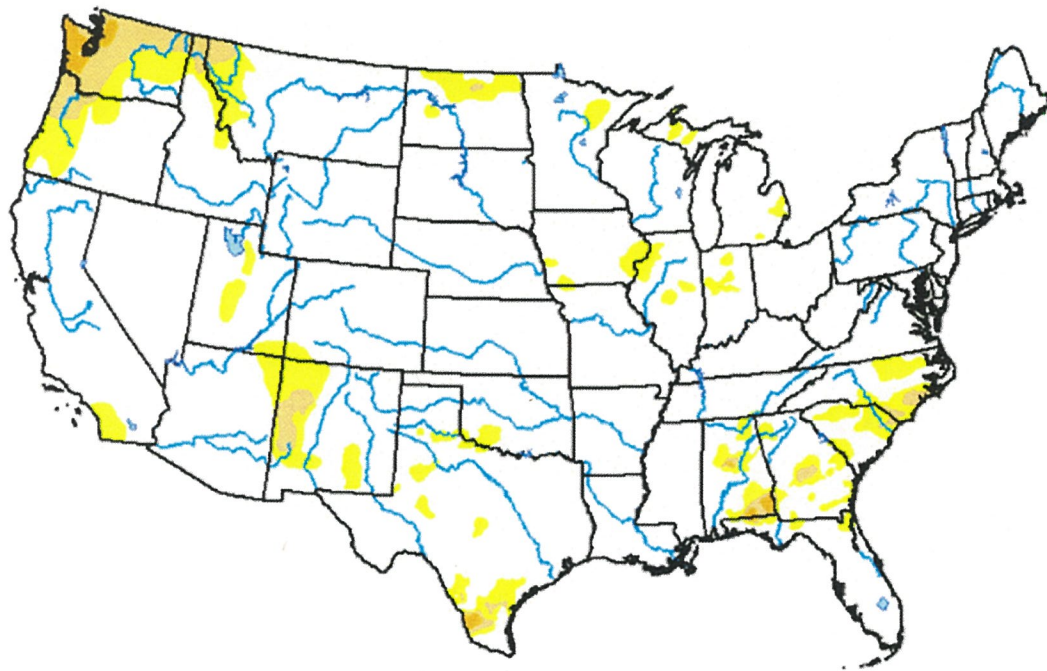


Drought Classification

- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)
- No Data

