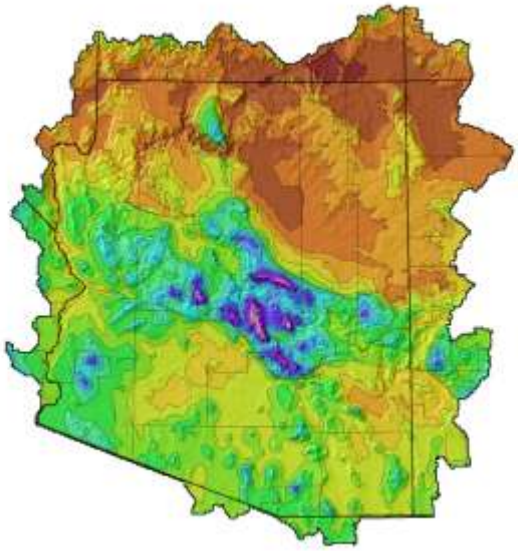
Probable Maximum Precipitation Study for Arizona
Appendix F



Prepared for

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July 2013

NOTICE

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Appendix F:
List of Storms Analyzed

Storm files were made for the fifty-one storms used to derive the PMP values for the state. This includes 29 local convective storms, 12 general frontal storms, and 10 remnant tropical storms (Table F.1). Storm files and SPAS analysis results for each of these storms are contained in this appendix.

Table F.1 Arizona PMP Short Storm List (Chronological listing)

SPAS Storm Number	Storm Name	State	Storm Type	Lat	Lon	Year	Month	Day	Total Storm Rainfall
1107	SAN JUAN MOUNTAINS	CO	tropical	37.663	-106.938	1911	10	4	7.88
1144	MT ORD	AZ	general	33.904	-111.413	1916	1	14	10.63
1077	CROSSMAN PEAK	AZ	tropical	34.546	114.196	1939	9	4	9.65
1061	THATCHER	AZ	local	32.763	-109.829	1939	9	16	4.18
1076	CROWN KING	AZ	tropical	34.204	112.354	1951	8	26	14.99
1096	QUEEN CREEK	AZ	local	33.203	-111.145	1954	8	18	8.06
1064	WELLTON	AZ	local	32.579	-114.338	1955	8	24	6.49
1154	HORSESHOE DAM	AZ	general	33.938	-111.736	1959	10	27	10.86
1083	SONORA DESERT MUSEUM	AZ	tropical	32.179	-111.388	1962	9	25	7.16
1130	PAGE	AZ	local	36.917	-111.450	1963	8	30	2.03
1060	NORTH TUCSON	AZ	local	32.304	-111.004	1964	9	5	5.28
1059	SAHUARITA	AZ	local	32.006	-110.904	1964	9	9	6.77
1137	YOUNG	AZ	general	33.821	-110.921	1965	11	22	11.58
1141	JUNIPINE	AZ	general	36.229	-112.063	1966	12	4	15.86
1133	JAKES CORNER	AZ	general	34.021	-111.379	1967	12	17	10.02
1249	BLANDING	UT	local	37.826	-109.543	1968	8	1	6.67
1118	SELIGMAN	AZ	local	35.317	-112.883	1970	7	21	5.89
1075	WORKMAN CREEK	AZ	tropical	33.820	-110.904	1970	9	4	12.13
1062	PHOENIX	AZ	local	33.517	-112.023	1972	6	22	5.63
1102	WORKMAN CREEK	AZ	tropical	33.821	-110.921	1972	10	4	11.66
1073	SEDONA	AZ	local	34.882	-111.765	1975	7	13	4.27
1042	YUMA	AZ	local	32.611	-114.631	1977	8	15	6.85
1097	NOGALES	AZ	tropical	31.339	-110.935	1977	10	6	15.97
1150	BEAR SPRING	AZ	general	34.038	-111.488	1978	2	27	15.52
1134	BROWNS PEAK	AZ	general	33.675	-111.335	1978	12	16	10.37
1138	CROWN KING	AZ	general	34.221	-112.346	1980	2	13	17.63
1135	ALAMO	NV	local	36.554	-114.713	1981	8	10	6.50
1063	PRESCOTT	AZ	local	34.621	-112.554	1983	9	23	17.95
1074	MT GRAHAM	AZ	tropical	33.288	-109.104	1983	9	27	13.99
1122	HARQUAHALA VALLEY	AZ	local	33.488	-113.254	1984	9	2	8.00
1139	KNOLES HOLE SPRING	AZ	general	33.829	-110.913	1993	1	5	13.36
1086	TUCSON	AZ	local	32.390	-110.800	1996	9	3	7.37
1084	HARQUAHALA MOUNTAIN	AZ	tropical	33.815	-113.335	1997	9	25	12.13
1115	JOSEPH CITY	AZ	local	34.945	-110.355	1998	7	31	4.20
1087	SABINO CANYON	AZ	local	32.385	-110.705	1999	7	14	7.87
1043	SOLS WASH	AZ	local	34.130	-113.080	2000	8	29	5.54
1131	BLUFF	UT	local	37.255	-109.575	2001	8	14	6.28
1094	CASTLE HOT SPRINGS	AZ	local	33.950	-112.340	2003	8	27	10.17
1109	ROOSEVELT LAKE	AZ	local	33.596	-111.065	2003	9	6	11.19
1088	CYPRESS MOUNTAIN	AZ	tropical	34.730	-113.020	2004	9	18	10.10
1147	BIG PINE FLAT	AZ	general	33.685	-111.325	2005	2	10	8.72
1091	CAMP CREEK	AZ	local	34.380	-111.180	2005	9	3	4.93
1120	CEDAR CITY	UT	local	37.375	-113.075	2006	7	31	5.69
1113	PETRIFIED FOREST	AZ	local	34.725	-109.645	2007	7	27	7.18
1149	COOKS MESA	AZ	general	34.460	-111.230	2007	11	30	8.60
1051	MAGMA	AZ	local	33.194	-111.347	2008	7	10	5.34
1128	HAVASUPAI	AZ	local	35.155	-112.575	2008	8	15	4.49
1085	WENDEN & BOUSE	AZ	local	33.915	-113.905	2008	8	26	4.82
1166	WAGON BOW	AZ	local	34.865	-113.455	2009	7	2	7.67
1200	PETERSON RANCH	AZ	general	33.810	-110.910	2010	1	19	14.93
1262	ANTHEM	AZ	local	33.859	-112.141	2012	7	31	6.38

Note, in table F.1 and in the Table of Contents in this appendix, only the location name associated with the highest SPAS analyzed rainfall is listed. However, for many of the SPAS storm analyses, several DAD zones were analyzed. These DAD zone delineations, if any, are displayed on the total storm isohyetal maps provided in this Appendix.

Table of Contents
(Chronological listing)

Wagon Wheel Gap, CO October 3-7, 1911	1
Mt Ord, AZ January 14-21, 1916	6
Crossman Creek, AZ September 3-7, 1939	11
Thatcher, AZ September 15-18, 1939	16
Crown King, AZ August 26-30, 1951	21
Queen Creek, AZ August 19, 1954	30
Wellton, AZ August 24, 1955	35
Horseshoe Dam, AZ October 27 – November 1, 1959	40
Sonora Desert, AZ September 26-28, 1962	45
Page, AZ August 29-September 1, 1963	50
North Tucson, AZ September 6-7, 1964	54
Sahuarita, AZ September 9-11, 1964	60
Young, AZ November 21-27, 1965	65
Junipine, AZ December 2-8, 1966	71
Jakes Corner, AZ December 17-22, 1967	76
Blanding, UT July 31-August 3, 1968	81
Seligman, AZ July 21-22, 1970	86
Workman Creek, AZ September 3-8, 1970	91
Phoenix, AZ June 22, 1972	96
Workman Creek, AZ October 3-7, 1972	101
Sedona, AZ July 14, 1975	106
Yuma Valley, AZ August 15, 1977	110
Nogales, AZ October 6-10, 1977	115
Bear Spring, AZ February 27 – March 3, 1978	120

Browns Peak, AZ December 17-19, 1978 125

Crown King, AZ February 13-22, 1980 130

Alamo, NV August 10, 1981 135

Prescott, AZ September 22-25, 1983 140

Mount Graham, AZ September 27-October 4, 1983 145

Harquahala Valley, AZ September 1, 1984 150

Knoles Hole Spring, AZ January 5-10, 1993 155

Tucson, AZ September 3, 1996 160

Harquahala Mountain-Nora, AZ September 25-27, 1997 165

Joseph City, AZ July 31, 1998 170

Sabino Canyon, AZ July 14-15, 1999 175

Sols Wash, AZ August 29, 2000 180

Bluff, UT August 14, 2001 185

Castle Hot Springs, AZ August 27, 2003 190

Roosevelt Lakes, AZ September 9, 2003 195

Cypress Mountain, AZ September 18-20, 2004 200

Big Pine Flat, AZ February 10-13, 2005 205

Camp Creek, AZ September 3-4, 2005 210

Cedar City, UT July 31, 2006 215

Petrified Forest, AZ July 27-28, 2007 220

Cooks Mesa, AZ November 30 – December 2, 2007 225

Magma, AZ July 10, 2008 231

Havasupai, AZ August 15-18, 2008 236

Wenden and Bouse, AZ August 26, 2008 241

Wagon Bow, AZ July 3-4, 2009 246

Peterson Ranch, AZ January 19-22, 2010 251

Anthem, AZ July 31, 2012 256

Wagon Wheel Gap, CO

October 3-7, 1911

Storm Type: Remnant Tropical

Storm Precipitation Analysis System (SPAS) For Storm #1107

General Storm Location: near (SW) of Wagon Wheel, CO (Previously known as the Gladstone, CO storm of 1911)

Storm Dates: October 3-7, 1911

Event: Remnants of unnamed tropical storm

Latitude: 37.6625

Longitude: -106.9375

Max. Grid/Radar Rainfall Amount: 7.88”

Max. Observed Rainfall Amount: 5.08”

Number of Stations: 126 (55 daily, 12 hourly, and 59 supplemental)

SPAS Version: 7.0

Base Map Used: 1971-2000 Mean September Precip (PRISM)

Spatial resolution: 30-sec

Radar Included: N

Depth-Area-Duration (DAD) analysis: Y

Storm Name:	SPAS-1107-San Juan Mtns
Storm Date:	10/4-6/1911
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	20-Sep	
	Lat	Long
Storm center location	37.66	-106.94
Storm Rep dew point location	34.50	-111.60
Transposition dewpoint location	27.815	-115.035
Basin location	30.975	-110.375

Moisture Inflow Direction:	SW @ 350	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	12,500	feet
Storm Analysis Duration	24	hours

The storm representative dew point is	68.0 F	with total precipitable water above sea level of			2.05	inches.
The in-place maximum dew point is	74.5 F	with total precipitable water above sea level of			2.79	inches.
The transpositioned maximum dew point is	76.5 F	with total precipitable water above sea level of			3.07	inches.
The in-place storm elevation is	12,500	which subtracts	1.60	inches of precipitable water at	68.0 F	
The in-place storm elevation is	12,500	which subtracts	2.07	inches of precipitable water at	74.5 F	
The in-place storm elevation is	12,500	which subtracts	2.24	inches of precipitable water at	76.5 F	

The in-place maximization factor is	1.60
The moisture transposition factor is	1.16
The orographic transposition factor is	0.96
The total adjustment factor is	1.78

Notes: Formally known as Gladstone, CO

Observed Storm Depth-Area-Duration

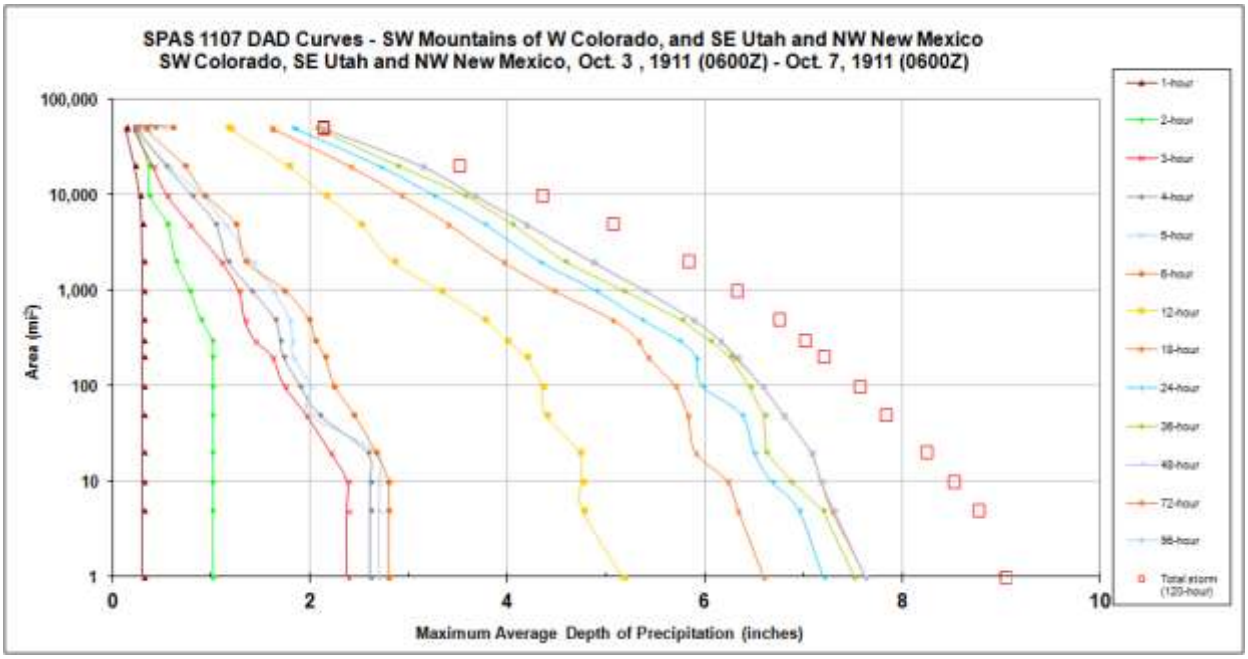
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	72 Hours
1 sq miles	0.3	2.8	4.8	6.6	6.7	-	6.9	7.1	7.2
10 sq miles	0.3	2.2	4.4	6.2	6.0	-	6.5	6.5	6.6
100 sq miles	0.3	2.2	4.2	5.7	5.9	-	6.3	6.3	6.3
200 sq miles	0.3	2.0	3.8	5.4	5.4	-	5.8	5.8	5.9
500 sq miles	0.3	1.7	3.3	5.1	4.9	-	5.2	5.3	5.4
1000 sq miles	0.3	1.4	2.8	4.5	4.3	-	4.6	4.7	4.9
2000 sq miles	0.3	1.2	2.5	4.0	3.8	-	4.1	4.1	4.2
5000 sq miles	0.3	0.9	2.2	3.4	3.3	-	3.6	3.7	3.7
10000 sq miles	0.2	0.7	1.8	2.9	2.7	-	2.9	2.9	3.1
20000 sq miles	0.1	0.3	1.2	2.4	1.8	-	2.1	2.1	2.1

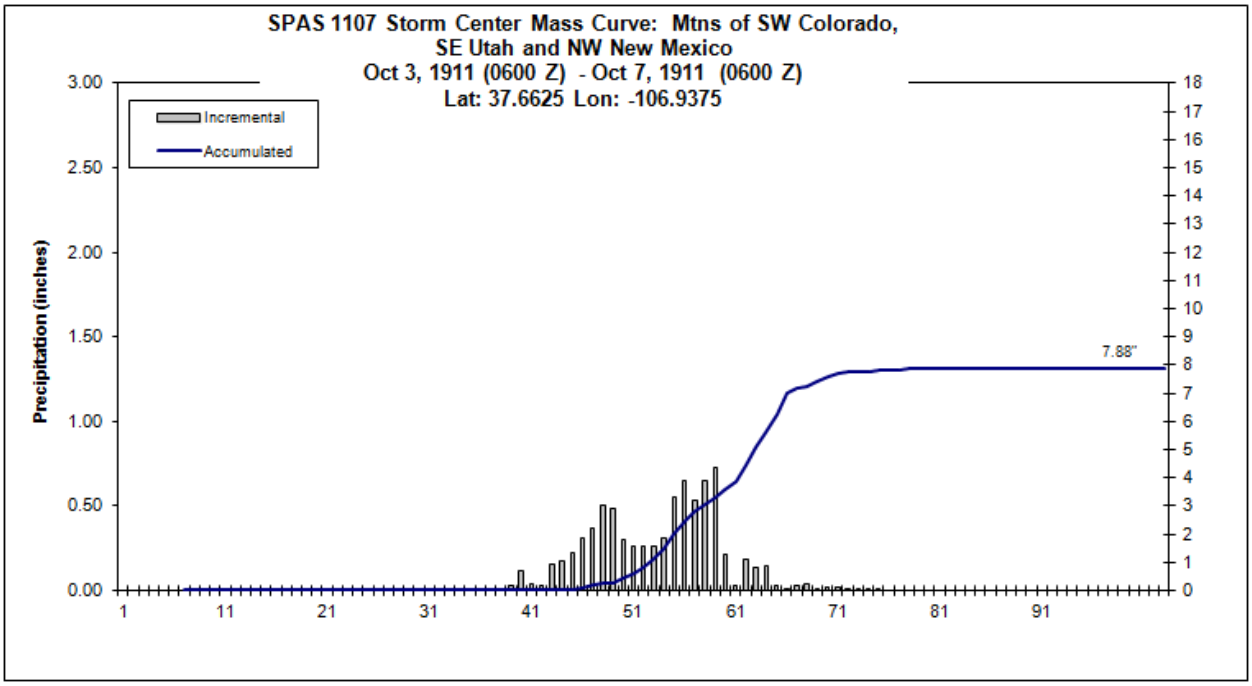
Adjusteded Storm Depth-Area-Duration

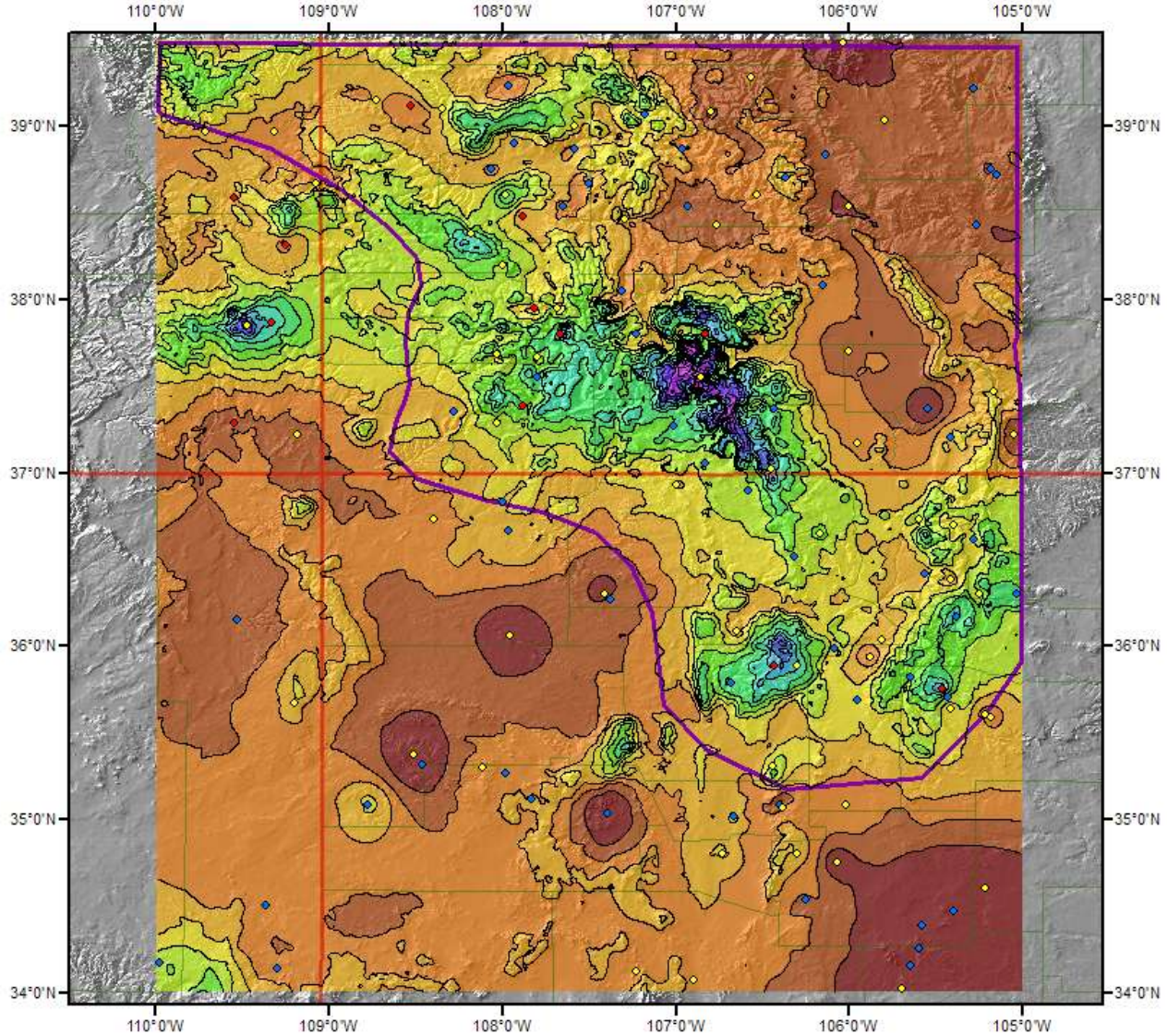
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	72 Hours
1 sq miles	0.5	5.0	8.5	11.7	11.9	-	12.2	12.6	12.8
10 sq miles	0.5	4.0	7.7	11.1	10.6	-	11.5	11.5	11.7
100 sq miles	0.5	3.8	7.5	10.1	10.5	-	11.2	11.2	11.2
200 sq miles	0.5	3.5	6.7	9.7	9.5	-	10.3	10.3	10.5
500 sq miles	0.5	3.1	5.9	9.0	8.7	-	9.2	9.4	9.6
1000 sq miles	0.5	2.4	5.1	7.9	7.7	-	8.2	8.3	8.6
2000 sq miles	0.5	2.2	4.5	7.0	6.7	-	7.2	7.4	7.4
5000 sq miles	0.5	1.7	3.8	6.0	5.8	-	6.4	6.5	6.5
10000 sq miles	0.4	1.3	3.2	5.2	4.8	-	5.1	5.2	5.6
20000 sq miles	0.2	0.6	2.1	4.3	3.3	-	3.7	3.8	3.8

Storm or Storm Center Name	SPAS-1107-San Juan Mtns	
Storm Date(s)	10/4-6/1911	
Storm Type	Tropical	
Storm Location	37.66	-106.94
Storm Center Elevation	12500	
Precipitation Total & Duration (10 sq mi)	7.88 inches 72 hours (SPAS 1107 DAD)	
Storm Representative Dewpoint	68.0 F	24
Storm Representative Dewpoint Location	34.5	-111.6
In-place Maximum Dewpoint	74.5 F	
Moisture Inflow Vector	SW @ 350	
In-place Maximization Factor		
Temporal Transposition (Date)	20-Sep	
Transposition Dewpoint Location	27.82	-115.04
Transposition Maximum Dewpoint	76.5 F	
Transposition Adjustment Factor	1.16	
Grid Point Location	30.975	-110.375
Grid Point Elevation	6,977	
Total Adjustment Factor	1.78	

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)																
	Duration (hours)															
Area (mi^2)	1	2	3	4	5	6	12	18	24	36	48	72	96			Total
0.27	0.72	1.37	2.66	2.93	3.03	3.10	5.49	6.92	7.50	7.84	7.88	7.88	7.88			9.31
1	0.30	1.01	2.38	2.61	2.70	2.79	5.17	6.59	7.20	7.51	7.62	7.62	7.62			9.03
5	0.30	1.01	2.38	2.61	2.70	2.79	4.76	6.33	6.95	7.20	7.27	7.28	7.30			8.76
10	0.30	1.01	2.38	2.61	2.70	2.79	4.75	6.22	6.67	6.87	7.05	7.17	7.17			8.51
20	0.30	1.01	2.21	2.58	2.67	2.66	4.73	5.90	6.50	6.62	6.98	7.07	7.07			8.23
50	0.30	1.01	1.96	2.09	2.00	2.44	4.39	5.82	6.37	6.60	6.76	6.79	6.79			7.82
100	0.30	1.01	1.74	1.90	2.00	2.24	4.35	5.69	5.97	6.45	6.45	6.57	6.57			7.55
200	0.30	1.01	1.62	1.73	1.83	2.15	4.19	5.42	5.91	6.26	6.28	6.30	6.32			7.19
300	0.30	1.01	1.44	1.70	1.82	2.05	3.99	5.32	5.73	6.05	6.07	6.15	6.15			7.00
500	0.30	0.89	1.34	1.64	1.79	1.98	3.76	5.05	5.35	5.76	5.78	5.87	5.87			6.73
1000	0.30	0.78	1.28	1.41	1.63	1.74	3.32	4.46	4.89	5.17	5.25	5.38	5.38			6.31
2000	0.30	0.64	1.10	1.17	1.41	1.35	2.84	3.95	4.33	4.58	4.65	4.85	4.86			5.82
5000	0.29	0.55	0.78	1.04	1.14	1.24	2.51	3.39	3.76	4.05	4.14	4.18	4.18			5.05
10000	0.27	0.37	0.55	0.80	0.90	0.93	2.15	2.92	3.25	3.57	3.65	3.65	3.66			4.34
20000	0.22	0.36	0.41	0.54	0.57	0.73	1.78	2.40	2.70	2.89	2.91	3.13	3.13			3.50
50000	0.13	0.24	0.22	0.25	0.27	0.34	1.18	1.62	1.84	2.08	2.11	2.13	2.13			2.12
51059	0.13	0.24	0.33	0.42	0.51	0.60	1.16	1.60	1.82	2.06	2.09	2.09	2.09			2.12




SPAS 1107 Storm Center Mass Curve: Mtns of SW Colorado,
SE Utah and NW New Mexico
Oct 3, 1911 (0600 Z) - Oct 7, 1911 (0600 Z)
Lat: 37.6625 Lon: -106.9375
Incremental
Accumulated
Precipitation (inches)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
7.88"
1
11
21
31
41
51
61
71
81
91



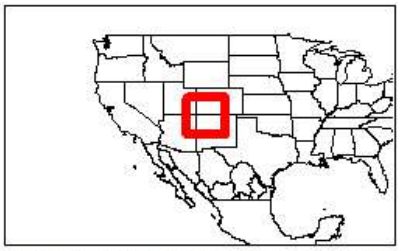
Total Precipitation
SPAS 1107
Oct 3, 1911 (0600 Z) - Oct 7, 1911 (0600 Z)

Miles: 0 25 50 100
Kilometers: 0 25 50 100 150

Stations

0.00 - 0.50	3.01 - 3.50	6.01 - 6.50	Daily
0.51 - 1.00	3.51 - 4.00	6.51 - 7.00	Hourly
1.01 - 1.50	4.01 - 4.50	7.01 - 7.50	Supplemental
1.51 - 2.00	4.51 - 5.00	7.51 - 8.00	
2.01 - 2.50	5.01 - 5.50		
2.51 - 3.00	5.51 - 6.00		

N



Coordinate system: GCS North American 1983

Metstat/AWA June 16, 2009

Mt Ord, AZ

January 14-21, 1916

Storm Type: General Frontal

Storm Precipitation Analysis System (SPAS) For Storm #1144

General Storm Location: Reno RS (near), Arizona

Storm Dates: January 14 (0600Z) – January 21 (0600Z), 1916

Event: Winter storm

DAD Zone 1: Southern Deserts

Latitude: 32.4292

Longitude: -110.8125

Max. Grid/Radar Rainfall Amount: 9.80”

Max. Observed Rainfall Amount:

DAD Zone 2: Mogollon Rim

Latitude: 33.9042

Longitude: -111.4125

Max. Grid/Radar Rainfall Amount: 10.63”

Max. Observed Rainfall Amount: 8.90” Reno RS, AZ

DAD Zone 3: Colorado Plateau

Latitude: 35.1125

Longitude: -108.1958

Max. Grid/Radar Rainfall Amount: 4.23”

Max. Observed Rainfall Amount: n/a

Number of Stations: 217 (77 Daily, 45 Hourly, 15 Hourly Pseudo, 77 Supplemental and 3 Supplemental Pseudo)

SPAS Version: 7.0

Base Map Used: PRISM Mean (71-00) January Precipitation

Spatial resolution: 30-sec

Radar Included: N

Depth-Area-Duration (DAD) analysis: Y

Storm Name:	SPAS-1144-Mt Ord-Zone 2
Storm Date:	01/14-20/1916
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	1-Feb	
	Lat	Long
Storm center location	33.75	-111.56
Storm Rep dew point location	33.20	-113.42
Transposition dewpoint location	30.425	-112.235
Basin location	30.975	-110.375

Moisture Inflow Direction:	VSW @ 11	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	3,200	feet
Storm Analysis Duration	24	hours

The storm representative dew point is	57.0 F	with total precipitable water above sea level of			1.19	inches.
The in-place maximum dew point is	60.0 F	with total precipitable water above sea level of			1.38	inches.
The transpositioned maximum dew point is	60.5 F	with total precipitable water above sea level of			1.42	inches.
The in-place storm elevation is	3,200	which subtracts	0.40	inches of precipitable water at	57.0 F	
The in-place storm elevation is	3,200	which subtracts	0.44	inches of precipitable water at	60.0 F	
The in-place storm elevation is	3,200	which subtracts	0.45	inches of precipitable water at	60.5 F	

The in-place maximization factor is	1.19
The moisture transposition factor is	1.03
The orographic transposition factor is	0.69
The total adjustment factor is	0.85

Notes: 24hr ave from Yuma and Phoenix twice daily observations at 530am and 530pm on the 17th

Observed Storm Depth-Area-Duration

	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	0.8	2.9	4.1	5.3	5.8	-	-	7.9	-	10.1
10 sq miles	0.8	2.9	4.1	5.3	5.8	-	-	7.0	-	9.5
100 sq miles	0.7	2.9	3.6	4.5	5.1	-	-	6.3	-	8.5
200 sq miles	0.7	2.6	3.3	4.2	4.7	-	-	5.9	-	8.0
500 sq miles	0.7	2.2	3.0	3.7	4.1	-	-	5.2	-	7.1
1000 sq miles	0.7	2.1	2.7	3.2	3.7	-	-	4.7	-	6.6
2000 sq miles	0.6	1.8	2.4	2.9	3.2	-	-	4.1	-	6.0
5000 sq miles	0.3	1.4	2.0	2.3	2.7	-	-	3.5	-	5.2
10000 sq miles	0.2	1.2	1.7	2.0	2.3	-	-	3.1	-	4.5
20000 sq miles	0.2	0.8	1.2	1.7	1.9	-	-	2.6	-	3.7

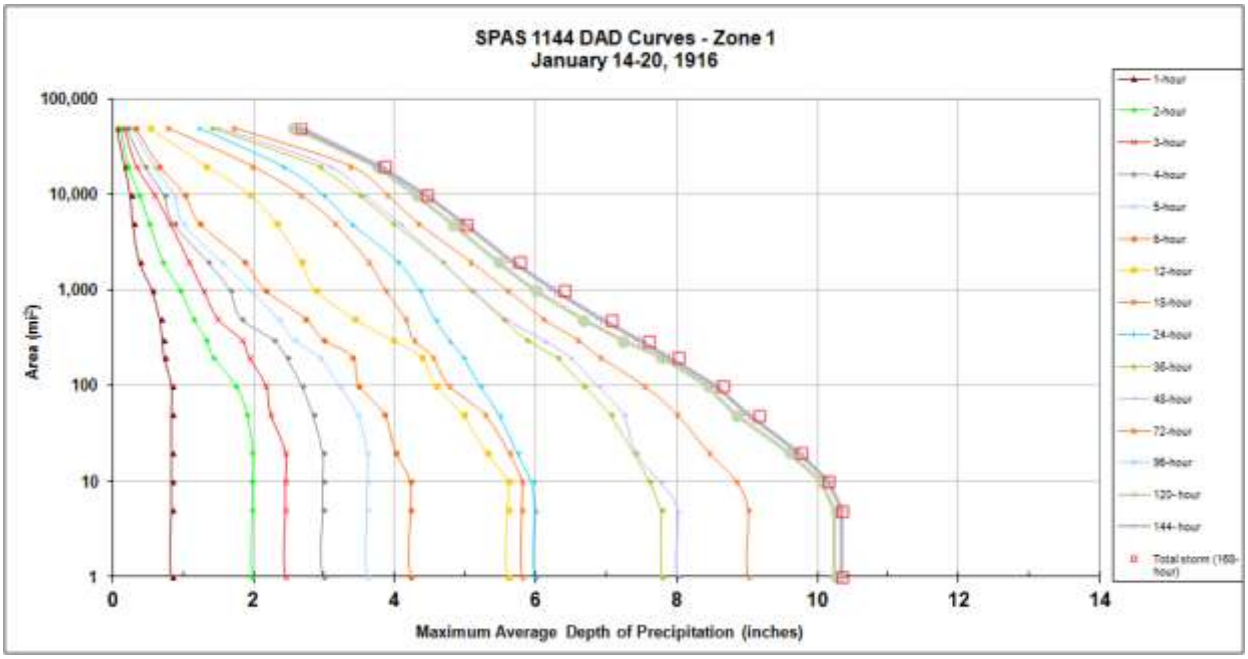
Adjusteded Storm Depth-Area-Duration

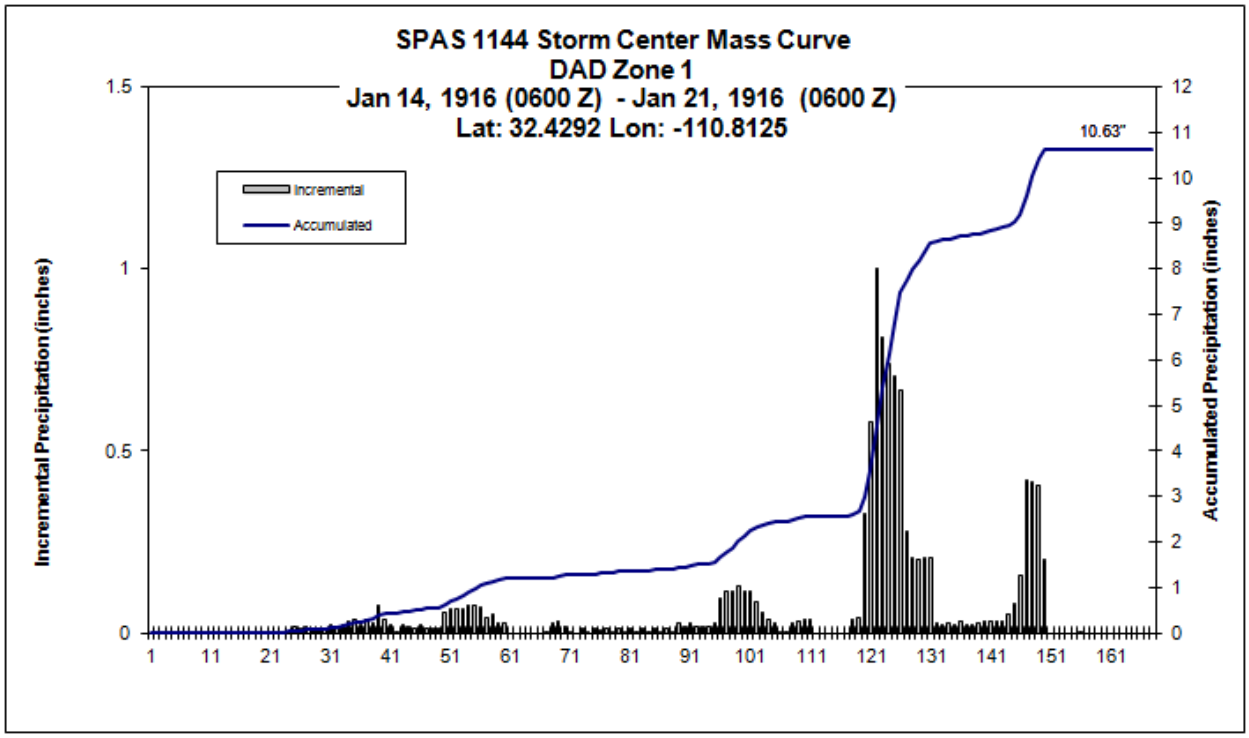
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	0.7	2.5	3.5	-	4.9	-	-	6.7	-	8.5
10 sq miles	0.7	2.5	3.5	-	4.9	-	-	5.9	-	8.1
100 sq miles	0.6	2.5	3.1	-	4.3	-	-	5.3	-	7.2
200 sq miles	0.6	2.2	2.8	-	4.0	-	-	5.0	-	6.8
500 sq miles	0.6	1.9	2.5	-	3.5	-	-	4.4	-	6.0
1000 sq miles	0.6	1.8	2.3	-	3.1	-	-	4.0	-	5.6
2000 sq miles	0.5	1.5	2.1	-	2.7	-	-	3.5	-	5.1
5000 sq miles	0.3	1.2	1.7	-	2.3	-	-	3.0	-	4.4
10000 sq miles	0.2	1.0	1.4	-	1.9	-	-	2.6	-	3.8
20000 sq miles	0.1	0.7	1.0	-	1.6	-	-	2.2	-	3.1

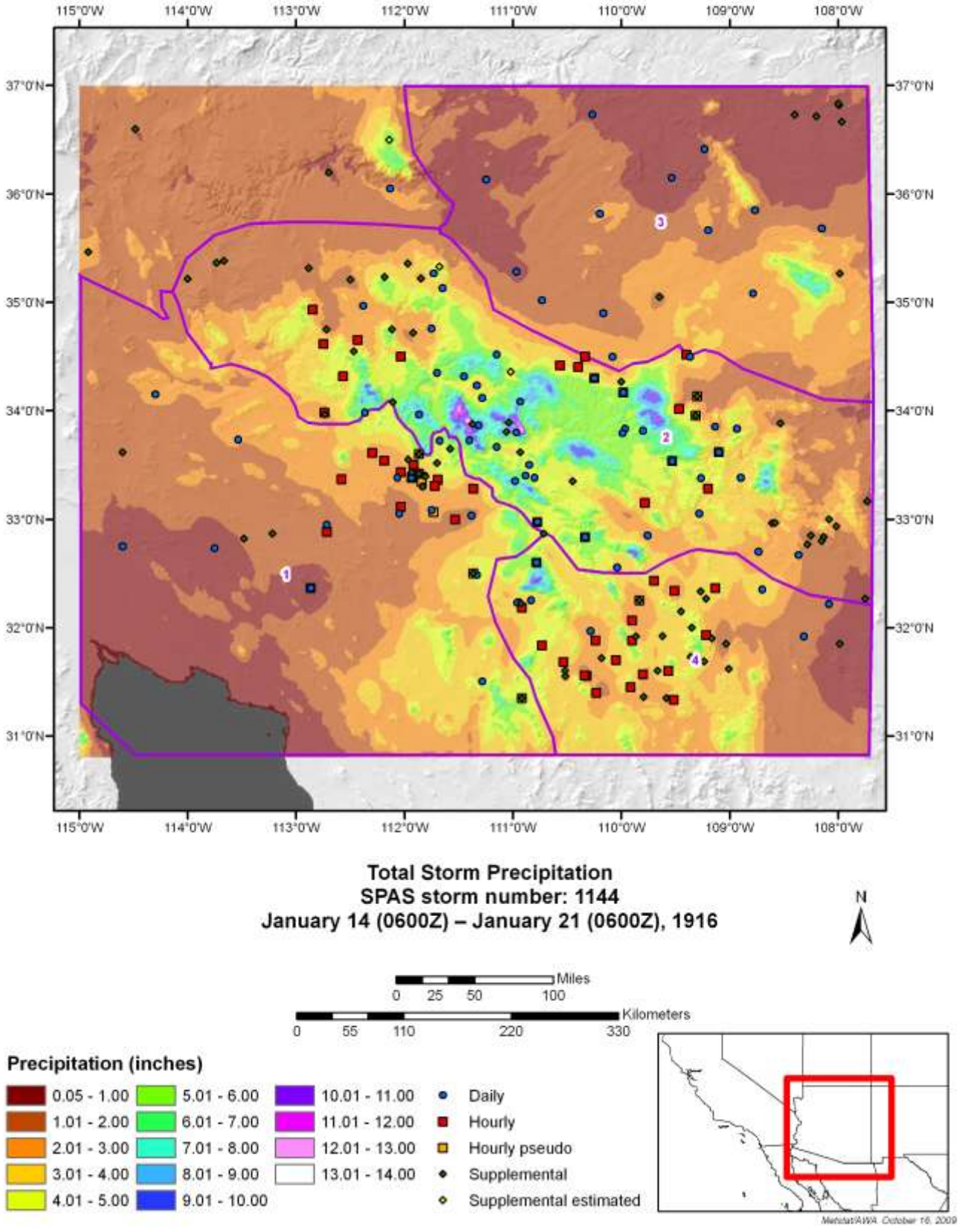
Storm or Storm Center Name	SPAS-1144-Mt Ord-Zone 2		
Storm Date(s)	01/14-20/1916		
Storm Type	General		
Storm Location	33.75	-111.56	
Storm Center Elevation	3200		
Precipitation Total & Duration (10 sq mi)	7.85 inches 72 hours (SPAS 1144 DAD)		
Storm Representative Dewpoint	57.0 F	24	KYUM KPHX
Storm Representative Dewpoint Location	33.2	-113.42	
In-place Maximum Dewpoint	60.0 F		
Moisture Inflow Vector	WSW @ 114		
In-place Maximization Factor			
Temporal Transposition (Date)	1-Feb		
Transposition Dewpoint Location	30.43	-112.24	
Transposition Maximum Dewpoint	60.5 F		
Transposition Adjustment Factor	1.03		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	0.85		

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

Area (mi²)	Duration (hours)															
	1	2	3	4	5	6	12	18	24	36	48	72	96	120	144	Total
0.27	1.17	2.28	2.83	3.26	3.94	4.50	5.93	6.11	6.27	8.10	8.34	9.32		10.53	10.63	10.63
1	0.84	1.98	2.45	2.98	3.61	4.22	5.60	5.81	5.99	7.78	8.01	9.01		10.24	10.34	10.34
5	0.84	1.98	2.45	2.98	3.61	4.22	5.60	5.81	5.99	7.78	8.01	9.01		10.24	10.34	10.34
10	0.84	1.98	2.45	2.98	3.61	4.22	5.60	5.81	5.94	7.61	7.75	8.84		10.04	10.15	10.15
20	0.84	1.98	2.45	2.98	3.61	4.01	5.30	5.62	5.74	7.39	7.42	8.45		9.59	9.72	9.76
50	0.84	1.90	2.24	2.84	3.47	3.85	4.96	5.28	5.48	7.06	7.24	8.00		8.83	9.01	9.15
100	0.84	1.74	2.17	2.68	3.21	3.49	4.59	4.77	5.21	6.68	6.88	7.53		8.43	8.55	8.64
200	0.73	1.42	1.93	2.46	2.92	3.40	4.37	4.54	4.97	6.30	6.48	6.90		7.77	7.88	8.02
300	0.71	1.33	1.83	2.28	2.57	2.99	3.96	4.27	4.77	5.86	6.11	6.59		7.22	7.46	7.59
500	0.67	1.14	1.49	1.82	2.34	2.73	3.42	4.15	4.57	5.53	5.58	6.10		6.65	6.92	7.06
1000	0.56	0.96	1.28	1.66	1.96	2.16	2.88	3.87	4.35	5.08	5.10	5.59		5.98	6.26	6.39
2000	0.38	0.71	1.08	1.34	1.53	1.86	2.67	3.62	4.04	4.67	4.67	5.06		5.46	5.66	5.77
5000	0.29	0.52	0.81	0.86	1.00	1.23	2.32	3.15	3.38	3.97	4.07	4.33		4.81	4.98	5.01
10000	0.25	0.38	0.59	0.72	0.87	1.02	1.95	2.66	2.98	3.49	3.56	3.88		4.3	4.43	4.44
20000	0.17	0.22	0.33	0.45	0.58	0.66	1.32	1.96	2.39	2.93	3.06	3.36		3.73	3.79	3.84
50000	0.06	0.11	0.16	0.20	0.27	0.32	0.52	0.77	1.21	1.40	1.48	1.70		2.55	2.66	2.66
51059																




SPAS 1144 Storm Center Mass Curve
DAD Zone 1
Jan 14, 1916 (0600 Z) - Jan 21, 1916 (0600 Z)
Lat: 32.4292 Lon: -110.8125
Incremental
Accumulated
10.63"
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
1.5
1
0.5
0
12
11
10
9
8
7
6
5
4
3
2
1
0
1
11
21
31
41
51
61
71
81
91
101
111
121
131
141
151
161


115°0'W
114°0'W
113°0'W
112°0'W
111°0'W
110°0'W
109°0'W
108°0'W
37°0'N
36°0'N
35°0'N
34°0'N
33°0'N
32°0'N
31°0'N
1
2
3
4
Total Storm Precipitation
SPAS storm number: 1144
January 14 (0600Z) – January 21 (0600Z), 1916
N
Miles
0 25 50 100
Kilometers
0 55 110 220 330
Precipitation (inches)
0.05 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
4.01 - 5.00
5.01 - 6.00
6.01 - 7.00
7.01 - 8.00
8.01 - 9.00
9.01 - 10.00
10.01 - 11.00
11.01 - 12.00
12.01 - 13.00
13.01 - 14.00
Daily
Hourly
Hourly pseudo
Supplemental
Supplemental estimated
Metstat/AWA October 16, 2009

Crossman Creek, AZ

September 3-7, 1939

Storm Type: Remnant Tropical

Storm Precipitation Analysis System (SPAS) For Storm #1077

General Storm Location: Wikieup, Arizona

Storm Dates: September 3-7, 1939

Event: Remnants of a tropical storm

DAD Zone 1 (Southern deserts):

Lat: 34.5458

Lon: -114.1958

Max. Grid/Radar Rainfall Amount: 9.65”

Max. Observed Rainfall Amount: n/a

DAD Zone 2 (Mogollon Rim)

Latitude: 34.7708

Longitude: -113.7792

Max. Grid/Radar Rainfall Amount: 9.53”

Max. Observed Rainfall Amount: 7.11” at Wikieup, AZ

DAD Zone 3 (Colorado Plateau and SW Colorado Mtns)

Latitude: 36.3375

Longitude: -112.0708

Max. Grid/Radar Rainfall Amount: 7.82”

Max. Observed Rainfall Amount: na

Number of Stations: 193 (13 hourly, 132 daily, 38 supplemental, and 10 pseudo supplemental)

SPAS Version: 7.0

Base Map Used: PRISM Mean (1971-2000) September precipitation

Spatial resolution: 30-sec

Radar Included: No

Depth-Area-Duration (DAD) analysis: Yes

Storm Name:	SPAS-1077-Crossman Peak Sept
Storm Date:	9/3-7/1939
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	20-Aug	
	Lat	Long
Storm center location	34.55	-114.20
Storm Rep dew point location	33.21	-114.87
Transposition dewpoint location	29.635	-111.045
Basin location	30.975	-110.375

Moisture Inflow Direction:	SSW @ 10(	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	4,150	feet
Storm Analysis Duration	24	hours

The storm representative dew point is	73.5 F	with total precipitable water above sea level of			2.67	inches.
The in-place maximum dew point is	78.0 F	with total precipitable water above sea level of			3.29	inches.
The transpositioned maximum dew point is	78.5 F	with total precipitable water above sea level of			3.37	inches.
The in-place storm elevation is	4,150	which subtracts	0.89	inches of precipitable water at	73.5 F	
The in-place storm elevation is	4,150	which subtracts	1.03	inches of precipitable water at	78.0 F	
The in-place storm elevation is	4,150	which subtracts	1.05	inches of precipitable water at	78.5 F	

The in-place maximization factor is	1.27
The moisture transposition factor is	1.03
The orographic transposition factor is	0.93
The total adjustment factor is	1.21

Notes: 24hr average taken from the From 1001 reports at Needles, Blythe, and Yuma which reported every 6hrs. USGS WSP 1820, p123

Observed Storm Depth-Area-Duration

	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	72 Hours
1 sq miles	1.3	3.2	3.6	-	5.0	-	6.9	7.7	9.3
10 sq miles	1.3	3.2	3.6	-	5.0	-	6.9	7.7	8.9
100 sq miles	1.2	3.1	3.3	-	5.0	-	6.7	7.4	8.3
200 sq miles	1.0	3.1	3.3	-	4.9	-	6.1	6.9	8.0
500 sq miles	1.0	2.8	3.0	-	4.4	-	6.1	6.8	7.6
1000 sq miles	0.9	2.5	2.9	-	4.3	-	5.9	6.5	7.2
2000 sq miles	0.8	2.2	2.5	-	4.0	-	5.5	6.1	7.0
5000 sq miles	0.5	1.8	2.3	-	3.4	-	5.1	5.7	6.4
10000 sq miles	0.4	1.4	2.1	-	3.0	-	4.7	5.2	5.9
20000 sq miles	0.3	1.1	1.7	-	2.4	-	3.9	4.4	5.1

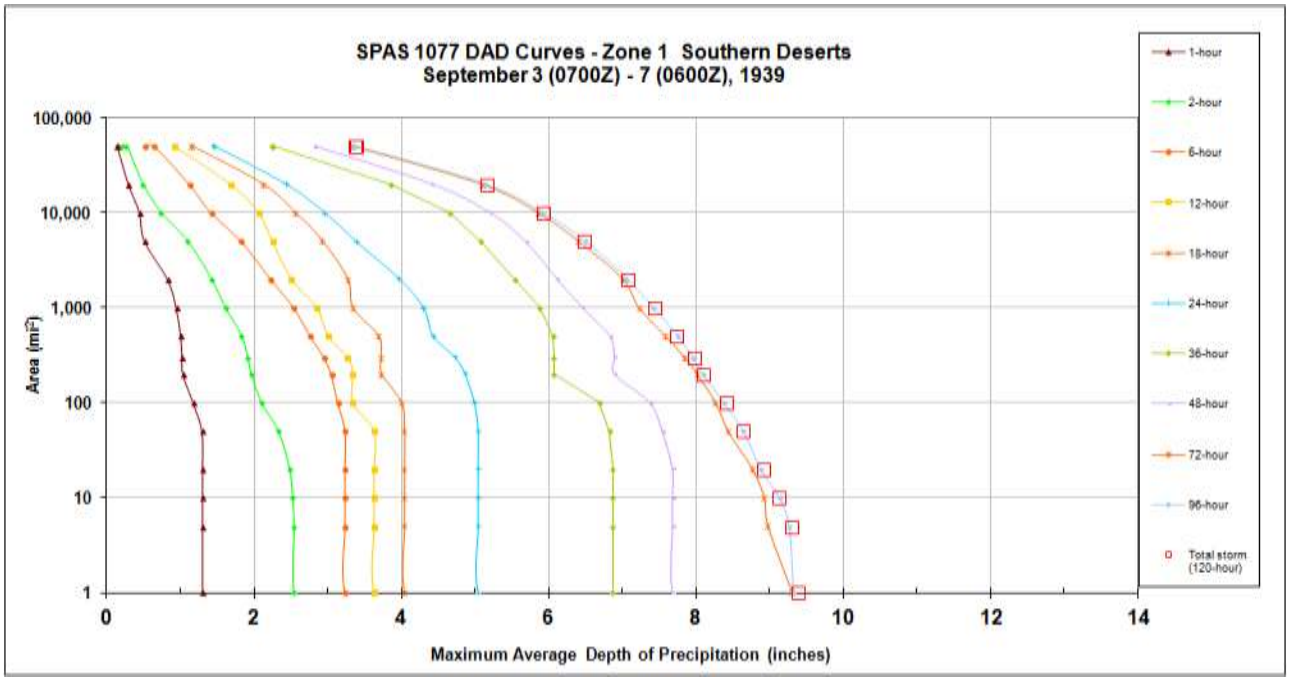
Adjusteded Storm Depth-Area-Duration

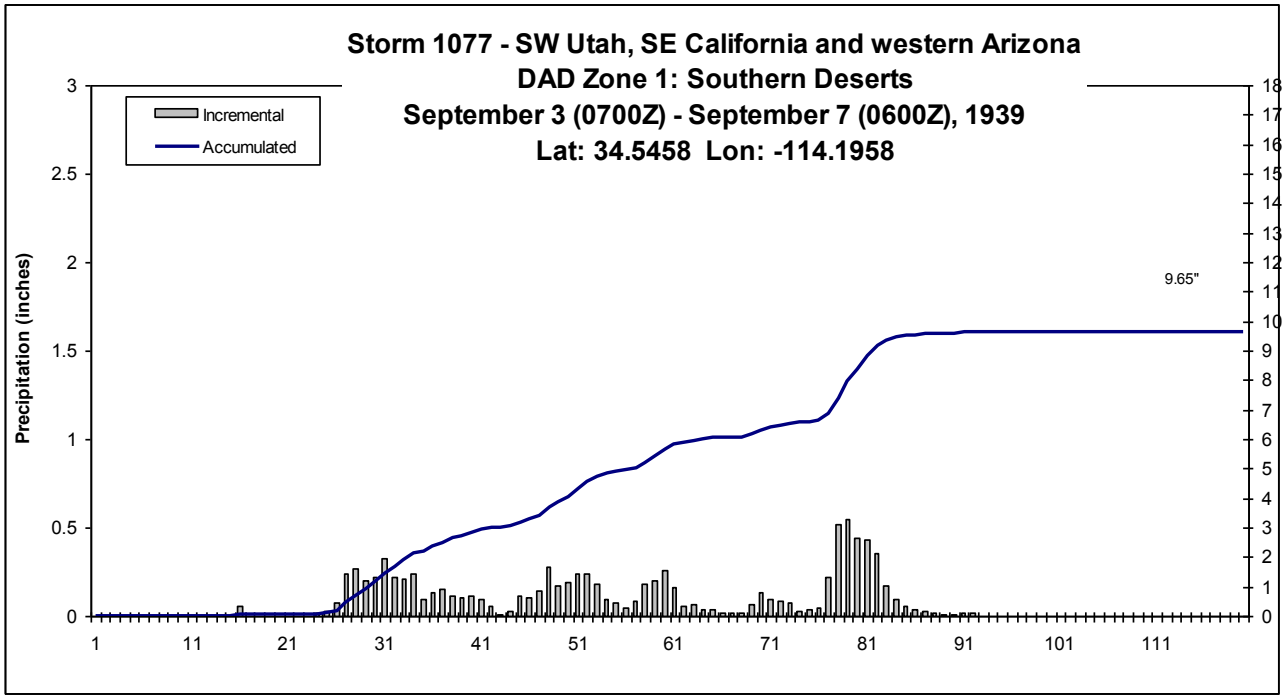
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours
1 sq miles	1.6	3.9	4.4	-	6.1	-	8.3	9.3	11.3
10 sq miles	1.6	3.9	4.4	-	6.1	-	8.3	9.3	10.8
100 sq miles	1.4	3.8	4.0	-	6.0	-	8.1	8.9	10.0
200 sq miles	1.2	3.7	4.0	-	5.9	-	7.4	8.4	9.7
500 sq miles	1.2	3.4	3.6	-	5.4	-	7.3	8.3	9.2
1000 sq miles	1.1	3.1	3.5	-	5.2	-	7.1	7.8	8.8
2000 sq miles	1.0	2.7	3.0	-	4.8	-	6.7	7.4	8.5
5000 sq miles	0.6	2.2	2.7	-	4.1	-	6.2	6.9	7.8
10000 sq miles	0.5	1.7	2.5	-	3.6	-	5.6	6.3	7.1
20000 sq miles	0.4	1.4	2.0	-	2.9	-	4.7	5.3	6.2

Storm or Storm Center Name	SPAS-1077-Crossman Peak Sept 1939-Zone 1		
Storm Date(s)	9/3-7/1939		
Storm Type	Tropical		
Storm Location	34.55	-114.20	
Storm Center Elevation	4150		
Precipitation Total & Duration (10 sq mi)	9.57 inches 72 hours 4.04" 12hrs (SPAS 1077 DAD)		
Storm Representative Dewpoint	73.5 F	24	hr ave of Needles, Blythe, Yuma
Storm Representative Dewpoint Location	33.21	-114.87	
In-place Maximum Dewpoint	78.0 F		
Moisture Inflow Vector	SSW @ 100		
In-place Maximization Factor			
Temporal Transposition (Date)	20-Aug		
Transposition Dewpoint Location	29.64	-111.05	
Transposition Maximum Dewpoint	78.5 F		
Transposition Adjustment Factor	1.03		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	1.21		

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

Area (mi²)	Duration (hours)													
	1	2	3	4	5	6	12	18	24	36	48	72	96	Total
0.27	1.67	2.77	2.94	2.97	3.34	3.63	4.04	4.42	5.43	7.24	7.97	9.57	9.65	9.65
1	1.30	2.54	2.55	2.70	2.96	3.24	3.63	4.04	5.04	6.87	7.68	9.31	9.33	9.38
5	1.30	2.54	2.55	2.70	2.96	3.24	3.63	4.04	5.04	6.87	7.68	8.98	9.27	9.30
10	1.30	2.52	2.55	2.66	2.96	3.24	3.63	4.04	5.04	6.87	7.68	8.93	9.14	9.12
20	1.30	2.48	2.54	2.64	2.96	3.24	3.63	4.04	5.04	6.87	7.68	8.77	8.88	8.92
50	1.29	2.33	2.45	2.58	2.96	3.24	3.63	4.04	5.04	6.83	7.54	8.44	8.65	8.63
100	1.17	2.10	2.30	2.48	2.96	3.14	3.34	4.00	4.99	6.69	7.37	8.27	8.38	8.41
200	1.03	1.96	1.85	2.38	2.85	3.05	3.34	3.73	4.86	6.07	6.89	8.02	8.10	8.10
300	1.02	1.91	1.75	2.30	2.74	2.95	3.27	3.72	4.73	6.07	6.89	7.85	7.96	7.98
500	1.00	1.83	1.73	2.14	2.38	2.77	3.01	3.69	4.43	6.06	6.83	7.59	7.76	7.74
1000	0.94	1.61	1.67	1.72	2.27	2.54	2.85	3.34	4.30	5.88	6.46	7.23	7.43	7.44
2000	0.82	1.42	1.33	1.67	1.94	2.23	2.51	3.27	3.97	5.54	6.11	7.01	7.07	7.08
5000	0.51	1.10	1.10	1.25	1.65	1.83	2.25	2.93	3.38	5.08	5.68	6.41	6.50	6.49
10000	0.44	0.74	0.90	1.17	1.35	1.42	2.06	2.56	2.96	4.65	5.20	5.86	5.92	5.92
20000	0.29	0.49	0.65	0.85	1.00	1.12	1.68	2.12	2.43	3.85	4.41	5.09	5.15	5.16
50000	0.14	0.27	0.41	0.49	0.58	0.65	0.92	1.16	1.46	2.25	2.82	3.34	3.38	3.39
50368	0.13	0.21	0.32	0.40	0.45	0.52	0.92	1.15	1.45	2.24	2.82	3.34	3.36	3.37




Storm 1077 - SW Utah, SE California and western Arizona
DAD Zone 1: Southern Deserts
September 3 (0700Z) - September 7 (0600Z), 1939
Lat: 34.5458 Lon: -114.1958
Incremental
Accumulated
Precipitation (inches)
9.65"
0
0.5
1
1.5
2
2.5
3
0
1
2
3
4
5
6
7
8
9
10
11
12
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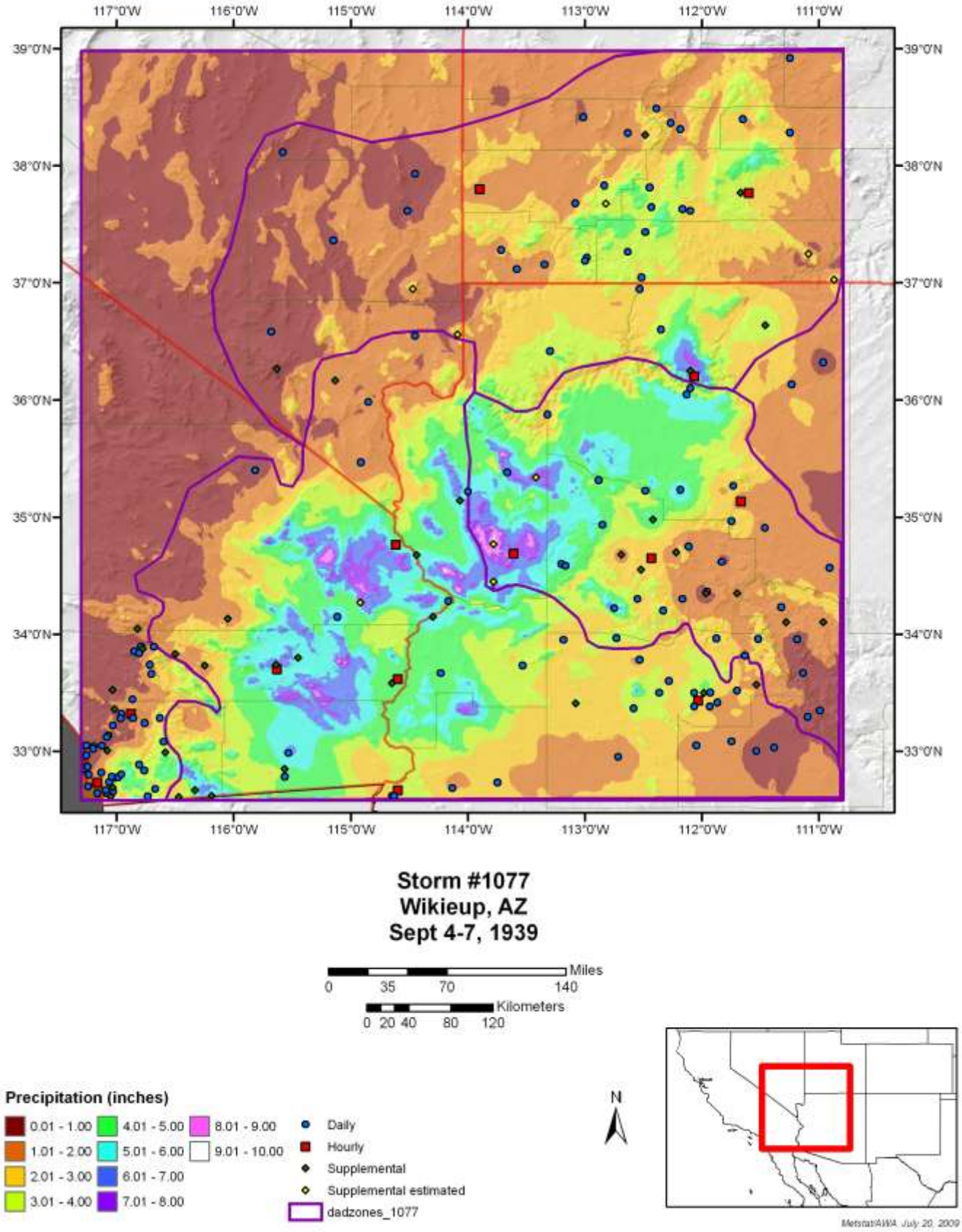
61
71
81
91
101
111


117°0'W
116°0'W
115°0'W
114°0'W
113°0'W
112°0'W
111°0'W
39°0'N
38°0'N
37°0'N
36°0'N
35°0'N
34°0'N
33°0'N
Storm #1077
Wikieup, AZ
Sept 4-7, 1939
Miles
0 35 70 140
Kilometers
0 20 40 80 120
Precipitation (inches)
0.01 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
4.01 - 5.00
5.01 - 6.00
6.01 - 7.00
7.01 - 8.00
8.01 - 9.00
9.01 - 10.00
Daily
Hourly
Supplemental
Supplemental estimated
dadzones_1077
N
MetstatAWA July 20, 2009

Thatcher, AZ

September 15-18, 1939

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1061

General Storm Location: Thatcher, AZ

Storm Dates: 09/15/1939 0800Z – 09/18/1939 0800Z

Event: Convective

Latitude: 32.7625

Longitude: -109.8291

Max. Grid/Radar Rainfall Amount: 4.18" (Grid/Pixel Point)

Max. Observed Rainfall Amount: 4.05" (Thatcher 7SW, type=supplemental)

Number of Stations: 43 (3-hourly, 7-daily, 33-daily supplemental) gauging stations within the defined search domain.

SPAS Version: 7.0

Base Map Used: Yes, hybrid see comment section

Spatial resolution: 0.28 mi^2

Radar Included: No

Depth-Area-Duration (DAD) analysis: Yes: 1, 2, 3, 4, 5, 6, 9, & 12 hours

Storm Name:	SPAS-1061-Thatcher
Storm Date:	September 17, 1939
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	1-Sep	
	Lat	Long
Storm center location	32.76	-109.83
Storm Rep dew point location	31.85	-109.03
Transposition dewpoint location	30.065	-109.575
Basin location	30.975	-110.375

Moisture Inflow Direction:	SE @ 80	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	4,650	feet
Storm Analysis Duration	3	hours

The storm representative dew point is	73.5 F	with total precipitable water above sea level of			2.67	inches.
The in-place maximum dew point is	79.0 F	with total precipitable water above sea level of			3.44	inches.
The transpositioned maximum dew point is	80.5 F	with total precipitable water above sea level of			3.68	inches.
The in-place storm elevation is	4,650	which subtracts	0.98	inches of precipitable water at	73.5 F	
The in-place storm elevation is	4,650	which subtracts	1.18	inches of precipitable water at	79.0 F	
The in-place storm elevation is	4,650	which subtracts	1.24	inches of precipitable water at	80.5 F	

The in-place maximization factor is	1.34
The moisture transposition factor is	1.08
The orographic transposition factor is	1.26
The total adjustment factor is	1.82

Notes:

Observed Storm Depth-Area-Duration

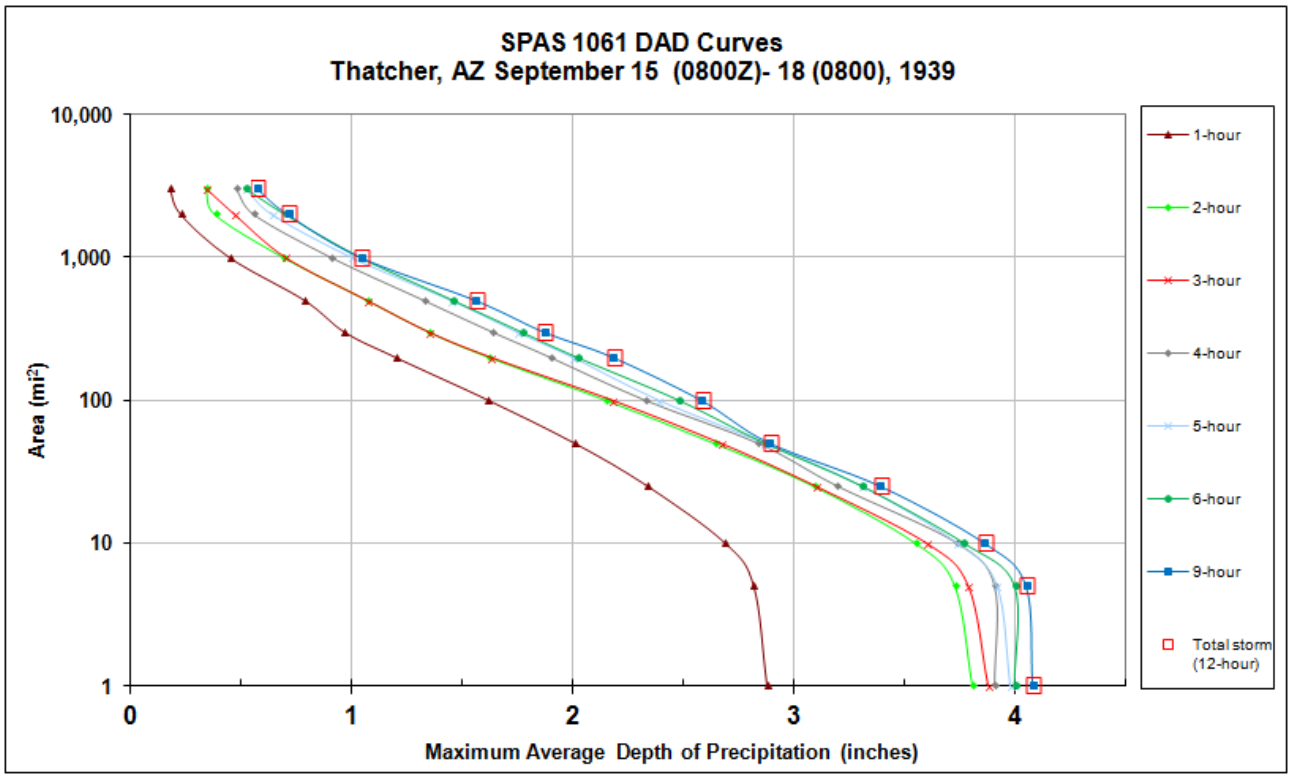
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	2.9	3.8	3.9	3.9	4.0	4.0			
10 sq miles	2.7	3.6	3.6	3.7	3.7	3.8			
50 sq miles	2.0	2.6	2.7	2.8	2.9	2.9			
100 sq miles	1.6	2.2	2.2	2.3	2.4	2.5			
200 sq miles	1.2	1.6	1.6	1.9	2.0	2.0			
500 sq miles	0.8	1.1	1.1	1.3	1.5	1.5			
1000 sq miles	0.5	0.7	0.7	0.9	1.0	1.0			
2000 sq miles	0.2	0.4	0.5	0.6	0.6	0.7			
5000 sq miles									

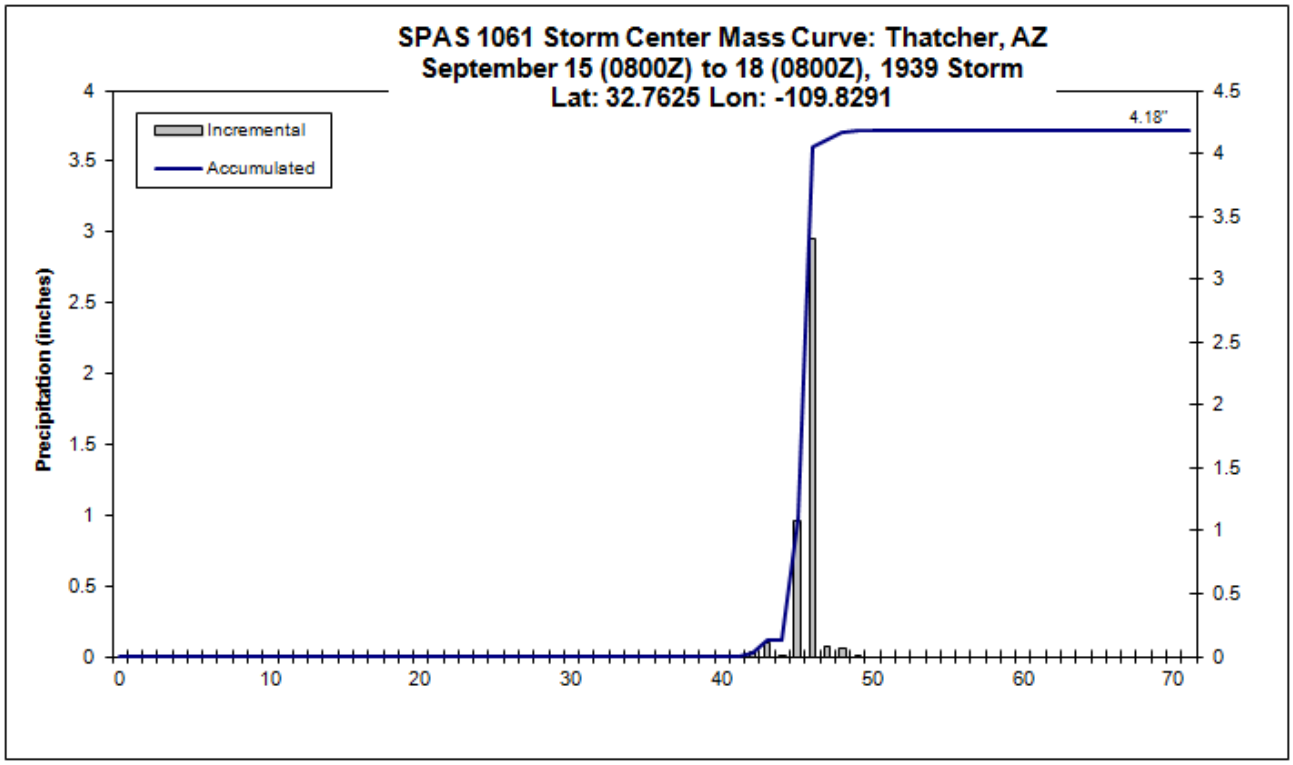
Adjusted Storm Depth-Area-Duration

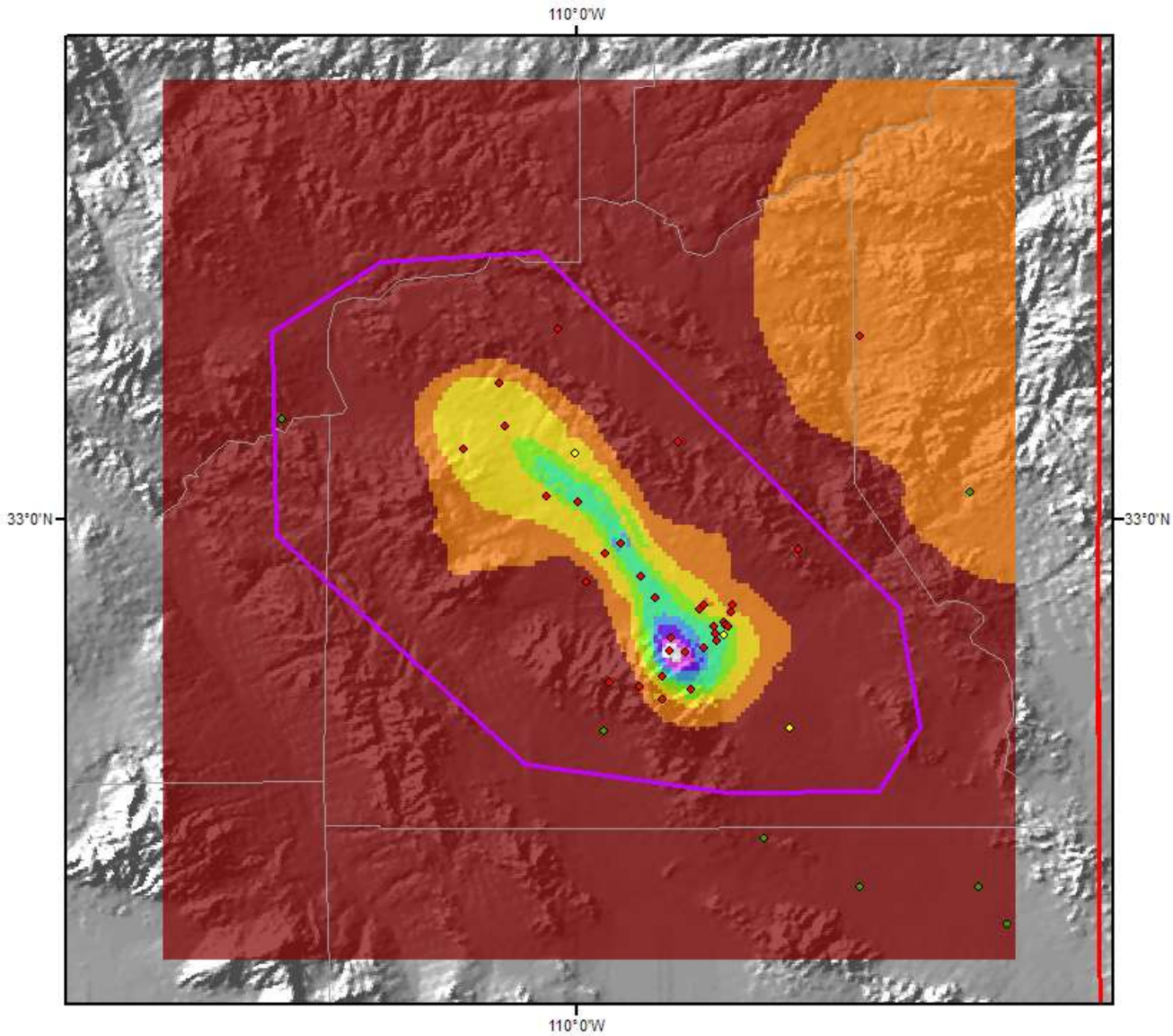
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	5.2	6.9	7.1	7.1	7.2	7.3			
10 sq miles	4.9	6.5	6.5	6.8	6.8	6.9			
50 sq miles	3.7	4.8	4.9	5.2	5.2	5.2			
100 sq miles	2.9	3.9	4.0	4.2	4.3	4.5			
200 sq miles	2.2	2.9	3.0	3.5	3.6	3.7			
500 sq miles	1.4	1.9	1.9	2.4	2.6	2.7			
1000 sq miles	0.8	1.3	1.3	1.7	1.8	1.9			
2000 sq miles	0.4	0.7	0.9	1.0	1.2	1.3			
5000 sq miles									

Storm or Storm Center Name	SPAS-1061-Thatcher		
Storm Date(s)	9/17/39		
Storm Type	Local Storm		
Storm Location	32.76	-109.83	
Storm Center Elevation	4650		
Precipitation Total & Duration (10 sq mi)	3.98 inches 3 hours 2.95" in 1hr (SPAS 1061 DAD)		
Storm Representative Dewpoint	73.5 F	3	hr ave, taken from the 16th 1130pm local time Rodeo, NM
Storm Representative Dewpoint Location	31.85	-109.03	
In-place Maximum Dewpoint	79.0 F		
Moisture Inflow Vector	SE @ 80		
In-place Maximization Factor	1.34		
Temporal Transposition (Date)	1-Sep		
Transposition Dewpoint Location	30.07	-109.58	
Transposition Maximum Dewpoint	80.5 F		
Transposition Adjustment Factor	1.08		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	1.82		

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)								
	Duration (hours)							
Area (mi^2)	1	2	3	4	5	6	9	total
0.28	2.95	3.91	3.98	4.03	4.08	4.14	4.18	4.18
1	2.88	3.81	3.88	3.91	3.98	4.00	4.08	4.08
5	2.82	3.73	3.79	3.91	3.92	4.00	4.05	4.05
10	2.69	3.55	3.60	3.74	3.74	3.77	3.86	3.86
25	2.34	3.09	3.10	3.20	3.31	3.31	3.39	3.39
50	2.01	2.64	2.67	2.84	2.87	2.87	2.89	2.89
100	1.62	2.15	2.18	2.33	2.39	2.48	2.58	2.58
200	1.20	1.62	1.63	1.90	2.00	2.02	2.18	2.18
300	0.97	1.35	1.35	1.64	1.75	1.77	1.87	1.87
500	0.79	1.07	1.07	1.33	1.45	1.46	1.56	1.56
1,000	0.45	0.69	0.70	0.91	1.00	1.04	1.04	1.04
2,000	0.23	0.38	0.47	0.56	0.64	0.70	0.71	0.71
3,045	0.18	0.34	0.34	0.48	0.52	0.52	0.57	0.57




SPAS 1061 Storm Center Mass Curve: Thatcher, AZ
September 15 (0800Z) to 18 (0800Z), 1939 Storm
Lat: 32.7625 Lon: -109.8291
Incremental
Accumulated
4.18"
Precipitation (inches)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
0
10
20
30
40
50
60
70



Total Rainfall (72-hours)
Thatcher, AZ 1939 Storm
Storm #1061 September 15 (0800 Z) to 18 (0800 Z), 1939

Miles
0 5 10 20
Kilometers
0 10 20 40 60

Gauging Stations

- Daily
- Supplemental
- Hourly

N

Precipitation (inches)

0.00 - 0.50	1.51 - 2.00	3.01 - 3.50
0.51 - 1.00	2.01 - 2.50	3.51 - 4.00
1.01 - 1.50	2.51 - 3.00	4.01 - 4.50

Coordinate system: GCS North American 1983
Scale: 1:1,135,617
Metstat/AWA March 25, 2009

Crown King, AZ

August 26-30, 1951

Storm Type: Remnant Tropical

Storm Precipitation Analysis System (SPAS) For Storm #1061

General Storm Location: Thatcher, AZ

Storm Dates: 09/15/1939 0800Z – 09/18/1939 0800Z

Event: Convective

Latitude: 32.7625

Longitude: -109.8291

Max. Grid/Radar Rainfall Amount: 4.18" (Grid/Pixel Point)

Max. Observed Rainfall Amount: 4.05" (Thatcher 7SW, type=supplemental)

Number of Stations: 43 (3-hourly, 7-daily, 33-daily supplemental) gauging stations within the defined search domain.

SPAS Version: 7.0

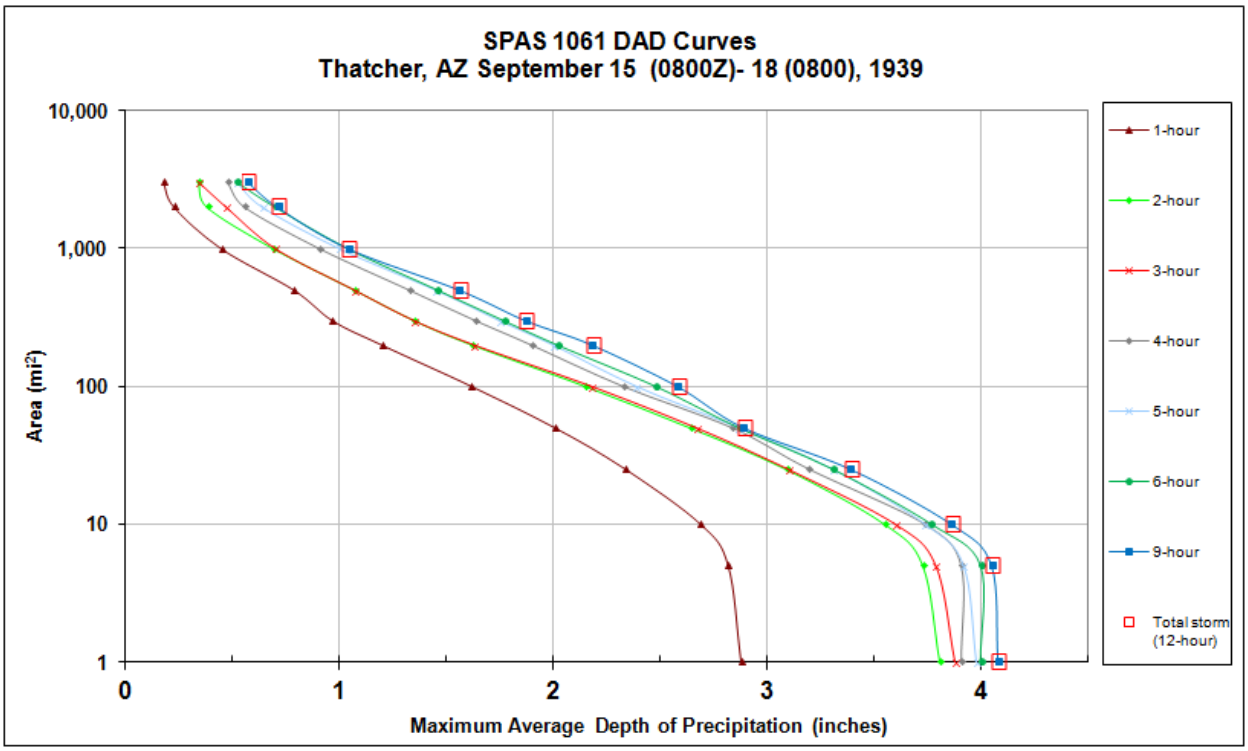
Base Map Used: Yes, hybrid see comment section

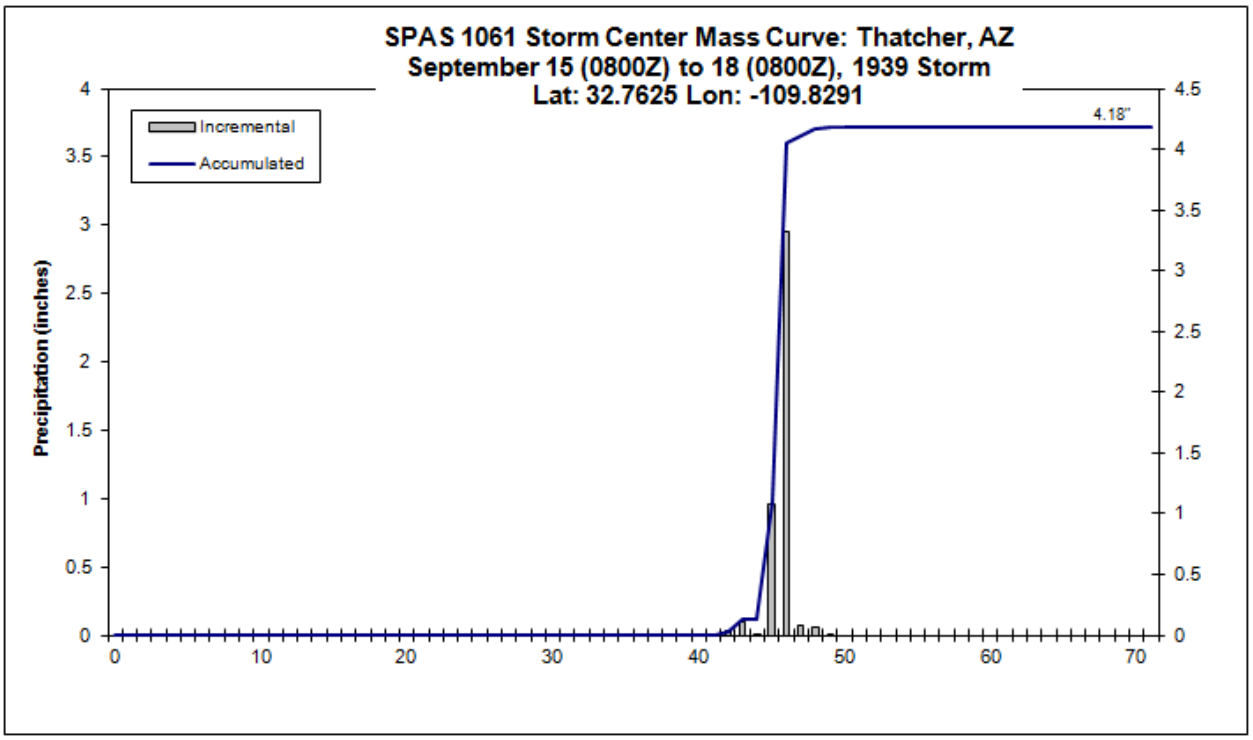
Spatial resolution: 0.28 mi^2

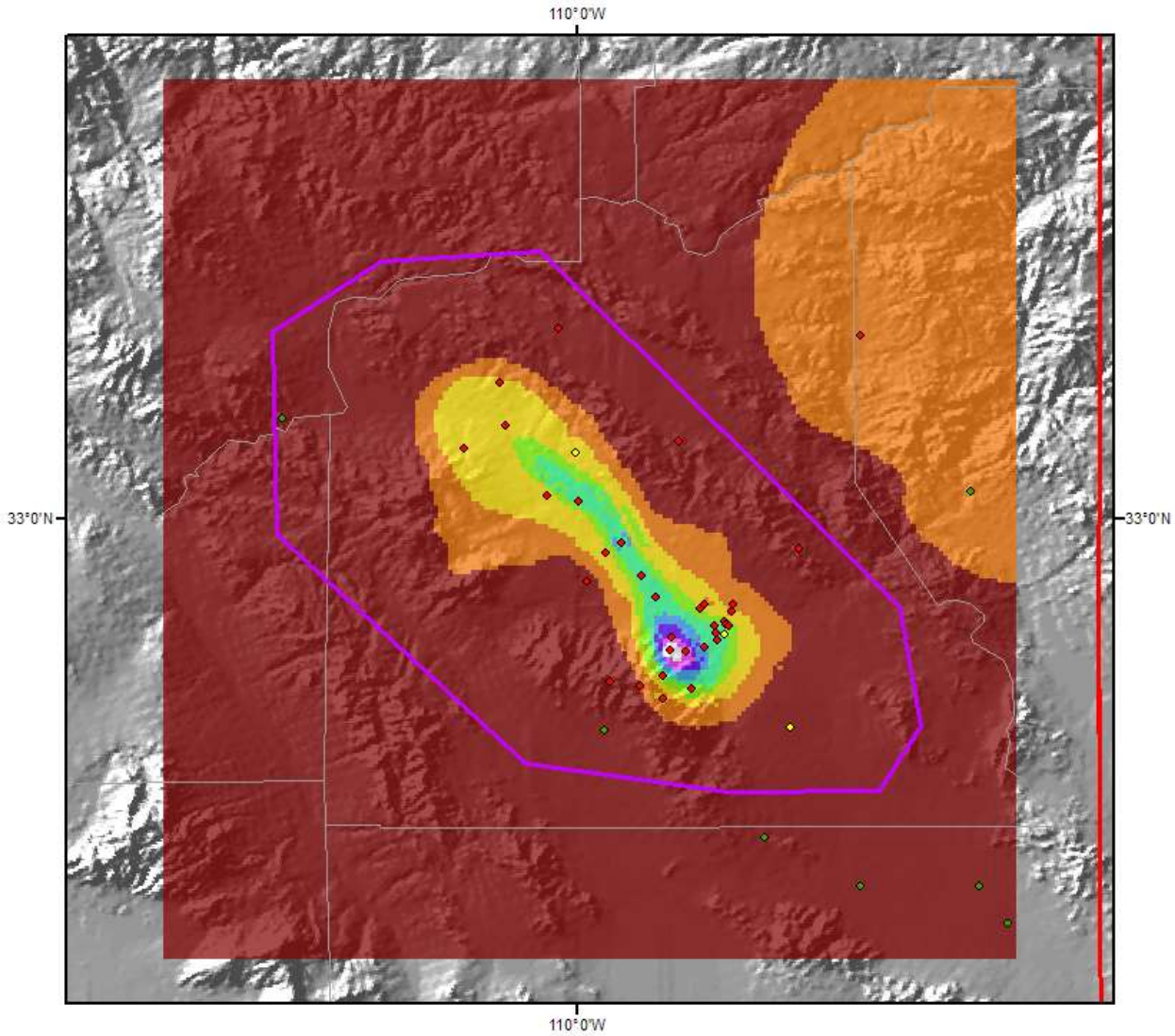
Radar Included: No

Depth-Area-Duration (DAD) analysis: Yes: 1, 2, 3, 4, 5, 6, 9, & 12 hours

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)								
	Duration (hours)							
Area (mi^2)	1	2	3	4	5	6	9	total
0.28	2.95	3.91	3.98	4.03	4.08	4.14	4.18	4.18
1	2.88	3.81	3.88	3.91	3.98	4.00	4.08	4.08
5	2.82	3.73	3.79	3.91	3.92	4.00	4.05	4.05
10	2.69	3.55	3.60	3.74	3.74	3.77	3.86	3.86
25	2.34	3.09	3.10	3.20	3.31	3.31	3.39	3.39
50	2.01	2.64	2.67	2.84	2.87	2.87	2.89	2.89
100	1.62	2.15	2.18	2.33	2.39	2.48	2.58	2.58
200	1.20	1.62	1.63	1.90	2.00	2.02	2.18	2.18
300	0.97	1.35	1.35	1.64	1.75	1.77	1.87	1.87
500	0.79	1.07	1.07	1.33	1.45	1.46	1.56	1.56
1,000	0.45	0.69	0.70	0.91	1.00	1.04	1.04	1.04
2,000	0.23	0.38	0.47	0.56	0.64	0.70	0.71	0.71
3,045	0.18	0.34	0.34	0.48	0.52	0.52	0.57	0.57




SPAS 1061 Storm Center Mass Curve: Thatcher, AZ
September 15 (0800Z) to 18 (0800Z), 1939 Storm
Lat: 32.7625 Lon: -109.8291
Incremental
Accumulated
4.18"
Precipitation (inches)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
0
10
20
30
40
50
60
70



Total Rainfall (72-hours)
Thatcher, AZ 1939 Storm
Storm #1061 September 15 (0800 Z) to 18 (0800 Z), 1939

Miles
0 5 10 20
Kilometers
0 10 20 40 60

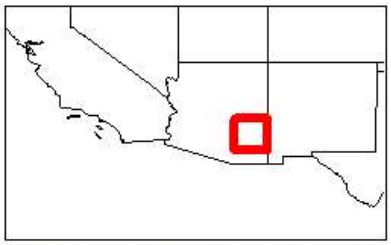
N

Gauging Stations

- Daily
- Supplemental
- Hourly

Precipitation (inches)

0.00 - 0.50	1.51 - 2.00	3.01 - 3.50
0.51 - 1.00	2.01 - 2.50	3.51 - 4.00
1.01 - 1.50	2.51 - 3.00	4.01 - 4.50



Coordinate system: GCS North American 1983
Scale: 1:1,135,617

Metstat/AWA March 25, 2000

Crown King, AZ

August 26-30, 1951

Storm Type: Remnant Tropical

Storm Precipitation Analysis System (SPAS) For Storm #1076

General Storm Location: Crown King, Arizona

Storm Dates: Aug 26, 1951 (0700 Z) - Aug 31, 1951 (0600 Z)

Event: Remnants of a hurricane

DAD Zone 1 (southern deserts):

Latitude: 34.0125

Longitude: -112.2625

Max. Grid/Radar Rainfall Amount: 10.60”

Max. Observed Rainfall Amount: n/a

DAD Zone 2 (Mogollon Rim, Arizona):

Latitude: 34.2041

Longitude: -112.3541

Max. Grid/Radar Rainfall Amount: 14.99”

Max. Observed Rainfall Amount: 13.56” at Crown King

Number of Stations: 366 (244 daily, 61 hourly, 3 hourly estimated, 3 hourly pseudo, 55 supplemental)

SPAS Version: 7.0

Base Map Used: Yes, mean (1971-2000) August precipitation

Spatial resolution: 30-seconds

Radar Included: No.

Depth-Area-Duration (DAD) analysis: Yes.

Storm Name:	SPAS-1076-Crown King-Zone 2
Storm Date:	8/26-30/1951
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	15-Aug	
	Lat	Long
Storm center location	34.01	-112.26
Storm Rep dew point location	32.46	-112.35
Transposition dewpoint location	29.425	-110.465
Basin location	30.975	-110.375

Moisture Inflow Direction:	S @ 120	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	2,900	feet
Storm Analysis Duration	24	hours

The storm representative dew point is	73.5 F	with total precipitable water above sea level of			2.67	inches.
The in-place maximum dew point is	78.5 F	with total precipitable water above sea level of			3.37	inches.
The transpositioned maximum dew point is	79.0 F	with total precipitable water above sea level of			3.44	inches.
The in-place storm elevation is	2,900	which subtracts	0.65	inches of precipitable water at	73.5 F	
The in-place storm elevation is	2,900	which subtracts	0.77	inches of precipitable water at	78.5 F	
The in-place storm elevation is	2,900	which subtracts	0.79	inches of precipitable water at	79.0 F	

The in-place maximization factor is	1.29
The moisture transposition factor is	1.02
The orographic transposition factor is	0.65
The total adjustment factor is	0.85

Notes:

Observed Storm Depth-Area-Duration

	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	72 Hours
1 sq miles	1.6	3.2	5.4	-	7.9	-	10.8	12.3	14.2
10 sq miles	1.1	2.9	4.8	-	7.4	-	9.6	11.1	13.4
100 sq miles	1.1	2.6	4.4	-	7.1	-	9.0	10.5	12.6
200 sq miles	1.0	2.2	3.8	-	6.6	-	7.9	9.5	11.9
500 sq miles	0.8	1.9	3.5	-	6.2	-	7.3	8.7	10.9
1000 sq miles	0.5	1.8	3.2	-	5.6	-	6.8	7.9	9.6
2000 sq miles	0.3	1.5	2.7	-	4.6	-	5.7	6.7	8.0
5000 sq miles	0.3	1.2	2.3	-	3.7	-	5.0	5.9	6.8
10000 sq miles	0.2	1.0	1.9	-	2.7	-	4.1	4.8	5.5
20000 sq miles	0.1	0.5	1.0	-	1.5	-	2.5	3.0	3.6

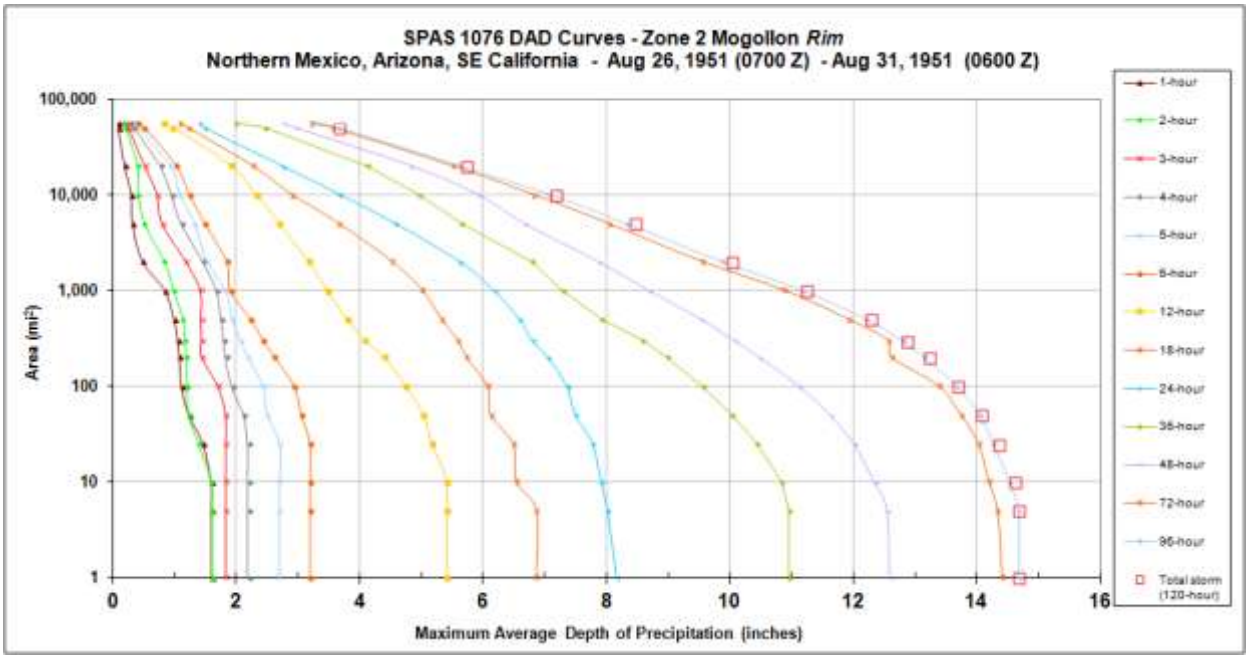
Adjusteded Storm Depth-Area-Duration

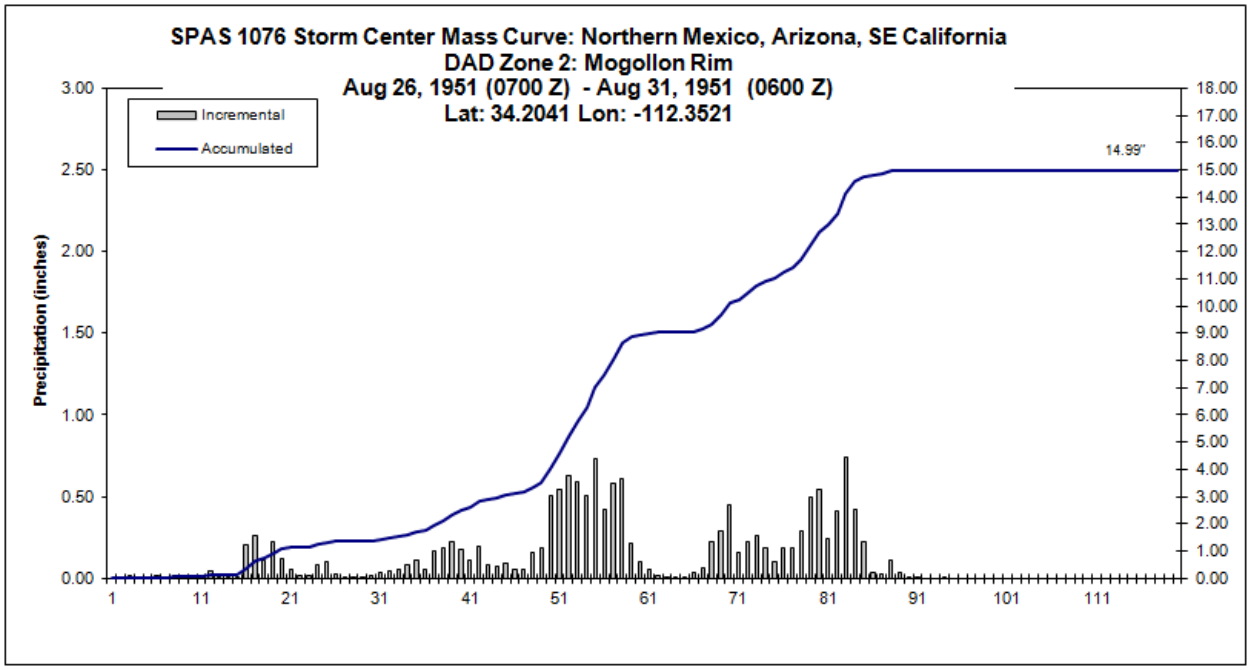
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours
1 sq miles	1.4	2.7	4.6	-	6.8	-	9.2	10.5	12.1
10 sq miles	0.9	2.5	4.1	-	6.3	-	8.2	9.5	11.4
100 sq miles	0.9	2.2	3.8	-	6.0	-	7.7	8.9	10.8
200 sq miles	0.8	1.9	3.2	-	5.6	-	6.8	8.1	10.2
500 sq miles	0.7	1.6	3.0	-	5.3	-	6.2	7.4	9.3
1000 sq miles	0.4	1.6	2.7	-	4.8	-	5.8	6.7	8.1
2000 sq miles	0.3	1.3	2.3	-	3.9	-	4.8	5.7	6.8
5000 sq miles	0.3	1.1	2.0	-	3.1	-	4.2	5.0	5.8
10000 sq miles	0.2	0.9	1.6	-	2.3	-	3.5	4.1	4.7
20000 sq miles	0.1	0.4	0.8	-	1.3	-	2.1	2.5	3.0

Storm or Storm Center Name	SPAS-1076-Crown King-Zone 2	
Storm Date(s)	8/26-30/1951	
Storm Type	Tropical	
Storm Location	34.01	-112.26
Storm Center Elevation	2900	
Precipitation Total & Duration (10 sq mi)	10.30 inches 72 hours (SPAS 1076 DAD)	
Storm Representative Dewpoint	73.5 F	24
Storm Representative Dewpoint Location	32.46	-112.35
In-place Maximum Dewpoint	78.5 F	
Moisture Inflow Vector	S @ 120	
In-place Maximization Factor		
Temporal Transposition (Date)	15-Aug	
Transposition Dewpoint Location	29.43	-110.47
Transposition Maximum Dewpoint	79.0 F	
Transposition Adjustment Factor	1.02	
Grid Point Location	30.975	-110.375
Grid Point Elevation	6,977	
Total Adjustment Factor	0.85	

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

	Duration (hours)														
Area (mi²)	1	2	3	4	5	6	12	18	24	36	48	72	96	120	Total
0.27	1.88	1.88	2.21	2.49	3.00	3.51	5.68	7.19	8.49	11.26	12.85	14.75	14.99	14.99	14.99
1	1.60	1.60	1.83	2.19	2.70	3.20	5.42	6.86	8.17	10.96	12.58	14.41	14.69	14.68	14.68
5	1.60	1.60	1.83	2.19	2.70	3.20	5.42	6.86	8.02	10.96	12.54	14.33	14.68	14.68	14.68
10	1.59	1.59	1.83	2.19	2.70	3.20	5.42	6.54	7.92	10.83	12.33	14.19	14.53	14.61	14.61
25	1.46	1.38	1.83	2.19	2.70	3.20	5.18	6.48	7.78	10.44	12.00	14.02	14.28	14.35	14.35
50	1.23	1.22	1.83	2.12	2.50	3.06	5.04	6.12	7.50	10.03	11.61	13.74	14.05	14.07	14.07
100	1.11	1.20	1.70	1.93	2.43	2.94	4.75	6.06	7.36	9.56	11.11	13.38	13.68	13.70	13.70
200	1.08	1.18	1.44	1.83	2.19	2.62	4.40	5.73	7.05	8.98	10.47	12.61	13.15	13.22	13.22
300	1.05	1.16	1.44	1.80	2.07	2.44	4.09	5.59	6.80	8.58	10.06	12.56	12.80	12.87	12.87
500	0.99	1.13	1.43	1.76	1.94	2.23	3.80	5.32	6.59	7.92	9.52	11.92	12.21	12.29	12.29
1,000	0.84	0.98	1.42	1.68	1.82	1.90	3.48	5.01	6.18	7.29	8.67	10.88	11.17	11.24	11.24
2,000	0.48	0.83	1.18	1.46	1.52	1.84	3.18	4.52	5.62	6.80	7.86	9.55	9.87	10.04	10.04
5,000	0.32	0.51	0.80	1.11	1.32	1.49	2.70	3.66	4.58	5.65	6.66	8.03	8.32	8.47	8.47
10,000	0.30	0.41	0.72	0.95	1.09	1.24	2.33	2.90	3.68	4.96	5.91	6.82	7.08	7.17	7.17
20,000	0.19	0.40	0.52	0.77	0.93	1.03	1.92	2.26	2.74	4.12	4.83	5.50	5.62	5.74	5.74
50,000	0.09	0.20	0.26	0.34	0.41	0.51	0.98	1.22	1.48	2.47	2.95	3.55	3.67	3.67	3.67
56,112	0.09	0.16	0.23	0.29	0.38	0.40	0.83	1.08	1.41	1.99	2.75	3.21	3.32	3.37	3.37




SPAS 1076 Storm Center Mass Curve: Northern Mexico, Arizona, SE California
DAD Zone 2: Mogollon Rim
Aug 26, 1951 (0700 Z) - Aug 31, 1951 (0600 Z)
Lat: 34.2041 Lon: -112.3521
Incremental
Accumulated
14.99"
Precipitation (inches)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
18.00
17.00
16.00
15.00
14.00
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
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41
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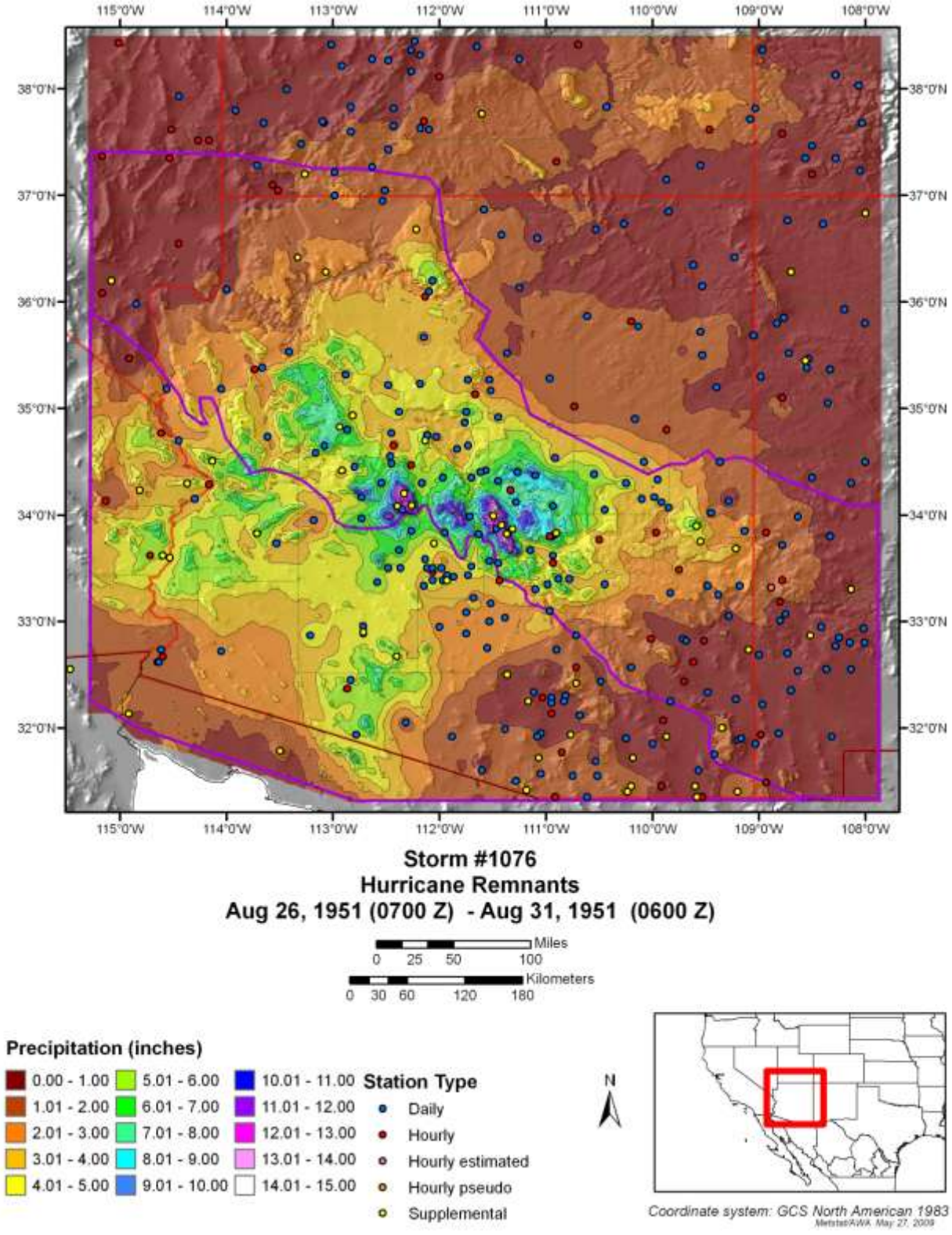
61
71
81
91
101
111



Storm #1076
Hurricane Remnants
Aug 26, 1951 (0700 Z) - Aug 31, 1951 (0600 Z)

Queen Creek, AZ

August 19, 1954

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1096

General Storm Location: Queen Creek, Arizona

Storm Dates: **Event**: August 18-20, 1954

Latitude: 33.203

Longitude: -111.145

Max. Grid/Radar Rainfall Amount: 8.06”

Max. Observed Rainfall Amount: 7.10” (Martinez Canyon, AZ)

Number of Stations: 47 (13 Daily, 4 hourly, 2 hourly pseudo, 16 supplemental, and 12 estimated supplemental)

SPAS Version: 7.0

Base Map Used: Mean (1971-2000) August PRISM Precip.

Spatial resolution: 30-sec

Radar Included: N

Depth-Area-Duration (DAD) analysis: Yes

Storm Name:	**SPAS-1096-Queen Creek**
Storm Date:	**August 19, 1954**
AWA Analysis Date:	**5/25/2013**

Storm Adjustment for Grid Point 1

Temporal Transposition Date	**15-Aug**	
	Lat	**Long**
Storm center location	**33.20**	**-111.15**
Storm Rep dew point location	**32.74**	**-112.61**
Transposition dewpoint location	**30.515**	**-111.835**
Basin location	**30.975**	**-110.375**

Moisture Inflow Direction:	**WSW @ 90**	miles
Grid Point Elevation	**6,977**	feet
Storm Center Elevation	**3,500**	feet
Storm Analysis Duration	**3**	hours

The storm representative dew point is	**74.0 F**	with total precipitable water above sea level of			**2.73**	inches.
The in-place maximum dew point is	**81.5 F**	with total precipitable water above sea level of			**3.84**	inches.
The transpositioned maximum dew point is	**82.0 F**	with total precipitable water above sea level of			**3.92**	inches.
The in-place storm elevation is	**3,500**	which subtracts	**0.78**	inches of precipitable water at	**74.0 F**	
The in-place storm elevation is	**3,500**	which subtracts	**1.00**	inches of precipitable water at	**81.5 F**	
The in-place storm elevation is	**3,500**	which subtracts	**1.01**	inches of precipitable water at	**82.0 F**	

The in-place maximization factor is	**1.46**
The moisture transposition factor is	**1.02**
The orographic transposition factor is	**1.11**
The total adjustment factor is	**1.66**

Notes:

Observed Storm Depth-Area-Duration

	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**2.4**	**4.3**	**5.8**	**7.0**	**7.5**	**7.5**	**7.5**	**7.5**	**7.8**
10 sq miles	**2.4**	**4.3**	**5.7**	**6.9**	**7.4**	**7.4**	**7.4**	**7.4**	**7.6**
50 sq miles	**2.2**	**4.2**	**5.2**	**6.2**	**6.6**	**6.6**	**6.6**	**6.6**	**6.9**
100 sq miles	**2.1**	**4.0**	**4.9**	**5.7**	**6.1**	**6.1**	**6.1**	**6.1**	**6.5**
200 sq miles	**1.9**	**3.7**	**4.4**	**5.2**	**5.5**	**5.5**	**5.5**	**5.5**	**5.9**
500 sq miles	**1.6**	**3.1**	**3.7**	**4.3**	**4.6**	**4.6**	**4.6**	**4.6**	**5.1**
1000 sq miles	**1.2**	**2.4**	**2.9**	**3.3**	**3.5**	**3.5**	**3.5**	**3.5**	**4.0**
2000 sq miles	**0.8**	**1.6**	**1.8**	**2.2**	**2.3**	**2.3**	**2.3**	**2.3**	**2.8**
5000 sq miles	-	-	-	-	-	-	-	-	-

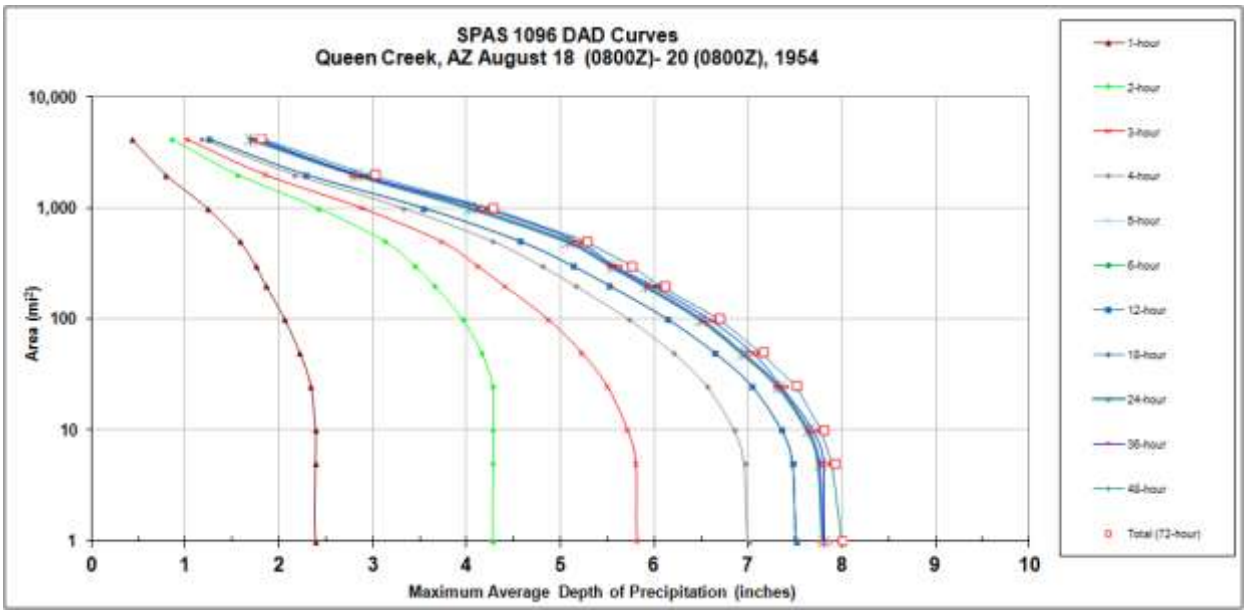
Adjusted Storm Depth-Area-Duration

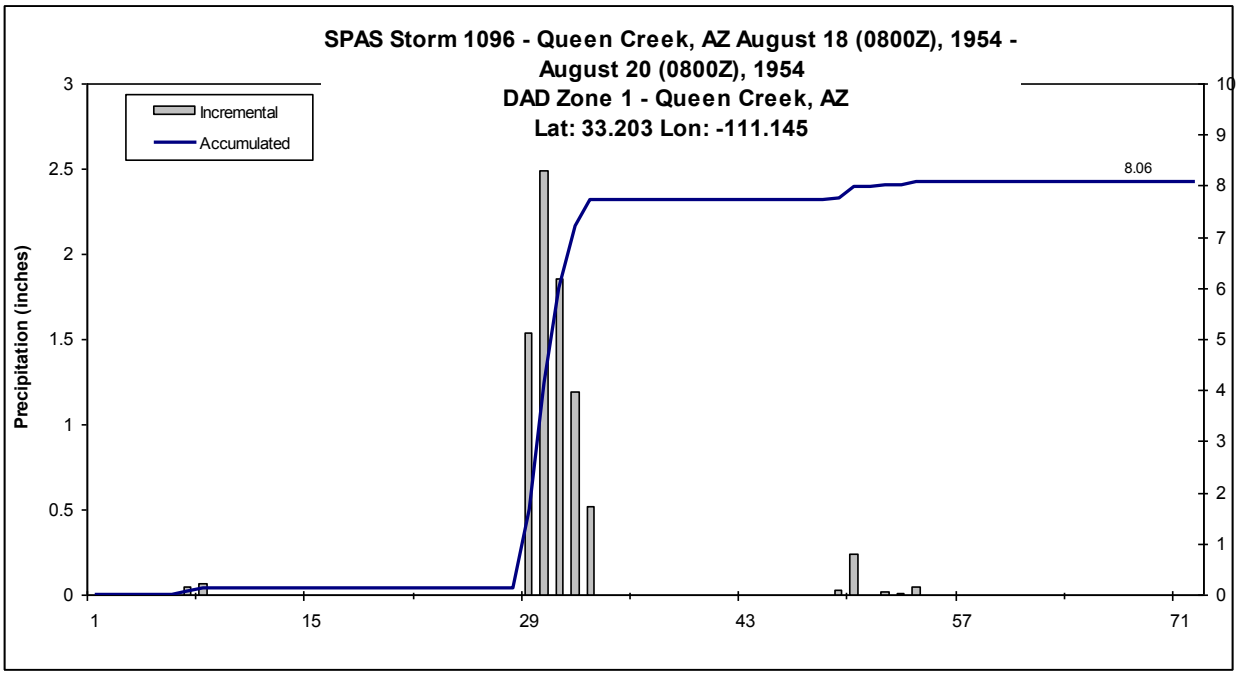
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**4.0**	**7.1**	**9.6**	**11.6**	**12.4**	**12.4**	**12.4**	**12.4**	**12.9**
10 sq miles	**4.0**	**7.1**	**9.5**	**11.3**	**12.2**	**12.2**	**12.2**	**12.2**	**12.6**
50 sq miles	**3.7**	**6.9**	**8.6**	**10.3**	**11.0**	**11.0**	**11.0**	**11.0**	**11.5**
100 sq miles	**3.4**	**6.5**	**8.1**	**9.5**	**10.2**	**10.2**	**10.2**	**10.2**	**10.7**
200 sq miles	**3.1**	**6.0**	**7.3**	**8.5**	**9.1**	**9.1**	**9.1**	**9.1**	**9.8**
500 sq miles	**2.6**	**5.2**	**6.2**	**7.1**	**7.6**	**7.6**	**7.6**	**7.6**	**8.4**
1000 sq miles	**2.0**	**4.0**	**4.8**	**5.5**	**5.8**	**5.8**	**5.8**	**5.8**	**6.7**
2000 sq miles	**1.3**	**2.6**	**3.0**	**3.6**	**3.8**	**3.8**	**3.8**	**3.8**	**4.6**
5000 sq miles	-	-	-	-	-	-	-	-	-

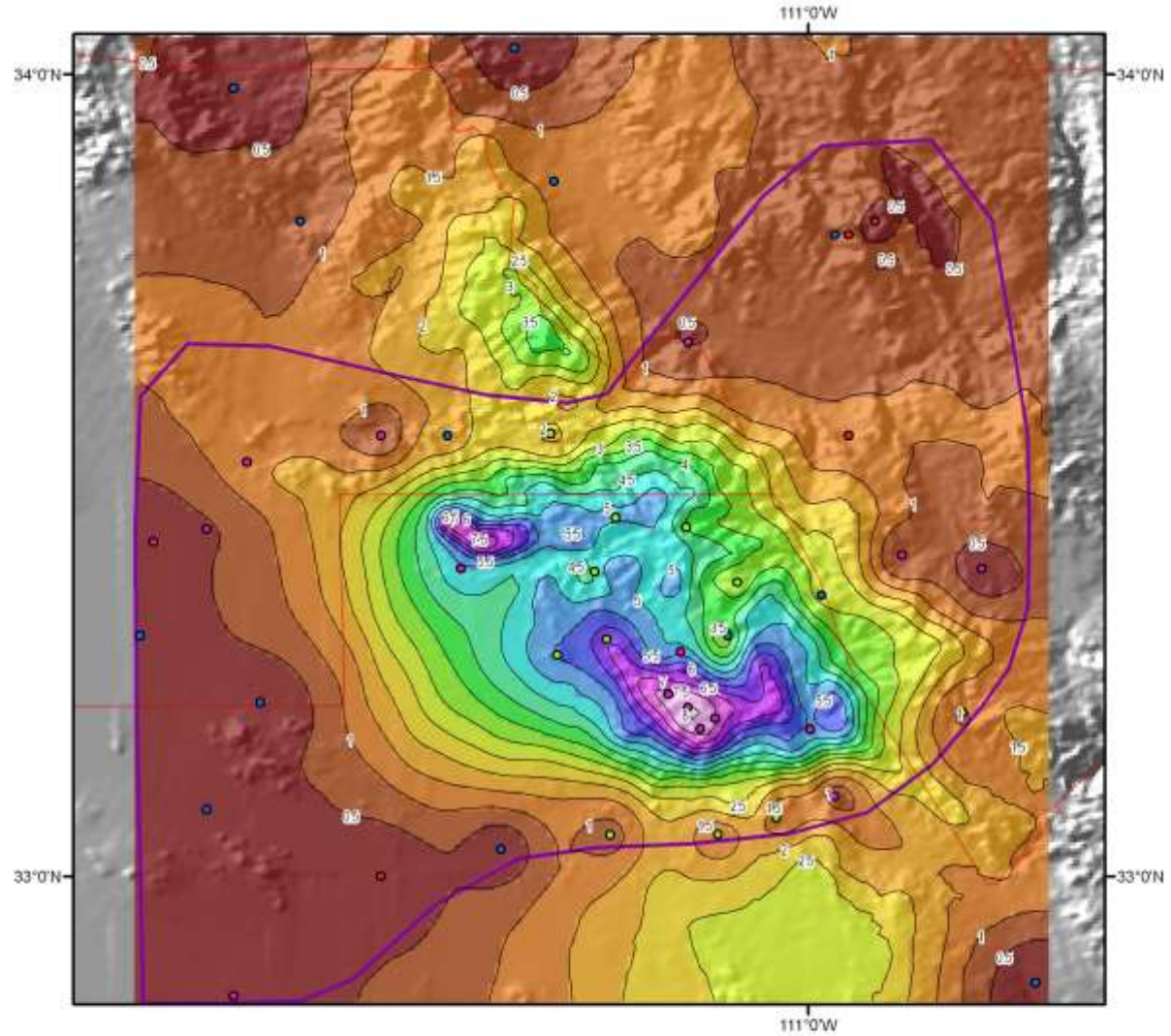
Storm or Storm Center Name	**SPAS-1096-Queen Creek**		
Storm Date(s)	8/19/54		
Storm Type	Local Storm		
Storm Location	33.20	-111.15	
Storm Center Elevation	3500		
Precipitation Total & Duration (10 sq mi)	8.06 inches 48 hours 7.60" in 5hrs		
Storm Representative Dewpoint	74.0 F	3	rh ave KPHX, KYUM
Storm Representative Dewpoint Location	32.74	-112.61	
In-place Maximum Dewpoint	81.5 F		
Moisture Inflow Vector	WSW @ 90		
In-place Maximization Factor	1.46		
Temporal Transposition (Date)	15-Aug		
Transposition Dewpoint Location	30.52	-111.84	
Transposition Maximum Dewpoint	82.0 F		
Transposition Adjustment Factor	1.02		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	1.66		

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

	Duration (hours)											
Area (mi^2)	1	2	3	4	5	6	12	18	24	36	48	total
0.28	2.49	4.40	5.88	7.08	7.60	7.60	7.60	7.60	7.88	7.95	8.06	8.06
1	2.39	4.28	5.81	7.00	7.51	7.51	7.51	7.51	7.80	7.82	8.00	8.00
5	2.39	4.28	5.80	6.96	7.47	7.47	7.47	7.47	7.75	7.81	7.89	7.92
10	2.39	4.28	5.71	6.85	7.35	7.35	7.35	7.35	7.63	7.69	7.77	7.80
25	2.34	4.27	5.49	6.56	7.03	7.03	7.03	7.03	7.31	7.35	7.51	7.52
50	2.22	4.15	5.22	6.19	6.63	6.63	6.63	6.63	6.92	7.04	7.13	7.16
100	2.06	3.95	4.86	5.72	6.13	6.13	6.13	6.13	6.48	6.58	6.69	6.70
200	1.86	3.65	4.39	5.15	5.51	5.51	5.51	5.51	5.89	5.97	6.04	6.11
300	1.75	3.44	4.11	4.79	5.12	5.12	5.12	5.12	5.53	5.57	5.75	5.76
500	1.58	3.12	3.72	4.27	4.56	4.56	4.56	4.56	5.06	5.17	5.25	5.28
1,000	1.23	2.41	2.87	3.31	3.53	3.53	3.53	3.53	4.02	4.16	4.26	4.28
2,000	0.79	1.55	1.84	2.15	2.27	2.27	2.27	2.27	2.80	2.82	2.94	3.02
4,181	0.43	0.85	1.01	1.16	1.24	1.24	1.24	1.24	1.68	1.76	1.81	1.81




SPAS Storm 1096 - Queen Creek, AZ August 18 (0800Z), 1954 - August 20 (0800Z), 1954
DAD Zone 1 - Queen Creek, AZ
Lat: 33.203 Lon: -111.145
Incremental
Accumulated
Precipitation (inches)
8.06
0
0.5
1
1.5
2
2.5
3
0
1
2
3
4
5
6
7
8
9
10
1
15
29
43
57
71



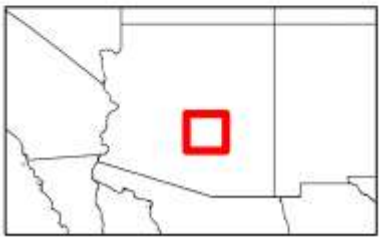
Storm #1096
Queen Creek 1954
August 18-20, 1954

Miles
0 4 8 16
Kilometers
0 4 8 16 24

Precipitation (inches)

0.04 - 0.50	3.01 - 3.50	6.01 - 6.50	Daily
0.51 - 1.00	3.51 - 4.00	6.51 - 7.00	Hourly
1.01 - 1.50	4.01 - 4.50	7.01 - 7.50	Hourly pseudo
1.51 - 2.00	4.51 - 5.00	7.51 - 8.00	Supplemental
2.01 - 2.50	5.01 - 5.50	8.01 - 8.50	Supplemental estimated
2.51 - 3.00	5.51 - 6.00		dadzones_1096

N



Coordinate system: GCS North American 1983
MetstatAWA June 3, 2009

Wellton, AZ

August 24, 1955

Storm Type: Remnant Tropical

Storm Precipitation Analysis System (SPAS) For Storm #1064

General Storm Location: Wellton, AZ

Storm Dates: 08/22/1955 0800Z – 08/25/1955 0800Z

Event: Convective

Latitude: 32.5792

Longitude: -114.3375

Max. Grid/Radar Rainfall Amount: 6.49" (Grid/Pixel Point)

Max. Observed Rainfall Amount: 6.00" (Texas Hill Farm, type=supplemental)

Number of Stations: 17 (1-hourly, 0-hourly pseudo, 3-daily, 13-daily supplemental) gauging stations within the defined search domain.

SPAS Version: 7.0

Base Map Used: Yes, "conus_prism_ppt_in_1971_2000_08"

Spatial resolution: 0.28 mi^2

Radar Included: No

Depth-Area-Duration (DAD) analysis: Yes: 1, 2, 3, 4, 5, 6, 9, 12, 18, 24, 36, & 48 hours

Storm Name:	SPAS-1064-Wellton
Storm Date:	August 24, 1955
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	15-Aug	
	Lat	Long
Storm center location	32.58	-114.34
Storm Rep dew point location	32.65	-114.60
Transposition dewpoint location	31.045	-110.635
Basin location	30.975	-110.375

Moisture Inflow Direction:	WNW @ 20	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	1,650	feet
Storm Analysis Duration	3	hours

The storm representative dew point is	75.0 F	with total precipitable water above sea level of			2.85	inches.
The in-place maximum dew point is	82.0 F	with total precipitable water above sea level of			3.92	inches.
The transpositioned maximum dew point is	81.5 F	with total precipitable water above sea level of			3.84	inches.
The in-place storm elevation is	1,650	which subtracts	0.41	inches of precipitable water at	75.0 F	
The in-place storm elevation is	1,650	which subtracts	0.49	inches of precipitable water at	82.0 F	
The in-place storm elevation is	1,650	which subtracts	0.49	inches of precipitable water at	81.5 F	

The in-place maximization factor is	1.40
The moisture transposition factor is	0.98
The orographic transposition factor is	0.85
The total adjustment factor is	1.16

Notes:

Observed Storm Depth-Area-Duration

	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	3.3	4.9	5.0	5.0	5.0	5.1	5.1	5.1	-
10 sq miles	2.7	3.9	4.2	4.2	4.2	4.2	4.3	4.3	-
50 sq miles	1.9	2.7	2.9	3.0	3.0	3.0	3.1	3.1	-
100 sq miles	1.5	2.2	2.4	2.5	2.5	2.5	2.5	2.6	-
200 sq miles	1.3	1.8	2.0	2.0	2.0	2.0	2.1	2.1	-
500 sq miles	1.0	1.4	1.5	1.5	1.6	1.6	1.6	1.7	-
1000 sq miles	0.8	1.1	1.2	1.2	1.2	1.3	1.4	1.4	-
2000 sq miles	0.5	0.8	0.9	0.9	0.9	0.9	1.1	1.1	-
5000 sq miles	-	-	-	-	-	-	-	-	-

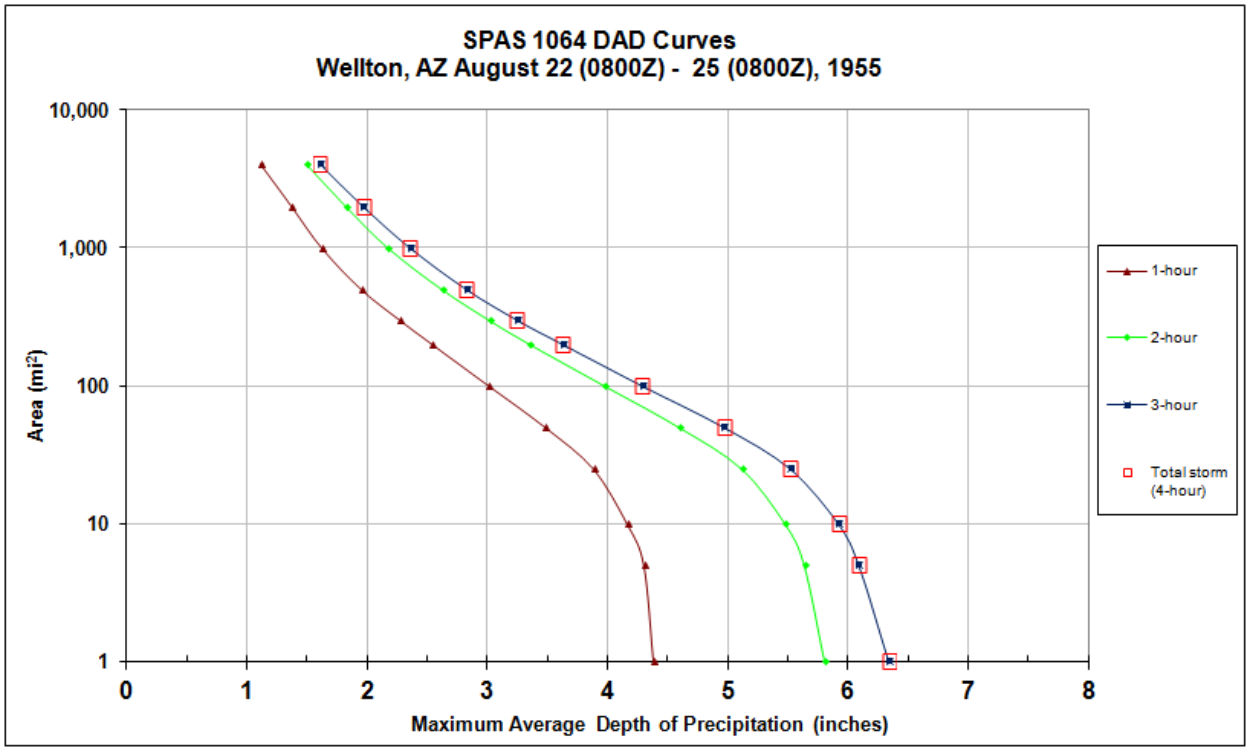
Adjusted Storm Depth-Area-Duration

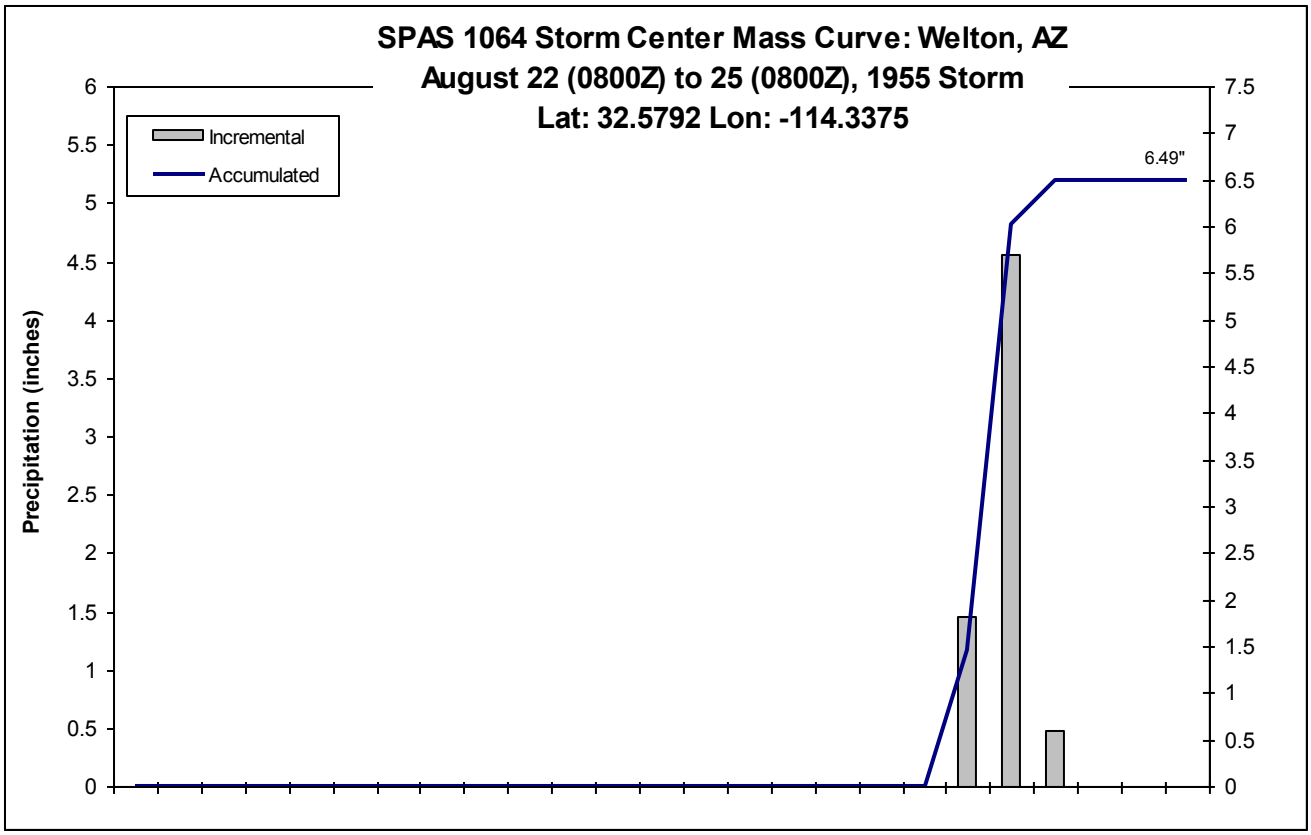
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	3.9	5.7	5.8	5.9	5.9	5.9	6.0	6.0	-
10 sq miles	3.2	4.6	4.9	4.9	4.9	4.9	5.0	5.0	-
50 sq miles	2.2	3.1	3.4	3.4	3.4	3.5	3.6	3.6	-
100 sq miles	1.8	2.6	2.8	2.9	2.9	2.9	2.9	3.0	-
200 sq miles	1.5	2.1	2.3	2.3	2.3	2.3	2.4	2.5	-
500 sq miles	1.1	1.6	1.8	1.8	1.8	1.8	1.9	1.9	-
1000 sq miles	0.9	1.3	1.4	1.4	1.4	1.5	1.6	1.6	-
2000 sq miles	0.6	1.0	1.0	1.1	1.1	1.1	1.2	1.2	-
5000 sq miles	-	-	-	-	-	-	-	-	-

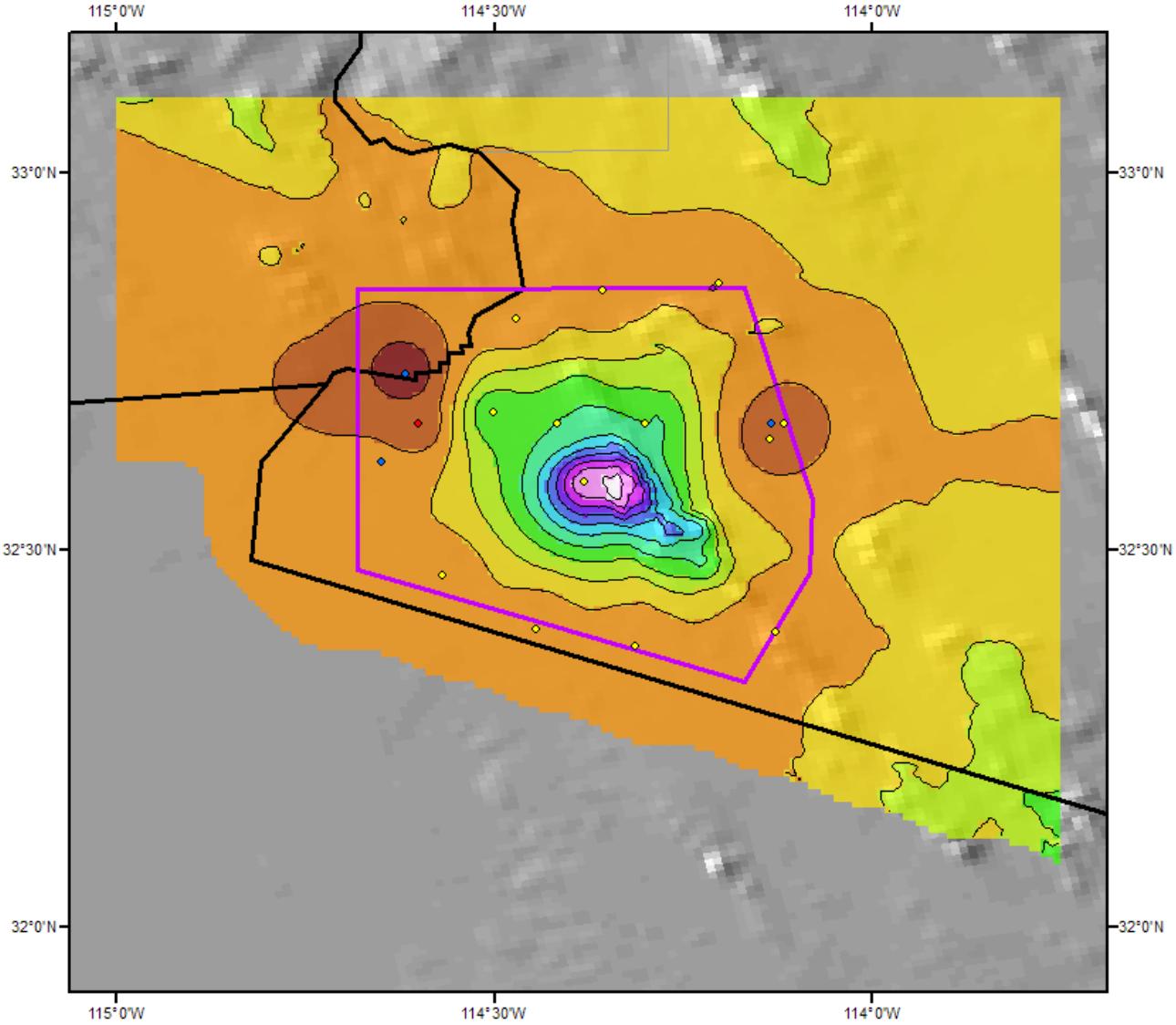
Storm or Storm Center Name	SPAS-1064-Wellton		
Storm Date(s)	8/24/55		
Storm Type	Local Storm		
Storm Location	32.58	-114.34	
Storm Center Elevation	1650		
Precipitation Total & Duration (10 sq mi)	6.49 inches 3 hours 4.56" in 1hr and 6.01" in 2hrs (SPAS 1064 DAD)		
Storm Representative Dewpoint	75.0 F	3	rh ave-KYUM
Storm Representative Dewpoint Location	32.65	-114.6	
In-place Maximum Dewpoint	82.0 F		
Moisture Inflow Vector	WNW @ 20		
In-place Maximization Factor	1.40		
Temporal Transposition (Date)	15-Aug		
Transposition Dewpoint Location	31.05	-110.64	
Transposition Maximum Dewpoint	81.5 F		
Transposition Adjustment Factor	0.98		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	1.16		

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

Area (mi^2)	Duration (hours)							
	1	2	3	4	5	6	12	total
0.28	4.56	6.01	6.49	6.49	-	-	-	6.49
1	4.38	5.81	6.34	6.34	-	-	-	6.34
5	4.30	5.64	6.09	6.09	-	-	-	6.09
10	4.16	5.48	5.92	5.92	-	-	-	5.92
25	3.88	5.12	5.52	5.52	-	-	-	5.52
50	3.48	4.60	4.97	4.97	-	-	-	4.97
100	3.01	3.98	4.29	4.29	-	-	-	4.29
200	2.54	3.36	3.63	3.63	-	-	-	3.63
300	2.27	3.02	3.25	3.25	-	-	-	3.25
500	1.95	2.63	2.83	2.83	-	-	-	2.83
1,000	1.62	2.18	2.36	2.36	-	-	-	2.36
2,000	1.37	1.83	1.97	1.97	-	-	-	1.97
4,060	1.11	1.50	1.61	1.61	-	-	-	1.61




SPAS 1064 Storm Center Mass Curve: Welton, AZ
August 22 (0800Z) to 25 (0800Z), 1955 Storm
Lat: 32.5792 Lon: -114.3375
Incremental
Accumulated
6.49"
Precipitation (inches)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
7
7.5



Total Rainfall (72-hours)
Welton, AZ 1955 Storm
Storm #1064 August 22 (0800 Z) to 25 (0800 Z), 1955

Gauging Stations

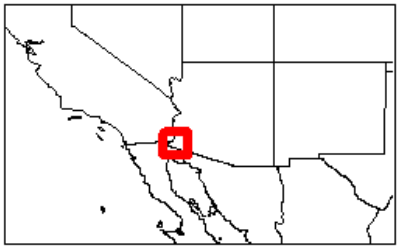
- Daily
- Hourly
- Supplemental

Miles: 0 4.5 9 18
Kilometers: 0 5 10 20 30 40

Precipitation (inches)

0.13 - 0.50	2.01 - 2.50	4.01 - 4.50	6.01 - 6.50
0.51 - 1.00	2.51 - 3.00	4.51 - 5.00	
1.01 - 1.50	3.01 - 3.50	5.01 - 5.50	
1.51 - 2.00	3.51 - 4.00	5.51 - 6.00	

N



Coordinate system: GCS North American 1983
Scale: 1:821,805

MetstatAWA April 28, 2009

Horseshoe Dam, AZ

October 27 – November 1, 1959

Storm Type: General Frontal

Storm Precipitation Analysis System (SPAS) For Storm #1154

General Storm Location: Horseshoe Dam, Arizona

Storm Dates: October 27, 1959 – November 1, 1959

Event: Synoptic storm

DAD Zone 1 -- Southern Deserts

Latitude: 33.0375

Longitude: -110.9958

Max. Grid/Radar Rainfall Amount: 6.71”

Max. Observed Rainfall Amount: n/a

DAD Zone 2 – Mogollon Rim Deserts

Latitude: 33.9375

Longitude: -111.7375

Max. Grid/Radar Rainfall Amount: 10.86”

Max. Observed Rainfall Amount: 10.47”

Number of Stations: 343 (233 daily, 38 hourly, 4 hourly estimated, 11 hourly pseudo, 57 supplemental)

SPAS Version: 7.0

Base Map Used: PRISM Mean October Precipitation

Spatial resolution: 30-seconds

Radar Included: N

Depth-Area-Duration (DAD) analysis: Yes

Storm Name:	SPAS-1154-Horshoe Dam DAD Zo
Storm Date:	10/29-11-1/1959
AWA Analysis Date:	5/28/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	15-Oct	
	Lat	Long
Storm center location	33.04	-111.00
Storm Rep dew point location	32.22	-111.04
Transposition dewpoint location	30.155	-110.415
Basin location	30.975	-110.375

Moisture Inflow Direction:	S @ 60	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	2,750	feet
Storm Analysis Duration	24	hours

The storm representative dew point is	69.5 F	with total precipitable water above sea level of			2.20	inches.
The in-place maximum dew point is	72.0 F	with total precipitable water above sea level of			2.47	inches.
The transpositioned maximum dew point is	72.0 F	with total precipitable water above sea level of			2.47	inches.
The in-place storm elevation is	2,750	which subtracts	0.54	inches of precipitable water at	69.5 F	
The in-place storm elevation is	2,750	which subtracts	0.59	inches of precipitable water at	72.0 F	
The in-place storm elevation is	2,750	which subtracts	0.59	inches of precipitable water at	72.0 F	

The in-place maximization factor is	1.13
The moisture transposition factor is	1.00
The orographic transposition factor is	0.77
The total adjustment factor is	0.87

Notes: 24hr average from KDMA 27th 7LST-28th 4LST (6 obs), KFHU 28th (6obs), KLUF 27th 9LST-28th 21LST (6obs)

Observed Storm Depth-Area-Duration

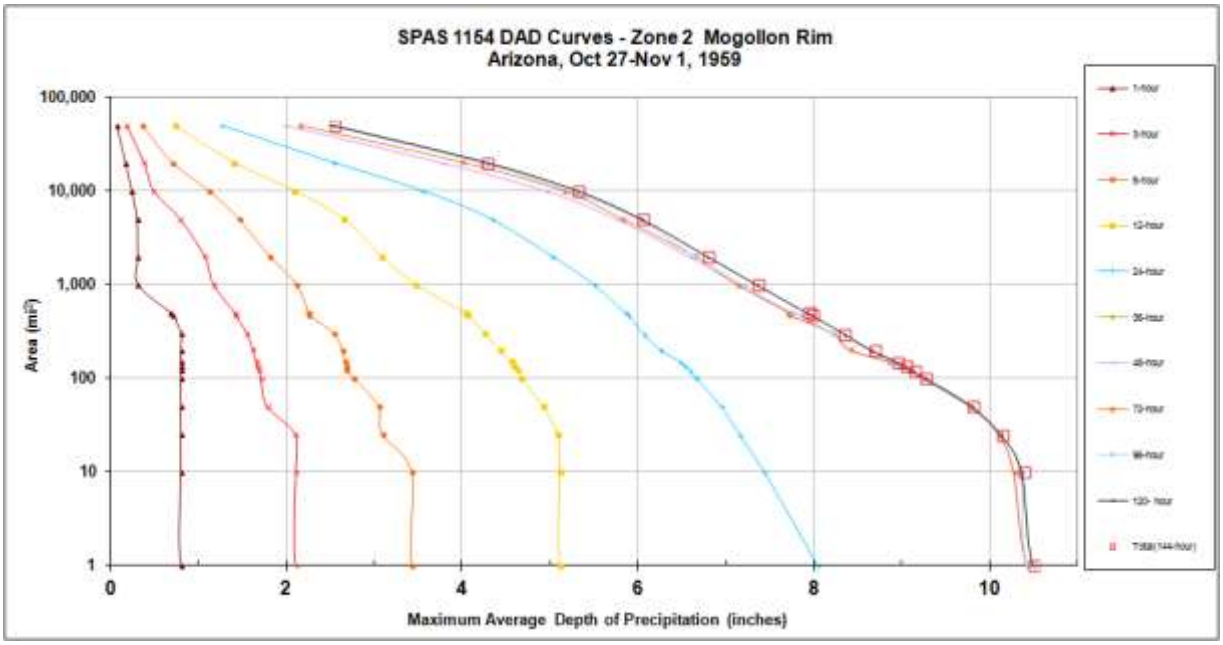
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	0.8	3.4	5.1	-	8.0	-	-	10.4	-	10.4
10 sq miles	0.8	3.4	5.1	-	7.4	-	-	10.3	-	10.3
100 sq miles	0.8	2.8	4.7	-	6.7	-	-	9.2	-	9.2
200 sq miles	0.8	2.6	4.4	-	6.3	-	-	8.4	-	8.4
500 sq miles	0.7	2.3	4.0	-	5.9	-	-	7.7	-	7.7
1000 sq miles	0.3	2.1	3.5	-	5.5	-	-	7.1	-	7.1
2000 sq miles	0.3	1.8	3.1	-	5.0	-	-	6.6	-	6.7
5000 sq miles	0.3	1.5	2.7	-	4.3	-	-	5.8	-	5.8
10000 sq miles	0.2	1.1	2.1	-	3.6	-	-	4.9	-	5.2
20000 sq miles	0.2	0.7	1.4	-	2.5	-	-	3.8	-	4.0

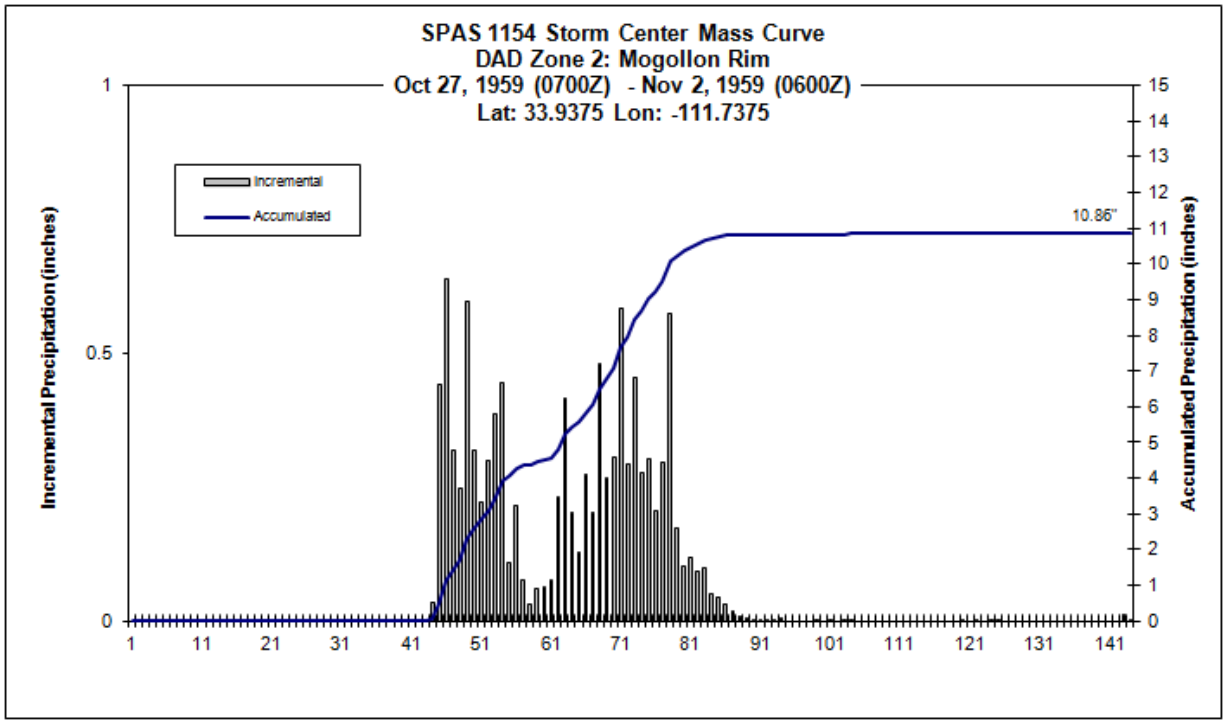
Adjusteded Storm Depth-Area-Duration

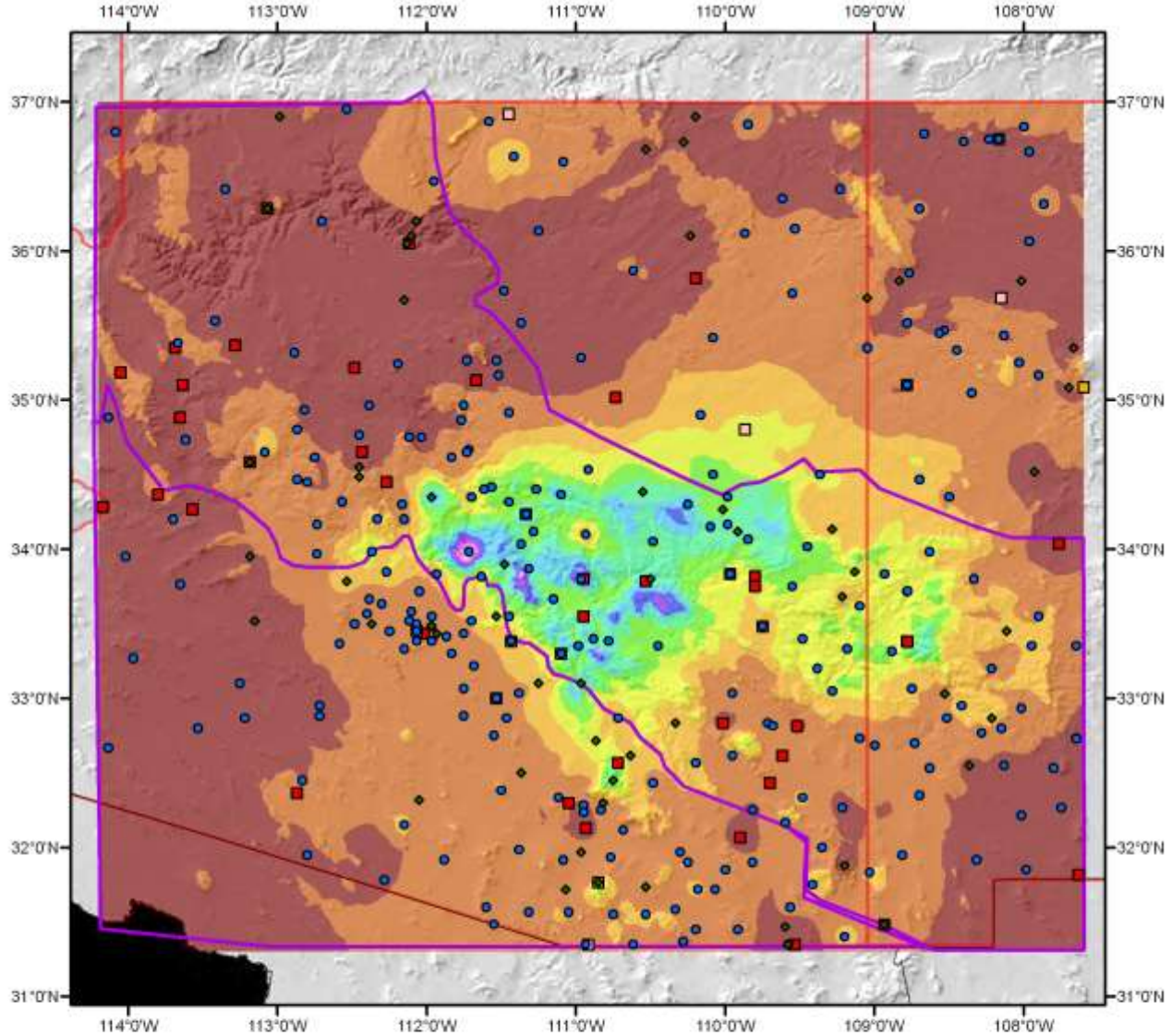
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	0.7	3.0	4.5	-	7.0	-	-	9.1	-	9.1
10 sq miles	0.7	3.0	4.5	-	6.5	-	-	9.0	-	9.0
100 sq miles	0.7	2.4	4.1	-	5.8	-	-	8.0	-	8.1
200 sq miles	0.7	2.3	3.9	-	5.5	-	-	7.3	-	7.3
500 sq miles	0.6	2.0	3.5	-	5.1	-	-	6.7	-	6.7
1000 sq miles	0.3	1.8	3.0	-	4.8	-	-	6.2	-	6.2
2000 sq miles	0.3	1.6	2.7	-	4.4	-	-	5.7	-	5.8
5000 sq miles	0.3	1.3	2.3	-	3.8	-	-	5.0	-	5.1
10000 sq miles	0.2	1.0	1.8	-	3.1	-	-	4.3	-	4.5
20000 sq miles	0.1	0.6	1.2	-	2.2	-	-	3.3	-	3.5

Storm or Storm Center Name	SPAS-1154-Horshoe Dam DAD Zone 2	
Storm Date(s)	10/29-11-1/1959	
Storm Type	General	
Storm Location	33.04	-111.00
Storm Center Elevation	2750	
Precipitation Total & Duration (10 sq mi)	6.70 inches 72 hours (SPAS 1134 DAD Zone 1)	
Storm Representative Dewpoint	69.5 F	24
Storm Representative Dewpoint Location	32.22	-111.04
In-place Maximum Dewpoint	72.0 F	
Moisture Inflow Vector	S @ 60	
In-place Maximization Factor		
Temporal Transposition (Date)	15-Oct	
Transposition Dewpoint Location	30.16	-110.42
Transposition Maximum Dewpoint	72.0 F	
Transposition Adjustment Factor	1.00	
Grid Point Location	30.975	-110.375
Grid Point Elevation	6,977	
Total Adjustment Factor	0.87	

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)															
	Duration (hours)														
Area (mi²)	1	2	3	4	5	6	12	18	24	36	48	72	96	120	Total (144-h
0.27	1.09		2.38			3.71	5.44		8.37		10.82	10.84	10.84	10.86	10.86
1	0.8		2.11			3.43	5.11		8.04		10.42	10.43	10.43	10.49	10.49
10	0.8		2.11			3.43	5.11		7.43		10.27	10.28	10.36	10.36	10.38
25	0.8		2.1			3.09	5.08		7.15		10.1	10.11	10.12	10.12	10.13
50	0.8		1.78			3.05	4.91		6.94		9.76	9.77	9.78	9.79	9.8
100	0.8		1.71			2.77	4.67		6.66		9.22	9.24	9.24	9.26	9.26
121	0.8		1.69			2.68	4.62		6.58		9.06	9.07	9.09	9.11	9.13
135	0.8		1.67			2.68	4.59		6.53		8.96	8.97	8.99	9.02	9.04
150	0.8		1.66			2.67	4.55		6.47		8.85	8.86	8.88	8.93	8.95
200	0.8		1.62			2.64	4.43		6.25		8.39	8.42	8.64	8.64	8.68
300	0.8		1.55			2.54	4.25		6.06		8.21	8.22	8.22	8.33	8.34
475	0.71		1.42			2.25	4.06		5.88		7.71	7.71	7.84	7.96	7.98
500	0.68		1.41			2.25	4.03		5.85		7.71	7.71	7.76	7.91	7.93
1000	0.31		1.17			2.12	3.47		5.49		7.13	7.13	7.19	7.34	7.36
2000	0.31		1.07			1.81	3.08		5.02		6.57	6.65	6.64	6.78	6.79
5000	0.3		0.79			1.46	2.65		4.33		5.75	5.83	6.01	6.03	6.04
10000	0.24		0.49			1.12	2.09		3.55		4.94	5.15	5.21	5.3	5.31
20000	0.17		0.38			0.7	1.4		2.54		3.75	4.01	4.21	4.27	4.27
50,000	0.07		0.18			0.36	0.73		1.26		1.97	2.15	2.48	2.52	2.54




SPAS 1154 Storm Center Mass Curve
DAD Zone 2: Mogollon Rim
Oct 27, 1959 (0700Z) - Nov 2, 1959 (0600Z)
Lat: 33.9375 Lon: -111.7375
Incremental
Accumulated
10.86"
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
1
0.5
0
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
1
11
21
31
41
51
61
71
81
91
101
111
121
131
141

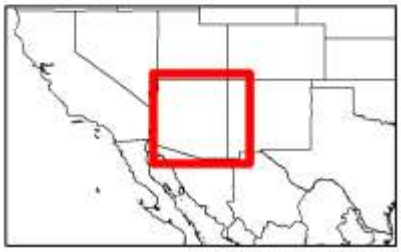


Total Precipitation
SPAS storm 1154
10/27/1959 - 11/01/1959

Miles
0 15 30 60

Stations

0.00 - 1.00	4.01 - 5.00	8.01 - 9.00	Daily
1.01 - 2.00	5.01 - 6.00	9.01 - 10.00	Hourly
2.01 - 3.00	6.01 - 7.00	10.01 - 11.00	Hourly estimated
3.01 - 4.00	7.01 - 8.00		Hourly pseudo
			Supplemental



Metstat/AWA August 19, 2009

Sonora Desert, AZ

September 26-28, 1962

Storm Type: Remnant Tropical

Storm Precipitation Analysis System (SPAS) For Storm #1083

General Storm Location: Sonora Desert Museum, Arizona

Storm Dates: September 25-27, 1962 (24hr window 9/26/62 0800 – 9/28/62 0800

Event: Remnants of tropical storm Claudia

Latitude: 32.1791

Longitude: -111.3875

Max. Grid/Radar Rainfall Amount: 7.16”

Max. Observed Rainfall Amount: 7.00”

Number of Stations: 449 (58-hourly, 8-hourly pseudo, 287-daily, 96-daily supplemental) gauging stations within the defined search domain.

SPAS Version: 7.0

Base Map Used: Yes, us_ppt_1962_09_30sec_in

Spatial resolution: 0.28 mi^2

Radar Included: No

Depth-Area-Duration (DAD) analysis: Yes: 1, 2, 3, 4, 5, 6, 9, 12, 18, & 24 hours

Storm Name:	SPAS-1083-Sonora Desert Museu
Storm Date:	9/26-27/1962
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	10-Sep	
	Lat	Long
Storm center location	32.18	-111.39
Storm Rep dew point location	32.12	-110.93
Transposition dewpoint location	30.915	-109.915
Basin location	30.975	-110.375

Moisture Inflow Direction:	ESE @ 25	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	3,200	feet
Storm Analysis Duration	24	hours

The storm representative dew point is	72.5 F	with total precipitable water above sea level of			2.54	inches.
The in-place maximum dew point is	77.5 F	with total precipitable water above sea level of			3.22	inches.
The transpositioned maximum dew point is	78.0 F	with total precipitable water above sea level of			3.29	inches.
The in-place storm elevation is	3,200	which subtracts	0.68	inches of precipitable water at	72.5 F	
The in-place storm elevation is	3,200	which subtracts	0.81	inches of precipitable water at	77.5 F	
The in-place storm elevation is	3,200	which subtracts	0.82	inches of precipitable water at	78.0 F	

The in-place maximization factor is	1.30
The moisture transposition factor is	1.02
The orographic transposition factor is	1.14
The total adjustment factor is	1.51

Notes: USGS WSP 1820, p123, Storm rep taken at KTUS, KDMA, KFHU, however rain was falling during the 12hr window 01Z-12Z on the 26th at KTUS

Observed Storm Depth-Area-Duration

	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	1.5	1.9	2.1	2.4	3.3	3.8	6.0	7.1	7.1
10 sq miles	1.5	1.9	2.1	2.4	3.3	3.8	5.9	7.0	7.0
50 sq miles	1.5	1.8	2.0	2.3	3.1	3.6	5.5	6.6	6.6
100 sq miles	1.4	1.7	1.9	2.2	2.9	3.4	5.3	6.3	6.3
200 sq miles	1.3	1.6	1.9	2.1	2.8	3.2	5.1	6.1	6.1
500 sq miles	1.2	1.4	1.6	1.9	2.5	2.9	4.6	5.6	5.6
1000 sq miles	1.0	1.3	1.5	1.6	2.2	2.5	4.1	5.1	5.1
2000 sq miles	0.9	1.1	1.4	1.4	1.9	2.2	3.6	4.6	4.7
5000 sq miles	0.6	0.8	1.1	1.2	1.5	1.8	2.9	3.9	3.9

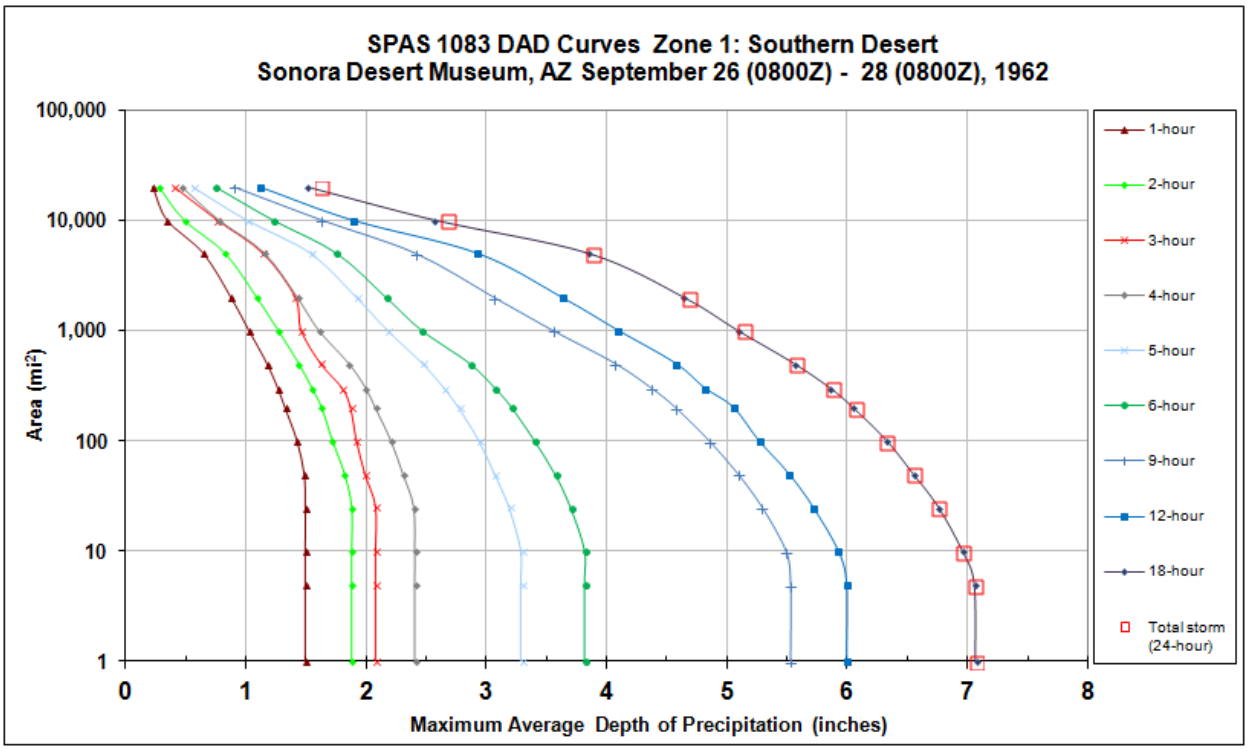
Adjusteded Storm Depth-Area-Duration

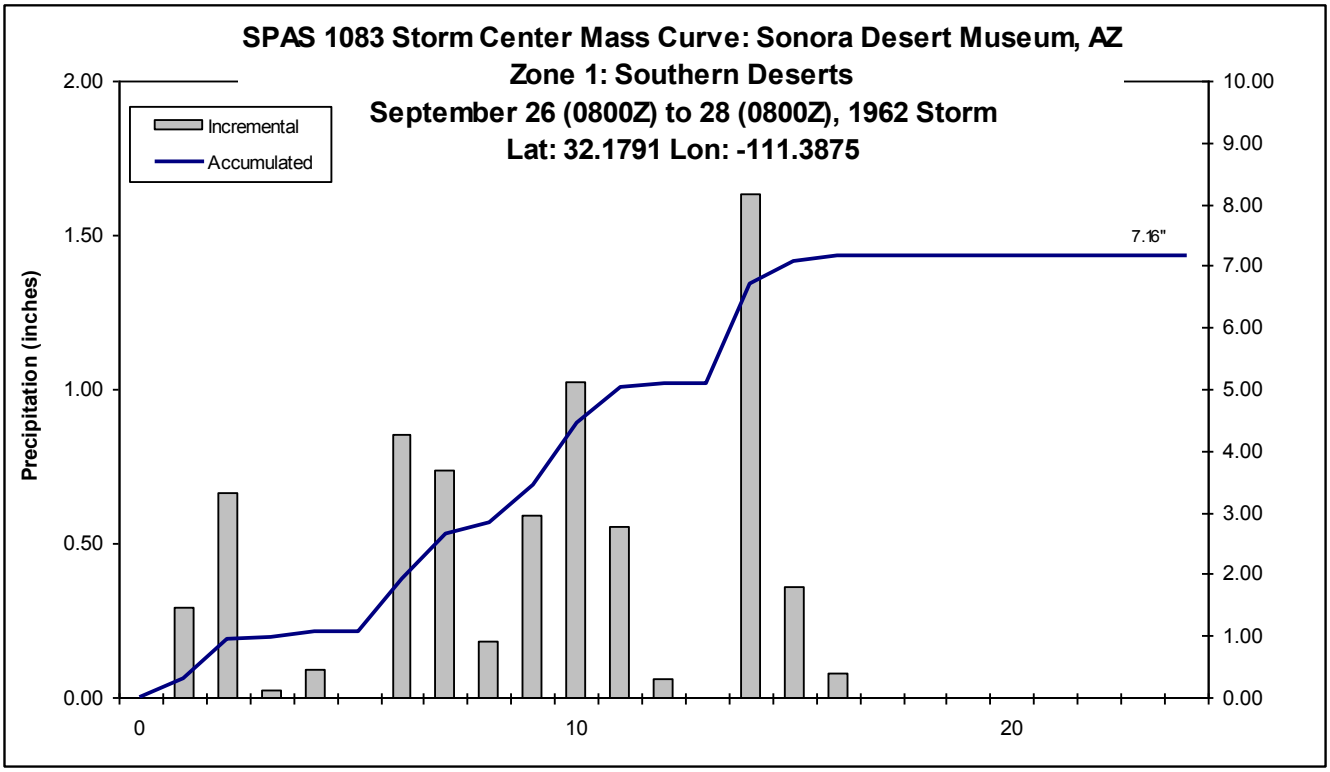
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	2.3	2.8	3.1	3.6	5.0	5.8	9.1	10.7	-
10 sq miles	2.3	2.8	3.1	3.6	5.0	5.8	9.0	10.5	-
50 sq miles	2.2	2.8	3.0	3.5	4.6	5.4	8.4	9.9	-
100 sq miles	2.1	2.6	2.9	3.3	4.5	5.1	8.0	9.6	-
200 sq miles	2.0	2.5	2.8	3.1	4.2	4.9	7.7	9.2	-
500 sq miles	1.8	2.2	2.5	2.8	3.7	4.3	6.9	8.4	-
1000 sq miles	1.5	1.9	2.2	2.4	3.3	3.7	6.2	7.7	-
2000 sq miles	1.3	1.7	2.1	2.1	2.9	3.3	5.5	7.0	-
5000 sq miles	1.0	1.3	1.7	1.7	2.3	2.6	4.4	5.8	-

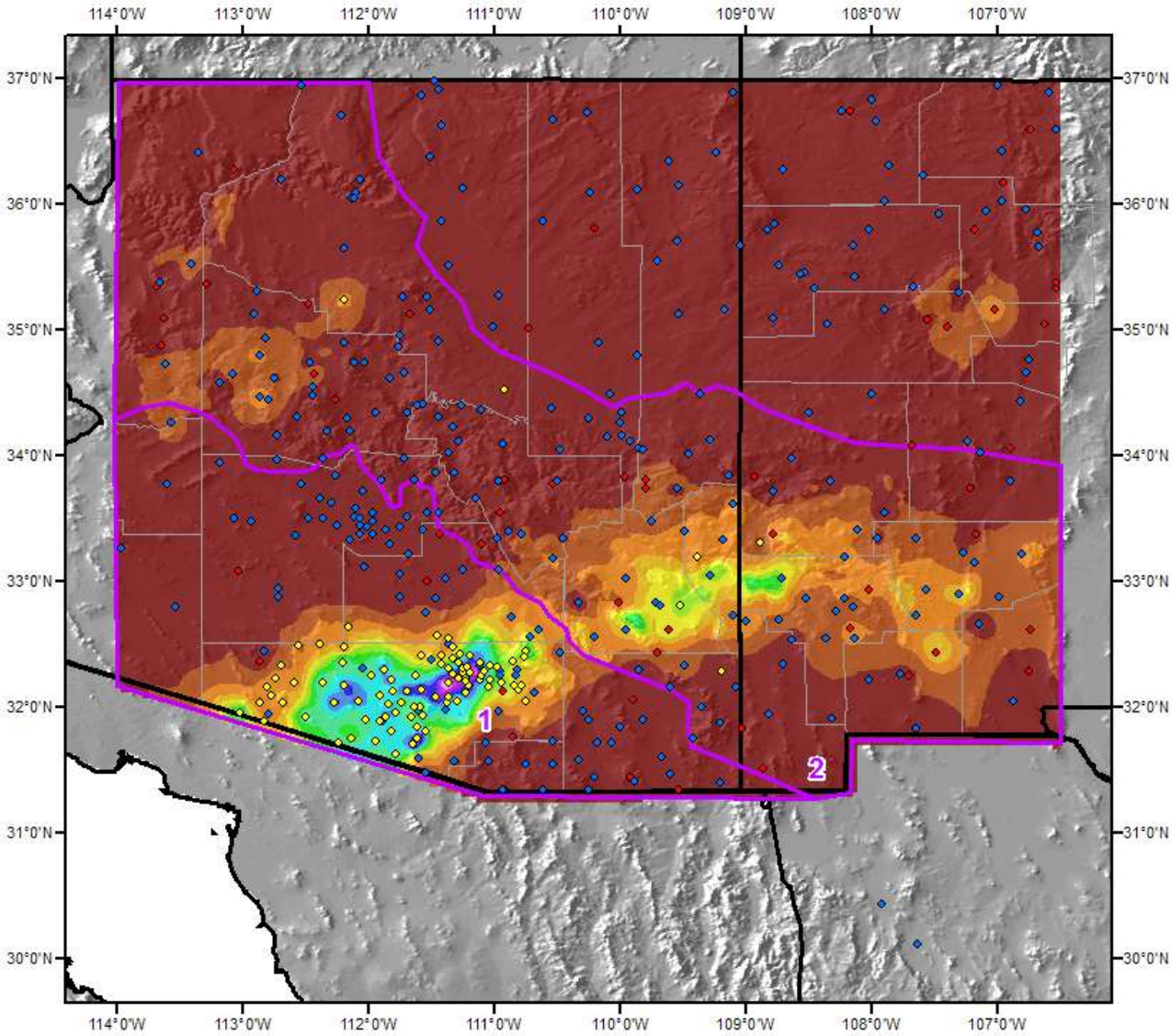
Storm or Storm Center Name	SPAS-1083-Sonora Desert Museum		
Storm Date(s)	9/26-27/1962		
Storm Type	Local-Tropical		
Storm Location	32.18	-111.39	
Storm Center Elevation	3200	non-orogra	1k relief desert floor to isolated mtns at storm center
Precipitation Total & Duration (10 sq mi)	7.16 inches 18 hours 3.94" 6hrs (SPAS 1083 DAD)		
Storm Representative Dewpoint	72.5 F	12	hr ave KTUS, KDMA, KFHU
Storm Representative Dewpoint Location	32.12	-110.93	
In-place Maximum Dewpoint	77.5 F		
Moisture Inflow Vector	ESE @ 25	based on HYSPLIT	
In-place Maximization Factor			
Temporal Transposition (Date)	10-Sep		
Transposition Dewpoint Location	30.92	-109.92	
Transposition Maximum Dewpoint	78.0 F		
Transposition Adjustment Factor	1.02		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	1.51		

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

Area (mi^2)	Duration (hours)									
	1	2	3	4	5	6	9	12	18	total
0.28	1.64	2.00	2.21	2.53	3.39	3.94	5.64	6.09	7.16	7.16
1	1.49	1.88	2.08	2.40	3.29	3.82	5.53	6.00	7.07	7.07
5	1.49	1.88	2.08	2.40	3.29	3.82	5.53	6.00	7.06	7.06
10	1.49	1.88	2.08	2.40	3.29	3.82	5.49	5.93	6.96	6.96
25	1.49	1.88	2.08	2.39	3.19	3.70	5.29	5.72	6.76	6.76
50	1.48	1.82	1.99	2.30	3.07	3.57	5.09	5.52	6.55	6.56
100	1.42	1.72	1.92	2.20	2.94	3.40	4.85	5.27	6.33	6.33
200	1.32	1.63	1.87	2.07	2.77	3.21	4.57	5.06	6.05	6.07
300	1.26	1.55	1.80	1.99	2.65	3.07	4.37	4.82	5.86	5.88
500	1.17	1.44	1.62	1.85	2.47	2.86	4.07	4.58	5.56	5.58
1,000	1.02	1.27	1.46	1.60	2.18	2.46	3.55	4.10	5.09	5.14
2,000	0.87	1.09	1.41	1.42	1.92	2.16	3.06	3.63	4.64	4.68
5,000	0.64	0.83	1.14	1.15	1.54	1.75	2.41	2.93	3.85	3.88
10,000	0.34	0.49	0.76	0.77	1.01	1.22	1.63	1.89	2.57	2.68
20,000	0.22	0.28	0.40	0.46	0.56	0.74	0.90	1.12	1.51	1.63




SPAS 1083 Storm Center Mass Curve: Sonora Desert Museum, AZ
Zone 1: Southern Deserts
September 26 (0800Z) to 28 (0800Z), 1962 Storm
Lat: 32.1791 Lon: -111.3875
Incremental
Accumulated
Precipitation (inches)
2.00
1.50
1.00
0.50
0.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
7.16"
0
10
20



Total Rainfall (24-hours)
Sonora Desert Museum, AZ 1962 Storm
Storm #1083 September 26 (0800 Z) to 28 (0800 Z), 1962

Miles: 0 25 50 100
Kilometers: 0 45 90 180 270

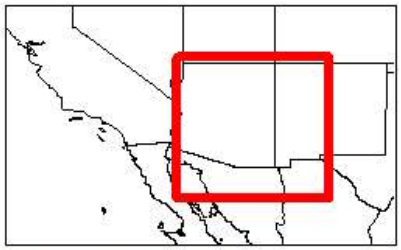
Gauging Stations

- Daily
- Hourly Pseudo
- Hourly
- Supplemental

N

Precipitation (inches)

0.00 - 0.50	2.01 - 2.50	4.01 - 4.50	6.01 - 6.50
0.51 - 1.00	2.51 - 3.00	4.51 - 5.00	6.51 - 7.00
1.01 - 1.50	3.01 - 3.50	5.01 - 5.50	7.01 - 7.50
1.51 - 2.00	3.51 - 4.00	5.51 - 6.00	



Coordinate system: GCS North American 1983
Scale: 1:4,980,531

MetstatAWA May 22, 2009

Page, AZ

August 29-September 1, 1963

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1130

General Storm Location: Page, AZ

Storm Dates: August 29 – September 1, 1963

Event: Thunderstorm

Zone 1

Latitude: 36.9125

Longitude: -111.4542

Max. Grid Rainfall Amount: 2.21”

Max. Observed Rainfall Amount: 2.22” at PAGE AZ

Number of Stations: 70 (50 Daily, 1 Hourly, 7 Hourly Pseudo, 7 Supplemental, and 4 Supplemental Estimated)

SPAS Version: 8.5

Base Map Used: Yes, conus_prism_ppt_in_1971_2000_08

Spatial resolution: 00:00:30 (0.30 sq. miles)

Radar Included: No

Depth-Area-Duration (DAD) analysis: Yes

Storm Name:	SPAS-1130-Page
Storm Date:	8/29/1963-9/1/1963
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	15-Aug	
	Lat	Long
Storm center location	36.91	-111.45
Storm Rep dew point location	35.30	-111.00
Transposition dewpoint location	29.365	-109.925
Basin location	30.975	-110.375

Moisture Inflow Direction:	SSE @ 115	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	4,350	feet
Storm Analysis Duration	3	hours

The storm representative dew point is	76.0 F	with total precipitable water above sea level of			2.99	inches.
The in-place maximum dew point is	80.0 F	with total precipitable water above sea level of			3.60	inches.
The transpositioned maximum dew point is	82.0 F	with total precipitable water above sea level of			3.92	inches.
The in-place storm elevation is	4,350	which subtracts	1.00	inches of precipitable water at	76.0 F	
The in-place storm elevation is	4,350	which subtracts	1.14	inches of precipitable water at	80.0 F	
The in-place storm elevation is	4,350	which subtracts	1.22	inches of precipitable water at	82.0 F	

The in-place maximization factor is	1.24
The moisture transposition factor is	1.10
The orographic transposition factor is	1.50
The total adjustment factor is	2.04

Notes:

Observed Storm Depth-Area-Duration

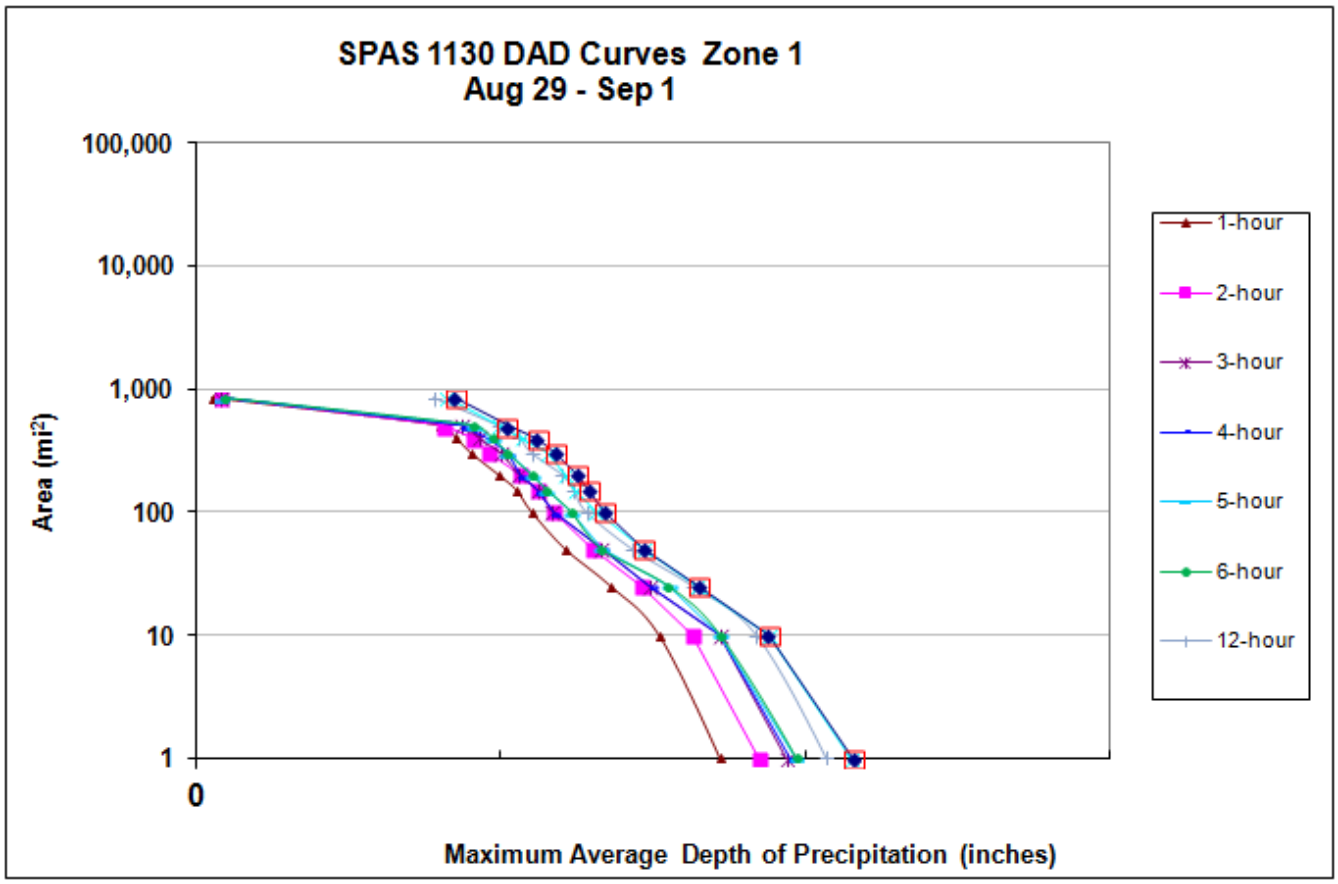
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	1.7	1.9	1.9	2.0	2.0	2.0	2.1	2.2	2.2
10 sq miles	1.5	1.6	1.7	1.7	1.7	1.7	1.8	1.9	1.9
50 sq miles	1.2	1.3	1.3	1.3	1.3	1.3	1.4	1.5	1.5
100 sq miles	1.1	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.3
200 sq miles	1.0	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.3
500 sq miles	0.8	0.8	0.9	0.9	0.9	0.9	1.0	1.0	1.0
1000 sq miles	-	-	-	-	-	-	-	-	-
2000 sq miles	-	-	-	-	-	-	-	-	-
5000 sq miles	-	-	-	-	-	-	-	-	-

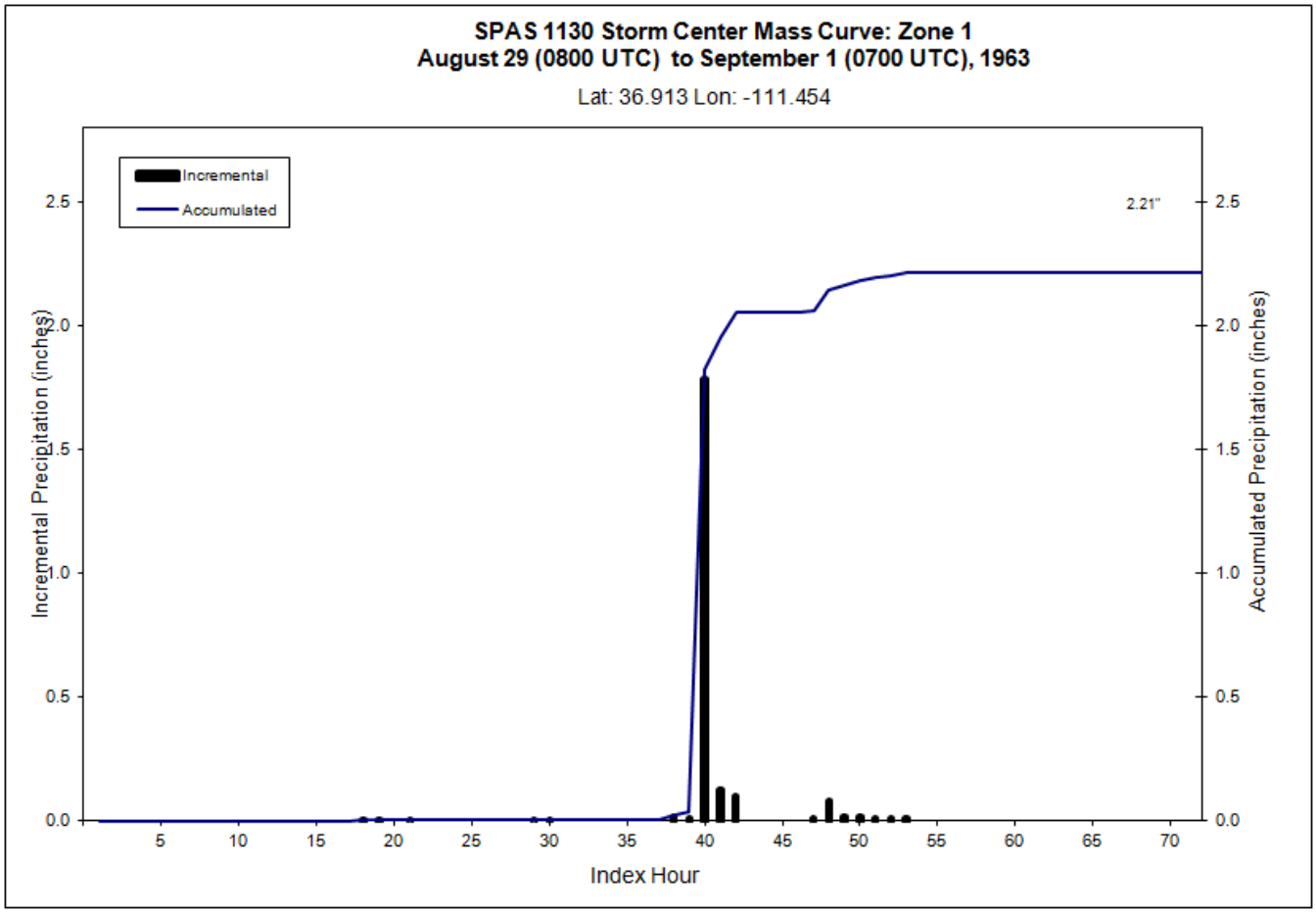
Adjusted Storm Depth-Area-Duration

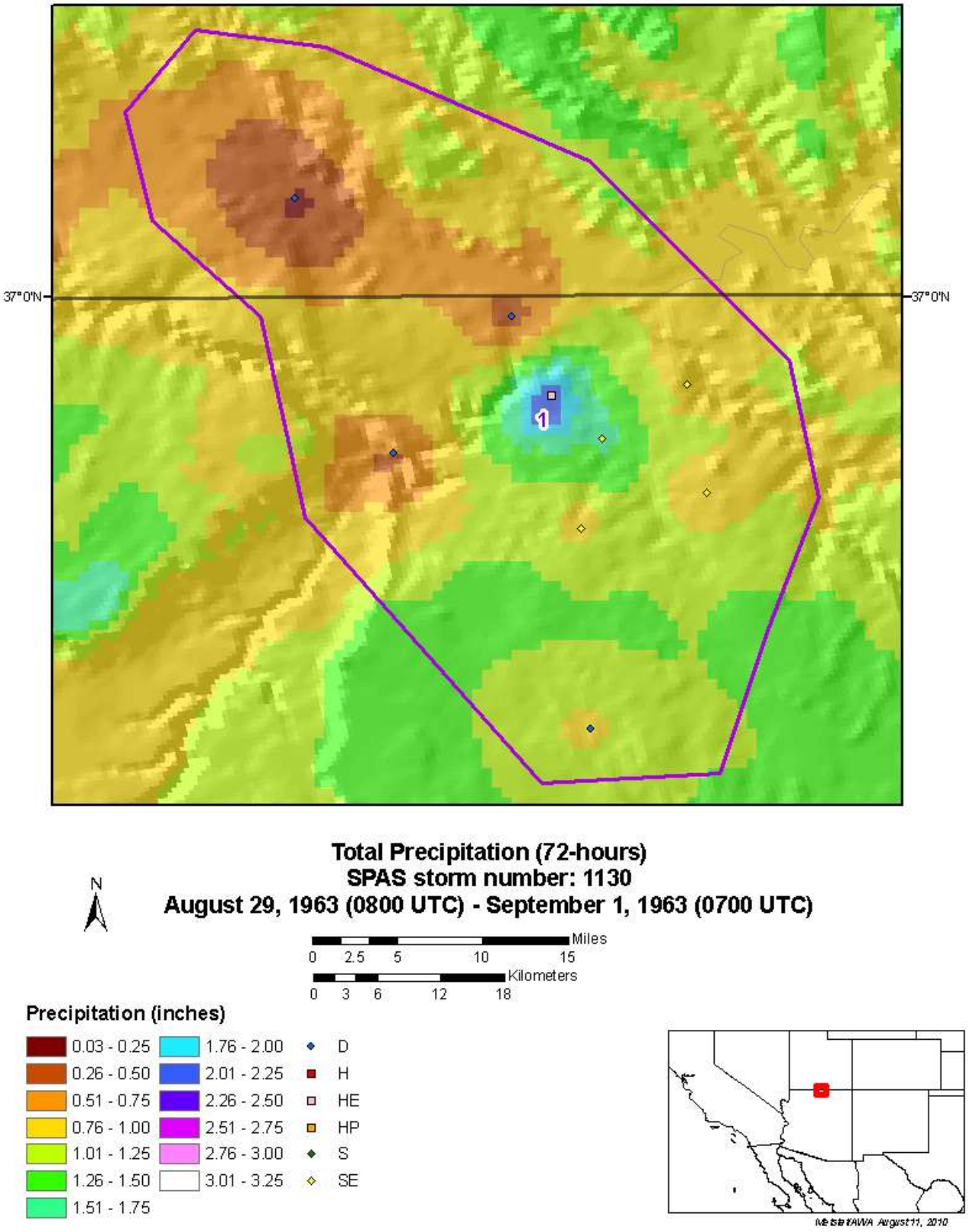
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	3.5	3.8	3.9	4.0	4.0	4.0	4.2	4.4	4.4
10 sq miles	3.1	3.3	3.5	3.5	3.5	3.5	3.7	3.8	3.8
50 sq miles	2.5	2.6	2.7	2.7	2.7	2.7	2.9	3.0	3.0
100 sq miles	2.2	2.4	2.4	2.4	2.5	2.5	2.6	2.7	2.7
200 sq miles	2.0	2.2	2.2	2.2	2.2	2.2	2.4	2.5	2.5
500 sq miles	1.6	1.6	1.8	1.8	1.9	1.9	2.0	2.0	2.1
1000 sq miles	-	-	-	-	-	-	-	-	-
2000 sq miles	-	-	-	-	-	-	-	-	-
5000 sq miles	-	-	-	-	-	-	-	-	-

Storm or Storm Center Name	SPAS-1130-Page		
Storm Date(s)	8/29/1963-9/1/1963		
Storm Type	Local Storm		
Storm Location	36.91	-111.45	
Storm Center Elevation	4350		
Precipitation Total & Duration (10 sq mi)	2.2 inches 24 hour (SPAS 1130 DAD)		
Storm Representative Dewpoint	76.0 F	3	hr ave from KFLG and KINW
Storm Representative Dewpoint Location	35.3	-111	
In-place Maximum Dewpoint	80.0 F		
Moisture Inflow Vector	SSE @ 115		
In-place Maximization Factor	1.24		
Temporal Transposition (Date)	15-Aug		
Transposition Dewpoint Location	29.37	-109.93	
Transposition Maximum Dewpoint	82.0 F		
Transposition Adjustment Factor	1.10		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	2.04		

Storm 1130 - August 29, 1963 (0800 UTC) - September 1, 1963 (0700 UTC)										
MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)										
	Duration (hours)									
Area (mi^2)	1	2	3	4	5	6	12	18	24	Total
0	1.79	1.92	2.01	2.02	2.04	2.04	2.15	2.2	2.2	2.20
1	1.72	1.85	1.94	1.95	1.97	1.97	2.07	2.15	2.16	2.16
10	1.52	1.63	1.72	1.72	1.72	1.72	1.84	1.88	1.88	1.88
25	1.36	1.46	1.49	1.49	1.55	1.55	1.63	1.64	1.65	1.65
50	1.21	1.3	1.33	1.33	1.33	1.33	1.43	1.47	1.47	1.47
100	1.1	1.17	1.17	1.17	1.23	1.23	1.28	1.31	1.34	1.34
150	1.05	1.12	1.12	1.12	1.15	1.15	1.24	1.24	1.29	1.29
200	0.99	1.06	1.06	1.06	1.1	1.1	1.2	1.21	1.25	1.25
300	0.9	0.96	1	1.02	1.02	1.02	1.1	1.15	1.18	1.18
400	0.85	0.91	0.93	0.96	0.97	0.97	1.06	1.07	1.12	1.12
500	0.8	0.81	0.87	0.87	0.91	0.91	0.99	0.99	1.02	1.02
836	0.05	0.08	0.08	0.08	0.08	0.09	0.78	0.82	0.85	0.85




SPAS 1130 Storm Center Mass Curve: Zone 1
August 29 (0800 UTC) to September 1 (0700 UTC), 1963
Lat: 36.913 Lon: -111.454
Incremental
Accumulated
2.21"
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
Index Hour
0.0
0.5
1.0
1.5
2.0
2.5
5
10
15
20
25
30
35
40
45
50
55
60
65
70


37°0'N
37°0'N
1
Total Precipitation (72-hours)
SPAS storm number: 1130
August 29, 1963 (0800 UTC) - September 1, 1963 (0700 UTC)
N
Miles
0 2.5 5 10 15
Kilometers
0 3 6 12 18
Precipitation (inches)
0.03 - 0.25
0.26 - 0.50
0.51 - 0.75
0.76 - 1.00
1.01 - 1.25
1.26 - 1.50
1.51 - 1.75
1.76 - 2.00
2.01 - 2.25
2.26 - 2.50
2.51 - 2.75
2.76 - 3.00
3.01 - 3.25
D
H
HE
HP
S
SE

North Tucson, AZ

September 6-7, 1964

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1060

General Storm Location: North Tucson, AZ

Storm Dates: 09/06/1964 0800Z – 09/07/1964 0800Z

Event: Convective

Latitude: 32.3042

Longitude: -111.0042

Max. Grid/Radar Rainfall Amount: 5.28" (Grid/Pixel Point)

Max. Observed Rainfall Amount: ~5.00" (North Tucson, type=supplemental)

Number of Stations: 22 (3-hourly, 1-hourly pseudo, 17-daily, 1-supplemental) gauging stations within the defined search domain.

SPAS Version: 7.0

Base Map Used: Yes, sa100yr24ha_ver4

Spatial resolution: 0.28 mi^2

Radar Included: No

Depth-Area-Duration (DAD) analysis: Yes: 1, 2, 3, 4, 5, 6, 12, & 24 hours

Storm Name:	**SPAS-1060-North Tucson**
Storm Date:	**9/6-7/1964**
AWA Analysis Date:	**5/25/2013**

Storm Adjustment for Grid Point 1

Temporal Transposition Date	**20-Aug**	
	Lat	**Long**
Storm center location	**32.30**	**-111.00**
Storm Rep dew point location	**32.17**	**-110.93**
Transposition dewpoint location	**30.845**	**-110.305**
Basin location	**30.975**	**-110.375**

Moisture Inflow Direction:	**SSE @ 10**	miles
Grid Point Elevation	**6,977**	feet
Storm Center Elevation	**2,250**	feet
Storm Analysis Duration	**3**	hours

The storm representative dew point is	**71.5 F**	with total precipitable water above sea level of			**2.42**	inches.
The in-place maximum dew point is	**80.5 F**	with total precipitable water above sea level of			**3.68**	inches.
The transpositioned maximum dew point is	**81.0 F**	with total precipitable water above sea level of			**3.76**	inches.
The in-place storm elevation is	**2,250**	which subtracts	**0.48**	inches of precipitable water at	**71.5 F**	
The in-place storm elevation is	**2,250**	which subtracts	**0.66**	inches of precipitable water at	**80.5 F**	
The in-place storm elevation is	**2,250**	which subtracts	**0.67**	inches of precipitable water at	**81.0 F**	

The in-place maximization factor is	**1.50**
The moisture transposition factor is	**1.02**
The orographic transposition factor is	**1.20**
The total adjustment factor is	**1.84**

Notes: In-place max. factor held to 1.50

Observed Storm Depth-Area-Duration

	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**3.3**	**4.9**	**5.0**	**5.0**	**5.0**	**5.1**	**5.1**	**5.1**	
10 sq miles	**2.7**	**3.9**	**4.2**	**4.2**	**4.2**	**4.2**	**4.3**	**4.3**	
50 sq miles	**1.9**	**2.7**	**2.9**	**3.0**	**3.0**	**3.0**	**3.1**	**3.1**	
100 sq miles	**1.5**	**2.2**	**2.4**	**2.5**	**2.5**	**2.5**	**2.5**	**2.6**	
200 sq miles	**1.3**	**1.8**	**2.0**	**2.0**	**2.0**	**2.0**	**2.1**	**2.1**	
500 sq miles	**1.0**	**1.4**	**1.5**	**1.5**	**1.6**	**1.6**	**1.6**	**1.7**	
1000 sq miles	**0.8**	**1.1**	**1.2**	**1.2**	**1.2**	**1.3**	**1.4**	**1.4**	
2000 sq miles	**0.5**	**0.8**	**0.9**	**0.9**	**0.9**	**0.9**	**1.1**	**1.1**	
5000 sq miles									

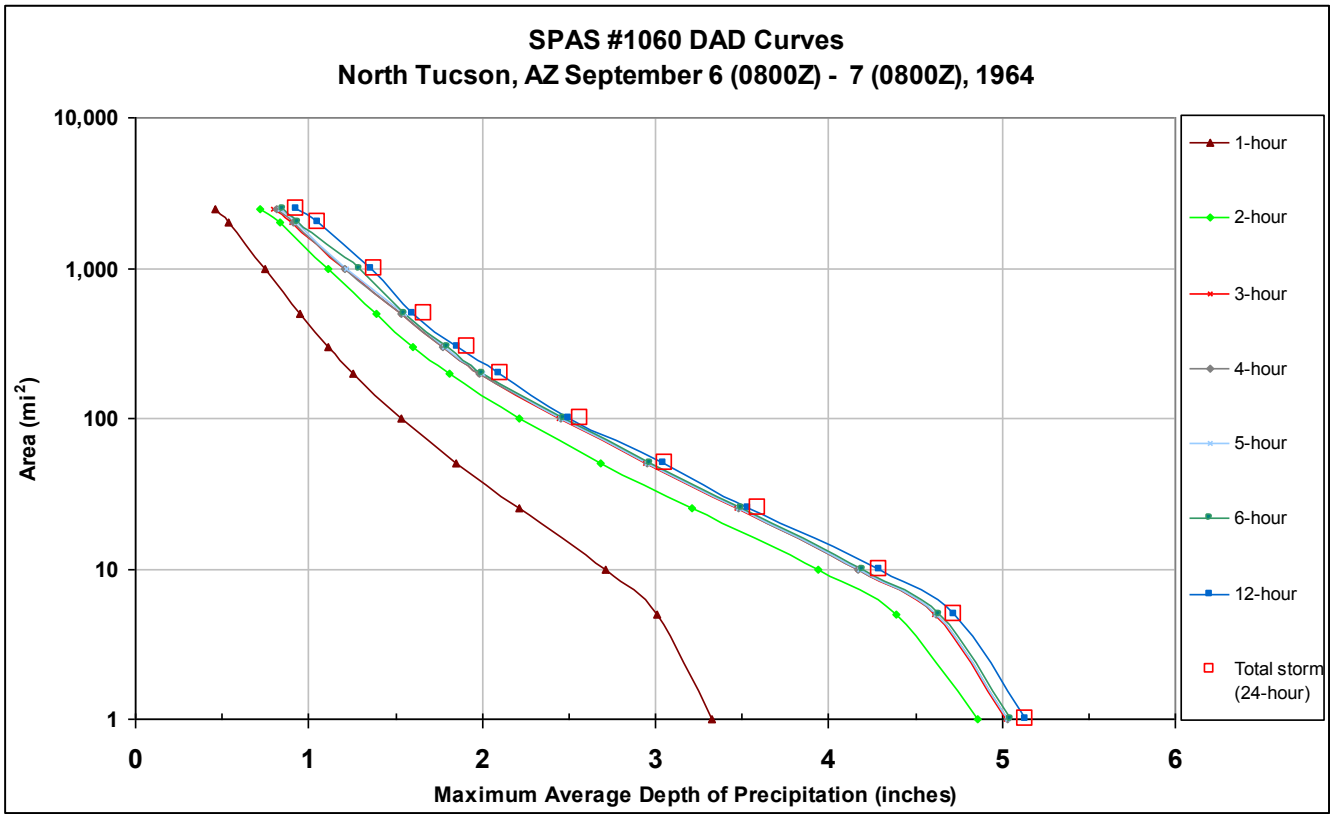
Adjusted Storm Depth-Area-Duration

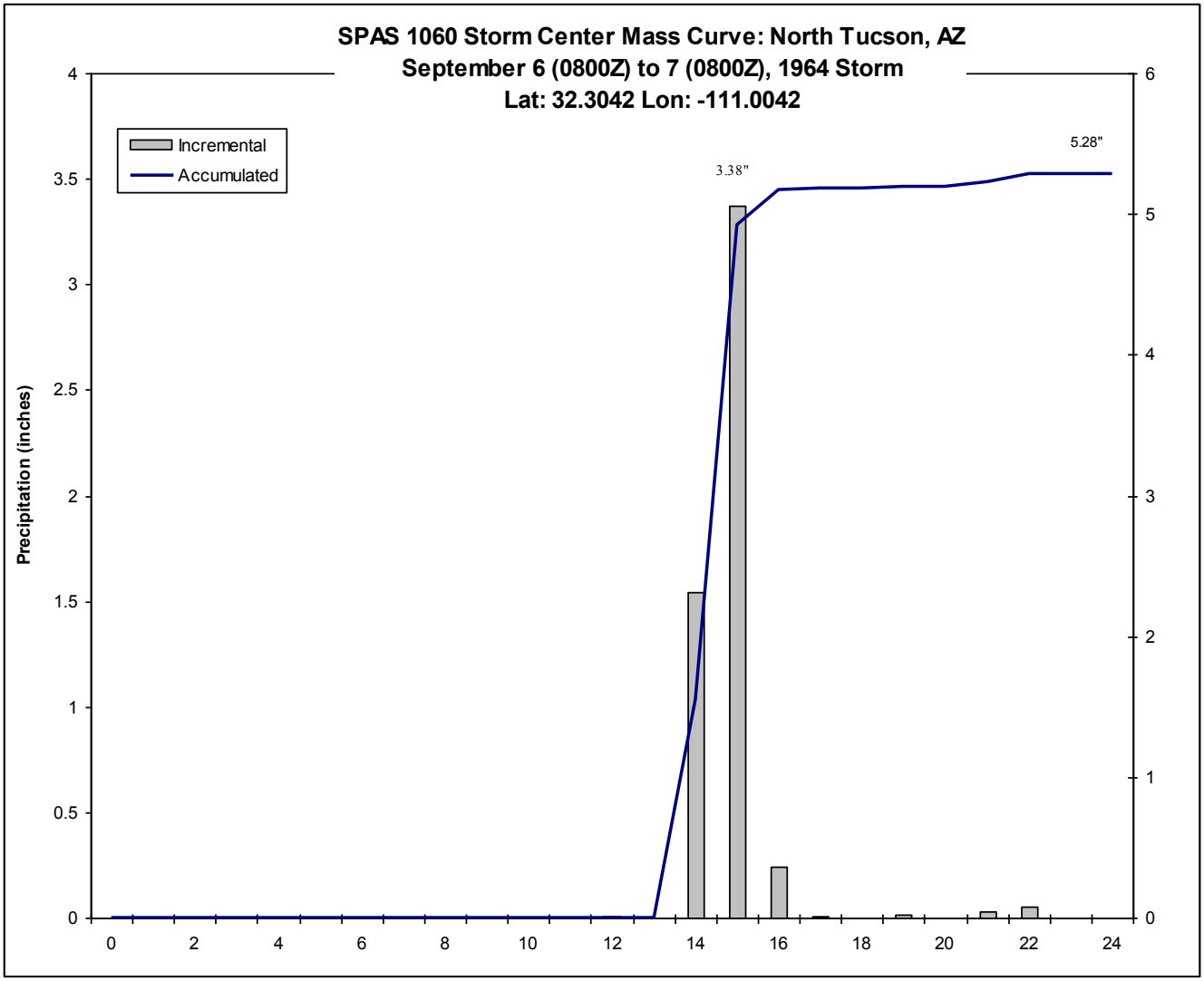
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**6.1**	**9.0**	**9.2**	**9.3**	**9.3**	**9.3**	**9.5**	**9.5**	
10 sq miles	**5.0**	**7.3**	**7.7**	**7.7**	**7.7**	**7.7**	**7.9**	**7.9**	
50 sq miles	**3.4**	**4.9**	**5.4**	**5.4**	**5.4**	**5.5**	**5.6**	**5.6**	
100 sq miles	**2.8**	**4.1**	**4.5**	**4.5**	**4.5**	**4.5**	**4.6**	**4.7**	
200 sq miles	**2.3**	**3.3**	**3.6**	**3.6**	**3.7**	**3.7**	**3.9**	**3.9**	
500 sq miles	**1.7**	**2.6**	**2.8**	**2.8**	**2.9**	**2.9**	**2.9**	**3.1**	
1000 sq miles	**1.4**	**2.0**	**2.2**	**2.2**	**2.2**	**2.4**	**2.5**	**2.5**	
2000 sq miles	**1.0**	**1.5**	**1.7**	**1.7**	**1.7**	**1.7**	**1.9**	**1.9**	
5000 sq miles									

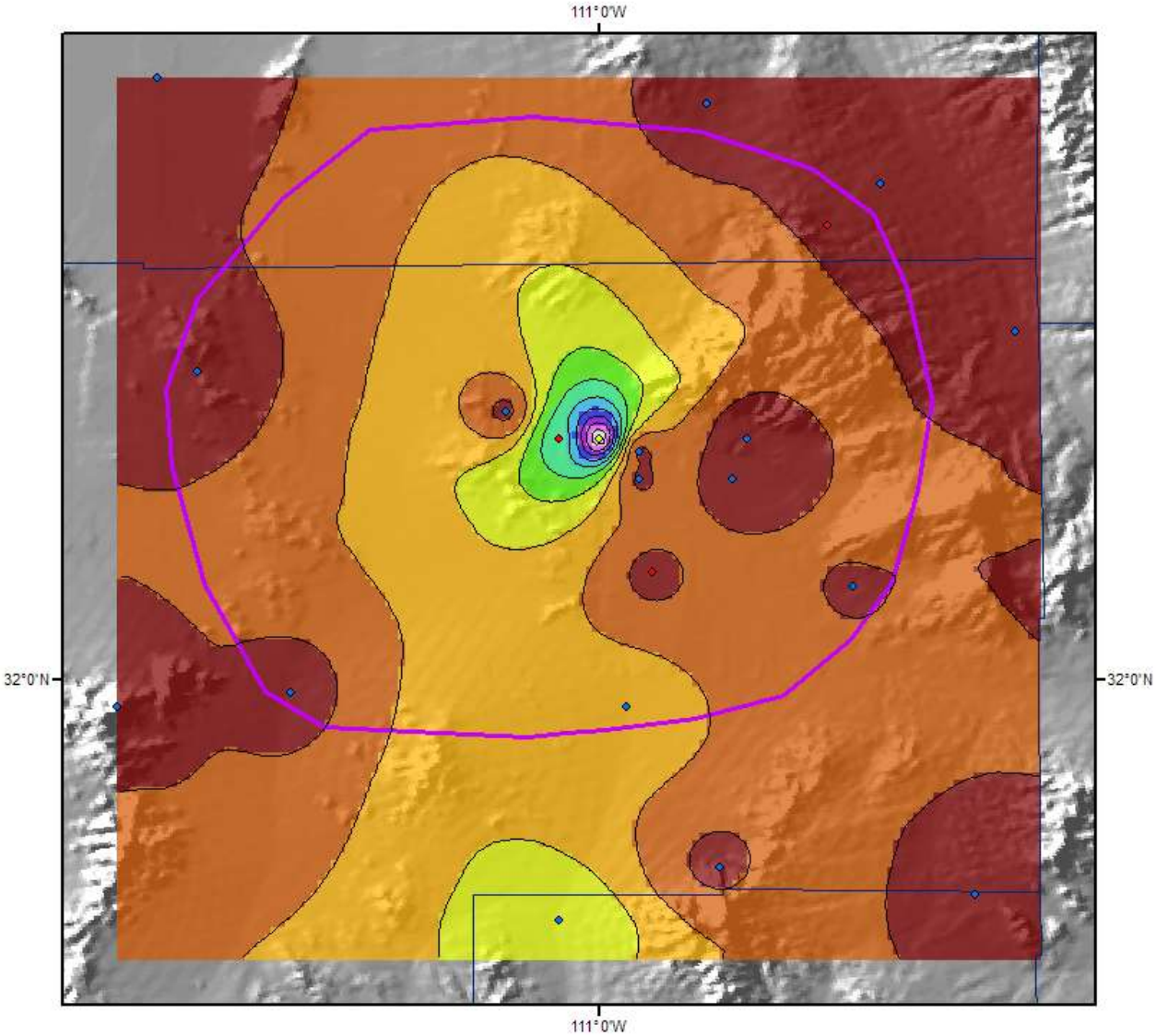
Storm or Storm Center Name	**SPAS-1060-North Tucson**		
Storm Date(s)	9/6-7/1964		
Storm Type	Local Storm		
Storm Location	32.30	-111.00	
Storm Center Elevation	2250		
Precipitation Total & Duration (10 sq mi)	5.19 inches 6 hours 3.38" in 1hr and 4.92" in 2hrs (SPAS 1060 DAD)		
Storm Representative Dewpoint	71.5 F	3	hr ave KTUS, KDMA
Storm Representative Dewpoint Location	32.17	-110.93	
In-place Maximum Dewpoint	80.5 F		
Moisture Inflow Vector	SSE @ 10		
In-place Maximization Factor	1.50		
Temporal Transposition (Date)	20-Aug		
Transposition Dewpoint Location	30.85	-110.31	
Transposition Maximum Dewpoint	81.0 F		
Transposition Adjustment Factor	1.02		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	1.84		

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

Area (mi^2)	Duration (hours) 1	2	3	4	5	6	12	total
0.28	3.38	4.92	5.16	5.17	5.17	5.19	5.28	5.28
1	3.33	4.86	5.02	5.03	5.03	5.05	5.14	5.14
5	3.01	4.39	4.61	4.62	4.62	4.64	4.73	4.73
10	2.71	3.94	4.17	4.17	4.18	4.20	4.29	4.29
25	2.21	3.21	3.47	3.48	3.48	3.50	3.54	3.59
50	1.85	2.68	2.94	2.95	2.95	2.97	3.05	3.06
100	1.53	2.21	2.44	2.45	2.45	2.47	2.50	2.57
200	1.26	1.81	1.98	1.98	2.00	2.00	2.10	2.11
300	1.11	1.60	1.77	1.77	1.78	1.80	1.86	1.92
500	0.95	1.39	1.53	1.53	1.55	1.55	1.60	1.67
1,000	0.75	1.11	1.21	1.21	1.22	1.29	1.36	1.38
2,000	0.54	0.83	0.90	0.91	0.93	0.94	1.05	1.05
2,443	0.46	0.72	0.80	0.81	0.83	0.85	0.93	0.93




SPAS 1060 Storm Center Mass Curve: North Tucson, AZ
September 6 (0800Z) to 7 (0800Z), 1964 Storm
Lat: 32.3042 Lon: -111.0042
Incremental
Accumulated
3.38"
5.28"
Precipitation (inches)
0
0.5
1
1.5
2
2.5
3
3.5
4
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
18
20
22
24



Total Rainfall (24-hours)
North Tuscon, AZ 1964 Storm
Storm #1060 September 6 (0800 Z) to 7 (0800 Z), 1964

Miles
0 3.75 7.5 15
Kilometers
0 5 10 20 30

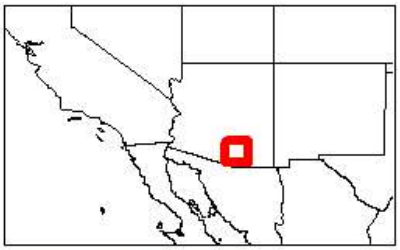
Gauging Station

- Hourly
- Daily
- Hourly Pseudo
- Supplemental

N

Precipitation (inches)

0.01 - 0.50	1.51 - 2.00	3.01 - 3.50	4.51 - 5.00
0.51 - 1.00	2.01 - 2.50	3.51 - 4.00	5.01 - 5.50
1.01 - 1.50	2.51 - 3.00	4.01 - 4.50	



Coordinate system: GCS North American 1983
Scale: 1:781,680
Metstat/AWA March 30, 2000

Sahuarita, AZ

September 9-11, 1964

Storm Type: Remnant Tropical

Storm Precipitation Analysis System (SPAS) For Storm #1059

General Storm Location: Sahuarita, AZ

Storm Dates: 09/09/1964 0800Z – 09/11/1964 0800Z

Event: Convective

Latitude: 32.0063

Longitude: -110.9042

Max. Grid/Radar Rainfall Amount: 6.77" (Grid/Pixel Point)

Max. Observed Rainfall Amount: 6.75" (Nelson, type=supplemental)

Number of Stations: 79 (3-hourly, 1-hourly pseudo, 25-daily, 50-daily supplemental) gauging stations within the defined search domain.