Drought Monitor United States

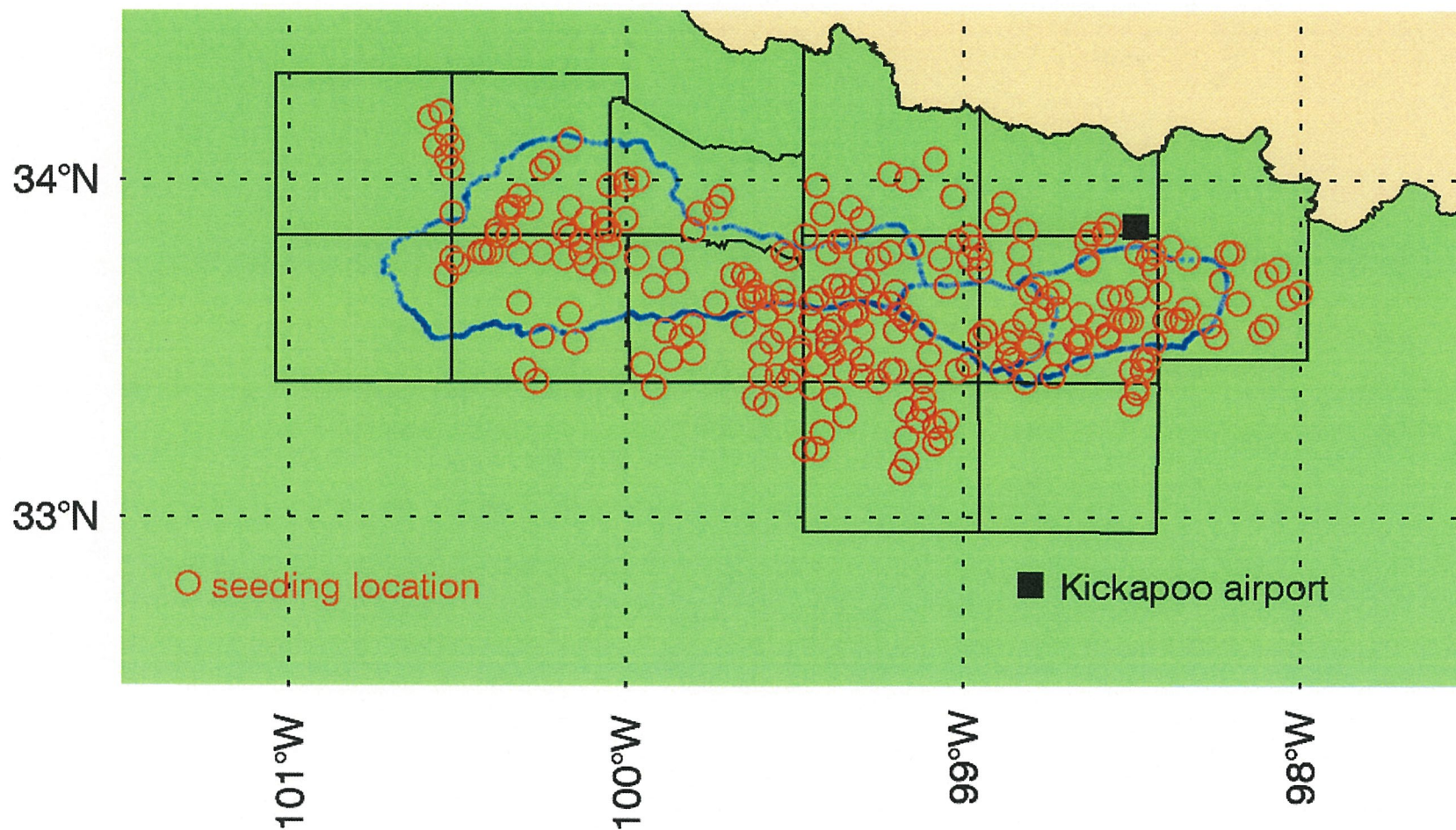
August 1, 2019



Drought Classification

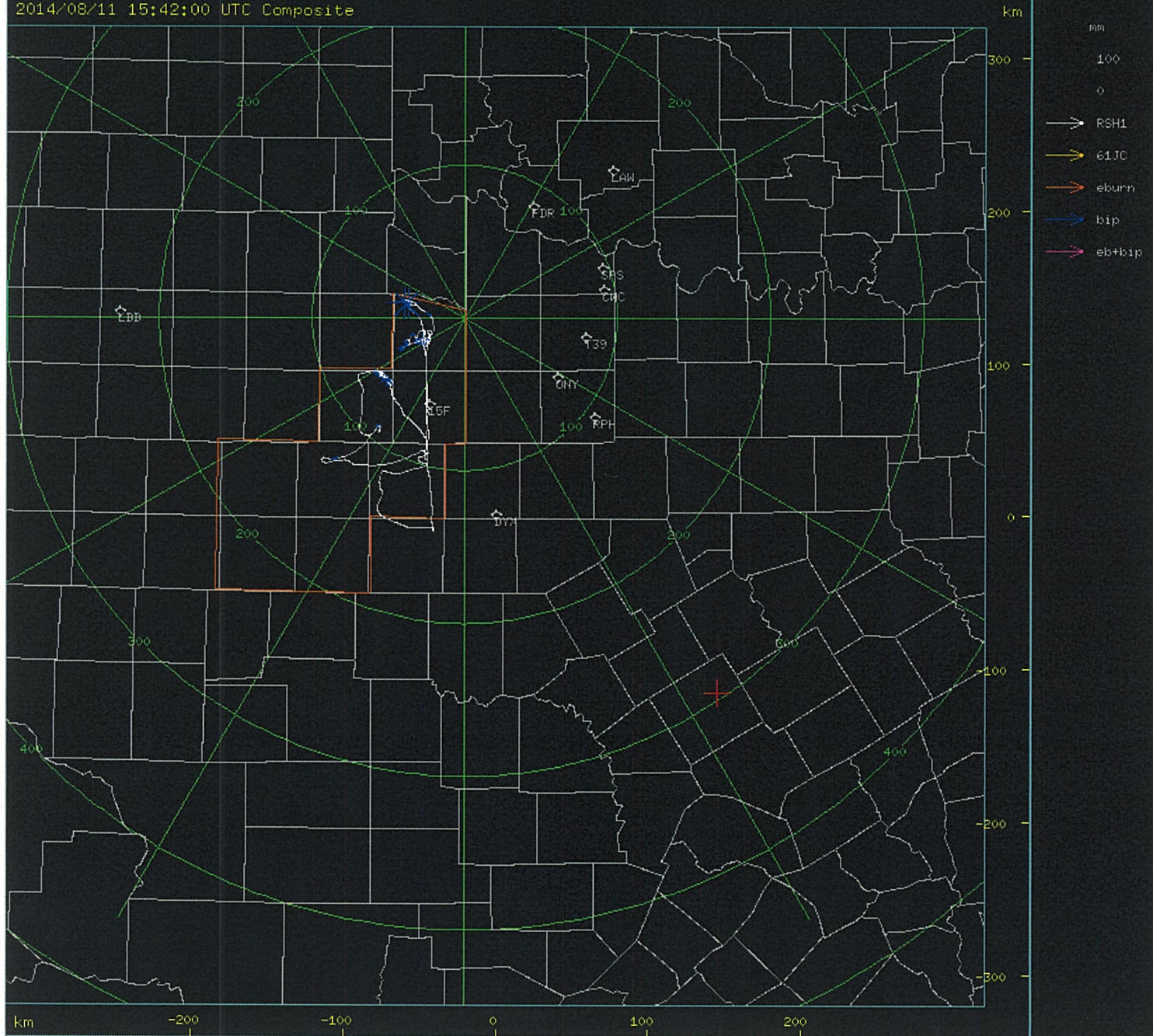
-
- None
 - D0 (Abnormally Dry)
 - D1 (Moderate Drought)
 - D2 (Severe Drought)
 - D3 (Extreme Drought)
 - D4 (Exceptional Drought)
 - No Data