SPAS Version: 7.0

Base Map Used: Yes, see comment section

Spatial resolution: 0.28 mi^2

Radar Included: No

Depth-Area-Duration (DAD) analysis: Yes: 1, 2, 3, 4, 5, 6, 9, 12, 18, 24, 36, & 48 hours

Storm Name:	**SPAS-1059-Sahuarita**
Storm Date:	**9/9-11/1964**
AWA Analysis Date:	**5/25/2013**

Storm Adjustment for Grid Point 1

Temporal Transposition Date **25-Aug**

	Lat	Long
Storm center location	**32.01**	**-110.90**
Storm Rep dew point location	**32.50**	**-114.00**
Transposition dewpoint location	**31.465**	**-113.475**
Basin location	**30.975**	**-110.375**

Moisture Inflow Direction:	**WNW @ 18**	miles
Grid Point Elevation	**6,977**	feet
Storm Center Elevation	**2,750**	feet
Storm Analysis Duration	**12**	hours

The storm representative dew point is	**75.0 F**	with total precipitable water above sea level of			**2.85**	inches.
The in-place maximum dew point is	**79.0 F**	with total precipitable water above sea level of			**3.44**	inches.
The transpositioned maximum dew point is	**79.0 F**	with total precipitable water above sea level of			**3.44**	inches.
The in-place storm elevation is	**2,750**	which subtracts	**0.66**	inches of precipitable water at	**75.0 F**	
The in-place storm elevation is	**2,750**	which subtracts	**0.74**	inches of precipitable water at	**79.0 F**	
The in-place storm elevation is	**2,750**	which subtracts	**0.74**	inches of precipitable water at	**79.0 F**	

The in-place maximization factor is	**1.23**
The moisture transposition factor is	**1.00**
The orographic transposition factor is	**1.13**
The total adjustment factor is	**1.39**

Notes:

Observed Storm Depth-Area-Duration

	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours	36 Hours
1 sq miles	**1.6**	**2.1**	**2.3**	**2.6**	**2.9**	**3.2**	**5.8**	**6.2**	**6.5**	**6.6**
10 sq miles	**1.6**	**2.1**	**2.3**	**2.6**	**2.8**	**3.0**	**5.8**	**6.2**	**6.4**	**6.6**
50 sq miles	**1.5**	**1.8**	**2.1**	**2.5**	**2.7**	**3.0**	**5.4**	**5.8**	**6.1**	**6.2**
100 sq miles	**1.3**	**1.7**	**1.9**	**2.5**	**2.6**	**2.9**	**5.2**	**5.7**	**6.0**	**6.2**
200 sq miles	**1.2**	**1.6**	**1.8**	**2.3**	**2.4**	**2.9**	**5.0**	**5.4**	**5.7**	**5.9**
500 sq miles	**1.0**	**1.3**	**1.6**	**2.1**	**2.3**	**2.7**	**4.4**	**4.8**	**5.2**	**5.4**
1000 sq miles	**0.8**	**1.3**	**1.4**	**1.9**	**2.1**	**2.5**	**4.0**	**4.5**	**5.0**	**5.1**
2000 sq miles	**0.7**	**1.0**	**1.2**	**1.6**	**1.8**	**2.1**	**3.4**	**4.0**	**4.5**	**4.6**
5000 sq miles	**0.4**	**0.5**	**0.7**	**1.1**	**1.2**	**1.4**	**2.3**	**2.9**	**3.2**	**3.3**

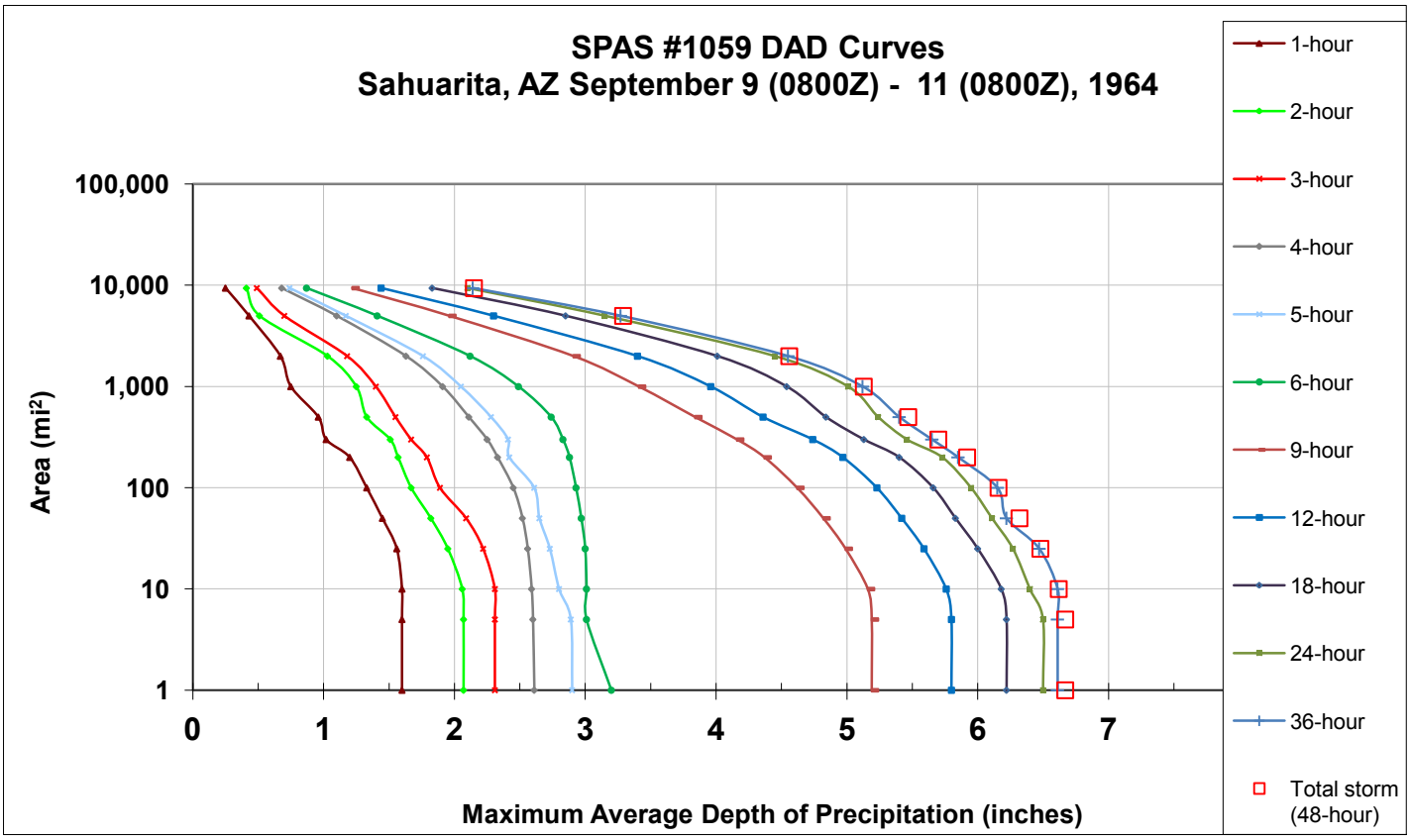
Adjusted Storm Depth-Area-Duration

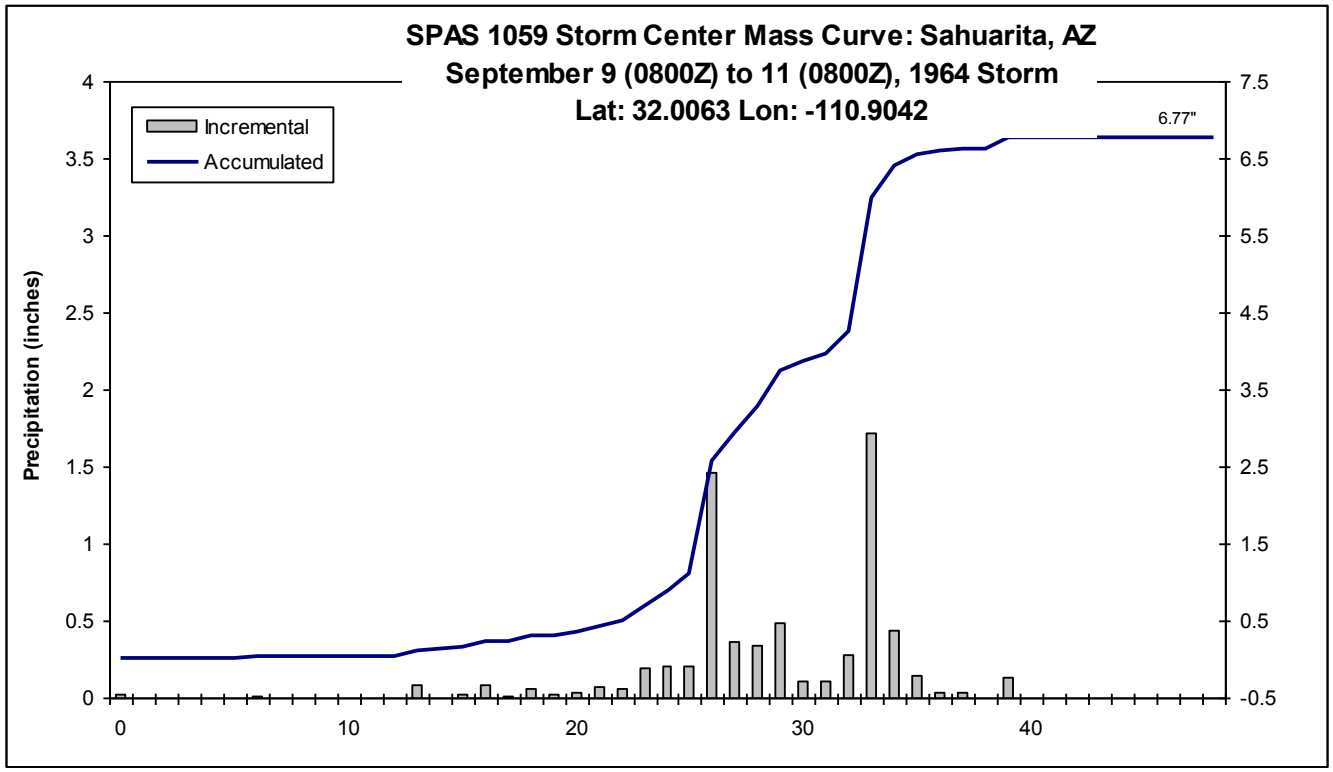
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours	36 Hours
1 sq miles	**2.2**	**2.9**	**3.2**	**3.6**	**4.0**	**4.4**	**8.1**	**8.6**	**9.0**	**9.2**
10 sq miles	**2.2**	**2.9**	**3.2**	**3.6**	**3.9**	**4.2**	**8.0**	**8.6**	**8.9**	**9.2**
50 sq miles	**2.0**	**2.5**	**2.9**	**3.5**	**3.7**	**4.1**	**7.5**	**8.1**	**8.5**	**8.6**
100 sq miles	**1.8**	**2.3**	**2.6**	**3.4**	**3.6**	**4.1**	**7.3**	**7.9**	**8.3**	**8.6**
200 sq miles	**1.7**	**2.2**	**2.5**	**3.2**	**3.4**	**4.0**	**6.9**	**7.5**	**8.0**	**8.1**
500 sq miles	**1.3**	**1.8**	**2.2**	**2.9**	**3.2**	**3.8**	**6.1**	**6.7**	**7.3**	**7.5**
1000 sq miles	**1.0**	**1.7**	**1.9**	**2.7**	**2.9**	**3.5**	**5.5**	**6.3**	**7.0**	**7.1**
2000 sq miles	**0.9**	**1.4**	**1.6**	**2.3**	**2.4**	**2.9**	**4.7**	**5.6**	**6.2**	**6.3**
5000 sq miles	**0.6**	**0.7**	**1.0**	**1.5**	**1.6**	**2.0**	**3.2**	**4.0**	**4.4**	**4.5**

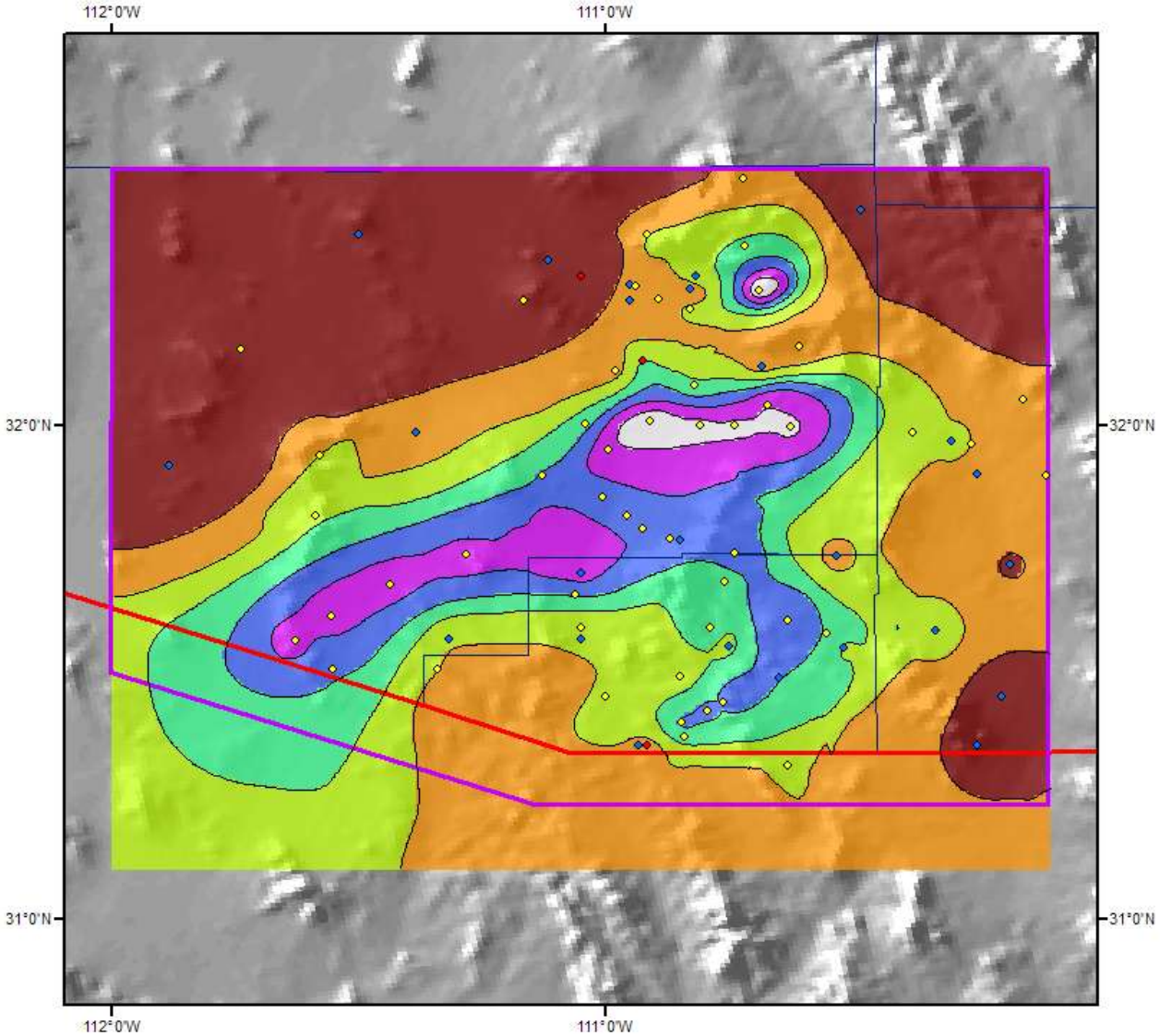
Storm or Storm Center Name	**SPAS-1059-Sahuarita**		
Storm Date(s)	9/9-11/1964		
Storm Type	Local-Tropcial		
Storm Location	32.01	-110.90	
Storm Center Elevation	2750		
Precipitation Total & Duration (10 sq mi)	5.92 inches 12 hours 6.74" in 36hrs (SPAS 1059 DAD)		
Storm Representative Dewpoint	75.0 F	12	hr ave at KYUM
Storm Representative Dewpoint Location	32.5	-114	
In-place Maximum Dewpoint	79.0 F		
Moisture Inflow Vector	WNW @ 185		
In-place Maximization Factor	1.23		
Temporal Transposition (Date)	25-Aug		
Transposition Dewpoint Location	31.47	-113.48	
Transposition Maximum Dewpoint	79.0 F		
Transposition Adjustment Factor	1.00		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	1.39		

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

Area (mi^2)	Duration (hours)											
	1	2	3	4	5	6	9	12	18	24	36	total
0.28	1.73	2.16	2.44	2.74	3.03	3.26	5.31	5.92	6.34	6.62	6.74	6.77
1	1.60	2.07	2.31	2.61	2.90	3.20	5.19	5.80	6.22	6.50	6.61	6.67
5	1.60	2.07	2.31	2.60	2.89	3.01	5.19	5.80	6.22	6.50	6.61	6.67
10	1.60	2.06	2.31	2.59	2.80	3.01	5.16	5.76	6.18	6.40	6.61	6.62
25	1.56	1.95	2.22	2.56	2.73	3.00	4.99	5.59	6.00	6.27	6.47	6.48
50	1.45	1.82	2.09	2.52	2.65	2.97	4.82	5.42	5.83	6.11	6.22	6.32
100	1.33	1.67	1.89	2.45	2.61	2.93	4.62	5.23	5.66	5.95	6.15	6.16
200	1.20	1.57	1.79	2.33	2.42	2.88	4.37	4.97	5.40	5.73	5.85	5.92
300	1.02	1.51	1.67	2.25	2.41	2.83	4.16	4.74	5.13	5.46	5.65	5.70
500	0.96	1.33	1.55	2.11	2.28	2.74	3.84	4.36	4.84	5.24	5.40	5.47
1,000	0.75	1.25	1.40	1.91	2.05	2.49	3.41	3.96	4.54	5.01	5.12	5.13
2,000	0.67	1.03	1.18	1.63	1.76	2.12	2.91	3.40	4.01	4.45	4.55	4.56
5,000	0.43	0.51	0.70	1.10	1.17	1.41	1.96	2.30	2.85	3.15	3.27	3.29
9,403	0.25	0.41	0.49	0.68	0.74	0.87	1.22	1.44	1.83	2.10	2.14	2.15




SPAS 1059 Storm Center Mass Curve: Sahuarita, AZ
September 9 (0800Z) to 11 (0800Z), 1964 Storm
Lat: 32.0063 Lon: -110.9042
Incremental
Accumulated
6.77"
Precipitation (inches)
4
3.5
3
2.5
2
1.5
1
0.5
0
7.5
6.5
5.5
4.5
3.5
2.5
1.5
0.5
-0.5
0
10
20
30
40



Total Rainfall (48-hours)
Sahuarita, AZ 1964 Storm
Storm #1059 September 9 (0800 Z) to 11 (0800 Z), 1964

Gauging Stations

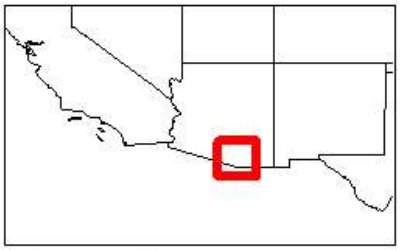
- Daily
- Hourly
- Hourly Pseudo
- Supplemental

Miles: 0 4.5 9 18
Kilometers: 0 10 20 40 60

N

Precipitation (inches)

- 0.24 - 1.00
- 1.01 - 2.00
- 2.01 - 3.00
- 3.01 - 4.00
- 4.01 - 5.00
- 5.01 - 6.00
- 6.01 - 7.00



Coordinate system: GCS North American 1983
Scale: 1:1,271,778
Metstat/AWA March 26, 2000

Young, AZ

November 21-27, 1965

Storm Type: General Winter

Storm Precipitation Analysis System (SPAS) For Storm #1137

General Storm Location: Young, Arizona

Storm Dates: November 21-27, 1965

Event: Winter synoptic

Zone 1

Latitude: 33.9875

Longitude: -112.3542

Max. Grid Rainfall Amount: 4.31”

Max. Observed Rainfall Amount: n/a

Zone 2

Latitude: 33.8208

Longitude: -110.9208

Max. Grid Rainfall Amount: 11.58”

Max. Observed Rainfall Amount: 11.33” at WORKMAN CREEK 1 AZ

Zone 3

Latitude: 37.9292

Longitude: -111.8708

Max. Grid Rainfall Amount: 6.31”

Max. Observed Rainfall Amount: n/a

Zone 4

Latitude: 36.8125

Longitude: -109.1792

Max. Grid Rainfall Amount: 3.36”

Max. Observed Rainfall Amount: n/a

Zone 5

Latitude: 37.0958

Longitude: -106.6292

Max. Grid Rainfall Amount: 7.00”

Max. Observed Rainfall Amount: n/a

Zone 6

Latitude: 32.4375

Longitude: -110.7625

Max. Grid Rainfall Amount: 6.75”

Max. Observed Rainfall Amount: n/a

Number of Stations: **559** (435 Daily, 46 Hourly, 16 Hourly Estimated, 37 Hourly Pseudo, 20 Supplemental, and 5 Supplemental Estimated)

SPAS Version: 8.0

Base Map Used: Yes, conus_prism_ppt_in_1971_2000_11

Spatial resolution: 00:00:30 (0.27 sq. mi.)

Radar Included: No

Depth-Area-Duration (DAD) analysis: Yes

Storm Name:	**SPAS-1137-Young-Zone 2**
Storm Date:	**11/21-27/1965**
AWA Analysis Date:	**5/25/2013**

Storm Adjustment for Grid Point 1

Temporal Transposition Date	**5-Nov**	

	Lat	Long
Storm center location	**33.82**	**-110.92**
Storm Rep dew point location	**32.13**	**-110.96**
Transposition dewpoint location	**29.285**	**-110.415**
Basin location	**30.975**	**-110.375**

Moisture Inflow Direction:	**S @ 115**	miles
Grid Point Elevation	**6,977**	feet
Storm Center Elevation	**7,100**	feet
Storm Analysis Duration	**24**	hours

The storm representative dew point is	**64.0 F**	with total precipitable water above sea level of			**1.68**	inches.
The in-place maximum dew point is	**67.5 F**	with total precipitable water above sea level of			**2.00**	inches.
The transpositioned maximum dew point is	**68.0 F**	with total precipitable water above sea level of			**2.05**	inches.
The in-place storm elevation is	**7,100**	which subtracts	**0.95**	inches of precipitable water at	**64.0 F**	
The in-place storm elevation is	**7,100**	which subtracts	**1.09**	inches of precipitable water at	**67.5 F**	
The in-place storm elevation is	**7,100**	which subtracts	**1.11**	inches of precipitable water at	**68.0 F**	

The in-place maximization factor is	**1.25**
The moisture transposition factor is	**1.03**
The orographic transposition factor is	**0.60**
The total adjustment factor is	**0.77**

Observed Storm Depth-Area-Duration

	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	**0.8**	**2.9**	**4.4**	-	**7.1**	-	**7.7**	**7.7**	-	**10.9**
10 sq miles	**0.8**	**2.4**	**4.2**	-	**5.9**	-	**6.3**	**6.3**	-	**8.8**
100 sq miles	**0.7**	**2.1**	**3.4**	-	**4.3**	-	**4.7**	**4.7**	-	**7.0**
200 sq miles	**0.7**	**2.0**	**3.1**	-	**4.2**	-	**4.3**	**4.3**	-	**6.4**
500 sq miles	**0.6**	**1.8**	**2.9**	-	**3.8**	-	**4.0**	**4.2**	-	**6.1**
1000 sq miles	**0.5**	**1.7**	**2.5**	-	**3.5**	-	**3.6**	**3.6**	-	**5.7**
2000 sq miles	**0.5**	**1.5**	**2.4**	-	**3.2**	-	**3.4**	**3.5**	-	**5.2**
5000 sq miles	**0.4**	**1.2**	**2.0**	-	**2.8**	-	**2.9**	**2.9**	-	**4.4**
10000 sq miles	**0.3**	**1.1**	**1.7**	-	**2.4**	-	**2.6**	**2.6**	-	**3.9**
20000 sq miles	**0.2**	**0.8**	**1.3**	-	**1.9**	-	**2.1**	**2.2**	-	**3.1**

Adjusteded Storm Depth-Area-Duration

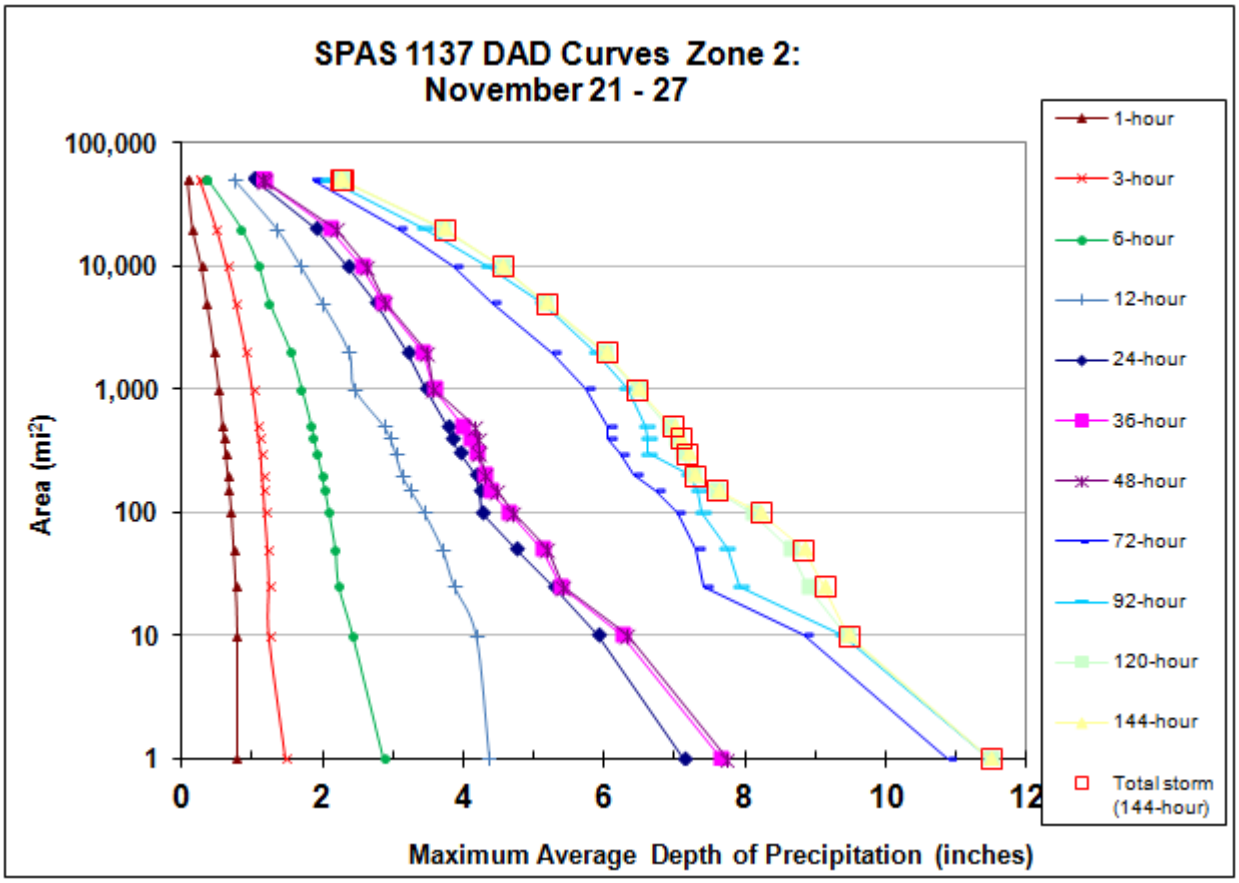
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	**0.6**	**2.2**	**3.4**	-	**5.5**	-	**5.9**	**6.0**	-	**8.4**
10 sq miles	**0.6**	**1.9**	**3.2**	-	**4.6**	-	**4.8**	**4.9**	-	**6.8**
100 sq miles	**0.5**	**1.6**	**2.7**	-	**3.3**	-	**3.6**	**3.6**	-	**5.4**
200 sq miles	**0.5**	**1.5**	**2.4**	-	**3.2**	-	**3.3**	**3.3**	-	**5.0**
500 sq miles	**0.4**	**1.4**	**2.2**	-	**2.9**	-	**3.1**	**3.2**	-	**4.7**
1000 sq miles	**0.4**	**1.3**	**1.9**	-	**2.7**	-	**2.8**	**2.8**	-	**4.4**
2000 sq miles	**0.4**	**1.2**	**1.8**	-	**2.5**	-	**2.6**	**2.7**	-	**4.0**
5000 sq miles	**0.3**	**1.0**	**1.5**	-	**2.1**	-	**2.2**	**2.2**	-	**3.4**
10000 sq miles	**0.2**	**0.8**	**1.3**	-	**1.8**	-	**2.0**	**2.0**	-	**3.0**
20000 sq miles	**0.1**	**0.6**	**1.0**	-	**1.5**	-	**1.6**	**1.7**	-	**2.4**

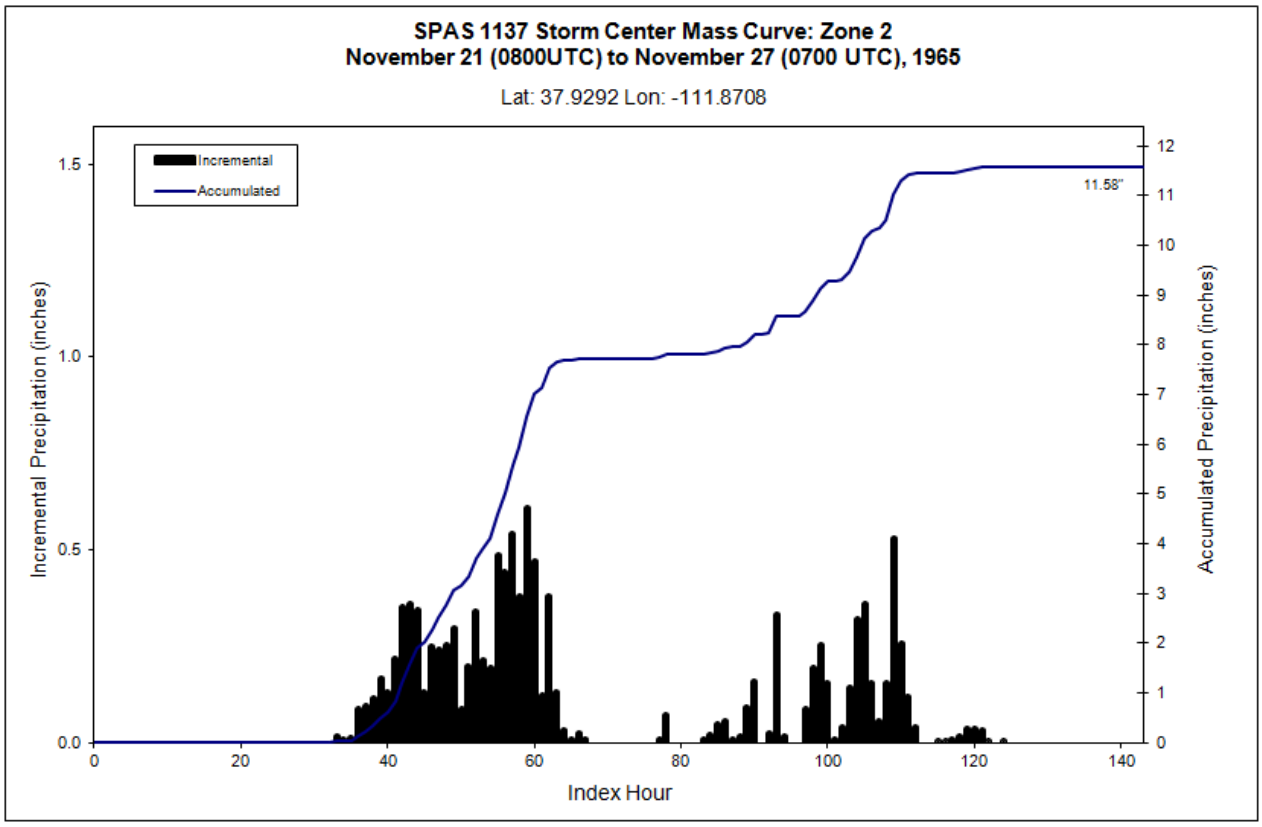
Storm or Storm Center Name	**SPAS-1137-Young-Zone 2**		
Storm Date(s)	11/21-27/1965		
Storm Type	General		
Storm Location	33.82	-110.92	
Storm Center Elevation	7100		
Precipitation Total & Duration (10 sq mi)	11.58 inches 144 hours (SPAS 1137 DAD)		
Storm Representative Dewpoint	64.0 F	24	hr ave KTUS
Storm Representative Dewpoint Location	32.13	-110.96	
In-place Maximum Dewpoint	67.5 F		
Moisture Inflow Vector	S @ 115		
In-place Maximization Factor			
Temporal Transposition (Date)	5-Nov		
Transposition Dewpoint Location	29.29	-110.42	
Transposition Maximum Dewpoint	68.0 F		
Transposition Adjustment Factor	1.03		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	0.77		

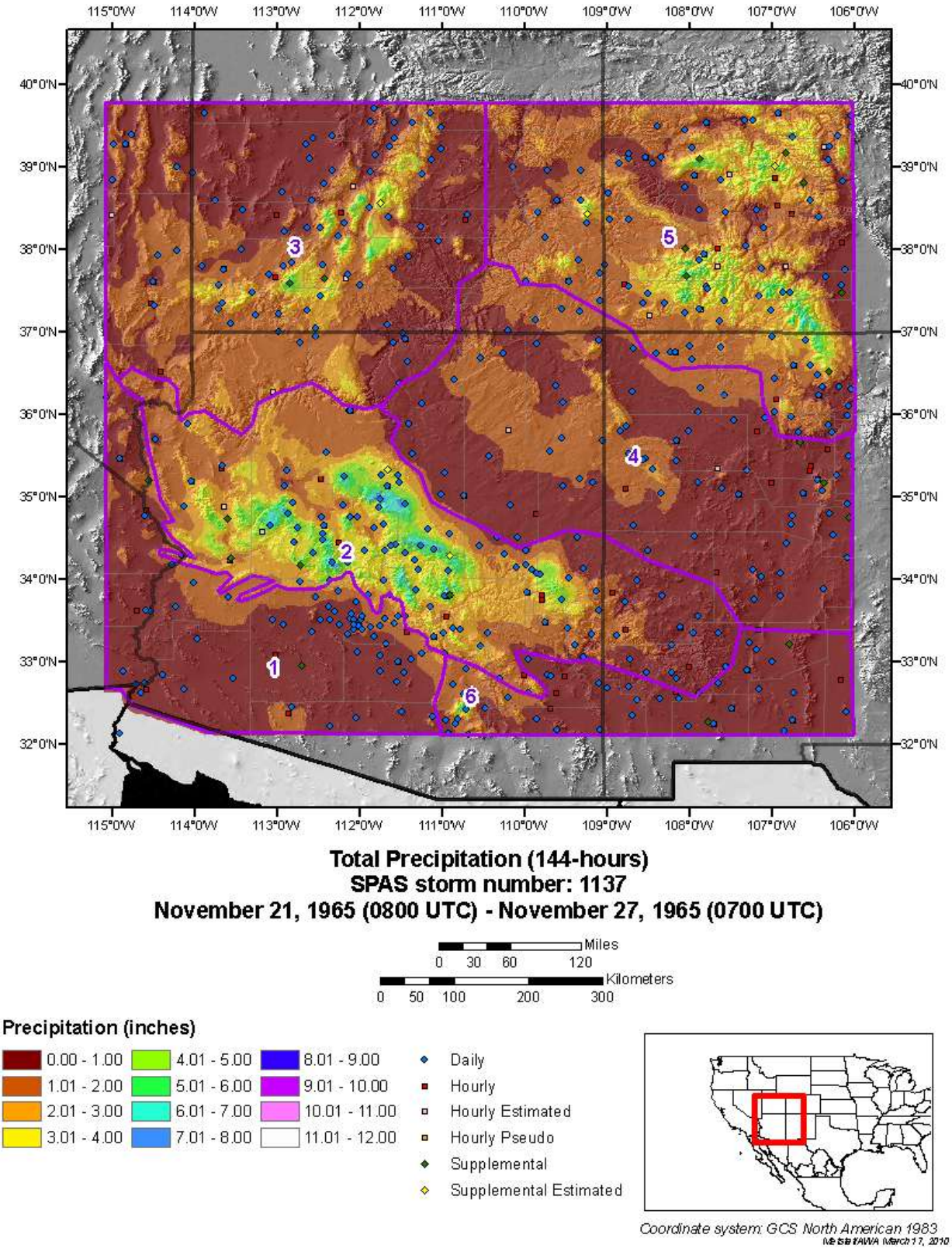
Storm 1137 - November 21, 1965 (0800 UTC) - November 27, 1965 (0700 UTC)

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

	Duration (hours)											
Area (mi^2)	1	3	6	12	24	36	48	72	96	120	144	Total
0.27	0.84	1.53	2.93	4.52	7.19	7.73	7.80	10.96	11.58	11.58	11.58	11.58
1	0.78	1.48	2.87	4.36	7.13	7.66	7.74	10.88	11.48	11.48	11.48	11.48
10	0.78	1.24	2.43	4.17	5.91	6.25	6.32	8.84	9.37	9.44	9.46	9.46
25	0.76	1.24	2.23	3.86	5.28	5.38	5.41	7.41	7.93	8.90	9.13	9.13
50	0.73	1.22	2.18	3.69	4.74	5.12	5.19	7.31	7.74	8.63	8.82	8.82
100	0.70	1.18	2.09	3.43	4.27	4.65	4.70	7.03	7.38	8.10	8.21	8.21
150	0.67	1.16	2.03	3.24	4.24	4.38	4.48	6.74	7.33	7.57	7.60	7.60
200	0.65	1.14	1.99	3.12	4.16	4.30	4.30	6.43	7.20	7.23	7.27	7.27
300	0.62	1.12	1.92	3.03	3.94	4.18	4.23	6.21	6.62	7.10	7.17	7.17
400	0.60	1.09	1.87	2.95	3.84	4.09	4.21	6.06	6.61	7.00	7.07	7.07
500	0.58	1.07	1.84	2.86	3.78	3.99	4.16	6.05	6.59	6.91	6.97	6.97
1,000	0.53	1.00	1.70	2.45	3.47	3.58	3.58	5.73	6.32	6.46	6.47	6.47
2,000	0.46	0.91	1.54	2.37	3.21	3.42	3.48	5.24	5.89	5.99	6.02	6.02
5,000	0.36	0.76	1.24	1.99	2.75	2.85	2.88	4.40	5.12	5.13	5.17	5.17
10,000	0.28	0.63	1.08	1.68	2.36	2.56	2.64	3.87	4.35	4.53	4.54	4.54
20,000	0.16	0.48	0.83	1.34	1.91	2.10	2.19	3.06	3.43	3.70	3.72	3.72
50,000	0.09	0.24	0.35	0.74	1.04	1.17	1.17	1.87	2.09	2.27	2.27	2.27
50,369	0.09	0.24	0.35	0.74	1.03	1.16	1.16	1.87	2.06	2.25	2.25	2.25




SPAS 1137 Storm Center Mass Curve: Zone 2
November 21 (0800UTC) to November 27 (0700 UTC), 1965
Lat: 37.9292 Lon: -111.8708
Incremental
Accumulated
11.58"
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
Index Hour
0.0
0.5
1.0
1.5
0
20
40
60
80
100
120
140
0
1
2
3
4
5
6
7
8
9
10
11
12



Total Precipitation (144-hours)
SPAS storm number: 1137
November 21, 1965 (0800 UTC) - November 27, 1965 (0700 UTC)

Junipine, AZ

December 2-8, 1966

Storm Type: General Winter

Storm Precipitation Analysis System (SPAS) For Storm #1141

General Storm Location: Junipine, Arizona
Storm Dates: Dec. 2-8, 1966
Event: Winter synoptic
Zone 1

Latitude: 34.9792

Longitude: -111.7708

Max. Grid Rainfall Amount: 10.74”

Max. Observed Rainfall Amount: n/a

Zone 2

Latitude: 36.2292

Longitude: -112.0625

Max. Grid Rainfall Amount: 15.86”

Max. Observed Rainfall Amount: 14.00” at NORTH RIM CHECKING STN AZ

Zone 3

Latitude: 36.8208

Longitude: -109.1875

Max. Grid Rainfall Amount: 4.26”

Max. Observed Rainfall Amount: n/a

Zone 4

Latitude: 38.9875

Longitude: -106.9125

Max. Grid Rainfall Amount: 14.94”

Max. Observed Rainfall Amount: n/a

Number of Stations: **462** (304 Daily, 37 Hourly, 30 Hourly Pseudo, 4 Hourly Estimated, 4 Hourly Estimated Pseudo, 74 Supplemental, and 9 Supplemental Estimated)
SPAS Version: 8.0
Base Map Used: Yes, conus_prism_ppt_in_1971_2000_12
Spatial resolution: 00:00:30 (0.27 sq. miles)
Radar Included: No
Depth-Area-Duration (DAD) analysis: Yes

Storm Name:	**SPAS-1141-Junipine-Zone 2**
Storm Date:	**12/2-8/1966**
AWA Analysis Date:	**5/25/2013**

Storm Adjustment for Grid Point 1

Temporal Transposition Date	**15-Nov**	

	Lat	Long
Storm center location	**36.23**	**-112.06**
Storm Rep SST location	**27.50**	**-124.50**
Transposition SST location	**22.245**	**-122.815**
Basin location	**30.975**	**-110.375**

Moisture Inflow Direction:	**SW @ 950**	miles
Grid Point Elevation	**6,977**	feet
Storm Center Elevation	**8,150**	feet
Storm Analysis Duration	**24**	hours

The storm representative SST is	**68.0 F**	with total precipitable water above sea level of			**2.05**	inches.
The in-place maximum SST is	**70.0 F**	with total precipitable water above sea level of			**2.25**	inches.
The transpositioned maximum SST is	**75.0 F**	with total precipitable water above sea level of			**2.85**	inches.
The in-place storm elevation is	**8,150**	which subtracts	**1.23**	inches of precipitable water at	**68.0 F**	
The in-place storm elevation is	**8,150**	which subtracts	**1.32**	inches of precipitable water at	**70.0 F**	
The in-place storm elevation is	**8,150**	which subtracts	**1.58**	inches of precipitable water at	**75.0 F**	

The in-place maximization factor is	**1.13**
The moisture transposition factor is	**1.37**
The orographic transposition factor is	**0.86**
The total adjustment factor is	**1.33**

Notes: Storm representative SST value was based on SST values between December 4-6 along with HYSPLIT backward trajectory. Values were selected in region where temperature did not vary more than a degree over a large area.

Observed Storm Depth-Area-Duration

	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	**1.5**	**4.3**	**6.4**	-	**7.9**	-	**9.7**	**10.5**	-	**11.3**
10 sq miles	**1.4**	**4.1**	**6.1**	-	**7.5**	-	**9.3**	**10.5**	-	**11.3**
100 sq miles	**1.3**	**3.5**	**5.0**	-	**6.8**	-	**8.6**	**9.7**	-	**10.4**
200 sq miles	**1.1**	**3.3**	**4.5**	-	**6.2**	-	**8.2**	**9.1**	-	**9.7**
500 sq miles	**0.9**	**3.0**	**4.0**	-	**5.6**	-	**7.6**	**8.4**	-	**8.4**
1000 sq miles	**0.8**	**2.7**	**3.7**	-	**5.0**	-	**6.7**	**7.6**	-	**7.6**
2000 sq miles	**0.7**	**2.3**	**3.4**	-	**4.3**	-	**6.1**	**6.6**	-	**6.9**
5000 sq miles	**0.6**	**1.9**	**2.9**	-	**3.5**	-	**4.9**	**5.4**	-	**5.5**
10000 sq miles	**0.4**	**1.6**	**2.4**	-	**2.9**	-	**4.0**	**4.4**	-	**4.7**
20000 sq miles	**0.3**	**1.1**	**1.8**	-	**2.2**	-	**3.2**	**3.3**	-	**3.6**

Adjusteded Storm Depth-Area-Duration

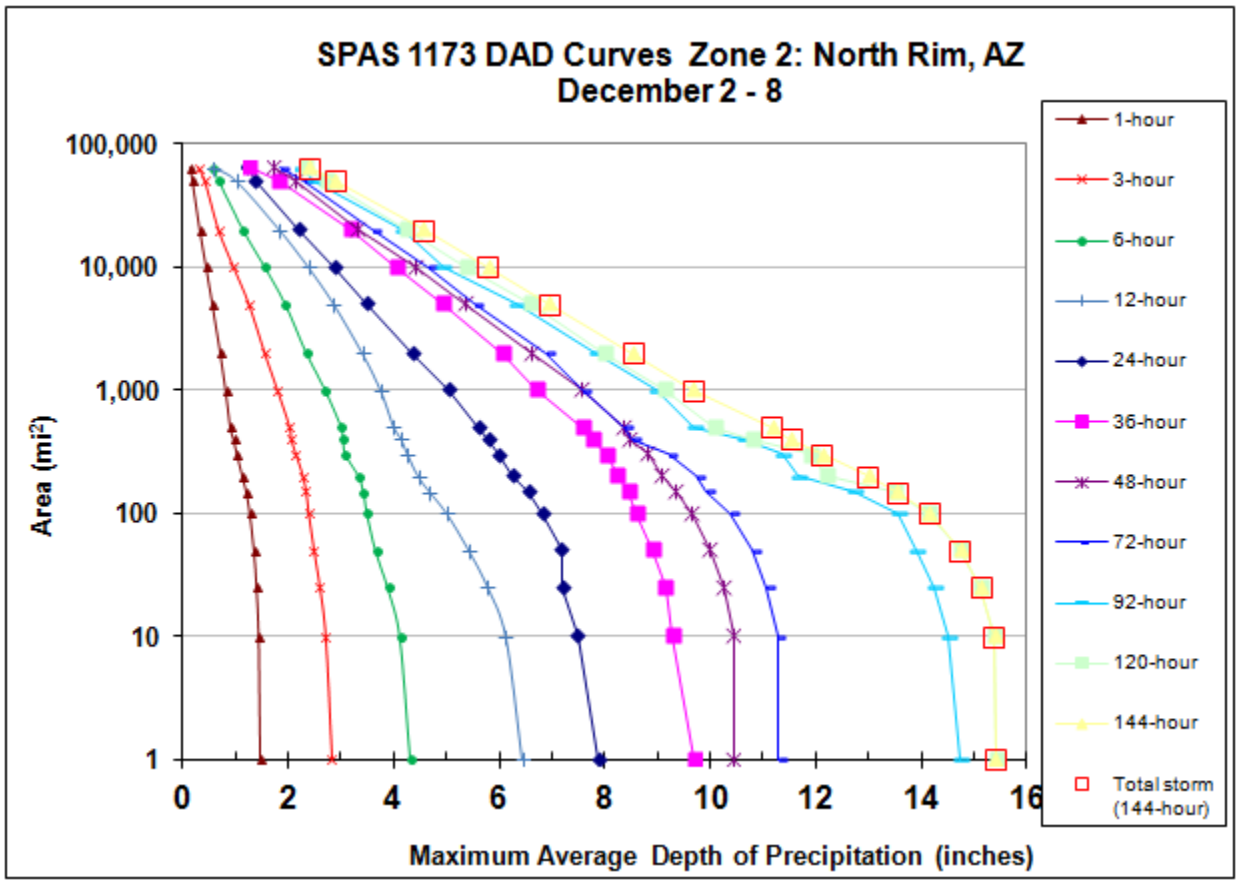
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	**2.0**	**5.7**	**8.6**	-	**10.5**	-	**12.9**	**13.9**	-	**15.1**
10 sq miles	**1.9**	**5.5**	**8.1**	-	**10.0**	-	**12.4**	**13.9**	-	**15.0**
100 sq miles	**1.7**	**4.6**	**6.6**	-	**9.1**	-	**11.4**	**12.9**	-	**13.8**
200 sq miles	**1.5**	**4.4**	**5.9**	-	**8.3**	-	**11.0**	**12.1**	-	**13.0**
500 sq miles	**1.2**	**4.0**	**5.3**	-	**7.4**	-	**10.1**	**11.1**	-	**11.2**
1000 sq miles	**1.1**	**3.6**	**5.0**	-	**6.7**	-	**8.9**	**10.1**	-	**10.1**
2000 sq miles	**0.9**	**3.1**	**4.5**	-	**5.8**	-	**8.1**	**8.8**	-	**9.2**
5000 sq miles	**0.7**	**2.6**	**3.8**	-	**4.6**	-	**6.5**	**7.1**	-	**7.4**
10000 sq miles	**0.6**	**2.1**	**3.2**	-	**3.8**	-	**5.4**	**5.9**	-	**6.2**
20000 sq miles	**0.4**	**1.5**	**2.4**	-	**2.9**	-	**4.2**	**4.4**	-	**4.8**

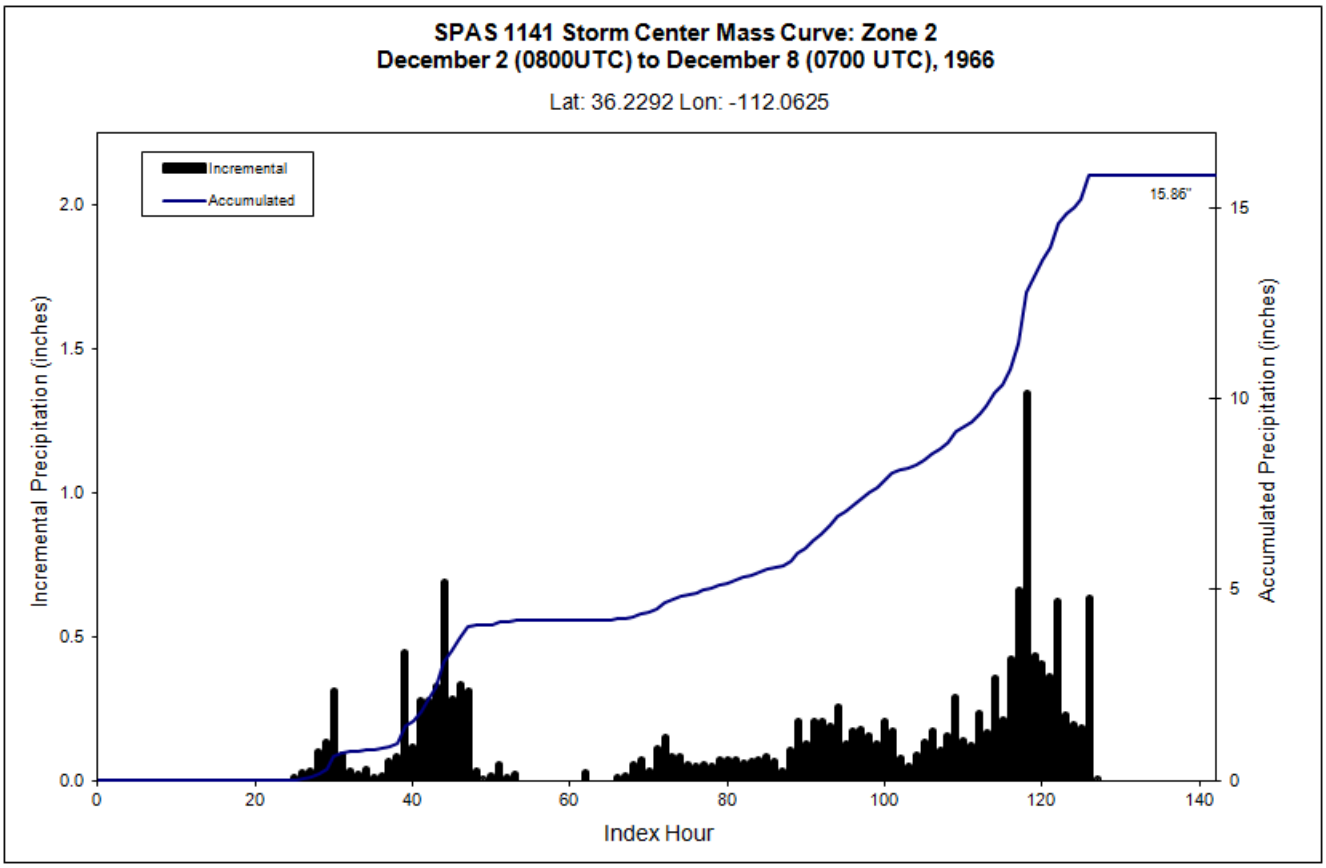
Storm or Storm Center Name	**SPAS-1141-Junipine-Zone 2**	
Storm Date(s)	12/2-8/1966	
Storm Type	General	
Storm Location	36.23	-112.06
Storm Center Elevation	8150	
Precipitation Total & Duration (10 sq mi)	15.86 inches 144 hours (SPAS 1141 DAD)	
Storm Representative SST	68.0 F	24
Storm Representative SST Location	27.5	-124.5
In-place Maximum SST	70.0 F	
Moisture Inflow Vector	SW @ 950	
In-place Maximization Factor		
Temporal Transposition (Date)	15-Nov	
Transposition SST Location	22.25	-122.82
Transposition Maximum SST	75.0 F	
Transposition Adjustment Factor	1.37	
Grid Point Location	30.975	-110.375
Grid Point Elevation	6,977	
Total Adjustment Factor	1.33	

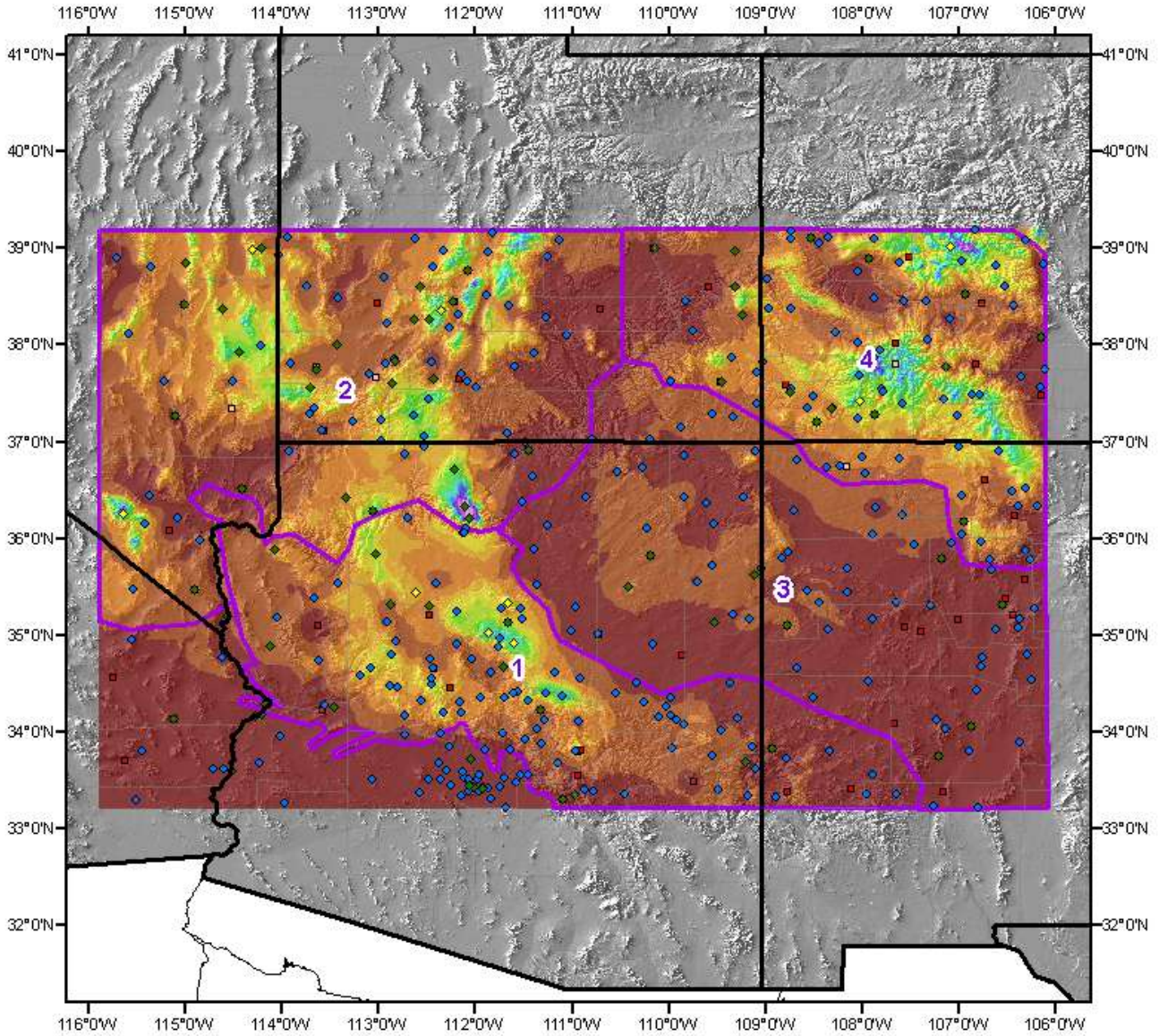
Storm 1141 - December 2, 1966 (0800 UTC) - December 8, 1966 (0700 UTC)

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

	Duration (hours)											
Area (mi²)	1	3	6	12	24	36	48	72	96	120	144	Total
0.27	1.50	2.89	4.44	6.61	8.10	9.93	10.83	11.67	15.23	15.86	15.86	15.86
1	1.47	2.82	4.31	6.42	7.89	9.69	10.45	11.30	14.75	15.40	15.40	15.40
10	1.44	2.70	4.11	6.11	7.48	9.28	10.45	11.27	14.51	15.37	15.37	15.37
25	1.40	2.59	3.88	5.77	7.21	9.15	10.25	11.07	14.26	15.12	15.12	15.12
50	1.35	2.48	3.65	5.41	7.18	8.90	9.99	10.79	13.89	14.73	14.73	14.73
100	1.27	2.38	3.49	4.99	6.83	8.59	9.65	10.37	13.55	14.14	14.15	14.15
150	1.20	2.33	3.42	4.66	6.54	8.46	9.36	9.94	12.72	13.50	13.53	13.53
200	1.13	2.27	3.33	4.45	6.24	8.24	9.08	9.73	11.66	12.19	12.99	12.99
300	1.03	2.14	3.08	4.25	5.97	8.03	8.82	9.21	11.38	11.91	12.11	12.11
400	0.96	2.05	3.04	4.13	5.78	7.76	8.48	8.52	10.66	10.79	11.53	11.53
500	0.90	2.02	3.00	3.99	5.59	7.58	8.36	8.38	9.69	10.09	11.17	11.17
1,000	0.81	1.79	2.70	3.74	5.03	6.70	7.58	7.58	8.98	9.11	9.67	9.67
2,000	0.71	1.55	2.34	3.39	4.34	6.06	6.61	6.89	7.83	8.00	8.53	8.53
5,000	0.56	1.25	1.94	2.85	3.49	4.91	5.35	5.54	6.33	6.57	6.94	6.94
10,000	0.44	0.96	1.55	2.37	2.87	4.04	4.42	4.65	4.94	5.36	5.79	5.79
20,000	0.32	0.68	1.14	1.82	2.18	3.19	3.33	3.58	4.15	4.25	4.56	4.56
50,000	0.18	0.42	0.68	1.00	1.38	1.83	2.15	2.29	2.50	2.73	2.89	2.89
63,673	0.14	0.30	0.56	0.56	1.23	1.27	1.74	1.85	2.25	2.32	2.40	2.40




SPAS 1141 Storm Center Mass Curve: Zone 2
December 2 (0800UTC) to December 8 (0700 UTC), 1966
Lat: 36.2292 Lon: -112.0625
Incremental
Accumulated
15.86"
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
Index Hour
0.0
0.5
1.0
1.5
2.0
0
5
10
15
0
20
40
60
80
100
120
140



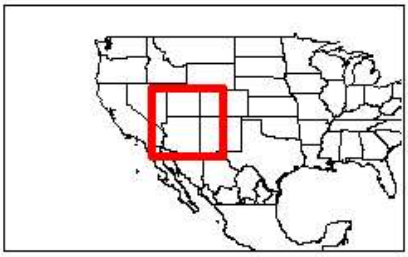
Total Precipitation (144-hours)
SPAS storm number: 1141
December 2, 1966 (0800 UTC) - December 8, 1966 (0700 UTC)

Miles: 0 25 50 100
Kilometers: 0 65 130 260 390

Precipitation (inches)

- 0.00 - 1.00
- 1.01 - 2.00
- 2.01 - 3.00
- 3.01 - 4.00
- 4.01 - 5.00
- 5.01 - 6.00
- 6.01 - 7.00
- 7.01 - 8.00
- 8.01 - 9.00
- 9.01 - 10.00
- 10.01 - 11.00
- 11.01 - 12.00
- 12.01 - 13.00
- 13.01 - 14.00
- 14.01 - 15.00
- 15.01 - 16.00

- Daily
- Hourly
- Hourly Estimated
- Hourly Estimated Pseudo
- Hourly Pseudo
- Supplemental
- Supplemental Estimated



Coordinate system: GCS North American 1983
Mesta/AWA March 4, 2010

Jakes Corner, AZ

December 17-22, 1967

Storm Type: General Winter

Storm Precipitation Analysis System (SPAS) For Storm #1133

General Storm Location: Papago Indian Reservation, Arizona

Storm Dates: December 17 (0800) – 22 (0800), 1967

Event: Winter Storm Event

Latitude: 34.0208

Longitude: -111.3791

Max. Grid/Radar Rainfall Amount: 10.02”

Max. Observed Rainfall Amount: 9.90”

Number of Stations: 294 (194-daily, 1-daily pseudo, 34-hourly, 1-hourly estimated, 8-hourly pseudo, 56-supplemental

SPAS Version: 7.0

Base Map Used: Yes, conus_prism_ppt_in_1971_2000_12_mx. PRISM basemap was extended down into Mexico based on elevation/monthly precipitation.

Spatial resolution: 0.28 mi^2

Radar Included: No

Depth-Area-Duration (DAD) analysis: Yes, 1, 2, 3, 4, 5, 6, 12, 18, 24, 36, 48, 72, 96, and 120-hours.

Storm Name:	SPAS-1133-Jakes Corner-zone 2
Storm Date:	12/17-22/1967
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	1-Dec	
	Lat	Long
Storm center location	34.02	-111.38
Storm Rep SST location	30.00	-120.00
Transposition SST location	26.955	-118.995
Basin location	30.975	-110.375

Moisture Inflow Direction:	SW @ 575	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	4,350	feet
Storm Analysis Duration	24	hours

The storm representative SST is	64.0 F	with total precipitable water above sea level of			1.68	inches.
The in-place maximum SST is	66.0 F	with total precipitable water above sea level of			1.86	inches.
The transpositioned maximum SST is	69.5 F	with total precipitable water above sea level of			2.20	inches.
The in-place storm elevation is	4,350	which subtracts	0.67	inches of precipitable water at	64.0 F	
The in-place storm elevation is	4,350	which subtracts	0.72	inches of precipitable water at	66.0 F	
The in-place storm elevation is	4,350	which subtracts	0.81	inches of precipitable water at	69.5 F	

The in-place maximization factor is	1.13
The moisture transposition factor is	1.22
The orographic transposition factor is	0.74
The total adjustment factor is	1.02

Notes:

Observed Storm Depth-Area-Duration

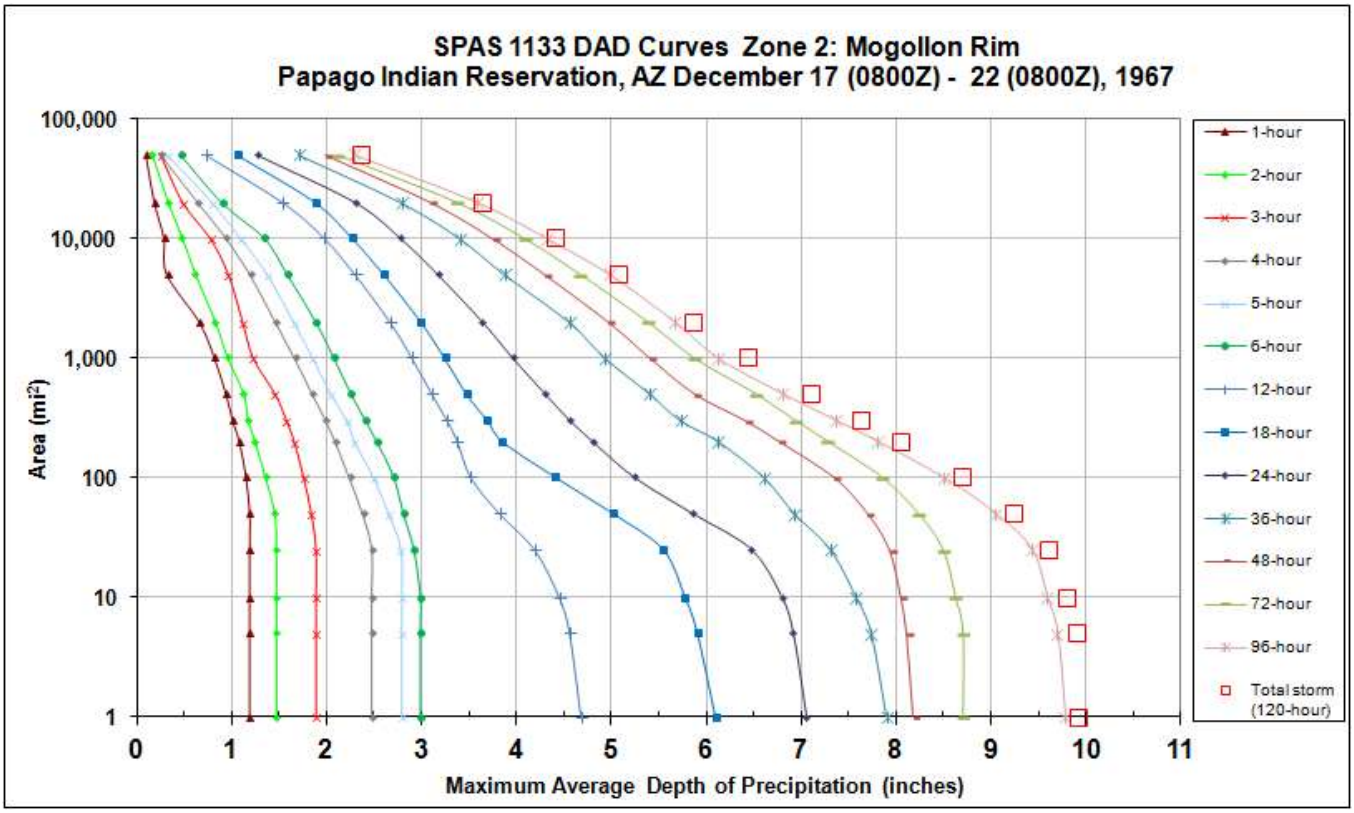
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	1.2	3.0	4.7	6.1	7.1	-	7.9	8.2	-	8.7
10 sq miles	1.2	3.0	4.5	5.8	6.8	-	7.6	8.1	-	8.6
100 sq miles	1.2	2.7	3.5	4.4	5.2	-	6.6	7.4	-	7.9
200 sq miles	1.1	2.5	3.4	3.9	4.8	-	6.1	6.8	-	7.3
500 sq miles	0.9	2.3	3.1	3.5	4.3	-	5.4	5.9	-	6.5
1000 sq miles	0.8	2.1	2.9	3.2	4.0	-	4.9	5.4	-	5.9
2000 sq miles	0.7	1.9	2.7	3.0	3.6	-	4.6	5.0	-	5.4
5000 sq miles	0.3	1.6	2.3	2.6	3.2	-	3.9	4.3	-	4.7
10000 sq miles	0.3	1.4	2.0	2.3	2.8	-	3.4	3.8	-	4.1
20000 sq miles	0.2	0.9	1.5	1.9	2.3	-	2.8	3.1	-	3.4

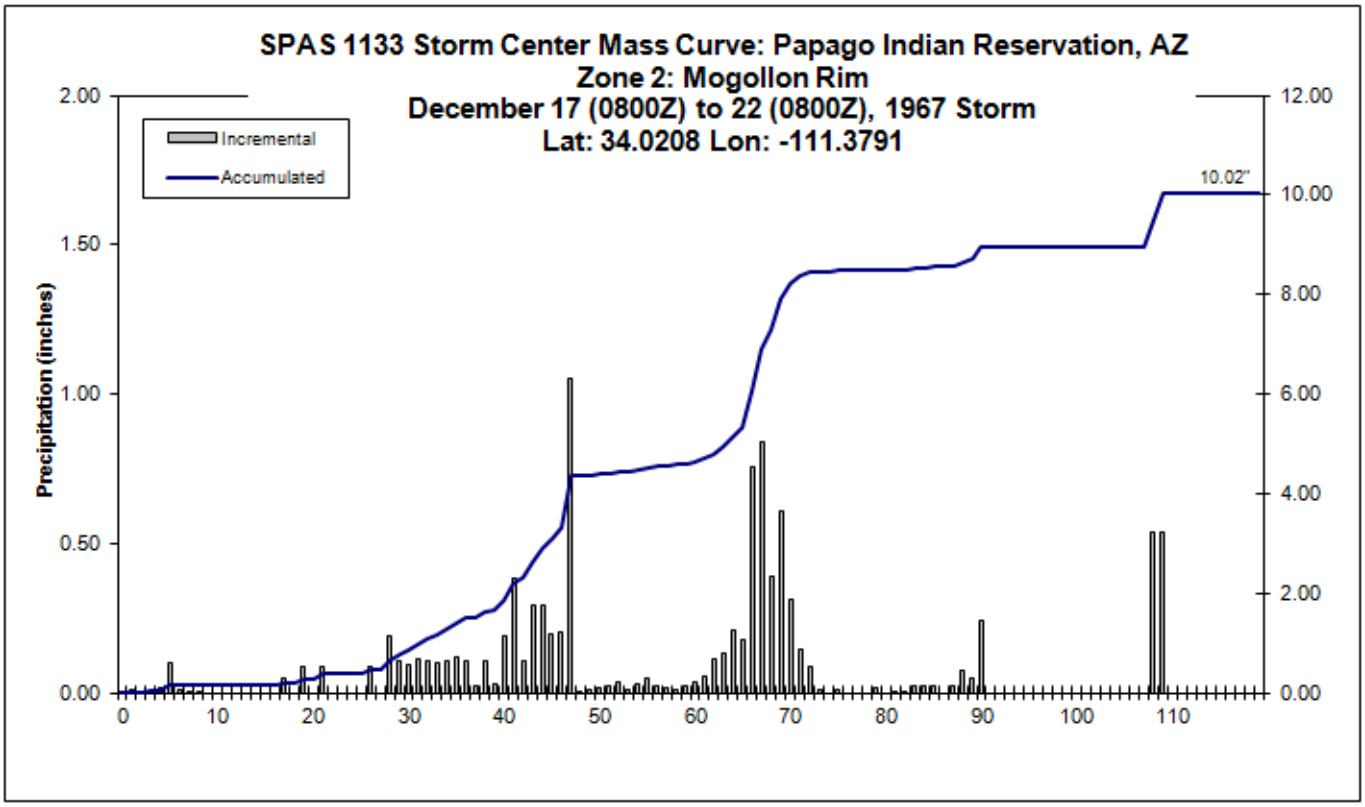
Adjusteded Storm Depth-Area-Duration

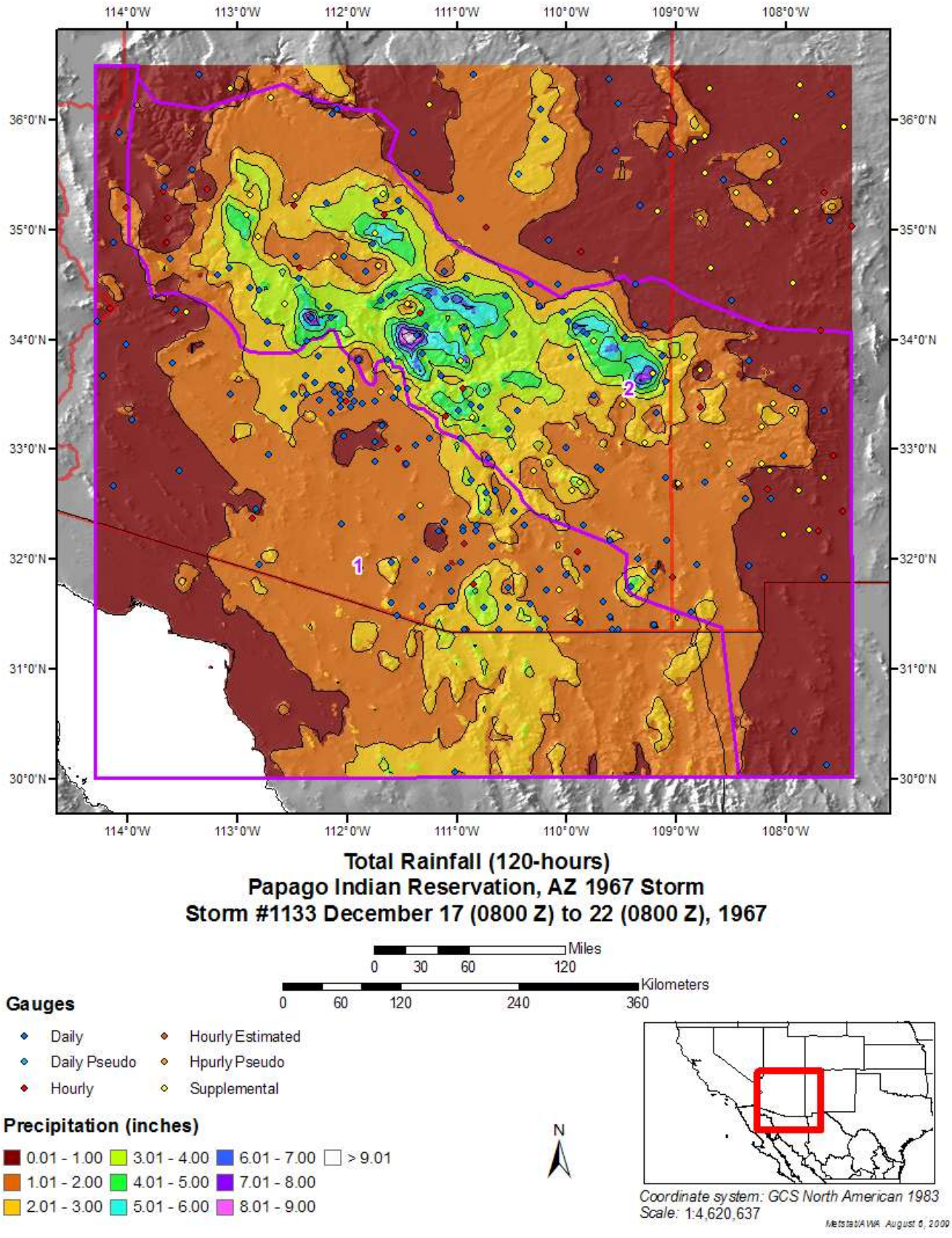
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	1.2	3.0	4.8	-	7.2	-	8.0	8.3	-	8.9
10 sq miles	1.2	3.0	4.5	-	6.9	-	7.7	8.2	-	8.8
100 sq miles	1.2	2.8	3.6	-	5.3	-	6.7	7.5	-	8.0
200 sq miles	1.1	2.6	3.4	-	4.9	-	6.2	6.9	-	7.4
500 sq miles	1.0	2.3	3.2	-	4.4	-	5.5	6.0	-	6.6
1000 sq miles	0.8	2.1	3.0	-	4.0	-	5.0	5.5	-	6.0
2000 sq miles	0.7	1.9	2.7	-	3.7	-	4.6	5.1	-	5.5
5000 sq miles	0.3	1.6	2.3	-	3.2	-	3.9	4.4	-	4.8
10000 sq miles	0.3	1.4	2.0	-	2.8	-	3.5	3.8	-	4.2
20000 sq miles	0.2	0.9	1.6	-	2.3	-	2.8	3.2	-	3.4

Storm or Storm Center Name	SPAS-1133-Jakes Corner-zone 2	
Storm Date(s)	12/17-22/1967	
Storm Type	General	
Storm Location	34.02	-111.38
Storm Center Elevation	4350	
Precipitation Total & Duration (10 sq mi)	8.84 inches 72 hours (SPAS 1133 DAD)	
Storm Representative SST	64.0 F	Daily SST
Storm Representative SST Location	30	-120
In-place Maximum SST	66.0 F	
Moisture Inflow Vector	SW @ 575	
In-place Maximization Factor		
Temporal Transposition (Date)	1-Dec	
Transposition SST Location	26.96	-119.00
Transposition Maximum SST	69.5 F	
Transposition Adjustment Factor	1.22	
Grid Point Location	30.975	-110.375
Grid Point Elevation	6,977	
Total Adjustment Factor	1.02	

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)														
	Duration (hours)													
Area (mi^2)	1	2	3	4	5	6	12	18	24	36	48	72	96	total
0.28	1.32	1.59	2.04	2.59	2.90	3.10	4.80	6.22	7.32	8.15	8.43	8.84	9.88	10.02
1	1.19	1.48	1.88	2.48	2.79	2.99	4.68	6.09	7.05	7.89	8.18	8.70	9.78	9.91
5	1.19	1.48	1.88	2.48	2.79	2.99	4.56	5.90	6.91	7.73	8.11	8.70	9.70	9.90
10	1.19	1.48	1.88	2.48	2.79	2.99	4.45	5.77	6.79	7.57	8.05	8.62	9.59	9.79
25	1.19	1.48	1.88	2.48	2.78	2.92	4.19	5.54	6.47	7.30	7.93	8.49	9.43	9.61
50	1.19	1.46	1.83	2.38	2.65	2.81	3.82	5.01	5.85	6.92	7.70	8.23	9.05	9.23
100	1.15	1.36	1.75	2.24	2.49	2.71	3.52	4.41	5.24	6.60	7.35	7.85	8.50	8.69
200	1.08	1.25	1.65	2.09	2.29	2.53	3.38	3.85	4.80	6.12	6.77	7.28	7.81	8.05
300	1.01	1.18	1.57	1.99	2.21	2.41	3.27	3.69	4.56	5.72	6.41	6.94	7.37	7.63
500	0.94	1.13	1.45	1.85	2.04	2.26	3.11	3.47	4.30	5.40	5.88	6.52	6.81	7.10
1,000	0.82	0.96	1.22	1.66	1.85	2.08	2.90	3.24	3.96	4.93	5.41	5.87	6.12	6.43
2,000	0.66	0.83	1.11	1.46	1.65	1.89	2.67	2.99	3.64	4.55	4.97	5.38	5.67	5.86
5,000	0.32	0.62	0.96	1.19	1.37	1.59	2.30	2.60	3.17	3.87	4.30	4.67	4.98	5.08
10,000	0.29	0.48	0.77	0.94	1.09	1.35	1.98	2.27	2.78	3.40	3.75	4.08	4.32	4.41
20,000	0.19	0.33	0.48	0.64	0.79	0.90	1.54	1.88	2.30	2.78	3.10	3.37	3.59	3.64
50,000	0.10	0.16	0.25	0.25	0.32	0.47	0.73	1.06	1.27	1.71	1.99	2.12	2.30	2.36




SPAS 1133 Storm Center Mass Curve: Papago Indian Reservation, AZ
Zone 2: Mogollon Rim
December 17 (0800Z) to 22 (0800Z), 1967 Storm
Lat: 34.0208 Lon: -111.3791
Incremental
Accumulated
10.02"
Precipitation (inches)
2.00
1.50
1.00
0.50
0.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
0
10
20
30
40
50
60
70
80
90
100
110



Total Rainfall (120-hours)
Papago Indian Reservation, AZ 1967 Storm
Storm #1133 December 17 (0800 Z) to 22 (0800 Z), 1967

Blanding, UT

July 31-August 3, 1968

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1249

General Storm Location: Utah

Storm Dates: July 31 - August 3, 1968

Event: Convective

DAD Zone 1

Latitude: 37.8258

Longitude: -109.5425

Max. Grid Rainfall Amount: 6.67"

Max. Observed Rainfall Amount: 4.73"

Number of Stations: 27 (21 Daily, 3 Hourly, 1 Hourly Pseudo, and 2 Supplemental)

SPAS Version: 9.5

Basemap: PRISM mean (1981-2010) August precipitation

Spatial resolution: 00:00:30 (~ 0.30 mi^2)

Radar Included: No

Depth-Area-Duration (DAD) analysis: Yes

Storm Name:	**SPAS1249 Blanding, UT**
Storm Date:	**7/31-8/3/1968**
AWA Analysis Date:	**5/25/2013**

Storm Adjustment for Grid Point 1

Temporal Transposition Date	**15-Aug**	
	Lat	**Long**
Storm center location	**37.82**	**-109.54**
Storm Rep dew point location	**35.00**	**-112.00**
Transposition dewpoint location	**28.155**	**-112.835**
Basin location	**30.975**	**-110.375**

Moisture Inflow Direction:	**SW @ 240**	miles
Grid Point Elevation	**6,977**	feet
Storm Center Elevation	**9,800**	feet
Storm Analysis Duration	**24**	hours

The storm representative dew point is	**76.0 F**	with total precipitable water above sea level of			**2.99**	inches.
The in-place maximum dew point is	**78.0 F**	with total precipitable water above sea level of			**3.29**	inches.
The transpositioned maximum dew point is	**79.0 F**	with total precipitable water above sea level of			**3.44**	inches.
The in-place storm elevation is	**9,800**	which subtracts	**1.91**	inches of precipitable water at	**76.0 F**	
The in-place storm elevation is	**9,800**	which subtracts	**2.06**	inches of precipitable water at	**78.0 F**	
The in-place storm elevation is	**9,800**	which subtracts	**2.13**	inches of precipitable water at	**79.0 F**	

The in-place maximization factor is	**1.14**
The moisture transposition factor is	**1.07**
The orographic transposition factor is	**1.35**
The total adjustment factor is	**1.64**

Notes: DAD values taken from SPAS 1249. Storm representative dew point value was based on maximum 24-hr Td values between July 29 - August 1, 1968 at KFLG and KPRC. Values were selected in region where temperature did not vary more than a 1-degree over a large area.

Observed Storm Depth-Area-Duration

	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**1.0**	**2.0**	**2.3**	**2.5**	**2.9**	**3.5**	**4.3**	**5.7**	**5.8**
10 sq miles	**1.0**	**2.0**	**2.2**	**2.4**	**2.9**	**3.5**	**4.2**	**5.7**	**5.7**
50 sq miles	**1.0**	**1.9**	**2.0**	**2.2**	**2.7**	**3.3**	**3.8**	**4.9**	**4.9**
100 sq miles	**0.9**	**1.8**	**1.9**	**2.0**	**2.6**	**3.1**	**3.5**	**4.6**	**4.6**
200 sq miles	**0.8**	**1.5**	**1.6**	**1.7**	**2.1**	**2.6**	**2.9**	**3.8**	**3.9**
500 sq miles	**0.6**	**1.2**	**1.3**	**1.4**	**1.7**	**2.1**	**2.3**	**3.0**	**3.1**
1000 sq miles	**0.5**	**0.8**	**1.0**	**1.1**	**1.1**	**1.5**	**1.9**	**2.4**	**2.4**
2000 sq miles	**0.3**	**0.5**	**0.7**	**0.8**	**0.8**	**0.8**	**1.3**	**1.4**	**1.4**
5000 sq miles	**0.2**	**0.3**	**0.5**	**0.5**	**0.5**	**0.6**	**0.9**	**1.1**	**1.2**

Adjusted Storm Depth-Area-Duration

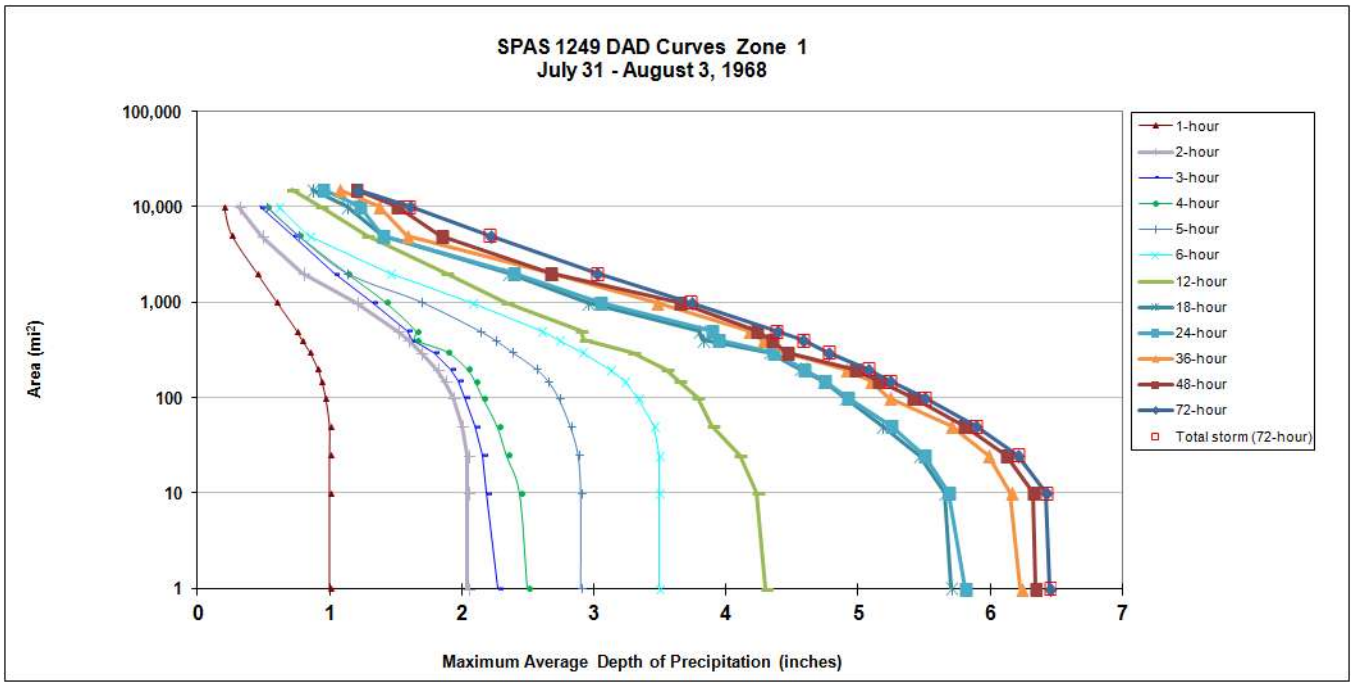
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**1.6**	**3.3**	**3.7**	**4.1**	**4.7**	**5.7**	**7.0**	**9.3**	**9.5**
10 sq miles	**1.6**	**3.3**	**3.6**	**4.0**	**4.7**	**5.7**	**6.9**	**9.3**	**9.3**
50 sq miles	**1.6**	**3.2**	**3.3**	**3.5**	**4.5**	**5.5**	**6.2**	**8.0**	**8.1**
100 sq miles	**1.5**	**3.0**	**3.1**	**3.3**	**4.2**	**5.1**	**5.8**	**7.5**	**7.5**
200 sq miles	**1.2**	**2.5**	**2.6**	**2.7**	**3.5**	**4.3**	**4.7**	**6.2**	**6.4**
500 sq miles	**1.0**	**2.0**	**2.2**	**2.3**	**2.8**	**3.4**	**3.8**	**4.8**	**5.0**
1000 sq miles	**0.7**	**1.3**	**1.7**	**1.9**	**1.9**	**2.4**	**3.1**	**3.8**	**3.9**
2000 sq miles	**0.4**	**0.8**	**1.2**	**1.2**	**1.2**	**1.4**	**2.1**	**2.3**	**2.3**
5000 sq miles	**0.3**	**0.5**	**0.8**	**0.9**	**0.9**	**1.0**	**1.5**	**1.9**	**2.0**

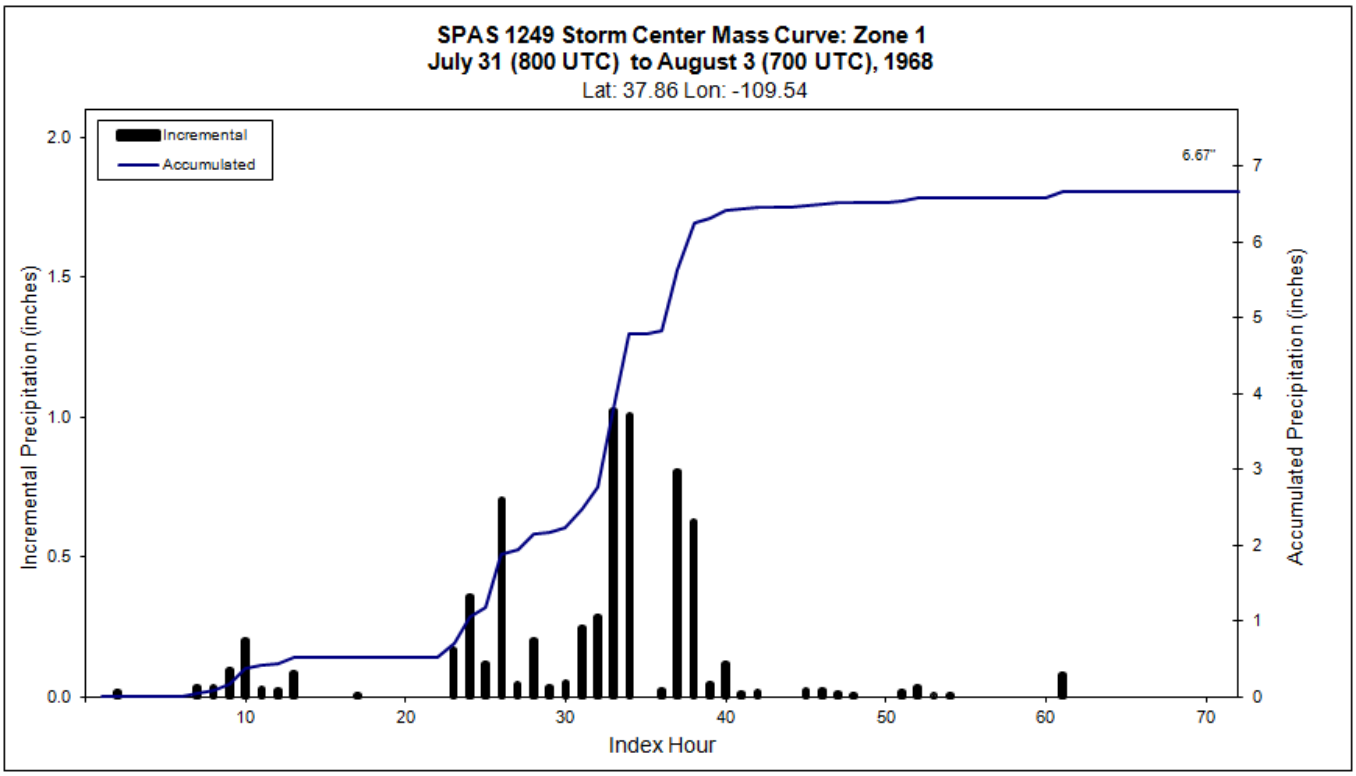
Storm or Storm Center Name	**SPAS1249 Blanding, UT**	
Storm Date(s)	7/31-8/3/1968	
Storm Type	Convective	
Storm Location	37.82	-109.54
Storm Center Elevation	9,800	
Precipitation Total & Duration (10 sq mi)	6.67 Inches 72-hours	
Storm Representative Dewpoint	76.0 F	24
Storm Representative Dewpoint Location	35	-112
In-place Maximum Dewpoint	78.0 F	
Moisture Inflow Vector	SW @ 240	Miles
In-place Maximization Factor	1.14	
Temporal Transposition (Date)	15-Aug	
Transposition Dewpoint Location	28.16	-112.84
Transposition Maximum Dewpoint	79.0 F	
Transposition Adjustment Factor	1.07	
Grid Point Location	30.975	-110.375
Grid Point Elevation	6,977	
Total Adjustment Factor	1.64	

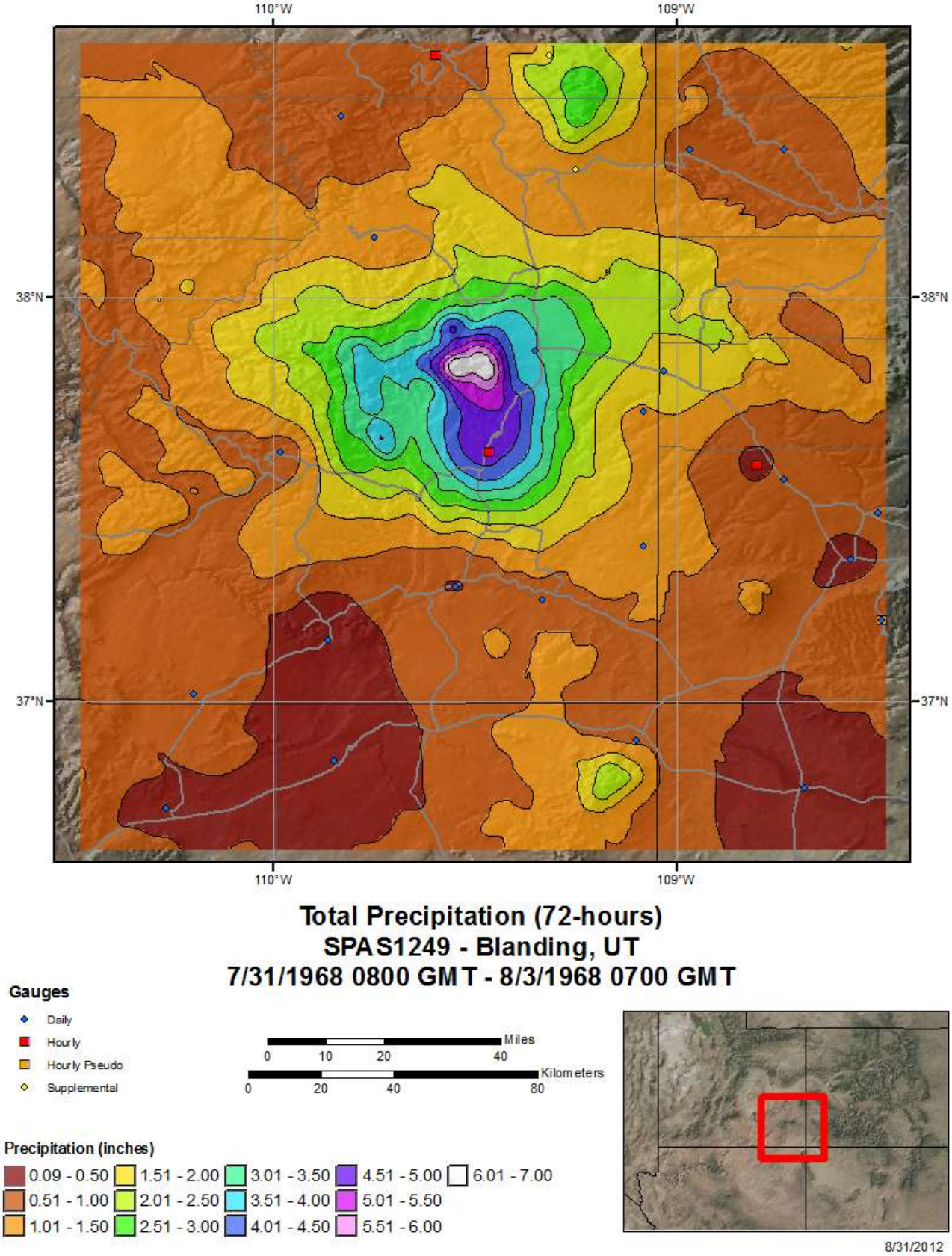
Storm 1249 - July 31 (8 UTC) - August 3 (7 UTC), 1968

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

	Duration (hours)												
Area (mi²)	1	2	3	4	5	6	12	18	24	36	48	72	Total
0.3	1.06	2.08	2.32	2.57	2.94	3.60	4.45	5.89	5.97	6.44	6.57	6.67	6.67
1	1.00	2.04	2.27	2.50	2.90	3.49	4.30	5.70	5.81	6.23	6.34	6.45	6.45
10	1.00	2.04	2.19	2.44	2.90	3.49	4.23	5.65	5.68	6.15	6.32	6.42	6.42
25	1.00	2.04	2.16	2.34	2.88	3.49	4.10	5.46	5.50	5.98	6.12	6.21	6.21
50	1.00	2.00	2.10	2.27	2.82	3.45	3.89	5.18	5.25	5.70	5.80	5.89	5.89
100	0.97	1.93	2.02	2.16	2.73	3.33	3.78	4.90	4.92	5.23	5.41	5.50	5.50
150	0.94	1.87	1.97	2.10	2.65	3.23	3.64	4.73	4.74	5.09	5.15	5.24	5.24
200	0.91	1.81	1.91	2.04	2.56	3.12	3.54	4.56	4.59	4.90	4.97	5.07	5.07
300	0.85	1.69	1.79	1.89	2.38	2.91	3.29	4.33	4.36	4.45	4.46	4.77	4.77
400	0.79	1.59	1.62	1.65	2.25	2.73	2.92	3.82	3.94	4.27	4.34	4.58	4.58
500	0.75	1.51	1.58	1.65	2.13	2.60	2.90	3.79	3.89	4.17	4.23	4.38	4.38
1,000	0.60	1.20	1.32	1.42	1.69	2.07	2.33	2.95	3.05	3.47	3.65	3.73	3.73
2,000	0.45	0.79	1.03	1.13	1.13	1.45	1.88	2.35	2.39	2.67	2.67	3.02	3.02
5,000	0.26	0.48	0.72	0.76	0.76	0.84	1.28	1.40	1.40	1.58	1.84	2.21	2.21
10,000	0.20	0.31	0.47	0.52	0.52	0.61	0.93	1.13	1.23	1.37	1.51	1.60	1.60
15,130	0.15	0.27	0.34	0.39	0.40	0.45	0.71	0.87	0.95	1.07	1.20	1.21	1.21




SPAS 1249 Storm Center Mass Curve: Zone 1
July 31 (800 UTC) to August 3 (700 UTC), 1968
Lat: 37.86 Lon: -109.54
Incremental
Accumulated
6.67"
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
Index Hour
0.0
0.5
1.0
1.5
2.0
0
1
2
3
4
5
6
7
10
20
30
40
50
60
70


110°W
109°W
38°N
37°N
Total Precipitation (72-hours)
SPAS1249 - Blanding, UT
7/31/1968 0800 GMT - 8/3/1968 0700 GMT
Gauges
Daily
Hourly
Hourly Pseudo
Supplemental
Miles
0 10 20 40
Kilometers
0 20 40 80
Precipitation (inches)
0.09 - 0.50
0.51 - 1.00
1.01 - 1.50
1.51 - 2.00
2.01 - 2.50
2.51 - 3.00
3.01 - 3.50
3.51 - 4.00
4.01 - 4.50
4.51 - 5.00
5.01 - 5.50
5.51 - 6.00
6.01 - 7.00
8/31/2012

Seligman, AZ

July 21-22, 1970

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1118

General Storm Location: Seligman, Arizona

Storm Dates: July 21 – 22, 1970

Event: Thunderstorm

Zone 1

Latitude: 35.3292

Longitude: -112.9042

Max. Grid Rainfall Amount: 5.89”

Max. Observed Rainfall Amount: 5.09” at SELIGMAN AZ

Number of Stations: 31 (18 Daily, 5 Hourly, 4 Hourly Estimated Pseudo, and 4 Supplemental)

SPAS Version: 8.5

Base Map Used: Yes, spas1118_radar_basemap_field

Spatial resolution: 00:00:30 (0.3 sq. miles)

Radar Included: No

Depth-Area-Duration (DAD) analysis: Yes

Storm Name:	**SPAS-1118-Seligman**
Storm Date:	**7/21-22/1970**
AWA Analysis Date:	**5/25/2013**

Storm Adjustment for Grid Point 1

Temporal Transposition Date	**5-Aug**

	Lat	Long
Storm center location	**35.33**	**-112.90**
Storm Rep dew point location	**34.65**	**-112.43**
Transposition dewpoint location	**30.295**	**-109.905**
Basin location	**30.975**	**-110.375**

Moisture Inflow Direction:	**SE @ 50**	miles
Grid Point Elevation	**6,977**	feet
Storm Center Elevation	**5,250**	feet
Storm Analysis Duration	**3**	hours

The storm representative dew point is	**75.0 F**	with total precipitable water above sea level of				**2.85**	inches.
The in-place maximum dew point is	**80.5 F**	with total precipitable water above sea level of				**3.68**	inches.
The transpositioned maximum dew point is	**81.0 F**	with total precipitable water above sea level of				**3.76**	inches.
The in-place storm elevation is	**5,250**	which subtracts	**1.12**	inches of precipitable water at		**75.0 F**	
The in-place storm elevation is	**5,250**	which subtracts	**1.40**	inches of precipitable water at		**80.5 F**	
The in-place storm elevation is	**5,250**	which subtracts	**1.42**	inches of precipitable water at		**81.0 F**	

The in-place maximization factor is	**1.32**
The moisture transposition factor is	**1.03**
The orographic transposition factor is	**1.08**
The total adjustment factor is	**1.46**

Notes:

Observed Storm Depth-Area-Duration

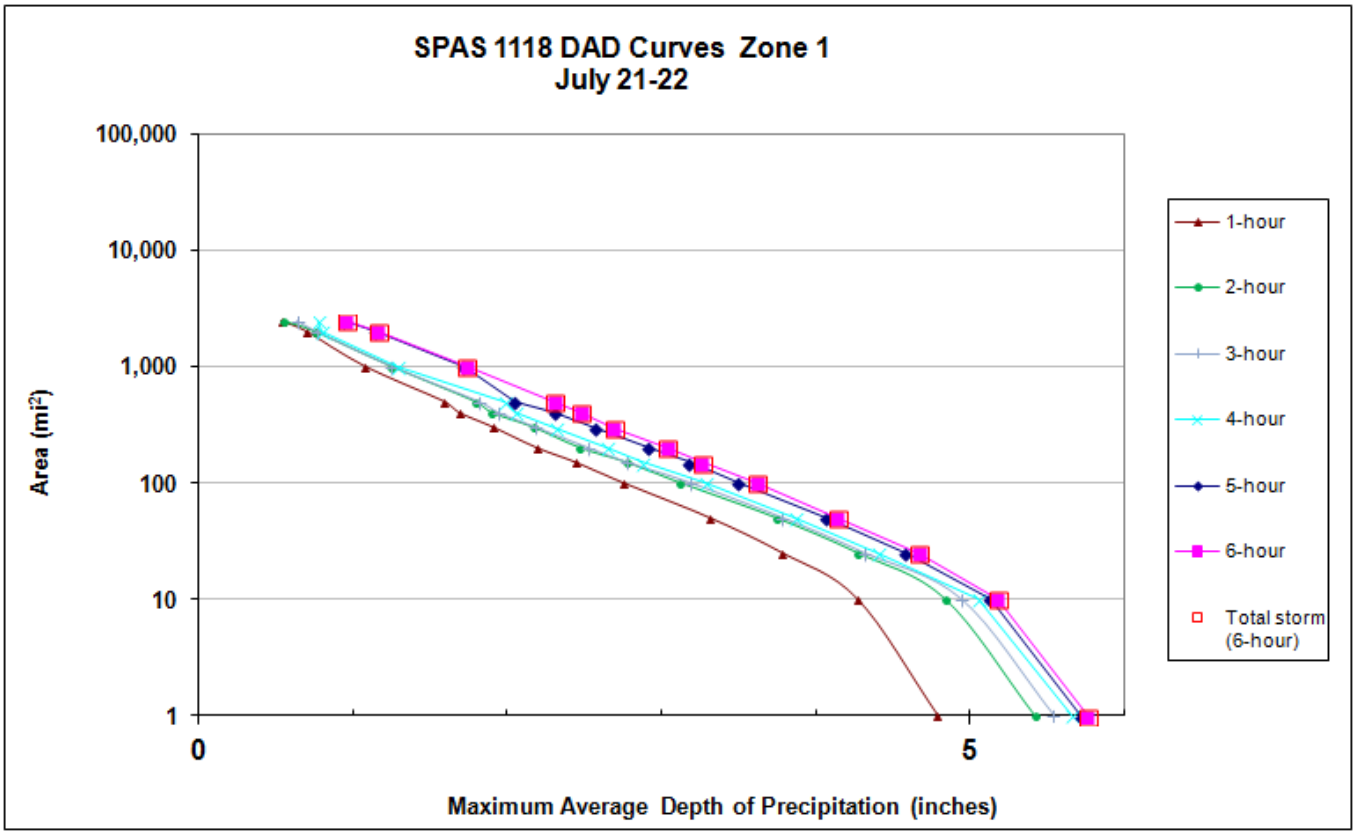
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**4.8**	**5.4**	**5.5**	**5.7**	**5.7**	**5.8**	-	-	-
10 sq miles	**4.3**	**4.8**	**4.9**	**5.1**	**5.1**	**5.2**	-	-	-
50 sq miles	**3.3**	**3.7**	**3.8**	**3.9**	**4.1**	**4.1**	-	-	-
100 sq miles	**2.8**	**3.1**	**3.2**	**3.3**	**3.5**	**3.6**	-	-	-
200 sq miles	**2.2**	**2.5**	**2.5**	**2.7**	**2.9**	**3.0**	-	-	-
500 sq miles	**1.6**	**1.8**	**1.8**	**2.0**	**2.1**	**2.3**	-	-	-
1000 sq miles	**1.1**	**1.3**	**1.3**	**1.3**	**1.7**	**1.7**	-	-	-
2000 sq miles	**0.7**	**0.8**	**0.8**	**0.8**	**1.2**	**1.2**	-	-	-
5000 sq miles	-	-	-	-	-	-	-	-	-

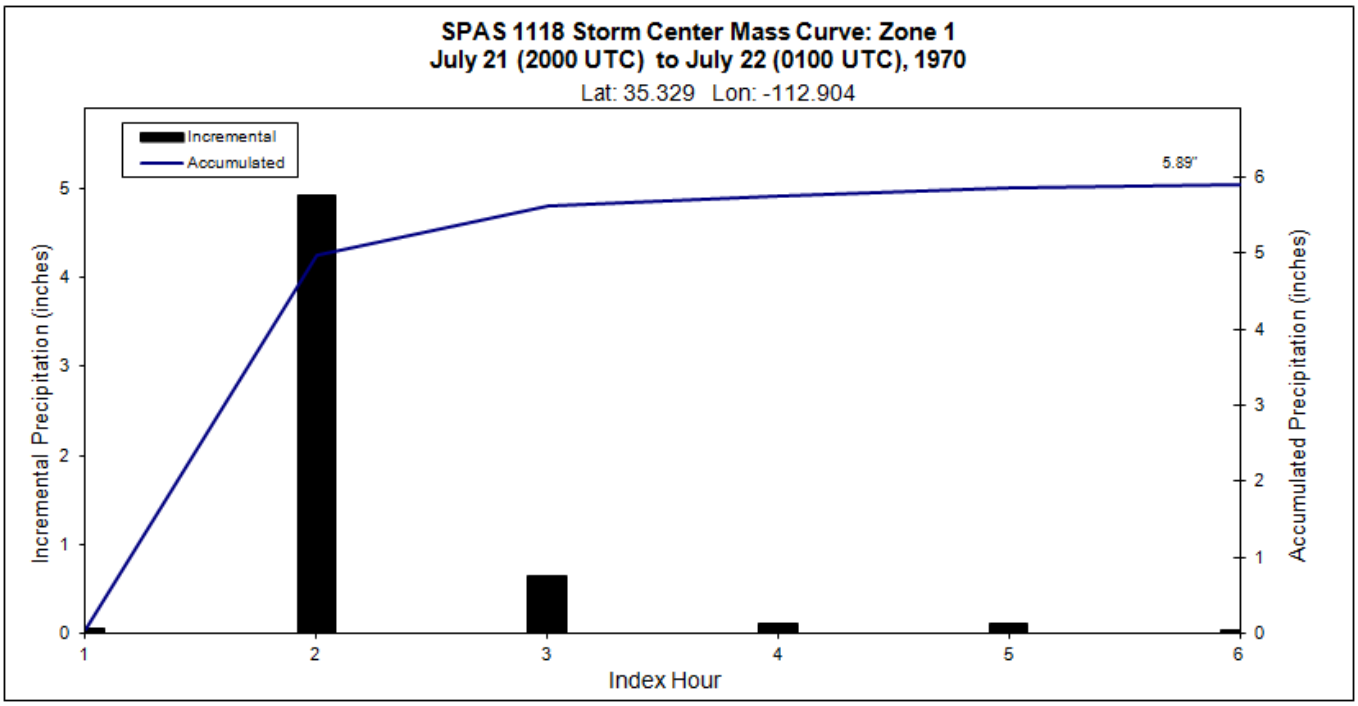
Adjusted Storm Depth-Area-Duration

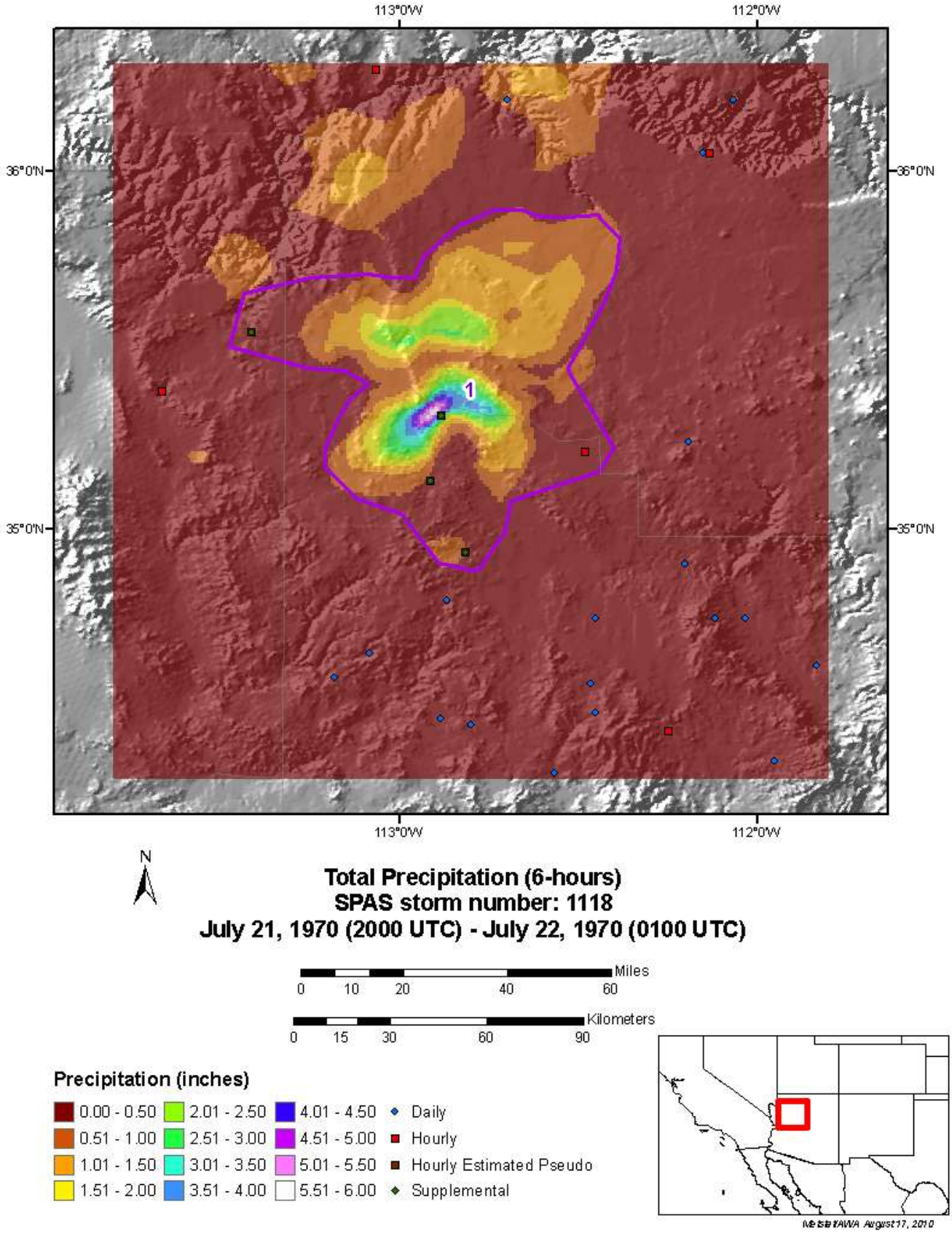
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**7.0**	**7.9**	**8.1**	**8.3**	**8.4**	**8.4**	-	-	-
10 sq miles	**6.2**	**7.1**	**7.2**	**7.4**	**7.5**	**7.6**	-	-	-
50 sq miles	**4.8**	**5.5**	**5.5**	**5.7**	**5.9**	**6.0**	-	-	-
100 sq miles	**4.0**	**4.6**	**4.6**	**4.8**	**5.1**	**5.3**	-	-	-
200 sq miles	**3.2**	**3.6**	**3.7**	**3.9**	**4.3**	**4.4**	-	-	-
500 sq miles	**2.3**	**2.6**	**2.6**	**2.9**	**3.0**	**3.4**	-	-	-
1000 sq miles	**1.6**	**1.8**	**1.8**	**1.9**	**2.5**	**2.5**	-	-	-
2000 sq miles	**1.0**	**1.1**	**1.1**	**1.2**	**1.7**	**1.7**	-	-	-
5000 sq miles	-	-	-	-	-	-	-	-	-

Storm or Storm Center Name	**SPAS-1118-Seligman**		
Storm Date(s)	7/21-22/1970		
Storm Type	Local Storm		
Storm Location	35.33	-112.90	
Storm Center Elevation	5250		
Precipitation Total & Duration (10 sq mi)	5.89 inches 6 hour (SPAS 1118 DAD)		
Storm Representative Dewpoint	75.0 F	3	hr ave from KPRC
Storm Representative Dewpoint Location	34.65	-112.43	
In-place Maximum Dewpoint	80.5 F		
Moisture Inflow Vector	SE @ 50		
In-place Maximization Factor			
Temporal Transposition (Date)	5-Aug		
Transposition Dewpoint Location	30.30	-109.91	
Transposition Maximum Dewpoint	81.0 F		
Transposition Adjustment Factor	1.03		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	1.46		

Storm 1118 - July 21, 1970 (2000 UTC) - July 22, 1970 (0100 UTC) MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)							
	Duration (hours)						
Area (mi^2)	1	2	3	4	5	6	Total
0	4.92	5.57	5.69	5.8	5.86	5.89	5.89
1	4.79	5.42	5.54	5.66	5.72	5.76	5.76
10	4.27	4.84	4.94	5.05	5.13	5.18	5.18
25	3.78	4.27	4.31	4.4	4.59	4.67	4.67
50	3.31	3.74	3.78	3.87	4.07	4.14	4.14
100	2.75	3.12	3.18	3.29	3.5	3.62	3.62
150	2.44	2.77	2.77	2.88	3.18	3.26	3.26
200	2.19	2.47	2.52	2.65	2.92	3.04	3.04
300	1.91	2.17	2.18	2.32	2.58	2.69	2.69
400	1.69	1.9	1.94	2.05	2.31	2.48	2.48
500	1.59	1.79	1.81	1.99	2.05	2.31	2.31
1,000	1.08	1.25	1.25	1.29	1.72	1.74	1.74
2,000	0.7	0.75	0.76	0.8	1.15	1.16	1.16
2,442	0.54	0.55	0.64	0.78	0.95	0.96	0.96




SPAS 1118 Storm Center Mass Curve: Zone 1
July 21 (2000 UTC) to July 22 (0100 UTC), 1970
Lat: 35.329 Lon: -112.904
Incremental
Accumulated
5.89"
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
Index Hour
0
1
2
3
4
5
6


113°0'W
112°0'W
36°0'N
35°0'N
1
N
Total Precipitation (6-hours)
SPAS storm number: 1118
July 21, 1970 (2000 UTC) - July 22, 1970 (0100 UTC)
Miles
0 10 20 40 60
Kilometers
0 15 30 60 90
Precipitation (inches)
0.00 - 0.50
0.51 - 1.00
1.01 - 1.50
1.51 - 2.00
2.01 - 2.50
2.51 - 3.00
3.01 - 3.50
3.51 - 4.00
4.01 - 4.50
4.51 - 5.00
5.01 - 5.50
5.51 - 6.00
Daily
Hourly
Hourly Estimated Pseudo
Supplemental
Meteorology August 17, 2010

Workman Creek, AZ

September 3-8, 1970

Storm Type: Remnant Tropical

Storm Precipitation Analysis System (SPAS) For Storm #1075

General Storm Location: Northern Mexico, Arizona, Colorado and Utah
Storm Dates: September 3 (0700Z), 1970 - September 8 (0700Z), 1970
Event: Tropical remnants of Hurricane
DAD Zone 1: Southern Deserts

Lat: 32.4111

Lon: -110.7208

Max. Grid/Radar Rainfall Amount: 9.31”

Max. Observed Rainfall Amount: n/a

DAD Zone 2: Mogollon Rim

Lat: 33.8197

Lon: -110.9041

Max. Grid/Radar Rainfall Amount: 12.13”

Max. Observed Rainfall Amount: n/a

DAD Zone 3: Colorado Plateau

Lat: 35.4950

Lon: -110.4208

Max. Grid/Radar Rainfall Amount: 7.00”

Max. Observed Rainfall Amount: n/a

DAD Zone 4: SW Colorado Mtns

Lat: 37.5620

Lon: -106.8792

Max. Grid/Radar Rainfall Amount: 5.95”

Max. Observed Rainfall Amount: n/a

Number of Stations: 740 (148-hourly, 4-hourly pseudo, 6-hourly estimated, 372-daily, 205-supplemental, 4 supplemental estimated and 1 supplemental pseudo)
SPAS Version: 7.0
Base Map Used: Yes, “conus_prism_ppt_in_1971_2000_09”
Spatial resolution: 0.27 mi^2
Radar Included: No
Depth-Area-Duration (DAD) analysis: Yes: 1, 2, 3, 4, 5, 6, 12, 18, 24, 36, 48, 72, 96, 120 hours

Storm Name:	SPAS-1075-Workman Creek-Nor
Storm Date:	9/4-6/1970
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	20-Aug	
	Lat	Long
Storm center location	33.82	-110.90
Storm Rep dew point location	32.79	-112.13
Transposition dewpoint location	29.945	-111.605
Basin location	30.975	-110.375

Moisture Inflow Direction:	SW @ 100	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	7,250	feet
Storm Analysis Duration	24	hours

The storm representative dew point is	75.0 F	with total precipitable water above sea level of			2.85	inches.
The in-place maximum dew point is	77.5 F	with total precipitable water above sea level of			3.29	inches.
The transpositioned maximum dew point is	78.5 F	with total precipitable water above sea level of			3.37	inches.
The in-place storm elevation is	7,250	which subtracts	1.47	inches of precipitable water at	75.0 F	
The in-place storm elevation is	7,250	which subtracts	1.60	inches of precipitable water at	77.5 F	
The in-place storm elevation is	7,250	which subtracts	1.66	inches of precipitable water at	78.5 F	

The in-place maximization factor is	1.22
The moisture transposition factor is	1.01
The orographic transposition factor is	0.66
The total adjustment factor is	0.82

Notes: Storm rep Td taken from KGBN, KYUM 24hr ave

Observed Storm Depth-Area-Duration

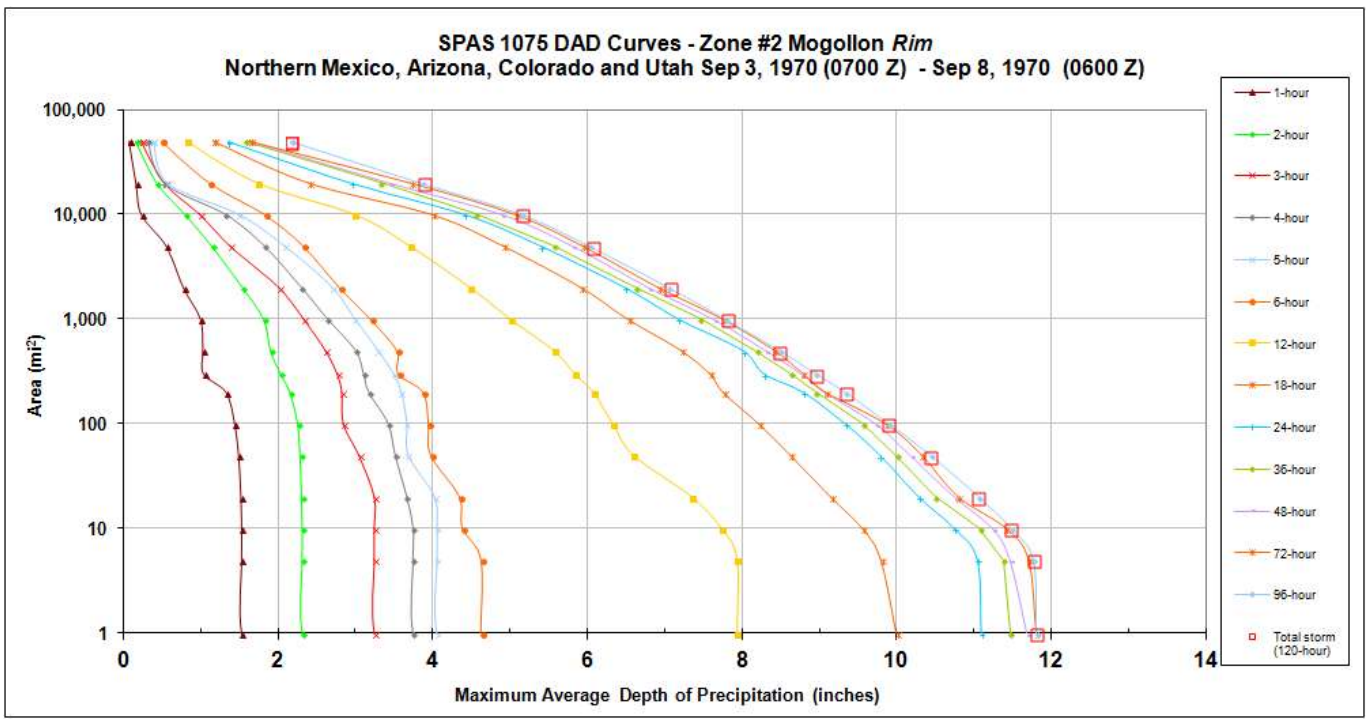
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	72 Hours
1 sq miles	1.5	4.6	7.9	10.0	11.1	-	11.5	11.7	11.8
10 sq miles	1.5	4.6	7.9	9.8	11.0	-	11.4	11.5	11.7
100 sq miles	1.5	4.4	7.7	9.6	10.7	-	11.1	11.2	11.4
200 sq miles	1.4	4.0	6.3	8.2	9.3	-	9.6	9.7	9.9
500 sq miles	1.3	3.9	6.1	7.8	8.8	-	9.0	9.1	9.1
1000 sq miles	1.0	3.6	5.8	7.6	8.3	-	8.6	8.8	8.8
2000 sq miles	1.0	3.5	5.6	7.2	8.0	-	8.2	8.3	8.4
5000 sq miles	1.0	3.2	5.0	6.5	7.2	-	7.5	7.6	7.8
10000 sq miles	0.8	2.8	4.5	5.9	6.5	-	6.6	6.8	6.9
20000 sq miles	0.6	2.3	3.7	4.9	5.4	-	5.6	5.8	5.9

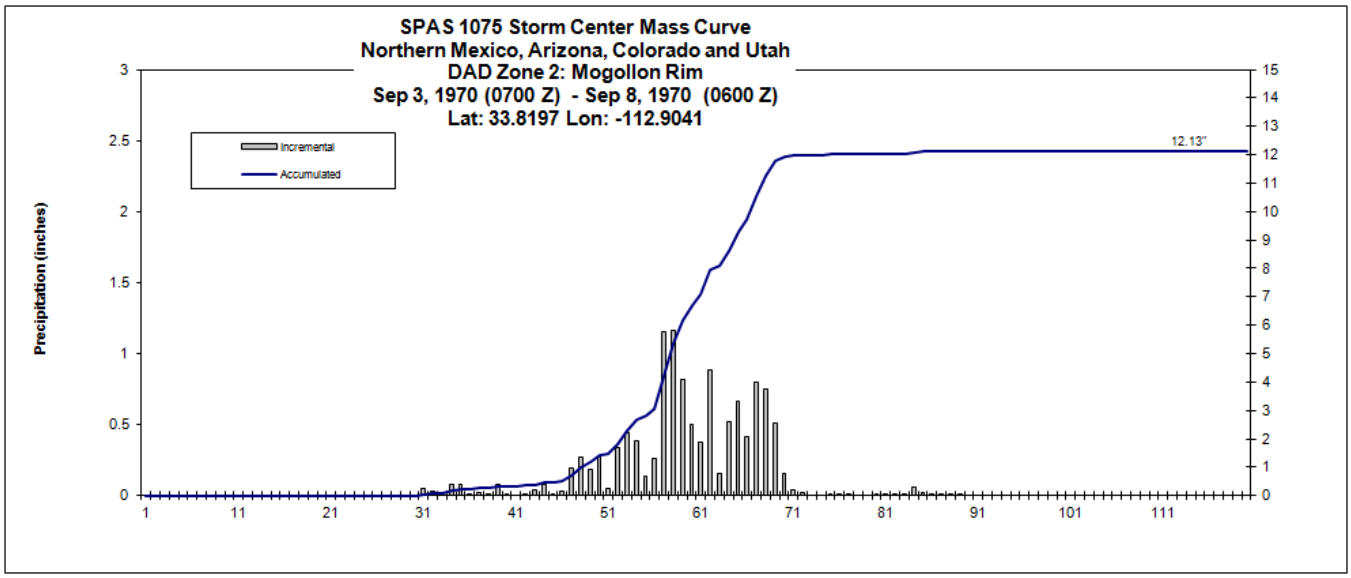
Adjusteded Storm Depth-Area-Duration

	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours
1 sq miles	1.3	3.8	6.5	8.2	9.1	-	9.4	9.6	9.7
10 sq miles	1.3	3.8	6.5	8.0	9.0	-	9.3	9.4	9.6
100 sq miles	1.3	3.6	6.3	7.8	8.8	-	9.1	9.2	9.3
200 sq miles	1.2	3.2	5.2	6.7	7.6	-	7.8	8.0	8.1
500 sq miles	1.1	3.2	5.0	6.3	7.2	-	7.3	7.4	7.4
1000 sq miles	0.9	2.9	4.8	6.2	6.8	-	7.1	7.2	7.2
2000 sq miles	0.8	2.9	4.6	5.9	6.6	-	6.7	6.8	6.9
5000 sq miles	0.8	2.6	4.1	5.3	5.9	-	6.1	6.2	6.3
10000 sq miles	0.6	2.3	3.7	4.8	5.3	-	5.4	5.6	5.7
20000 sq miles	0.5	1.9	3.0	4.0	4.4	-	4.6	4.8	4.9

Storm or Storm Center Name	SPAS-1075-Workman Creek-Norma-Zone 2		
Storm Date(s)	9/4-6/1970		
Storm Type	Tropical		
Storm Location	33.82	-110.90	
Storm Center Elevation	7250		
Precipitation Total & Duration (10 sq mi)	12.01 inches 48 hours 3.88" in 1hr and 11.42" in 24hrs (SPAS 1075 DAD)		
Storm Representative Dewpoint	75.0 F	24	hr ave KGBN, KYUM
Storm Representative Dewpoint Location	32.79	-112.13	
In-place Maximum Dewpoint	77.5 F		
Moisture Inflow Vector	SW @ 100		
In-place Maximization Factor			
Temporal Transposition (Date)	20-Aug		
Transposition Dewpoint Location	29.95	-111.61	
Transposition Maximum Dewpoint	78.5 F		
Transposition Adjustment Factor	1.01		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	0.82		

	Duration (hours)													
Area (mi²)	1	2	3	4	5	6	12	18	24	36	48	72	96	Total
0.27	1.83	2.63	3.56	4.07	4.44	4.90	8.21	10.29	11.42	11.78	12.01	12.12	12.12	12.12
1	1.53	2.32	3.25	3.75	4.06	4.63	7.94	10.00	11.09	11.47	11.69	11.80	11.80	11.80
5	1.53	2.32	3.25	3.75	4.06	4.63	7.94	9.80	11.04	11.38	11.47	11.70	11.76	11.76
10	1.53	2.32	3.25	3.75	4.06	4.39	7.74	9.56	10.74	11.07	11.24	11.41	11.47	11.47
20	1.52	2.31	3.25	3.67	4.03	4.35	7.35	9.15	10.28	10.50	10.75	10.79	11.05	11.05
50	1.49	2.29	3.05	3.52	3.69	3.98	6.60	8.63	9.78	10.00	10.18	10.32	10.43	10.43
100	1.44	2.26	2.85	3.43	3.67	3.95	6.33	8.22	9.33	9.56	9.73	9.85	9.89	9.89
200	1.33	2.16	2.83	3.18	3.60	3.88	6.08	7.76	8.79	8.95	9.07	9.08	9.33	9.33
300	1.04	2.04	2.77	3.11	3.50	3.56	5.84	7.59	8.28	8.64	8.77	8.79	8.95	8.95
500	1.03	1.91	2.62	3.01	3.30	3.54	5.57	7.22	8.01	8.19	8.31	8.42	8.48	8.48
1,000	1.00	1.82	2.34	2.65	3.00	3.20	5.01	6.53	7.18	7.46	7.63	7.75	7.78	7.80
2,000	0.78	1.55	2.02	2.31	2.71	2.80	4.49	5.93	6.49	6.62	6.80	6.92	7.05	7.06
5,000	0.56	1.15	1.39	1.83	2.09	2.33	3.71	4.92	5.40	5.58	5.81	5.94	6.02	6.06
10,000	0.24	0.81	1.00	1.33	1.50	1.83	3.00	4.00	4.42	4.56	4.90	5.07	5.15	5.15
20,000	0.17	0.44	0.54	0.53	0.57	1.12	1.74	2.41	2.95	3.32	3.45	3.72	3.85	3.89
50,000	0.08	0.17	0.24	0.32	0.39	0.50	0.83	1.18	1.36	1.58	1.65	1.65	2.17	2.17
50,140	0.08	0.17	0.24	0.32	0.39	0.50	0.83	1.17	1.36	1.58	1.64	1.64	2.17	2.17




SPAS 1075 Storm Center Mass Curve
Northern Mexico, Arizona, Colorado and Utah
DAD Zone 2: Mogollon Rim
Sep 3, 1970 (0700 Z) - Sep 8, 1970 (0600 Z)
Lat: 33.8197 Lon: -112.9041
Incremental
Accumulated
12.13"
Precipitation (inches)
0
0.5
1
1.5
2
2.5
3
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
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11
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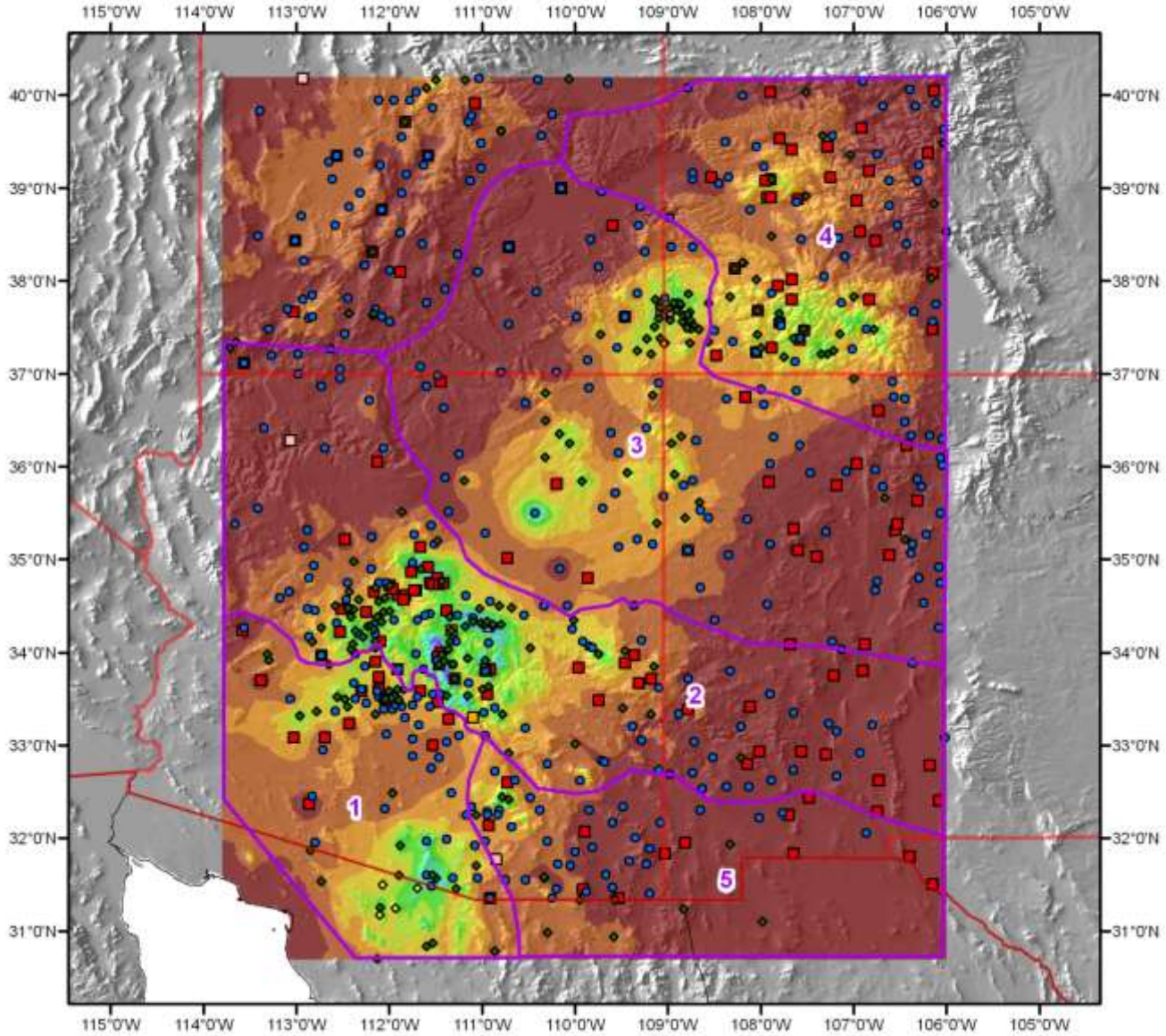
41
51
61
71
81
91
101
111



SPAS Storm #1075
Total Rainfall (120-hours)
Sep 3, 1970 (0700 Z) - Sep 8, 1970 (0600 Z)
Tropical Storm Norma Remnants

N

Miles
0 37.5 75 150

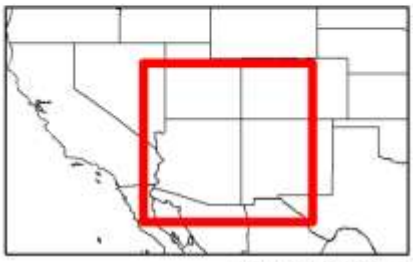
Kilometers
0 55 110 220 330

Precipitation (inches)

- 0.00 - 1.00
- 1.01 - 2.00
- 2.01 - 3.00
- 3.01 - 4.00
- 4.01 - 5.00
- 5.01 - 6.00
- 6.01 - 7.00
- 7.01 - 8.00
- 8.01 - 9.00
- 9.01 - 10.00
- 10.01 - 11.00
- 11.01 - 12.00
- 12.01 - 13.00

Station Type

- Daily
- Hourly
- Hourly estimated
- Hourly pseudo
- Supplemental
- Supplemental estimated
- Supplemental pseudo



Metstat/AWA October 16, 2009

Phoenix, AZ

June 22, 1972

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1062

General Storm Location: Phoenix, AZ

Storm Dates: 06/20/1972 0800Z – 06/23/1972 0800Z

Event: Convective

Latitude: 33.5173

Longitude: -112.0230

Max. Grid/Radar Rainfall Amount: 5.63" (Grid/Pixel Point)

Max. Observed Rainfall Amount: 5.63" (HMR, type=supplemental)

Number of Stations: 88 (2-hourly, 1-hourly pseudo, 25-daily, 60-daily supplemental) gauging stations within the defined search domain.

SPAS Version: 7.0

Base Map Used: Yes, see comment section

Spatial resolution: 0.28 mi^2

Radar Included: No

Depth-Area-Duration (DAD) analysis: Yes: 1, 2, 3, 4, 5, 6, 9, 12, 18, 24, & 36 hours

Storm Name:	**SPAS-1062-Phoenix**
Storm Date:	**June 22, 1972**
AWA Analysis Date:	**5/25/2013**

Storm Adjustment for Grid Point 1

Temporal Transposition Date	**5-Jul**

	Lat	Long
Storm center location	**33.52**	**-112.02**
Storm Rep dew point location	**33.43**	**-112.02**
Transposition dewpoint location	**30.885**	**-110.375**
Basin location	**30.975**	**-110.375**

Moisture Inflow Direction:	**S @ 10**	miles
Grid Point Elevation	**6,977**	feet
Storm Center Elevation	**1,200**	feet
Storm Analysis Duration	**3**	hours

The storm representative dew point is	**70.0 F**	with total precipitable water above sea level of			**2.25**	inches.
The in-place maximum dew point is	**78.5 F**	with total precipitable water above sea level of			**3.37**	inches.
The transpositioned maximum dew point is	**79.5 F**	with total precipitable water above sea level of			**3.52**	inches.
The in-place storm elevation is	**1,200**	which subtracts	**0.25**	inches of precipitable water at	**70.0 F**	
The in-place storm elevation is	**1,200**	which subtracts	**0.34**	inches of precipitable water at	**78.5 F**	
The in-place storm elevation is	**1,200**	which subtracts	**0.35**	inches of precipitable water at	**79.5 F**	

The in-place maximization factor is	**1.50**
The moisture transposition factor is	**1.05**
The orographic transposition factor is	**1.39**
The total adjustment factor is	**2.18**

Notes: In-place maax. factor held to 1.50

Observed Storm Depth-Area-Duration

	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**3.6**	**4.7**	**4.7**	**5.1**	**5.1**	**5.1**	**5.1**	**5.4**	**5.4**
10 sq miles	**3.2**	**4.2**	**4.2**	**4.5**	**4.5**	**4.5**	**4.5**	**4.9**	**5.0**
50 sq miles	**2.6**	**3.4**	**3.4**	**3.6**	**3.6**	**3.6**	**3.6**	**4.0**	**4.1**
100 sq miles	**2.1**	**2.7**	**2.7**	**3.0**	**3.0**	**3.0**	**3.0**	**3.3**	**3.4**
200 sq miles	**1.6**	**2.1**	**2.1**	**2.3**	**2.3**	**2.3**	**2.3**	**2.5**	**2.6**
500 sq miles	**1.0**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.6**	**1.6**
1000 sq miles	**0.7**	**0.7**	**0.8**	**0.8**	**0.9**	**0.9**	**0.9**	**1.0**	**1.0**
2000 sq miles	**0.5**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.7**	**0.8**
5000 sq miles									

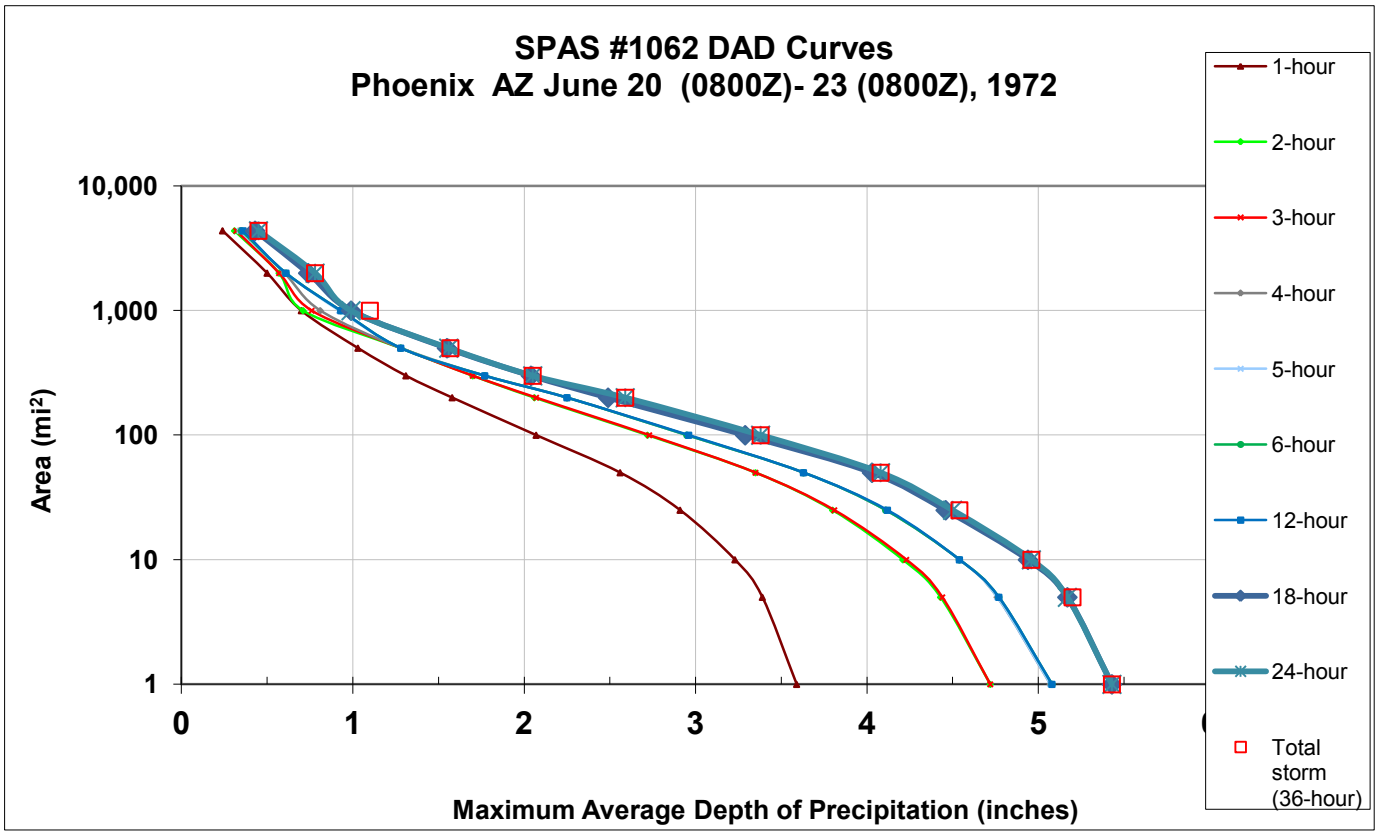
Adjusted Storm Depth-Area-Duration

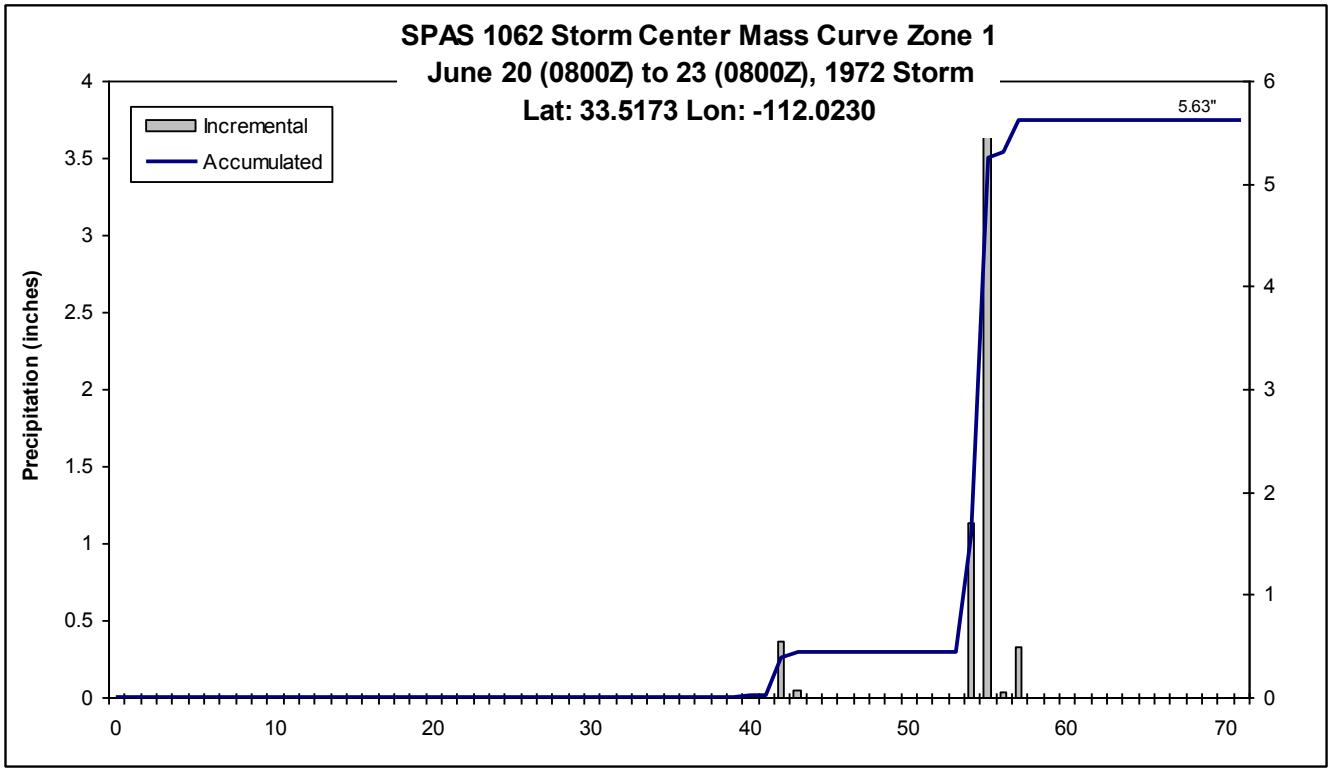
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**7.8**	**10.3**	**10.3**	**11.1**	**11.1**	**11.1**	**11.1**	**11.8**	**11.8**
10 sq miles	**7.0**	**9.2**	**9.2**	**9.9**	**9.9**	**9.9**	**9.9**	**10.8**	**10.8**
50 sq miles	**5.6**	**7.3**	**7.3**	**7.9**	**7.9**	**7.9**	**7.9**	**8.8**	**8.9**
100 sq miles	**4.5**	**5.9**	**6.0**	**6.4**	**6.4**	**6.4**	**6.5**	**7.2**	**7.4**
200 sq miles	**3.4**	**4.5**	**4.5**	**4.9**	**4.9**	**4.9**	**4.9**	**5.4**	**5.6**
500 sq miles	**2.2**	**2.8**	**2.8**	**2.8**	**2.8**	**2.8**	**2.8**	**3.4**	**3.4**
1000 sq miles	**1.5**	**1.5**	**1.7**	**1.8**	**2.0**	**2.0**	**2.0**	**2.2**	**2.2**
2000 sq miles	**1.1**	**1.2**	**1.2**	**1.3**	**1.3**	**1.3**	**1.3**	**1.6**	**1.7**
5000 sq miles									

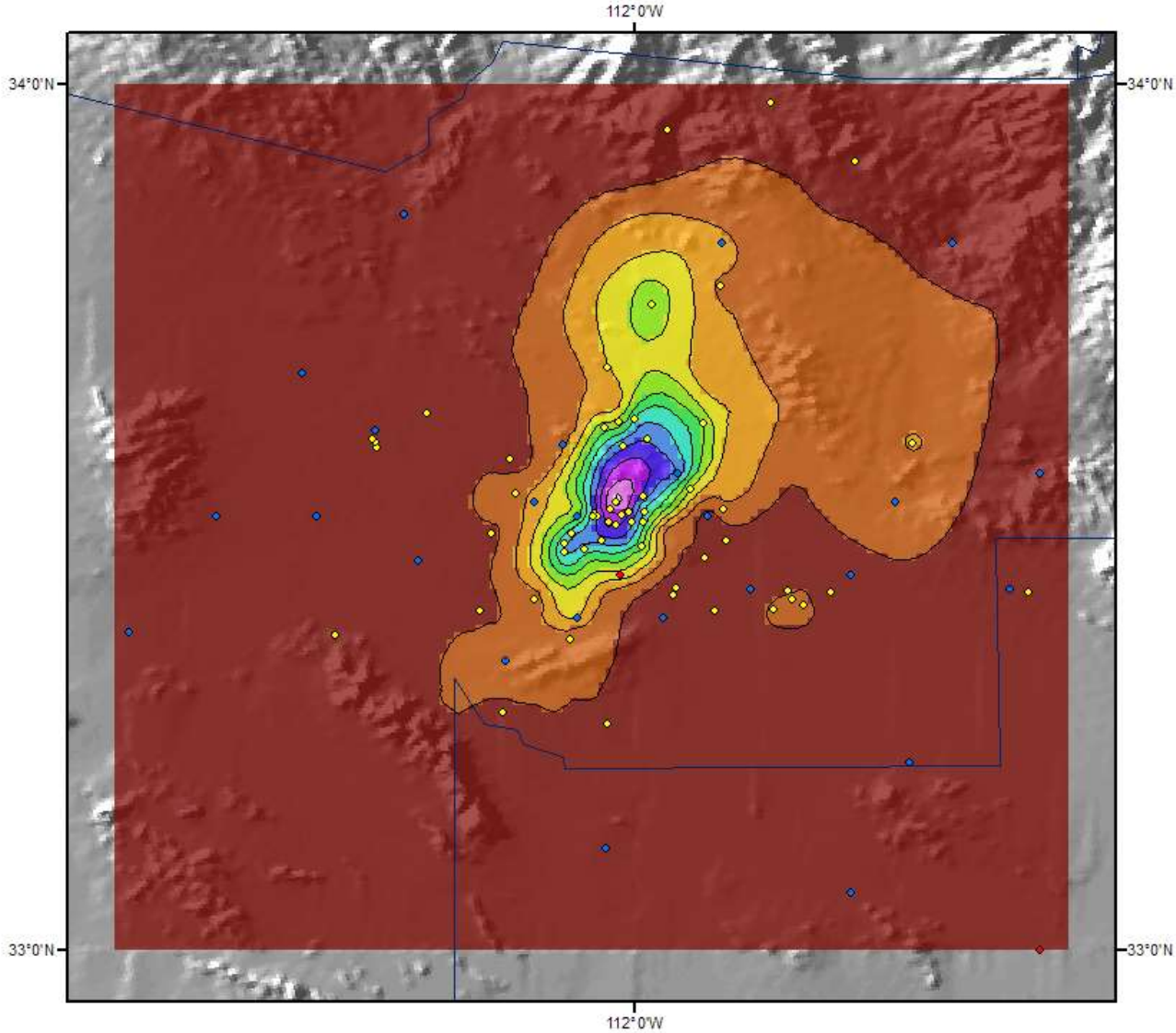
Storm or Storm Center Name	**SPAS-1062-Phoenix**		
Storm Date(s)	6/22/72		
Storm Type	Local Storm		
Storm Location	33.52	-112.02	
Storm Center Elevation	1200		
Precipitation Total & Duration (10 sq mi)	5.19 inches 4 hours 3.69" in 1hr and 4.82" in 2hrs (SPAS 1062 DAD)		
Storm Representative Dewpoint	70.0 F	3	hr ave KPHX
Storm Representative Dewpoint Location	33.43	-112.02	
In-place Maximum Dewpoint	78.5 F		
Moisture Inflow Vector	S @ 10		
In-place Maximization Factor	1.50		
Temporal Transposition (Date)	5-Jul		
Transposition Dewpoint Location	30.89	-110.38	
Transposition Maximum Dewpoint	79.5 F		
Transposition Adjustment Factor	1.05		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	2.18		

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

Area (mi^2)	Duration (hours)									
	1	2	3	4	5	6	12	18	24	total
0.28	3.69	4.82	4.86	5.19	5.19	5.19	5.19	5.62	5.62	5.62
1	3.59	4.72	4.72	5.07	5.07	5.08	5.08	5.43	5.43	5.43
5	3.39	4.43	4.44	4.76	4.76	4.77	4.77	5.17	5.17	5.20
10	3.23	4.21	4.23	4.54	4.54	4.54	4.54	4.94	4.96	4.96
25	2.91	3.80	3.81	4.11	4.11	4.11	4.12	4.46	4.50	4.54
50	2.56	3.35	3.35	3.63	3.63	3.63	3.63	4.03	4.08	4.08
100	2.07	2.72	2.73	2.95	2.95	2.95	2.96	3.29	3.38	3.38
200	1.58	2.06	2.07	2.25	2.25	2.25	2.25	2.49	2.59	2.59
300	1.31	1.70	1.70	1.77	1.77	1.77	1.77	2.04	2.05	2.05
500	1.03	1.28	1.28	1.28	1.28	1.28	1.28	1.55	1.56	1.57
1,000	0.70	0.71	0.76	0.81	0.92	0.93	0.93	0.99	0.99	1.10
2,000	0.50	0.57	0.57	0.60	0.61	0.61	0.61	0.74	0.78	0.78
4,377	0.24	0.31	0.32	0.34	0.34	0.35	0.36	0.43	0.45	0.45




SPAS 1062 Storm Center Mass Curve Zone 1
June 20 (0800Z) to 23 (0800Z), 1972 Storm
Lat: 33.5173 Lon: -112.0230
Incremental
Accumulated
5.63"
Precipitation (inches)
0
0.5
1
1.5
2
2.5
3
3.5
4
0
1
2
3
4
5
6
0
10
20
30
40
50
60
70



Total Rainfall (72-hours)
Phoenix, AZ 1972 Storm
Storm #1062 June 20 (0800Z) to 23 (0800 Z), 1972

Miles: 0 4.5 9 18
Kilometers: 0 5 10 20 30 40

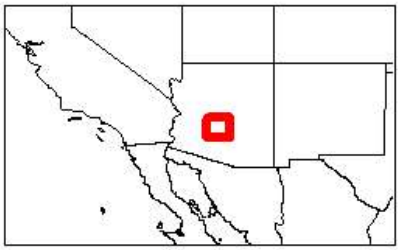
Gauging Stations

- Daily
- Hourly
- Hourly Psuedo
- Supplemental

N

Precipitation (inches)

0.00 - 0.50	1.51 - 2.00	3.01 - 3.50	4.51 - 5.00
0.51 - 1.00	2.01 - 2.50	3.51 - 4.00	5.01 - 5.50
1.01 - 1.50	2.51 - 3.00	4.01 - 4.50	5.51 - 6.00



Coordinate system: GCS North American 1983
Scale: 1:723,188

MetstatAWA April 28, 2009

Workman Creek, AZ

October 3-7, 1972

Storm Type: Remnant Tropical

Storm Precipitation Analysis System (SPAS) For Storm #1102

General Storm Location: Workman Creek, Arizona

Storm Dates: October 3 (0700Z) – October 7 (0700Z), 1972

Event: Remnants of Hurricane Joanne

DAD Zone 1: Southern Deserts

Latitude: 31.7792

Longitude: -113.4958

Max. Grid/Radar Rainfall Amount: 7.12”

Max. Observed Rainfall Amount: n/a

DAD Zone 2: Mogollon Rim

Latitude: 33.8208

Longitude: -110.9208

Max. Grid/Radar Rainfall Amount: 11.66”

Max. Observed Rainfall Amount: 11.70” at Workman Cr, AZ

DAD Zone 3: Colorado Plateau

Latitude: 37.8375

Longitude: -109.4708

Max. Grid/Radar Rainfall Amount: 4.99”

Max. Observed Rainfall Amount: n/a

Number of Stations: 601 (439 Daily, 64 Hourly, 34 Hourly Pseudo, 64 Supplemental)

SPAS Version: 7.0

Base Map Used: PRISM Mean (71-00) October Precipitation

Spatial resolution: 30 sec.

Radar Included: N

Depth-Area-Duration (DAD) analysis: Yes

Storm Name:	**SPAS-1102-Joanne-Zone 2**
Storm Date:	**10/3-7/1972**
AWA Analysis Date:	**5/25/2013**

Storm Adjustment for Grid Point 1

Temporal Transposition Date	**20-Sep**	
	Lat	**Long**
Storm center location	**33.82**	**-110.92**
Storm Rep dew point location	**32.77**	**-111.49**
Transposition dewpoint location	**29.925**	**-110.945**
Basin location	**30.975**	**-110.375**

Moisture Inflow Direction:	**SW @ 80**	miles
Grid Point Elevation	**6,977**	feet
Storm Center Elevation	**7,100**	feet
Storm Analysis Duration	**24**	hours

The storm representative dew point is	**73.0 F**	with total precipitable water above sea level of			**2.60**	inches.
The in-place maximum dew point is	**75.0 F**	with total precipitable water above sea level of			**2.85**	inches.
The transpositioned maximum dew point is	**76.0 F**	with total precipitable water above sea level of			**2.99**	inches.
The in-place storm elevation is	**7,100**	which subtracts	**1.35**	inches of precipitable water at	**73.0 F**	
The in-place storm elevation is	**7,100**	which subtracts	**1.43**	inches of precipitable water at	**75.0 F**	
The in-place storm elevation is	**7,100**	which subtracts	**1.48**	inches of precipitable water at	**76.0 F**	

The in-place maximization factor is	**1.14**
The moisture transposition factor is	**1.06**
The orographic transposition factor is	**0.61**
The total adjustment factor is	**0.74**

Notes: 24hr ave from KTUS and KPHX

Observed Storm Depth-Area-Duration

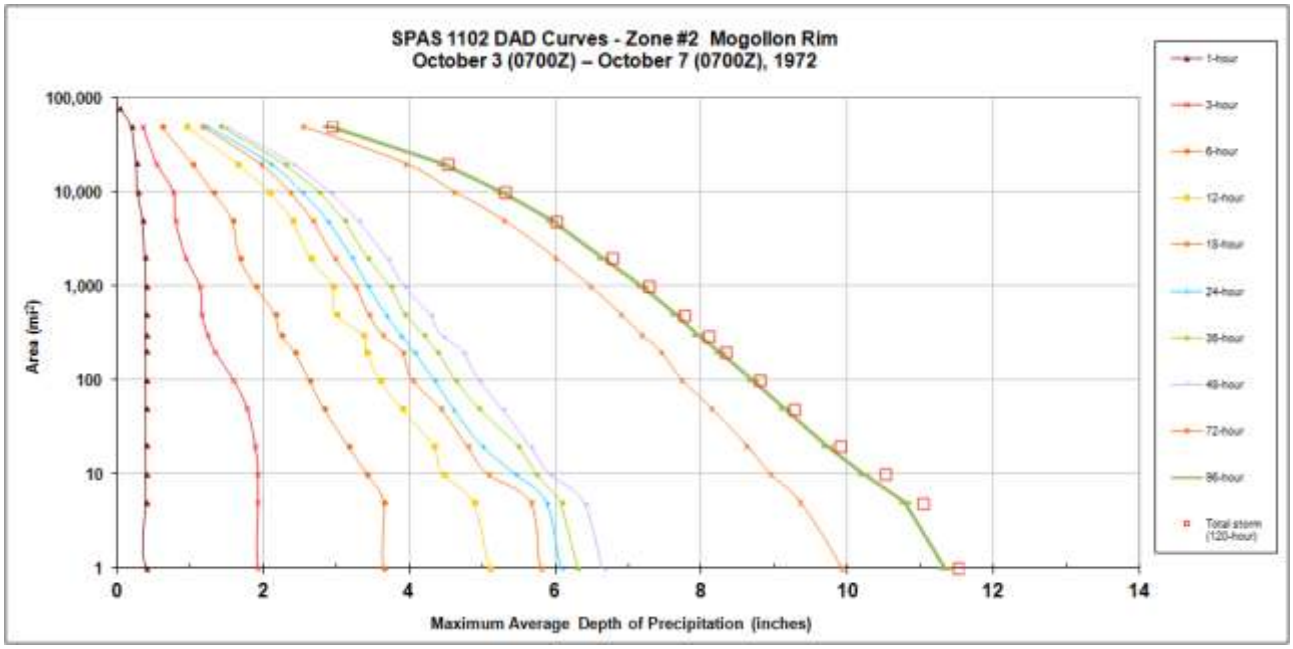
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	72 Hours
1 sq miles	**0.4**	**3.6**	**5.1**	**5.8**	**6.1**	-	**6.3**	**6.6**	**9.9**
10 sq miles	**0.4**	**3.4**	**4.5**	**5.1**	**5.5**	-	**5.7**	**5.9**	**8.9**
100 sq miles	**0.4**	**2.8**	**3.9**	**4.0**	**4.6**	-	**4.9**	**5.3**	**8.1**
200 sq miles	**0.4**	**2.6**	**3.6**	**3.9**	**4.3**	-	**4.6**	**5.0**	**7.7**
500 sq miles	**0.4**	**2.4**	**3.4**	**3.4**	**4.1**	-	**4.4**	**4.7**	**7.4**
1000 sq miles	**0.4**	**2.2**	**3.0**	**3.3**	**3.7**	-	**3.9**	**4.3**	**6.9**
2000 sq miles	**0.4**	**1.9**	**2.9**	**3.0**	**3.4**	-	**3.7**	**3.9**	**6.5**
5000 sq miles	**0.4**	**1.7**	**2.6**	**2.7**	**3.2**	-	**3.4**	**3.7**	**6.0**
10000 sq miles	**0.3**	**1.6**	**2.4**	**2.4**	**2.9**	-	**3.1**	**3.3**	**5.3**
20000 sq miles	**0.3**	**1.3**	**2.1**	**2.0**	**2.5**	-	**2.8**	**2.9**	**4.6**

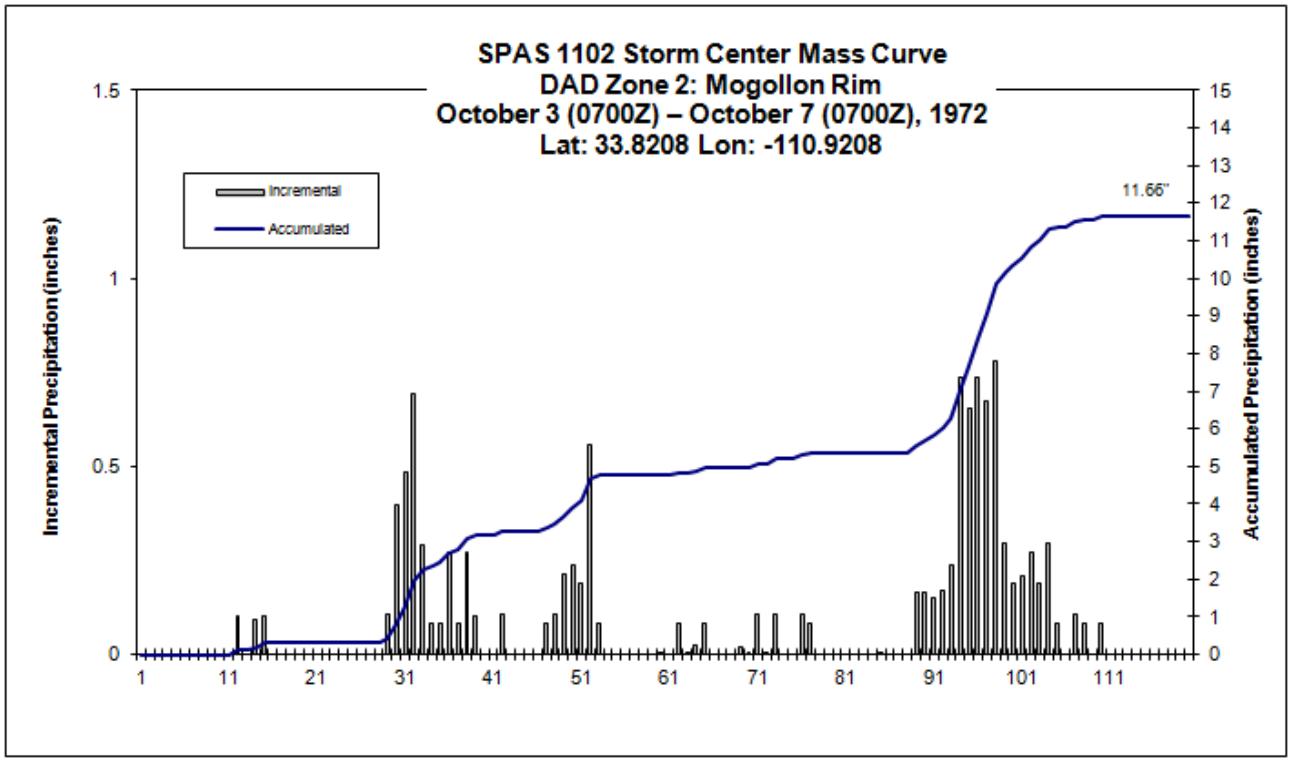
Adjusteded Storm Depth-Area-Duration

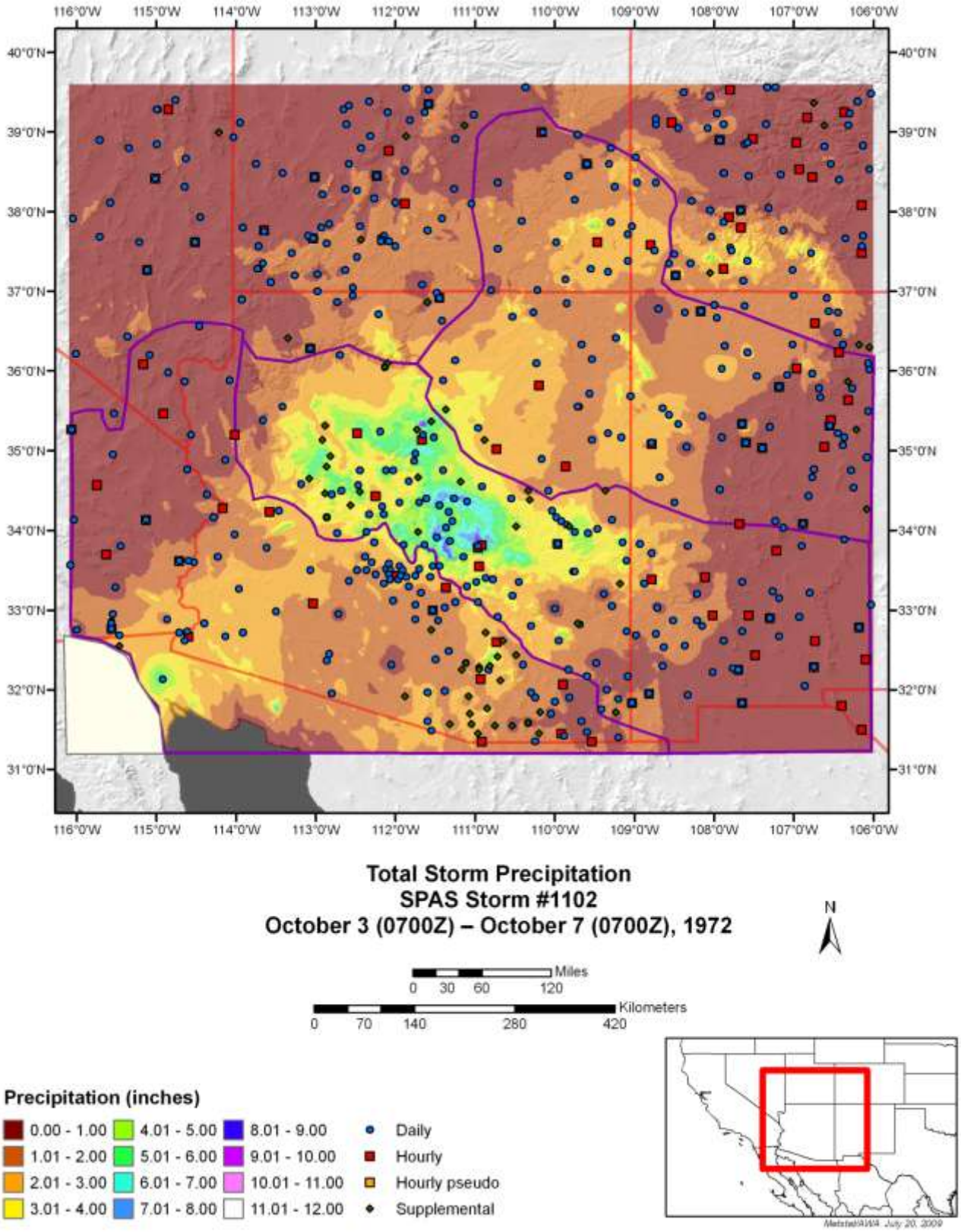
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours
1 sq miles	**0.3**	**2.7**	**3.8**	**4.3**	**4.5**	-	**4.6**	**4.9**	**7.3**
10 sq miles	**0.3**	**2.5**	**3.3**	**3.7**	**4.0**	-	**4.2**	**4.4**	**6.6**
100 sq miles	**0.3**	**2.1**	**2.9**	**3.0**	**3.4**	-	**3.6**	**3.9**	**6.0**
200 sq miles	**0.3**	**1.9**	**2.6**	**2.9**	**3.2**	-	**3.4**	**3.6**	**5.7**
500 sq miles	**0.3**	**1.8**	**2.5**	**2.5**	**3.0**	-	**3.2**	**3.5**	**5.5**
1000 sq miles	**0.3**	**1.6**	**2.2**	**2.4**	**2.7**	-	**2.9**	**3.1**	**5.1**
2000 sq miles	**0.3**	**1.4**	**2.2**	**2.2**	**2.5**	-	**2.7**	**2.9**	**4.8**
5000 sq miles	**0.3**	**1.2**	**1.9**	**2.0**	**2.4**	-	**2.5**	**2.7**	**4.4**
10000 sq miles	**0.3**	**1.2**	**1.8**	**1.7**	**2.1**	-	**2.3**	**2.4**	**3.9**
20000 sq miles	**0.2**	**1.0**	**1.5**	**1.4**	**1.9**	-	**2.0**	**2.1**	**3.4**

Storm or Storm Center Name	**SPAS-1102-Joanne-Zone 2**	
Storm Date(s)	10/3-7/1972	
Storm Type	Tropical	
Storm Location	33.82	-110.92
Storm Center Elevation	7100	
Precipitation Total & Duration (10 sq mi)	11.66 inches 96 hours 3.88" in 6hrs and 6.28" in 24hrs (SPAS 1102 DAD)	
Storm Representative Dewpoint	73.0 F	24
Storm Representative Dewpoint Location	32.77	-111.49
In-place Maximum Dewpoint	75.0 F	
Moisture Inflow Vector	SW @ 80	
In-place Maximization Factor		
Temporal Transposition (Date)	20-Sep	
Transposition Dewpoint Location	29.93	-110.95
Transposition Maximum Dewpoint	76.0 F	
Transposition Adjustment Factor	1.06	
Grid Point Location	30.975	-110.375
Grid Point Elevation	6,977	
Total Adjustment Factor	0.74	

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)															
	Duration (hours)														
Area (mi²)	1	2	3	4	5	6	12	18	24	36	48	72	96		Total
0.27	0.78		2.19			3.88	5.27	6.01	6.28	6.49	6.81	10.14	11.49		11.65
1	0.38		1.92			3.64	5.09	5.80	6.08	6.30	6.64	9.91	11.34		11.50
5	0.38		1.92			3.64	4.87	5.66	5.88	6.08	6.39	9.35	10.79		11.03
10	0.38		1.92			3.41	4.45	5.07	5.45	5.73	5.92	8.94	10.21		10.50
20	0.38		1.88			3.15	4.32	4.79	4.99	5.48	5.65	8.62	9.72		9.88
50	0.38		1.77			2.82	3.88	4.42	4.60	4.94	5.26	8.13	9.13		9.25
100	0.38		1.58			2.62	3.59	4.04	4.34	4.62	4.95	7.73	8.69		8.79
200	0.38		1.33			2.42	3.41	3.90	4.06	4.38	4.73	7.44	8.25		8.32
300	0.38		1.23			2.23	3.36	3.63	3.88	4.19	4.44	7.18	7.94		8.09
500	0.38		1.15			2.15	2.98	3.44	3.67	3.93	4.27	6.89	7.65		7.75
1000	0.38		1.12			1.88	2.94	3.26	3.43	3.73	3.93	6.47	7.18		7.26
2000	0.37		0.93			1.67	2.63	2.97	3.21	3.42	3.69	5.99	6.64		6.76
5000	0.34		0.79			1.57	2.39	2.67	2.87	3.10	3.29	5.29	5.93		5.99
10000	0.27		0.76			1.30	2.07	2.36	2.52	2.76	2.90	4.61	5.25		5.30
20000	0.25		0.53			1.02	1.63	1.95	2.09	2.28	2.39	3.94	4.45		4.50
50000	0.18		0.34			0.60	0.93	1.15	1.21	1.40	1.47	2.53	2.89		2.93




SPAS 1102 Storm Center Mass Curve
DAD Zone 2: Mogollon Rim
October 3 (0700Z) – October 7 (0700Z), 1972
Lat: 33.8208 Lon: -110.9208
Incremental
Accumulated
11.66"
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
1.5
1
0.5
0
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
1
11
21
31
41
51
61
71
81
91
101
111


116°0'W
115°0'W
114°0'W
113°0'W
112°0'W
111°0'W
110°0'W
109°0'W
108°0'W
107°0'W
106°0'W
40°0'N
39°0'N
38°0'N
37°0'N
36°0'N
35°0'N
34°0'N
33°0'N
32°0'N
31°0'N
Total Storm Precipitation
SPAS Storm #1102
October 3 (0700Z) – October 7 (0700Z), 1972
N
Miles
0 30 60 120
Kilometers
0 70 140 280 420
Precipitation (inches)
0.00 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
4.01 - 5.00
5.01 - 6.00
6.01 - 7.00
7.01 - 8.00
8.01 - 9.00
9.01 - 10.00
10.01 - 11.00
11.01 - 12.00
Daily
Hourly
Hourly pseudo
Supplemental

Sedona, AZ

July 14, 1975

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1073

General Storm Location: Sedona, Arizona

Storm Dates: July 14, 1975 (1-3 hrs, with most falling in 45-60 minutes)

Event: Convective Thunderstorm

Latitude: 34.8821

Longitude: -111.7652

Max. Grid/Radar Rainfall Amount: 4.27

Number of Stations: NA, analysis based on total storm grid isohyetal

SPAS Version: 8

Base Map Used: NA

Spatial resolution: 00:00:02

Radar Included: NO

Depth-Area-Duration (DAD) analysis: Yes, total storm DAD analysis

Hourly station at center of storm:

027708,SEDONA RS AZ,NCDC,34.8667,-111.7667,72,0100,13,MST,4270

1301, 0.00, 0.00, 0.00, 0.00, 0.00, 0.00, 0.00

1307, 0.00, 0.00, 0.10, 0.00, 0.00, 0.00, 0.10

1313, 0.00, 0.00, 0.00, 0.00, 0.00, 0.00, 0.00

1319, 0.00, 0.00, 0.00, 0.00, 0.00, 0.00, 0.00

1401, 0.00, 0.00, 0.00, 0.00, 0.00, 0.00, 0.00

1407, 0.00, 0.00, 0.00, 0.00, 0.00, 0.00, 0.00

1413, 0.00, 0.00, 0.00, 0.00, 0.60, 1.30, 1.90

1419, 0.10, 0.00, 0.00, 0.00, 0.00, 0.00, 0.10

1501, 0.00, 0.00, 0.00, 0.00, 0.00, 0.00, 0.00

1507, 0.00, 0.00, 0.00, 0.00, 0.00, 0.00, 0.00

1513, 0.00, 0.00, 0.00, 0.00, 0.00, 0.00, 0.00

1519, 0.00, 0.00, 0.00, 0.00, 0.00, 0.00, 0.00

Total Storm DAD Analysis: only did a total storm DAD analysis because of the small area size and in sufficient data to capture isohyetal pattern. Ran DAD on total storm, which was 3-hours with most falling in less than 1-hour.

Storm Name:	SPAS-1073-Sedona
Storm Date:	July 14, 1975
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	1-Aug	
	Lat	Long
Storm center location	34.88	-111.77
Storm Rep dew point location	33.17	-114.72
Transposition dewpoint location	29.265	-113.325
Basin location	30.975	-110.375

Moisture Inflow Direction:	WSW @ 85	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	4,450	feet
Storm Analysis Duration	3	hours

The storm representative dew point is	77.0 F	with total precipitable water above sea level of			3.14	inches.
The in-place maximum dew point is	81.0 F	with total precipitable water above sea level of			3.76	inches.
The transpositioned maximum dew point is	82.0 F	with total precipitable water above sea level of			3.92	inches.
The in-place storm elevation is	4,450	which subtracts	1.06	inches of precipitable water at	77.0 F	
The in-place storm elevation is	4,450	which subtracts	1.21	inches of precipitable water at	81.0 F	
The in-place storm elevation is	4,450	which subtracts	1.25	inches of precipitable water at	82.0 F	

The in-place maximization factor is	1.23
The moisture transposition factor is	1.05
The orographic transposition factor is	1.13
The total adjustment factor is	1.45

Notes:

Observed Storm Depth-Area-Duration

	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	3.8	-	-	-	-	-	-	-	-
10 sq miles	2.9	-	-	-	-	-	-	-	-
50 sq miles	1.4	-	-	-	-	-	-	-	-
100 sq miles	0.7	-	-	-	-	-	-	-	-
200 sq miles	-	-	-	-	-	-	-	-	-
500 sq miles	-	-	-	-	-	-	-	-	-
1000 sq miles	-	-	-	-	-	-	-	-	-
2000 sq miles	-	-	-	-	-	-	-	-	-
5000 sq miles	-	-	-	-	-	-	-	-	-

Adjusted Storm Depth-Area-Duration

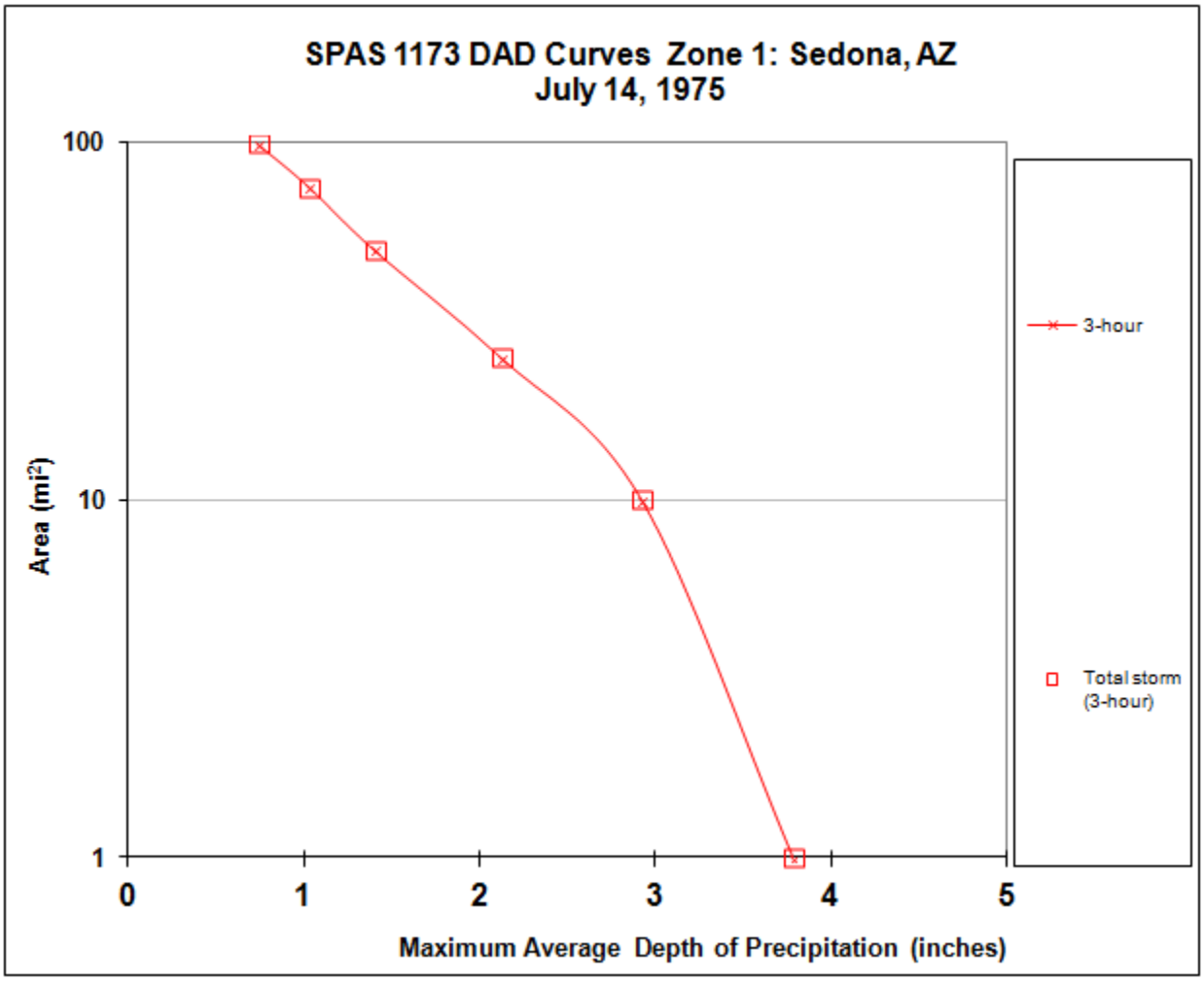
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	5.5	-	-	-	-	-	-	-	-
10 sq miles	4.2	-	-	-	-	-	-	-	-
50 sq miles	2.0	-	-	-	-	-	-	-	-
100 sq miles	1.1	-	-	-	-	-	-	-	-
200 sq miles	-	-	-	-	-	-	-	-	-
500 sq miles	-	-	-	-	-	-	-	-	-
1000 sq miles	-	-	-	-	-	-	-	-	-
2000 sq miles	-	-	-	-	-	-	-	-	-
5000 sq miles	-	-	-	-	-	-	-	-	-

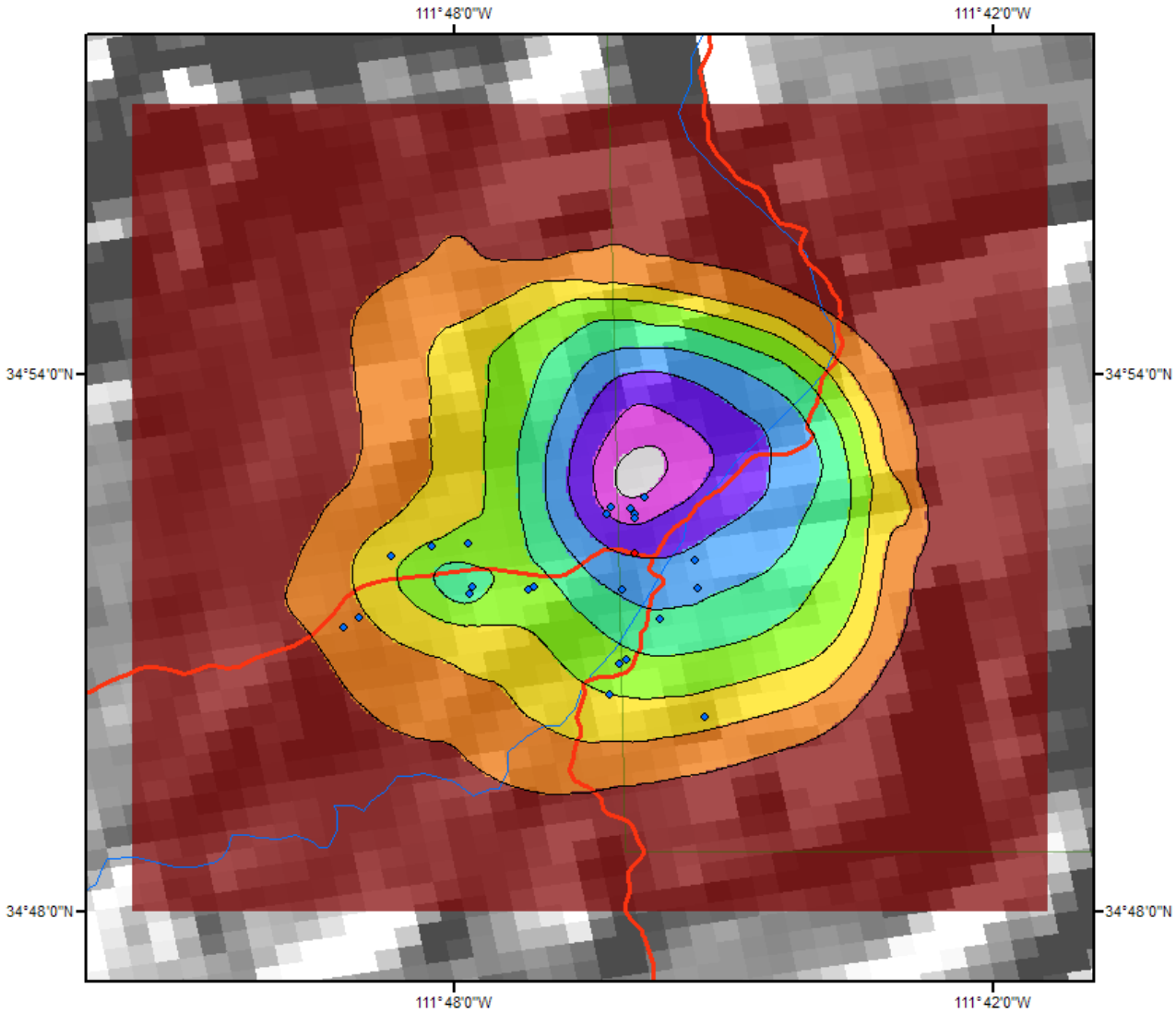
Storm or Storm Center Name	SPAS-1073-Sedona	
Storm Date(s)	7/14/1975	
Storm Type	Local Storm	
Storm Location	34.88	-111.77
Storm Center Elevation	4,450	
Precipitation Total & Duration (10 sq mi)	4.27" 1 hour (SPAS 1073 DAD)	
Storm Representative Dewpoint	77.0 F	3
Storm Representative Dewpoint Location	33.17	-114.72
In-place Maximum Dewpoint	81.0 F	
Moisture Inflow Vector	WSW @ 85	
In-place Maximization Factor	1.23	
Temporal Transposition (Date)	1-Aug	
Transposition Dewpoint Location	29.27	-113.33
Transposition Maximum Dewpoint	82.0 F	
Transposition Adjustment Factor	1.05	
Grid Point Location	30.975	-110.375
Grid Point Elevation	6,977	
Total Adjustment Factor	1.45	

Storm 1073 - July 14, 1975

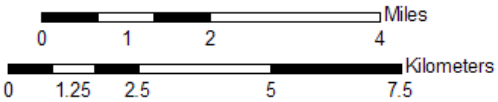
MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

	Duration (hours)								
Area (mi^2)	1	2	3	4	5	6	9	12	Total
0.01			4.27						4.27
1			3.78						3.78
10			2.92						2.92
25			2.12						2.12
50			1.40						1.40
75			1.03						1.03
99			0.74						0.74





Total Rainfall
Sedona, AZ 1975
SPAS 1073 July 14, 1975

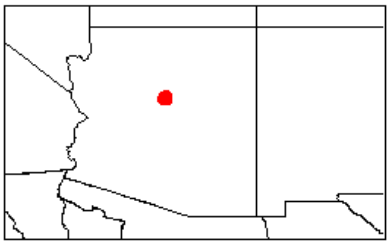


Precipitation Gauges

- Daily
- Hourly

Precipitation (inches)

0.04 - 0.50	1.51 - 2.00	3.01 - 3.50
0.51 - 1.00	2.01 - 2.50	3.51 - 4.00
1.01 - 1.50	2.51 - 3.00	4.01 - 4.50



MetstatAWA February 18, 2010

Yuma Valley, AZ

August 15, 1977

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1042
SPAS Analysis

General Storm Location: Yuma Valley, AZ

Storm Dates: 8/13/1977 0800Z – 8/18/1977 0700Z

Event: Hurricane Doreen

Latitude: 32.6114

Longitude: -114.6307

Rainfall Amount: 6.85" (Grid/Pixel Point) 7.01" (Yuma Valley, 029657)

Number of Stations: 38 (2-hourly, 1-hourly pseudo, 14-daily 21-supplemental) gauging stations within the defined search domain.

SPAS Version: 4.0

Base Map Used: Yes, August 1977 total precipitation

Spatial resolution: 15 seconds

Radar Included: No

Depth-Area-Duration (DAD) analysis: Yes: 1, 2, 3, 4, 5, 6, 12, 18, 24, 36, 48, 96, & 120 hours

Storm Name:	SPAS-1042-Yuma Valley
Storm Date:	August 15, 1977
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	15-Aug	
	Lat	Long
Storm center location	32.61	-114.63
Storm Rep dew point location	32.65	-114.60
Transposition dewpoint location	31.02	-110.35
Basin location	30.98	-110.38

Moisture Inflow Direction:	NE @ 5	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	192	feet
Storm Analysis Duration	3	hours

The storm representative dew point is	77.0 F	with total precipitable water above sea level of			3.14	inches.
The in-place maximum dew point is	82.0 F	with total precipitable water above sea level of			3.92	inches.
The transpositioned maximum dew point is	81.5 F	with total precipitable water above sea level of			3.84	inches.
The in-place storm elevation is	192	which subtracts	0.06	inches of precipitable water at	77.0 F	
The in-place storm elevation is	192	which subtracts	0.06	inches of precipitable water at	82.0 F	
The in-place storm elevation is	192	which subtracts	0.06	inches of precipitable water at	81.5 F	

The in-place maximization factor is	1.25
The transposition factor is	0.98
Orographic Transpostion Factor	0.91
The total adjustment factor is	1.12

Notes:

Observed Storm Depth-Area-Duration

	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	2.2	3.7	5.1	5.1	5.1	5.1	5.9	6.0	6.0
10 sq miles	2.0	3.3	4.5	4.6	4.6	4.6	5.2	5.3	5.3
50 sq miles	1.7	2.9	4.0	4.0	4.0	4.0	4.6	4.7	4.7
100 sq miles	1.6	2.7	3.7	3.7	3.7	3.7	4.3	4.4	4.4
200 sq miles	1.5	2.5	3.3	3.4	3.4	3.4	3.9	4.0	4.0
500 sq miles	1.2	2.0	2.7	2.8	2.8	2.8	3.2	3.3	3.3
1000 sq miles	1.1	1.7	2.4	2.4	2.4	2.4	2.7	2.8	2.8
2000 sq miles	0.9	1.5	2.0	2.0	2.0	2.0	2.3	2.4	2.5
5000 sq miles	0.6	1.0	1.4	1.4	1.4	1.5	1.7	1.7	1.9

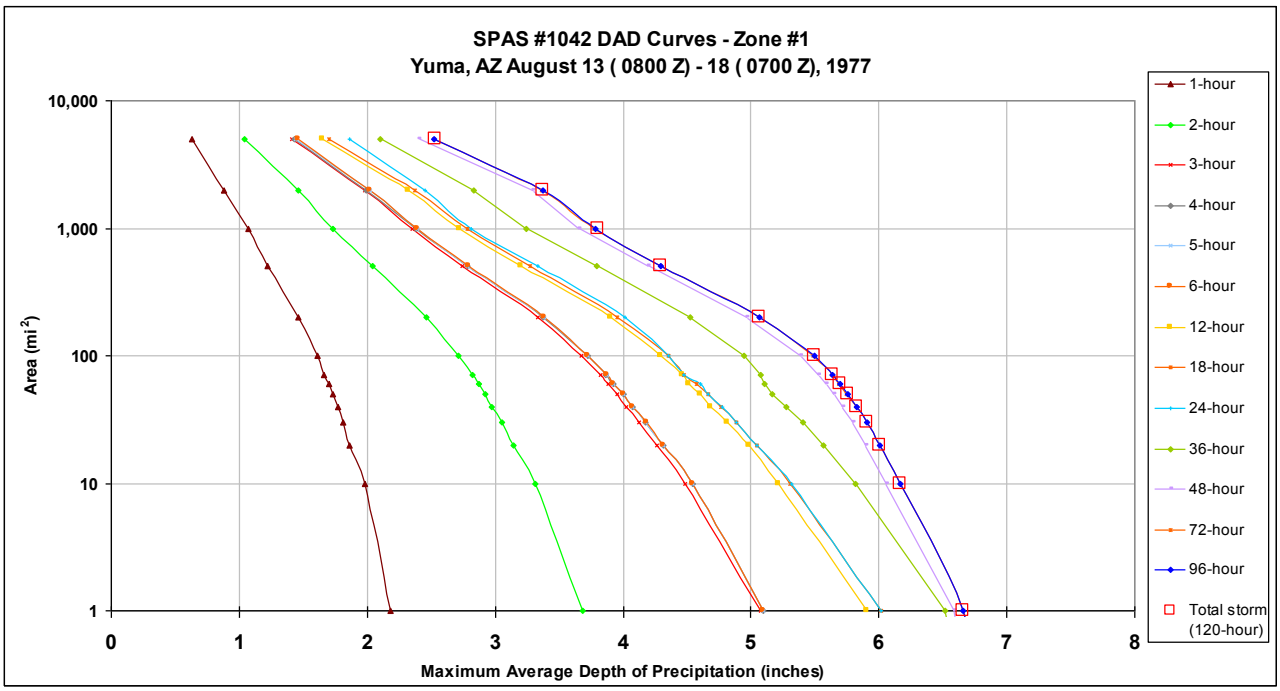
Adjusted Storm Depth-Area-Duration

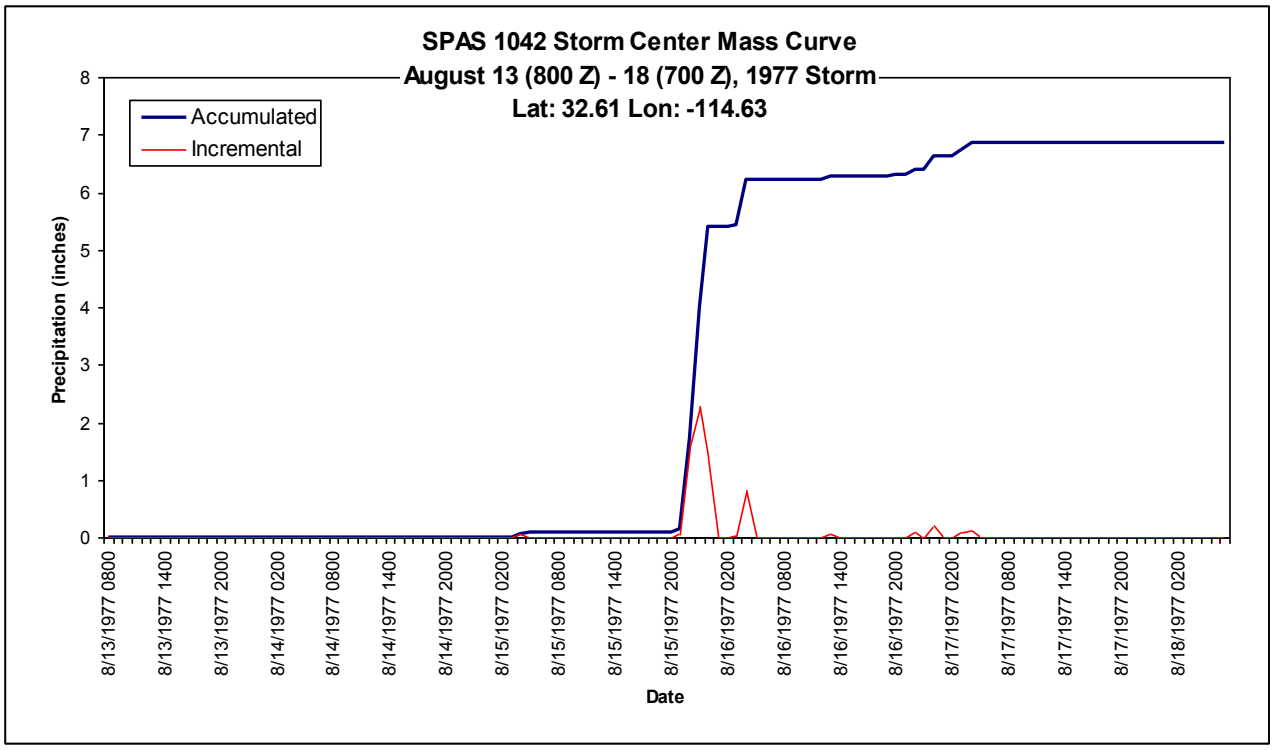
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	2.4	4.1	5.7	5.7	5.7	5.7	6.6	6.7	6.7
10 sq miles	2.2	3.7	5.0	5.1	5.1	5.1	5.8	5.9	5.9
50 sq miles	1.9	3.3	4.4	4.5	4.5	4.5	5.1	5.2	5.2
100 sq miles	1.8	3.0	4.1	4.2	4.2	4.2	4.8	4.9	4.9
200 sq miles	1.6	2.7	3.7	3.8	3.8	3.8	4.4	4.4	4.5
500 sq miles	1.4	2.3	3.1	3.1	3.1	3.1	3.6	3.7	3.7
1000 sq miles	1.2	1.9	2.6	2.7	2.7	2.7	3.0	3.1	3.1
2000 sq miles	1.0	1.6	2.2	2.2	2.3	2.3	2.6	2.6	2.7
5000 sq miles	0.7	1.2	1.6	1.6	1.6	1.6	1.8	1.9	2.1

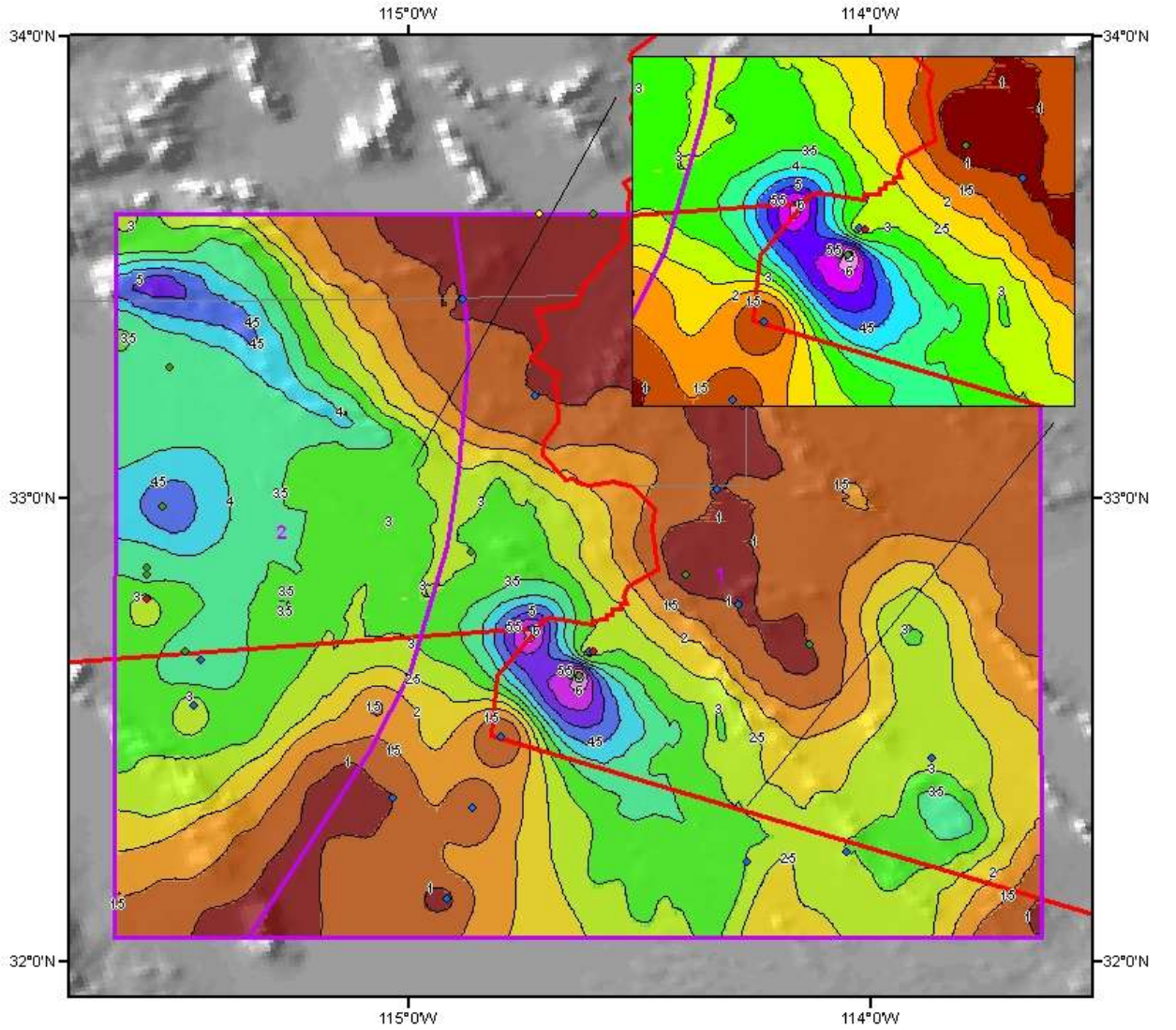
Storm or Storm Center Name	SPAS-1042-Yuma Valley		
Storm Date(s)	August 15, 1977		
Storm Type	Local Storm		
Storm Location	32.61	-114.63	
Storm Center Elevation	192		
Precipitation Total & Duration (10 sq mi)	5.33 inches 4 hours 6.85" in 72hrs (SPAS 1042DAD)		
Storm Representative Dewpoint	77.0 F	3	hr ave 13Z-15Z on the 15th at KYUM
Storm Representative Dewpoint Location	32.65	-114.6	
In-place Maximum Dewpoint	82.0 F		
Moisture Inflow Vector	NE @ 5		
In-place Maximization Factor			
Temporal Transposition (Date)	15-Aug		
Transposition Dewpoint Location	31.02	-110.35	
Transposition Maximum Dewpoint	81.5 F		
Transposition Adjustment Factor			
Grid Point Location	30.98	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	1.12		

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

Area (mi^2)	Duration (hours)													
	1	2	3	4	5	6	12	18	24	36	48	72	96	Total
0.07	2.29	3.88	5.26	5.33	5.33	5.33	6.17	6.17	6.18	6.78	6.79	6.85	6.85	6.85
1	2.18	3.68	5.08	5.10	5.10	5.10	5.91	6.02	6.02	6.52	6.59	6.66	6.66	6.66
10	1.98	3.31	4.49	4.55	4.55	4.55	5.22	5.31	5.32	5.82	6.06	6.17	6.17	6.17
20	1.86	3.14	4.27	4.32	4.32	4.32	4.99	5.05	5.05	5.57	5.90	6.01	6.01	6.01
30	1.81	3.05	4.13	4.18	4.18	4.19	4.82	4.89	4.89	5.41	5.80	5.91	5.91	5.91
40	1.77	2.97	4.03	4.08	4.08	4.08	4.69	4.77	4.78	5.28	5.72	5.83	5.83	5.83
50	1.73	2.92	3.95	4.00	4.00	4.00	4.61	4.67	4.67	5.17	5.65	5.75	5.76	5.76
60	1.70	2.87	3.88	3.92	3.92	3.92	4.52	4.58	4.61	5.11	5.59	5.69	5.70	5.70
70	1.66	2.82	3.82	3.86	3.87	3.87	4.47	4.48	4.48	5.08	5.53	5.64	5.64	5.64
100	1.61	2.71	3.67	3.72	3.72	3.72	4.30	4.36	4.36	4.95	5.39	5.49	5.50	5.50
200	1.46	2.46	3.33	3.37	3.38	3.38	3.90	3.95	4.02	4.53	4.97	5.07	5.07	5.07
500	1.22	2.04	2.74	2.78	2.78	2.79	3.20	3.27	3.33	3.79	4.20	4.30	4.30	4.30
1,000	1.07	1.73	2.35	2.38	2.39	2.39	2.72	2.78	2.81	3.24	3.65	3.77	3.78	3.80
2,000	0.88	1.46	1.98	1.99	2.02	2.02	2.32	2.37	2.45	2.83	3.29	3.36	3.37	3.37
5,000	0.63	1.04	1.41	1.43	1.44	1.46	1.65	1.70	1.86	2.10	2.40	2.52	2.52	2.53




SPAS 1042 Storm Center Mass Curve
August 13 (800 Z) - 18 (700 Z), 1977 Storm
Lat: 32.61 Lon: -114.63
Accumulated
Incremental
Precipitation (inches)
0
1
2
3
4
5
6
7
8
8/13/1977 0800
8/13/1977 1400
8/13/1977 2000
8/14/1977 0200
8/14/1977 0800
8/14/1977 1400
8/14/1977 2000
8/15/1977 0200
8/15/1977 0800
8/15/1977 1400
8/15/1977 2000
8/16/1977 0200
8/16/1977 0800
8/16/1977 1400
8/16/1977 2000
8/17/1977 0200
8/17/1977 0800
8/17/1977 1400
8/17/1977 2000
8/18/1977 0200
Date



Total Rainfall (120-hours)
Yuma, AZ 1977 Storm
SPAS Storm #1042- August 13 (800 Z) to 18 (700 Z), 1977

Miles: 0 5 10 20 30
Kilometers: 0 12.5 25 50 75

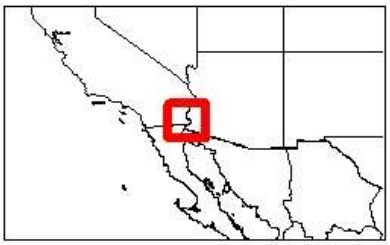
Gauging Stations

- Hourly
- Daily
- Hourly Pseudo
- Supplemental

N

Precipitation (inches)

0.54 - 1.00	2.01 - 2.50	3.51 - 4.00	5.01 - 5.50	6.51 - 7.00
1.01 - 1.50	2.51 - 3.00	4.01 - 4.50	5.51 - 6.00	
1.51 - 2.00	3.01 - 3.50	4.51 - 5.00	6.01 - 6.50	



Coordinate system: GCS North American 1983
Scale: 1:1,345,743

Metstat/NWA September 27, 2007

Nogales, AZ

October 6-10, 1977

Storm Type: Remnant Tropical

Storm Precipitation Analysis System (SPAS) For Storm #1097

General Storm Location: Nogales, Arizona

Storm Dates: October 6-10, 1977

Event: Tropical storm remnants

Zone 1

Latitude: 31.1042

Longitude: -110.7875

Max. Grid Rainfall Amount: 15.97”

Max. Observed Rainfall Amount: 14.00” at FIGURE 14 STATION 5 MX

Number of Stations: 184 (31 Daily, 6 Hourly, 1 Hourly Estimated Pseudo, 4 Hourly Pseudo, 140 Supplemental, and 2 Supplemental Estimated)

SPAS Version: 8.0

Base Map Used: Yes, conus_prism_ppt_in_1971_2000_10_mx

Spatial resolution: 00:00:30 (0.28 sq. miles)

Radar Included: No

Depth-Area-Duration (DAD) analysis: Yes

Comments:

Adjusted station FIG 14 STATION 2 MX up by 4% to bring the SPAS precipitation value closer to the observed value.

Storm Name:	SPAS-1097-Nogales-Heather Rem
Storm Date:	10/5-11/1977
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	20-Sep	
	Lat	Long
Storm center location	31.10	-110.79
Storm Rep dew point location	23.00	-115.00
Transposition dewpoint location	22.875	-114.585
Basin location	30.975	-110.375

Moisture Inflow Direction:	SW @ 615	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	5,000	feet
Storm Analysis Duration	24	hours

The storm representative dew point is	77.0 F	with total precipitable water above sea level of			3.14	inches.
The in-place maximum dew point is	80.0 F	with total precipitable water above sea level of			3.60	inches.
The transpositioned maximum dew point is	80.5 F	with total precipitable water above sea level of			3.68	inches.
The in-place storm elevation is	5,000	which subtracts	1.17	inches of precipitable water at	77.0 F	
The in-place storm elevation is	5,000	which subtracts	1.29	inches of precipitable water at	80.0 F	
The in-place storm elevation is	5,000	which subtracts	1.31	inches of precipitable water at	80.5 F	

The in-place maximization factor is	1.17
The moisture transposition factor is	1.03
The orographic transposition factor is	1.10
The total adjustment factor is	1.32

Notes: Storm rep SST taken from September 26th daily SST map and HYSPLIT backward trajectories.