3/5/14 - 6/28/14



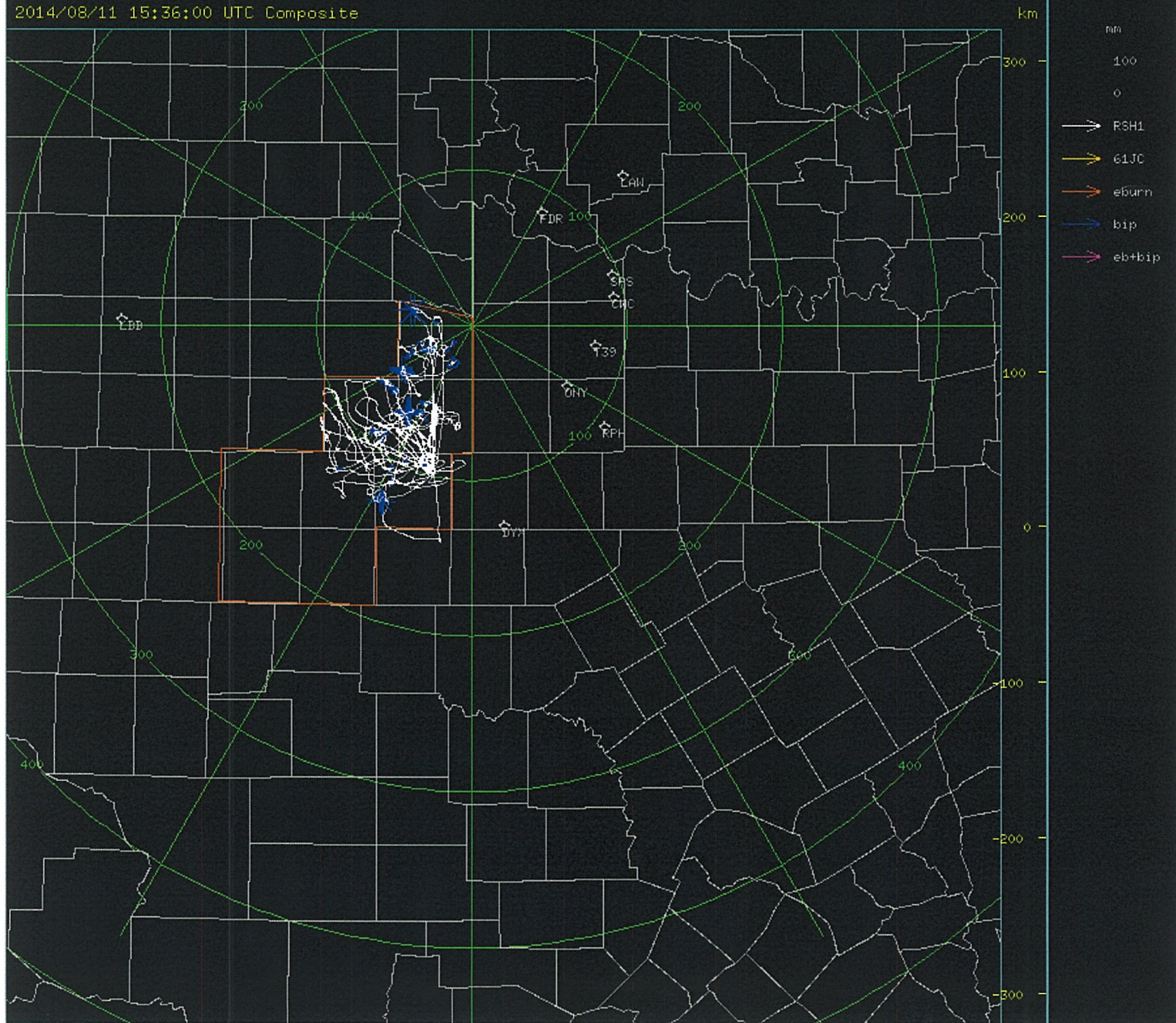
Daily_Flight_Tracks

2014/08/11 15:42:00 UTC Composite



Month_Flight_Tracks

2014/08/11 15:36:00 UTC Composite



WEATHER MODIFICATION WORKSHEET

REVISED

8/1/2019

NOTES

Total New Mexico Acres	77,819,520	
Total Seedable acres	43,000,000	Est. % seedable 55%
Average Annual Rainfall for NM	14.43	Average of all counties
Rainfall increase per acre (Inches)	1.7316	Expected 12% increase
Rainfall with anticipated increase of 12%	16.1616	
Water value per inch irrigated	\$ 4.56	My pumping cost/actual
Water value irrigated inch x acres	\$ 339,532,128.00	
Total value of increased rainfall due to seeding	\$ 339,532,128.00	
Total cost of statewide program	\$ 1,500,000.00	
Cost per acre	\$ 0.0349	
ROI per \$1.00 spent on program	\$ 226.35	

Seedable acres based on
2016 Ag Stats.

*nm ag's
8/6/19*

QUESTIONS?