Observed Storm Depth-Area-Duration

	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	72 Hours
1 sq miles	1.2	3.5	4.9	-	7.1	-	9.3	11.1	15.5
10 sq miles	1.2	3.5	4.8	-	6.9	-	9.3	11.1	15.5
100 sq miles	1.1	3.2	4.4	-	6.1	-	8.6	10.0	13.8
200 sq miles	1.0	3.0	4.1	-	5.9	-	8.2	9.6	13.5
500 sq miles	1.0	2.8	3.6	-	5.2	-	7.6	9.0	12.5
1000 sq miles	0.9	2.5	3.2	-	4.7	-	6.7	8.3	11.5
2000 sq miles	0.8	2.2	2.9	-	4.0	-	5.9	7.1	9.0
5000 sq miles	0.6	1.8	2.3	-	3.3	-	4.9	5.6	7.0
10000 sq miles	0.5	1.3	2.0	-	2.8	-	4.0	4.8	5.9
20000 sq miles	0.4	1.0	1.6	-	2.3	-	3.1	3.8	4.8

Adjusteded Storm Depth-Area-Duration

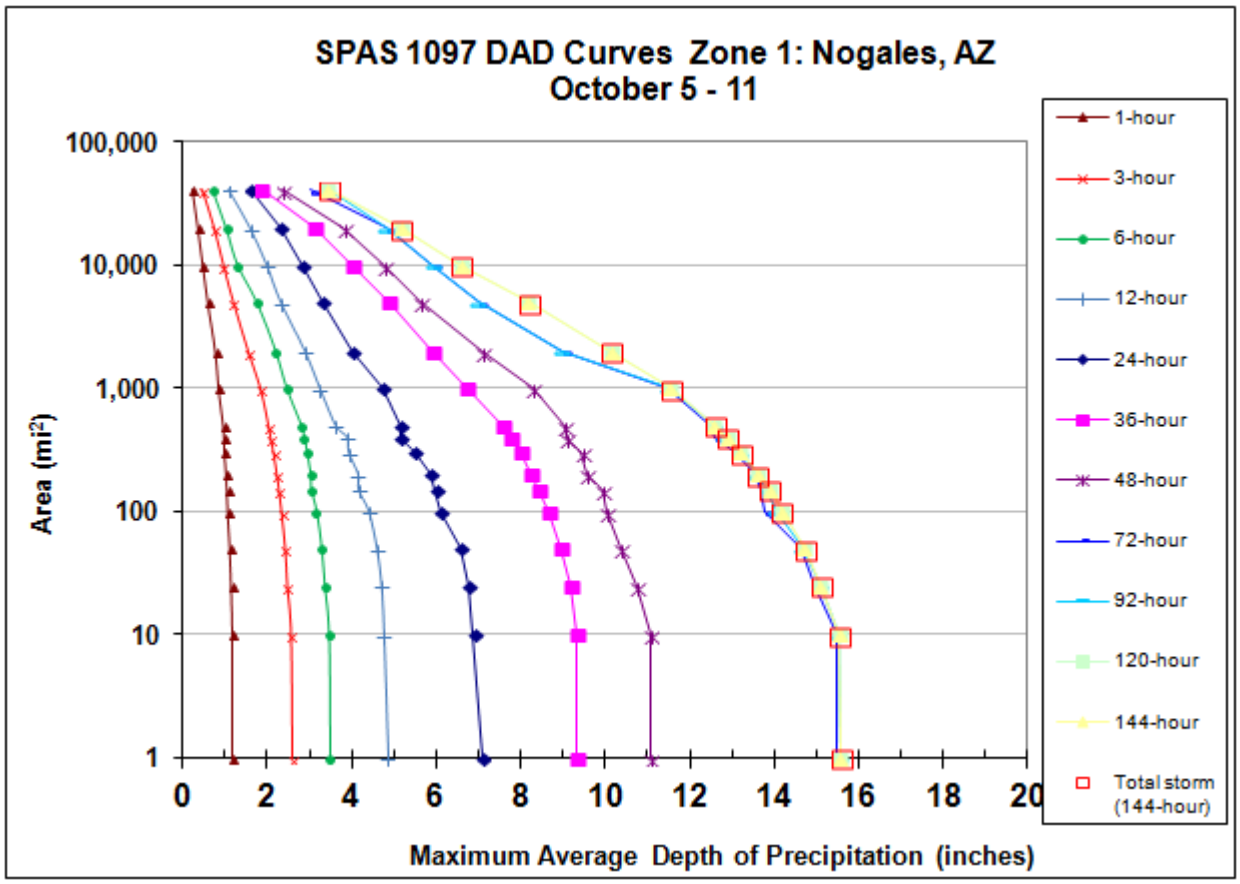
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	72 Hours
1 sq miles	1.6	4.6	6.4	-	9.4	-	12.3	14.7	20.5
10 sq miles	1.6	4.6	6.3	-	9.1	-	12.3	14.7	20.5
100 sq miles	1.4	4.2	5.8	-	8.1	-	11.4	13.3	18.2
200 sq miles	1.4	4.0	5.5	-	7.7	-	10.9	12.7	17.9
500 sq miles	1.3	3.7	4.8	-	6.8	-	10.0	11.9	16.5
1000 sq miles	1.1	3.3	4.3	-	6.3	-	8.9	10.9	15.2
2000 sq miles	1.0	2.9	3.8	-	5.3	-	7.8	9.4	11.9
5000 sq miles	0.8	2.3	3.1	-	4.3	-	6.5	7.5	9.3
10000 sq miles	0.6	1.7	2.6	-	3.7	-	5.3	6.3	7.8
20000 sq miles	0.5	1.4	2.1	-	3.0	-	4.1	5.0	6.4

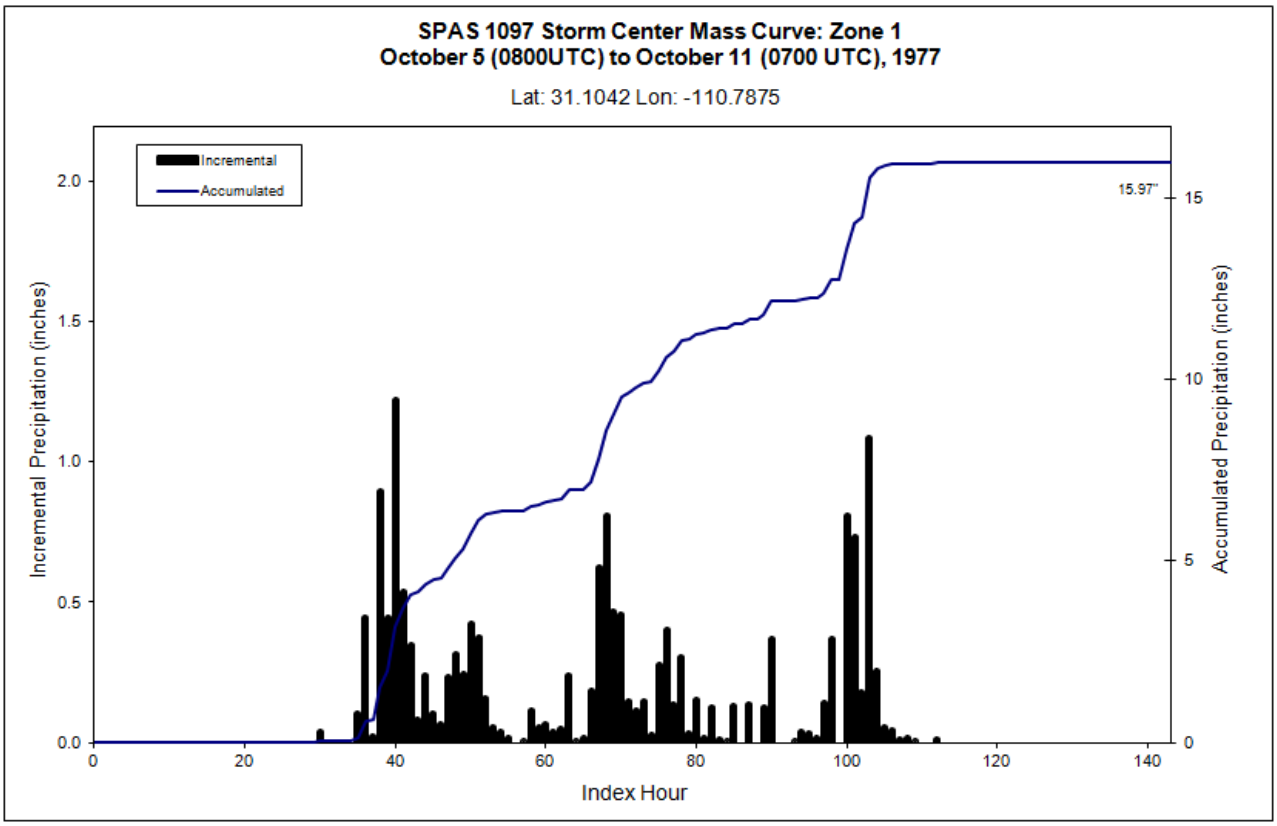
Storm or Storm Center Name	SPAS-1097-Nogales-Heather Remnants	
Storm Date(s)	10/5-11/1977	
Storm Type	Tropical	
Storm Location	31.10	-110.79
Storm Center Elevation	5000	
Precipitation Total & Duration (10 sq mi)	15.90 inches 72 hours (SPAS 1097 DAD)	
Storm Representative Dewpoint	77.0 F	24
Storm Representative Dewpoint Location	23	-115
In-place Maximum Dewpoint	80.0 F	
Moisture Inflow Vector	SW @ 615	
In-place Maximization Factor		
Temporal Transposition (Date)	20-Sep	
Transposition Dewpoint Location	22.88	-114.59
Transposition Maximum Dewpoint	80.5 F	
Transposition Adjustment Factor	1.03	
Grid Point Location	30.975	-110.375
Grid Point Elevation	6,977	
Total Adjustment Factor	1.32	

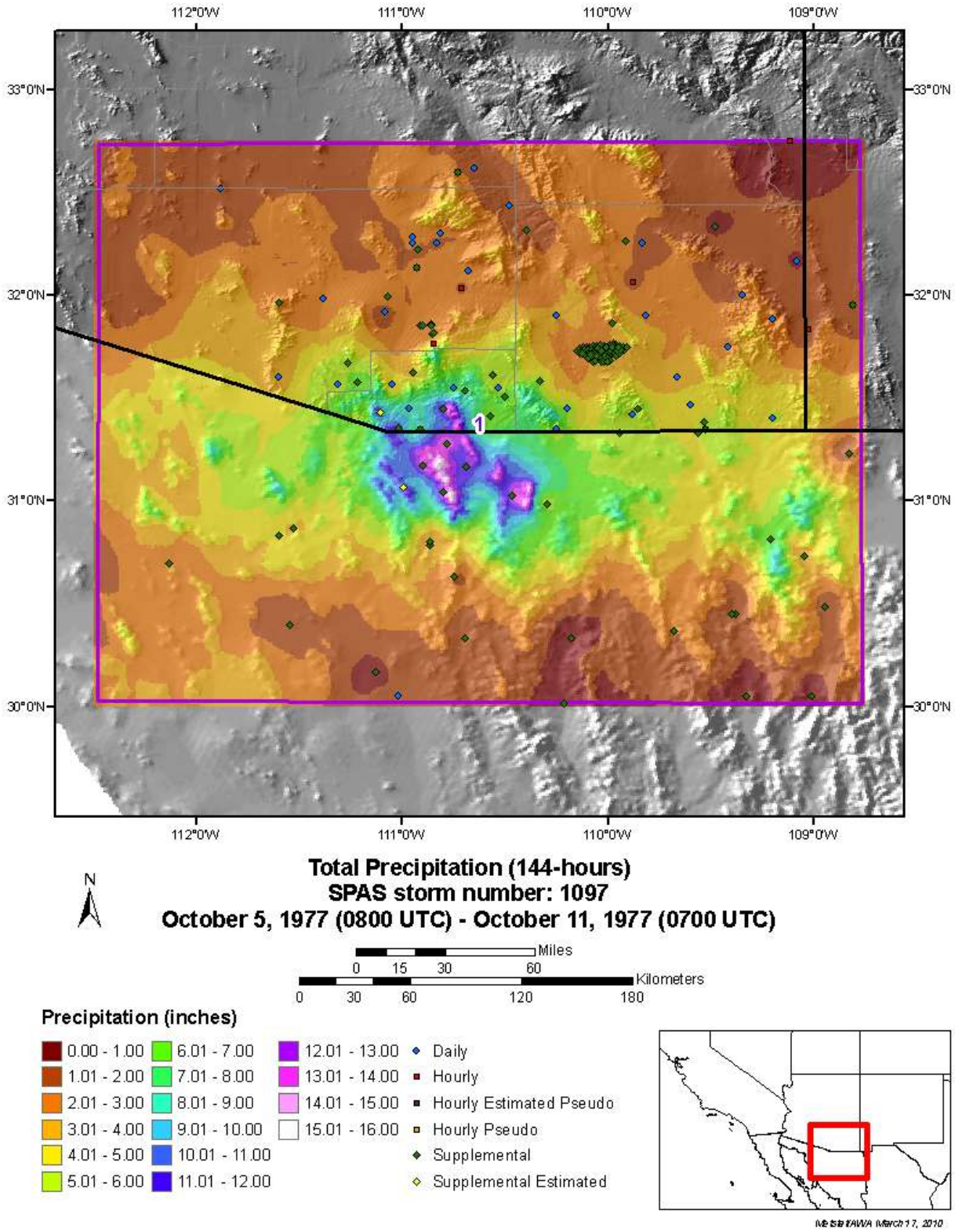
Storm 1097 - October 5 (0800 UTC) - October 11, 1977 (0700 UTC)

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

	Duration (hours)											
Area (mi^2)	1	3	6	12	24	36	48	72	96	120	144	Total
0.28	1.23	2.66	3.58	5.03	7.27	9.64	11.43	15.90	15.97	15.97	15.97	15.97
1	1.18	2.60	3.48	4.85	7.09	9.33	11.08	15.50	15.58	15.58	15.58	15.58
10	1.18	2.57	3.45	4.75	6.88	9.33	11.08	15.46	15.51	15.55	15.55	15.55
25	1.15	2.48	3.35	4.69	6.74	9.20	10.74	14.97	15.09	15.11	15.11	15.11
50	1.12	2.43	3.28	4.58	6.59	8.95	10.37	14.63	14.69	14.73	14.73	14.73
100	1.07	2.34	3.16	4.39	6.12	8.64	10.02	13.78	14.07	14.19	14.19	14.19
150	1.05	2.28	3.04	4.15	5.98	8.42	9.94	13.67	13.84	13.90	13.90	13.90
200	1.03	2.23	3.02	4.14	5.85	8.24	9.58	13.53	13.59	13.62	13.62	13.62
300	0.99	2.15	2.94	3.92	5.47	7.99	9.44	13.08	13.19	13.20	13.20	13.20
400	0.98	2.08	2.87	3.88	5.16	7.74	9.09	12.59	12.81	12.89	12.89	12.89
500	0.96	2.03	2.80	3.61	5.16	7.59	9.03	12.48	12.58	12.59	12.59	12.59
1,000	0.85	1.84	2.46	3.24	4.73	6.71	8.26	11.45	11.51	11.56	11.56	11.56
2,000	0.77	1.55	2.20	2.89	4.02	5.90	7.09	8.98	8.98	10.15	10.15	10.15
5,000	0.59	1.20	1.76	2.32	3.28	4.89	5.63	7.01	7.01	8.18	8.18	8.18
10,000	0.47	0.96	1.31	1.99	2.82	4.00	4.79	5.90	5.93	6.59	6.59	6.59
20,000	0.35	0.74	1.04	1.60	2.30	3.12	3.80	4.81	4.81	5.17	5.17	5.17
41,042	0.22	0.46	0.72	1.09	1.62	1.86	2.37	3.03	3.46	3.46	3.46	3.46




SPAS 1097 Storm Center Mass Curve: Zone 1
October 5 (0800UTC) to October 11 (0700 UTC), 1977
Lat: 31.1042 Lon: -110.7875
Incremental
Accumulated
15.97"
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
Index Hour
0.0
0.5
1.0
1.5
2.0
0
5
10
15
0
20
40
60
80
100
120
140


112°0'W
111°0'W
110°0'W
109°0'W
33°0'N
32°0'N
31°0'N
30°0'N
1
Total Precipitation (144-hours)
SPAS storm number: 1097
October 5, 1977 (0800 UTC) - October 11, 1977 (0700 UTC)
N
Miles
0 15 30 60
Kilometers
0 30 60 120 180
Precipitation (inches)
0.00 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
4.01 - 5.00
5.01 - 6.00
6.01 - 7.00
7.01 - 8.00
8.01 - 9.00
9.01 - 10.00
10.01 - 11.00
11.01 - 12.00
12.01 - 13.00
13.01 - 14.00
14.01 - 15.00
15.01 - 16.00
Daily
Hourly
Hourly Estimated Pseudo
Hourly Pseudo
Supplemental
Supplemental Estimated

Bear Spring, AZ

February 27 – March 3, 1978

Storm Type: General Frontal

Storm Precipitation Analysis System (SPAS) For Storm #1150

General Storm Location: Workman Creek, Arizona

Storm Dates: February 27 (0700Z), 1978 - March 3 (0700), 1978

Event: Large synoptic storm

DAD Zone 1: Southern Deserts

Latitude: 33.704

Longitude: -111.59

Max. Grid/Radar Rainfall Amount: 12.29”

Max. Observed Rainfall Amount: n/a

DAD Zone 2: Mogollon Rim

Latitude: 34.0375

Longitude: -111.4875

Max. Grid/Radar Rainfall Amount: 15.52”

Max. Observed Rainfall Amount: 14.80” (Workman Cr, AZ)

Number of Stations: 368 (288 Daily, 58 hourly, 2 Hourly Pseudo, 15 Supplemental, and 5 Supplemental Pseudo)

SPAS Version: 7.0

Base Map Used: PRISM Mean (71-00) March Precipitation

Spatial resolution: 30-sec

Radar Included: N

Depth-Area-Duration (DAD) analysis: Yes

Storm Name:	SPAS-1150-Bear Spring-Zone 2
Storm Date:	2/27-3-3/1978
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	15-Feb	
	Lat	Long
Storm center location	33.70	-111.60
Storm Rep dew point location	32.60	-111.83
Transposition dewpoint location	29.875	-110.605
Basin location	30.975	-110.375

Moisture Inflow Direction:	SSW @ 10(	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	2,300	feet
Storm Analysis Duration	24	hours

The storm representative dew point is	58.5 F	with total precipitable water above sea level of			1.28	inches.
The in-place maximum dew point is	61.0 F	with total precipitable water above sea level of			1.45	inches.
The transpositioned maximum dew point is	62.0 F	with total precipitable water above sea level of			1.52	inches.
The in-place storm elevation is	2,300	which subtracts	0.32	inches of precipitable water at	58.5 F	
The in-place storm elevation is	2,300	which subtracts	0.34	inches of precipitable water at	61.0 F	
The in-place storm elevation is	2,300	which subtracts	0.36	inches of precipitable water at	62.0 F	

The in-place maximization factor is	1.16
The moisture transposition factor is	1.05
The orographic transposition factor is	0.66
The total adjustment factor is	0.80

Notes:

Observed Storm Depth-Area-Duration

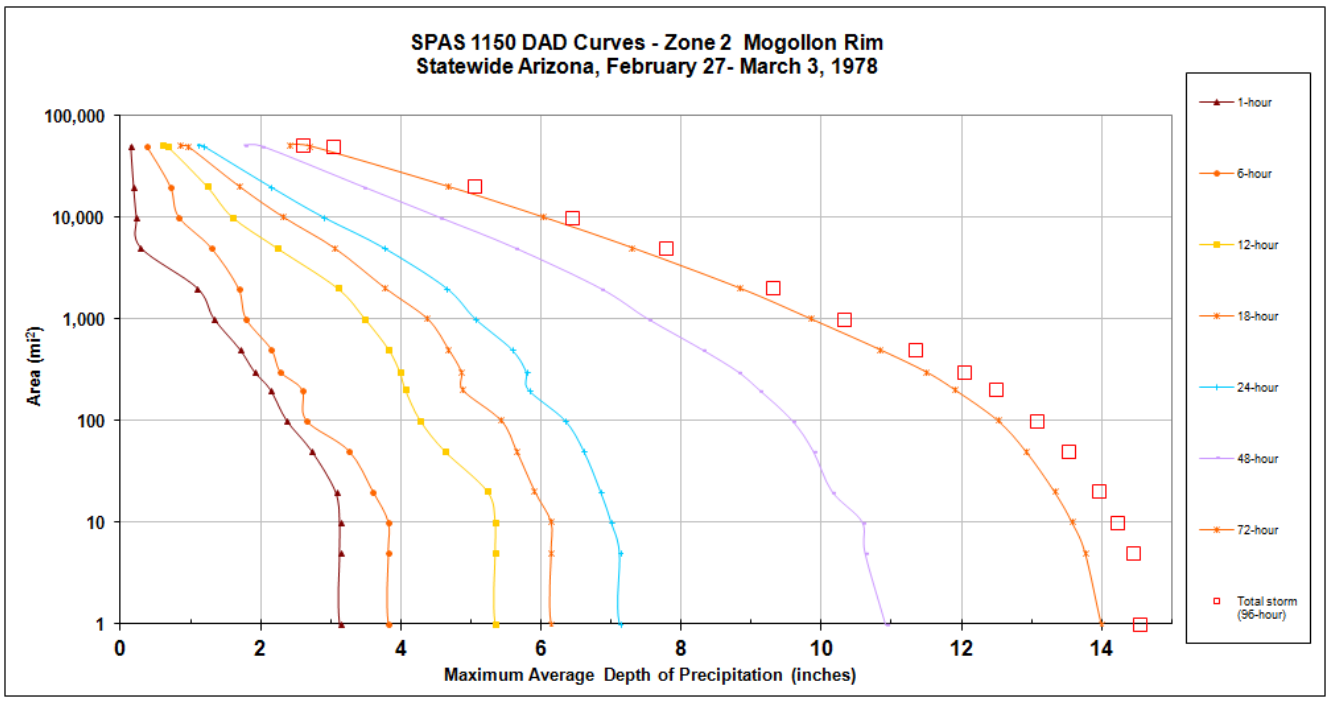
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	3.1	3.8	5.3	6.1	7.1	-	-	10.9	-	14.0
10 sq miles	3.1	3.8	5.3	6.1	7.0	-	-	10.6	-	13.6
100 sq miles	2.4	2.7	4.3	5.4	6.3	-	-	9.6	-	12.5
200 sq miles	2.1	2.6	4.1	4.9	5.8	-	-	9.1	-	11.9
500 sq miles	1.7	2.2	3.8	4.7	5.6	-	-	8.3	-	10.8
1000 sq miles	1.3	1.8	3.5	4.4	5.1	-	-	7.5	-	9.9
2000 sq miles	1.1	1.7	3.1	3.8	4.7	-	-	6.9	-	8.8
5000 sq miles	0.3	1.3	2.2	3.1	3.8	-	-	5.6	-	7.3
10000 sq miles	0.2	0.8	1.6	2.3	2.9	-	-	4.6	-	6.0
20000 sq miles	0.2	0.7	1.2	1.7	2.1	-	-	3.5	-	4.7

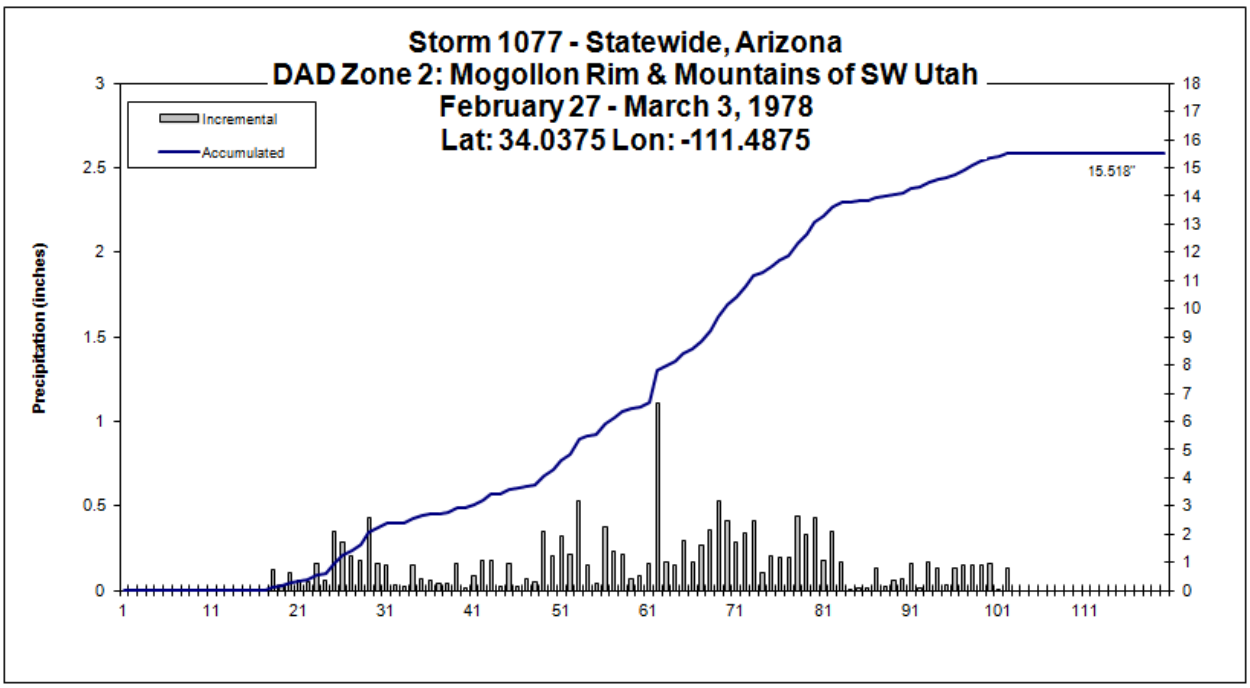
Adjusteded Storm Depth-Area-Duration

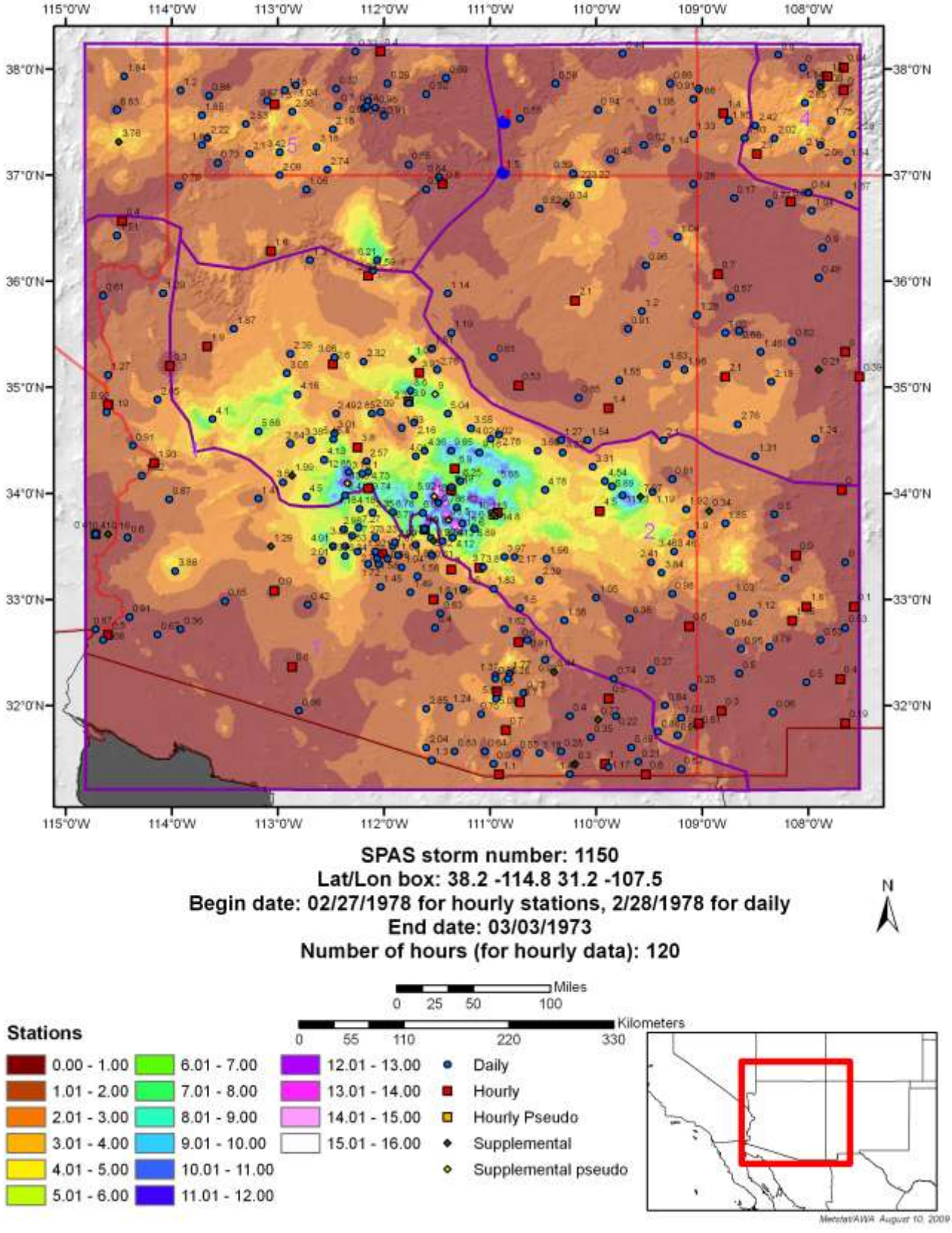
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	2.5	3.0	4.3	-	5.7	-	-	8.7	-	11.2
10 sq miles	2.5	3.0	4.3	-	5.6	-	-	8.4	-	10.8
100 sq miles	1.9	2.1	3.4	-	5.1	-	-	7.6	-	10.0
200 sq miles	1.7	2.1	3.2	-	4.6	-	-	7.3	-	9.5
500 sq miles	1.4	1.7	3.0	-	4.5	-	-	6.6	-	8.6
1000 sq miles	1.1	1.4	2.8	-	4.0	-	-	6.0	-	7.9
2000 sq miles	0.9	1.3	2.5	-	3.7	-	-	5.5	-	7.0
5000 sq miles	0.2	1.0	1.8	-	3.0	-	-	4.5	-	5.8
10000 sq miles	0.2	0.7	1.3	-	2.3	-	-	3.6	-	4.8
20000 sq miles	0.1	0.6	1.0	-	1.7	-	-	2.8	-	3.7

Storm or Storm Center Name	SPAS-1150-Bear Spring-Zone 2		
Storm Date(s)	2/27-3-3/1978		
Storm Type	General		
Storm Location	33.70	-111.60	
Storm Center Elevation	2300		
Precipitation Total & Duration (10 sq mi)	12.04 inches 72 hours		
Storm Representative Dewpoint	58.5 F	24	hr ave KGBN, KDMA, KTUS, KFHU
Storm Representative Dewpoint Location	32.6	-111.83	
In-place Maximum Dewpoint	61.0 F		
Moisture Inflow Vector	SSW @ 100		
In-place Maximization Factor			
Temporal Transposition (Date)	15-Feb		
Transposition Dewpoint Location	29.88	-110.61	
Transposition Maximum Dewpoint	62.0 F		
Transposition Adjustment Factor	1.05		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	0.80		

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)															
	Duration (hours)														
Area (mi²)	1	2	3	4	5	6	12	18	24	36	48	72	96		Total
0.27	3.35					4.06	5.6	6.43	7.49		11.15	14.22	14.77		14.77
1	3.13					3.82	5.34	6.14	7.12		10.92	14	14.54		14.54
5	3.13					3.82	5.34	6.14	7.12		10.63	13.77	14.45		14.45
10	3.13					3.82	5.34	6.14	7		10.59	13.58	14.22		14.22
20	3.07					3.6	5.23	5.91	6.85		10.16	13.33	13.96		13.96
50	2.73					3.26	4.62	5.65	6.61		9.89	12.92	13.53		13.53
100	2.37					2.65	4.27	5.43	6.34		9.59	12.52	13.08		13.08
200	2.14					2.59	4.06	4.88	5.82		9.12	11.91	12.49		12.49
300	1.91					2.28	3.98	4.86	5.79		8.82	11.5	12.04		12.04
500	1.7					2.15	3.82	4.68	5.58		8.3	10.83	11.35		11.35
1000	1.33					1.79	3.48	4.38	5.06		7.53	9.85	10.33		10.33
2000	1.09					1.68	3.09	3.78	4.65		6.85	8.84	9.31		9.31
5000	0.28					1.29	2.22	3.05	3.75		5.63	7.3	7.78		7.78
10000	0.22					0.83	1.59	2.33	2.89		4.55	6.03	6.44		6.44
20000	0.18					0.71	1.23	1.7	2.13		3.46	4.67	5.05		5.05
50000	0.14					0.37	0.66	0.96	1.18		2.02	2.7	3.04		3.04
51059							0.59	0.85	1.11		1.77	2.41	2.6		2.60




Storm 1077 - Statewide, Arizona
DAD Zone 2: Mogollon Rim & Mountains of SW Utah
February 27 - March 3, 1978
Lat: 34.0375 Lon: -111.4875
Incremental
Accumulated
15.518"
Precipitation (inches)
0
0.5
1
1.5
2
2.5
3
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
1
11
21
31
41
51
61
71
81
91
101
111


115°0'W
114°0'W
113°0'W
112°0'W
111°0'W
110°0'W
109°0'W
108°0'W
38°0'N
37°0'N
36°0'N
35°0'N
34°0'N
33°0'N
32°0'N
SPAS storm number: 1150
Lat/Lon box: 38.2 -114.8 31.2 -107.5
Begin date: 02/27/1978 for hourly stations, 2/28/1978 for daily
End date: 03/03/1973
Number of hours (for hourly data): 120
N
Miles
0 25 50 100
Kilometers
0 55 110 220 330
Stations
0.00 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
4.01 - 5.00
5.01 - 6.00
6.01 - 7.00
7.01 - 8.00
8.01 - 9.00
9.01 - 10.00
10.01 - 11.00
11.01 - 12.00
12.01 - 13.00
13.01 - 14.00
14.01 - 15.00
15.01 - 16.00
Daily
Hourly
Hourly Pseudo
Supplemental
Supplemental pseudo
Metstat/AWA August 10, 2009

Browns Peak, AZ

December 17-19, 1978

Storm Type: General Frontal

Storm Precipitation Analysis System (SPAS) For Storm #1134

General Storm Location: Mount Lemmon, Arizona

Storm Dates: December 16-20, 1978

Event: Winter storm

DAD Zone 1 -- Southern Deserts

Max. Grid/Radar Rainfall Amount: 9.41”

Max. Observed Rainfall Amount: 9.83” (Three Bar D-2, AZ)

DAD Zone 2 – Mogollon Rim Deserts

Max. Grid/Radar Rainfall Amount: 10.37”

Max. Observed Rainfall Amount: 8.52” (Palisades RS, AZ)

Number of Stations: 283 (177 daily, 30 hourly, 9 hourly pseudo, 65 supplemental, and 2 Supplemental estimated)

SPAS Version: 7.0

Base Map Used: Mean December Precipitation

Spatial resolution: 30-sec

Radar Included: N

Depth-Area-Duration (DAD) analysis: Y

Storm Name:	SPAS-1134-Browns Peak Zone 2
Storm Date:	12/17-19/1978
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	1-Dec	
	Lat	Long
Storm center location	33.43	-111.45
Storm Rep SST location	25.00	-118.00
Transposition SST location	22.545	-116.925
Basin location	30.975	-110.375

Moisture Inflow Direction:	SW @ 720	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	3,400	feet
Storm Analysis Duration	24	hours

The storm representative SST is	69.5 F	with total precipitable water above sea level of			2.20	inches.
The in-place maximum SST is	71.5 F	with total precipitable water above sea level of			2.42	inches.
The transpositioned maximum SST is	75.5 F	with total precipitable water above sea level of			2.92	inches.
The in-place storm elevation is	3,400	which subtracts	0.65	inches of precipitable water at	69.5 F	
The in-place storm elevation is	3,400	which subtracts	0.70	inches of precipitable water at	71.5 F	
The in-place storm elevation is	3,400	which subtracts	0.80	inches of precipitable water at	75.5 F	

The in-place maximization factor is	1.11
The moisture transposition factor is	1.23
The orographic transposition factor is	0.66
The total adjustment factor is	0.90

Notes: Daily SST used since moisture source on land not found because of rain contamination and unrepresentative values.

Observed Storm Depth-Area-Duration

	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	1.0	2.1	3.7	-	6.4	-	8.3	9.6	-	10.2
10 sq miles	1.0	2.1	3.7	-	6.4	-	8.3	9.2	-	9.8
100 sq miles	1.0	1.9	3.4	-	5.4	-	7.2	8.5	-	8.9
200 sq miles	1.0	1.9	3.3	-	5.2	-	6.9	8.0	-	8.2
500 sq miles	0.9	1.6	2.9	-	4.8	-	6.3	7.3	-	7.7
1000 sq miles	0.8	1.5	2.7	-	4.4	-	5.8	6.7	-	6.9
2000 sq miles	0.6	1.5	2.5	-	4.0	-	5.2	6.1	-	6.4
5000 sq miles	0.5	1.1	2.1	-	3.5	-	4.6	5.3	-	5.6
10000 sq miles	0.3	1.0	1.9	-	3.1	-	4.1	4.7	-	5.0
20000 sq miles	0.2	0.8	1.6	-	2.6	-	3.5	4.0	-	4.2

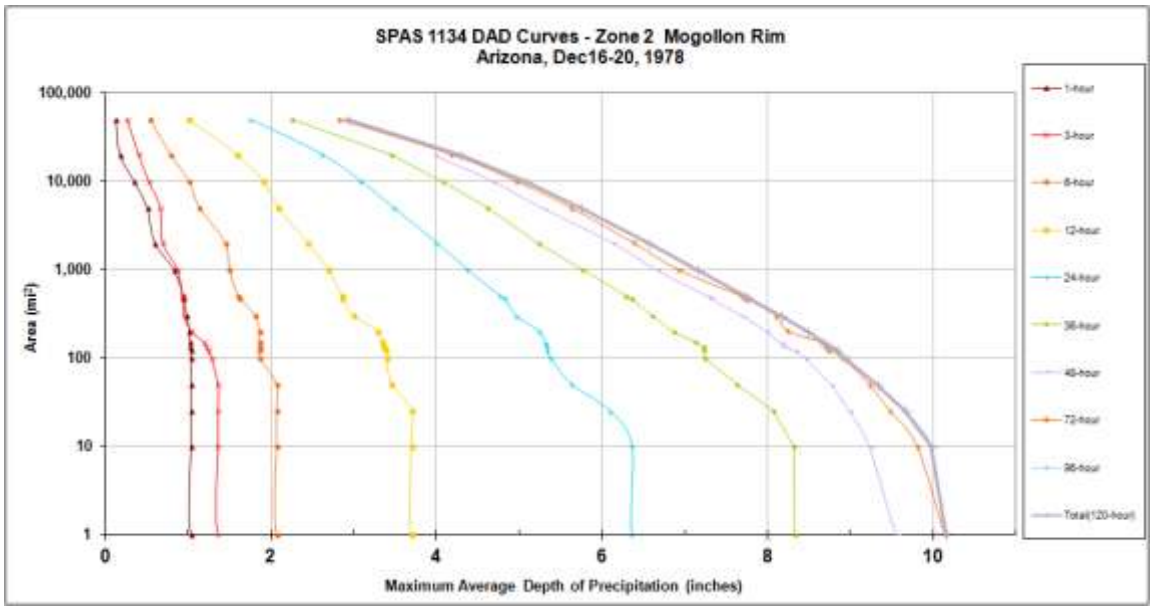
Adjusteded Storm Depth-Area-Duration

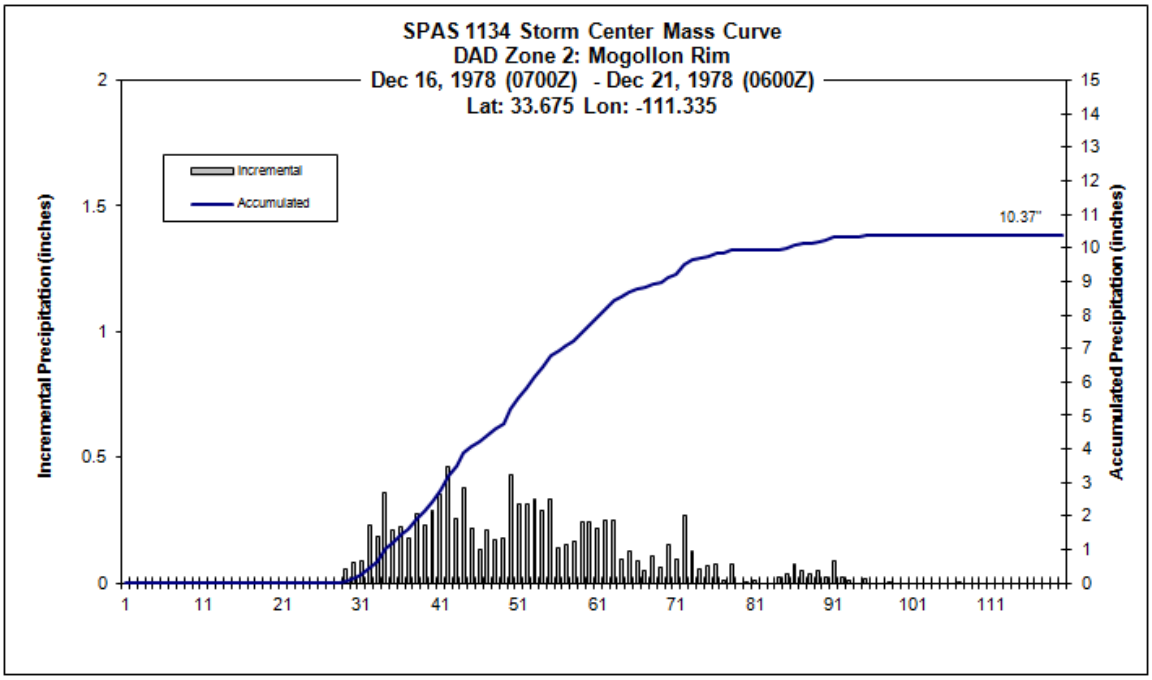
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	0.9	1.9	3.3	-	5.7	-	7.5	8.6	-	9.2
10 sq miles	0.9	1.9	3.3	-	5.7	-	7.5	8.3	-	8.9
100 sq miles	0.9	1.7	3.1	-	4.8	-	6.5	7.6	-	8.0
200 sq miles	0.9	1.7	3.0	-	4.7	-	6.2	7.2	-	7.4
500 sq miles	0.8	1.4	2.6	-	4.3	-	5.7	6.6	-	6.9
1000 sq miles	0.7	1.4	2.4	-	3.9	-	5.2	6.0	-	6.2
2000 sq miles	0.5	1.3	2.2	-	3.6	-	4.7	5.5	-	5.8
5000 sq miles	0.5	1.0	1.9	-	3.1	-	4.2	4.8	-	5.1
10000 sq miles	0.3	0.9	1.7	-	2.8	-	3.7	4.2	-	4.5
20000 sq miles	0.2	0.7	1.4	-	2.4	-	3.1	3.6	-	3.8

Storm or Storm Center Name	SPAS-1134-Browns Peak Zone 2	
Storm Date(s)	12/17-19/1978	
Storm Type	General	
Storm Location	33.43	-111.45
Storm Center Elevation	3400	
Precipitation Total & Duration (10 sq mi)	5.61 inches 72 hours (SPAS 1134 DAD)	
Storm Representative SST	69.5 F	SST
Storm Representative SST Location	25	-118
In-place Maximum SST	71.5 F	
Moisture Inflow Vector	SW @ 720	
In-place Maximization Factor		
Temporal Transposition (Date)	1-Dec	
Transposition SST Location	22.55	-116.93
Transposition Maximum SST	75.5 F	
Transposition Adjustment Factor	1.23	
Grid Point Location	30.975	-110.375
Grid Point Elevation	6,977	
Total Adjustment Factor	0.90	

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

	Duration (hours)													
Area (mi²)	1	2	3	4	5	6	12	18	24	36	48	72	96	Total (120-hr
0.39	1.35		1.66			2.38	4.01		6.63	8.63	9.83	10.37	10.37	10.37
1	1.03		1.36			2.07	3.7		6.36	8.33	9.56	10.15	10.15	10.15
10	1.03		1.36			2.07	3.7		6.36	8.32	9.23	9.61	9.98	9.98
25	1.03		1.36			2.07	3.7		6.09	8.07	8.99	9.48	9.65	9.66
50	1.03		1.36			2.07	3.46		5.63	7.63	8.76	9.23	9.31	9.31
100	1.03		1.28			1.86	3.4		5.37	7.24	8.45	8.91	8.93	8.93
121	1.03		1.24			1.86	3.38		5.34	7.23	8.32	8.74	8.82	8.83
135	1.02		1.22			1.86	3.36		5.33	7.22	8.18	8.7	8.75	8.75
150	1.02		1.19			1.86	3.34		5.31	7.12	8.15	8.65	8.67	8.67
200	1.01		1.03			1.86	3.29		5.24	6.86	7.98	8.24	8.48	8.48
300	0.98		0.95			1.81	3		4.96	6.6	7.69	8.1	8.15	8.15
475	0.94		0.94			1.62	2.86		4.82	6.35	7.3	7.73	7.76	7.76
500	0.94		0.93			1.6	2.86		4.77	6.29	7.27	7.68	7.72	7.73
1000	0.82		0.87			1.5	2.69		4.37	5.76	6.65	6.92	7.14	7.15
2000	0.59		0.69			1.45	2.45		4	5.23	6.13	6.38	6.55	6.56
5000	0.5		0.66			1.14	2.09		3.48	4.61	5.28	5.63	5.74	5.74
10000	0.34		0.52			1.01	1.91		3.08	4.07	4.68	4.96	5.04	5.07
20000	0.17		0.4			0.79	1.59		2.62	3.45	3.97	4.18	4.29	4.29
50,000	0.12		0.26			0.54	1.01		1.75	2.25	2.63	2.82	2.92	2.92




SPAS 1134 Storm Center Mass Curve
DAD Zone 2: Mogollon Rim
Dec 16, 1978 (0700Z) - Dec 21, 1978 (0600Z)
Lat: 33.675 Lon: -111.335
Incremental
Accumulated
10.37"
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
0
0.5
1
1.5
2
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
1
11
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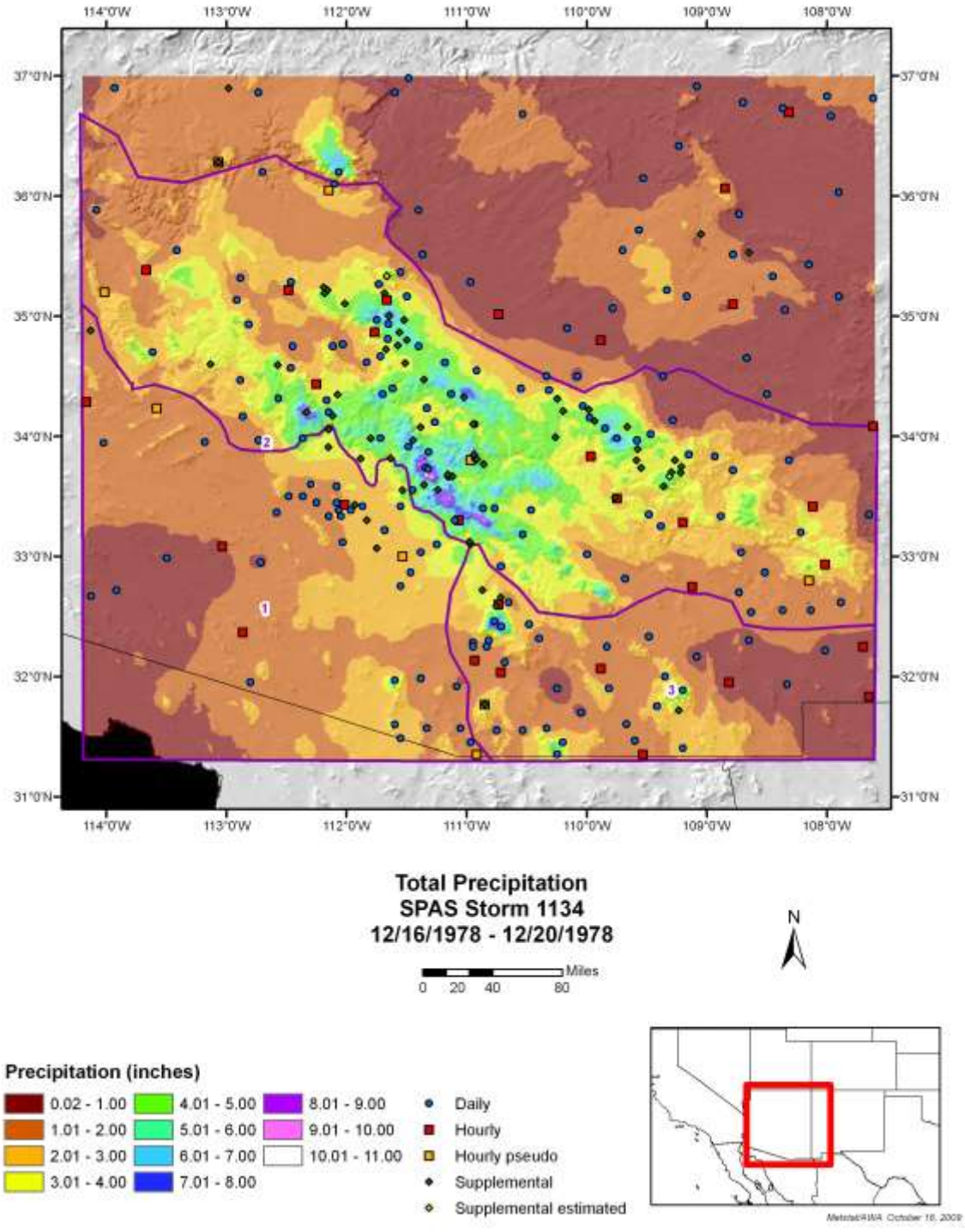
41
51
61
71
81
91
101
111


114°0'W
113°0'W
112°0'W
111°0'W
110°0'W
109°0'W
108°0'W
37°0'N
36°0'N
35°0'N
34°0'N
33°0'N
32°0'N
31°0'N
1
2
3
Total Precipitation
SPAS Storm 1134
12/16/1978 - 12/20/1978
N
Miles
0 20 40 80
Precipitation (inches)
0.02 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
4.01 - 5.00
5.01 - 6.00
6.01 - 7.00
7.01 - 8.00
8.01 - 9.00
9.01 - 10.00
10.01 - 11.00
Daily
Hourly
Hourly pseudo
Supplemental
Supplemental estimated

Crown King, AZ

February 13-22, 1980

Storm Type: General Frontal

Storm Precipitation Analysis System (SPAS) For Storm #1138

General Storm Location: Crown King, Arizona

Storm Dates: February 13 (0800Z) – 22 (0800Z), 1980

Event: General Storm

Latitude: 34.2208

Longitude: -112.3458

Max. Grid/Radar Rainfall Amount: 17.63”

Max. Observed Rainfall Amount: 16.41”

Number of Stations: 239 (177-daily, 30-hourly, 7-hourly pseudo, 25-suppleemntal)

SPAS Version: 7.0

Base Map Used: Yes, conus_prism_ppt_in_1971_2000_02_mx

Spatial resolution: 0.27 mi^2

Radar Included: No

Depth-Area-Duration (DAD) analysis: Yes, 1, 3, 6, 12, 18, 24, 36, 48, 72, 96, 120, 144, 168, and 216-hours

Storm Name:	SPAS-1138-Crown King Zone 2
Storm Date:	2/13-22/1980
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	15-Feb	
	Lat	Long
Storm center location	34.01	-112.26
Storm Rep dew point location	32.48	-112.35
Transposition dewpoint location	29.445	-110.465
Basin location	30.975	-110.375

Moisture Inflow Direction:	S @ 120	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	2,900	feet
Storm Analysis Duration	24	hours

The storm representative dew point is	60.0 F	with total precipitable water above sea level of			1.38	inches.
The in-place maximum dew point is	61.0 F	with total precipitable water above sea level of			1.45	inches.
The transpositioned maximum dew point is	62.0 F	with total precipitable water above sea level of			1.52	inches.
The in-place storm elevation is	2,900	which subtracts	0.41	inches of precipitable water at	60.0 F	
The in-place storm elevation is	2,900	which subtracts	0.42	inches of precipitable water at	61.0 F	
The in-place storm elevation is	2,900	which subtracts	0.44	inches of precipitable water at	62.0 F	

The in-place maximization factor is	1.06
The moisture transposition factor is	1.05
The orographic transposition factor is	0.64
The total adjustment factor is	0.71

Notes: 24hr ave KP65, KTUS, KLUF

Observed Storm Depth-Area-Duration

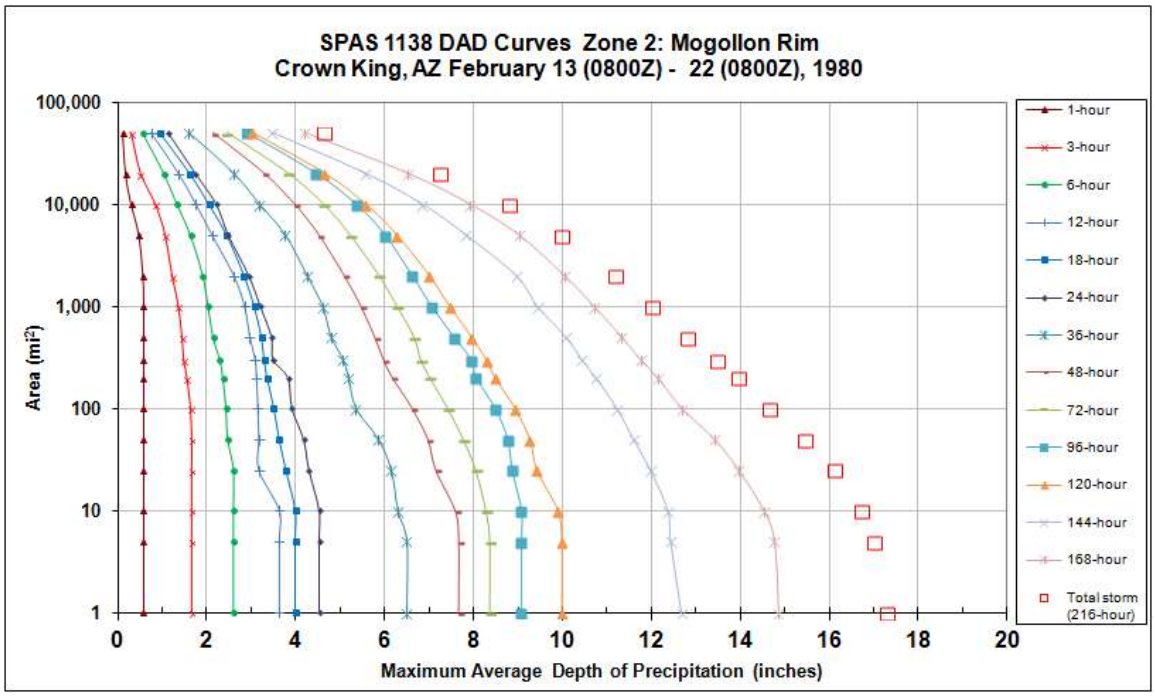
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	0.6	2.6	3.6	4.0	4.5	-	6.5	7.7	-	8.4
10 sq miles	0.6	2.6	3.6	4.0	4.5	-	6.3	7.6	-	8.3
100 sq miles	0.6	2.4	3.1	3.5	3.9	-	5.4	6.6	-	7.4
200 sq miles	0.6	2.4	3.1	3.4	3.8	-	5.2	6.2	-	7.0
500 sq miles	0.6	2.1	3.0	3.2	3.5	-	4.8	5.8	-	6.7
1000 sq miles	0.6	2.0	2.8	3.1	3.2	-	4.6	5.5	-	6.3
2000 sq miles	0.6	1.9	2.6	2.8	2.9	-	4.3	5.1	-	5.9
5000 sq miles	0.5	1.6	2.1	2.4	2.5	-	3.8	4.5	-	5.2
10000 sq miles	0.3	1.3	1.8	2.0	2.2	-	3.2	4.0	-	4.6
20000 sq miles	0.2	1.0	1.4	1.6	1.7	-	2.6	3.3	-	3.8

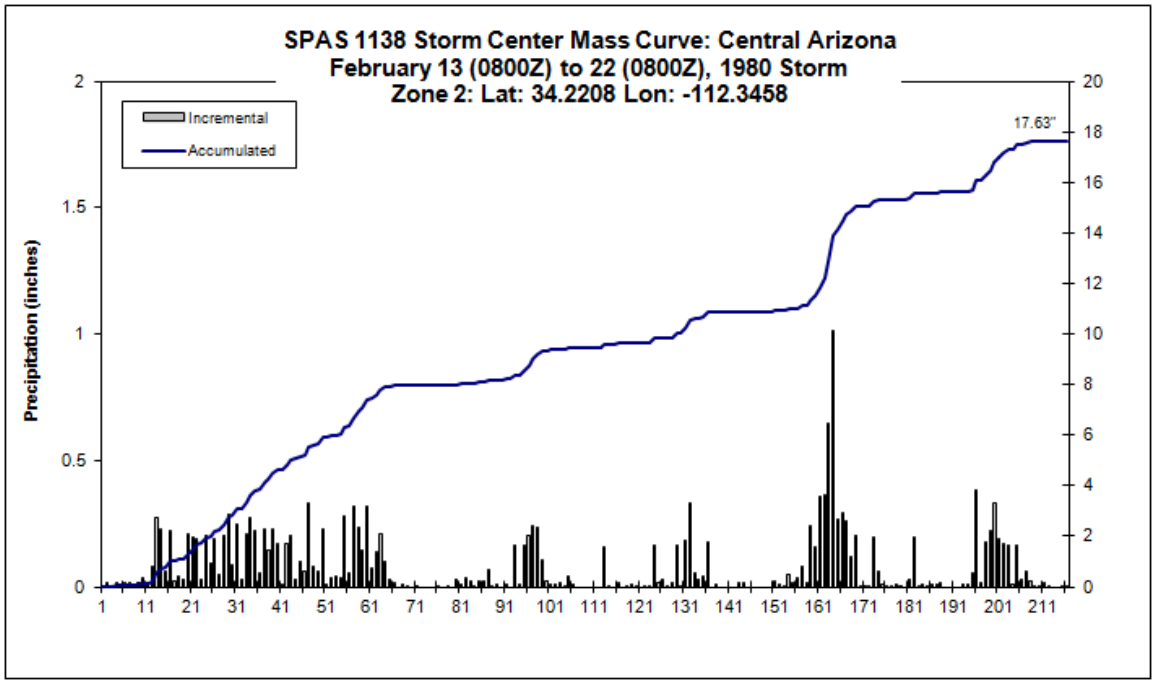
Adjusteded Storm Depth-Area-Duration

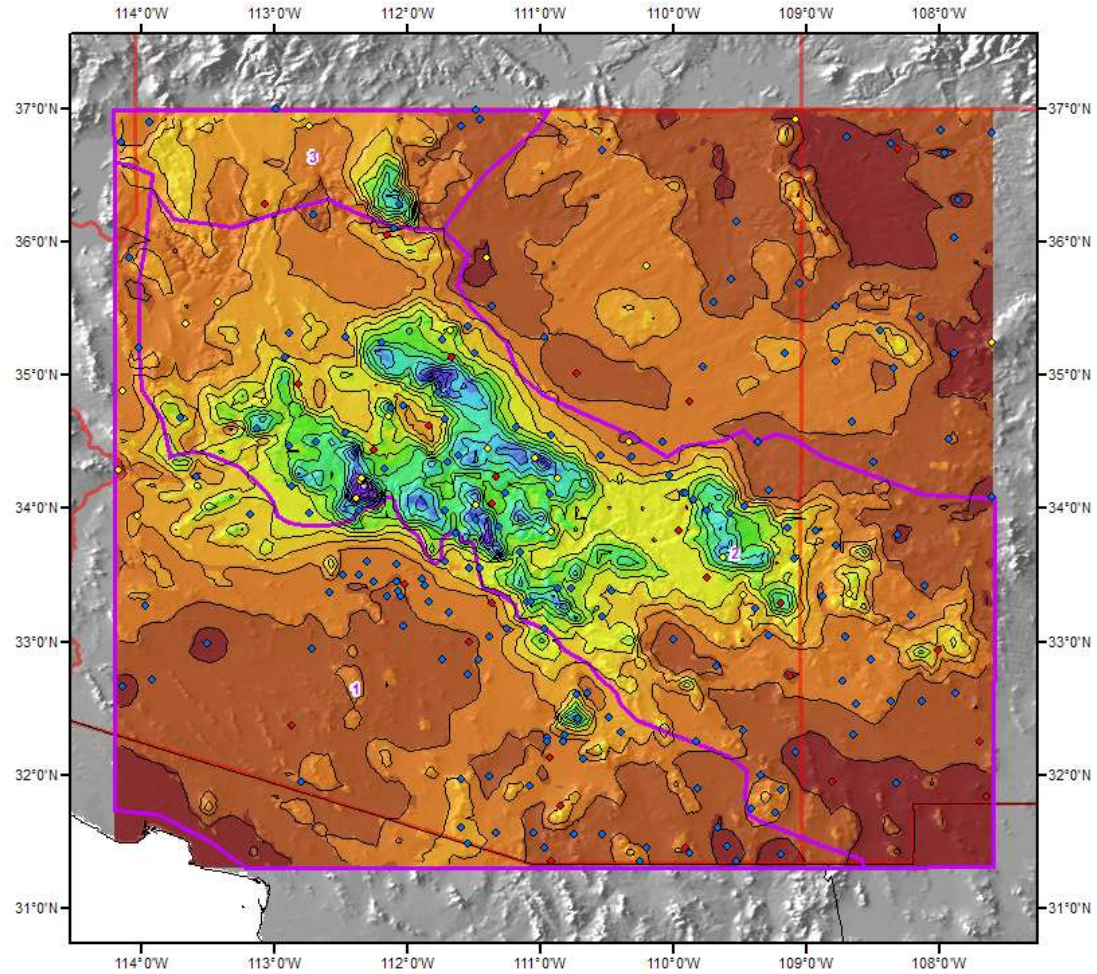
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	0.4	1.8	2.6	-	3.2	-	4.6	5.5	-	6.0
10 sq miles	0.4	1.8	2.6	-	3.2	-	4.5	5.4	-	5.9
100 sq miles	0.4	1.7	2.2	-	2.8	-	3.8	4.7	-	5.3
200 sq miles	0.4	1.7	2.2	-	2.7	-	3.7	4.4	-	5.0
500 sq miles	0.4	1.5	2.1	-	2.5	-	3.4	4.1	-	4.7
1000 sq miles	0.4	1.4	2.0	-	2.3	-	3.3	3.9	-	4.5
2000 sq miles	0.4	1.4	1.9	-	2.1	-	3.0	3.6	-	4.2
5000 sq miles	0.3	1.2	1.5	-	1.8	-	2.7	3.2	-	3.7
10000 sq miles	0.2	0.9	1.2	-	1.6	-	2.3	2.8	-	3.3
20000 sq miles	0.1	0.7	1.0	-	1.2	-	1.9	2.3	-	2.7

Storm or Storm Center Name	SPAS-1138-Crown King Zone 2		
Storm Date(s)	2/13-22/1980		
Storm Type	General		
Storm Location	34.01	-112.26	
Storm Center Elevation	2900		
Precipitation Total & Duration (10 sq mi)	8.09 inches 72 hours 11.10" 216 hrs (SPAS 1138 DAD)		
Storm Representative Dewpoint	60.0 F	24	hr ave P65, KTUS, KLUF
Storm Representative Dewpoint Location	32.48	-112.35	
In-place Maximum Dewpoint	61.0 F		
Moisture Inflow Vector	S @ 120		
In-place Maximization Factor			
Temporal Transposition (Date)	15-Feb		
Transposition Dewpoint Location	29.45	-110.47	
Transposition Maximum Dewpoint	62.0 F		
Transposition Adjustment Factor	1.05		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	0.71		

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)														
	Duration (hours)													
Area (mi²)	1	3	6	12	18	24	36	48	72	96	120	144	168	total
0.27	1.01	2.02	2.94	3.94	4.28	4.77	6.75	7.98	8.65	9.45	10.33	13.02	15.24	17.63
1	0.57	1.67	2.59	3.62	3.98	4.52	6.49	7.68	8.37	9.07	9.98	12.68	14.86	17.30
5	0.57	1.67	2.59	3.62	3.98	4.52	6.49	7.68	8.37	9.07	9.98	12.44	14.76	17.00
10	0.57	1.67	2.59	3.62	3.98	4.52	6.29	7.60	8.28	9.07	9.89	12.38	14.53	16.72
25	0.57	1.67	2.59	3.16	3.77	4.29	6.14	7.16	8.05	8.86	9.42	11.98	13.95	16.11
50	0.57	1.67	2.46	3.16	3.62	4.17	5.85	6.98	7.77	8.76	9.26	11.60	13.41	15.45
100	0.57	1.64	2.42	3.14	3.50	3.91	5.35	6.63	7.42	8.48	8.93	11.23	12.68	14.67
200	0.57	1.56	2.35	3.11	3.35	3.82	5.18	6.18	7.02	8.05	8.48	10.75	12.13	13.95
300	0.57	1.49	2.28	3.08	3.28	3.49	5.06	5.98	6.81	7.94	8.28	10.44	11.75	13.48
500	0.57	1.45	2.13	2.96	3.22	3.45	4.79	5.78	6.66	7.55	7.95	10.08	11.32	12.83
1,000	0.57	1.37	2.02	2.84	3.06	3.20	4.60	5.47	6.28	7.05	7.46	9.44	10.70	12.02
2,000	0.55	1.23	1.90	2.60	2.83	2.94	4.25	5.09	5.87	6.61	7.00	8.96	10.03	11.19
5,000	0.46	1.07	1.62	2.11	2.44	2.48	3.76	4.52	5.22	6.00	6.27	7.83	9.01	9.98
10,000	0.29	0.85	1.32	1.75	2.04	2.21	3.18	3.97	4.62	5.35	5.57	6.85	7.91	8.81
20,000	0.17	0.52	1.02	1.36	1.61	1.74	2.60	3.28	3.83	4.45	4.65	5.57	6.51	7.26
50,000	0.11	0.31	0.55	0.75	0.94	1.13	1.60	2.13	2.45	2.90	3.03	3.48	4.20	4.64




SPAS 1138 Storm Center Mass Curve: Central Arizona
February 13 (0800Z) to 22 (0800Z), 1980 Storm
Zone 2: Lat: 34.2208 Lon: -112.3458
Incremental
Accumulated
17.63"
Precipitation (inches)
2
1.5
1
0.5
0
20
18
16
14
12
10
8
6
4
2
0
1
11
21
31
41
51
61
71
81
91
101
111
121
131
141
151
161
171
181
191
201
211



Total Rainfall (216-hours)
Crown King 1980 Storm
Storm #1138 February 13 (0800 Z) to 22 (0700 Z), 1980

Guages

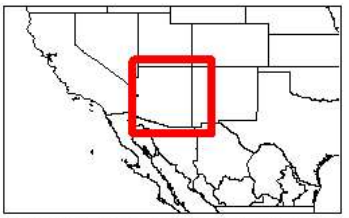
- Daily
- Hourly
- Hourly Pseudo
- Supplemental

Miles: 0 25 50 100
Kilometers: 0 40 80 160 240

Precip.

0.18 - 1.00	5.01 - 6.00	10.01 - 11.00	15.01 - 16.00
1.01 - 2.00	6.01 - 7.00	11.01 - 12.00	16.01 - 17.00
2.01 - 3.00	7.01 - 8.00	12.01 - 13.00	17.01 - 18.00
3.01 - 4.00	8.01 - 9.00	13.01 - 14.00	
4.01 - 5.00	9.01 - 10.00	14.01 - 15.00	

N



Coordinate system: GCS North American 1983
Scale: 1:4,417,755
MetstatAWA September 10, 2009

Alamo, NV

August 10, 1981

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1135

General Storm Location: Alamo, Nevada

Storm Dates: August 10 (0000Z – 0500Z), 1981

Event: Convective

Latitude: 36.5542

Longitude: -114.7125

Max. Grid/Radar Rainfall Amount: 6.50”

Max. Observed Rainfall Amount: 6.50”

Max. Observed 1-hour Rainfall Amount: 6.15”

Number of Stations: 30 (daily-7, hourly-3, hourly pseudo 2, supplemental – 18).

SPAS Version: 8

Base Map Used: Yes, SPAS_1135_total_Storm (derived from previous Isohyetal pattern)

Spatial resolution: 00:00:30

Radar Included: No

Depth-Area-Duration (DAD) analysis: Yes, 1, 2, 3, 4, 5, and 6.

Storm Name:	**SPAS-1135-Maopa Valley**
Storm Date:	**August 10, 1981**
AWA Analysis Date:	**5/25/2013**

Storm Adjustment for Grid Point 1

Temporal Transposition Date	**15-Aug**	

	Lat	Long
Storm center location	**36.55**	**-114.71**
Storm Rep dew point location	**33.50**	**-115.50**
Transposition dewpoint location	**27.925**	**-111.165**
Basin location	**30.975**	**-110.375**

Moisture Inflow Direction:	**SSW @ 215**	miles
Grid Point Elevation	**6,977**	feet
Storm Center Elevation	**1,900**	feet
Storm Analysis Duration	**3**	hours

The storm representative dew point is	**75.5 F**	with total precipitable water above sea level of			**2.92**	inches.
The in-place maximum dew point is	**82.0 F**	with total precipitable water above sea level of			**3.92**	inches.
The transpositioned maximum dew point is	**83.0 F**	with total precipitable water above sea level of			**4.08**	inches.
The in-place storm elevation is	**1,900**	which subtracts	**0.47**	inches of precipitable water at	**75.5 F**	
The in-place storm elevation is	**1,900**	which subtracts	**0.56**	inches of precipitable water at	**82.0 F**	
The in-place storm elevation is	**1,900**	which subtracts	**0.57**	inches of precipitable water at	**83.0 F**	

The in-place maximization factor is	**1.37**
The moisture transposition factor is	**1.04**
The orographic transposition factor is	**1.50**
The total adjustment factor is	**2.15**

Notes:

Observed Storm Depth-Area-Duration

	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**6.1**	**6.4**	**6.4**	**6.4**	**6.4**	**6.4**	-	-	-
10 sq miles	**5.2**	**5.6**	**5.6**	**5.6**	**5.6**	**5.6**	-	-	-
50 sq miles	**3.9**	**4.2**	**4.3**	**4.3**	**4.3**	**4.3**	-	-	-
100 sq miles	**3.4**	**3.6**	**3.7**	**3.7**	**3.7**	**3.7**	-	-	-
200 sq miles	**2.8**	**3.1**	**3.2**	**3.2**	**3.2**	**3.2**	-	-	-
500 sq miles	**2.1**	**2.4**	**2.5**	**2.5**	**2.5**	**2.5**	-	-	-
1000 sq miles	**1.6**	**1.8**	**1.8**	**1.9**	**1.9**	**1.9**	-	-	-
2000 sq miles	**1.1**	**1.2**	**1.4**	**1.4**	**1.4**	**1.4**	-	-	-
5000 sq miles	**0.8**	**0.8**	**0.9**	**0.9**	**0.9**	**0.9**	-	-	-

Adjusted Storm Depth-Area-Duration

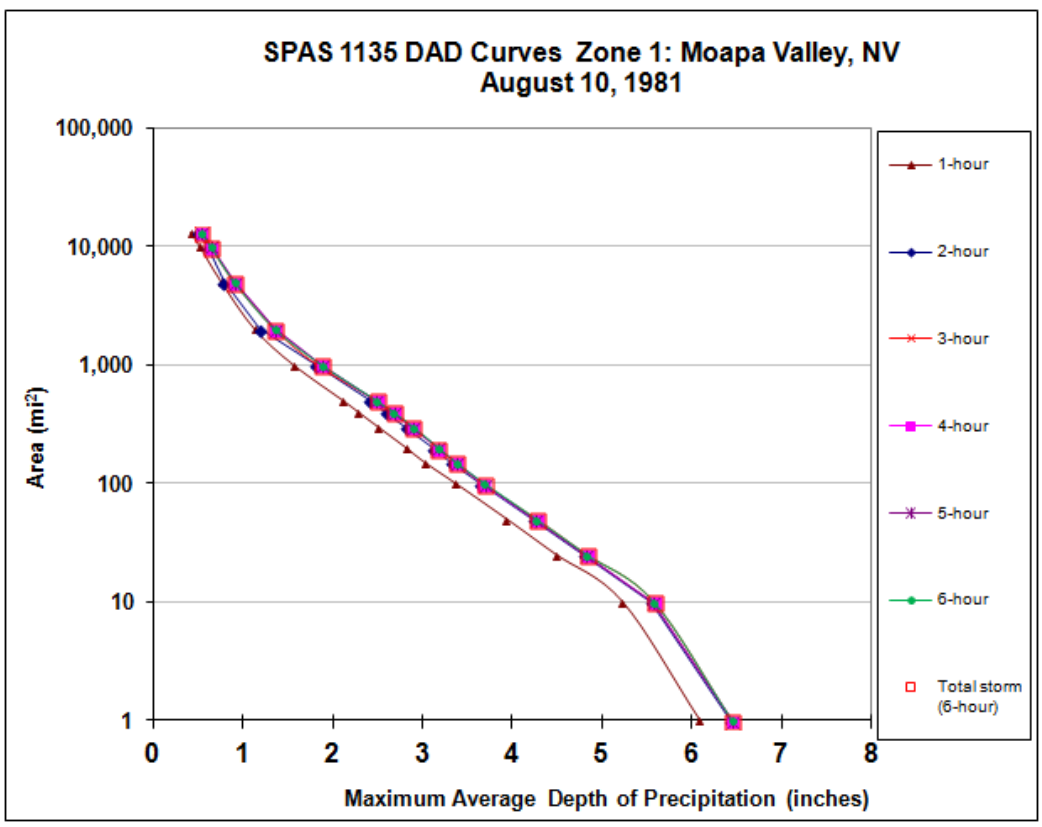
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**13.1**	**13.8**	**13.8**	**13.8**	**13.8**	**13.8**	-	-	-
10 sq miles	**11.2**	**11.9**	**12.0**	**12.0**	**12.0**	**12.0**	-	-	-
50 sq miles	**8.4**	**9.1**	**9.2**	**9.2**	**9.2**	**9.2**	-	-	-
100 sq miles	**7.2**	**7.8**	**7.9**	**7.9**	**7.9**	**7.9**	-	-	-
200 sq miles	**6.0**	**6.7**	**6.8**	**6.8**	**6.8**	**6.8**	-	-	-
500 sq miles	**4.5**	**5.2**	**5.3**	**5.3**	**5.3**	**5.3**	-	-	-
1000 sq miles	**3.4**	**3.9**	**3.9**	**4.0**	**4.0**	**4.0**	-	-	-
2000 sq miles	**2.4**	**2.5**	**2.9**	**2.9**	**2.9**	**2.9**	-	-	-
5000 sq miles	**1.6**	**1.7**	**1.9**	**1.9**	**1.9**	**1.9**	-	-	-

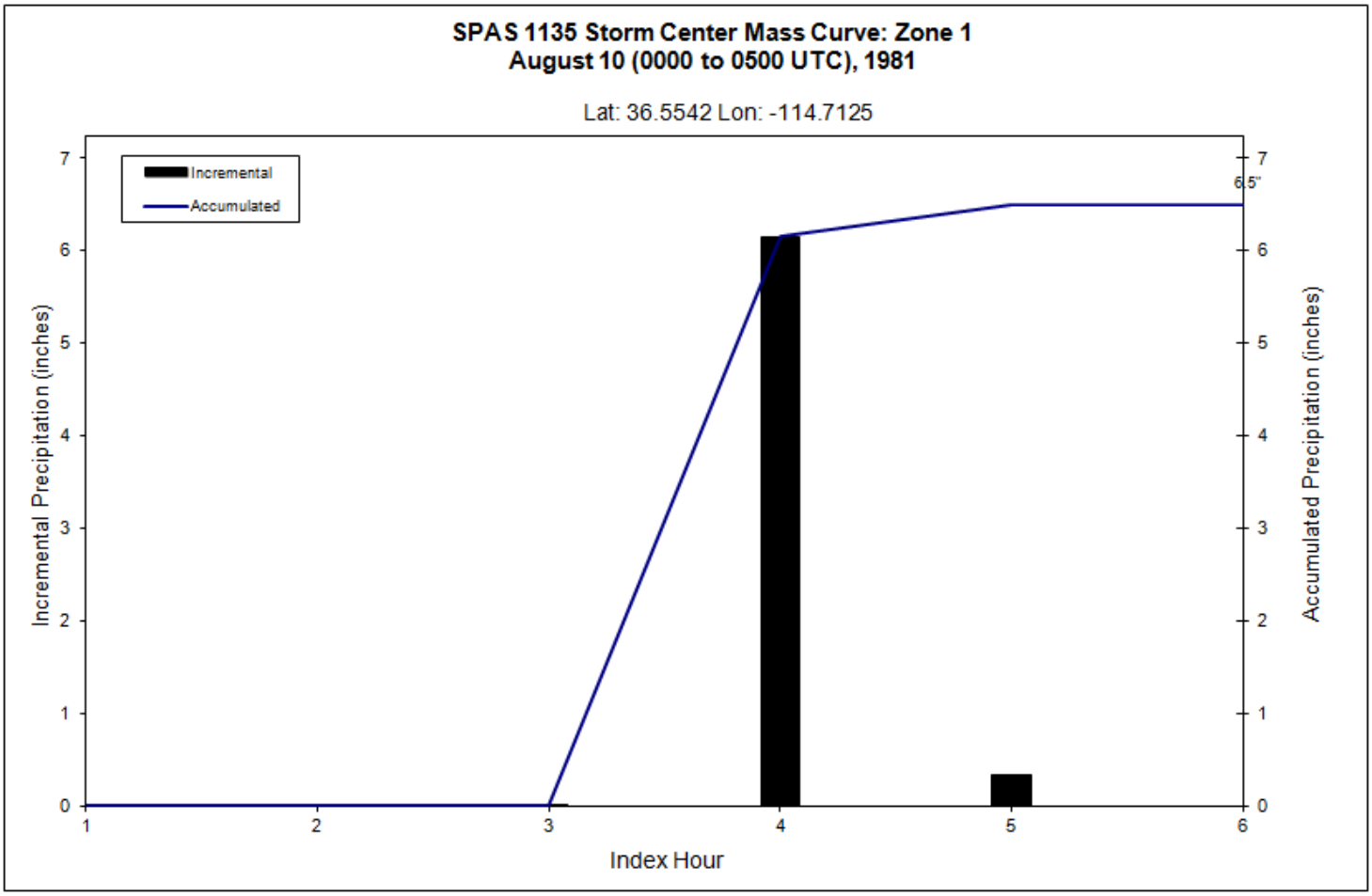
Storm or Storm Center Name	**SPAS-1135-Maopa Valley**		
Storm Date(s)	8/10/81		
Storm Type	Local Storm		
Storm Location	36.55	-114.71	
Storm Center Elevation	1,900		
Precipitation Total & Duration (10 sq mi)	6.5 inches 2 hours (SPAS 1135 DAD)		
Storm Representative Dewpoint	75.5 F	3	hr ave from KIPL, KTRM, and KBLH
Storm Representative Dewpoint Location	33.5	-115.5	
In-place Maximum Dewpoint	82.0 F		
Moisture Inflow Vector	SSW @ 215		
In-place Maximization Factor	1.37		
Temporal Transposition (Date)	15-Aug		
Transposition Dewpoint Location	27.93	-111.17	
Transposition Maximum Dewpoint	83.0 F		
Transposition Adjustment Factor	1.04		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	2.15		

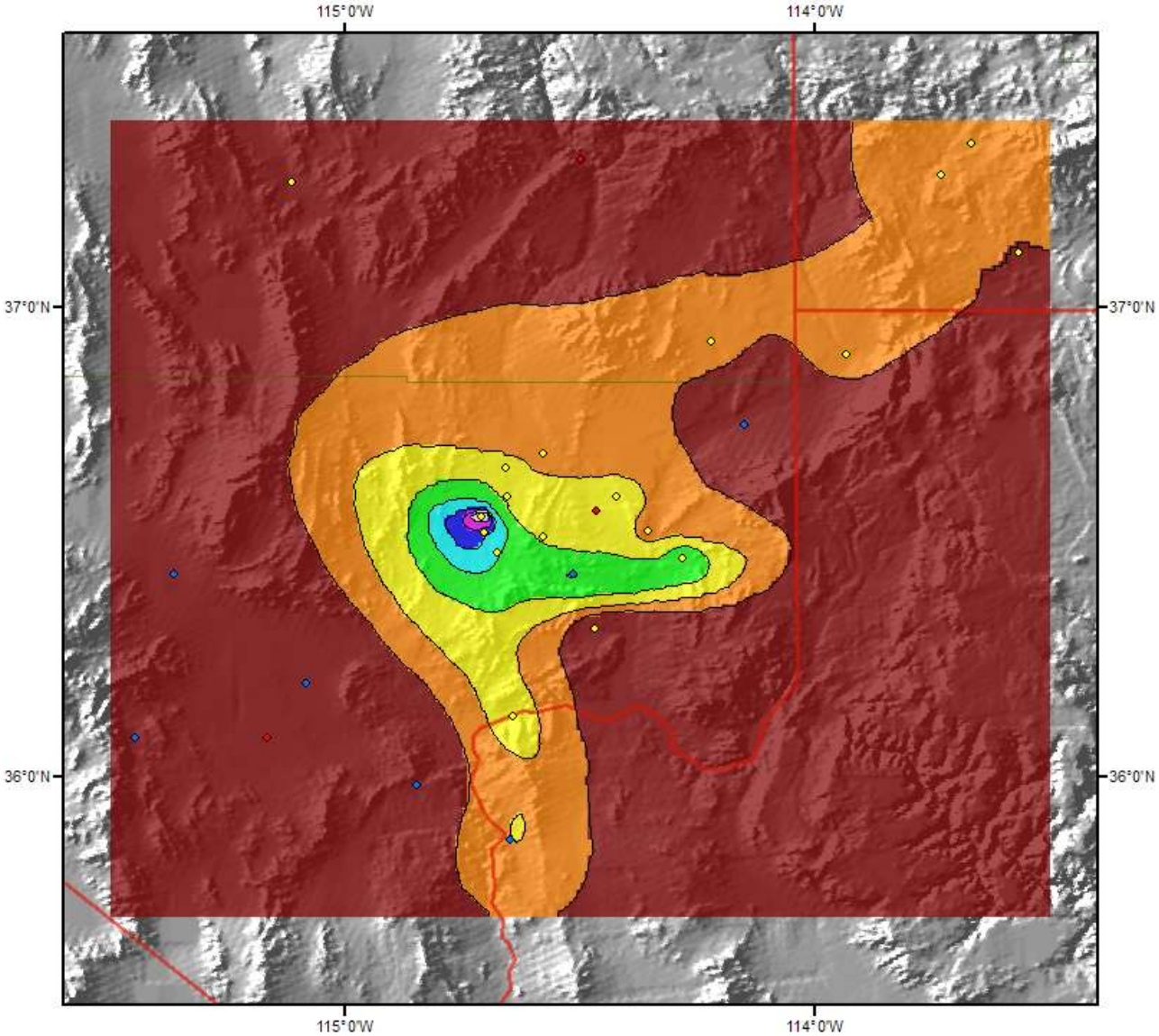
Storm 1135 - August 10 (0000 to 0500 UTC), 1981

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

	Duration (hours)						
Area (mi^2)	1	2	3	4	5	6	Total
0.27	6.15	6.49	6.50	6.50	6.50	6.50	6.50
1	6.08	6.43	6.44	6.44	6.44	6.44	6.44
10	5.22	5.55	5.57	5.57	5.57	5.57	5.57
25	4.48	4.79	4.82	4.82	4.82	4.82	4.82
50	3.93	4.23	4.26	4.26	4.26	4.26	4.26
100	3.36	3.64	3.66	3.66	3.68	3.68	3.68
150	3.02	3.32	3.36	3.37	3.37	3.37	3.37
200	2.81	3.11	3.16	3.17	3.17	3.17	3.17
300	2.50	2.81	2.89	2.89	2.89	2.89	2.89
400	2.28	2.59	2.67	2.67	2.67	2.67	2.67
500	2.11	2.41	2.48	2.48	2.48	2.48	2.48
1,000	1.56	1.81	1.82	1.87	1.87	1.87	1.87
2,000	1.13	1.18	1.35	1.35	1.35	1.35	1.35
5,000	0.76	0.78	0.90	0.90	0.90	0.90	0.90
10,000	0.52	0.60	0.64	0.64	0.64	0.64	0.64
13,042	0.42	0.50	0.53	0.53	0.53	0.53	0.53




SPAS 1135 Storm Center Mass Curve: Zone 1
August 10 (0000 to 0500 UTC), 1981
Lat: 36.5542 Lon: -114.7125
Incremental
Accumulated
6.5"
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
Index Hour
0
1
2
3
4
5
6
7



Total Rainfall (6-hrs)
Moapa Valley, AZ 1981 Storm
SPAS #1135 August 10 (0000 to 0500 UTC), 1981

Miles: 0, 12.5, 25, 50
Kilometers: 0, 15, 30, 60, 90

Legend

- Hourly
- Daily
- Hourly Pseudo
- Supplemental

Precipitation (inches)

- 0.00 - 0.50
- 0.51 - 1.00
- 1.01 - 2.00
- 2.01 - 3.00
- 3.01 - 4.00
- 4.01 - 5.00
- 5.01 - 6.00
- 6.01 - 6.50

N

Prescott, AZ

September 22-25, 1983

Storm Type: Local-Tropical

Storm Precipitation Analysis System (SPAS) For Storm #1063

General Storm Location: Prescott, AZ

Storm Dates: 09/22/1983 0800Z – 09/25/1983 0800Z

Event: Convective

Latitude: 34.6208

Longitude: -112.5541

Max. Grid/Radar Rainfall Amount: 17.80" (Grid/Pixel Point)

Max. Observed Rainfall Amount: 17.95" (Granite Basin Campground, type=supplemental)

Number of Stations: 91 (6-hourly, 4-hourly pseudo, 19-daily, 62-supplemental) gauging stations within the defined search domain.

SPAS Version: 7.0

Base Map Used: Yes, us_ppt_1983_09_30sec_in

Spatial resolution: 0.27 mi^2

Radar Included: No

Depth-Area-Duration (DAD) analysis: Yes: 1, 2, 3, 4, 5, 6, 12, 18, 24, 36, 48 & 72 hours

Storm Name:	**SPAS-1063-Prescott**
Storm Date:	**9/22-24/1983**
AWA Analysis Date:	**5/25/2013**

Storm Adjustment for Grid Point 1

Temporal Transposition Date	**5-Sep**	
	Lat	**Long**
Storm center location	**34.62**	**-112.55**
Storm Rep SST location	**26.00**	**-113.00**
Transposition SST location	**22.355**	**-110.825**
Basin location	**30.975**	**-110.375**

Moisture Inflow Direction:	**S @ 600**	miles
Grid Point Elevation	**6,977**	feet
Storm Center Elevation	**5,700**	feet
Storm Analysis Duration	**SST**	hours

The storm representative SST is	**81.0 F**	with total precipitable water above sea level of			**3.76**	inches.
The in-place maximum SST is	**83.0 F**	with total precipitable water above sea level of			**4.08**	inches.
The transpositioned maximum SST is	**84.0 F**	with total precipitable water above sea level of			**4.24**	inches.
The in-place storm elevation is	**5,700**	which subtracts	**1.55**	inches of precipitable water at	**81.0 F**	
The in-place storm elevation is	**5,700**	which subtracts	**1.65**	inches of precipitable water at	**83.0 F**	
The in-place storm elevation is	**5,700**	which subtracts	**1.70**	inches of precipitable water at	**84.0 F**	

The in-place maximization factor is	**1.10**
The moisture transposition factor is	**1.05**
The orographic transposition factor is	**0.93**
The total adjustment factor is	**1.07**

Notes:

Observed Storm Depth-Area-Duration

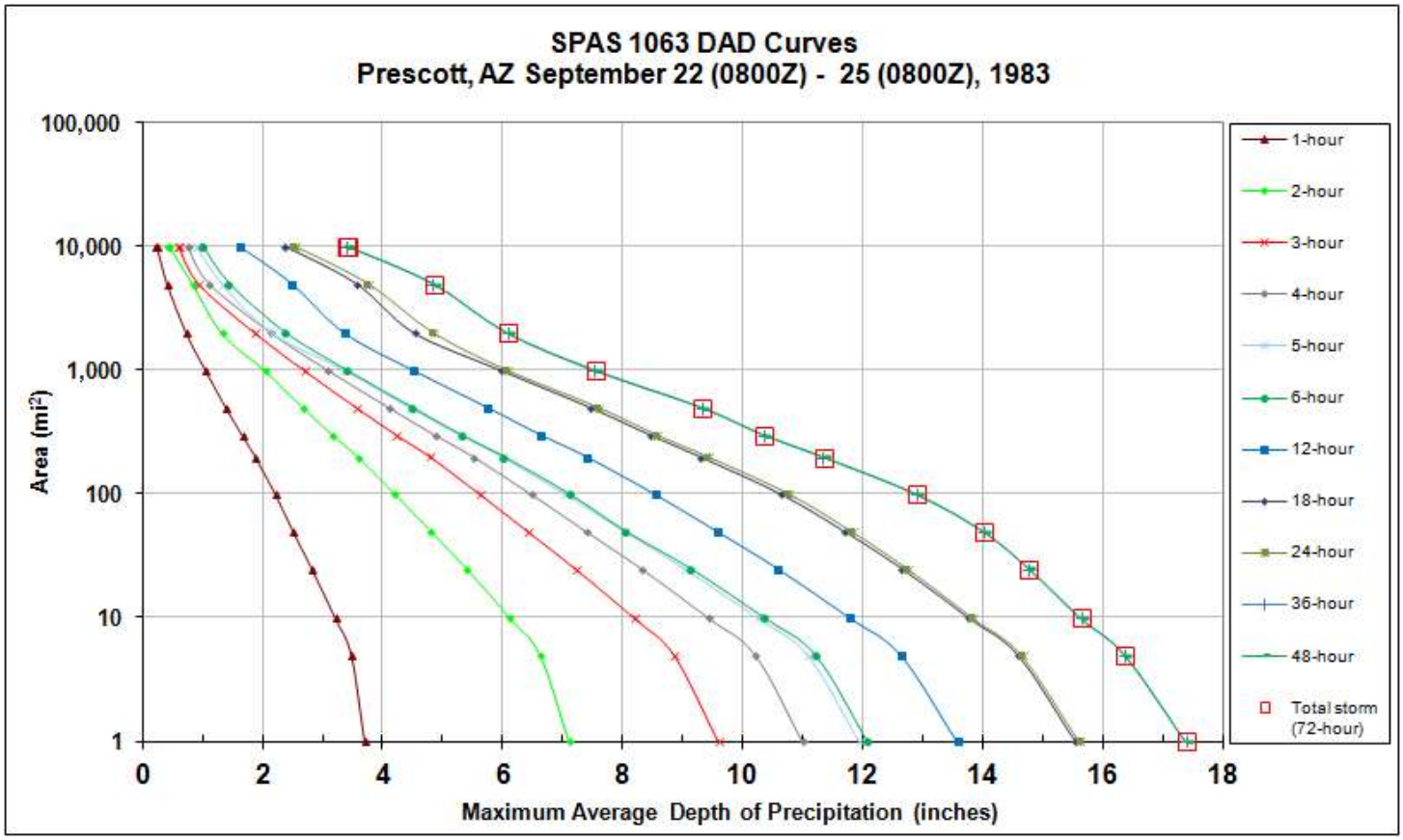
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**3.7**	**7.1**	**9.6**	**11.0**	**12.0**	**12.1**	**13.6**		**15.6**
10 sq miles	**3.2**	**6.1**	**8.2**	**9.4**	**10.3**	**10.4**	**11.8**		**13.8**
50 sq miles	**2.5**	**4.8**	**6.4**	**7.4**	**8.0**	**8.1**	**9.6**		**11.8**
100 sq miles	**2.2**	**4.2**	**5.6**	**6.5**	**7.0**	**7.1**	**8.5**		**10.8**
200 sq miles	**1.9**	**3.6**	**4.8**	**5.5**	**6.0**	**6.0**	**7.4**		**9.4**
500 sq miles	**1.4**	**2.7**	**3.6**	**4.1**	**4.5**	**4.5**	**5.7**		**7.6**
1000 sq miles	**1.1**	**2.0**	**2.7**	**3.1**	**3.4**	**3.4**	**4.5**		**6.1**
2000 sq miles	**0.7**	**1.3**	**1.9**	**2.1**	**2.2**	**2.4**	**3.4**		**4.8**
5000 sq miles	**0.4**	**0.8**	**0.9**	**1.1**	**1.3**	**1.4**	**2.5**		**3.8**

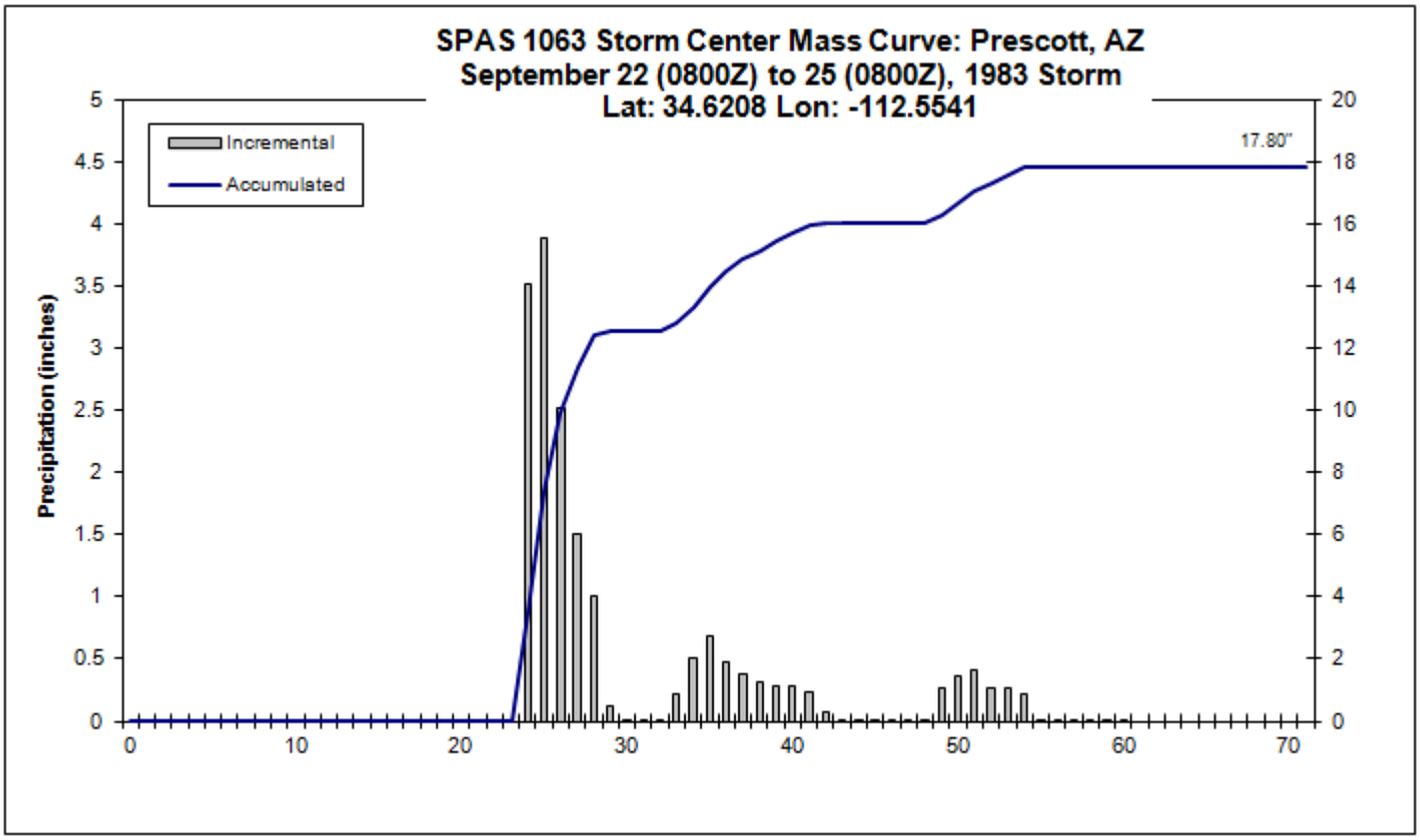
Adjusted Storm Depth-Area-Duration

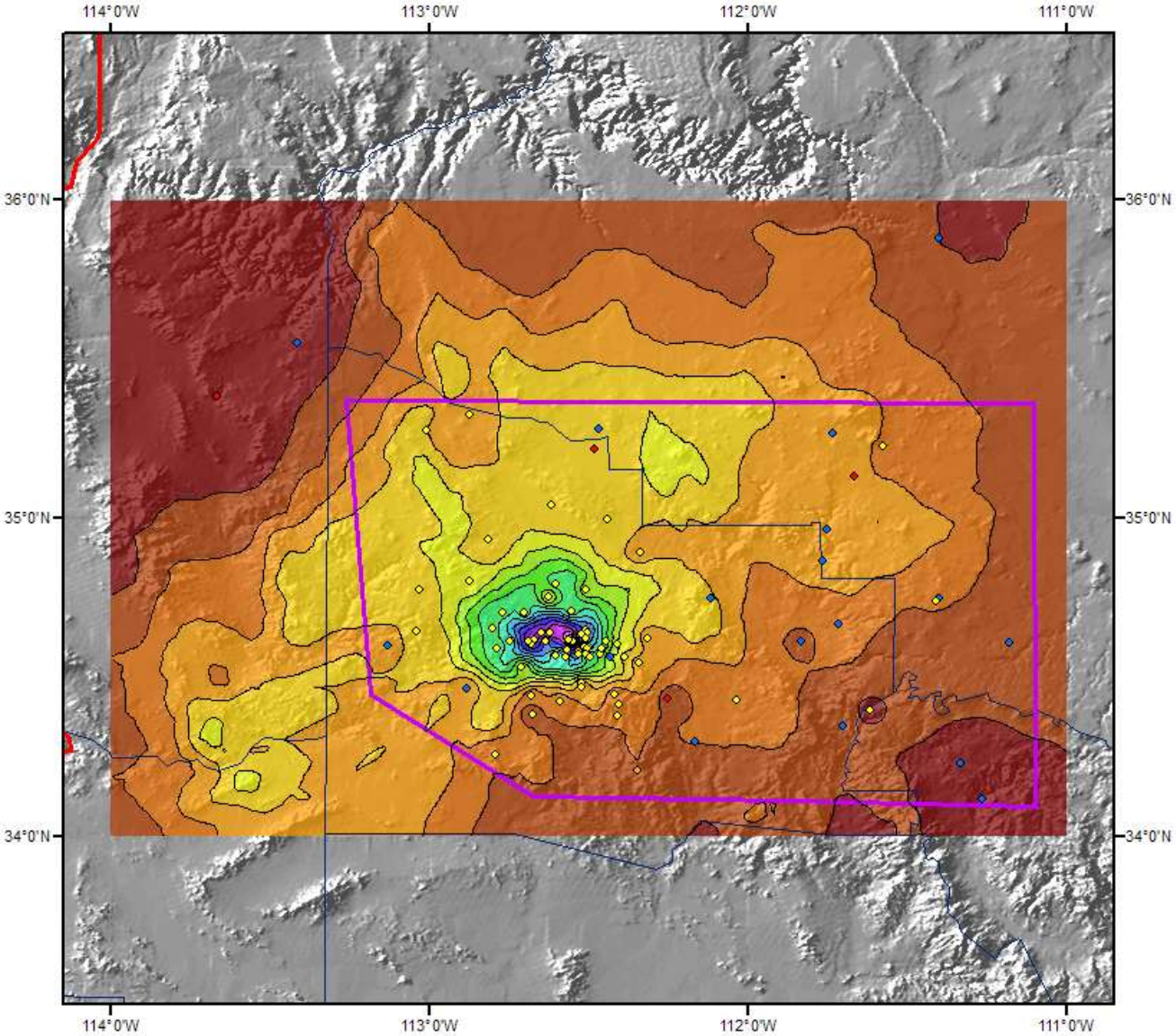
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**4.0**	**7.6**	**10.3**	**11.7**	**12.8**	**12.9**	**14.5**		**16.7**
10 sq miles	**3.4**	**6.5**	**8.8**	**10.1**	**11.0**	**11.1**	**12.6**		**14.8**
50 sq miles	**2.7**	**5.1**	**6.9**	**7.9**	**8.6**	**8.6**	**10.2**		**12.6**
100 sq miles	**2.4**	**4.5**	**6.0**	**6.9**	**7.5**	**7.6**	**9.1**		**11.5**
200 sq miles	**2.0**	**3.8**	**5.1**	**5.9**	**6.4**	**6.4**	**7.9**		**10.1**
500 sq miles	**1.5**	**2.9**	**3.8**	**4.4**	**4.8**	**4.8**	**6.1**		**8.1**
1000 sq miles	**1.1**	**2.2**	**2.9**	**3.3**	**3.6**	**3.6**	**4.8**		**6.5**
2000 sq miles	**0.8**	**1.4**	**2.0**	**2.3**	**2.3**	**2.5**	**3.6**		**5.2**
5000 sq miles	**0.4**	**0.9**	**1.0**	**1.2**	**1.4**	**1.5**	**2.7**		**4.0**

Storm or Storm Center Name	**SPAS-1063-Prescott**	
Storm Date(s)	9/22-24/1983	
Storm Type	Local-Tropical	
Storm Location	34.62	-112.55
Storm Center Elevation	5,700	
Precipitation Total & Duration (10 sq mi)	17.80 inches 36 hours 3.88" in 1hr and 11.40" in 4hrs (SPAS 1063 DAD)	
Storm Representative SST	81.0 F	SST
Storm Representative SST Location	26	-113
In-place Maximum SST	83.0 F	
Moisture Inflow Vector	S @ 600	
In-place Maximization Factor	1.10	
Temporal Transposition (Date)	5-Sep	
Transposition SST Location	22.36	-110.83
Transposition Maximum SST	84.0 F	
Transposition Adjustment Factor	1.05	
Grid Point Location	30.975	-110.375
Grid Point Elevation	6,977	
Total Adjustment Factor	1.07	

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)												
	Duration (hours)											
Area (mi^2)	1	2	3	4	5	6	12	18	24	36	48	total
0.27	3.88	7.39	9.90	11.40	12.40	12.53	13.96	15.94	16.01	17.80	17.80	17.80
1	3.70	7.09	9.60	10.99	11.95	12.08	13.56	15.53	15.61	17.37	17.38	17.38
5	3.48	6.61	8.86	10.20	11.09	11.21	12.62	14.57	14.64	16.36	16.36	16.36
10	3.21	6.11	8.19	9.42	10.25	10.36	11.77	13.75	13.83	15.62	15.62	15.62
25	2.82	5.39	7.21	8.30	9.03	9.13	10.57	12.64	12.74	14.76	14.76	14.76
50	2.51	4.80	6.42	7.38	8.04	8.05	9.56	11.68	11.81	13.99	14.00	14.00
100	2.21	4.20	5.62	6.46	7.04	7.11	8.52	10.62	10.77	12.88	12.88	12.88
200	1.88	3.58	4.79	5.50	5.99	6.02	7.39	9.28	9.42	11.31	11.33	11.33
300	1.66	3.17	4.23	4.86	5.29	5.31	6.63	8.45	8.57	10.34	10.35	10.35
500	1.39	2.67	3.56	4.09	4.45	4.49	5.74	7.45	7.59	9.30	9.31	9.31
1,000	1.05	2.03	2.69	3.08	3.36	3.40	4.50	5.96	6.07	7.51	7.54	7.54
2,000	0.73	1.32	1.87	2.13	2.15	2.38	3.35	4.52	4.84	6.07	6.07	6.07
5,000	0.41	0.83	0.93	1.10	1.32	1.44	2.48	3.56	3.75	4.83	4.84	4.84
10,000	0.24	0.45	0.60	0.75	0.90	1.00	1.61	2.37	2.53	3.40	3.41	3.41
10,032	0.21	0.41	0.58	0.75	0.90	1.00	1.61	2.36	2.52	3.39	3.39	3.39




SPAS 1063 Storm Center Mass Curve: Prescott, AZ
September 22 (0800Z) to 25 (0800Z), 1983 Storm
Lat: 34.6208 Lon: -112.5541
Incremental
Accumulated
17.80"
Precipitation (inches)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
0
2
4
6
8
10
12
14
16
18
20
0
10
20
30
40
50
60
70



Total Rainfall (72-hours)
Prescott, AZ 1983 Storm
Storm #1063 September 22 (0800 Z) to 25 (0800 Z), 1983

Miles: 0 15 30 60
Kilometers: 0 20 40 80 120

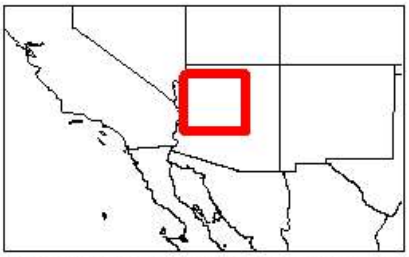
Gauging Stations

- Daily
- Hourly
- Supplemental
- Hourly Psuedo

Precipitation (inches)

0.00 - 1.00	4.01 - 5.00	8.01 - 9.00	12.01 - 13.00	16.01 - 17.00
1.01 - 2.00	5.01 - 6.00	9.01 - 10.00	13.01 - 14.00	17.01 - 18.00
2.01 - 3.00	6.01 - 7.00	10.01 - 11.00	14.01 - 15.00	
3.01 - 4.00	7.01 - 8.00	11.01 - 12.00	15.01 - 16.00	

N



Coordinate system: GCS North American 1983
Scale: 1:1,972,332

Metstat/AWA May 07, 2009

Mount Graham, AZ

September 27-October 4, 1983

Storm Type: Remnant Tropical

Storm Precipitation Analysis System (SPAS) For Storm #1074

General Storm Location: Mount Graham, Arizona

Storm Dates: September 27 - October 4, 1983

Event: Tropical Storm Remnants

Zone 1

Latitude: 30.6458

Longitude: -111.7708

Max. Grid Rainfall Amount: 13.86”

Max. Observed Rainfall Amount: 12.66” at ALTAR, MX

Zone 2

Latitude: 33.2875

Longitude: -109.1042

Max. Grid Rainfall Amount: 13.99”

Max. Observed Rainfall Amount: N/A

Number of Stations: 309 (171 Daily, 19 Hourly, 23 Hourly Pseudo, 85 Supplemental, and 11 Supplemental Pseudo)

SPAS Version: 8.0

Base Map Used: Yes, conus_prism_ppt_in_1971_2000_09_mx

Spatial resolution: 00:00:30 (0.28 sq. miles)

Radar Included: No

Depth-Area-Duration (DAD) analysis: Yes

Comments:

Storm Name:	SPAS-1074-Octave Remnants
Storm Date:	9/28-10/4 1983
AWA Analysis Date:	5/28/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	15-Sep	
	Lat	Long
Storm center location	33.25	-109.10
Storm Rep dew point location	31.35	-110.00
Transposition dewpoint location	29.075	-111.275
Basin location	30.975	-110.375

Moisture Inflow Direction:	SSW @ 140	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	6,350	feet
Storm Analysis Duration	24	hours

The storm representative dew point is	73.5 F	with total precipitable water above sea level of			2.67	inches.
The in-place maximum dew point is	76.0 F	with total precipitable water above sea level of			2.99	inches.
The transpositioned maximum dew point is	77.0 F	with total precipitable water above sea level of			3.14	inches.
The in-place storm elevation is	6,350	which subtracts	1.25	inches of precipitable water at	73.5 F	
The in-place storm elevation is	6,350	which subtracts	1.35	inches of precipitable water at	76.0 F	
The in-place storm elevation is	6,350	which subtracts	1.40	inches of precipitable water at	77.0 F	

The in-place maximization factor is	1.15
The moisture transposition factor is	1.06
The orographic transposition factor is	1.17
The total adjustment factor is	1.43

Notes: 24hr average taken from the 24hr ave Td values at KFHU (10-1-20Z to 1-2-19Z) and KDUG (10-1-20Z to 1-2-19Z

Observed Storm Depth-Area-Duration

	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	72 Hours
1 sq miles	1.1	4.1	4.5	-	6.5	-	7.5	9.4	12.5
10 sq miles	1.1	4.1	4.5	-	6.4	-	7.2	8.9	12.2
100 sq miles	1.0	3.7	4.1	-	5.9	-	6.6	8.1	10.9
200 sq miles	0.9	3.3	3.5	-	4.6	-	5.9	7.0	10.0
500 sq miles	0.7	2.7	3.1	-	4.4	-	5.2	6.4	8.8
1000 sq miles	0.6	2.3	2.8	-	4.0	-	4.7	5.9	7.9
2000 sq miles	0.6	1.9	2.5	-	3.5	-	4.3	5.1	7.3
5000 sq miles	0.5	1.6	2.3	-	3.0	-	3.8	4.6	6.5
10000 sq miles	0.4	1.4	1.9	-	2.6	-	3.3	4.1	5.7
20000 sq miles	0.3	1.1	1.5	-	2.0	-	2.6	3.2	4.8

Adjusteded Storm Depth-Area-Duration

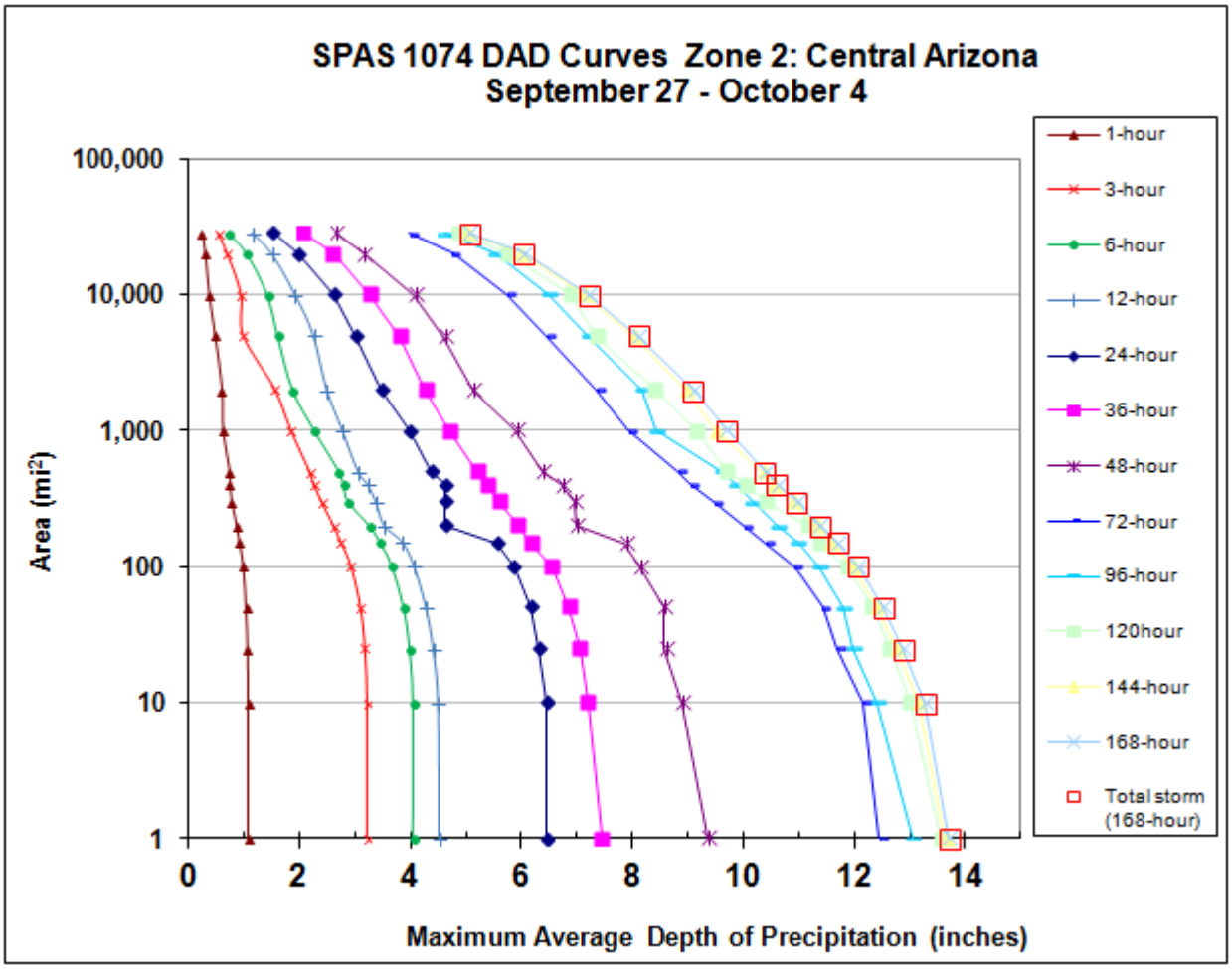
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	72 Hours
1 sq miles	1.5	5.8	6.5	-	9.2	-	10.7	13.4	17.8
10 sq miles	1.5	5.8	6.4	-	9.2	-	10.3	12.7	17.4
100 sq miles	1.4	5.3	5.8	-	8.4	-	9.4	11.6	15.7
200 sq miles	1.2	4.7	5.0	-	6.6	-	8.5	10.0	14.3
500 sq miles	1.1	3.9	4.4	-	6.3	-	7.5	9.1	12.7
1000 sq miles	0.9	3.3	4.0	-	5.7	-	6.8	8.4	11.3
2000 sq miles	0.9	2.7	3.6	-	5.0	-	6.1	7.4	10.5
5000 sq miles	0.7	2.3	3.2	-	4.3	-	5.4	6.6	9.3
10000 sq miles	0.5	2.0	2.8	-	3.7	-	4.7	5.8	8.2
20000 sq miles	0.4	1.5	2.2	-	2.8	-	3.7	4.5	6.8

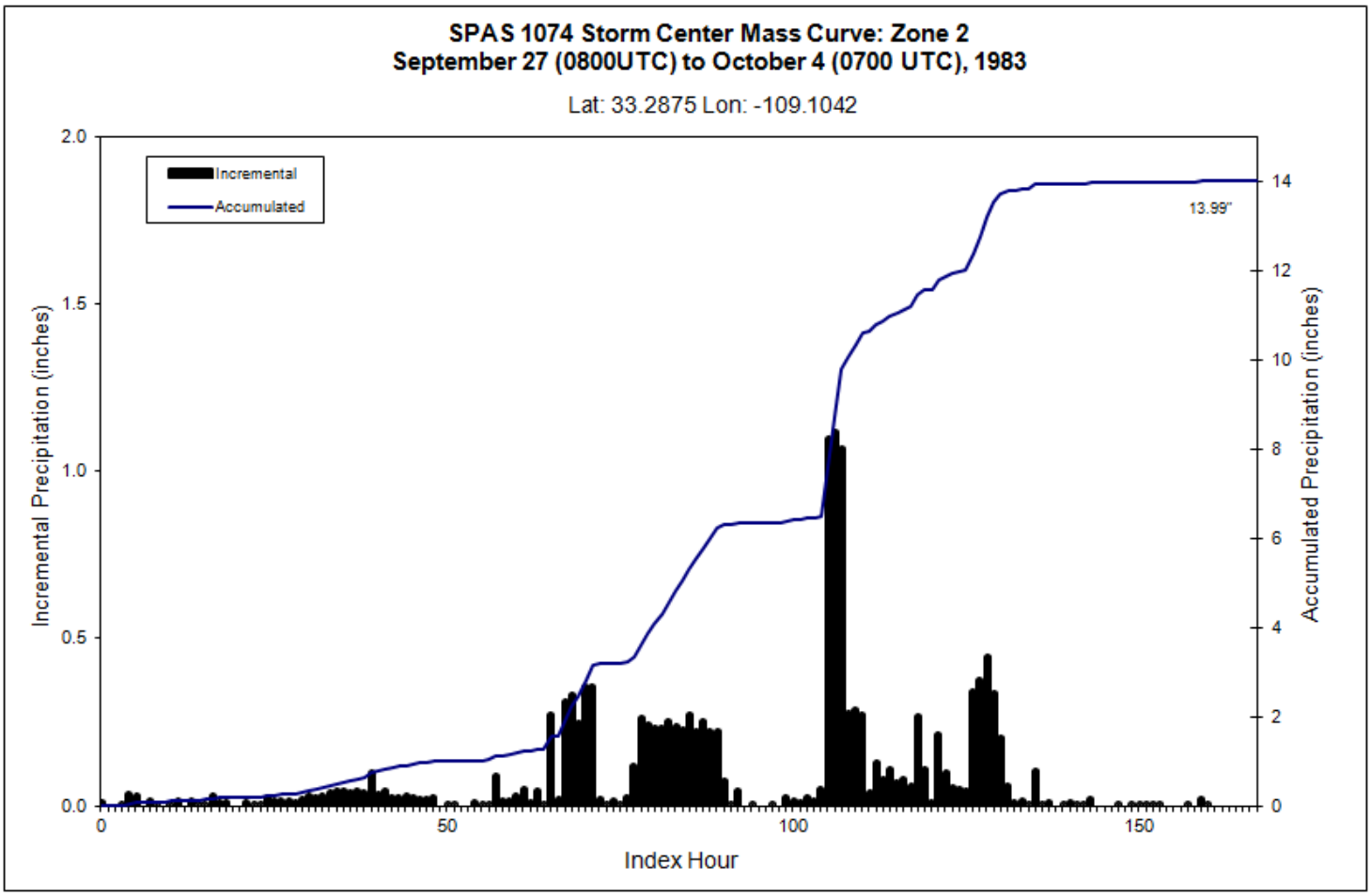
Storm or Storm Center Name	SPAS-1074-Octave Remnants	
Storm Date(s)	9/28-10/4 1983	
Storm Type	Tropical	
Storm Location	33.25	-109.10
Storm Center Elevation	6350	
Precipitation Total & Duration (10 sq mi)	12.66 inches 72 hours (SPAS 1074 DAD)	
Storm Representative Dewpoint	73.5 F	24
Storm Representative Dewpoint Location	31.35	-110
In-place Maximum Dewpoint	76.0 F	
Moisture Inflow Vector	SSW @ 140	
In-place Maximization Factor		
Temporal Transposition (Date)	15-Sep	
Transposition Dewpoint Location	29.08	-111.28
Transposition Maximum Dewpoint	77.0 F	
Transposition Adjustment Factor	1.06	
Grid Point Location	30.975	-110.375
Grid Point Elevation	6,977	
Total Adjustment Factor	1.43	

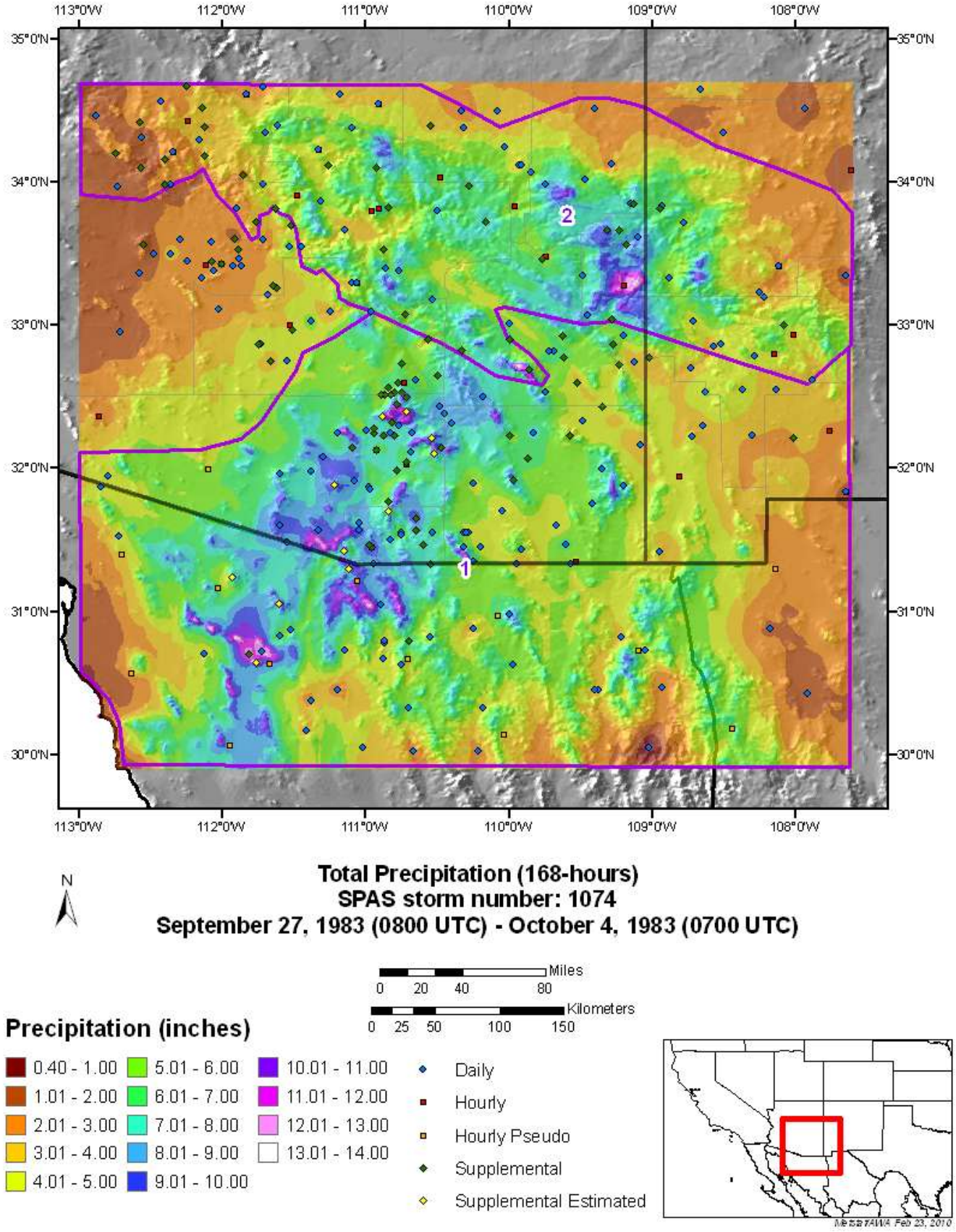
Storm 1074 - September 27, 1983 (0800 UTC) - October 4, 1983 (0700 UTC)

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

	Duration (hours)												
Area (mi^2)	1	3	6	12	24	36	48	72	96	120	144	168	Tptal
0.28	1.13	3.32	4.17	4.66	6.73	7.57	9.52	12.66	13.25	13.78	13.95	13.99	13.99
1	1.08	3.22	4.05	4.51	6.45	7.45	9.36	12.45	13.04	13.55	13.64	13.71	13.71
10	1.08	3.22	4.05	4.49	6.44	7.19	8.89	12.15	12.42	13.00	13.17	13.28	13.28
25	1.07	3.18	3.99	4.40	6.32	7.05	8.58	11.69	11.99	12.64	12.75	12.89	12.89
50	1.04	3.10	3.88	4.27	6.15	6.86	8.57	11.42	11.81	12.32	12.39	12.52	12.52
100	0.99	2.93	3.67	4.06	5.86	6.55	8.12	10.92	11.38	11.87	11.96	12.07	12.07
150	0.92	2.75	3.46	3.85	5.55	6.17	7.86	10.40	10.99	11.38	11.58	11.70	11.70
200	0.87	2.61	3.26	3.52	4.63	5.94	6.98	10.00	10.62	11.14	11.31	11.38	11.38
300	0.78	2.40	2.88	3.37	4.62	5.60	6.94	9.47	10.17	10.40	10.89	10.97	10.97
400	0.75	2.26	2.80	3.22	4.61	5.39	6.72	9.04	9.85	10.03	10.53	10.60	10.60
500	0.74	2.18	2.71	3.05	4.38	5.20	6.37	8.83	9.62	9.70	10.34	10.39	10.39
1,000	0.62	1.85	2.27	2.77	3.98	4.71	5.89	7.91	8.43	9.14	9.50	9.70	9.70
2,000	0.60	1.56	1.88	2.49	3.47	4.27	5.13	7.34	8.18	8.41	8.95	9.10	9.10
5,000	0.47	0.99	1.61	2.25	3.00	3.80	4.60	6.46	7.21	7.35	8.02	8.11	8.11
10,000	0.36	0.95	1.42	1.92	2.61	3.27	4.06	5.72	6.49	6.89	7.13	7.21	7.21
20,000	0.29	0.70	1.05	1.50	1.96	2.60	3.15	4.75	5.51	5.75	5.97	6.04	6.04
28,228	0.23	0.54	0.72	1.15	1.52	2.07	2.65	3.98	4.61	4.86	5.03	5.07	5.07




SPAS 1074 Storm Center Mass Curve: Zone 2
September 27 (0800UTC) to October 4 (0700 UTC), 1983
Lat: 33.2875 Lon: -109.1042
Incremental
Accumulated
13.99"
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
Index Hour
2.0
1.5
1.0
0.5
0.0
14
12
10
8
6
4
2
0
0
50
100
150



Total Precipitation (168-hours)
SPAS storm number: 1074
September 27, 1983 (0800 UTC) - October 4, 1983 (0700 UTC)

Harquahala Valley, AZ

September 1, 1984

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1122

General Storm Location: Harquahala Valley, Arizona

Storm Dates: September 2, 1984

Event: Thunderstorm

Latitude: 33.4875

Longitude: -113.2542

Max. Grid/Radar Rainfall Amount: 7.98”

Max. Observed Rainfall Amount: 8.00”

Number of Stations: 61 (36 daily, 8 hourly, 1 hourly pseudo, 16 supplemental)

SPAS Version: 7.0

Base Map Used: None.

Spatial resolution: 30-sec (0.28 sq-mi)

Radar Included: N

Depth-Area-Duration (DAD) analysis: Y

Comments:

This storm analysis was updated to EXCLUDE the 11.00” value at HARQ11,HARQ11 ADJ 1100 AZ,USDA,33.4860,-113.2475,8888,1,MST,-999 because it was deemed unreliable.

Storm Name:	SPAS-1122-Harquahala Valley
Storm Date:	September 1, 1984
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	15-Aug	
	Lat	Long
Storm center location	33.49	-113.25
Storm Rep dew point location	33.17	-114.72
Transposition dewpoint location	30.655	-111.845
Basin location	30.975	-110.375

Moisture Inflow Direction:	WSW @ 85	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	1,200	feet
Storm Analysis Duration	3hr ave	hours

The storm representative dew point is	77.0 F	with total precipitable water above sea level of			3.14	inches.
The in-place maximum dew point is	82.0 F	with total precipitable water above sea level of			3.92	inches.
The transpositioned maximum dew point is	82.0 F	with total precipitable water above sea level of			3.92	inches.
The in-place storm elevation is	1,200	which subtracts	0.32	inches of precipitable water at	77.0 F	
The in-place storm elevation is	1,200	which subtracts	0.37	inches of precipitable water at	82.0 F	
The in-place storm elevation is	1,200	which subtracts	0.37	inches of precipitable water at	82.0 F	

The in-place maximization factor is	1.26
The moisture transposition factor is	1.00
The orographic transposition factor is	1.00
The total adjustment factor is	1.26

Notes:

Observed Storm Depth-Area-Duration

	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	3.1	5.2	7.4	7.7	7.7	7.7	-	-	7.7
10 sq miles	2.6	4.7	6.5	6.5	6.5	6.5	-	-	6.5
50 sq miles	1.8	3.5	4.9	4.9	4.9	4.9	-	-	4.9
100 sq miles	1.4	2.8	4.0	4.1	4.1	4.1	-	-	4.1
200 sq miles	1.0	2.2	3.1	3.1	3.2	3.2	-	-	3.3
500 sq miles	0.6	1.4	2.0	2.1	2.1	2.2	-	-	2.2
1000 sq miles	-	-	-	-	-	-	-	-	-
2000 sq miles	-	-	-	-	-	-	-	-	-
5000 sq miles	-	-	-	-	-	-	-	-	-

Adjusted Storm Depth-Area-Duration

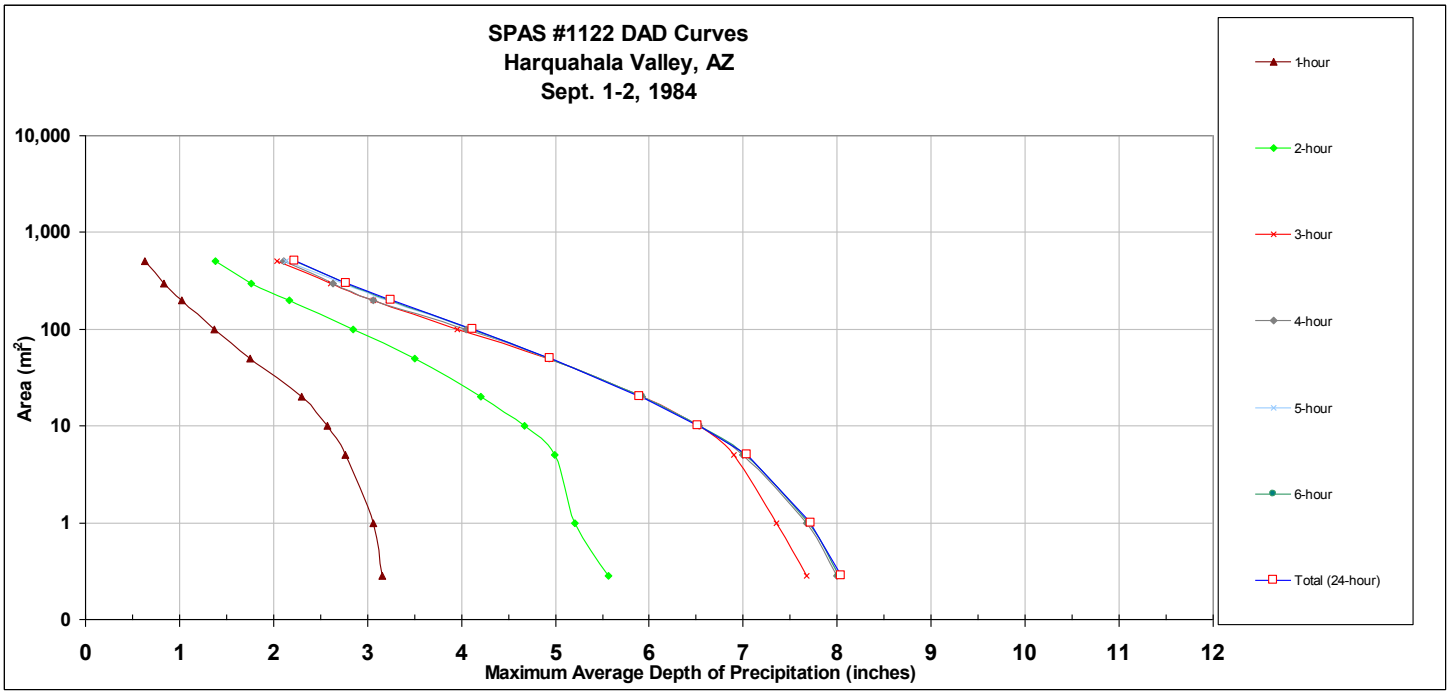
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	3.9	6.6	9.3	9.7	9.7	9.7	-	-	9.7
10 sq miles	3.2	5.9	8.2	8.2	8.2	8.2	-	-	8.2
50 sq miles	2.2	4.4	6.2	6.2	6.2	6.2	-	-	6.2
100 sq miles	1.7	3.6	5.0	5.1	5.1	5.2	-	-	5.2
200 sq miles	1.3	2.7	3.9	3.9	4.1	4.1	-	-	4.1
500 sq miles	0.8	1.7	2.6	2.6	2.7	2.8	-	-	2.8
1000 sq miles	-	-	-	-	-	-	-	-	-
2000 sq miles	-	-	-	-	-	-	-	-	-
5000 sq miles	-	-	-	-	-	-	-	-	-

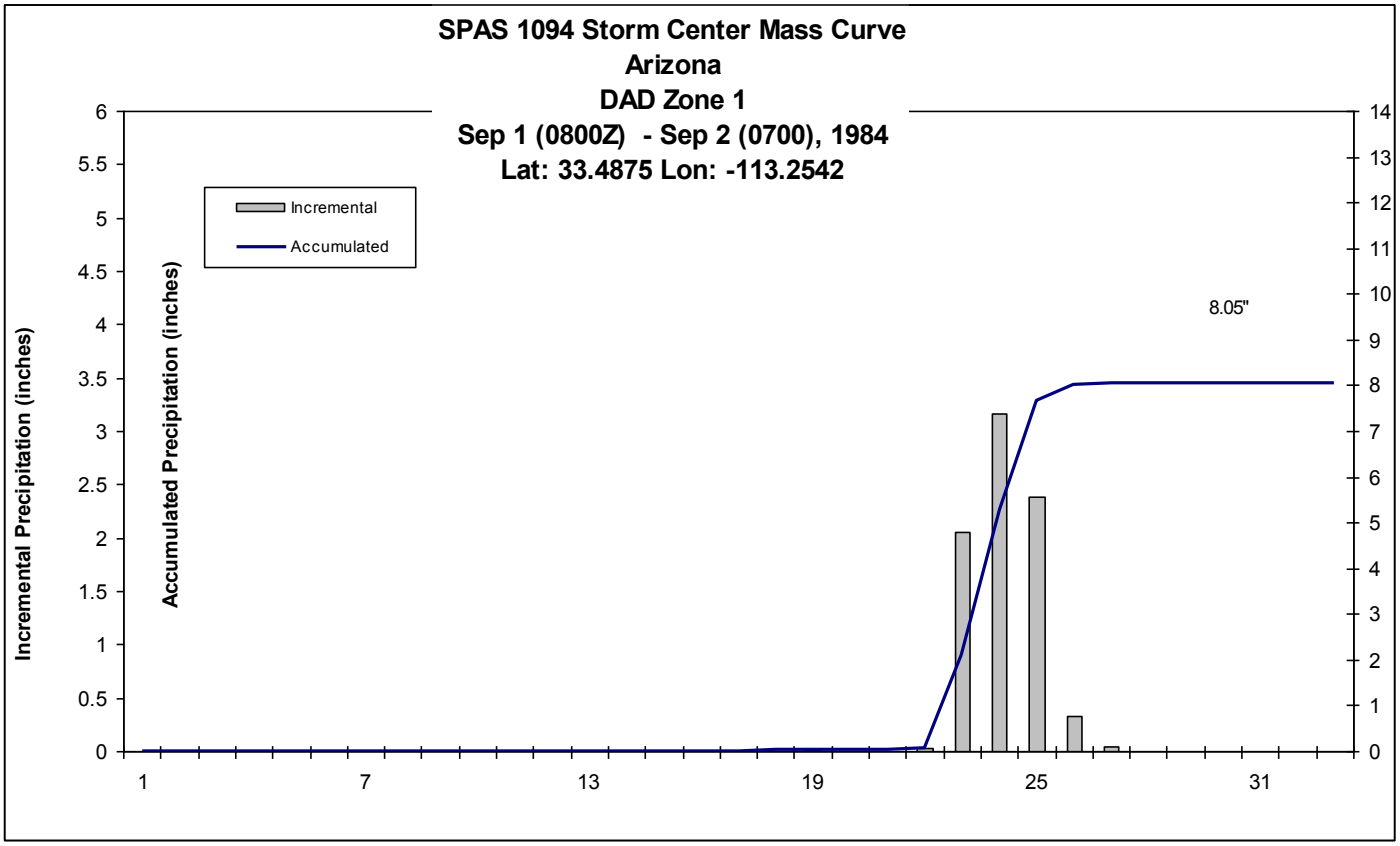
Storm or Storm Center Name	SPAS-1122-Harquahala Valley	
Storm Date(s)	9/1/84	
Storm Type	Local Storm	
Storm Location	33.49	-113.25
Storm Center Elevation	1200	
Precipitation Total & Duration (10 sq mi)	3.25 inches 1 hour 8.00" in 4hrs (SPAS 1094 DAD)	
Storm Representative Dewpoint	77.0 F	3hr ave KYUM, KBLH
Storm Representative Dewpoint Location	33.17	-114.72
In-place Maximum Dewpoint	82.0 F	
Moisture Inflow Vector	WSW @ 85	
In-place Maximization Factor	1.26	
Temporal Transposition (Date)	15-Aug	
Transposition Dewpoint Location	30.66	-111.85
Transposition Maximum Dewpoint	82.0 F	
Transposition Adjustment Factor	1.00	
Grid Point Location	30.975	-110.375
Grid Point Elevation	6,977	
Total Adjustment Factor	1.26	

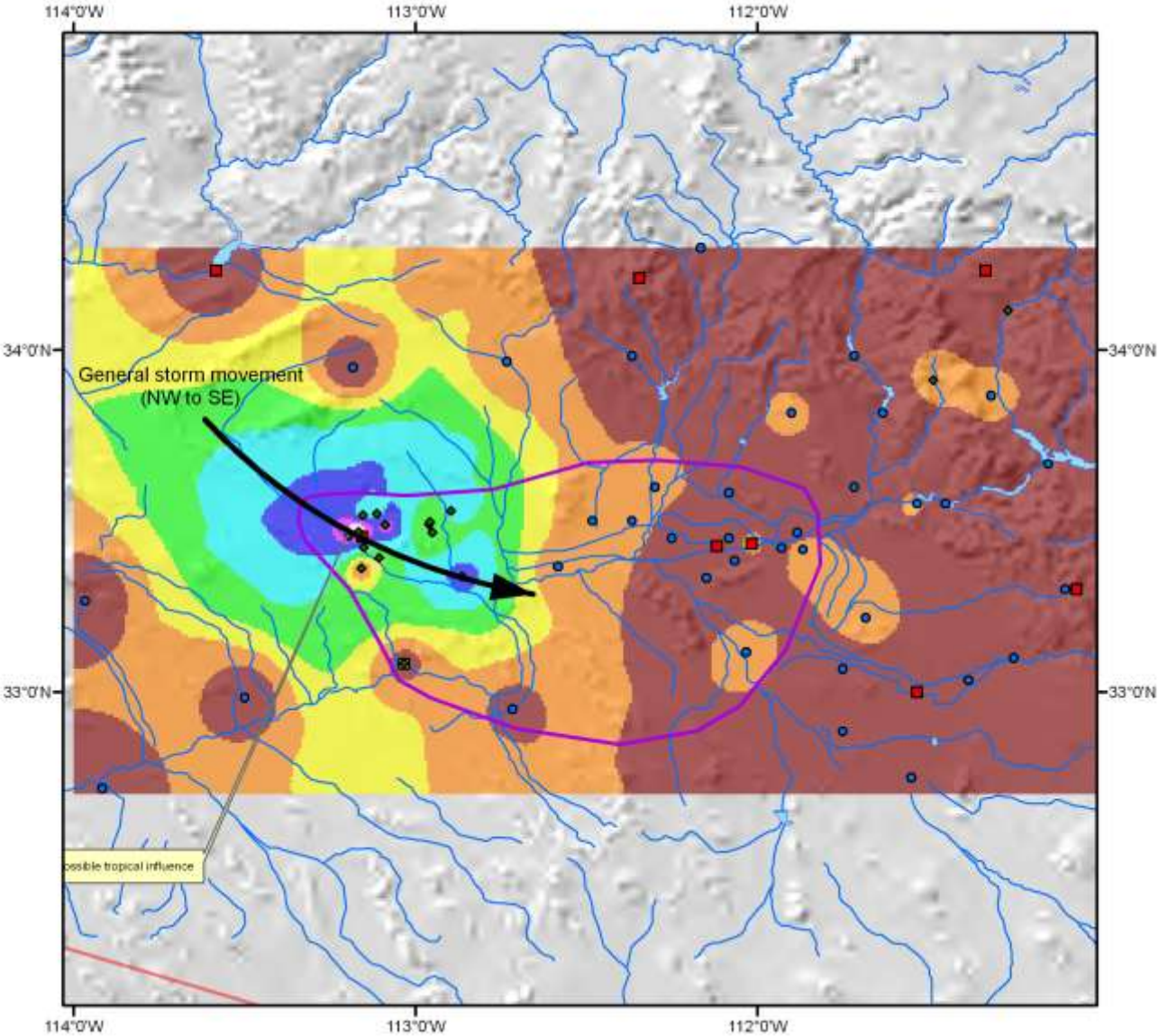
SPAS Storm 1122 - Harquahala Valley, AZ Sept. 1-2, 1984

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

	Duration (hours)												
Area (mi^2)	1	2	3	4	5	6							total (24hr)
0.28	3.16	5.57	7.68	8.00	8.02	8.02							8.05
1	3.07	5.21	7.35	7.67	7.70	7.70							7.72
5	2.76	4.99	6.91	7.00	7.02	7.02							7.05
10	2.58	4.67	6.53	6.53	6.53	6.53							6.52
20	2.30	4.21	5.92	5.93	5.93	5.93							5.90
50	1.75	3.51	4.93	4.93	4.93	4.93							4.94
100	1.37	2.84	3.96	4.05	4.09	4.11							4.12
200	1.02	2.17	3.06	3.06	3.22	3.24							3.25
300	0.83	1.76	2.61	2.64	2.74	2.77							2.78
500	0.63	1.38	2.04	2.10	2.14	2.22							2.23




SPAS 1094 Storm Center Mass Curve
Arizona
DAD Zone 1
Sep 1 (0800Z) - Sep 2 (0700), 1984
Lat: 33.4875 Lon: -113.2542
Incremental
Accumulated
8.05"
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
1
7
13
19
25
31



SPAS Storm #1122
HARQUAHALA VALLEY, AZ
9/1-3/1984

Miles
0 12.5 25 50

Kilometers
0 12.5 25 50 75

N

Precipitation (inches)

- 0.01 - 1.00
- 1.01 - 2.00
- 2.01 - 3.00
- 3.01 - 4.00
- 4.01 - 5.00
- 5.01 - 6.00
- 6.01 - 7.00
- 7.01 - 8.00

- Daily
- Hourly
- Hourly pseudo
- Supplemental

Metstat/AWA November 18, 2009

Knoles Hole Spring, AZ

January 5-10, 1993

Storm Type: General Frontal

Storm Precipitation Analysis System (SPAS) For Storm #1139

General Storm Location: Central Arizona

Storm Dates: January 5-10, 1993

Event: General Storm

Latitude: 33.8291

Longitude: -110.9125

Max. Grid/Radar Rainfall Amount: 13.36”

Max. Observed Rainfall Amount: 11.60”

Number of Stations: 504 (186-daily, 256-hourly, 1-hourly estimated, 61-supplemental)

SPAS Version: 7.0

Base Map Used: Yes, conus_prism_ppt_in_1971_2000_01_mx

Spatial resolution: 0.27 mi^2

Radar Included: No

Depth-Area-Duration (DAD) analysis: Yes, 1, 3, 6, 12, 18, 24, 36, 48, 72, 96, 120, & 144

Storm Name:	SPAS-1139-Knoles Hole Spring
Storm Date:	1/5-10/1993
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	20-Dec	
	Lat	Long
Storm center location	33.83	-110.92
Storm Rep dew point location	31.95	-110.91
Transposition dewpoint location	29.095	-110.365
Basin location	30.975	-110.375

Moisture Inflow Direction:	S @ 130	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	7,400	feet
Storm Analysis Duration	24	hours

The storm representative dew point is	60.0 F	with total precipitable water above sea level of			1.38	inches.
The in-place maximum dew point is	64.0 F	with total precipitable water above sea level of			1.68	inches.
The transpositioned maximum dew point is	64.5 F	with total precipitable water above sea level of			1.73	inches.
The in-place storm elevation is	7,400	which subtracts	0.84	inches of precipitable water at	60.0 F	
The in-place storm elevation is	7,400	which subtracts	1.00	inches of precipitable water at	64.0 F	
The in-place storm elevation is	7,400	which subtracts	1.02	inches of precipitable water at	64.5 F	

The in-place maximization factor is	1.26
The moisture transposition factor is	1.04
The orographic transposition factor is	0.61
The total adjustment factor is	0.80

Observed Storm Depth-Area-Duration

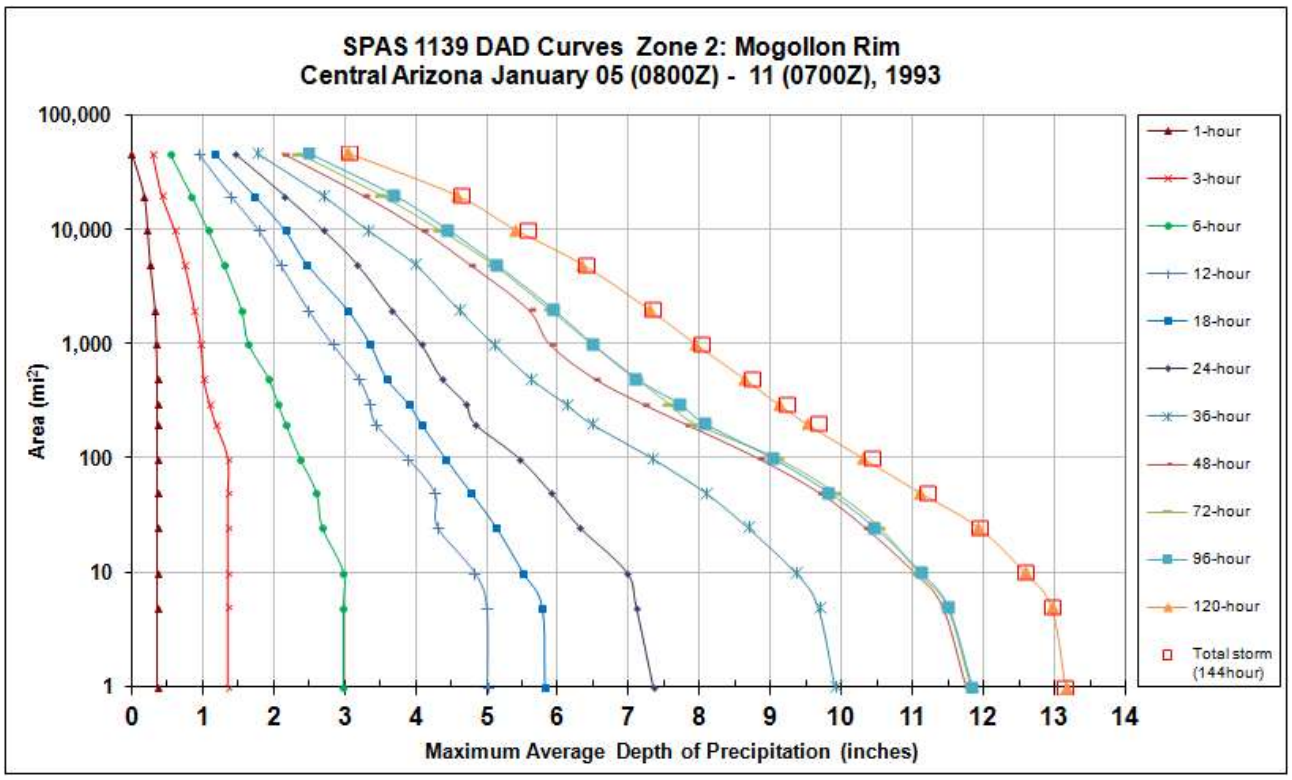
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	0.4	3.0	5.0	5.8	7.3	-	9.9	11.7	-	11.8
10 sq miles	0.4	3.0	4.8	5.5	7.0	-	9.4	11.0	-	11.1
100 sq miles	0.4	2.4	3.9	4.4	5.5	-	7.3	8.8	-	9.1
200 sq miles	0.4	2.2	3.4	4.1	4.8	-	6.5	7.8	-	7.9
500 sq miles	0.4	1.9	3.2	3.6	4.4	-	5.6	6.5	-	7.1
1000 sq miles	0.4	1.7	2.8	3.4	4.1	-	5.1	5.9	-	6.5
2000 sq miles	0.3	1.6	2.5	3.0	3.7	-	4.6	5.6	-	5.9
5000 sq miles	0.3	1.3	2.1	2.5	3.2	-	4.0	4.8	-	5.1
10000 sq miles	0.2	1.1	1.8	2.2	2.7	-	3.3	4.1	-	4.3
20000 sq miles	0.2	0.9	1.4	1.7	2.2	-	2.7	3.3	-	3.5

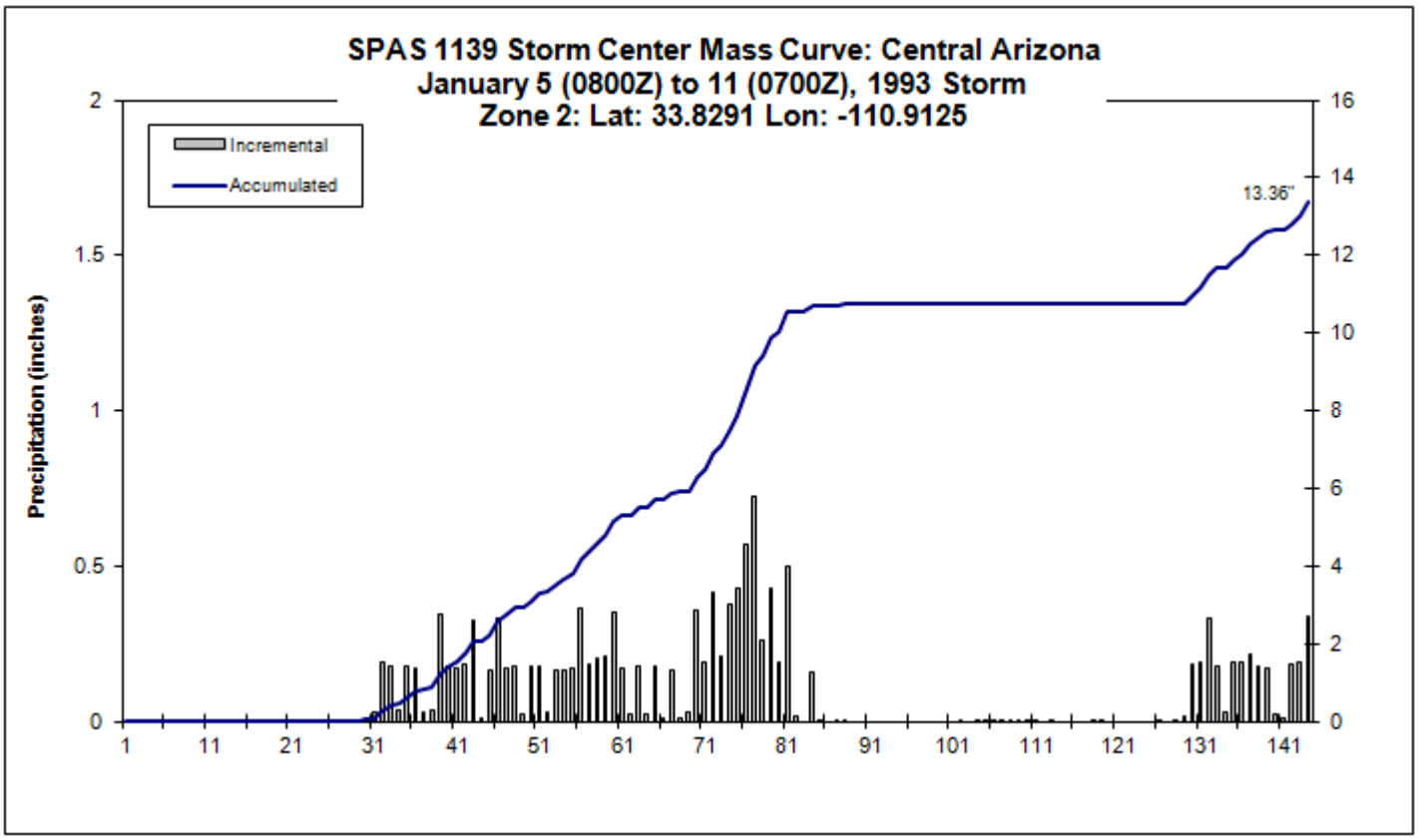
Adjusteded Storm Depth-Area-Duration

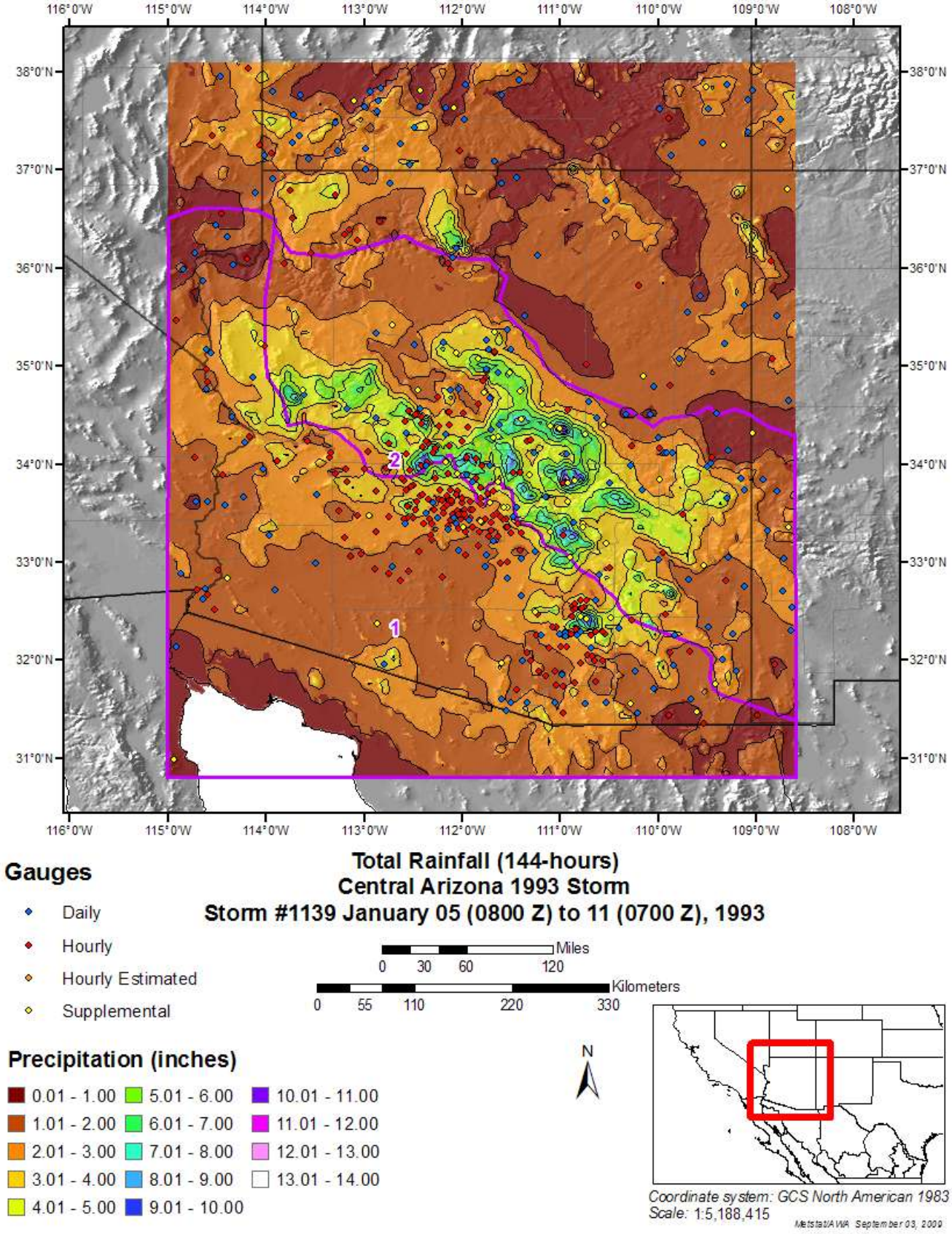
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	0.3	2.4	4.0	-	5.9	-	7.9	9.4	-	9.5
10 sq miles	0.3	2.4	3.9	-	5.6	-	7.5	8.8	-	8.9
100 sq miles	0.3	1.9	3.1	-	4.4	-	5.9	7.1	-	7.3
200 sq miles	0.3	1.7	2.8	-	3.9	-	5.2	6.2	-	6.4
500 sq miles	0.3	1.5	2.6	-	3.5	-	4.5	5.2	-	5.7
1000 sq miles	0.3	1.3	2.3	-	3.3	-	4.1	4.7	-	5.2
2000 sq miles	0.3	1.2	2.0	-	2.9	-	3.7	4.5	-	4.7
5000 sq miles	0.2	1.0	1.7	-	2.5	-	3.2	3.8	-	4.1
10000 sq miles	0.2	0.9	1.4	-	2.2	-	2.7	3.3	-	3.5
20000 sq miles	0.1	0.7	1.1	-	1.7	-	2.2	2.6	-	2.8

Storm or Storm Center Name	SPAS-1139-Knoles Hole Spring		
Storm Date(s)	1/5-10/1993		
Storm Type	General		
Storm Location	33.83	-110.92	
Storm Center Elevation	7400		
Precipitation Total & Duration (10 sq mi)	12.11 inches 72 hours (SPAS 1139 DAD)		
Storm Representative Dewpoint	60.0 F	24	hr ave KTUS, KDMA, KDUG
Storm Representative Dewpoint Location	31.95	-110.91	
In-place Maximum Dewpoint	64.0 F		
Moisture Inflow Vector	S @ 130		
In-place Maximization Factor			
Temporal Transposition (Date)	20-Dec		
Transposition Dewpoint Location	29.10	-110.37	
Transposition Maximum Dewpoint	64.5 F		
Transposition Adjustment Factor	1.04		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	0.80		

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)												
	Duration (hours)											
Area (mi^2)	1	3	6	12	18	24	36	48	72	96	120	total
0.27	0.76	1.71	3.27	5.27	6.12	7.60	10.20	12.04	12.11	12.12	13.36	13.36
1	0.37	1.36	2.98	5.01	5.82	7.34	9.91	11.74	11.81	11.83	13.16	13.14
5	0.37	1.36	2.98	5.00	5.78	7.10	9.67	11.41	11.48	11.49	12.96	12.97
10	0.37	1.36	2.98	4.83	5.51	6.97	9.35	11.01	11.07	11.11	12.58	12.59
25	0.37	1.36	2.68	4.31	5.13	6.30	8.67	10.31	10.52	10.45	11.92	11.94
50	0.37	1.36	2.60	4.27	4.78	5.90	8.08	9.67	9.90	9.81	11.10	11.22
100	0.37	1.36	2.37	3.89	4.42	5.45	7.33	8.81	9.08	9.02	10.30	10.43
200	0.37	1.19	2.17	3.44	4.08	4.83	6.48	7.78	7.93	8.07	9.51	9.67
300	0.37	1.10	2.06	3.36	3.90	4.70	6.11	7.18	7.56	7.71	9.10	9.24
500	0.37	1.02	1.93	3.20	3.59	4.36	5.62	6.50	7.10	7.09	8.62	8.74
1,000	0.36	0.98	1.65	2.83	3.36	4.07	5.10	5.88	6.48	6.49	7.94	8.04
2,000	0.34	0.89	1.55	2.49	3.04	3.66	4.61	5.58	5.88	5.94	7.29	7.34
5,000	0.27	0.75	1.30	2.10	2.47	3.17	3.99	4.75	5.08	5.13	6.34	6.40
10,000	0.23	0.61	1.08	1.79	2.16	2.69	3.32	4.07	4.33	4.45	5.40	5.59
20,000	0.18	0.43	0.85	1.40	1.73	2.15	2.69	3.25	3.51	3.70	4.57	4.64
46,652	0.00	0.30	0.55	0.95	1.17	1.45	1.77	2.12	2.34	2.50	3.05	3.07




SPAS 1139 Storm Center Mass Curve: Central Arizona
January 5 (0800Z) to 11 (0700Z), 1993 Storm
Zone 2: Lat: 33.8291 Lon: -110.9125
Incremental
Accumulated
13.36"
Precipitation (inches)
2
1.5
1
0.5
0
16
14
12
10
8
6
4
2
0
1
11
21
31
41
51
61
71
81
91
101
111
121
131
141


116°0'W
115°0'W
114°0'W
113°0'W
112°0'W
111°0'W
110°0'W
109°0'W
108°0'W
38°0'N
37°0'N
36°0'N
35°0'N
34°0'N
33°0'N
32°0'N
31°0'N
2
1
Total Rainfall (144-hours)
Central Arizona 1993 Storm
Storm #1139 January 05 (0800 Z) to 11 (0700 Z), 1993
Gauges
Daily
Hourly
Hourly Estimated
Supplemental
Miles
0 30 60 120
Kilometers
0 55 110 220 330
N
Precipitation (inches)
0.01 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
4.01 - 5.00
5.01 - 6.00
6.01 - 7.00
7.01 - 8.00
8.01 - 9.00
9.01 - 10.00
10.01 - 11.00
11.01 - 12.00
12.01 - 13.00
13.01 - 14.00
Coordinate system: GCS North American 1983
Scale: 1:5,188,415
Metstat/AWA September 03, 2009

Tucson, AZ

September 3, 1996

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1086

General Storm Location: Tucson, Arizona

Storm Dates: September 3-4, 1996

Event: Thunderstorm

Latitude: 32.3899

Longitude: -110.8000

Max. Grid/Radar Rainfall Amount: 7.37”

Max. Observed Rainfall Amount: 3.67” (reports of 5”)

Number of Stations: 109 (23 daily, 74 hourly, 1 hourly estimated, 9 supplemental and 2 supplemental estimated)

SPAS Version: 7.0

Base Map Used: Yes, Mean September Precipitation

Spatial resolution: 36-sec

Radar Included: Y

Depth-Area-Duration (DAD) analysis: Yes, but results considered somewhat unreliable

Storm Name:	SPAS-1086-Tucson
Storm Date:	September 3, 1996
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	18-Aug	
	Lat	Long
Storm center location	32.39	-110.80
Storm Rep dew point location	32.65	-114.60
Transposition dewpoint location	31.235	-114.175
Basin location	30.975	-110.375

Moisture Inflow Direction:	W @ 220	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	5,750	feet
Storm Analysis Duration	3	hours

The storm representative dew point is	77.5 F	with total precipitable water above sea level of			3.22	inches.
The in-place maximum dew point is	82.0 F	with total precipitable water above sea level of			3.92	inches.
The transpositioned maximum dew point is	82.5 F	with total precipitable water above sea level of			4.00	inches.
The in-place storm elevation is	5,750	which subtracts	1.34	inches of precipitable water at	77.5 F	
The in-place storm elevation is	5,750	which subtracts	1.60	inches of precipitable water at	82.0 F	
The in-place storm elevation is	5,750	which subtracts	1.63	inches of precipitable water at	82.5 F	

The in-place maximization factor is	1.23
The moisture transposition factor is	1.02
The orographic transposition factor is	0.96
The total adjustment factor is	1.21

Notes:

Observed Storm Depth-Area-Duration

	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	3.2	4.8	5.2	5.5	5.5	5.5	6.9	-	-
10 sq miles	2.7	4.3	4.7	4.6	4.6	4.6	5.9	-	-
50 sq miles	1.8	3.2	3.5	3.5	3.5	3.5	4.1	-	-
100 sq miles	1.4	2.6	2.8	2.9	2.9	2.9	3.2	-	-
200 sq miles	1.1	2.0	2.2	2.1	2.3	2.3	2.6	-	-
500 sq miles	0.7	1.3	1.5	1.5	1.5	1.6	1.6	-	-
1000 sq miles	0.4	0.8	0.9	1.0	1.0	1.1	1.2	-	-
2000 sq miles	-	-	-	-	-	-	-	-	-
5000 sq miles	-	-	-	-	-	-	-	-	-

Adjusted Storm Depth-Area-Duration

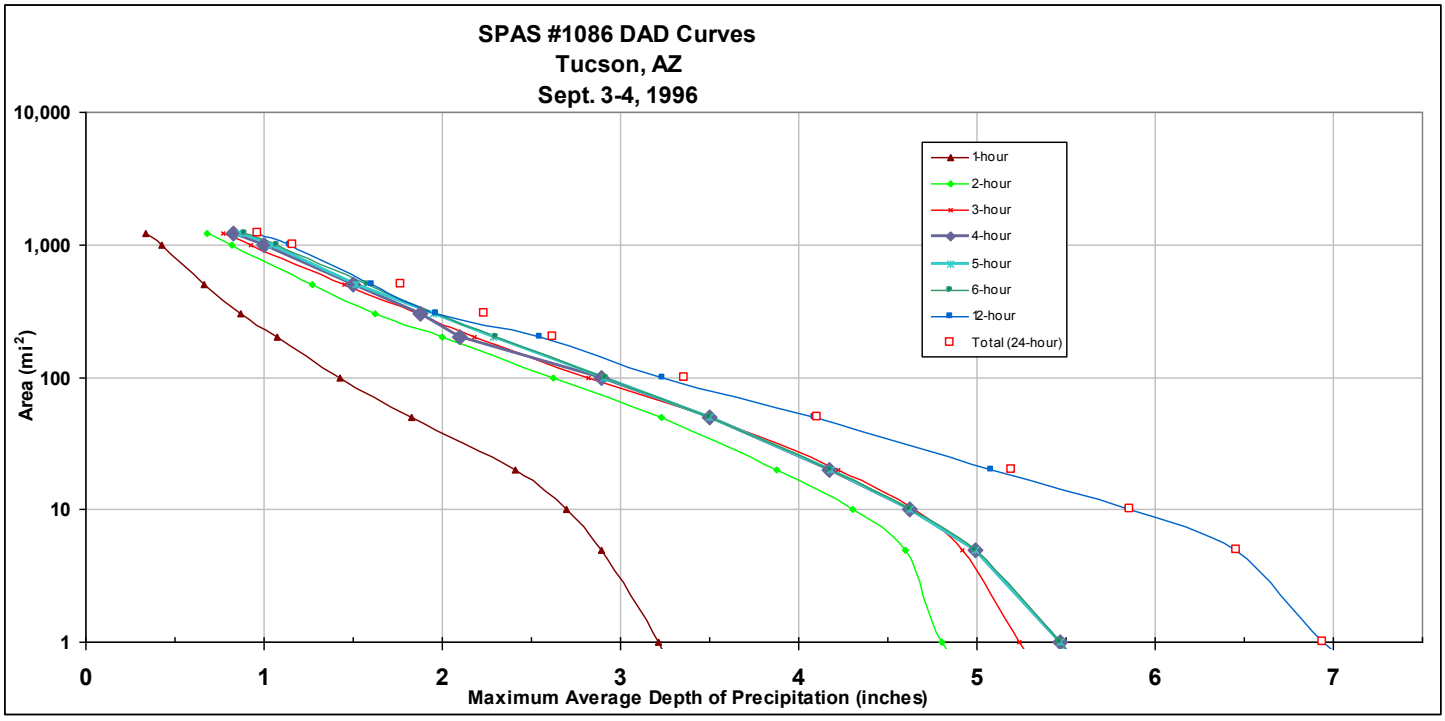
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	3.9	5.8	6.4	6.6	6.6	6.6	8.4	-	-
10 sq miles	3.3	5.2	5.6	5.6	5.6	5.6	7.1	-	-
50 sq miles	2.2	3.9	4.3	4.2	4.2	4.2	5.0	-	-
100 sq miles	1.7	3.2	3.4	3.5	3.5	3.5	3.9	-	-
200 sq miles	1.3	2.4	2.6	2.5	2.8	2.8	3.1	-	-
500 sq miles	0.8	1.5	1.8	1.8	1.8	1.9	2.0	-	-
1000 sq miles	0.5	1.0	1.1	1.2	1.3	1.3	1.4	-	-
2000 sq miles	-	-	-	-	-	-	-	-	-
5000 sq miles	-	-	-	-	-	-	-	-	-

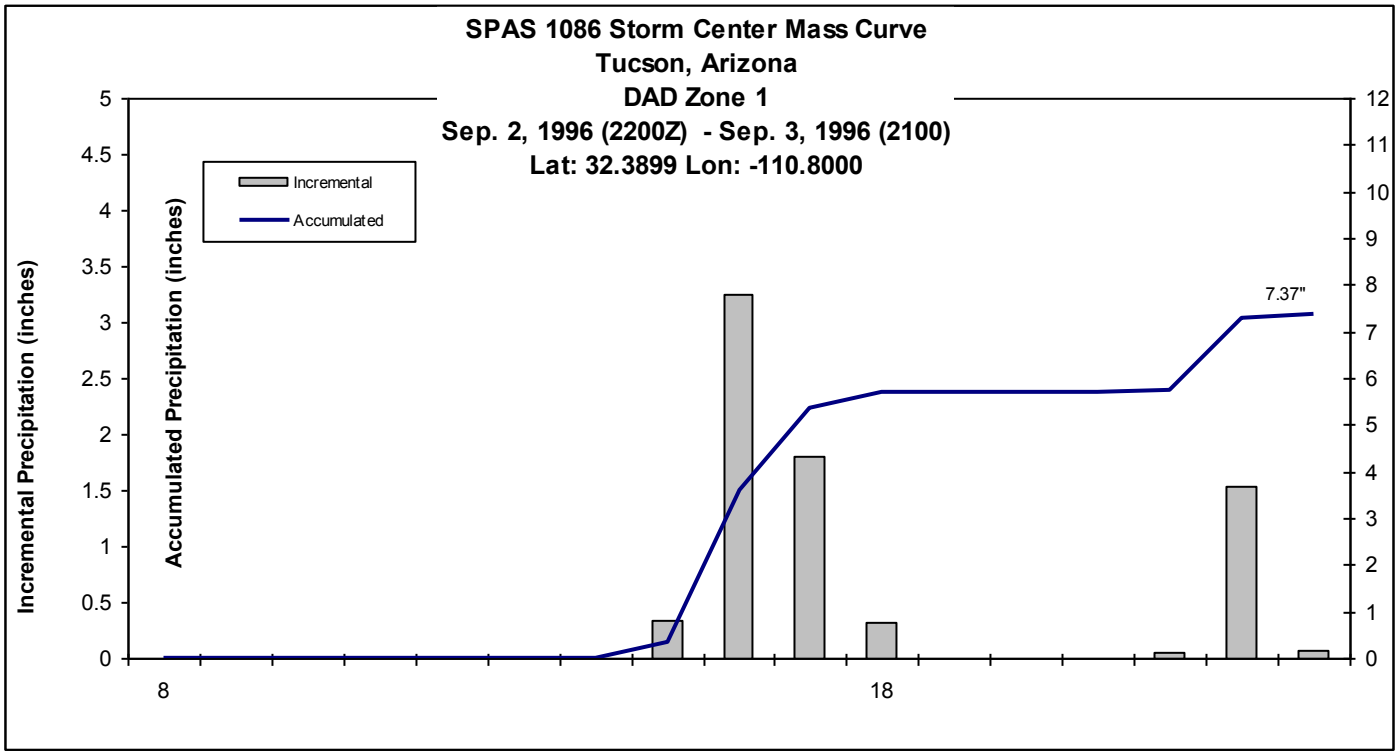
Storm or Storm Center Name	SPAS-1086-Tucson		
Storm Date(s)	9/3/96		
Storm Type	Local Storm		
Storm Location	32.39	-110.80	
Storm Center Elevation	5750		
Precipitation Total & Duration (10 sq mi)	3.31 inches 1 hour 5.47" in 3hrs (SPAS 1086 DAD)		
Storm Representative Dewpoint	77.5 F	3	hr ave KYUM
Storm Representative Dewpoint Location	32.65	-114.6	
In-place Maximum Dewpoint	82.0 F		
Moisture Inflow Vector	W @ 220		
In-place Maximization Factor	1.23		
Temporal Transposition (Date)	18-Aug		
Transposition Dewpoint Location	31.24	-114.18	
Transposition Maximum Dewpoint	82.5 F		
Transposition Adjustment Factor	1.02		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	1.21		

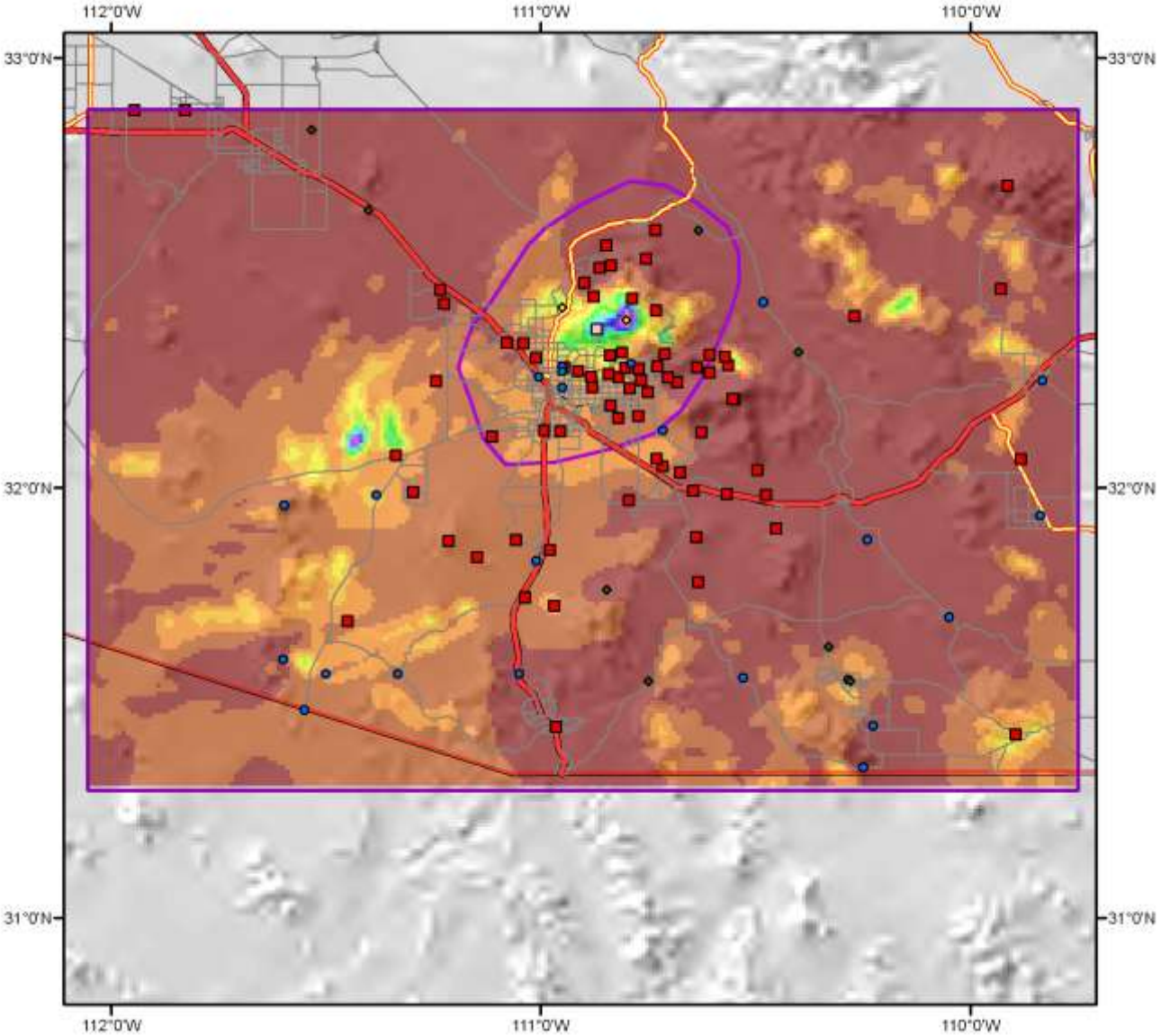
SPAS Storm 1086 - Tucson, AZ Sept. 3-4, 1996

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

Area (mi^2)	Duration (hours) 1	2	3	4	5	6	12	total (24-hr)
0.4	3.31	5.13	5.47	5.70	5.70	5.70	7.37	7.37
1	3.21	4.80	5.24	5.47	5.47	5.47	6.94	6.94
5	2.89	4.60	4.92	4.99	4.99	4.99	6.45	6.46
10	2.70	4.30	4.65	4.62	4.62	4.62	5.85	5.86
20	2.41	3.88	4.22	4.17	4.18	4.18	5.08	5.20
50	1.83	3.23	3.51	3.50	3.50	3.50	4.09	4.11
100	1.43	2.62	2.82	2.89	2.91	2.92	3.24	3.36
200	1.07	2.00	2.18	2.10	2.29	2.30	2.55	2.62
300	0.87	1.62	1.86	1.88	1.95	1.97	1.97	2.24
500	0.66	1.27	1.45	1.50	1.52	1.58	1.61	1.77
1,000	0.43	0.82	0.93	1.00	1.04	1.07	1.15	1.16
1,213	0.34	0.68	0.77	0.83	0.87	0.89	0.97	0.97




SPAS 1086 Storm Center Mass Curve
Tucson, Arizona
DAD Zone 1
Sep. 2, 1996 (2200Z) - Sep. 3, 1996 (2100)
Lat: 32.3899 Lon: -110.8000
Incremental
Accumulated
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
7.37"
8
18



Total Precipitation
SPAS Storm #1086
Sep. 2, 1996 (2200Z) - Sep. 3, 1996 (2100)

N

Miles
0 5 10 20

Kilometers
0 10 20 40 60

Stations

0.00 - 0.50	2.51 - 3.00	5.01 - 5.50	Daily
0.51 - 1.00	3.01 - 3.50	5.51 - 6.00	Hourly
1.01 - 1.50	3.51 - 4.00	6.01 - 6.50	Hourly estimated
1.51 - 2.00	4.01 - 4.50	6.51 - 7.00	Supplemental
2.01 - 2.50	4.51 - 5.00	7.01 - 7.50	Supplemental estimated

Metstat/AWA August 24, 2009

Harquahala Mountain-Nora, AZ

September 25-27, 1997

Storm Type: Remnant Tropical

Storm Precipitation Analysis System (SPAS) For Storm #1084

General Storm Location: Harquahala Mountain

Storm Dates: September 25-27, 1997

Event: Remnants of Hurricane Nora

Latitude: 33.815

Longitude: -113.335

Max. Grid/Radar Rainfall Amount: 12.13”

Max. Observed Rainfall Amount: 12.02”

Max. Grid/Radar 1-hour Rainfall Amount: 3.46”

Max. Observed 1-hour Rainfall Amount: 1.61”

Number of Stations: 418 (90-daily, 300-hourly, 1-hourly estimated, 5-hourly pseudo, 22-supplemental)

SPAS Version: 7.0

Base Map Used: Yes, conus_prism_ppt_in_1971_2000_09

Spatial resolution: 0.40 mi^2

Radar Included: Yes

Depth-Area-Duration (DAD) analysis: Yes, 1, 2, 3, 4, 5, 6, 12, 18, 24, 36, and 48-hour

Comments:

The following radar data was missing:

09/25 KIWA 0000 -0650 UTC
09/26 KESX 0925 -0000 UTC
09/26 KYUX 0720 -0000 UTC

Storm Name:	**SPAS-1084-Harquahala Mtn-Nora**
Storm Date:	**9/25-27/1997**
AWA Analysis Date:	**6/7/2013**

Storm Adjustment for Grid Point 1

Temporal Transposition Date	**10-Sep**	
	Lat	**Long**
Storm center location	**33.82**	**-113.34**
Storm Rep dew point location	**33.00**	**-113.00**
Transposition dewpoint location	**30.155**	**-110.035**
Basin location	**30.975**	**-110.375**

Moisture Inflow Direction:	**SSE @ 60**	miles
Grid Point Elevation	**6,977**	feet
Storm Center Elevation	**4,900**	feet
Storm Analysis Duration	**24**	hours

The storm representative dew point is	**73.5 F**	with total precipitable water above sea level of			**2.67**	inches.
The in-place maximum dew point is	**76.0 F**	with total precipitable water above sea level of			**2.99**	inches.
The transpositioned maximum dew point is	**77.0 F**	with total precipitable water above sea level of			**3.14**	inches.
The in-place storm elevation is	**4,900**	which subtracts	**1.02**	inches of precipitable water at	**73.5 F**	
The in-place storm elevation is	**4,900**	which subtracts	**1.11**	inches of precipitable water at	**76.0 F**	
The in-place storm elevation is	**4,900**	which subtracts	**1.15**	inches of precipitable water at	**77.0 F**	

The in-place maximization factor is	**1.14**
The moisture transposition factor is	**1.06**
The orographic transposition factor is	**0.78**
The total adjustment factor is	**0.94**

Notes: Storm rep taken from 24hr ave KYUM, KBLH, KSDL.

Observed Storm Depth-Area-Duration

	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	72 Hours
1 sq miles	**3.4**	**6.4**	**9.9**	**12.0**	**12.1**	-	**12.1**	**12.1**	-
10 sq miles	**2.7**	**5.9**	**9.0**	**10.9**	**10.9**	-	**10.9**	**10.9**	-
100 sq miles	**1.6**	**4.1**	**5.8**	**7.2**	**7.3**	-	**7.4**	**7.5**	-
200 sq miles	**1.5**	**3.5**	**4.9**	**6.1**	**6.1**	-	**6.3**	**6.3**	-
500 sq miles	**1.3**	**3.0**	**4.0**	**5.0**	**5.0**	-	**5.1**	**5.2**	-
1000 sq miles	**1.1**	**2.6**	**3.5**	**4.2**	**4.2**	-	**4.4**	**4.4**	-
2000 sq miles	**0.8**	**2.2**	**3.0**	**3.5**	**3.6**	-	**3.7**	**3.8**	-
5000 sq miles	**0.5**	**1.8**	**2.3**	**2.7**	**2.8**	-	**3.1**	**3.1**	-
10000 sq miles	**0.4**	**1.4**	**2.0**	**2.2**	**2.3**	-	**2.6**	**2.6**	-
20000 sq miles	**0.3**	**1.2**	**1.6**	**1.7**	**1.9**	-	**2.1**	**2.1**	-

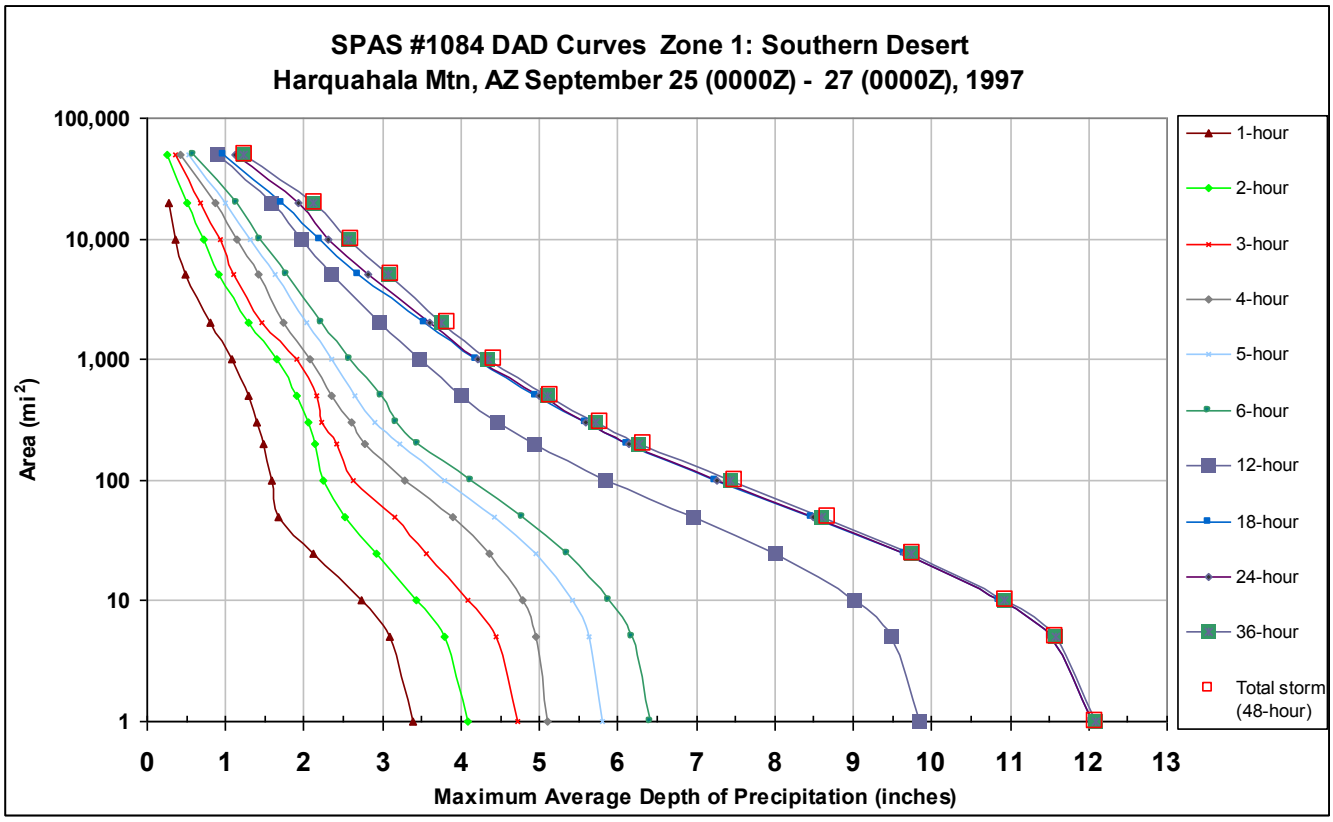
Adjusteded Storm Depth-Area-Duration

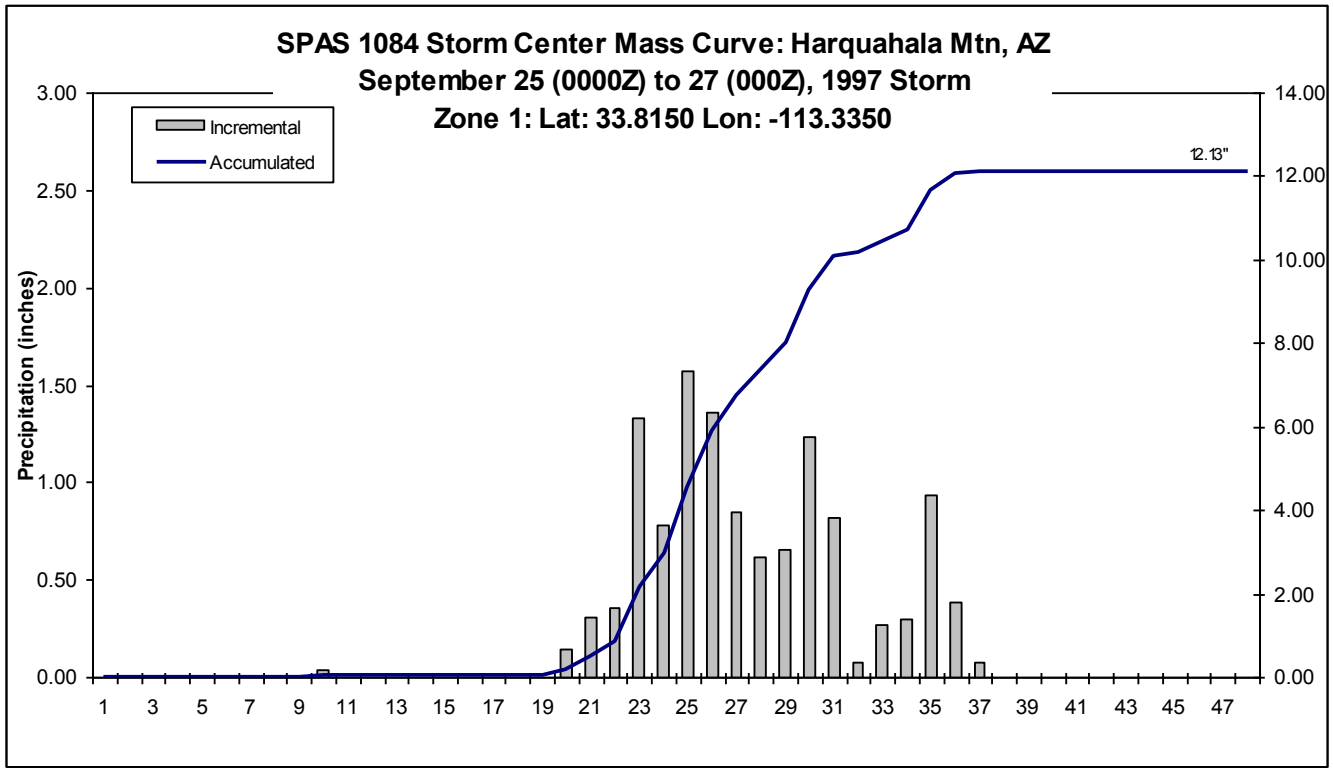
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	72 Hours
1 sq miles	**3.2**	**6.0**	**9.3**	**11.3**	**11.3**	-	**11.4**	**11.4**	-
10 sq miles	**2.6**	**5.5**	**8.5**	**10.2**	**10.2**	-	**10.3**	**10.3**	-
100 sq miles	**1.5**	**3.9**	**5.5**	**6.8**	**6.8**	-	**7.0**	**7.0**	-
200 sq miles	**1.4**	**3.3**	**4.6**	**5.8**	**5.8**	-	**5.9**	**6.0**	-
500 sq miles	**1.2**	**2.8**	**3.8**	**4.7**	**4.7**	-	**4.8**	**4.8**	-
1000 sq miles	**1.0**	**2.4**	**3.3**	**4.0**	**4.0**	-	**4.1**	**4.2**	-
2000 sq miles	**0.8**	**2.1**	**2.8**	**3.3**	**3.4**	-	**3.5**	**3.6**	-
5000 sq miles	**0.5**	**1.7**	**2.2**	**2.5**	**2.7**	-	**2.9**	**2.9**	-
10000 sq miles	**0.3**	**1.3**	**1.8**	**2.1**	**2.2**	-	**2.4**	**2.4**	-
20000 sq miles	**0.3**	**1.1**	**1.5**	**1.6**	**1.8**	-	**2.0**	**2.0**	-

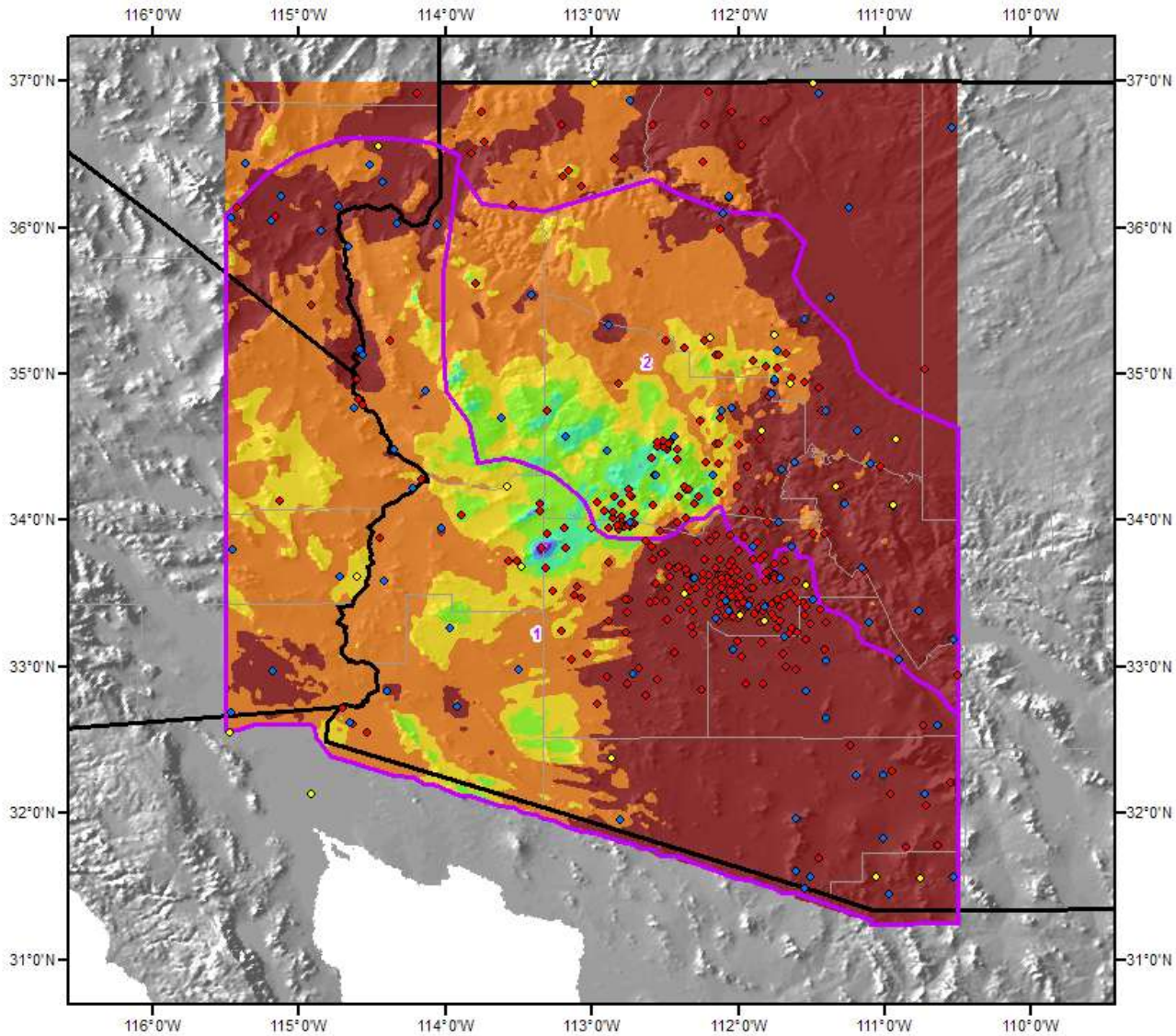
Storm or Storm Center Name	**SPAS-1084-Harquahala Mtn-Nora**	
Storm Date(s)	9/25-27/1997	
Storm Type	Tropical	
Storm Location	33.82	-113.34
Storm Center Elevation	4900	
Precipitation Total & Duration (10 sq mi)	12.09 inches 24 hours (SPAS 1084 DAD)	
Storm Representative Dewpoint	73.5 F	24
Storm Representative Dewpoint Location	33	-113
In-place Maximum Dewpoint	76.0 F	
Moisture Inflow Vector	SSE @ 60	
In-place Maximization Factor		
Temporal Transposition (Date)	10-Sep	
Transposition Dewpoint Location	30.16	-110.04
Transposition Maximum Dewpoint	77.0 F	
Transposition Adjustment Factor	1.06	
Grid Point Location	30.975	-110.375
Grid Point Elevation	6,977	
Total Adjustment Factor	0.94	

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

Area (mi^2)	Duration (hours) 1	2	3	4	5	6	12	18	24	36	total
0.4	3.46	4.16	4.80	5.23	5.89	6.51	10.03	12.08	12.09	12.13	12.13
1	3.38	4.08	4.73	5.11	5.81	6.42	9.85	12.04	12.05	12.09	12.09
5	3.09	3.79	4.45	4.96	5.64	6.18	9.48	11.52	11.53	11.57	11.58
10	2.73	3.43	4.09	4.78	5.42	5.88	9.01	10.86	10.87	10.93	10.94
25	2.11	2.92	3.56	4.37	4.96	5.36	8.00	9.66	9.65	9.73	9.76
50	1.68	2.53	3.15	3.89	4.43	4.79	6.96	8.47	8.49	8.59	8.69
100	1.59	2.25	2.62	3.29	3.80	4.12	5.84	7.24	7.26	7.43	7.49
200	1.49	2.13	2.41	2.77	3.22	3.46	4.93	6.12	6.13	6.27	6.34
300	1.40	2.05	2.23	2.61	2.90	3.18	4.47	5.58	5.59	5.71	5.77
500	1.30	1.91	2.16	2.35	2.65	2.98	4.00	4.95	5.00	5.11	5.15
1,000	1.09	1.66	1.91	2.08	2.35	2.59	3.48	4.20	4.22	4.35	4.43
2,000	0.80	1.30	1.46	1.74	2.03	2.22	2.96	3.53	3.60	3.74	3.84
5,000	0.49	0.92	1.11	1.41	1.63	1.77	2.34	2.69	2.82	3.06	3.11
10,000	0.36	0.71	0.93	1.14	1.32	1.43	1.96	2.20	2.30	2.56	2.60
20,000	0.27	0.50	0.68	0.86	1.00	1.15	1.59	1.72	1.92	2.12	2.14
50,000	-	0.25	0.35	0.43	0.52	0.60	0.89	0.98	1.13	1.23	1.25




SPAS 1084 Storm Center Mass Curve: Harquahala Mtn, AZ
September 25 (0000Z) to 27 (000Z), 1997 Storm
Zone 1: Lat: 33.8150 Lon: -113.3350
Incremental
Accumulated
12.13"
Precipitation (inches)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47



Total Rainfall (48-hours)
Harquahala Mtn, AZ 1997 Storm
Storm #1084 September 25 (0000 Z) to 27 (0000 Z), 1997

Miles: 0 30 60 120
Kilometers: 0 45 90 180 270

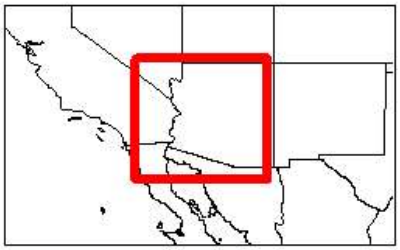
Gauging Stations

- Daily
- Hourly
- Hourly Estimated
- Hourly Pseudo
- Supplemental

N

Precipitation (inches)

- 0.00 - 1.00
- 1.01 - 2.00
- 2.01 - 3.00
- 3.01 - 4.00
- 4.01 - 6.00
- 6.01 - 8.00
- 8.01 - 10.00
- 10.01 - 11.00
- 11.01 - 13.00



Coordinate system: GCS North American 1983
Scale: 1:4,274,365

MetstatAWA August 24, 2009

Joseph City, AZ

July 31, 1998

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1115

General Storm Location: Joseph City, Arizona

Storm Dates: July 31, 1998

Event: Convective

Latitude: 34.945

Longitude: -110.355

Max. Grid/Radar Rainfall Amount: 4.20”

Max. Observed Rainfall Amount: 4.00”

Max. Grid/Radar 1-hour Rainfall Amount: 3.81”

Max. Observed 1-hour Rainfall Amount: 3.68”

Number of Stations: 37 (daily-21, hourly-8, hourly estimated-3, hourly pseudo-1, supplemental-4)

SPAS Version: 8.0

Base Map Used: Yes, defaultZR

Spatial resolution: 0.39 mi^2

Radar Included: Yes

Depth-Area-Duration (DAD) analysis: Yes, 1, 2, 3, 4, 5, 6, and 12- hour

Storm Name:	**SPAS-1115-Joseph City**
Storm Date:	**7/31/1998 - 8/1/1998**
AWA Analysis Date:	**5/25/2013**

Storm Adjustment for Grid Point 1

Temporal Transposition Date	**15-Aug**	
	Lat	**Long**
Storm center location	**34.95**	**-110.36**
Storm Rep dew point location	**34.00**	**-111.50**
Transposition dewpoint location	**30.025**	**-111.515**
Basin location	**30.975**	**-110.375**

Moisture Inflow Direction:	**SW @ 90**	miles
Grid Point Elevation	**6,977**	feet
Storm Center Elevation	**5,000**	feet
Storm Analysis Duration	**3**	hours

The storm representative dew point is	**74.5 F**	with total precipitable water above sea level of			**2.79**	inches.
The in-place maximum dew point is	**80.5 F**	with total precipitable water above sea level of			**3.68**	inches.
The transpositioned maximum dew point is	**82.0 F**	with total precipitable water above sea level of			**3.92**	inches.
The in-place storm elevation is	**5,000**	which subtracts	**1.07**	inches of precipitable water at	**74.5 F**	
The in-place storm elevation is	**5,000**	which subtracts	**1.31**	inches of precipitable water at	**80.5 F**	
The in-place storm elevation is	**5,000**	which subtracts	**1.37**	inches of precipitable water at	**82.0 F**	

The in-place maximization factor is	**1.38**
The moisture transposition factor is	**1.08**
The orographic transposition factor is	**1.39**
The total adjustment factor is	**2.06**

Notes:

Observed Storm Depth-Area-Duration

	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**3.7**	**4.1**	**4.1**	**4.2**	**4.2**	**4.2**	**4.2**	-	-
10 sq miles	**3.6**	**3.7**	**3.8**	**3.8**	**3.9**	**3.9**	**3.9**	-	-
50 sq miles	**3.2**	**3.3**	**3.3**	**3.3**	**3.4**	**3.4**	**3.5**	-	-
100 sq miles	**2.8**	**2.9**	**3.0**	**3.0**	**3.0**	**3.1**	**3.1**	-	-
200 sq miles	**2.4**	**2.4**	**2.4**	**2.5**	**2.5**	**2.6**	**2.6**	-	-
500 sq miles	**1.7**	**1.8**	**1.8**	**1.8**	**1.9**	**1.9**	**2.0**	-	-
1000 sq miles	**1.3**	**1.3**	**1.4**	**1.4**	**1.4**	**1.5**	**1.6**	-	-
2000 sq miles	**0.9**	**0.9**	**1.0**	**1.0**	**1.1**	**1.1**	**1.2**	-	-
5000 sq miles	**0.5**	**0.6**	**0.6**	**0.6**	**0.7**	**0.7**	**0.8**	-	-

Adjusted Storm Depth-Area-Duration

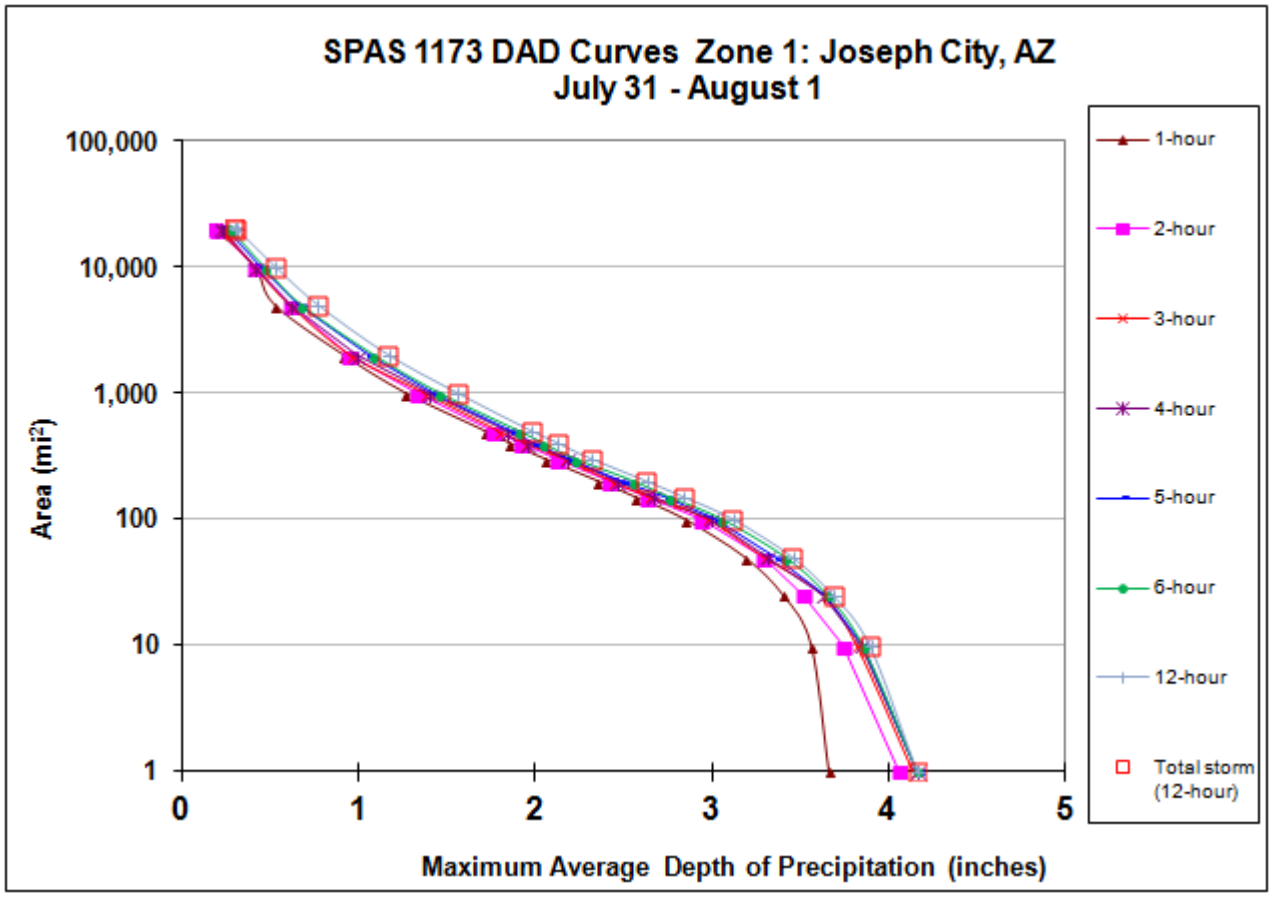
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**7.5**	**8.4**	**8.5**	**8.6**	**8.6**	**8.6**	**8.6**	-	-
10 sq miles	**7.3**	**7.7**	**7.9**	**7.9**	**7.9**	**7.9**	**8.0**	-	-
50 sq miles	**6.6**	**6.8**	**6.8**	**6.8**	**6.9**	**7.0**	**7.1**	-	-
100 sq miles	**5.9**	**6.1**	**6.1**	**6.2**	**6.2**	**6.3**	**6.4**	-	-
200 sq miles	**4.8**	**5.0**	**5.0**	**5.1**	**5.1**	**5.3**	**5.4**	-	-
500 sq miles	**3.5**	**3.6**	**3.7**	**3.8**	**3.8**	**3.9**	**4.1**	-	-
1000 sq miles	**2.6**	**2.7**	**2.8**	**2.9**	**2.9**	**3.0**	**3.2**	-	-
2000 sq miles	**1.9**	**1.9**	**2.0**	**2.0**	**2.2**	**2.2**	**2.4**	-	-
5000 sq miles	**1.1**	**1.3**	**1.3**	**1.3**	**1.4**	**1.4**	**1.6**	-	-

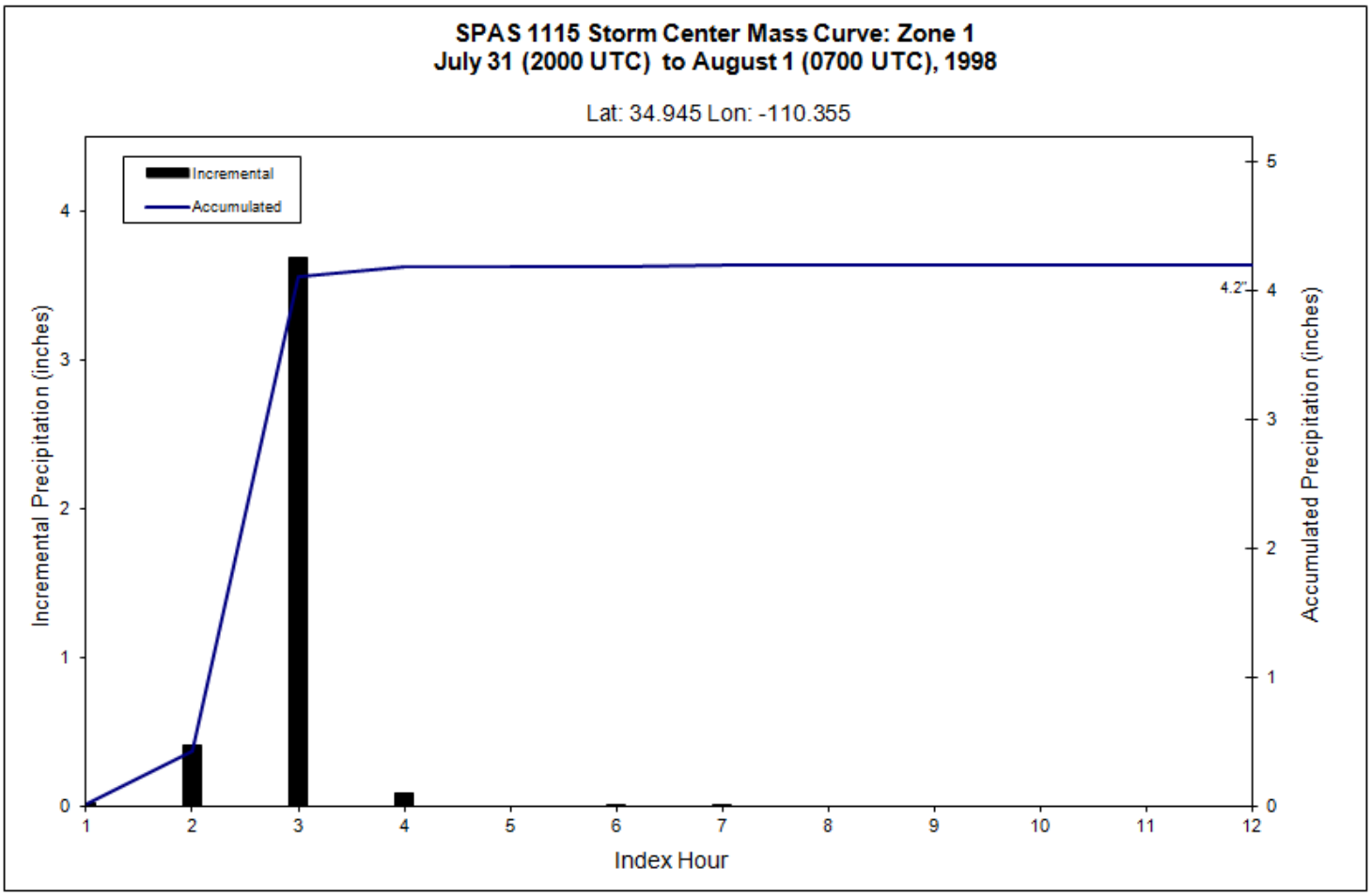
Storm or Storm Center Name	**SPAS-1115-Joseph City**		
Storm Date(s)	7/31/1998 - 8/1/1998		
Storm Type	Local Storm		
Storm Location	34.95	-110.36	
Storm Center Elevation	5,000		
Precipitation Total & Duration (10 sq mi)	4.20 inches 12 hour (SPAS 1115 DAD)		
Storm Representative Dewpoint	74.5 F	3	hr ave from KDVT and K0E4
Storm Representative Dewpoint Location	34	-111.5	
In-place Maximum Dewpoint	80.5 F		
Moisture Inflow Vector	SW @ 90		
In-place Maximization Factor	1.38		
Temporal Transposition (Date)	15-Aug		
Transposition Dewpoint Location	30.03	-111.52	
Transposition Maximum Dewpoint	82.0 F		
Transposition Adjustment Factor	1.08		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	2.06		

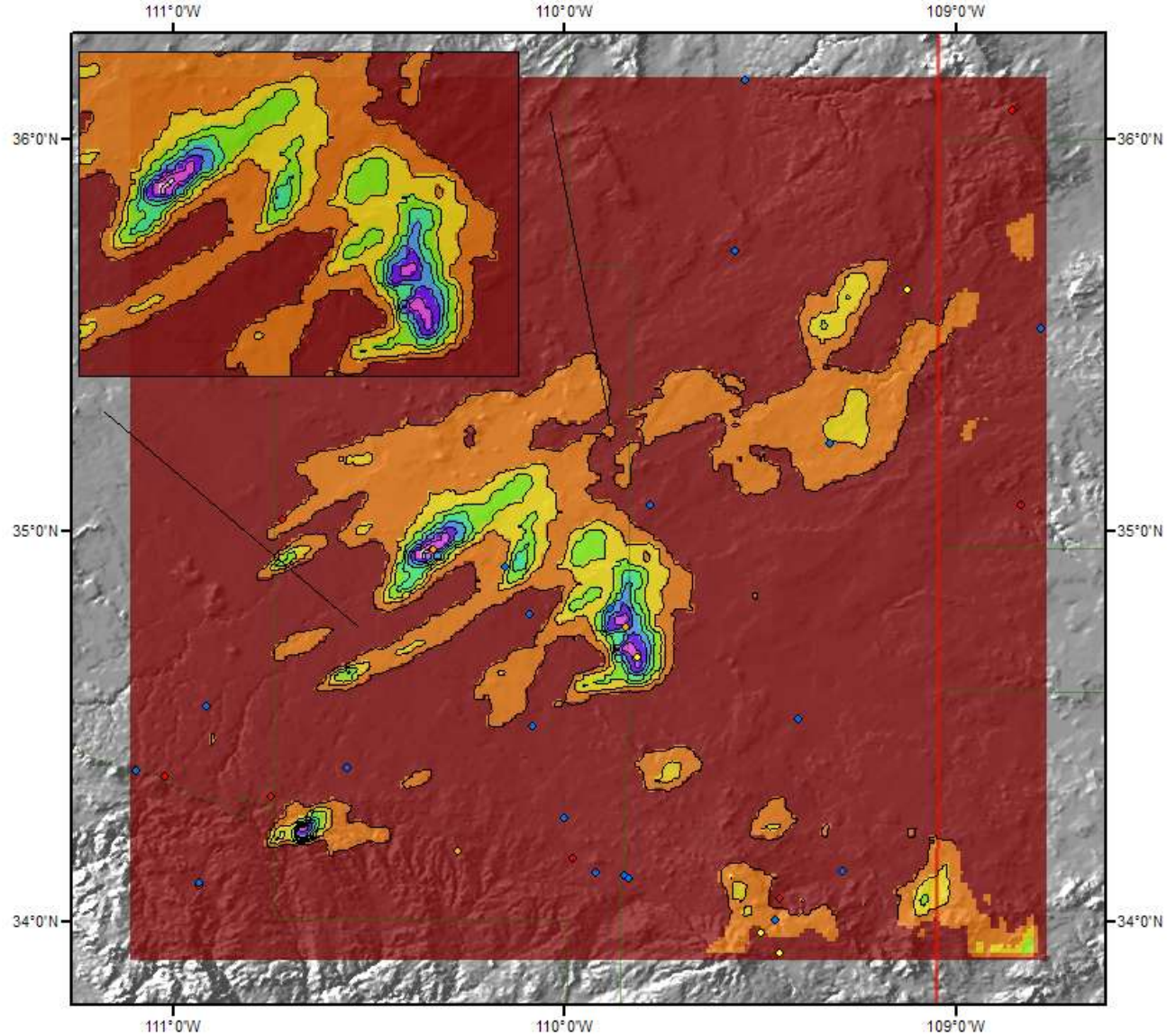
Storm 1115 - July 31 (2000 UTC) - August 1 (0700 UTC), 1998

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

	Duration (hours)							
Area (mi^2)	1	2	3	4	5	6	12	Total
0.39	3.82	4.09	4.17	4.19	4.19	4.19	4.20	4.20
1	3.66	4.06	4.14	4.16	4.16	4.16	4.16	4.16
10	3.56	3.74	3.82	3.84	3.85	3.85	3.89	3.89
25	3.40	3.52	3.63	3.63	3.64	3.65	3.68	3.68
50	3.18	3.29	3.29	3.31	3.36	3.41	3.45	3.45
100	2.84	2.94	2.97	2.99	3.02	3.05	3.11	3.11
150	2.56	2.63	2.64	2.67	2.73	2.75	2.83	2.83
200	2.35	2.42	2.43	2.46	2.48	2.55	2.62	2.62
300	2.05	2.12	2.16	2.18	2.19	2.22	2.31	2.31
400	1.85	1.92	1.94	1.95	1.98	2.04	2.12	2.12
500	1.71	1.76	1.79	1.84	1.86	1.90	1.97	1.97
1,000	1.26	1.33	1.37	1.40	1.42	1.45	1.55	1.55
2,000	0.91	0.94	0.95	0.99	1.05	1.08	1.16	1.16
5,000	0.52	0.61	0.61	0.61	0.66	0.67	0.76	0.76
10,000	0.41	0.41	0.41	0.41	0.44	0.46	0.52	0.52
20,000	0.18	0.20	0.22	0.23	0.25	0.27	0.30	0.30
20,670	0.17	0.19	0.21	0.22	0.24	0.26	0.29	0.29




SPAS 1115 Storm Center Mass Curve: Zone 1
July 31 (2000 UTC) to August 1 (0700 UTC), 1998
Lat: 34.945 Lon: -110.355
Incremental
Accumulated
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
Index Hour
4.2"
0
1
2
3
4
5
6
7
8
9
10
11
12



Total Rainfall (12-hours)
Joseph City, AZ 1998 Storm
SPAS # 1115 July 31 (2000 UTC) to August 1 (0700 UTC), 1998

Miles: 0 12.5 25 50
Kilometers: 0 15 30 60 90

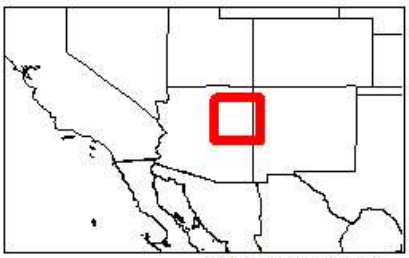
Legend

- Daily
- Hourly
- Hourly Estimated
- Supplemental

Legend

- 0.00 - 0.50
- 0.51 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00
- 2.01 - 2.50
- 2.51 - 3.00
- 3.01 - 3.50
- 3.51 - 4.00
- 4.01 - 4.50

N



Metstat/AWA March 03, 2010

Sabino Canyon, AZ

July 14-15, 1999

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1087

General Storm Location: Sabino Canyon, Arizona

Storm Dates: July 14-15, 1999

Event: Convective Local

Latitude: 32.3850

Longitude: -110.7050

Max. Grid/Radar Rainfall Amount: 7.87”

Max. Observed Rainfall Amount: 6.82”

Max. Grid/Radar 1-hour Rainfall Amount: 2.79”

Max. Observed 1-hour Rainfall Amount: 2.76”

Number of Stations: 149 (34-daily, 99-hourly, 16-supplemental)

SPAS Version: 7.0

Base Map Used: Yes, conus_prism_ppt_in_1971_2000_07

Spatial resolution: 0.40 mi^2

Radar Included: Yes

Depth-Area-Duration (DAD) analysis: Yes, 1, 2, 3, 4, 5, 6, 9, 12, 18, & 24-hour

Storm Name:	SPAS-1087-Sabino Canyon
Storm Date:	July 15, 1999
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	1-Aug	
	Lat	Long
Storm center location	32.39	-110.71
Storm Rep dew point location	32.12	-110.93
Transposition dewpoint location	30.705	-110.595
Basin location	30.975	-110.375

Moisture Inflow Direction:	SW @ 25	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	6,800	feet
Storm Analysis Duration	12	hours

The storm representative dew point is	75.0 F	with total precipitable water above sea level of			2.85	inches.
The in-place maximum dew point is	79.5 F	with total precipitable water above sea level of			3.52	inches.
The transpositioned maximum dew point is	79.5 F	with total precipitable water above sea level of			3.52	inches.
The in-place storm elevation is	6,800	which subtracts	1.39	inches of precipitable water at	75.0 F	
The in-place storm elevation is	6,800	which subtracts	1.63	inches of precipitable water at	79.5 F	
The in-place storm elevation is	6,800	which subtracts	1.63	inches of precipitable water at	79.5 F	

The in-place maximization factor is	1.29
The moisture transposition factor is	1.00
The orographic transposition factor is	0.96
The total adjustment factor is	1.24

Notes:

Observed Storm Depth-Area-Duration

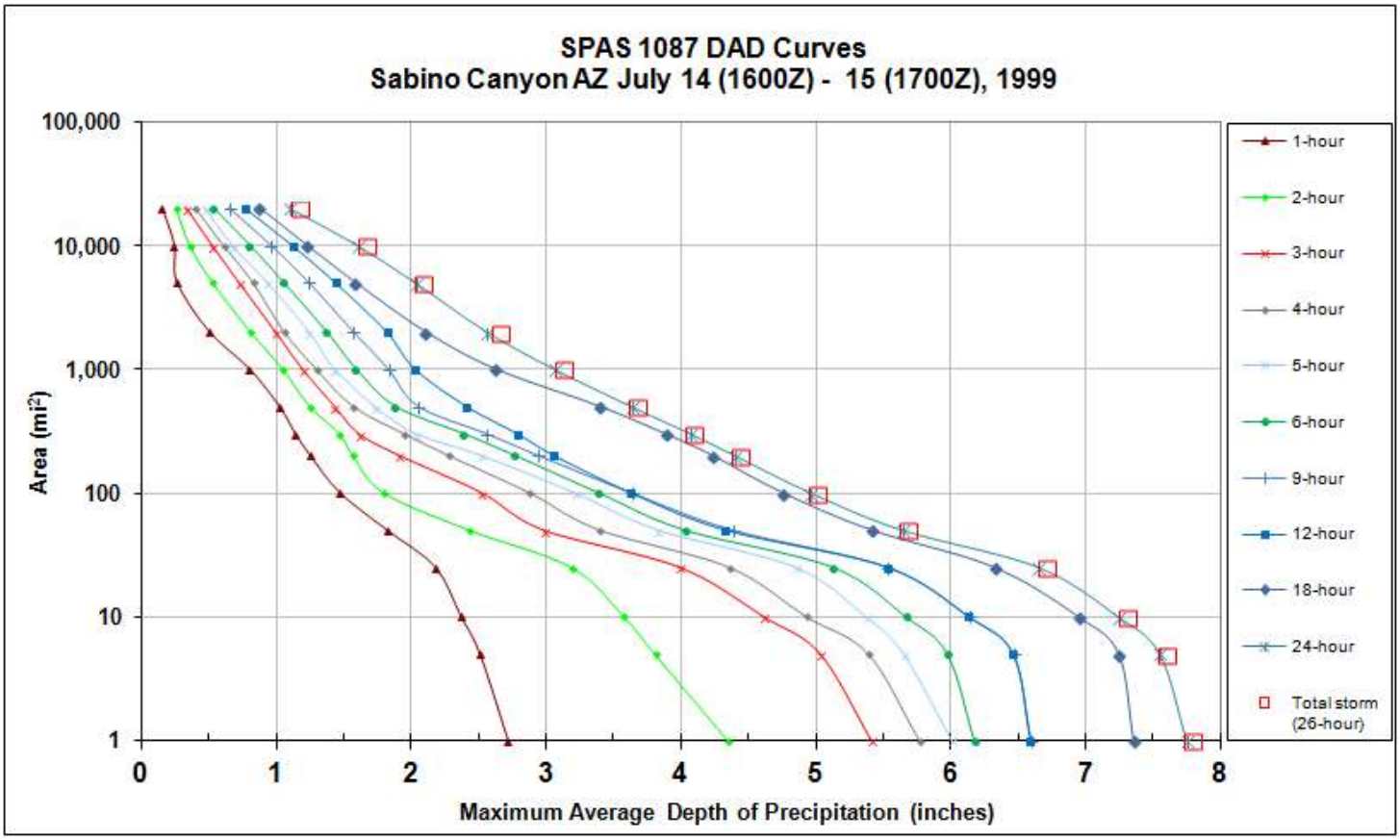
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	2.7	4.4	5.4	5.8	6.0	6.2	6.6	7.4	7.8
10 sq miles	2.4	3.6	4.6	4.9	5.4	5.7	6.1	7.0	7.2
50 sq miles	1.8	2.4	3.0	3.4	3.8	4.0	4.3	5.4	5.6
100 sq miles	1.5	1.8	2.5	2.9	3.2	3.4	3.6	4.8	5.0
200 sq miles	1.3	1.6	1.9	2.3	2.5	2.8	3.1	4.2	4.4
500 sq miles	1.0	1.3	1.4	1.6	1.7	1.9	2.4	3.4	3.6
1000 sq miles	0.8	1.1	1.2	1.3	1.4	1.6	2.0	2.6	3.1
2000 sq miles	0.5	0.8	1.0	1.1	1.2	1.4	1.8	2.1	2.6
5000 sq miles	0.3	0.5	0.7	0.8	0.9	1.1	1.4	1.6	2.0

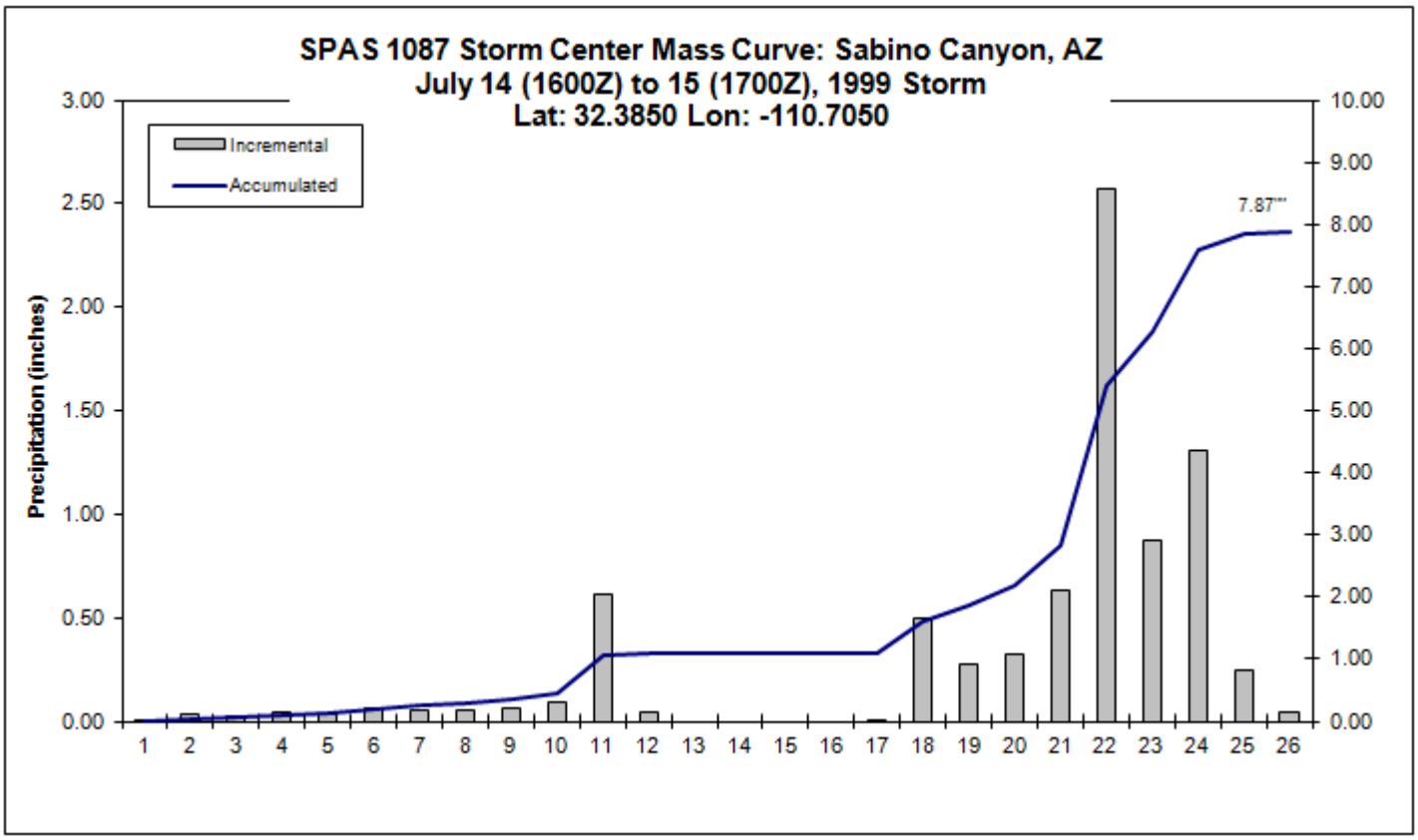
Adjusted Storm Depth-Area-Duration

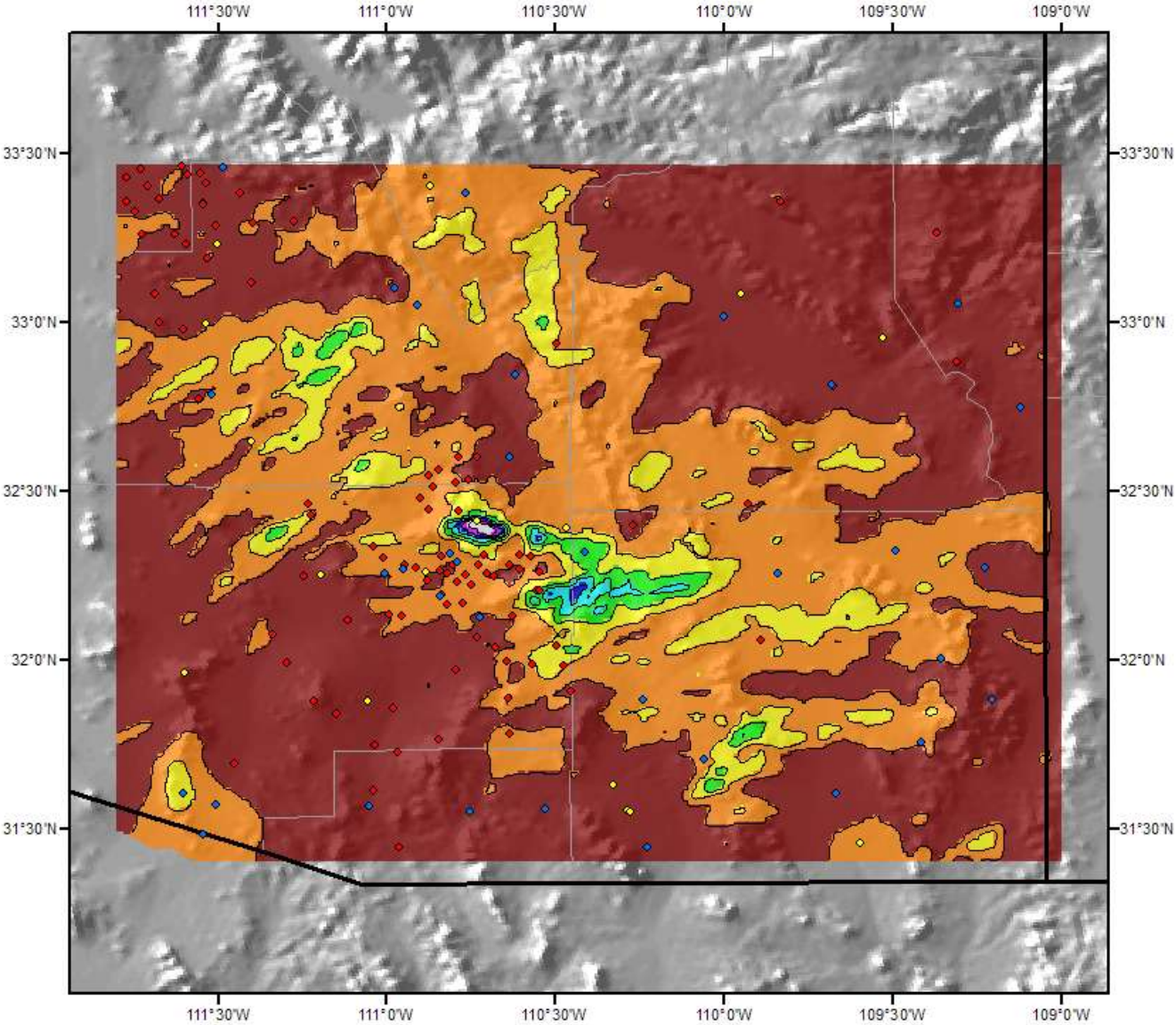
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	3.4	5.4	6.7	7.2	7.5	7.7	8.2	9.1	9.6
10 sq miles	2.9	4.4	5.7	6.1	6.7	7.0	7.6	8.6	9.0
50 sq miles	2.3	3.0	3.7	4.2	4.8	5.0	5.4	6.7	7.0
100 sq miles	1.8	2.2	3.1	3.6	4.0	4.2	4.5	5.9	6.2
200 sq miles	1.6	2.0	2.4	2.8	3.1	3.4	3.8	5.3	5.5
500 sq miles	1.3	1.6	1.8	2.0	2.1	2.3	3.0	4.2	4.5
1000 sq miles	1.0	1.3	1.5	1.6	1.8	2.0	2.5	3.3	3.8
2000 sq miles	0.6	1.0	1.2	1.3	1.5	1.7	2.3	2.6	3.2
5000 sq miles	0.3	0.7	0.9	1.0	1.2	1.3	1.8	2.0	2.5

Storm or Storm Center Name	SPAS-1087-Sabino Canyon		
Storm Date(s)	7/15/99		
Storm Type	Local Storm		
Storm Location	32.39	-110.71	
Storm Center Elevation	6800		
Precipitation Total & Duration (10 sq mi)	6.27" in 6hrs (SPAS 1087 DAD)		
Storm Representative Dewpoint	75.0 F	12	hr ave KTUS
Storm Representative Dewpoint Location	32.12	-110.93	
In-place Maximum Dewpoint	79.5 F		
Moisture Inflow Vector	SW @ 25		
In-place Maximization Factor	1.29		
Temporal Transposition (Date)	1-Aug		
Transposition Dewpoint Location	30.71	-110.60	
Transposition Maximum Dewpoint	79.5 F		
Transposition Adjustment Factor	1.00		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	1.24		

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)											
	Duration (hours)										
Area (mi^2)	1	2	3	4	5	6	9	12	18	24	total
0.4	2.80	4.48	5.55	5.96	6.12	6.27	6.77	6.77	7.59	7.84	7.87
1	2.72	4.35	5.41	5.77	6.01	6.18	6.59	6.59	7.36	7.75	7.79
5	2.51	3.81	5.03	5.39	5.65	5.98	6.46	6.46	7.25	7.55	7.61
10	2.37	3.58	4.61	4.93	5.37	5.67	6.13	6.13	6.95	7.24	7.31
25	2.18	3.19	3.99	4.36	4.85	5.13	5.53	5.53	6.33	6.65	6.71
50	1.82	2.43	2.98	3.40	3.83	4.03	4.38	4.33	5.42	5.64	5.69
100	1.47	1.80	2.52	2.88	3.21	3.39	3.63	3.63	4.76	4.96	5.01
200	1.25	1.57	1.91	2.28	2.52	2.77	2.94	3.06	4.24	4.40	4.44
300	1.14	1.47	1.61	1.95	2.03	2.39	2.56	2.79	3.89	4.07	4.10
500	1.02	1.25	1.43	1.57	1.73	1.88	2.05	2.41	3.40	3.63	3.68
1,000	0.80	1.05	1.19	1.30	1.43	1.59	1.83	2.03	2.63	3.06	3.14
2,000	0.50	0.81	0.99	1.06	1.24	1.37	1.57	1.82	2.11	2.56	2.67
5,000	0.26	0.53	0.72	0.83	0.93	1.05	1.24	1.44	1.59	2.03	2.10
10,000	0.24	0.36	0.52	0.61	0.67	0.80	0.96	1.12	1.23	1.60	1.68
20,000	0.15	0.26	0.33	0.40	0.47	0.53	0.65	0.77	0.88	1.10	1.18




SPAS 1087 Storm Center Mass Curve: Sabino Canyon, AZ
July 14 (1600Z) to 15 (1700Z), 1999 Storm
Lat: 32.3850 Lon: -110.7050
Incremental
Accumulated
Precipitation (inches)
7.87"
3.00
2.50
2.00
1.50
1.00
0.50
0.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26



Total Rainfall (24-hours)
Sabino Canyon, AZ 1999 Storm
Storm #1087 July 14 (1600 Z) to 15 (1700 Z), 1999

Miles: 0 10 20 40
Kilometers: 0 15 30 60 90

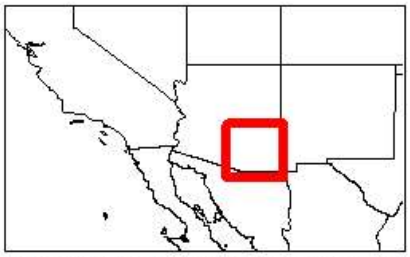
N

Gauging Stations

- Daily
- Hourly
- Supplemental

Precipitation (inches)

0.01 - 1.00	2.01 - 3.00	4.01 - 5.00	6.01 - 7.00
1.01 - 2.00	3.01 - 4.00	5.01 - 6.00	7.01 - 8.00



Coordinate system: GCS North American 1983
Scale: 1:1,840,917
Metstat/AWA August 21, 2009

Sols Wash, AZ

August 29, 2000

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1043

General Storm Location: Sols Wash at SR 71, AZ

Storm Dates: 8/29/2000 0100Z – 8/30/2000 0300Z

Event: Thunderstorm

Latitude: 34.13

Longitude: -113.08

Max. Grid/Radar Rainfall Amount: 5.54" (Grid/Pixel Point)

Max. Observed Rainfall Amount: 4.60" (Sols Wash at SR 71, 785275)

Number of Stations: 117 (84-hourly, 22-daily 11-supplemental) gauging stations within the defined search domain.

SPAS Version: 4.0

Base Map Used: No

Spatial resolution: 30 seconds

Radar Included: Yes, Phoenix, AZ Radar (KIWA)

Depth-Area-Duration (DAD) analysis: Yes: 1, 2, 3, 4, 5, 6, 12, 18, 24, & 27 hours

Storm Name:	**SPAS-1043-Sols Wash**
Storm Date:	**August 29, 2000**
AWA Analysis Date:	**5/25/2013**

Storm Adjustment for Grid Point 1

Temporal Transposition Date	**15-Aug**	
	Lat	**Long**
Storm center location	**34.13**	**-113.08**
Storm Rep dew point location	**33.00**	**-113.00**
Transposition dewpoint location	**29.85**	**-110.30**
Basin location	**30.98**	**-110.38**

Moisture Inflow Direction:	**S @ 80**	miles
Grid Point Elevation	**6,977**	feet
Storm Center Elevation	**2,650**	feet
Storm Analysis Duration	**12**	hours

The storm representative dew point is	**71.5 F**	with total precipitable water above sea level of			**2.42**	inches.
The in-place maximum dew point is	**79.5 F**	with total precipitable water above sea level of			**3.52**	inches.
The transpositioned maximum dew point is	**80.0 F**	with total precipitable water above sea level of			**3.60**	inches.
The in-place storm elevation is	**2,650**	which subtracts	**0.56**	inches of precipitable water at	**71.5 F**	
The in-place storm elevation is	**2,650**	which subtracts	**0.73**	inches of precipitable water at	**79.5 F**	
The in-place storm elevation is	**2,650**	which subtracts	**0.74**	inches of precipitable water at	**80.0 F**	

The in-place maximization factor is	**1.50**
The moisture transposition factor is	**1.03**
Orographic Transpostion Factor	**1.02**
The total adjustment factor is	**1.57**

Notes:

Observed Storm Depth-Area-Duration

	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**2.2**	**3.7**	**5.1**	**5.1**	**5.1**	**5.1**	**5.9**	**6.0**	**6.0**
10 sq miles	**2.0**	**3.3**	**4.5**	**4.6**	**4.6**	**4.6**	**5.2**	**5.3**	**5.3**
50 sq miles	**1.7**	**2.9**	**4.0**	**4.0**	**4.0**	**4.0**	**4.6**	**4.7**	**4.7**
100 sq miles	**1.6**	**2.7**	**3.7**	**3.7**	**3.7**	**3.7**	**4.3**	**4.4**	**4.4**
200 sq miles	**1.5**	**2.5**	**3.3**	**3.4**	**3.4**	**3.4**	**3.9**	**4.0**	**4.0**
500 sq miles	**1.2**	**2.0**	**2.7**	**2.8**	**2.8**	**2.8**	**3.2**	**3.3**	**3.3**
1000 sq miles	**1.1**	**1.7**	**2.4**	**2.4**	**2.4**	**2.4**	**2.7**	**2.8**	**2.8**
2000 sq miles	**0.9**	**1.5**	**2.0**	**2.0**	**2.0**	**2.0**	**2.3**	**2.4**	**2.5**
5000 sq miles	**0.6**	**1.0**	**1.4**	**1.4**	**1.4**	**1.5**	**1.7**	**1.7**	**1.9**

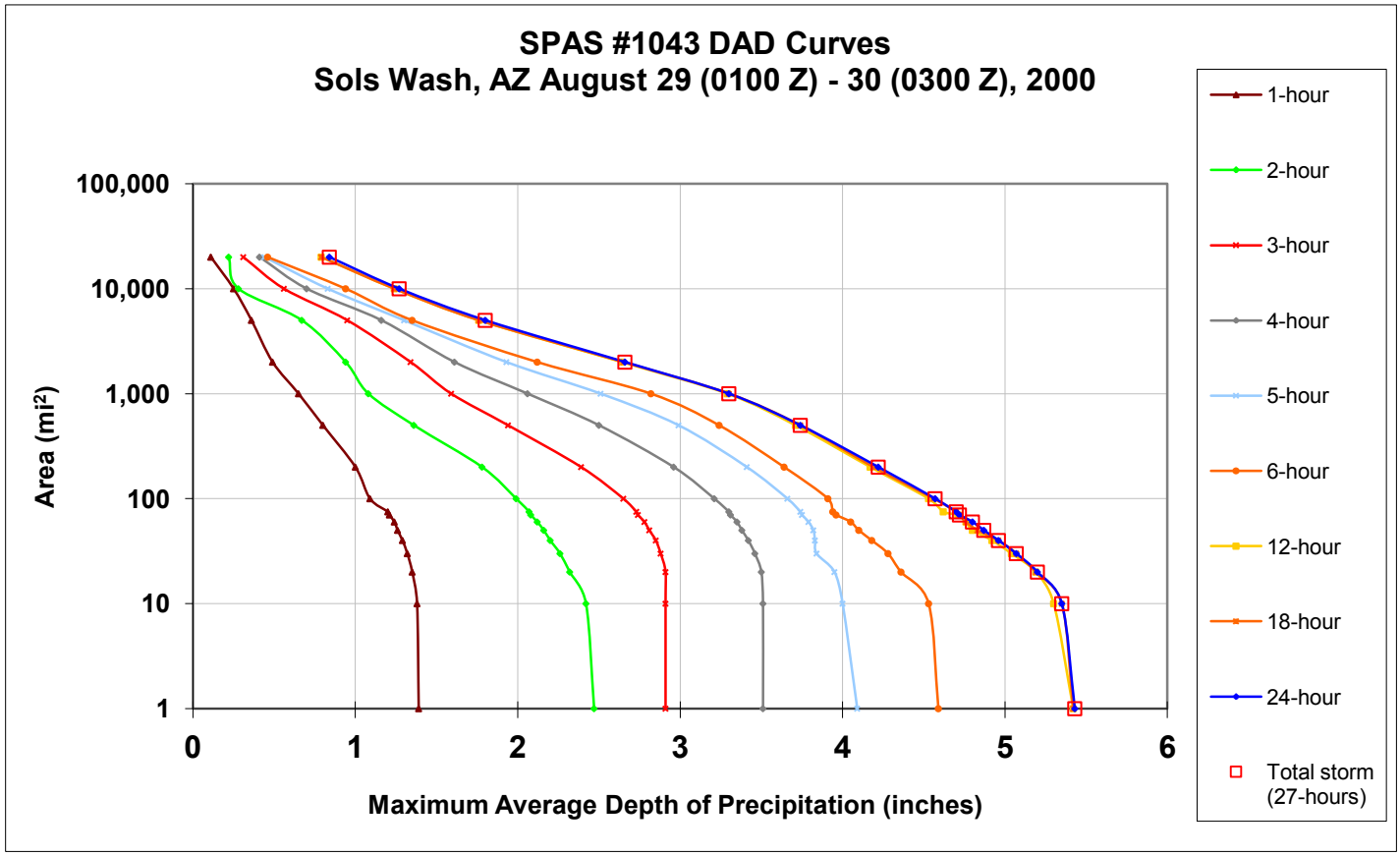
Adjusted Storm Depth-Area-Duration

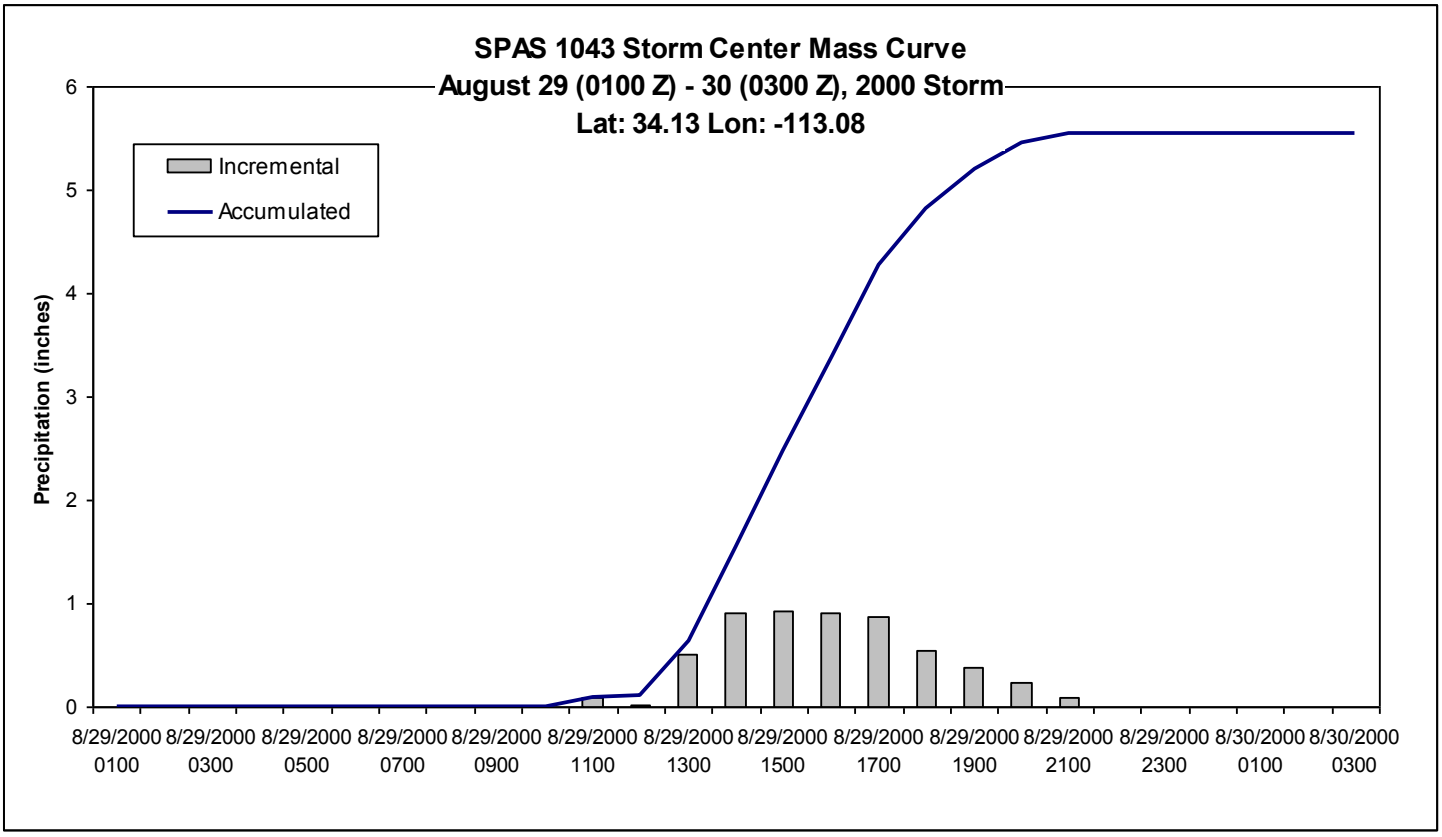
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**3.4**	**5.8**	**8.0**	**8.0**	**8.0**	**8.0**	**9.3**	**9.4**	**9.4**
10 sq miles	**3.1**	**5.2**	**7.0**	**7.1**	**7.1**	**7.1**	**8.2**	**8.3**	**8.3**
50 sq miles	**2.7**	**4.6**	**6.2**	**6.3**	**6.3**	**6.3**	**7.2**	**7.3**	**7.3**
100 sq miles	**2.5**	**4.3**	**5.8**	**5.8**	**5.8**	**5.8**	**6.7**	**6.8**	**6.8**
200 sq miles	**2.3**	**3.9**	**5.2**	**5.3**	**5.3**	**5.3**	**6.1**	**6.2**	**6.3**
500 sq miles	**1.9**	**3.2**	**4.3**	**4.4**	**4.4**	**4.4**	**5.0**	**5.1**	**5.2**
1000 sq miles	**1.7**	**2.7**	**3.7**	**3.7**	**3.7**	**3.7**	**4.3**	**4.4**	**4.4**
2000 sq miles	**1.4**	**2.3**	**3.1**	**3.1**	**3.2**	**3.2**	**3.6**	**3.7**	**3.8**
5000 sq miles	**1.0**	**1.6**	**2.2**	**2.2**	**2.3**	**2.3**	**2.6**	**2.7**	**2.9**

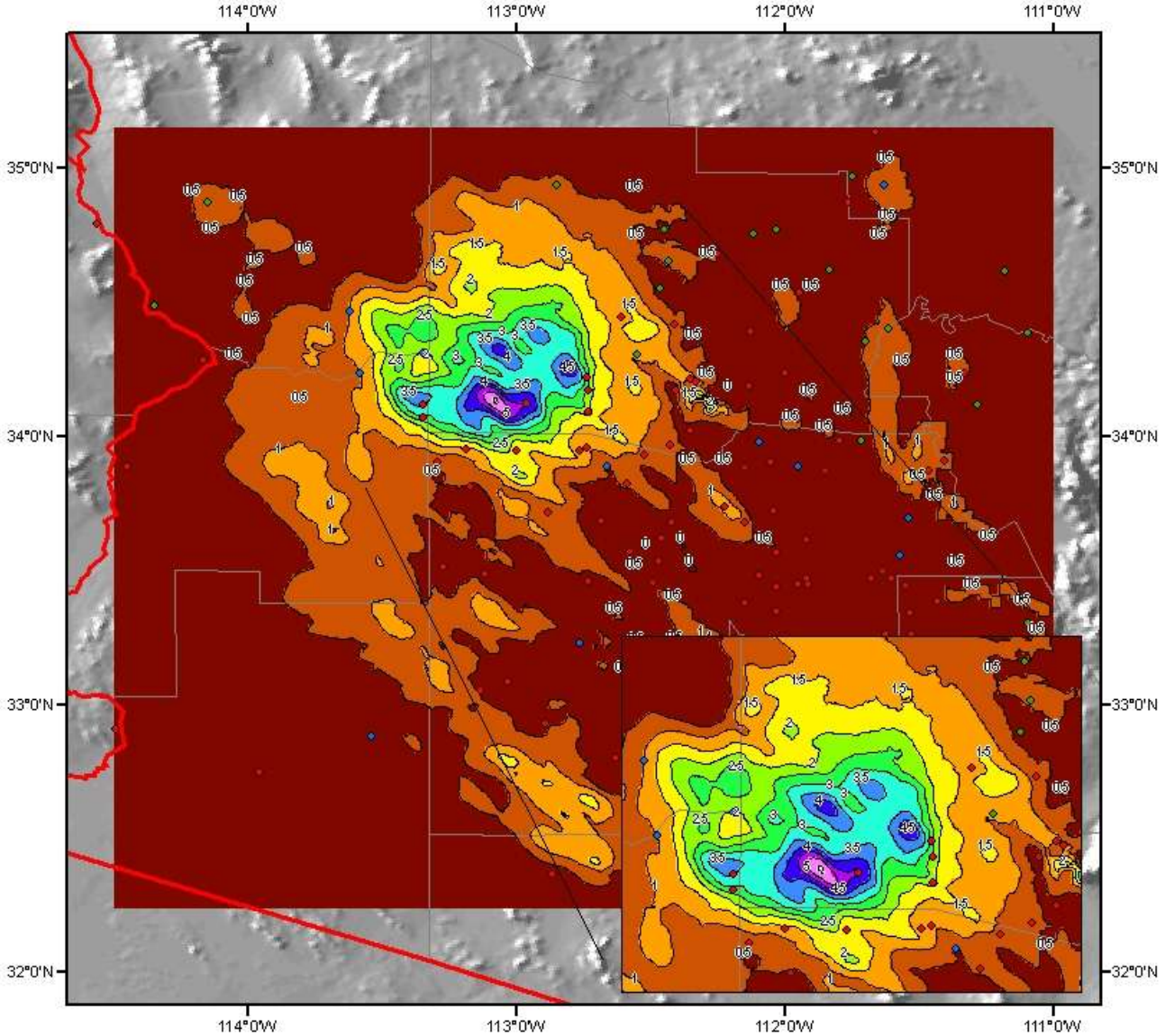
Storm or Storm Center Name	**SPAS-1043-Sols Wash**		
Storm Date(s)	August 29, 2000		
Storm Type	Local Storm		
Storm Location	34.13	-113.08	
Storm Center Elevation	2,650		
Precipitation Total & Duration (10 sq mi)	4.70 inches 6 hours 5.54" in 24hrs (SPAS 1043 DAD)		
Storm Representative Dewpoint	71.5 F	12	KGBN, KLUF
Storm Representative Dewpoint Location	33	-113	
In-place Maximum Dewpoint	79.5 F		
Moisture Inflow Vector	S @ 80		
In-place Maximization Factor			
Temporal Transposition (Date)	15-Aug		
Transposition Dewpoint Location	29.85	-110.30	
Transposition Maximum Dewpoint	80.0 F		
Transposition Adjustment Factor			
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	1.57		

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

Area (mi^2)	Duration (hours)									
	1	2	3	4	5	6	12	18	24	Total
0.28	1.48	2.58	3.03	3.63	4.18	4.70	5.53	5.54	5.54	5.54
1	1.39	2.47	2.91	3.51	4.09	4.59	5.42	5.42	5.43	5.43
10	1.38	2.42	2.91	3.51	4.00	4.53	5.30	5.35	5.35	5.35
20	1.35	2.32	2.91	3.50	3.95	4.36	5.19	5.19	5.20	5.20
30	1.32	2.26	2.88	3.46	3.84	4.28	5.04	5.07	5.07	5.07
40	1.29	2.20	2.85	3.42	3.83	4.18	4.92	4.96	4.96	4.96
50	1.26	2.16	2.81	3.38	3.82	4.10	4.80	4.83	4.87	4.87
60	1.24	2.12	2.78	3.35	3.79	4.05	4.76	4.76	4.80	4.80
70	1.21	2.08	2.74	3.31	3.75	3.96	4.71	4.72	4.72	4.72
75	1.20	2.07	2.73	3.30	3.74	3.94	4.62	4.70	4.70	4.70
100	1.09	1.99	2.65	3.21	3.66	3.91	4.53	4.56	4.57	4.57
200	1.00	1.78	2.39	2.96	3.41	3.64	4.17	4.19	4.22	4.22
500	0.80	1.36	1.94	2.50	2.99	3.24	3.71	3.74	3.74	3.74
1,000	0.65	1.08	1.59	2.06	2.51	2.82	3.29	3.30	3.30	3.30
2,000	0.49	0.94	1.34	1.61	1.93	2.12	2.64	2.65	2.66	2.66
5,000	0.36	0.67	0.95	1.16	1.30	1.35	1.76	1.76	1.80	1.80
10,000	0.25	0.28	0.56	0.70	0.83	0.94	1.24	1.24	1.27	1.27
20,000	0.11	0.22	0.31	0.41	0.44	0.46	0.79	0.79	0.84	0.84




SPAS 1043 Storm Center Mass Curve
August 29 (0100 Z) - 30 (0300 Z), 2000 Storm
Lat: 34.13 Lon: -113.08
Incremental
Accumulated
Precipitation (inches)
0
1
2
3
4
5
6
8/29/2000 0100
8/29/2000 0300
8/29/2000 0500
8/29/2000 0700
8/29/2000 0900
8/29/2000 1100
8/29/2000 1300
8/29/2000 1500
8/29/2000 1700
8/29/2000 1900
8/29/2000 2100
8/29/2000 2300
8/30/2000 0100
8/30/2000 0300



Total Rainfall (27-hours)
Sols Wash, AZ 2000 Storm
Storm #1043 August 29 (0100 Z) to 30 (0300 Z), 2000

Miles: 0 12.5 25 50
Kilometers: 0 20 40 80 120

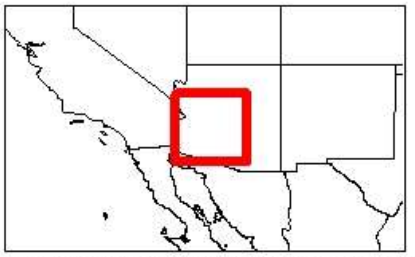
Gauging Stations

Hourly · Daily · Supplemental

N

Precipitation (inches)

0.00 - 0.50	1.51 - 2.00	3.01 - 3.50	4.51 - 5.00
0.51 - 1.00	2.01 - 2.50	3.51 - 4.00	5.01 - 5.50
1.01 - 1.50	2.51 - 3.00	4.01 - 4.50	5.51 - 6.00



Coordinate system: GCS North American 1983
Scale: 1:2,342,749
Metzler/AWA October 18, 2007

Bluff, UT

August 14, 2001

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1131

General Storm Location: Bluff, Utah

Storm Dates: August 14, 2001

Event: Convective Storm

Latitude: 37.255

Longitude: -109.575

Max. Grid/Radar Rainfall Amount: 6.28"

Max. Observed Rainfall Amount: 3.50" (Bluff, UT)

Max. Grid/Radar 1-hour Rainfall Amount: 5.85"

Max. Observed 1-hour Rainfall Amount: 3.03" (Bluff, UT)

Number of Stations: 27 (12-daily, 10-hourly, 4-hourly estimated, 1-supplemental)

SPAS Version: 85

Base Map Used: Yes

Spatial resolution: 0.38 mi^2

Radar Included: Yes, but data reflectivity was low (see discussions below)

Depth-Area-Duration (DAD) analysis: Yes, 1, 2, 3, 4, 5, and 6-hr

Storm Name:	SPAS-1131-Bluff
Storm Date:	August 14, 2001
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	15-Aug	
	Lat	Long
Storm center location	37.26	-109.58
Storm Rep dew point location	34.50	-110.00
Transposition dewpoint location	28.215	-110.795
Basin location	30.975	-110.375

Moisture Inflow Direction:	SSW @ 190	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	4,950	feet
Storm Analysis Duration	3	hours

The storm representative dew point is	77.5 F	with total precipitable water above sea level of			3.22	inches.
The in-place maximum dew point is	79.5 F	with total precipitable water above sea level of			3.52	inches.
The transpositioned maximum dew point is	82.5 F	with total precipitable water above sea level of			4.00	inches.
The in-place storm elevation is	4,950	which subtracts	1.17	inches of precipitable water at	77.5 F	
The in-place storm elevation is	4,950	which subtracts	1.25	inches of precipitable water at	79.5 F	
The in-place storm elevation is	4,950	which subtracts	1.37	inches of precipitable water at	82.5 F	

The in-place maximization factor is	1.11
The moisture transposition factor is	1.16
The orographic transposition factor is	1.41
The total adjustment factor is	1.81

Notes:

Observed Storm Depth-Area-Duration

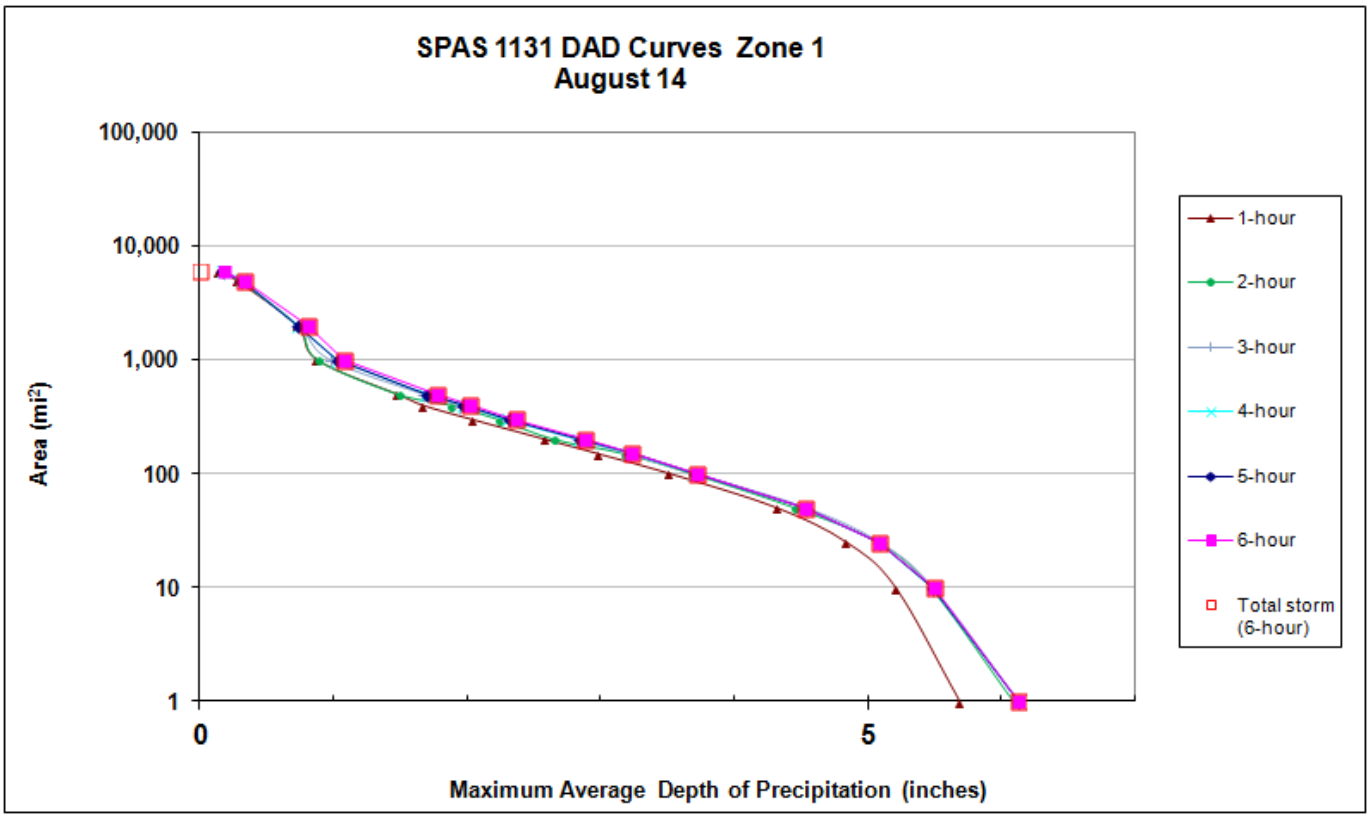
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	5.7	6.1	6.1	6.1	6.1	6.1	-	-	-
10 sq miles	5.2	5.5	5.5	5.5	5.5	5.5	-	-	-
50 sq miles	4.3	4.5	4.5	4.5	4.5	4.5	-	-	-
100 sq miles	3.5	3.7	3.7	3.7	3.7	3.7	-	-	-
200 sq miles	2.6	2.7	2.8	2.8	2.8	2.9	-	-	-
500 sq miles	1.5	1.5	1.7	1.7	1.7	1.8	-	-	-
1000 sq miles	0.9	0.9	1.0	1.0	1.0	1.1	-	-	-
2000 sq miles	0.7	0.7	0.7	0.7	0.7	0.8	-	-	-
5000 sq miles	0.3	0.3	0.3	0.3	0.3	0.3	-	-	-

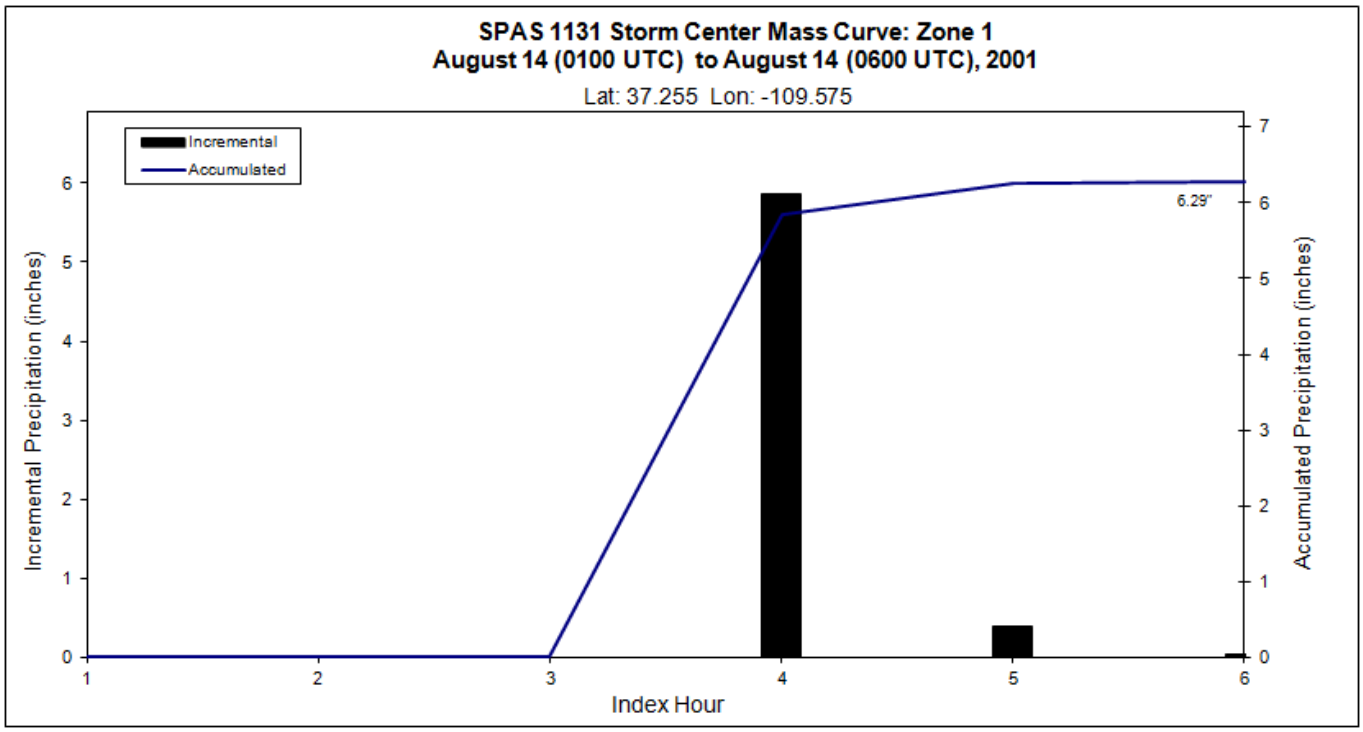
Adjusted Storm Depth-Area-Duration

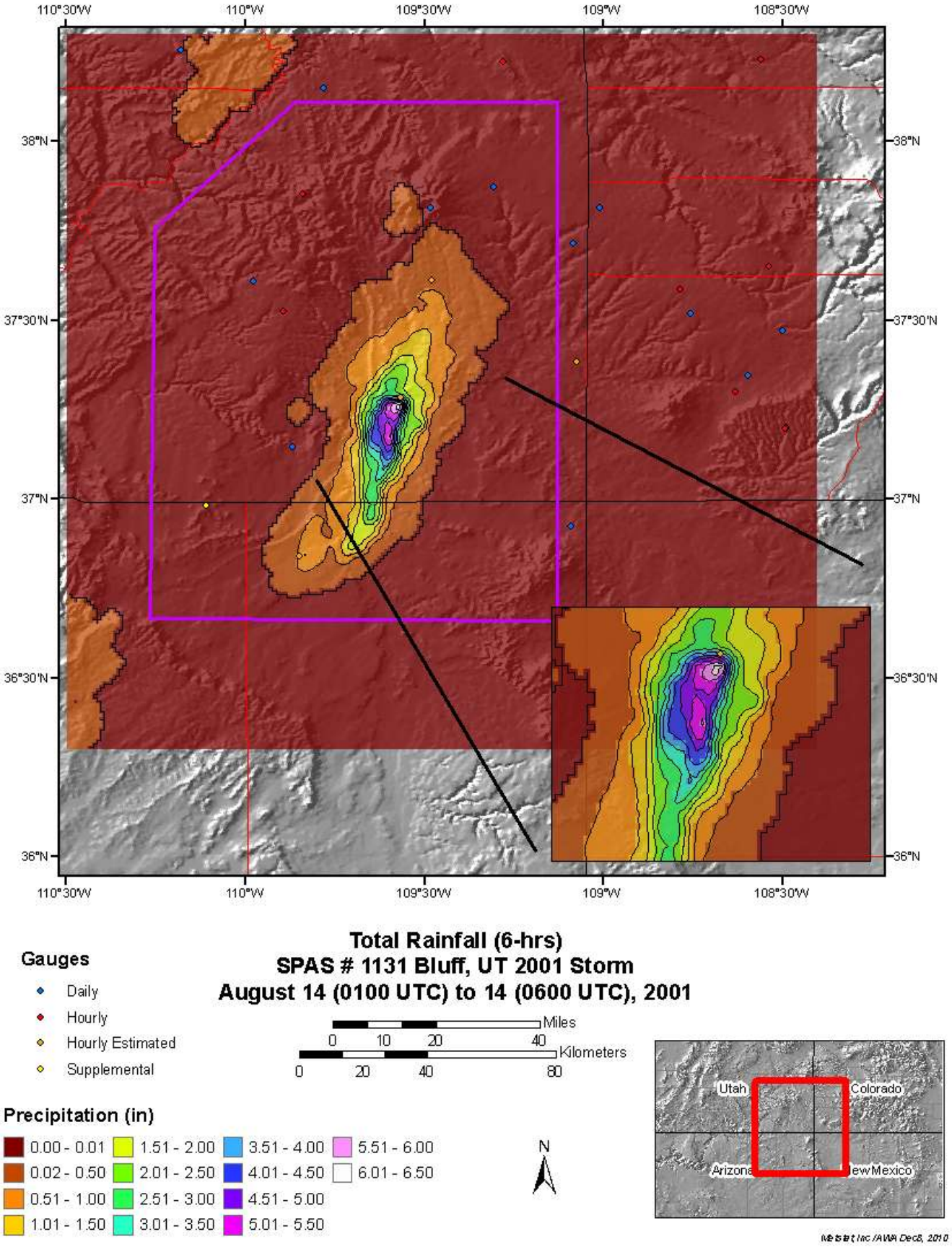
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	10.3	11.0	11.1	11.1	11.1	11.1	-	-	-
10 sq miles	9.4	9.9	9.9	9.9	9.9	9.9	-	-	-
50 sq miles	7.8	8.0	8.2	8.2	8.2	8.2	-	-	-
100 sq miles	6.3	6.7	6.7	6.7	6.7	6.7	-	-	-
200 sq miles	4.7	4.8	5.1	5.1	5.1	5.2	-	-	-
500 sq miles	2.7	2.7	3.0	3.1	3.1	3.2	-	-	-
1000 sq miles	1.6	1.6	1.8	1.9	1.9	1.9	-	-	-
2000 sq miles	1.3	1.3	1.3	1.3	1.3	1.4	-	-	-
5000 sq miles	0.5	0.5	0.5	0.6	0.6	0.6	-	-	-

Storm or Storm Center Name	SPAS-1131-Bluff		
Storm Date(s)	8/14/01		
Storm Type	Local Storm		
Storm Location	37.26	-109.58	
Storm Center Elevation	4,950		
Precipitation Total & Duration (10 sq mi)	6.29 inches 6 hour (SPAS 1131 DAD)		
Storm Representative Dewpoint	77.5 F	3	hr ave from KINW, KSOW and KSJN.
Storm Representative Dewpoint Location	34.5	-110	
In-place Maximum Dewpoint	79.5 F		
Moisture Inflow Vector	SSW @ 190		
In-place Maximization Factor	1.11		
Temporal Transposition (Date)	15-Aug		
Transposition Dewpoint Location	28.22	-110.80	
Transposition Maximum Dewpoint	82.5 F		
Transposition Adjustment Factor	1.16		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	1.81		

Storm 1131 - August 14, 2001 (0100 UTC) - August 14, 2001 (0600 UTC) MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)							
	Duration (hours)						
Area (mi^2)	1	2	3	4	5	6	Total
0	5.86	6.25	6.29	6.29	6.29	6.29	6.29
1	5.68	6.09	6.12	6.12	6.12	6.12	6.12
10	5.2	5.47	5.48	5.48	5.48	5.49	5.49
25	4.83	5.07	5.08	5.08	5.08	5.08	5.08
50	4.31	4.45	4.53	4.53	4.53	4.53	4.53
100	3.51	3.68	3.7	3.7	3.7	3.72	3.72
150	2.97	3.17	3.19	3.21	3.22	3.23	3.23
200	2.58	2.65	2.82	2.83	2.84	2.88	2.88
300	2.03	2.23	2.29	2.3	2.32	2.36	2.36
400	1.66	1.87	1.93	1.97	1.97	2.01	2.01
500	1.47	1.48	1.67	1.69	1.7	1.77	1.77
1,000	0.87	0.88	0.97	1.03	1.03	1.07	1.07
2,000	0.72	0.73	0.73	0.73	0.73	0.8	0.80
5,000	0.27	0.29	0.3	0.31	0.31	0.33	0.33
5,952	0.13	0.16	0.17	0.17	0.17	0.18	0.00




SPAS 1131 Storm Center Mass Curve: Zone 1
August 14 (0100 UTC) to August 14 (0600 UTC), 2001
Lat: 37.255 Lon: -109.575
Incremental
Accumulated
6.29"
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
Index Hour
0
1
2
3
4
5
6
7


110°30'W
110°W
109°30'W
109°W
108°30'W
38°N
37°30'N
37°N
36°30'N
36°N
Total Rainfall (6-hrs)
SPAS # 1131 Bluff, UT 2001 Storm
August 14 (0100 UTC) to 14 (0600 UTC), 2001
Gauges
Daily
Hourly
Hourly Estimated
Supplemental
Miles
0 10 20 40
Kilometers
0 20 40 80
Precipitation (in)
0.00 - 0.01
0.02 - 0.50
0.51 - 1.00
1.01 - 1.50
1.51 - 2.00
2.01 - 2.50
2.51 - 3.00
3.01 - 3.50
3.51 - 4.00
4.01 - 4.50
4.51 - 5.00
5.01 - 5.50
5.51 - 6.00
6.01 - 6.50
N
Utah
Colorado
Arizona
New Mexico
Metstat Inc./AWA Dec8, 2010

Castle Hot Springs, AZ

August 27, 2003

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1094

General Storm Location: Circle City, Arizona

Storm Dates: **Event**: August 25-27, 2003

Latitude: 33.95

Longitude: -112.34

Max. Grid/Radar Rainfall Amount: 10.17”

Max. Observed Rainfall Amount: 4.06”

Max. Grid/Radar 1-hour Rainfall Amount: 4.34”

Max. Observed 1-hour Rainfall Amount: 2.06”

Number of Stations: 294 (37 daily and 257 hourly)

SPAS Version: 7.0

Base Map Used: Yes, Mean PRISM August Precipitation

Spatial resolution: 0.40 sq-mi

Radar Included: Y

Depth-Area-Duration (DAD) analysis: Yes

Storm Name:	SPAS-1094-Castle Hot Springs
Storm Date:	August 27, 2003
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	15-Aug

	Lat	Long
Storm center location	33.95	-112.34
Storm Rep dew point location	33.50	-113.00
Transposition dewpoint location	30.525	-111.035
Basin location	30.975	-110.375

Moisture Inflow Direction:	SW @ 50	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	1,850	feet
Storm Analysis Duration	12	hours

The storm representative dew point is	74.0 F	with total precipitable water above sea level of				2.73	inches.
The in-place maximum dew point is	79.5 F	with total precipitable water above sea level of				3.52	inches.
The transpositioned maximum dew point is	80.0 F	with total precipitable water above sea level of				3.60	inches.
The in-place storm elevation is	1,850	which subtracts	0.44	inches of precipitable water at		74.0 F	
The in-place storm elevation is	1,850	which subtracts	0.53	inches of precipitable water at		79.5 F	
The in-place storm elevation is	1,850	which subtracts	0.53	inches of precipitable water at		80.0 F	

The in-place maximization factor is	1.31
The moisture transposition factor is	1.03
The orographic transposition factor is	1.12
The total adjustment factor is	1.50

Notes:

Observed Storm Depth-Area-Duration

	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	4.1	4.9	5.0	5.0	5.7	8.8	9.8	10.0	10.1
10 sq miles	3.5	4.2	4.3	4.3	4.8	7.3	8.0	8.2	8.3
50 sq miles	2.1	2.9	3.1	3.2	3.2	3.6	4.5	4.8	5.1
100 sq miles	1.7	2.5	2.7	2.8	2.8	2.8	3.5	4.0	4.2
200 sq miles	1.0	1.8	2.0	2.0	2.0	2.1	2.5	3.0	3.1
500 sq miles	0.8	1.2	1.4	1.5	1.5	1.5	1.7	2.0	2.3
1000 sq miles	0.3	0.6	0.8	0.9	0.9	0.9	1.1	1.4	1.6
2000 sq miles	-	-	-	-	-	-	-	-	-
5000 sq miles	-	-	-	-	-	-	-	-	-

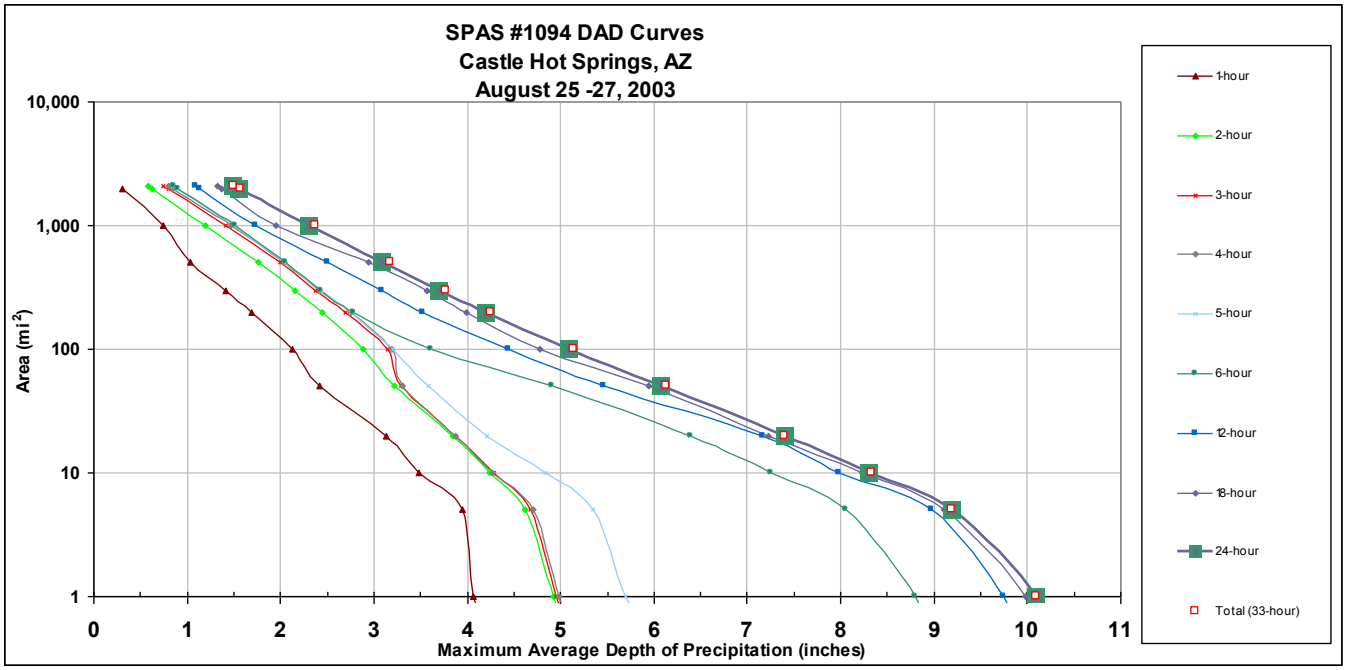
Adjusted Storm Depth-Area-Duration

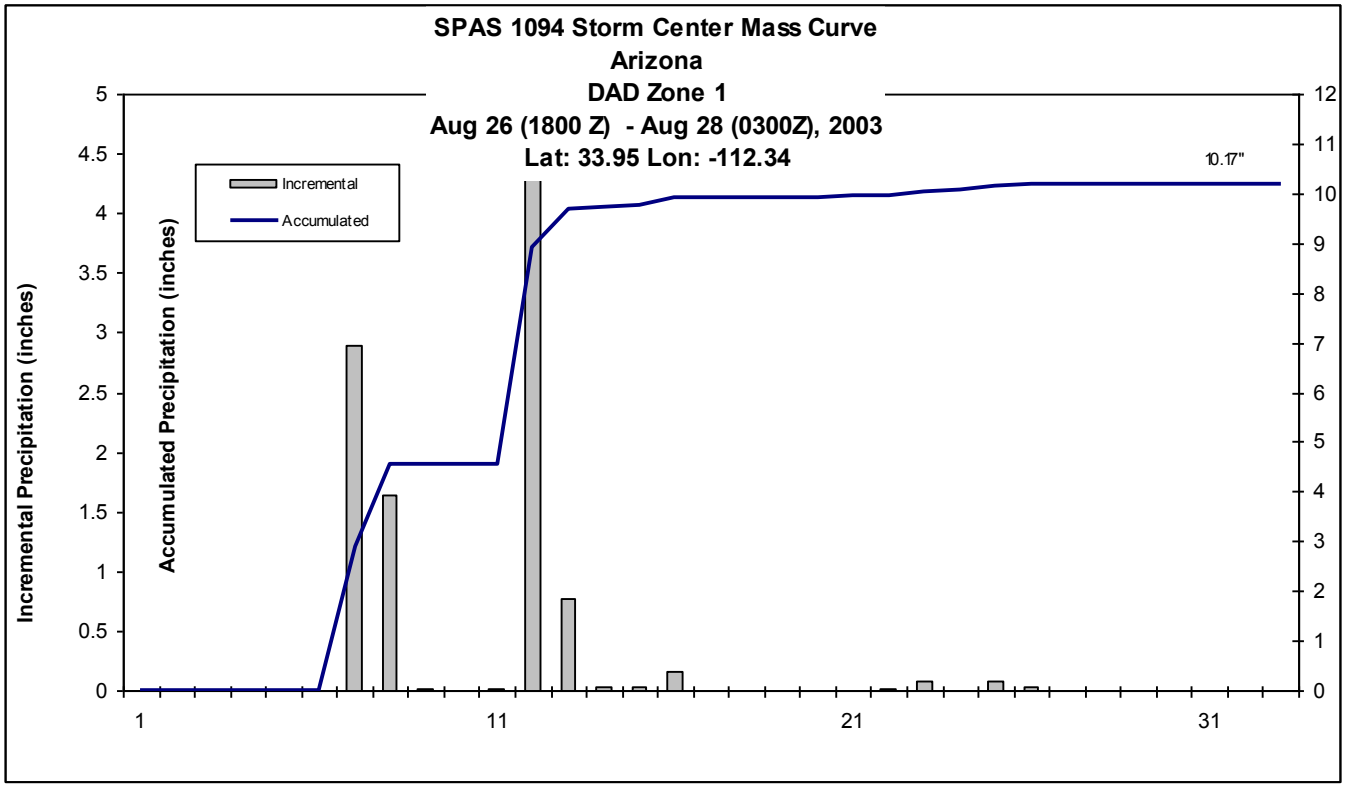
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	6.1	7.4	7.5	7.5	8.6	13.2	14.7	15.0	15.2
10 sq miles	5.2	6.4	6.4	6.4	7.3	10.9	12.0	12.4	12.5
50 sq miles	3.2	4.3	4.7	4.8	4.8	5.4	6.7	7.2	7.7
100 sq miles	2.5	3.7	4.0	4.1	4.1	4.2	5.3	6.0	6.3
200 sq miles	1.5	2.7	3.0	3.1	3.1	3.1	3.8	4.4	4.6
500 sq miles	1.1	1.8	2.1	2.2	2.3	2.3	2.6	2.9	3.5
1000 sq miles	0.5	0.9	1.2	1.3	1.3	1.4	1.7	2.1	2.3
2000 sq miles	-	-	-	-	-	-	-	-	-
5000 sq miles	-	-	-	-	-	-	-	-	-

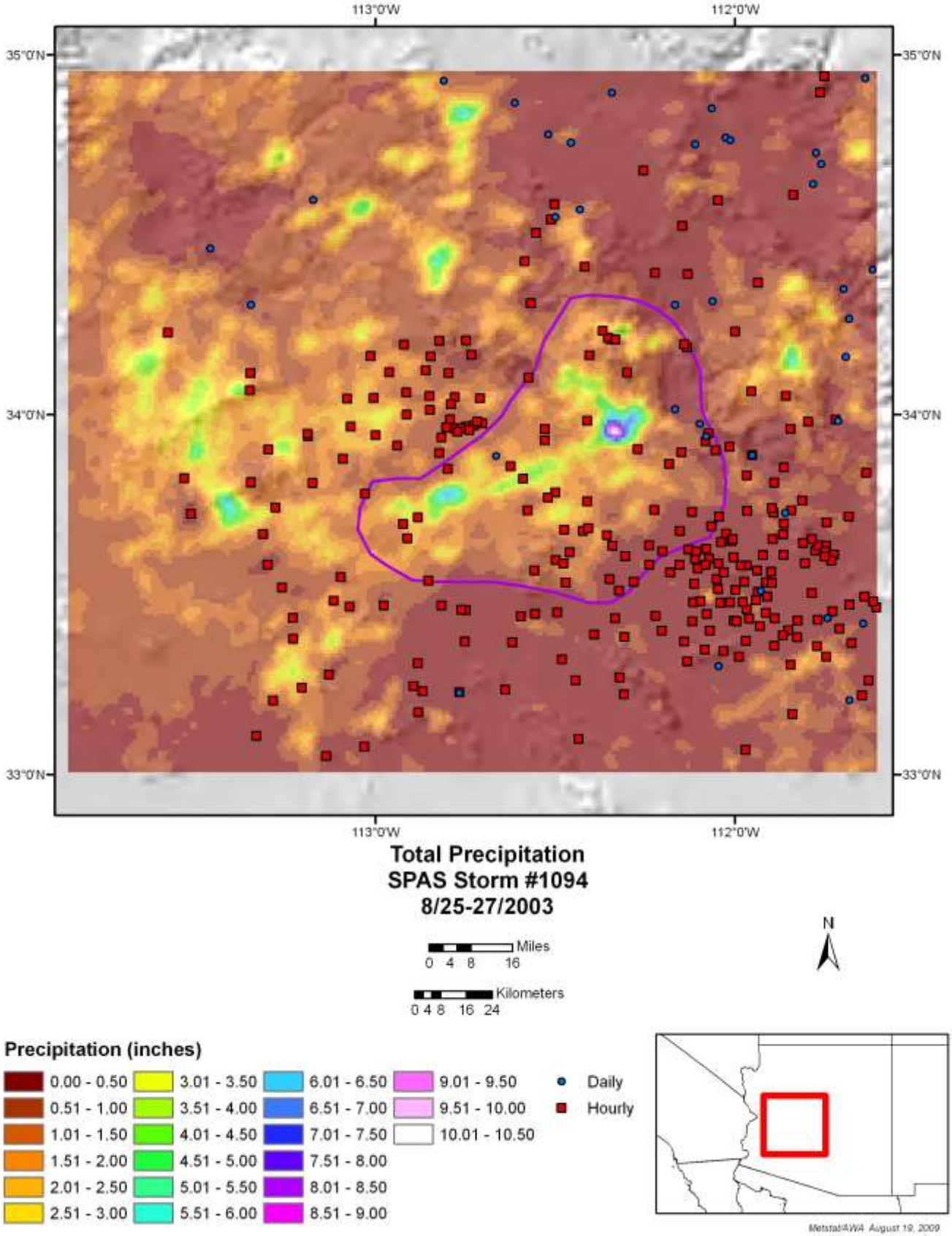
Storm or Storm Center Name	SPAS-1094-Castle Hot Springs		
Storm Date(s)	8/27/03		
Storm Type	Local Storm		
Storm Location	33.95	-112.34	
Storm Center Elevation	1850		
Precipitation Total & Duration (10 sq mi)	4.34 inches 1 hour 8.98" in 6hrs (SPAS 1094 DAD)		
Storm Representative Dewpoint	74.0 F	12	hr ave KGYR, KCGZ
Storm Representative Dewpoint Location	33.5	-113	
In-place Maximum Dewpoint	79.5 F		
Moisture Inflow Vector	SW @ 50		
In-place Maximization Factor	1.31		
Temporal Transposition (Date)	15-Aug		
Transposition Dewpoint Location	30.53	-111.04	
Transposition Maximum Dewpoint	80.0 F		
Transposition Adjustment Factor	1.03		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	1.50		

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

Area (mi^2)	Duration (hours) 1	2	3	4	5	6	12	18	24	total (33-hr)
0.4	4.34	5.12	5.16	5.18	6.02	8.98	9.93	10.05	10.17	10.17
1	4.07	4.92	4.96	4.98	5.69	8.80	9.75	9.98	10.09	10.09
5	3.95	4.62	4.67	4.70	5.35	8.06	8.98	9.10	9.19	9.20
10	3.48	4.24	4.28	4.27	4.83	7.25	7.98	8.23	8.31	8.33
20	3.13	3.85	3.87	3.88	4.21	6.39	7.17	7.23	7.4	7.40
50	2.42	3.22	3.29	3.30	3.59	4.91	5.47	5.95	6.07	6.13
100	2.13	2.88	3.14	3.19	3.20	3.61	4.45	4.78	5.09	5.14
200	1.69	2.45	2.69	2.75	2.75	2.78	3.52	3.99	4.19	4.26
300	1.41	2.15	2.38	2.42	2.43	2.43	3.09	3.57	3.7	3.77
500	1.03	1.77	1.99	2.04	2.04	2.06	2.51	2.95	3.09	3.17
1,000	0.75	1.2	1.42	1.47	1.50	1.51	1.73	1.95	2.3	2.37
2,000	0.31	0.63	0.80	0.85	0.89	0.91	1.14	1.37	1.56	1.57
2,105		0.58	0.75	0.80	0.84	0.86	1.09	1.32	1.49	1.50




SPAS 1094 Storm Center Mass Curve
Arizona
DAD Zone 1
Aug 26 (1800 Z) - Aug 28 (0300Z), 2003
Lat: 33.95 Lon: -112.34
10.17"
Incremental
Accumulated
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
0
1
2
3
4
5
6
7
8
9
10
11
12
1
11
21
31


113°0'W
112°0'W
35°0'N
34°0'N
33°0'N
Total Precipitation
SPAS Storm #1094
8/25-27/2003
Miles
0 4 8 16
Kilometers
0 4 8 16 24
N
Precipitation (inches)
0.00 - 0.50
0.51 - 1.00
1.01 - 1.50
1.51 - 2.00
2.01 - 2.50
2.51 - 3.00
3.01 - 3.50
3.51 - 4.00
4.01 - 4.50
4.51 - 5.00
5.01 - 5.50
5.51 - 6.00
6.01 - 6.50
6.51 - 7.00
7.01 - 7.50
7.51 - 8.00
8.01 - 8.50
8.51 - 9.00
9.01 - 9.50
9.51 - 10.00
10.01 - 10.50
Daily
Hourly
Metstat/AWA August 19, 2009

Roosevelt Lakes, AZ

September 9, 2003

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1109

General Storm Location: Roosevelt Lakes, Arizona

Storm Dates: September 9 (0100 to 1200 UTC), 2003

Event: Convective

Latitude: 33.595

Longitude: -111.065

Max. Grid/Radar Rainfall Amount: 11.19”

Max. Observed Rainfall Amount: 10.0”

Max. Grid/Radar 1-hour Rainfall Amount: 5.57”

Max. Observed 1-hour Rainfall Amount: 3.81”

Number of Stations: 64 (51-hourly, 10-daily, 3-supplemetntal)

SPAS Version: 8.0

Base Map Used: Yes, Default ZR precipitation (default_basemap)

Spatial resolution: 0.01

Radar Included: Yes

Depth-Area-Duration (DAD) analysis: Yes, 1, 2, 3, 4, 5, 6, 9, and 12-hours.

Storm Name:	SPAS-1109-Roosevelt Lakes
Storm Date:	September 9, 2003
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	26-Aug

	Lat	Long
Storm center location	33.60	-111.07
Storm Rep dew point location	33.30	-111.70
Transposition dewpoint location	30.675	-111.005
Basin location	30.975	-110.375

Moisture Inflow Direction:	SW @ 40	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	2,700	feet
Storm Analysis Duration	3	hours

The storm representative dew point is	76.0 F	with total precipitable water above sea level of				2.99	inches.
The in-place maximum dew point is	79.5 F	with total precipitable water above sea level of				3.52	inches.
The transpositioned maximum dew point is	81.0 F	with total precipitable water above sea level of				3.76	inches.
The in-place storm elevation is	2,700	which subtracts	0.66	inches of precipitable water at		76.0 F	
The in-place storm elevation is	2,700	which subtracts	0.74	inches of precipitable water at		79.5 F	
The in-place storm elevation is	2,700	which subtracts	0.77	inches of precipitable water at		81.0 F	

The in-place maximization factor is	1.19
The moisture transposition factor is	1.08
The orographic transposition factor is	1.12
The total adjustment factor is	1.44

Notes:

Observed Storm Depth-Area-Duration

	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	5.5	8.8	10.6	10.7	10.9	10.9	11.0	-	-
10 sq miles	4.6	7.8	9.8	10.0	10.1	10.1	10.1	-	-
50 sq miles	3.4	6.3	8.2	8.3	8.3	8.4	8.5	-	-
100 sq miles	2.9	5.4	7.2	7.3	7.4	7.4	7.4	-	-
200 sq miles	2.3	4.4	5.9	6.0	6.1	6.0	6.1	-	-
500 sq miles	1.7	3.1	4.0	4.1	4.1	4.1	4.2	-	-
1000 sq miles	1.1	2.1	2.7	2.8	2.9	2.9	2.9	-	-
2000 sq miles	0.7	1.4	1.8	1.9	1.9	1.9	2.0	-	-
5000 sq miles	0.4	0.8	0.8	1.0	1.1	1.1	1.1	-	-

Adjusted Storm Depth-Area-Duration

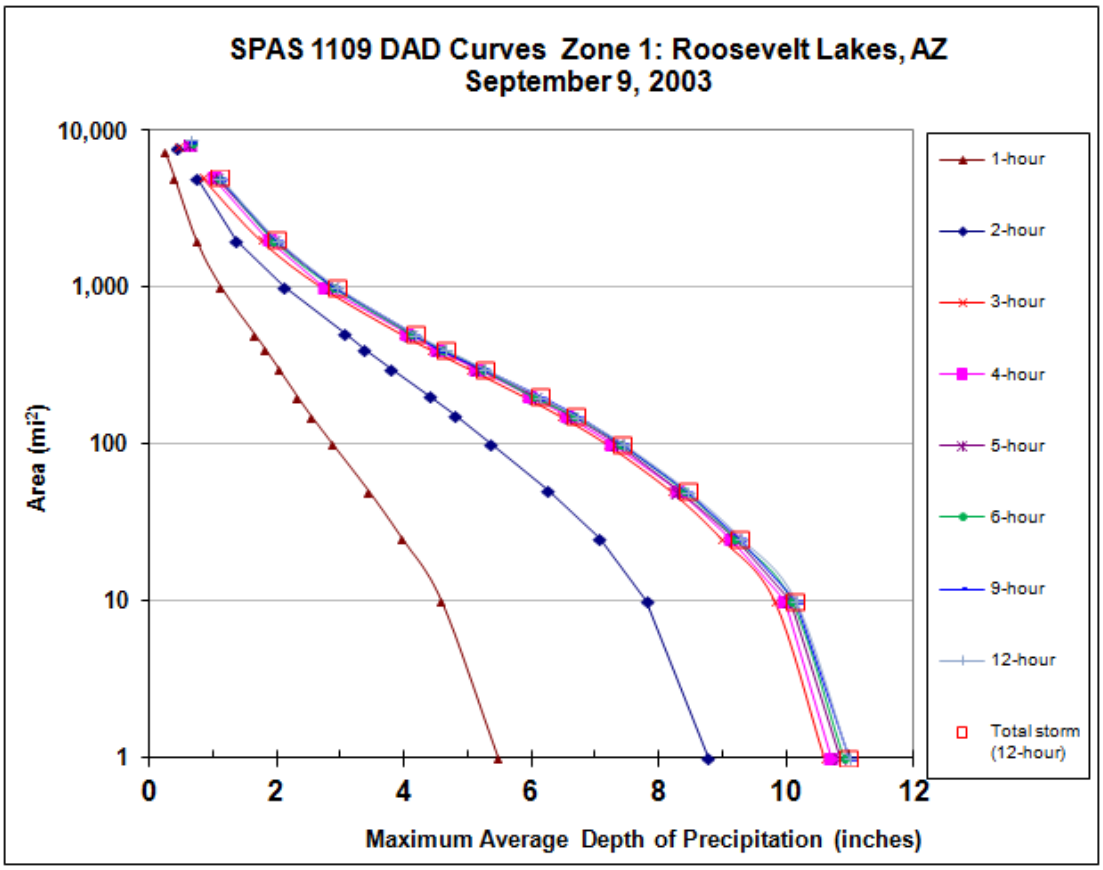
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	7.9	12.6	15.2	15.4	15.6	15.7	15.8	-	-
10 sq miles	6.6	11.2	14.1	14.3	14.5	14.5	14.6	-	-
50 sq miles	4.9	9.0	11.8	11.9	11.9	12.1	12.1	-	-
100 sq miles	4.1	7.7	10.3	10.4	10.6	10.6	10.7	-	-
200 sq miles	3.3	6.3	8.5	8.6	8.7	8.7	8.8	-	-
500 sq miles	2.4	4.4	5.7	5.8	5.9	5.9	6.0	-	-
1000 sq miles	1.6	3.0	3.9	4.0	4.1	4.1	4.2	-	-
2000 sq miles	1.0	2.0	2.5	2.7	2.8	2.8	2.9	-	-
5000 sq miles	0.6	1.1	1.2	1.5	1.5	1.6	1.6	-	-

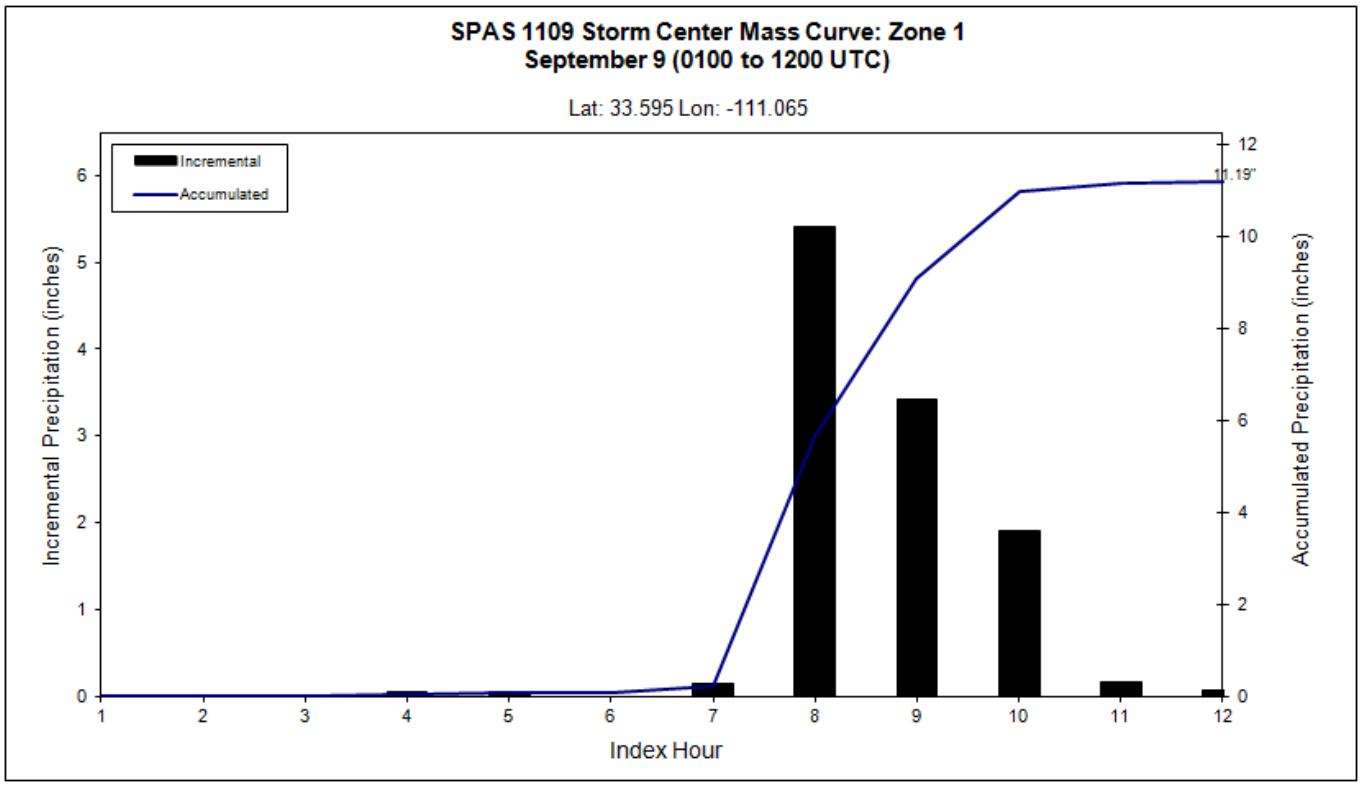
Storm or Storm Center Name	SPAS-1109-Roosevelt Lakes		
Storm Date(s)	9/9/03		
Storm Type	Local Storm		
Storm Location	33.60	-111.07	
Storm Center Elevation	2700		
Precipitation Total & Duration (10 sq mi)	11.19 inches 12 hour (SPAS 1109 DAD)		
Storm Representative Dewpoint	76.0 F	3	hr ave from KIWA
Storm Representative Dewpoint Location	33.3	-111.7	
In-place Maximum Dewpoint	79.5 F		
Moisture Inflow Vector	SW @ 40		
In-place Maximization Factor	1.19		
Temporal Transposition (Date)	26-Aug		
Transposition Dewpoint Location	30.68	-111.01	
Transposition Maximum Dewpoint	81.0 F		
Transposition Adjustment Factor	1.08		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	1.44		

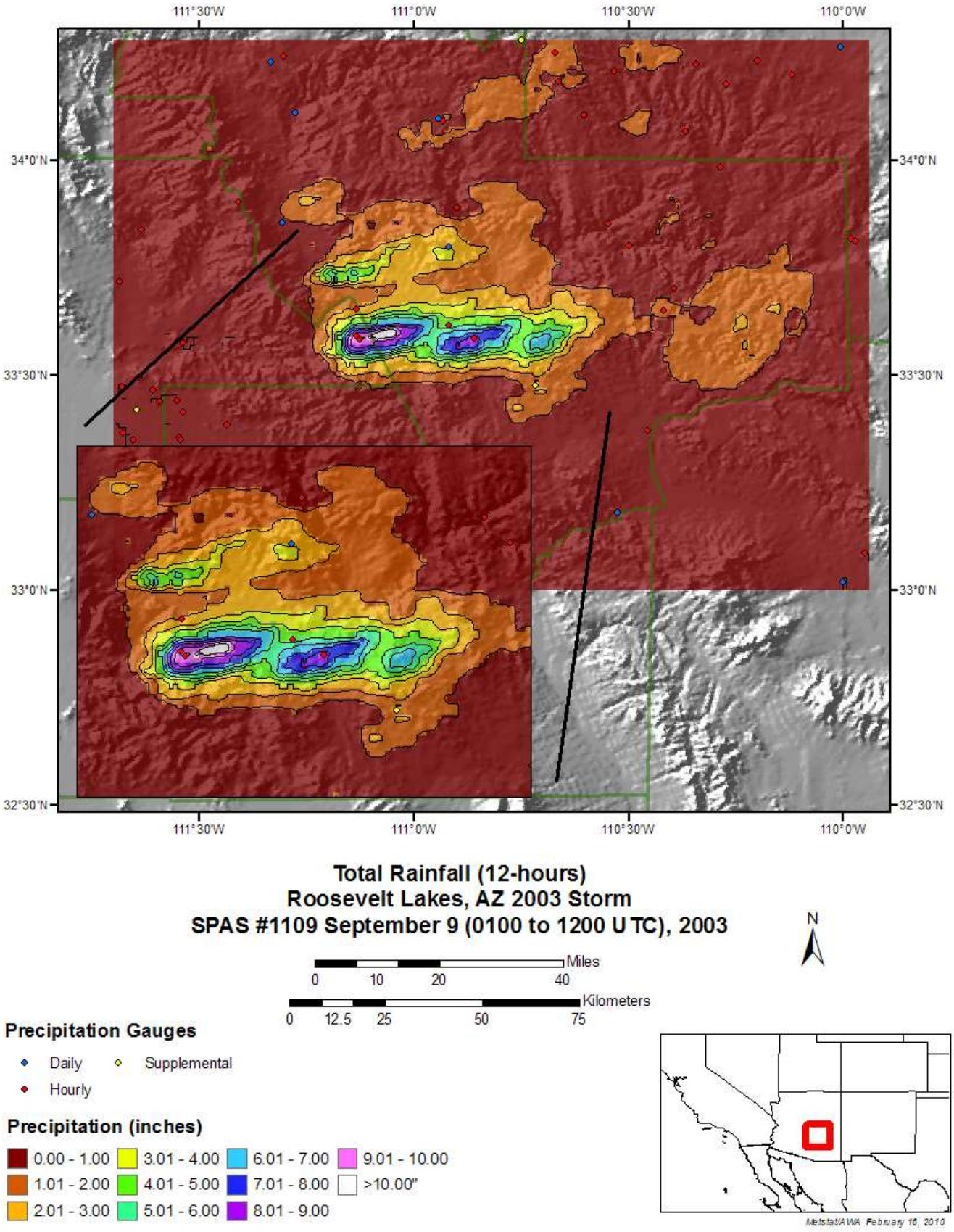
Storm 1109 - September 9 (0100 to 1200 UTC)

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

	Duration (hours)								
Area (mi^2)	1	2	3	4	5	6	9	12	Total
0.40	5.57	8.84	10.75	10.91	11.05	11.11	11.19	11.19	11.19
1	5.47	8.78	10.60	10.71	10.85	10.91	10.98	10.98	10.98
10	4.58	7.81	9.82	9.97	10.06	10.09	10.14	10.14	10.14
25	3.96	7.06	8.98	9.12	9.20	9.20	9.27	9.28	9.28
50	3.44	6.25	8.19	8.30	8.30	8.40	8.42	8.45	8.45
100	2.87	5.36	7.18	7.27	7.35	7.40	7.40	7.43	7.43
150	2.54	4.81	6.46	6.55	6.62	6.68	6.70	6.70	6.70
200	2.32	4.40	5.89	5.97	6.05	6.02	6.11	6.13	6.13
300	2.03	3.80	5.03	5.13	5.17	5.23	5.24	5.26	5.26
400	1.82	3.38	4.42	4.51	4.56	4.61	4.53	4.64	4.64
500	1.65	3.07	3.97	4.05	4.11	4.12	4.13	4.17	4.17
1,000	1.12	2.12	2.71	2.75	2.87	2.88	2.89	2.94	2.94
2,000	0.73	1.37	1.75	1.88	1.94	1.94	1.99	2.00	2.00
5,000	0.39	0.75	0.84	1.01	1.06	1.10	1.08	1.10	1.10
7,332	0.24								
7,711		0.45							
7,936			0.44						
8,114				0.64					
8,239					0.64				
8,333						0.68			
8,677							0.61		
8,773								0.64	




SPAS 1109 Storm Center Mass Curve: Zone 1
September 9 (0100 to 1200 UTC)
Lat: 33.595 Lon: -111.065
Incremental
Accumulated
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
11.19"
Index Hour
0
1
2
3
4
5
6
7
8
9
10
11
12


111°30'W
111°0'W
110°30'W
110°0'W
34°0'N
33°30'N
33°0'N
32°30'N
Total Rainfall (12-hours)
Roosevelt Lakes, AZ 2003 Storm
SPAS #1109 September 9 (0100 to 1200 UTC), 2003
N
Miles
0 10 20 40
Kilometers
0 12.5 25 50 75
Precipitation Gauges
Daily
Supplemental
Hourly
Precipitation (inches)
0.00 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
4.01 - 5.00
5.01 - 6.00
6.01 - 7.00
7.01 - 8.00
8.01 - 9.00
9.01 - 10.00
>10.00"
Metstat/AWA February 16, 2010

Cypress Mountain, AZ

September 18-20, 2004

Storm Type: Remnant Tropical

Storm Precipitation Analysis System (SPAS) For Storm #1088

General Storm Location: Cypress Mountain, Arizona

Storm Dates: September 18-20, 2004

Event: Widespread thunderstorms

DAD Zone 1 -- Southern Deserts

Latitude: 34.52

Longitude: -113.86

Max. Grid/Radar Rainfall Amount: 6.99"

Max. Observed Rainfall Amount: n/a

DAD Zone 2 – Mogollon Rim

Latitude: 34.73

Longitude: -113.02

Max. Grid/Radar Rainfall Amount: 10.10"

Max. Observed Rainfall Amount: 5.00"

Number of Stations: 634 (111 daily, 499 hourly and 14 supplemental, 8 hourly pseudo,1 hourly estimated and 1 supplemental estimated)

SPAS Version: 7.0

Base Map Used: PRISM Mean September

Spatial resolution: 0.39 sq-mi

Radar Included: Y

Depth-Area-Duration (DAD) analysis: Y

Comments: The following periods had missing radar data:

- KEMX 09/19 0815z -16 z,
- KFSX 09/18 23z,
- KFSX 09/19 0236 z onwards,
- KFSX 09/20

Storm Name:	SPAS-1088-Cypress Mountain-Zo
Storm Date:	9/18-20/2004
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	5-Sep	
	Lat	Long
Storm center location	34.56	-113.86
Storm Rep dew point location	32.98	-115.10
Transposition dewpoint location	29.395	-111.615
Basin location	30.975	-110.375

Moisture Inflow Direction:	SW @ 170	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	2,400	feet
Storm Analysis Duration	24	hours

The storm representative dew point is	73.5 F	with total precipitable water above sea level of			2.67	inches.
The in-place maximum dew point is	78.5 F	with total precipitable water above sea level of			3.37	inches.
The transpositioned maximum dew point is	78.5 F	with total precipitable water above sea level of			3.37	inches.
The in-place storm elevation is	2,400	which subtracts	0.55	inches of precipitable water at	73.5 F	
The in-place storm elevation is	2,400	which subtracts	0.64	inches of precipitable water at	78.5 F	
The in-place storm elevation is	2,400	which subtracts	0.64	inches of precipitable water at	78.5 F	

The in-place maximization factor is	1.29
The moisture transposition factor is	1.00
The orographic transposition factor is	0.89
The total adjustment factor is	1.15

Notes:

Observed Storm Depth-Area-Duration

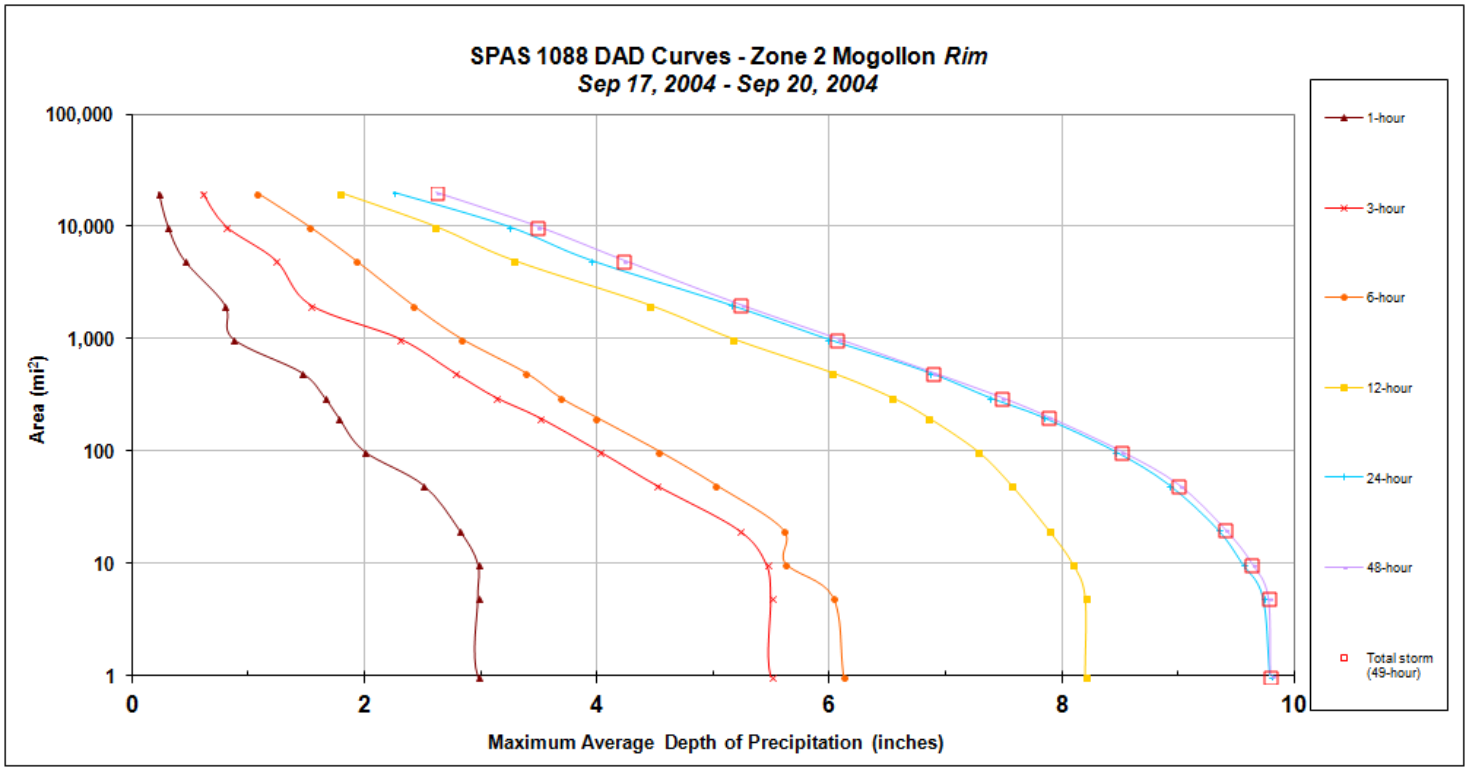
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	72 Hours
1 sq miles	3.0	6.1	8.2	-	9.8	-	-	9.8	-
10 sq miles	3.0	5.6	8.1	-	9.6	-	-	9.6	-
100 sq miles	2.5	5.0	7.6	-	8.9	-	-	9.0	-
200 sq miles	2.0	4.5	7.3	-	8.5	-	-	8.5	-
500 sq miles	1.8	4.0	6.8	-	7.8	-	-	7.9	-
1000 sq miles	1.5	3.4	6.0	-	6.9	-	-	6.9	-
2000 sq miles	0.9	2.8	5.2	-	6.0	-	-	6.1	-
5000 sq miles	0.8	2.4	4.4	-	5.1	-	-	5.2	-
10000 sq miles	0.5	1.9	3.3	-	3.9	-	-	4.2	-
20000 sq miles	0.3	1.5	2.6	-	3.2	-	-	3.5	-

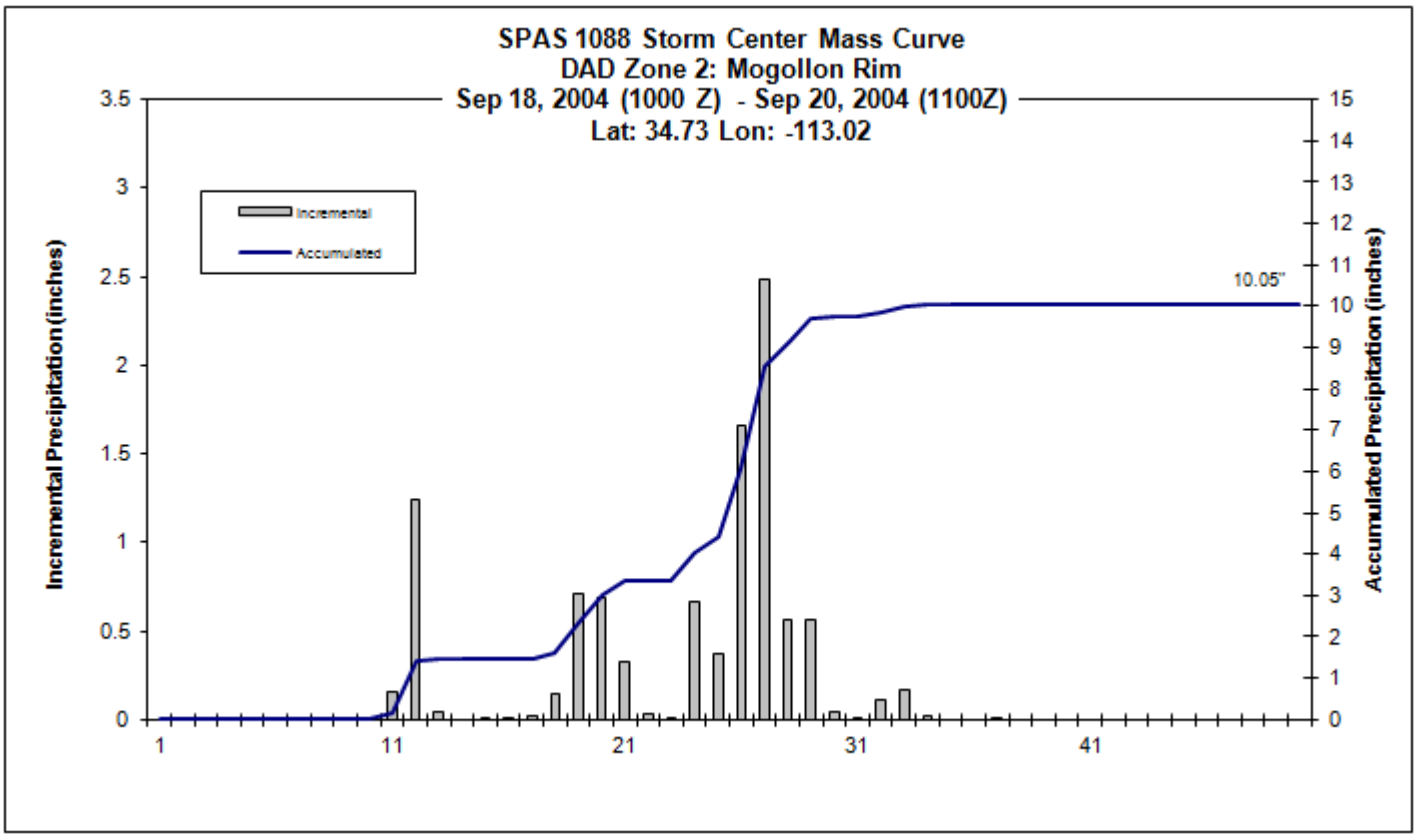
Adjusteded Storm Depth-Area-Duration

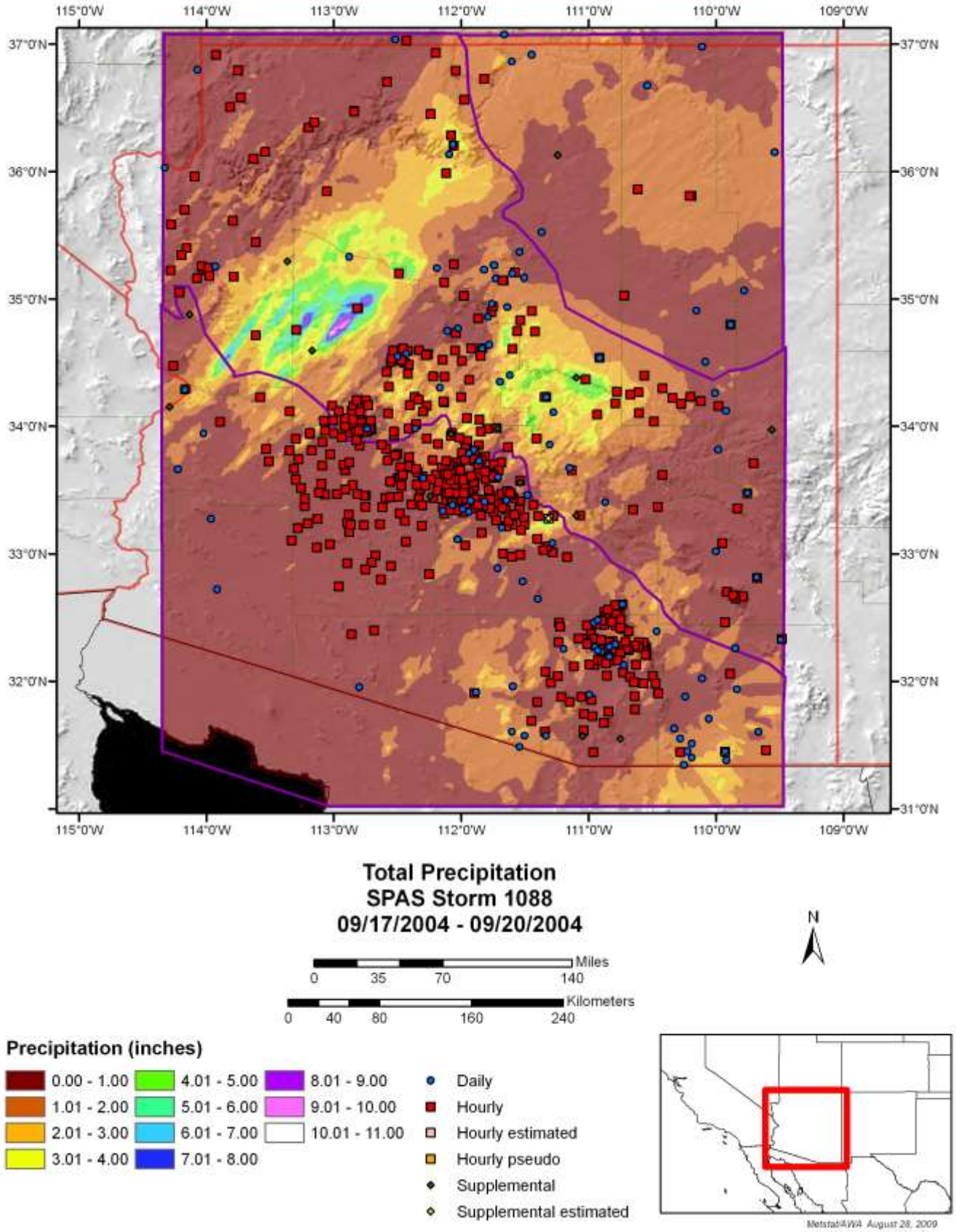
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	72 Hours
1 sq miles	3.4	7.0	9.4	-	11.2	-	-	11.2	-
10 sq miles	3.4	6.4	9.3	-	10.9	-	-	11.0	-
100 sq miles	2.9	5.8	8.7	-	10.2	-	-	10.3	-
200 sq miles	2.3	5.2	8.3	-	9.7	-	-	9.7	-
500 sq miles	2.0	4.6	7.8	-	9.0	-	-	9.0	-
1000 sq miles	1.7	3.9	6.9	-	7.9	-	-	7.9	-
2000 sq miles	1.0	3.2	5.9	-	6.8	-	-	6.9	-
5000 sq miles	0.9	2.8	5.1	-	5.9	-	-	6.0	-
10000 sq miles	0.5	2.2	3.7	-	4.5	-	-	4.8	-
20000 sq miles	0.4	1.7	3.0	-	3.7	-	-	4.0	-

Storm or Storm Center Name	SPAS-1088-Cypress Mountain-Zone 2		
Storm Date(s)	9/18-20/2004		
Storm Type	Local-Tropical		
Storm Location	34.56	-113.86	
Storm Center Elevation	2,400		
Precipitation Total & Duration (10 sq mi)	10.10 inches 24 hours 3.35" in 1hr and 5.88" in 3hrs (SPAS 1088 DAD)		
Storm Representative Dewpoint	73.5 F	12	hr ave KYUM, KNYL, KIPL
Storm Representative Dewpoint Location	32.98	-115.1	
In-place Maximum Dewpoint	78.5 F		
Moisture Inflow Vector	SW @ 170		
In-place Maximization Factor			
Temporal Transposition (Date)	5-Sep		
Transposition Dewpoint Location	29.40	-111.62	
Transposition Maximum Dewpoint	78.5 F		
Transposition Adjustment Factor	1.00		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	1.15		

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)															
	Duration (hours)														
Area (mi^2)	1	2	3	4	5	6	12	18	24	36	48	72	96		Total (49-hr)
0.39	3.35		5.80			6.38	8.49		10.10		10.10				10.10
1	2.98		5.50			6.12	8.20		9.79		9.79				9.79
5	2.98		5.50			6.03	8.20		9.73		9.77				9.77
10	2.98		5.46			5.62	8.09		9.55		9.63				9.63
20	2.82		5.22			5.60	7.88		9.34		9.40				9.40
50	2.51		4.51			5.02	7.56		8.92		9.00				9.00
100	2.00		4.02			4.53	7.27		8.45		8.50				8.50
200	1.78		3.50			3.99	6.84		7.83		7.88				7.88
300	1.66		3.13			3.68	6.53		7.37		7.47				7.47
500	1.46		2.77			3.38	6.01		6.85		6.88				6.88
1,000	0.87		2.30			2.83	5.16		5.97		6.06				6.06
2,000	0.80		1.53			2.41	4.44		5.14		5.23				5.23
5,000	0.45		1.23			1.92	3.27		3.94		4.22				4.22
10,000	0.31		0.80			1.52	2.60		3.23		3.48				3.48
20,000	0.23		0.60			1.07	1.78		2.25		2.61				2.62
							0.91		1.35		1.49				1.49




SPAS 1088 Storm Center Mass Curve
DAD Zone 2: Mogollon Rim
Sep 18, 2004 (1000 Z) - Sep 20, 2004 (1100Z)
Lat: 34.73 Lon: -113.02
Incremental
Accumulated
10.05"
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
3.5
3
2.5
2
1.5
1
0.5
0
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
1
11
21
31
41


115°0'W
114°0'W
113°0'W
112°0'W
111°0'W
110°0'W
109°0'W
37°0'N
36°0'N
35°0'N
34°0'N
33°0'N
32°0'N
31°0'N
Total Precipitation
SPAS Storm 1088
09/17/2004 - 09/20/2004
N
Miles
0 35 70 140
Kilometers
0 40 80 160 240
Precipitation (inches)
0.00 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
4.01 - 5.00
5.01 - 6.00
6.01 - 7.00
7.01 - 8.00
8.01 - 9.00
9.01 - 10.00
10.01 - 11.00
Daily
Hourly
Hourly estimated
Hourly pseudo
Supplemental
Supplemental estimated
Metstat/AWA August 28, 2009

Big Pine Flat, AZ

February 10-13, 2005

Storm Type: General Frontal

Storm Precipitation Analysis System (SPAS) For Storm #1147

General Storm Location: Big Pine Flat, Arizona

Storm Dates: February 10 (0800Z) – 13 (0800Z), 2005

Event: General

Latitude: 33.6850

Longitude: -111.3250

Max. Grid/Radar Rainfall Amount: 8.72”

Max. Observed Rainfall Amount: 7.12”

Max. Grid/Radar 1-hour Rainfall Amount: 1.27”

Max. Observed 1-hour Rainfall Amount: 0.80”

Number of Stations: 682 (Daily-165, Hourly-492, Hourly Estimated-3, Hourly Pseudo-1, Supplemental-21)

SPAS Version: 7.0

Base Map Used: Yes, conus_prism_ppt_in_1971_2000_02_mx

Spatial resolution: 0.40 mi^2

Radar Included: Yes

Depth-Area-Duration (DAD) analysis: Yes, 1, 3, 6, 12, 24, 36, 48, and 72-hours

Storm Name:	SPAS-1147-Big Pine Flat-Zone 2
Storm Date:	2/10-13/2005
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	15-Feb	
	Lat	Long
Storm center location	33.75	-111.36
Storm Rep dew point location	32.25	-110.93
Transposition dewpoint location	29.475	-109.945
Basin location	30.975	-110.375

Moisture Inflow Direction:	SSE @ 100	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	5,650	feet
Storm Analysis Duration	24	hours

The storm representative dew point is	58.5 F	with total precipitable water above sea level of			1.28	inches.
The in-place maximum dew point is	61.0 F	with total precipitable water above sea level of			1.45	inches.
The transpositioned maximum dew point is	61.5 F	with total precipitable water above sea level of			1.49	inches.
The in-place storm elevation is	5,650	which subtracts	0.68	inches of precipitable water at	58.5 F	
The in-place storm elevation is	5,650	which subtracts	0.73	inches of precipitable water at	61.0 F	
The in-place storm elevation is	5,650	which subtracts	0.74	inches of precipitable water at	61.5 F	

The in-place maximization factor is	1.20
The moisture transposition factor is	1.04
The orographic transposition factor is	0.67
The total adjustment factor is	0.84

Notes:

Observed Storm Depth-Area-Duration

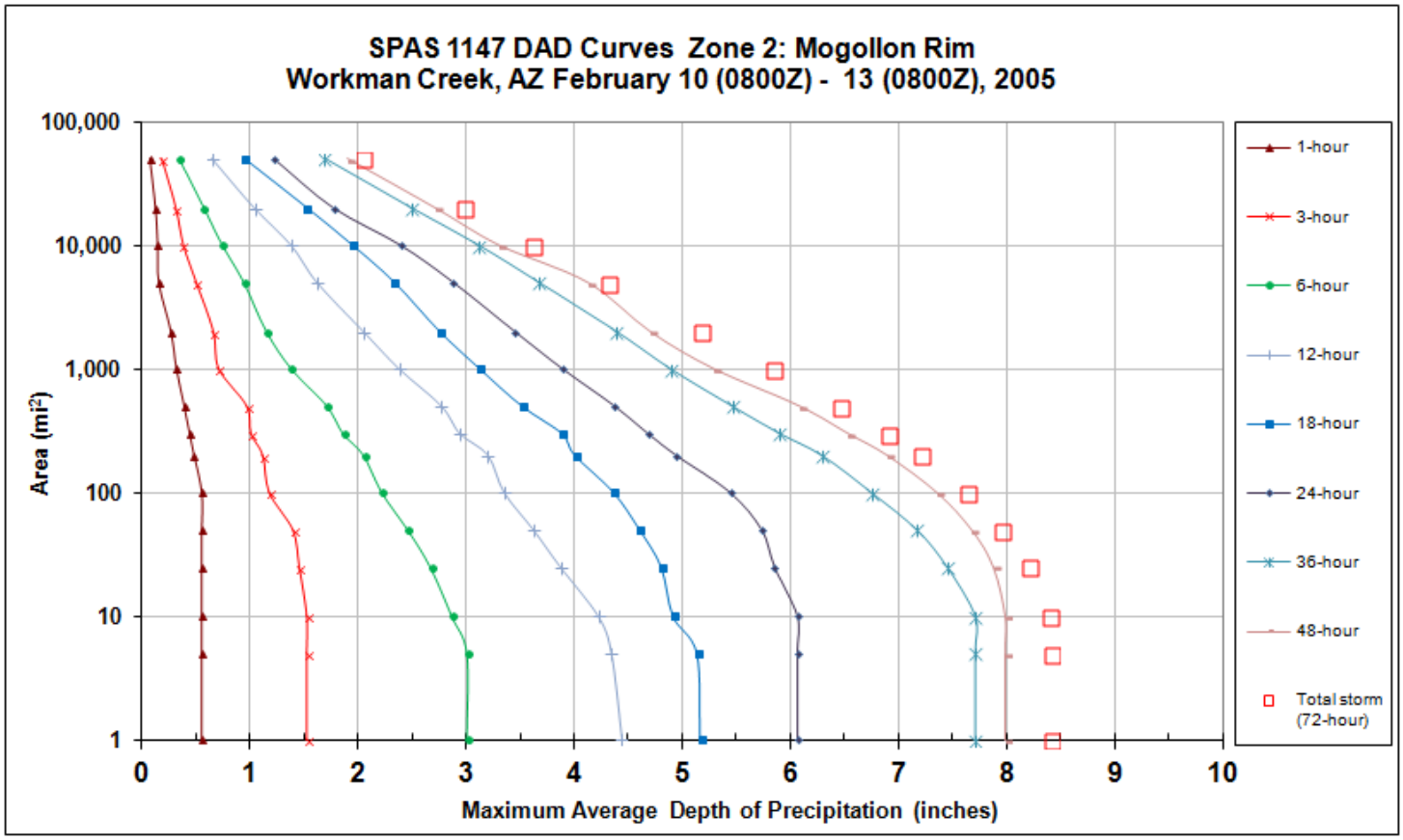
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	0.6	3.0	4.4	5.2	6.1	-	7.7	8.0	-	8.4
10 sq miles	0.6	2.9	4.2	4.9	6.1	-	7.7	8.0	-	8.4
100 sq miles	0.6	2.2	3.4	4.4	5.4	-	6.8	7.4	-	7.7
200 sq miles	0.5	2.1	3.2	4.0	4.9	-	6.3	6.9	-	7.2
500 sq miles	0.4	1.7	2.8	3.5	4.4	-	5.5	6.1	-	6.5
1000 sq miles	0.3	1.4	2.4	3.1	3.9	-	4.9	5.3	-	5.9
2000 sq miles	0.3	1.2	2.1	2.8	3.5	-	4.4	4.7	-	5.2
5000 sq miles	0.2	0.9	1.6	2.3	2.9	-	3.7	4.1	-	4.3
10000 sq miles	0.2	0.7	1.4	2.0	2.4	-	3.1	3.3	-	3.6
20000 sq miles	0.1	0.6	1.0	1.5	1.8	-	2.5	2.7	-	3.0

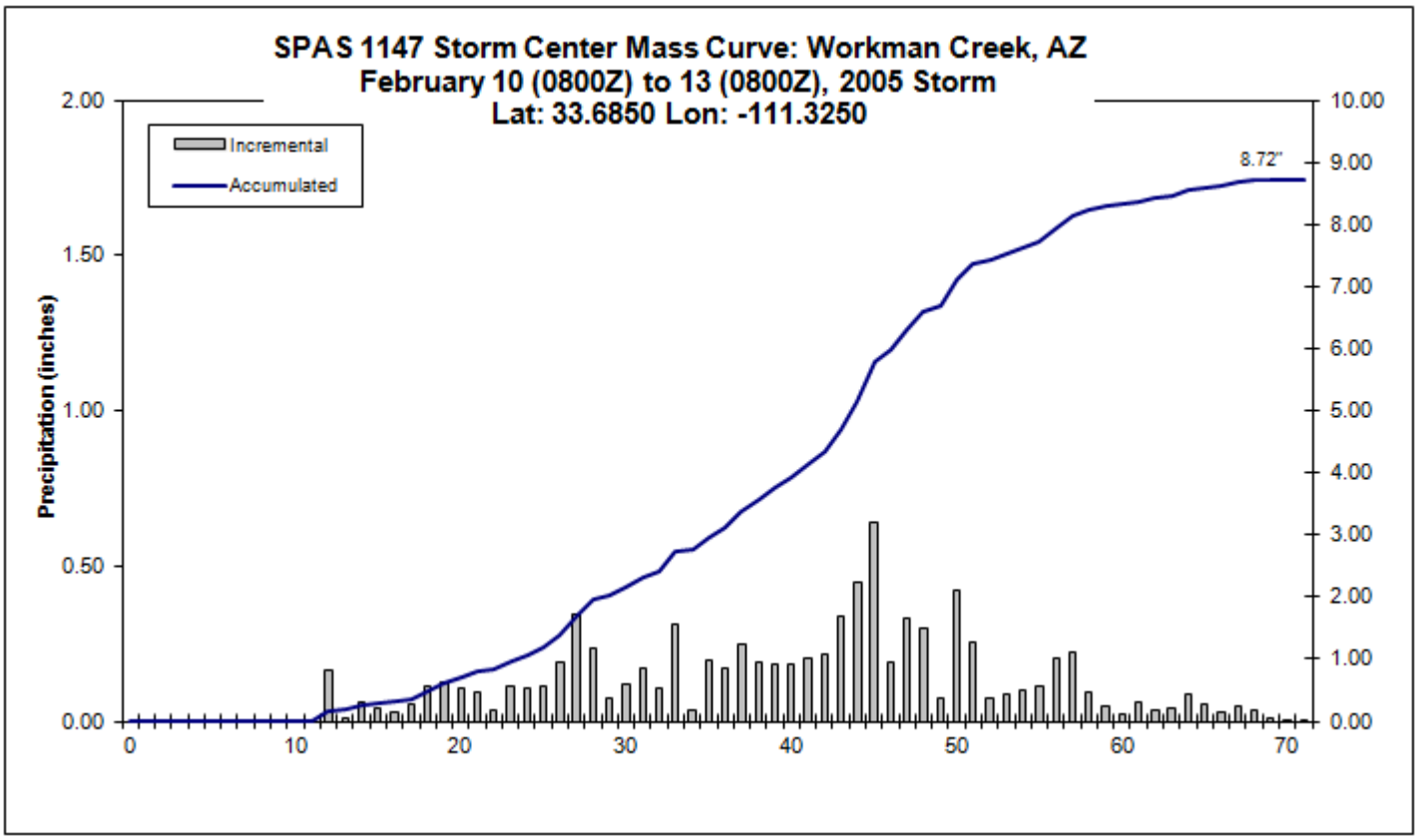
Adjusteded Storm Depth-Area-Duration

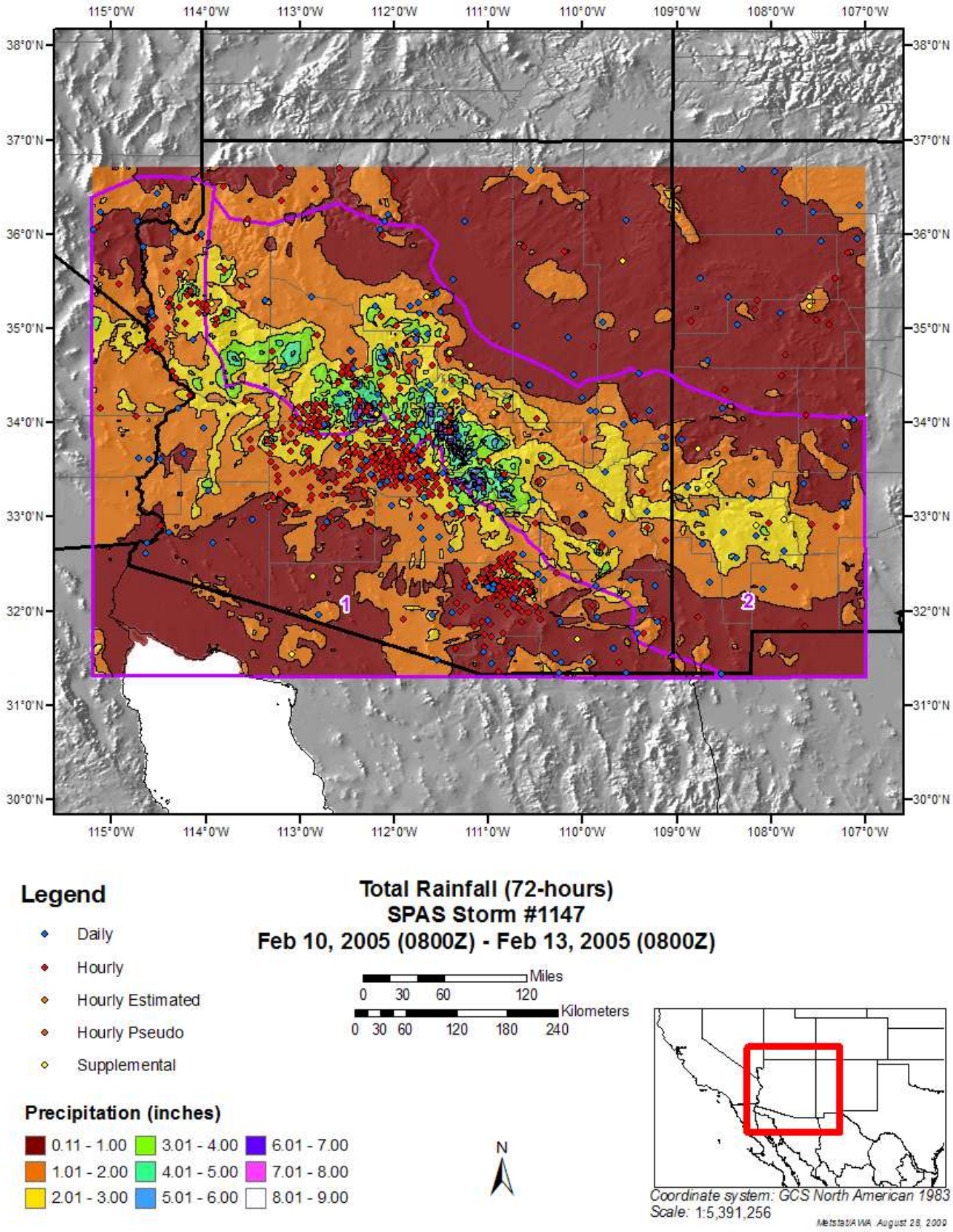
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	0.5	2.5	3.7	4.3	5.1	-	6.5	6.7	-	7.1
10 sq miles	0.5	2.4	3.5	4.1	5.1	-	6.5	6.7	-	7.0
100 sq miles	0.5	1.9	2.8	3.7	4.6	-	5.7	6.2	-	6.4
200 sq miles	0.4	1.7	2.7	3.4	4.1	-	5.3	5.8	-	6.0
500 sq miles	0.3	1.4	2.3	2.9	3.7	-	4.6	5.1	-	5.4
1000 sq miles	0.3	1.2	2.0	2.6	3.3	-	4.1	4.4	-	4.9
2000 sq miles	0.2	1.0	1.7	2.3	2.9	-	3.7	3.9	-	4.3
5000 sq miles	0.1	0.8	1.4	2.0	2.4	-	3.1	3.5	-	3.6
10000 sq miles	0.1	0.6	1.2	1.6	2.0	-	2.6	2.8	-	3.0
20000 sq miles	0.1	0.5	0.9	1.3	1.5	-	2.1	2.3	-	2.5

Storm or Storm Center Name	SPAS-1147-Big Pine Flat-Zone 2	
Storm Date(s)	2/10-13/2005	
Storm Type	General	
Storm Location	33.75	-111.36
Storm Center Elevation	5650	
Precipitation Total & Duration (10 sq mi)	8.79 inches 72 hours (SPAS 1147 DAD)	
Storm Representative Dewpoint	58.5 F	24
Storm Representative Dewpoint Location	32.25	-110.93
In-place Maximum Dewpoint	61.0 F	
Moisture Inflow Vector	SSE @ 100	
In-place Maximization Factor		
Temporal Transposition (Date)	15-Feb	
Transposition Dewpoint Location	29.48	-109.95
Transposition Maximum Dewpoint	61.5 F	
Transposition Adjustment Factor	1.04	
Grid Point Location	30.975	-110.375
Grid Point Elevation	6,977	
Total Adjustment Factor	0.84	

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)									
	Duration (hours)								
Area (mi^2)	1	3	6	12	18	24	36	48	total
0.39	0.86	1.85	3.28	4.68	5.40	6.37	8.02	8.28	8.72
1	0.55	1.53	3.01	4.44	5.17	6.06	7.71	7.99	8.42
5	0.55	1.53	3.01	4.34	5.14	6.06	7.71	7.99	8.42
10	0.55	1.53	2.87	4.22	4.92	6.06	7.71	7.99	8.41
25	0.55	1.46	2.67	3.87	4.81	5.85	7.45	7.88	8.22
50	0.55	1.40	2.46	3.62	4.61	5.73	7.17	7.68	7.96
100	0.55	1.18	2.22	3.35	4.37	5.44	6.75	7.36	7.65
200	0.48	1.12	2.05	3.20	4.01	4.94	6.29	6.90	7.22
300	0.44	1.01	1.86	2.94	3.89	4.68	5.90	6.54	6.91
500	0.39	0.97	1.71	2.77	3.52	4.37	5.46	6.09	6.47
1,000	0.32	0.71	1.38	2.38	3.13	3.89	4.89	5.30	5.85
2,000	0.27	0.66	1.15	2.05	2.76	3.45	4.39	4.71	5.19
5,000	0.16	0.50	0.94	1.62	2.34	2.88	3.67	4.13	4.32
10,000	0.15	0.38	0.74	1.38	1.95	2.39	3.11	3.31	3.63
20,000	0.13	0.31	0.57	1.04	1.53	1.77	2.49	2.72	2.99
50,000	0.08	0.18	0.34	0.65	0.95	1.22	1.69	1.91	2.06




SPAS 1147 Storm Center Mass Curve: Workman Creek, AZ
February 10 (0800Z) to 13 (0800Z), 2005 Storm
Lat: 33.6850 Lon: -111.3250
Incremental
Accumulated
8.72"
Precipitation (inches)
2.00
1.50
1.00
0.50
0.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0
10
20
30
40
50
60
70


115°0'W
114°0'W
113°0'W
112°0'W
111°0'W
110°0'W
109°0'W
108°0'W
107°0'W
38°0'N
37°0'N
36°0'N
35°0'N
34°0'N
33°0'N
32°0'N
31°0'N
30°0'N
1
2
Legend
Daily
Hourly
Hourly Estimated
Hourly Pseudo
Supplemental
Total Rainfall (72-hours)
SPAS Storm #1147
Feb 10, 2005 (0800Z) - Feb 13, 2005 (0800Z)
Miles
0 30 60 120
Kilometers
0 30 60 120 180 240
Precipitation (inches)
0.11 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
4.01 - 5.00
5.01 - 6.00
6.01 - 7.00
7.01 - 8.00
8.01 - 9.00
N
Coordinate system: GCS North American 1983
Scale: 1:5,391,256
MetstatAWA August 28, 2009

Camp Creek, AZ

September 3-4, 2005

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1091

General Storm Location: Camp Creek, Arizona

Storm Dates: September 3-4, 2005

Event: Thunderstorm

DAD Zone 1 (south center)

Latitude: 34.0399

Longitude: -111.8100

Max. Grid/Radar Rainfall Amount: 4.55”

Max. Observed Rainfall Amount: 3.15” (Camp Creek, AZ)

DAD Zone 2 (north center)

Latitude: 34.3799

Longitude: -111.1800

Max. Grid/Radar Rainfall Amount: 4.93”

Max. Observed Rainfall Amount:

Number of Stations: 348 (77 daily, 260 hourly, 2 hourly pseudo, and 9 supplemental)

SPAS Version: 7.0

Base Map Used: Yes, mean PRISM September precip

Spatial resolution: .40 sq-mi

Radar Included: Yes

Depth-Area-Duration (DAD) analysis: Yes

Storm Name:	**SPAS-1091-Camp Creek**
Storm Date:	**September 3, 2005**
AWA Analysis Date:	**5/25/2013**

Storm Adjustment for Grid Point 1

Temporal Transposition Date **18-Aug**

	Lat	Long
Storm center location	**34.38**	**-111.18**
Storm Rep dew point location	**33.32**	**-111.72**
Transposition dewpoint location	**29.915**	**-110.915**
Basin location	**30.975**	**-110.375**

Moisture Inflow Direction:	**SSW @ 80**	miles
Grid Point Elevation	**6,977**	feet
Storm Center Elevation	**6,300**	feet
Storm Analysis Duration	**3**	hours

The storm representative dew point is	**68.0 F**	with total precipitable water above sea level of			**2.05**	inches.
The in-place maximum dew point is	**81.0 F**	with total precipitable water above sea level of			**3.76**	inches.
The transpositioned maximum dew point is	**82.0 F**	with total precipitable water above sea level of			**3.92**	inches.
The in-place storm elevation is	**6,300**	which subtracts	**1.05**	inches of precipitable water at	**68.0 F**	
The in-place storm elevation is	**6,300**	which subtracts	**1.65**	inches of precipitable water at	**81.0 F**	
The in-place storm elevation is	**6,300**	which subtracts	**1.70**	inches of precipitable water at	**82.0 F**	

The in-place maximization factor is	**1.50**
The moisture transposition factor is	**1.05**
The orographic transposition factor is	**0.90**
The total adjustment factor is	**1.42**

Notes: In-place max. factor held to 1.50.

Observed Storm Depth-Area-Duration

	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**3.0**	**4.2**	**4.4**	**4.4**	**4.4**	**4.4**	**4.5**	-	-
10 sq miles	**2.5**	**3.5**	**3.6**	**3.8**	**3.8**	**3.8**	**3.8**	-	-
50 sq miles	**1.7**	**2.6**	**2.8**	**2.8**	**2.8**	**2.8**	**2.9**	-	-
100 sq miles	**1.3**	**2.1**	**2.3**	**2.4**	**2.4**	**2.4**	**2.4**	-	-
200 sq miles	**0.9**	**1.6**	**1.7**	**1.7**	**1.7**	**1.9**	**1.9**	-	-
500 sq miles	**0.5**	**1.0**	**1.1**	**1.1**	**1.1**	**1.3**	**1.3**	-	-
1000 sq miles	-	-	-	-	-	-	-	-	-
2000 sq miles	-	-	-	-	-	-	-	-	-
5000 sq miles	-	-	-	-	-	-	-	-	-

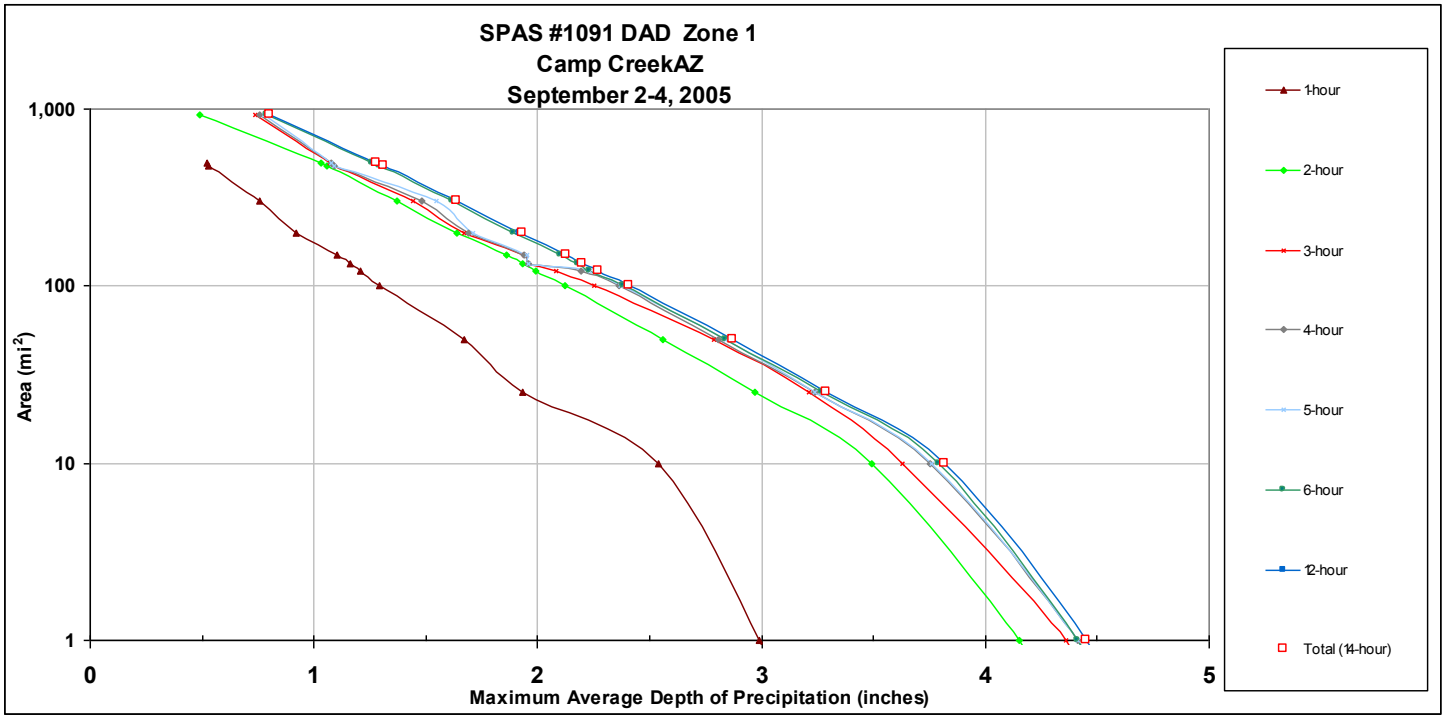
Adjusted Storm Depth-Area-Duration

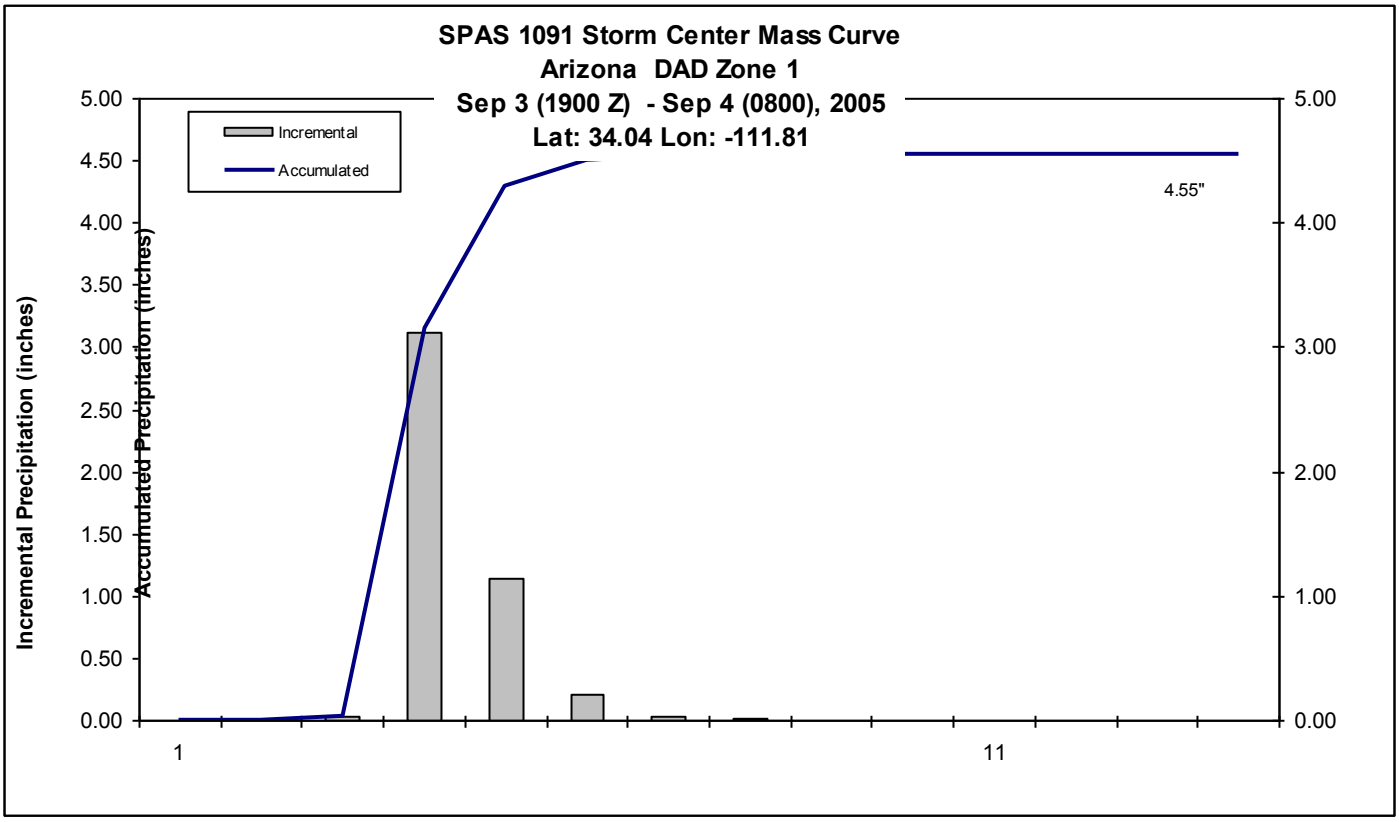
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**4.2**	**5.9**	**6.2**	**6.3**	**6.3**	**6.3**	**6.3**	-	-
10 sq miles	**3.6**	**5.0**	**5.2**	**5.3**	**5.3**	**5.4**	**5.4**	-	-
50 sq miles	**2.4**	**3.6**	**4.0**	**4.0**	**4.0**	**4.0**	**4.1**	-	-
100 sq miles	**1.8**	**3.0**	**3.2**	**3.4**	**3.4**	**3.4**	**3.4**	-	-
200 sq miles	**1.3**	**2.3**	**2.4**	**2.4**	**2.4**	**2.7**	**2.7**	-	-
500 sq miles	**0.7**	**1.5**	**1.5**	**1.5**	**1.5**	**1.8**	**1.8**	-	-
1000 sq miles	-	-	-	-	-	-	-	-	-
2000 sq miles	-	-	-	-	-	-	-	-	-
5000 sq miles	-	-	-	-	-	-	-	-	-

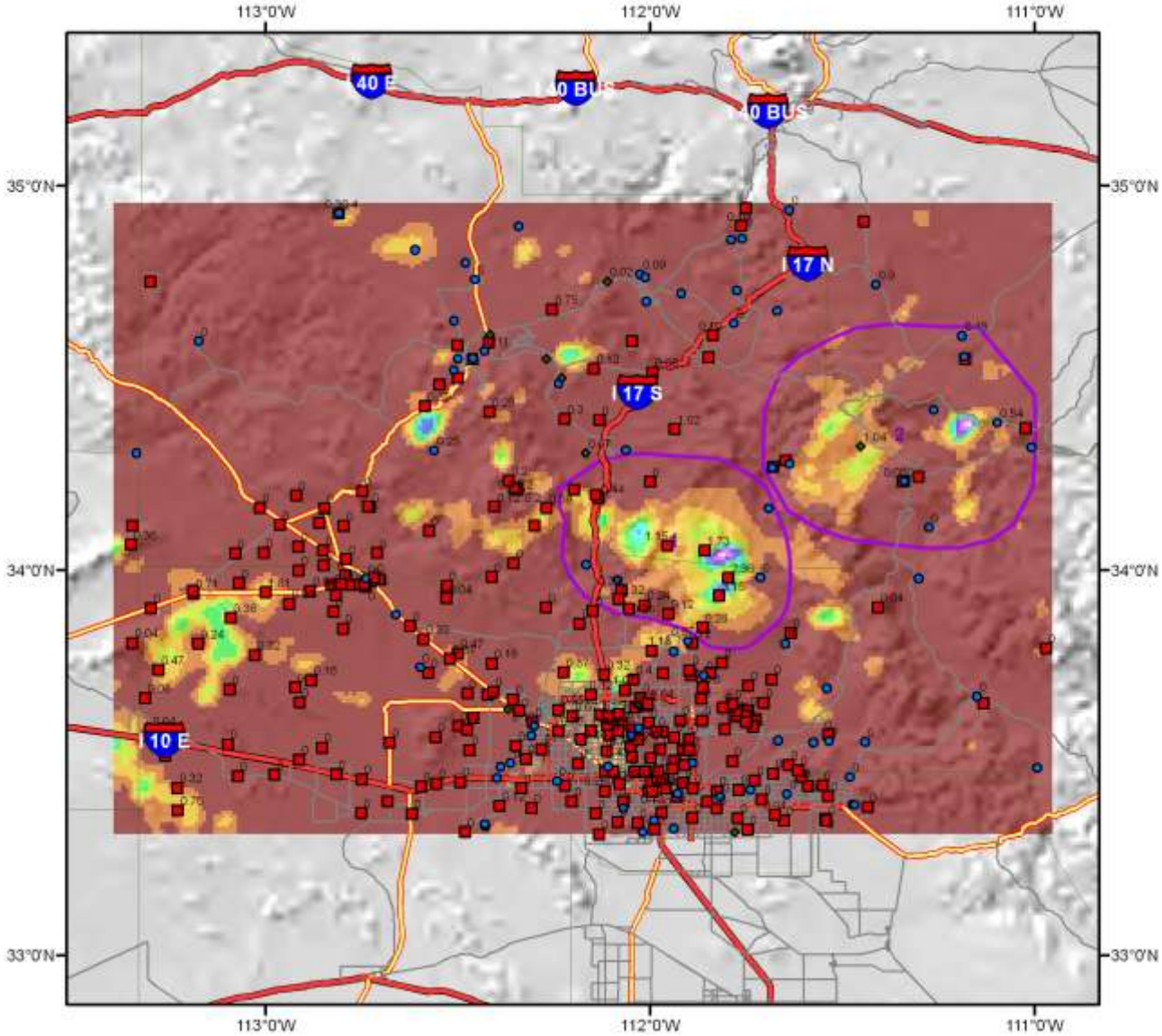
Storm or Storm Center Name	**SPAS-1091-Camp Creek**		
Storm Date(s)	9/3/05		
Storm Type	Local Storm		
Storm Location	34.38	-111.18	
Storm Center Elevation	6300		
Precipitation Total & Duration (10 sq mi)	3.34 inches 1 hour 4.82" in 2hrs (SPAS 1091 DAD)		
Storm Representative Dewpoint	68.0 F	3	hr ave KIWA, KCHD, KCGZ
Storm Representative Dewpoint Location	33.32	-111.72	
In-place Maximum Dewpoint	81.0 F		
Moisture Inflow Vector	SSW @ 80		
In-place Maximization Factor	1.50		
Temporal Transposition (Date)	18-Aug		
Transposition Dewpoint Location	29.92	-110.92	
Transposition Maximum Dewpoint	82.0 F		
Transposition Adjustment Factor	1.05		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	1.42		

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

Area (mi^2)	Duration (hours) 1	2	3	4	5	6	12	total (14-hr)
0.39	3.13	4.26	4.47	4.51	4.53	4.55	4.55	4.55
1	2.99	4.15	4.36	4.41	4.41	4.41	4.45	4.45
10	2.54	3.49	3.63	3.75	3.76	3.79	3.82	3.82
25	1.93	2.97	3.21	3.24	3.24	3.27	3.29	3.29
50	1.67	2.56	2.79	2.81	2.84	2.84	2.87	2.87
100	1.29	2.12	2.25	2.36	2.37	2.38	2.41	2.41
121	1.21	1.99	2.08	2.19	2.23	2.23	2.27	2.27
135	1.16	1.93	1.96	1.96	1.96	2.18	2.20	2.20
150	1.10	1.86	1.94	1.94	1.95	2.10	2.13	2.13
200	0.92	1.64	1.67	1.69	1.71	1.89	1.92	1.93
300	0.76	1.37	1.44	1.48	1.55	1.62	1.64	1.64
475	0.53	1.06	1.09	1.09	1.09	1.29	1.31	1.31
500	0.52	1.03	1.07	1.08	1.08	1.26	1.27	1.28
933		0.49	0.74	0.76	0.78	0.79	0.80	0.80




SPAS 1091 Storm Center Mass Curve
Arizona DAD Zone 1
Sep 3 (1900 Z) - Sep 4 (0800), 2005
Lat: 34.04 Lon: -111.81
Incremental
Accumulated
4.55"
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1
11



Total Precipitation
SPAS Storm #1091
09/2/2005 - 9/4/2005

N

Miles
0 5 10 20

Kilometers
0 12.5 25 50 75

Precipitation (inches)

0.00 - 0.50	2.01 - 2.50	4.01 - 4.50	Daily
0.51 - 1.00	2.51 - 3.00	4.51 - 5.00	Hourly
1.01 - 1.50	3.01 - 3.50		Hourly pseudo
1.51 - 2.00	3.51 - 4.00		Supplemental

Metstat/AWA ugust 14, 2009

Cedar City, UT

July 31, 2006

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1120

General Storm Location: Cedar City, Utah

Storm Dates: July 31 (0000 UTC) - July 31 (1100 UTC), 2006

Event: Convective

Zone 1

Latitude: 37.685

Longitude: -112.975

Max. Grid Rainfall Amount: 3.83"

Max. Observed Rainfall Amount: 3.82" (Cedar City, UT)

Zone 2

Latitude: 37.375

Longitude: -113.075

Max. Grid Rainfall Amount: 5.69"

Max. Observed Rainfall Amount: 3.04" (Lava Point, UT)

Zone 3

Latitude: 36.855

Longitude: -112.575

Max. Grid Rainfall Amount: 4.26"

Max. Observed Rainfall Amount: NA, no stations captured center, based on radar

Number of Stations: 137 (70 Daily, 57 Hourly, 2 Hourly Estimated, 6 Hourly Pseudo, 2 Supplemental)

SPAS Version: 8.5

Base Map Used: Mean (1971-2000) PRISM July Precipitation

Spatial resolution: 0.39 sq-mi

Radar Included: Yes

Depth-Area-Duration (DAD) analysis: Yes

Storm Name:	SPAS-1120-Cedar City
Storm Date:	July 31, 2006
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	15-Aug	
	Lat	Long
Storm center location	37.38	-113.08
Storm Rep dew point location	37.72	-113.10
Transposition dewpoint location	31.315	-110.395
Basin location	30.975	-110.375

Moisture Inflow Direction:	N @ 25	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	8,000	feet
Storm Analysis Duration	3	hours

The storm representative dew point is	74.0 F	with total precipitable water above sea level of			2.73	inches.
The in-place maximum dew point is	79.5 F	with total precipitable water above sea level of			3.52	inches.
The transpositioned maximum dew point is	81.0 F	with total precipitable water above sea level of			3.76	inches.
The in-place storm elevation is	8,000	which subtracts	1.52	inches of precipitable water at	74.0 F	
The in-place storm elevation is	8,000	which subtracts	1.85	inches of precipitable water at	79.5 F	
The in-place storm elevation is	8,000	which subtracts	1.94	inches of precipitable water at	81.0 F	

The in-place maximization factor is	1.38
The moisture transposition factor is	1.09
The orographic transposition factor is	1.12
The total adjustment factor is	1.68

Notes:

Observed Storm Depth-Area-Duration

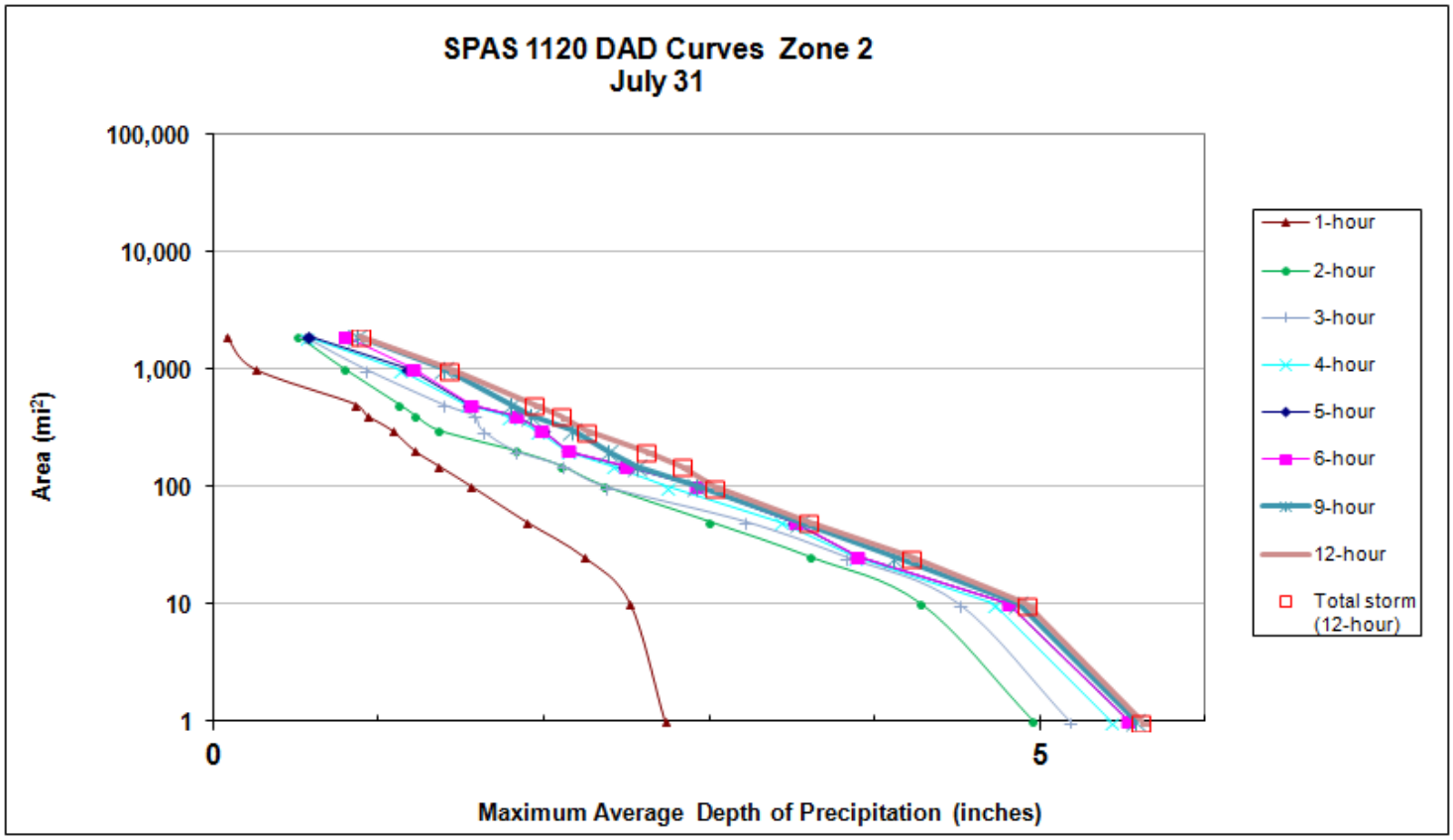
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	2.7	5.0	5.2	5.4	5.5	5.5	5.6	-	-
10 sq miles	2.5	4.3	4.5	4.7	4.8	4.8	4.9	-	-
50 sq miles	1.9	3.0	3.2	3.4	3.5	3.5	3.6	-	-
100 sq miles	1.6	2.4	2.4	2.7	2.9	2.9	3.0	-	-
200 sq miles	1.2	1.8	1.8	2.1	2.2	2.2	2.6	-	-
500 sq miles	0.9	1.1	1.4	1.5	1.6	1.6	1.9	-	-
1000 sq miles	0.3	0.8	0.9	1.1	1.2	1.2	1.4	-	-
2000 sq miles	-	-	-	-	-	-	-	-	-
5000 sq miles	-	-	-	-	-	-	-	-	-

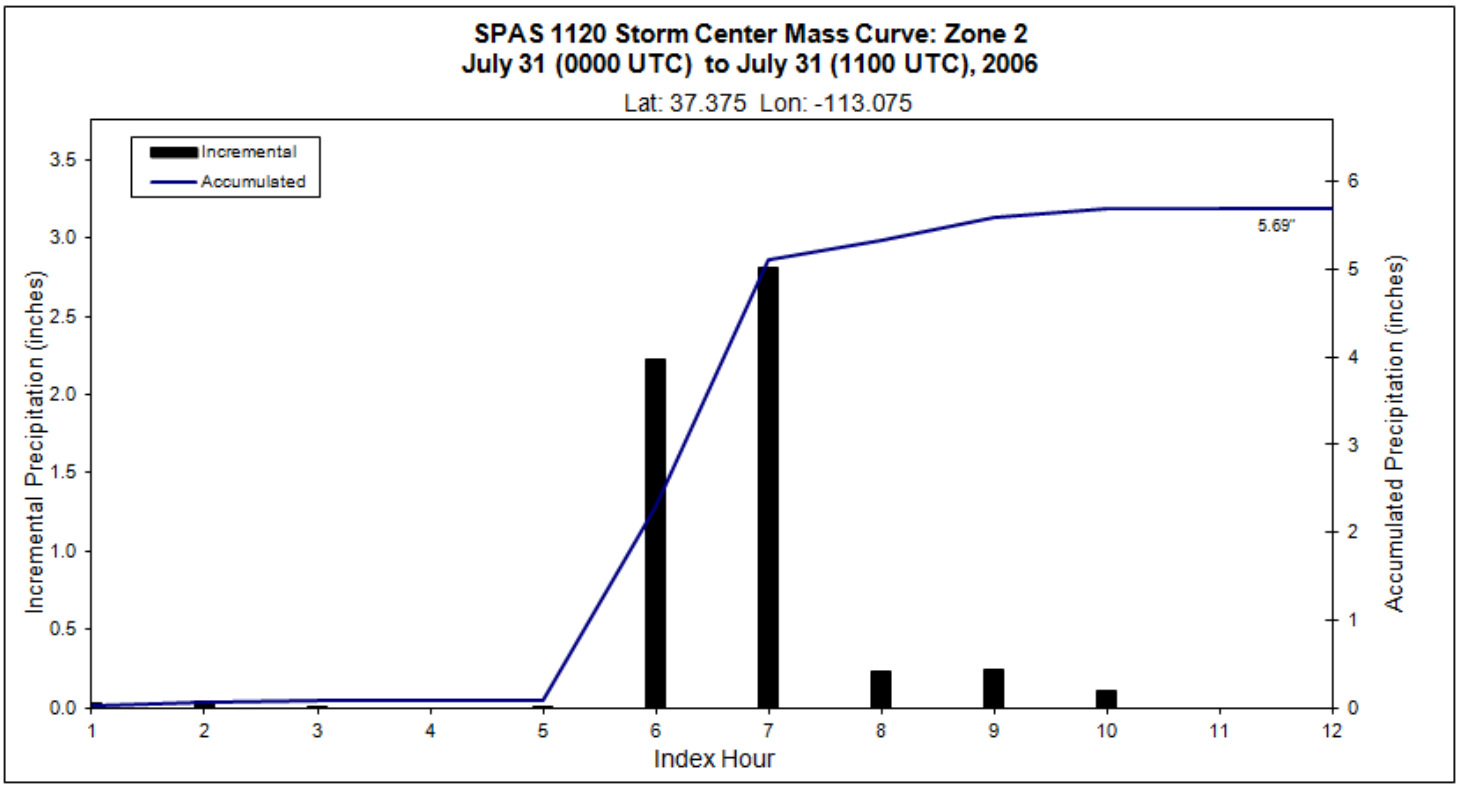
Adjusted Storm Depth-Area-Duration

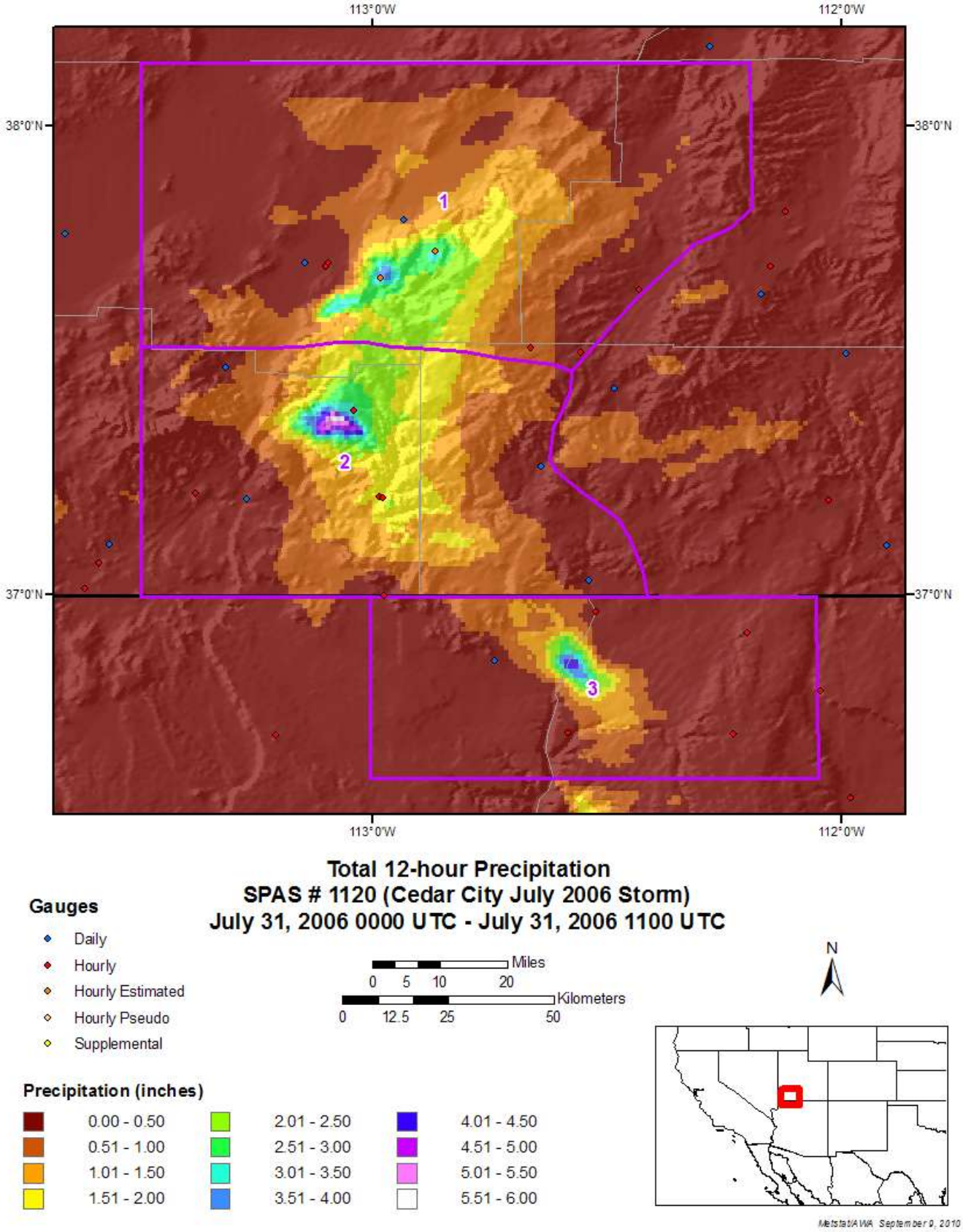
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	4.6	8.4	8.7	9.1	9.3	9.3	9.5	-	-
10 sq miles	4.2	7.2	7.6	8.0	8.1	8.1	8.3	-	-
50 sq miles	3.2	5.1	5.4	5.8	5.9	5.9	6.1	-	-
100 sq miles	2.6	4.0	4.0	4.6	4.9	4.9	5.1	-	-
200 sq miles	2.1	3.1	3.1	3.6	3.6	3.6	4.4	-	-
500 sq miles	1.4	1.9	2.3	2.6	2.6	2.6	3.3	-	-
1000 sq miles	0.4	1.3	1.5	1.9	2.0	2.0	2.4	-	-
2000 sq miles	-	-	-	-	-	-	-	-	-
5000 sq miles	-	-	-	-	-	-	-	-	-

Storm or Storm Center Name	SPAS-1120-Cedar City		
Storm Date(s)	7/31/06		
Storm Type	Local Storm		
Storm Location	37.38	-113.08	
Storm Center Elevation	8000		
Precipitation Total & Duration (10 sq mi)	5.69 inches 12 hour (SPAS 1120 DAD)		
Storm Representative Dewpoint	74.0 F	3	hr ave from KCDC
Storm Representative Dewpoint Location	37.72	-113.1	
In-place Maximum Dewpoint	79.5 F		
Moisture Inflow Vector	N @ 25		
In-place Maximization Factor	1.38		
Temporal Transposition (Date)	15-Aug		
Transposition Dewpoint Location	31.32	-110.40	
Transposition Maximum Dewpoint	81.0 F		
Transposition Adjustment Factor	1.09		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	1.68		

Storm 1120 - July 31, 1970 (0000 UTC) - July 31, 1970 (1100 UTC)									
MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)									
	Duration (hours)								
Area (mi^2)	1	2	3	4	5	6	9	12	Total
0.4	2.81	5.03	5.26	5.51	5.61	5.62	5.66	5.69	5.69
1	2.73	4.96	5.18	5.43	5.54	5.54	5.58	5.61	5.61
10	2.52	4.28	4.51	4.72	4.81	4.81	4.87	4.92	4.92
25	2.24	3.61	3.83	3.88	3.9	3.9	4.12	4.22	4.22
50	1.89	3	3.22	3.43	3.51	3.52	3.55	3.6	3.60
100	1.56	2.37	2.37	2.74	2.93	2.93	2.93	3.03	3.03
150	1.36	2.1	2.11	2.41	2.49	2.5	2.56	2.83	2.83
200	1.22	1.83	1.83	2.14	2.15	2.15	2.39	2.62	2.62
300	1.08	1.36	1.63	1.96	1.99	1.99	2.17	2.25	2.25
400	0.93	1.22	1.58	1.78	1.83	1.83	1.92	2.1	2.10
500	0.86	1.12	1.39	1.53	1.55	1.56	1.8	1.94	1.94
1000	0.25	0.79	0.92	1.12	1.18	1.21	1.4	1.43	1.43
1894	0.08	0.51	0.55	0.56	0.58	0.8	0.87	0.89	0.89




SPAS 1120 Storm Center Mass Curve: Zone 2
July 31 (0000 UTC) to July 31 (1100 UTC), 2006
Lat: 37.375 Lon: -113.075
Incremental
Accumulated
5.69"
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
Index Hour
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
0
1
2
3
4
5
6
1
2
3
4
5
6
7
8
9
10
11
12


113°0'W
112°0'W
38°0'N
37°0'N
1
2
3
Total 12-hour Precipitation
SPAS # 1120 (Cedar City July 2006 Storm)
July 31, 2006 0000 UTC - July 31, 2006 1100 UTC
Gauges
Daily
Hourly
Hourly Estimated
Hourly Pseudo
Supplemental
Miles
0 5 10 20
Kilometers
0 12.5 25 50
N
Precipitation (inches)
0.00 - 0.50
0.51 - 1.00
1.01 - 1.50
1.51 - 2.00
2.01 - 2.50
2.51 - 3.00
3.01 - 3.50
3.51 - 4.00
4.01 - 4.50
4.51 - 5.00
5.01 - 5.50
5.51 - 6.00
Metstat/AWA September 9, 2010

Petrified Forest, AZ

July 27-28, 2007

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1113

General Storm Location: Petrified Forest, Arizona

Storm Dates: July 27 (0000) - July 28 (0900), 2007

Event: Convective

Latitude: 34.7250

Longitude: -109.6450

Max. Grid/Radar Rainfall Amount: 7.18"

Max. Observed Rainfall Amount: 4.76"

Max. Grid/Radar 1-hour Rainfall Amount: 5.94"

Max. Observed 1-hour Rainfall Amount: 3.42"

Number of Stations: 80 (27 Daily, 44 Hourly, 3 Hourly Estimated, 1 Hourly Pseudo, 5 Supplemental)

SPAS Version: 8.5

Base Map Used: Mean (1971-2000) PRISM July Precipitation

Spatial resolution: 0.39 sq-mi

Radar Included: Yes

Depth-Area-Duration (DAD) analysis: Yes

Storm Name:	**SPAS-1113-Petrified Forest**
Storm Date:	**7/27-28/2007**
AWA Analysis Date:	**5/25/2013**

Storm Adjustment for Grid Point 1

Temporal Transposition Date	**15-Aug**	
	Lat	**Long**
Storm center location	**34.73**	**-109.65**
Storm Rep dew point location	**34.30**	**-110.36**
Transposition dewpoint location	**30.545**	**-111.085**
Basin location	**30.975**	**-110.375**

Moisture Inflow Direction:	**SW @ 50**	miles
Grid Point Elevation	**6,977**	feet
Storm Center Elevation	**5,500**	feet
Storm Analysis Duration	**3**	hours

The storm representative dew point is	**77.5 F**	with total precipitable water above sea level of			**3.22**	inches.
The in-place maximum dew point is	**79.5 F**	with total precipitable water above sea level of			**3.52**	inches.
The transpositioned maximum dew point is	**82.0 F**	with total precipitable water above sea level of			**3.92**	inches.
The in-place storm elevation is	**5,500**	which subtracts	**1.29**	inches of precipitable water at	**77.5 F**	
The in-place storm elevation is	**5,500**	which subtracts	**1.38**	inches of precipitable water at	**79.5 F**	
The in-place storm elevation is	**5,500**	which subtracts	**1.50**	inches of precipitable water at	**82.0 F**	

The in-place maximization factor is	**1.11**
The moisture transposition factor is	**1.13**
The orographic transposition factor is	**1.29**
The total adjustment factor is	**1.62**

Notes:

Observed Storm Depth-Area-Duration

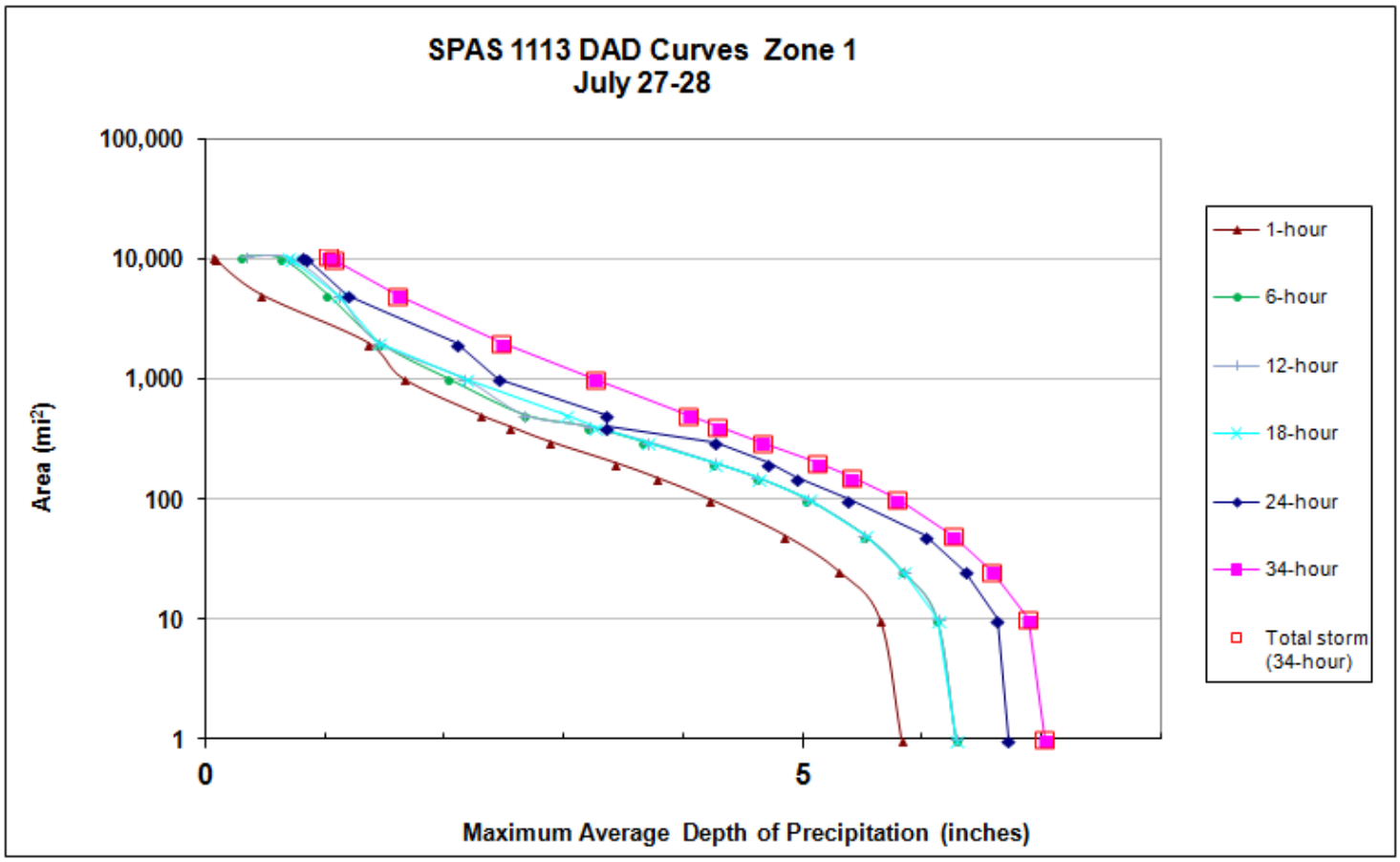
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**5.8**	**6.2**	**6.3**	**6.3**	**6.3**	**6.3**	**6.3**	**6.3**	**6.7**
10 sq miles	**5.7**	**6.1**	**6.1**	**6.1**	**6.1**	**6.1**	**6.1**	**6.1**	**6.6**
50 sq miles	**4.8**	**5.3**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	**6.0**
100 sq miles	**4.2**	**4.6**	**5.0**	**5.0**	**5.0**	**5.0**	**5.0**	**5.1**	**5.4**
200 sq miles	**3.4**	**3.8**	**4.2**	**4.2**	**4.2**	**4.3**	**4.3**	**4.3**	**4.7**
500 sq miles	**2.3**	**2.6**	**2.7**	**2.9**	**2.9**	**2.7**	**2.7**	**3.0**	**3.4**
1000 sq miles	**1.7**	**1.7**	**1.9**	**2.0**	**2.0**	**2.0**	**2.2**	**2.2**	**2.5**
2000 sq miles	**1.4**	**1.4**	**1.4**	**1.4**	**1.5**	**1.5**	**1.5**	**1.5**	**2.1**
5000 sq miles	**0.5**	**0.5**	**0.5**	**0.5**	**0.6**	**1.0**	**1.1**	**1.1**	**1.2**

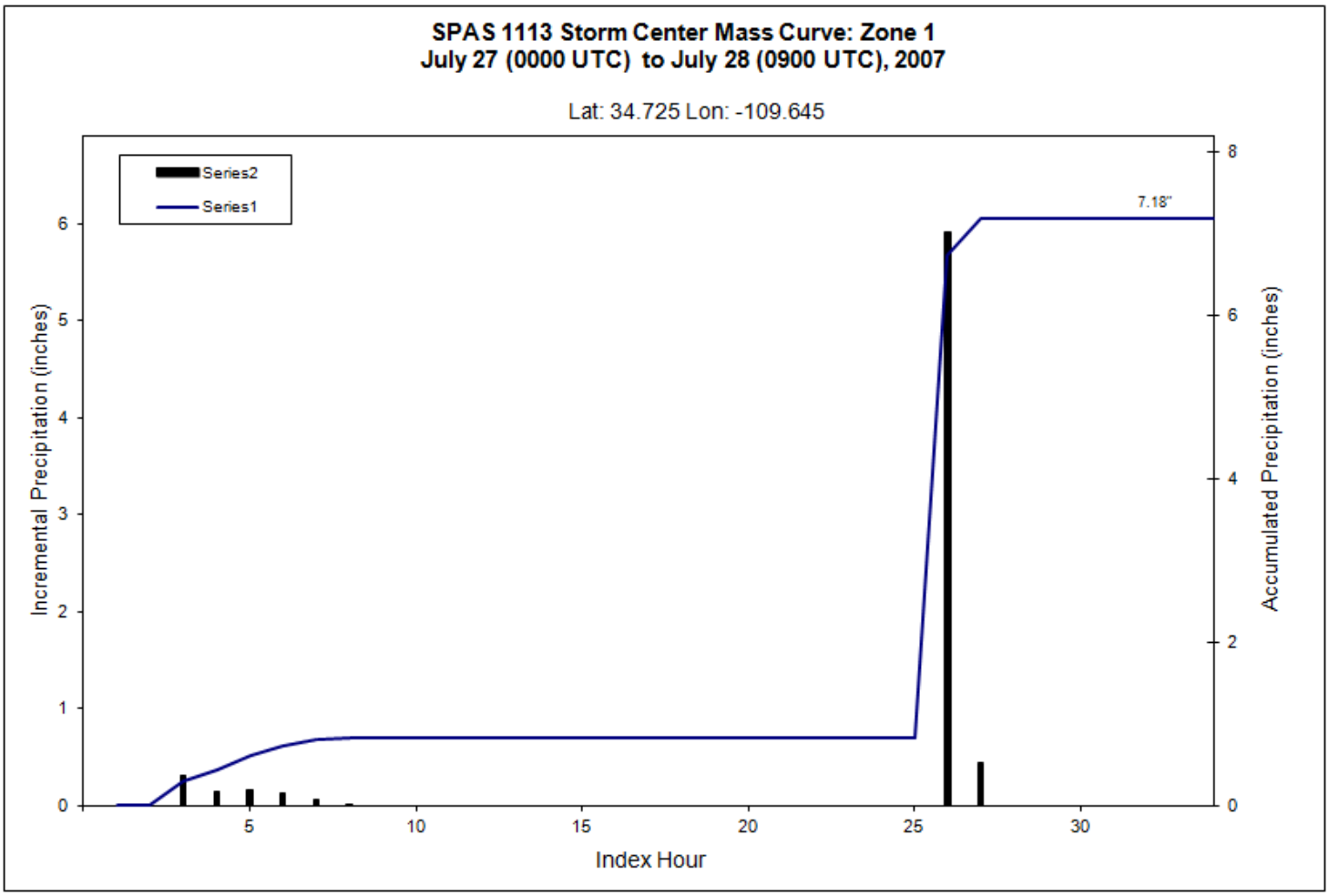
Adjusted Storm Depth-Area-Duration

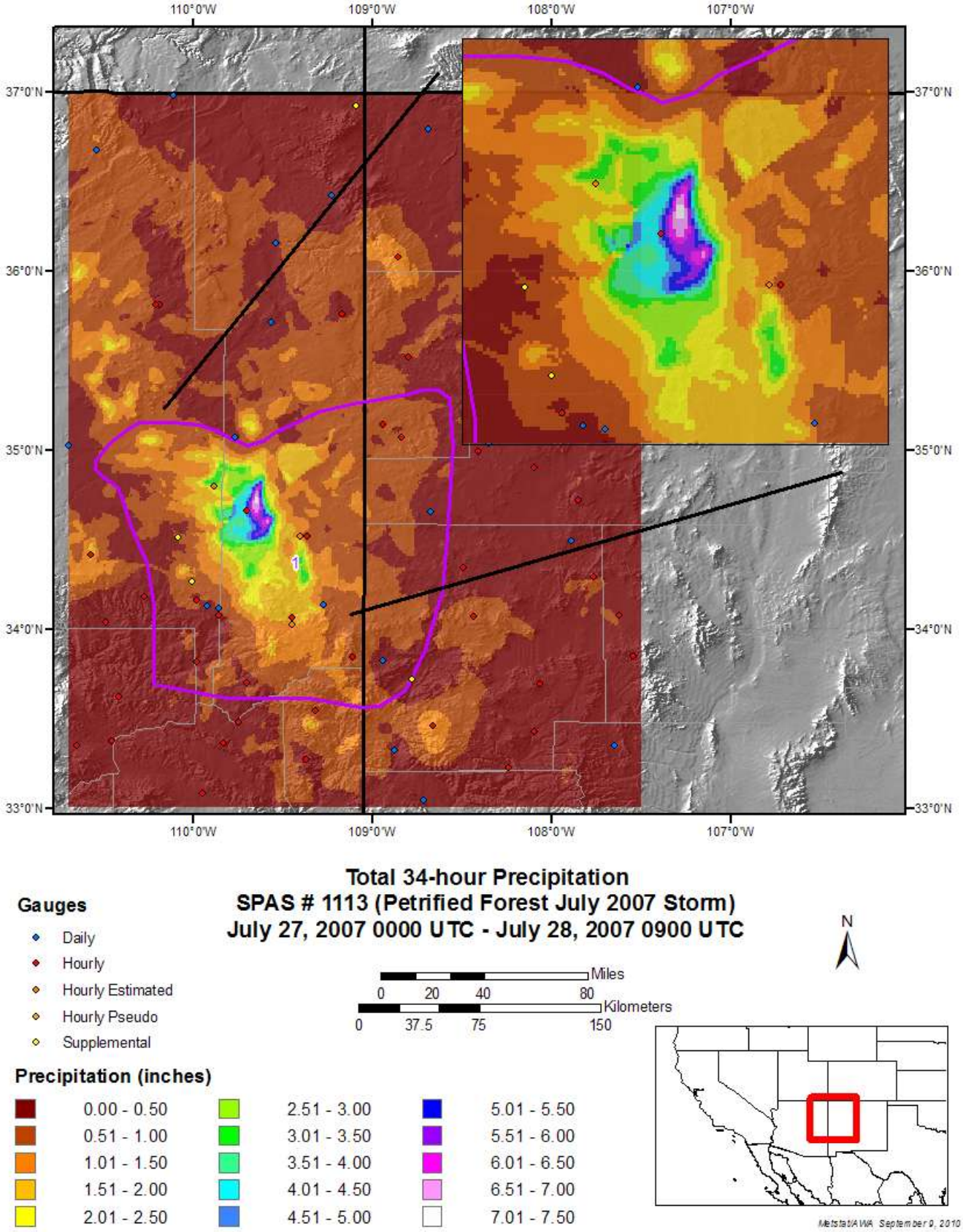
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**9.4**	**10.0**	**10.2**	**10.2**	**10.2**	**10.2**	**10.2**	**10.2**	**10.9**
10 sq miles	**9.1**	**9.9**	**9.9**	**9.9**	**9.9**	**9.9**	**9.9**	**9.9**	**10.7**
50 sq miles	**7.8**	**8.6**	**8.9**	**8.9**	**8.9**	**8.9**	**8.9**	**8.9**	**9.8**
100 sq miles	**6.8**	**7.4**	**8.1**	**8.1**	**8.2**	**8.1**	**8.2**	**8.2**	**8.7**
200 sq miles	**5.5**	**6.2**	**6.8**	**6.9**	**6.9**	**6.9**	**6.9**	**6.9**	**7.6**
500 sq miles	**3.7**	**4.2**	**4.3**	**4.7**	**4.7**	**4.3**	**4.3**	**4.9**	**5.4**
1000 sq miles	**2.7**	**2.7**	**3.1**	**3.2**	**3.3**	**3.3**	**3.5**	**3.5**	**4.0**
2000 sq miles	**2.2**	**2.2**	**2.2**	**2.2**	**2.3**	**2.3**	**2.3**	**2.3**	**3.4**
5000 sq miles	**0.7**	**0.8**	**0.8**	**0.9**	**1.0**	**1.6**	**1.8**	**1.8**	**1.9**

Storm or Storm Center Name	**SPAS-1113-Petrified Forest**		
Storm Date(s)	7/27-28/2007		
Storm Type	Local Storm		
Storm Location	34.73	-109.65	
Storm Center Elevation	5500		
Precipitation Total & Duration (10 sq mi)	5.94 inches 1 hour (SPAS 1113 DAD)		
Storm Representative Dewpoint	77.5 F	3	hr ave from KPRC and KSOW
Storm Representative Dewpoint Location	34.3	-110.36	
In-place Maximum Dewpoint	79.5 F		
Moisture Inflow Vector	SW @ 50		
In-place Maximization Factor	1.11		
Temporal Transposition (Date)	15-Aug		
Transposition Dewpoint Location	30.55	-111.09	
Transposition Maximum Dewpoint	82.0 F		
Transposition Adjustment Factor	1.13		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	1.62		

Storm 1113 - July 27, 2007 (0000 UTC) - July 28, 2007 (0900 UTC) MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)							
	Duration (hours)						
Area (mi^2)	1	6	12	18	24	34	Total
0	5.94	6.39	6.39	6.39	6.89	7.18	7.18
1	5.83	6.29	6.29	6.29	6.72	7.03	7.03
10	5.65	6.13	6.13	6.13	6.63	6.89	6.89
25	5.30	5.84	5.84	5.84	6.36	6.59	6.59
50	4.84	5.52	5.52	5.52	6.03	6.26	6.26
100	4.21	5.03	5.04	5.05	5.38	5.79	5.79
150	3.77	4.62	4.62	4.62	4.95	5.41	5.41
200	3.42	4.25	4.26	4.26	4.71	5.13	5.13
300	2.87	3.66	3.70	3.70	4.27	4.66	4.66
400	2.54	3.20	3.21	3.25	3.36	4.29	4.29
500	2.29	2.67	2.67	3.02	3.36	4.05	4.05
1,000	1.65	2.03	2.17	2.17	2.45	3.26	3.26
2,000	1.35	1.45	1.45	1.45	2.10	2.48	2.48
5,000	0.46	1.02	1.11	1.11	1.19	1.61	1.61
10,000	0.07	0.63	0.72	0.72	0.85	1.07	1.07
10,451	0.06	0.30	0.34	0.69	0.82	1.03	1.03




SPAS 1113 Storm Center Mass Curve: Zone 1
July 27 (0000 UTC) to July 28 (0900 UTC), 2007
Lat: 34.725 Lon: -109.645
Series2
Series1
7.18"
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
Index Hour
0
1
2
3
4
5
6
0
2
4
6
8
5
10
15
20
25
30


110°0'W
109°0'W
108°0'W
107°0'W
37°0'N
36°0'N
35°0'N
34°0'N
33°0'N
Total 34-hour Precipitation
SPAS # 1113 (Petrified Forest July 2007 Storm)
July 27, 2007 0000 UTC - July 28, 2007 0900 UTC
Gauges
Daily
Hourly
Hourly Estimated
Hourly Pseudo
Supplemental
Miles
0 20 40 80
Kilometers
0 37.5 75 150
N
Precipitation (inches)
0.00 - 0.50
0.51 - 1.00
1.01 - 1.50
1.51 - 2.00
2.01 - 2.50
2.51 - 3.00
3.01 - 3.50
3.51 - 4.00
4.01 - 4.50
4.51 - 5.00
5.01 - 5.50
5.51 - 6.00
6.01 - 6.50
6.51 - 7.00
7.01 - 7.50
Metstat/AWA September 9, 2010

Cooks Mesa, AZ

November 30 – December 2, 2007

Storm Type: General Frontal

Storm Precipitation Analysis System (SPAS) For Storm #1149

General Storm Location: Cooks Mesa, Arizona

Storm Dates: November 30-December 2, 2007

Event: Winter Storm

DAD Zone 1 -- Southern Deserts

Longitude: -110.78

Latitude: 32.44

Max. Grid/Radar Rainfall Amount: 6.53”

Max. Observed Rainfall Amount: 8.55” (Mt. Lemmon)

DAD Zone 2 – Mogollon Rim

Longitude: -111.23

Latitude: 34.46

Max. Grid/Radar Rainfall Amount: 8.60”

Max. Observed Rainfall Amount: n/a

DAD Zone 3 – Colorado Plateau Deserts

Longitude: -109.47

Latitude: 37.85

Max. Grid/Radar Rainfall Amount: 5.18”

Max. Observed Rainfall Amount: n/a

DAD Zone 4 – SW Colorado Mountains

Longitude: -106.87

Latitude: 37.54

Max. Grid/Radar Rainfall Amount: 6.69”

Max. Observed Rainfall Amount: n/a

DAD Zone 5 – Southeastern Utah, Northwestern Arizona and southern Nevada

Longitude: -113.93

Latitude: 37.47

Max. Grid/Radar Rainfall Amount: 4.70”

Max. Observed Rainfall Amount:

Number of Stations: 1126 (395 daily, 666 hourly, 19 hourly pseudo, 43 supplemental and 3 supplemental estimated)

SPAS Version: 7.0

Base Map Used: Mean December PRISM

Spatial resolution: 36-sec.

Radar Included: Y

Depth-Area-Duration (DAD) analysis: Y

Storm Name:	SPAS-1149-Cooks Mesa-zone 2
Storm Date:	11/30-12-2/2007
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	15-Nov	
	Lat	Long
Storm center location	34.46	-111.23
Storm Rep dew point location	31.70	-111.11
Transposition dewpoint location	28.215	-110.255
Basin location	30.975	-110.375

Moisture Inflow Direction:	S @ 190	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	7,450	feet
Storm Analysis Duration	24	hours

The storm representative dew point is	63.5 F	with total precipitable water above sea level of			1.64	inches.
The in-place maximum dew point is	65.0 F	with total precipitable water above sea level of			1.77	inches.
The transpositioned maximum dew point is	66.0 F	with total precipitable water above sea level of			1.86	inches.
The in-place storm elevation is	7,450	which subtracts	0.98	inches of precipitable water at	63.5 F	
The in-place storm elevation is	7,450	which subtracts	1.04	inches of precipitable water at	65.0 F	
The in-place storm elevation is	7,450	which subtracts	1.08	inches of precipitable water at	66.0 F	

The in-place maximization factor is	1.11
The moisture transposition factor is	1.07
The orographic transposition factor is	0.70
The total adjustment factor is	0.83

Notes:

Observed Storm Depth-Area-Duration

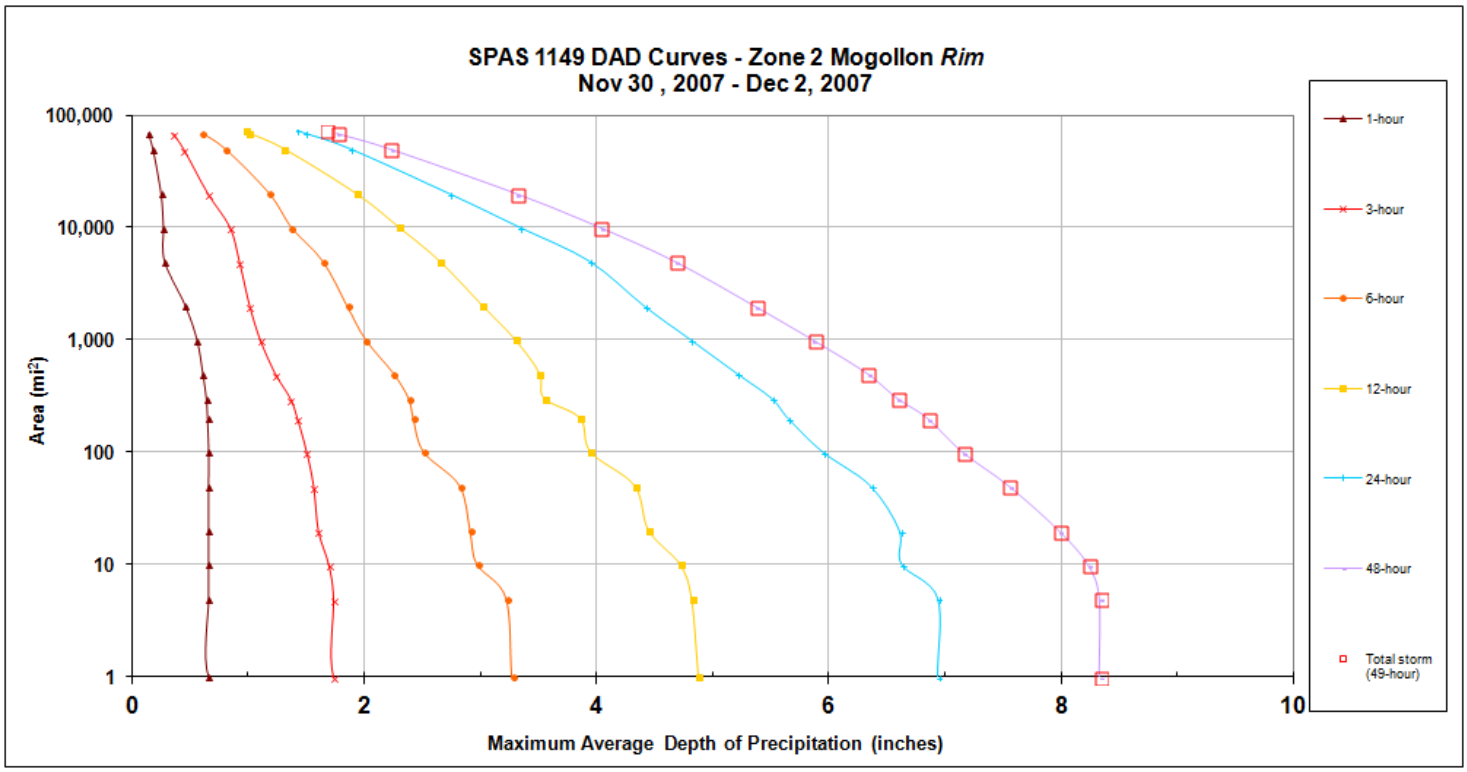
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	0.7	3.3	4.9	-	6.9	-	8.1	8.3	-	-
10 sq miles	0.7	3.0	4.7	-	6.6	-	7.8	8.2	-	-
100 sq miles	0.7	2.5	4.0	-	6.0	-	7.0	7.2	-	-
200 sq miles	0.7	2.4	3.9	-	5.7	-	6.4	6.9	-	-
500 sq miles	0.6	2.3	3.5	-	5.2	-	6.1	6.3	-	-
1000 sq miles	0.6	2.0	3.3	-	4.8	-	5.6	5.9	-	-
2000 sq miles	0.5	1.9	3.0	-	4.4	-	5.2	5.4	-	-
5000 sq miles	0.3	1.6	2.7	-	3.9	-	4.5	4.7	-	-
10000 sq miles	0.3	1.4	2.3	-	3.3	-	3.9	4.0	-	-
20000 sq miles	0.3	1.2	1.9	-	2.7	-	3.1	3.3	-	-

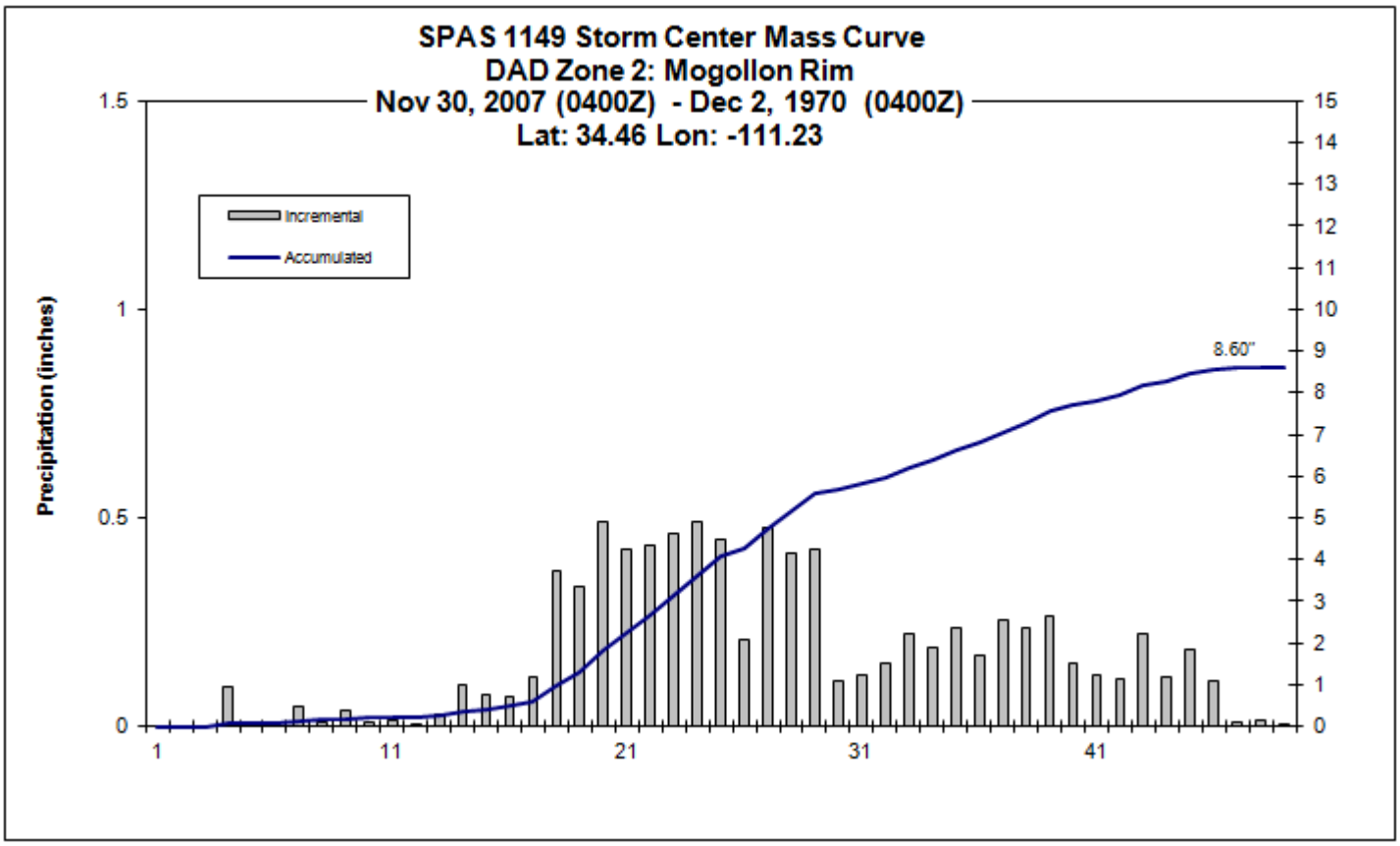
Adjusteded Storm Depth-Area-Duration

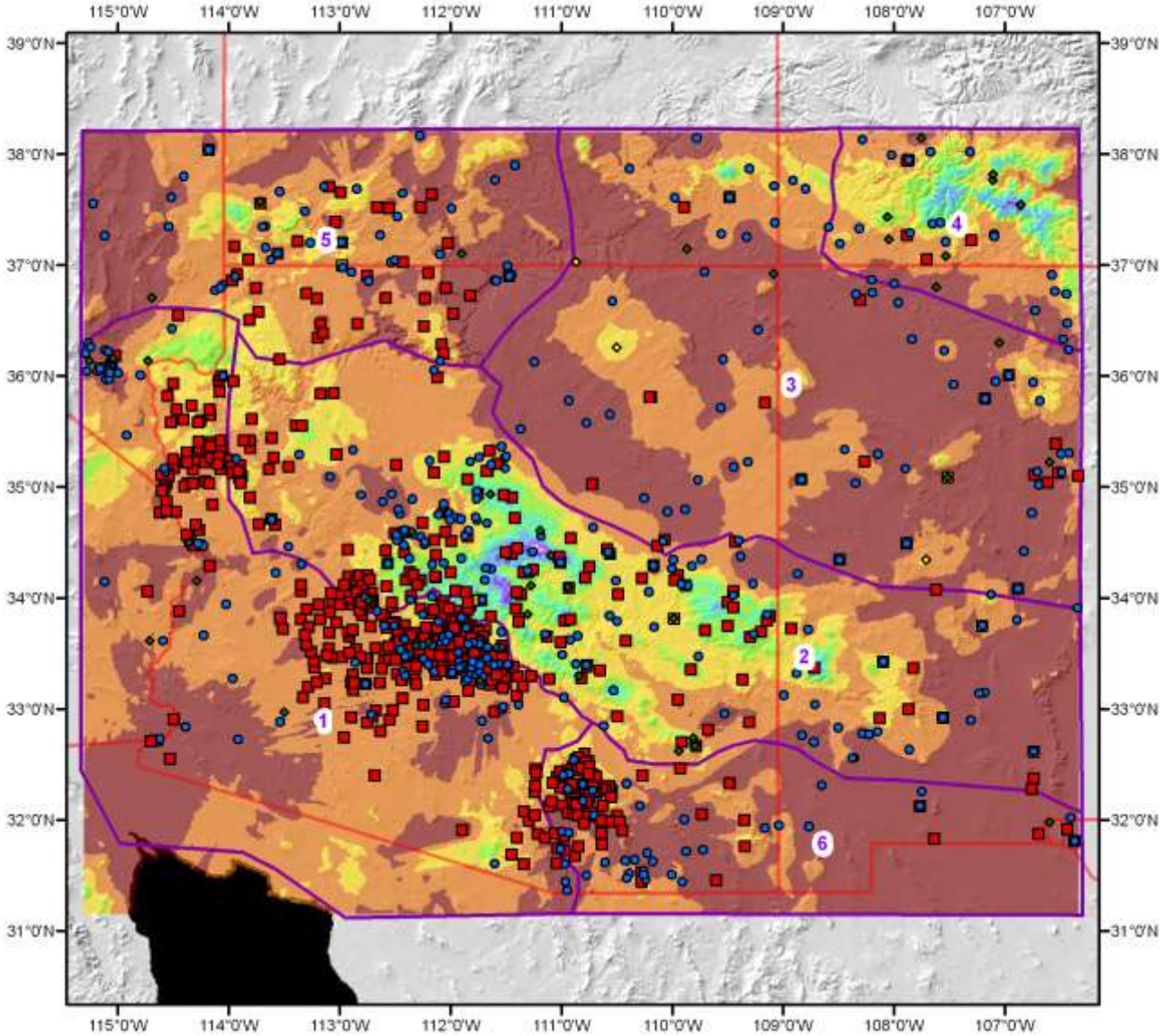
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	0.5	2.7	4.0	-	5.7	-	6.7	6.9	-	-
10 sq miles	0.5	2.5	3.9	-	5.5	-	6.5	6.8	-	-
100 sq miles	0.5	2.1	3.3	-	4.9	-	5.7	5.9	-	-
200 sq miles	0.5	2.0	3.2	-	4.7	-	5.3	5.7	-	-
500 sq miles	0.5	1.9	2.9	-	4.3	-	5.0	5.2	-	-
1000 sq miles	0.5	1.7	2.7	-	4.0	-	4.6	4.8	-	-
2000 sq miles	0.4	1.5	2.5	-	3.6	-	4.3	4.4	-	-
5000 sq miles	0.2	1.4	2.2	-	3.3	-	3.7	3.9	-	-
10000 sq miles	0.2	1.1	1.9	-	2.8	-	3.2	3.3	-	-
20000 sq miles	0.2	1.0	1.6	-	2.3	-	2.6	2.7	-	-

Storm or Storm Center Name	SPAS-1149-Cooks Mesa-zone 2		
Storm Date(s)	11/30-12-2/2007		
Storm Type	General		
Storm Location	34.46	-111.23	
Storm Center Elevation	7,450		
Precipitation Total & Duration (10 sq mi)	8.79 inches 72 hours (SPAS 1147 DAD)		
Storm Representative Dewpoint	63.5 F	24	hr ave KDMA, KOLS, KFHU, KPHX, KIWA, KTUS
Storm Representative Dewpoint Location	31.7	-111.11	
In-place Maximum Dewpoint	65.0 F		
Moisture Inflow Vector	S @ 190		
In-place Maximization Factor			
Temporal Transposition (Date)	15-Nov		
Transposition Dewpoint Location	28.22	-110.26	
Transposition Maximum Dewpoint	66.0 F		
Transposition Adjustment Factor	1.07		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	0.83		

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)															
	Duration (hours)														
Area (mi^2)	1	2	3	4	5	6	12	18	24	36	48				Total (49-hr
0.39	1.02		2.02			3.55	5.15		7.24	8.38	8.62				8.62
1	0.66		1.73			3.27	4.88		6.94	8.12	8.33				8.33
5	0.66		1.73			3.22	4.82		6.94	8.12	8.33				8.33
10	0.66		1.69			2.97	4.72		6.63	7.83	8.23				8.23
20	0.66		1.60			2.91	4.45		6.61	7.46	7.98				7.98
50	0.66		1.56			2.82	4.33		6.36	7.24	7.55				7.54
100	0.66		1.50			2.51	3.95		5.95	6.95	7.15				7.15
200	0.65		1.42			2.42	3.86		5.65	6.44	6.85				6.85
300	0.64		1.36			2.38	3.55		5.51	6.41	6.59				6.59
500	0.61		1.23			2.25	3.51		5.21	6.07	6.33				6.33
1,000	0.56		1.10			2.01	3.30		4.81	5.59	5.86				5.87
2,000	0.46		1.01			1.85	3.02		4.41	5.15	5.36				5.37
5,000	0.28		0.92			1.64	2.65		3.94	4.46	4.67				4.68
10,000	0.27		0.84			1.37	2.30		3.34	3.88	4.03				4.03
20,000	0.25		0.65			1.18	1.93		2.73	3.12	3.31				3.31
50,000	0.18		0.44			0.80	1.31		1.88	2.09	2.22				2.22
68,948	0.14		0.35			0.60	1.01		1.49	1.60	1.76				1.77
73,000							0.98		1.42	1.58	1.67				1.67




SPAS 1149 Storm Center Mass Curve
DAD Zone 2: Mogollon Rim
Nov 30, 2007 (0400Z) - Dec 2, 1970 (0400Z)
Lat: 34.46 Lon: -111.23
Incremental
Accumulated
Precipitation (inches)
8.60"
1.5
1
0.5
0
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
1
11
21
31
41



Total Storm Precipitation
SPAS Storm #1149
Nov. 30, 2007 - Dec. 2, 2007

N

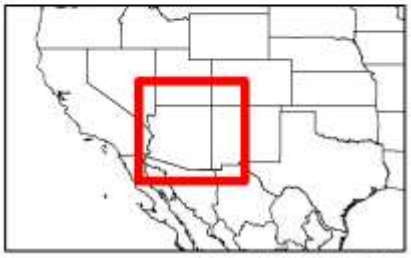
Miles
0 35 70 140

Kilometers
0 35 70 140 210

Precipitation (inches)

0.00 - 1.00	3.01 - 4.00	6.01 - 7.00
1.01 - 2.00	4.01 - 5.00	7.01 - 8.00
2.01 - 3.00	5.01 - 6.00	8.01 - 9.00

- Daily
- Hourly
- Hourly psuedo
- Supplemental
- Supplemental estimated



MetstatAWA October 16, 2009

Magma, AZ
July 10, 2008
Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1051

General Storm Location: Magma, AZ

Storm Dates: 7/10/2008 1800Z – 7/11/2008 1900Z

Event: Cloudburst Thunderstorm

Latitude: 33.194

Longitude: -111.347

Zone 1 Max. Grid/Radar Rainfall Amount: 4.87" (Grid/Pixel Point)

Zone 1 Max. Observed Rainfall Amount: 4.89" (Magma 79, id = PCFCD721, type=hourly)

Zone 1 Max. Grid/Radar 1-hour Rainfall Amount: 1.84" (hr 13)

Zone 1 Max. Observed 1-hour Rainfall Amount: 1.85" (hr 13)

South Center Max. Grid/Radar Rainfall Amount: 5.31" (Grid/Pixel Point)

South Center Max. Observed Rainfall Amount: 5.34" (Avra Valley, id = 969, type = daily)

West Zone 1 (4 mi) Max. Grid/Radar 1-hour Rainfall Amount: 1.89" (hr 13)

West Zone 1 (4 mi) Max. Observed 1-hour Rainfall Amount: 1.93" (hr 13)

Number of Stations: 838 (431-hourly, 4 hourly pseudo, 381-daily, 22-daily supplemental) gauging stations within the defined search domain.

SPAS Version: 6.0/6.1 SPAS-NEXRAD

Base Map Used: No

Spatial resolution: 0.28 mi^2

Radar Included: Yes, Weather Decision Technologies (WDT) Level-II radar reflectivity data.

Depth-Area-Duration (DAD) analysis: Yes: 1, 2, 3, 4, 5, 6, 12, 18, 24, & 25 hours

Storm Name:	SPAS-1051-Magma
Storm Date:	July 10, 2008
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	25-Jul	
	Lat	Long
Storm center location	33.20	-111.35
Storm Rep dew point location	32.20	-110.93
Transposition dewpoint location	29.975	-109.955
Basin location	30.975	-110.375

Moisture Inflow Direction:	SSE @ 75	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	1,800	feet
Storm Analysis Duration	3	hours

The storm representative dew point is	73.5 F	with total precipitable water above sea level of			2.67	inches.
The in-place maximum dew point is	80.0 F	with total precipitable water above sea level of			3.60	inches.
The transpositioned maximum dew point is	80.5 F	with total precipitable water above sea level of			3.68	inches.
The in-place storm elevation is	1,800	which subtracts	0.42	inches of precipitable water at	73.5 F	
The in-place storm elevation is	1,800	which subtracts	0.52	inches of precipitable water at	80.0 F	
The in-place storm elevation is	1,800	which subtracts	0.53	inches of precipitable water at	80.5 F	

The in-place maximization factor is	1.37
The moisture transposition factor is	1.02
The orographic transposition factor is	1.35
The total adjustment factor is	1.89

Notes:

Observed Storm Depth-Area-Duration

	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	1.6	2.6	3.8	4.0	4.2	4.3	4.4	4.8	4.8
10 sq miles	1.6	2.6	3.6	4.0	4.1	4.2	4.3	4.7	4.7
50 sq miles	1.4	2.1	2.9	3.5	3.8	3.9	4.0	4.2	4.2
100 sq miles	1.3	2.1	2.7	3.2	3.5	3.7	3.7	3.9	4.0
200 sq miles	1.2	1.9	2.5	3.0	3.2	3.4	3.5	3.6	3.7
500 sq miles	0.9	1.5	2.1	2.5	2.7	2.8	3.0	3.1	3.1
1000 sq miles	0.6	1.0	1.4	1.7	1.9	2.0	2.2	2.4	2.4
2000 sq miles	-	-	-	-	-	-	-	-	-
5000 sq miles	-	-	-	-	-	-	-	-	-

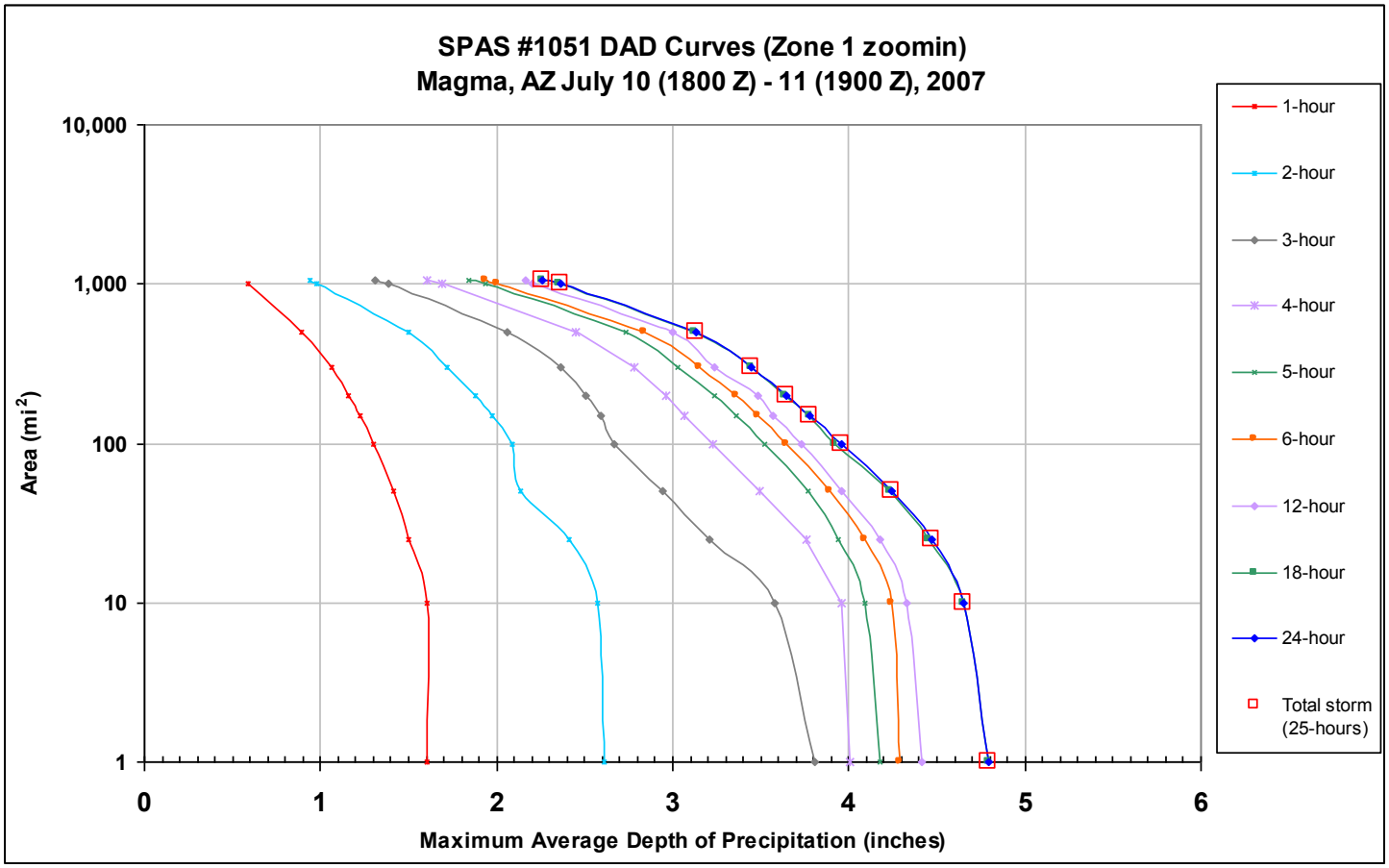
Adjusted Storm Depth-Area-Duration

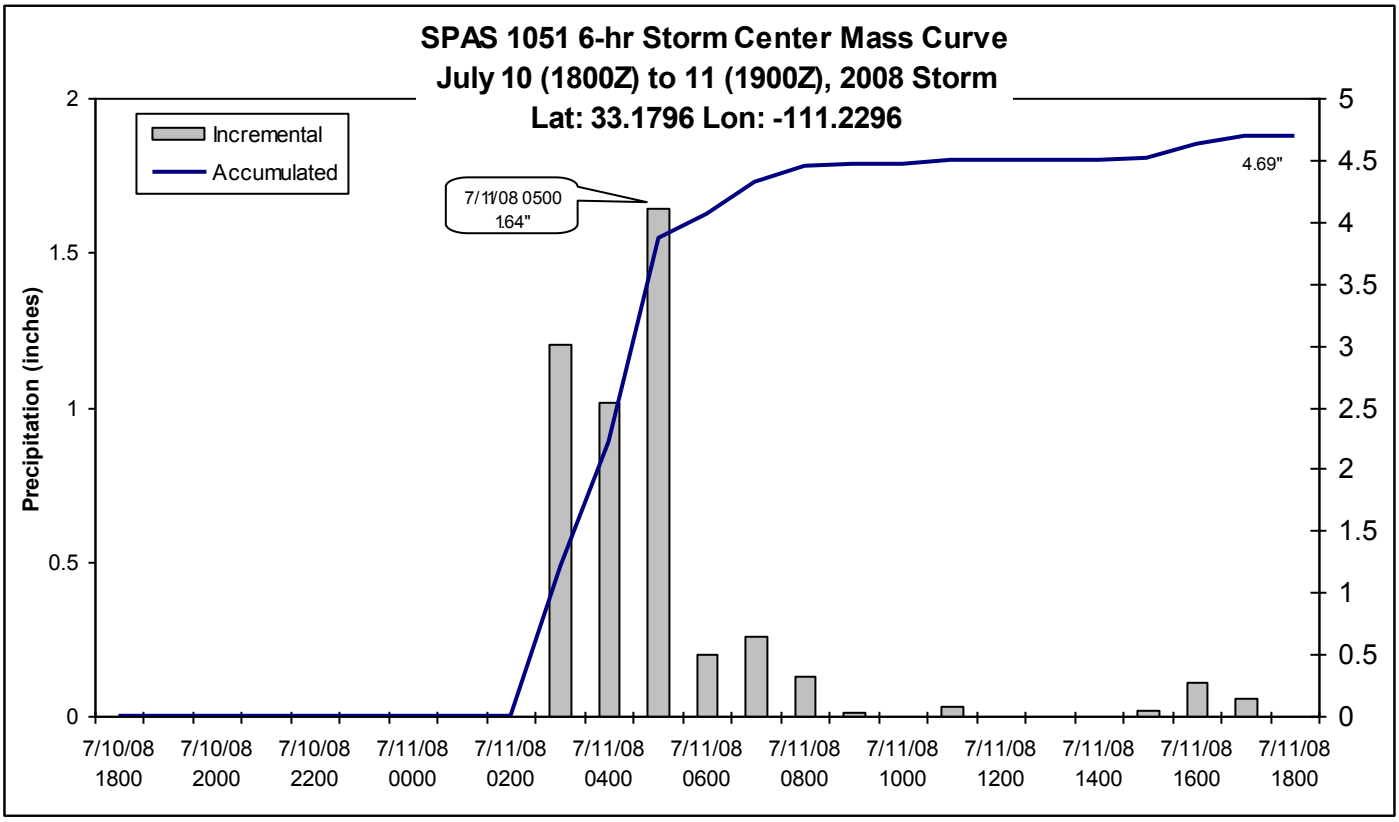
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	3.0	4.9	7.2	7.6	7.9	8.1	8.3	9.1	9.1
10 sq miles	3.0	4.9	6.8	7.5	7.7	8.0	8.2	8.8	8.8
50 sq miles	2.7	4.1	5.6	6.6	7.1	7.4	7.5	8.0	8.0
100 sq miles	2.5	4.0	5.1	6.1	6.7	6.9	7.1	7.4	7.5
200 sq miles	2.2	3.6	4.8	5.6	6.1	6.4	6.6	6.9	6.9
500 sq miles	1.7	2.8	3.9	4.6	5.2	5.4	5.7	5.9	5.9
1000 sq miles	1.1	1.9	2.6	3.2	3.7	3.8	4.2	4.4	4.5
2000 sq miles	-	-	-	-	-	-	-	-	-
5000 sq miles	-	-	-	-	-	-	-	-	-

Storm or Storm Center Name	SPAS-1051-Magma	
Storm Date(s)	July 10, 2008	
Storm Type	Local Storm	
Storm Location	33.20	-111.35
Storm Center Elevation	1,800	
Precipitation Total & Duration (10 sq mi)	4.89 inches 18 hours 3.89" in 3hrs (SPAS 1051DAD)	
Storm Representative Dewpoint	73.5 F	3
Storm Representative Dewpoint Location	32.2	-110.93
In-place Maximum Dewpoint	80.0 F	
Moisture Inflow Vector	SSE @ 75	
In-place Maximization Factor	1.37	
Temporal Transposition (Date)	25-Jul	
Transposition Dewpoint Location	29.98	-109.96
Transposition Maximum Dewpoint	80.5 F	
Transposition Adjustment Factor	1.02	
Grid Point Location	30.975	-110.375
Grid Point Elevation	6,977	
Total Adjustment Factor	1.89	

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

Area (mi^2)	Duration (hours)									
	1	2	3	4	5	6	12	18	24	Total
0.28	1.72	2.72	3.89	4.12	4.32	4.45	4.55	4.87	4.87	4.87
1	1.60	2.61	3.81	4.01	4.18	4.29	4.41	4.79	4.79	4.79
10	1.60	2.57	3.58	3.96	4.09	4.24	4.33	4.65	4.65	4.65
25	1.50	2.41	3.21	3.76	3.94	4.09	4.18	4.45	4.47	4.47
50	1.41	2.14	2.94	3.49	3.77	3.89	3.96	4.23	4.24	4.24
100	1.30	2.09	2.67	3.23	3.52	3.65	3.73	3.92	3.96	3.96
150	1.22	1.97	2.59	3.07	3.36	3.48	3.57	3.78	3.78	3.78
200	1.16	1.88	2.51	2.96	3.24	3.36	3.48	3.64	3.65	3.65
300	1.06	1.72	2.36	2.78	3.03	3.15	3.24	3.45	3.45	3.45
500	0.89	1.50	2.06	2.45	2.73	2.84	3.00	3.12	3.13	3.13
1,000	0.59	0.98	1.39	1.69	1.94	2.00	2.20	2.35	2.36	2.36
1,064	-	0.94	1.31	1.60	1.84	1.94	2.16	2.26	2.26	2.26




SPAS 1051 6-hr Storm Center Mass Curve
July 10 (1800Z) to 11 (1900Z), 2008 Storm
Lat: 33.1796 Lon: -111.2296
Incremental
Accumulated
7/11/08 0500
1.64"
4.69"
Precipitation (inches)
2
1.5
1
0.5
0
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
7/10/08 1800
7/10/08 2000
7/10/08 2200
7/11/08 0000
7/11/08 0200
7/11/08 0400
7/11/08 0600
7/11/08 0800
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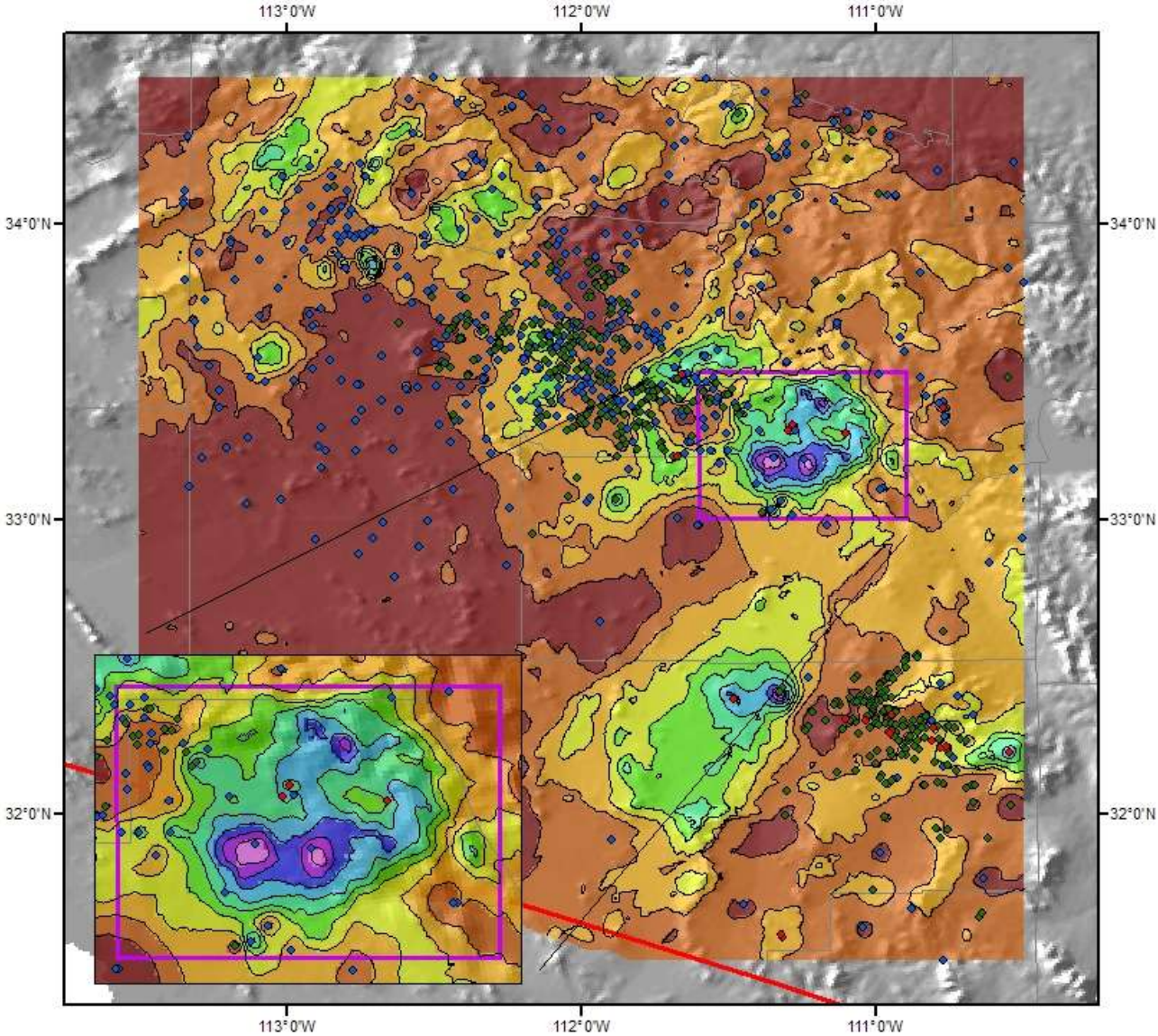
7/11/08 1400
7/11/08 1600
7/11/08 1800



Total Rainfall (25-hours)
Magma, AZ 2008 Storm
Storm #1051 July 10 (1800 Z) to 11 (1900 Z), 2008

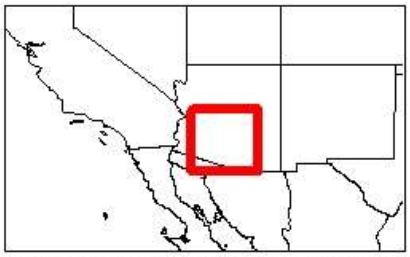
Miles
0 10 20 40
Kilometers
0 15 30 60 90
N

Gauging Stations

- Daily
- Hourly Pseudo
- Hourly
- Supplemental

Precipitation (inches)

- 0.00 - 0.50
- 0.51 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00
- 2.01 - 2.50
- 2.51 - 3.00
- 3.01 - 3.50
- 3.51 - 4.00
- 4.01 - 4.50
- 4.51 - 5.00
- 5.01 - 5.50



Coordinate system: GCS North American 1983
Scale: 1:2,133,219
Metstat/AWA September 11, 2008

Havasupai, AZ

August 15-18, 2008

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1128

General Storm Location: Havasupai, Arizona

Storm Dates: August 15 (2100) -18 (0000), 2008

Event: Thunderstorms

DAD Zone 1:

Latitude: 35.885

Longitude: -112.475

Max. Grid/Radar Rainfall Amount: 4.21”

Max. Observed Rainfall Amount: NA

DAD Zone 2:

Latitude: 35.155

Longitude: -112.575

Max. Grid/Radar Rainfall Amount: 4.49”

Max. Observed Rainfall Amount: NA

DAD Zone 3:

Latitude: 35.695

Longitude:-112.375

Max. Grid/Radar Rainfall Amount: 4.30”

Max. Observed Rainfall Amount: 2.13”

Number of Stations: 154 (39-daily, 108-hourly, 7-supplemental)

SPAS Version: 8.5

Base Map Used: Yes, dynamic hourly ZR precipitation based on default ZR relationship

Spatial resolution: 0.39 mi^2

Radar Included: Yes

Depth-Area-Duration (DAD) analysis: Yes, 1, 2, 3, 4, 5, 6 12, 18, 24, 36, 48, and 52 -hours

Storm Name:	**SPAS-1128-Havasupai-zone 2**
Storm Date:	**8/15-18/2008**
AWA Analysis Date:	**5/25/2013**

Storm Adjustment for Grid Point 1

Temporal Transposition Date **1-Aug**

	Lat	Long
Storm center location	**35.16**	**-112.58**
Storm Rep dew point location	**34.65**	**-112.40**
Transposition dewpoint location	**30.465**	**-110.195**
Basin location	**30.975**	**-110.375**

Moisture Inflow Direction:	**SSE @ 35**	miles
Grid Point Elevation	**6,977**	feet
Storm Center Elevation	**4,900**	feet
Storm Analysis Duration	**3**	hours

The storm representative dew point is	**74.5 F**	with total precipitable water above sea level of			**2.79**	inches.
The in-place maximum dew point is	**80.5 F**	with total precipitable water above sea level of			**3.68**	inches.
The transpositioned maximum dew point is	**81.0 F**	with total precipitable water above sea level of			**3.76**	inches.
The in-place storm elevation is	**4,900**	which subtracts	**1.06**	inches of precipitable water at	**74.5 F**	
The in-place storm elevation is	**4,900**	which subtracts	**1.31**	inches of precipitable water at	**80.5 F**	
The in-place storm elevation is	**4,900**	which subtracts	**1.33**	inches of precipitable water at	**81.0 F**	

The in-place maximization factor is	**1.37**
The moisture transposition factor is	**1.03**
The orographic transposition factor is	**1.14**
The total adjustment factor is	**1.60**

Notes:

Observed Storm Depth-Area-Duration

	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**2.3**	**3.8**	**4.1**	**4.1**	**4.1**	**4.2**	**4.2**	**4.2**	**4.3**
10 sq miles	**2.1**	**3.4**	**3.8**	**3.8**	**3.9**	**3.9**	**3.9**	**3.9**	**4.0**
50 sq miles	**1.1**	**1.7**	**2.1**	**2.6**	**2.6**	**2.6**	**2.7**	**2.7**	**2.7**
100 sq miles	**0.8**	**1.4**	**1.8**	**1.8**	**1.9**	**2.0**	**2.1**	**2.1**	**2.1**
200 sq miles	**0.5**	**0.5**	**1.0**	**1.2**	**1.4**	**1.4**	**1.4**	**1.4**	**1.5**
500 sq miles	**0.3**	**0.3**	**0.5**	**0.5**	**0.6**	**0.6**	**0.6**	**0.7**	**0.7**
1000 sq miles	**0.2**	**0.2**	**0.2**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**
2000 sq miles	**0.2**	**0.2**	**0.2**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**
5000 sq miles	-	-	-	-	-	-	-	-	-

Adjusted Storm Depth-Area-Duration

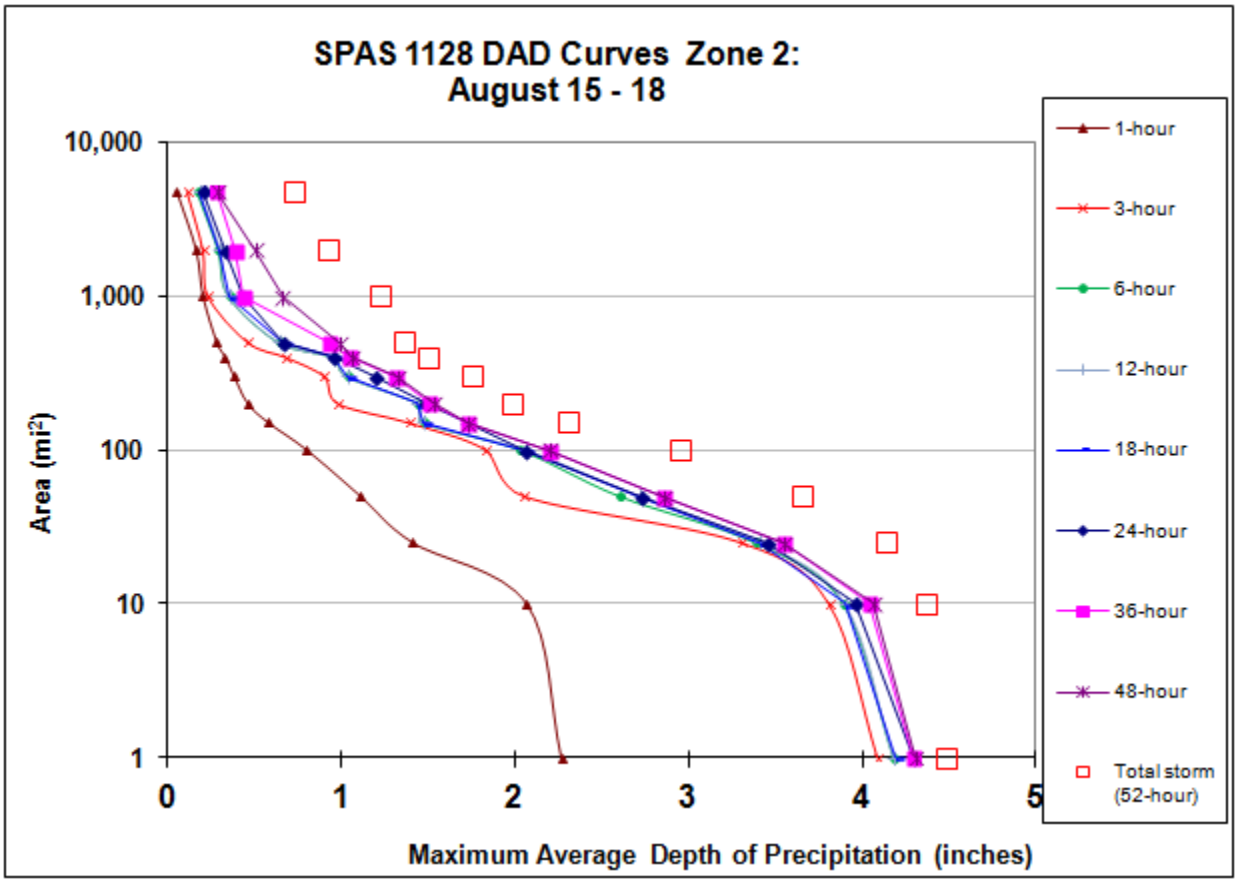
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**3.6**	**6.1**	**6.5**	**6.6**	**6.6**	**6.7**	**6.7**	**6.7**	**6.9**
10 sq miles	**3.3**	**5.4**	**6.1**	**6.1**	**6.2**	**6.2**	**6.2**	**6.2**	**6.3**
50 sq miles	**1.8**	**2.7**	**3.3**	**4.1**	**4.1**	**4.2**	**4.3**	**4.3**	**4.4**
100 sq miles	**1.3**	**2.3**	**2.9**	**2.9**	**3.0**	**3.3**	**3.3**	**3.3**	**3.3**
200 sq miles	**0.7**	**0.8**	**1.6**	**2.0**	**2.2**	**2.3**	**2.3**	**2.3**	**2.4**
500 sq miles	**0.4**	**0.5**	**0.7**	**0.7**	**0.9**	**1.0**	**1.0**	**1.1**	**1.1**
1000 sq miles	**0.3**	**0.4**	**0.4**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.7**
2000 sq miles	**0.3**	**0.3**	**0.3**	**0.4**	**0.4**	**0.5**	**0.5**	**0.5**	**0.5**
5000 sq miles	-	-	-	-	-	-	-	-	-

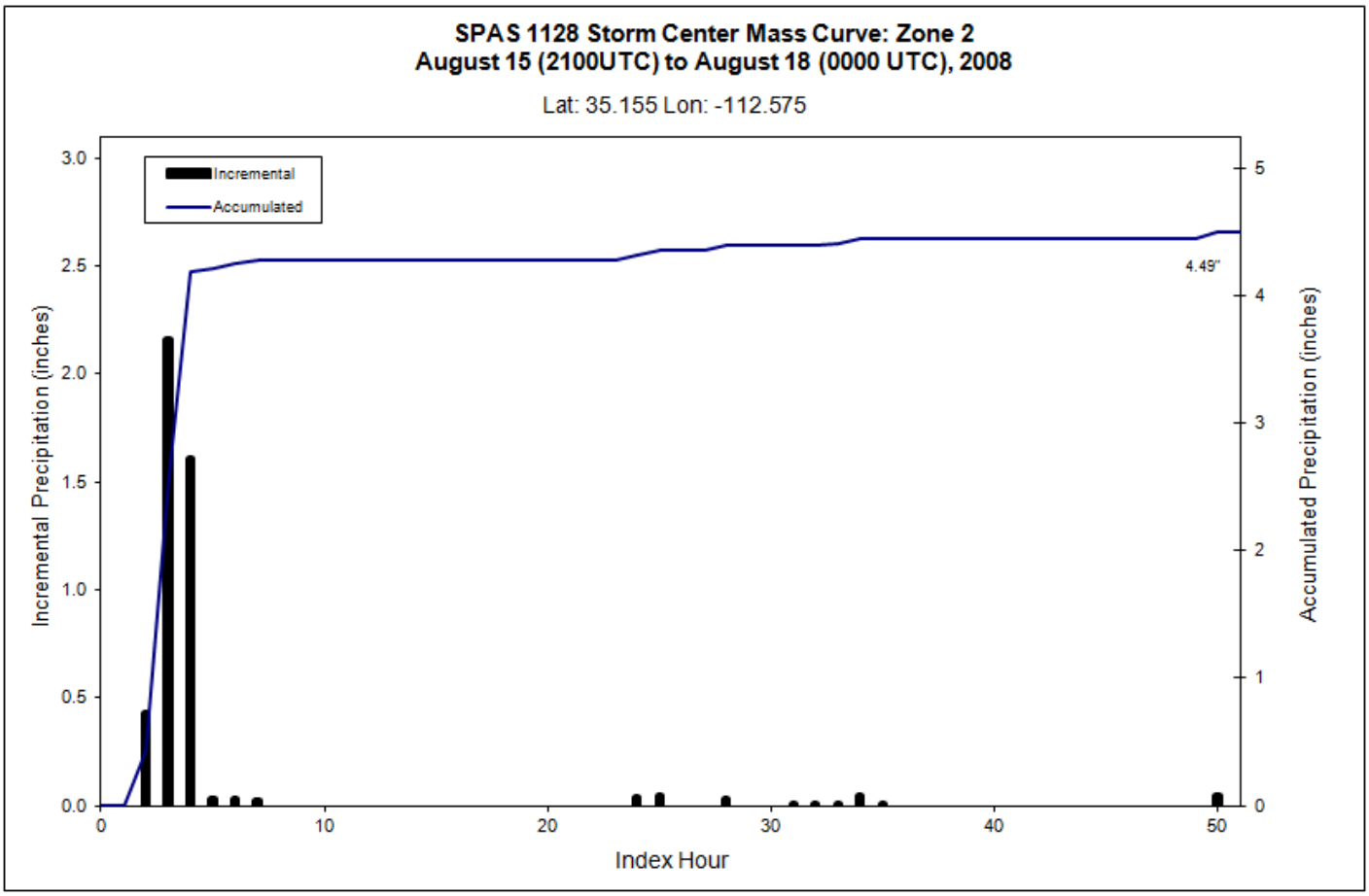
Storm or Storm Center Name	**SPAS-1128-Havasupai-zone 2**		
Storm Date(s)	8/15-18/2008		
Storm Type	Local Storm		
Storm Location	35.16	-112.58	
Storm Center Elevation	4900		
Precipitation Total & Duration (10 sq mi)	4.49 inches 52 hour (SPAS 1128 DAD)		
Storm Representative Dewpoint	74.5 F	3	hr ave from KPRC, closest station to center outside of rainfall
Storm Representative Dewpoint Location	34.65	-112.4	
In-place Maximum Dewpoint	80.5 F		
Moisture Inflow Vector	SSE @ 35		
In-place Maximization Factor	1.37		
Temporal Transposition (Date)	1-Aug		
Transposition Dewpoint Location	30.47	-110.20	
Transposition Maximum Dewpoint	81.0 F		
Transposition Adjustment Factor	1.03		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	1.60		

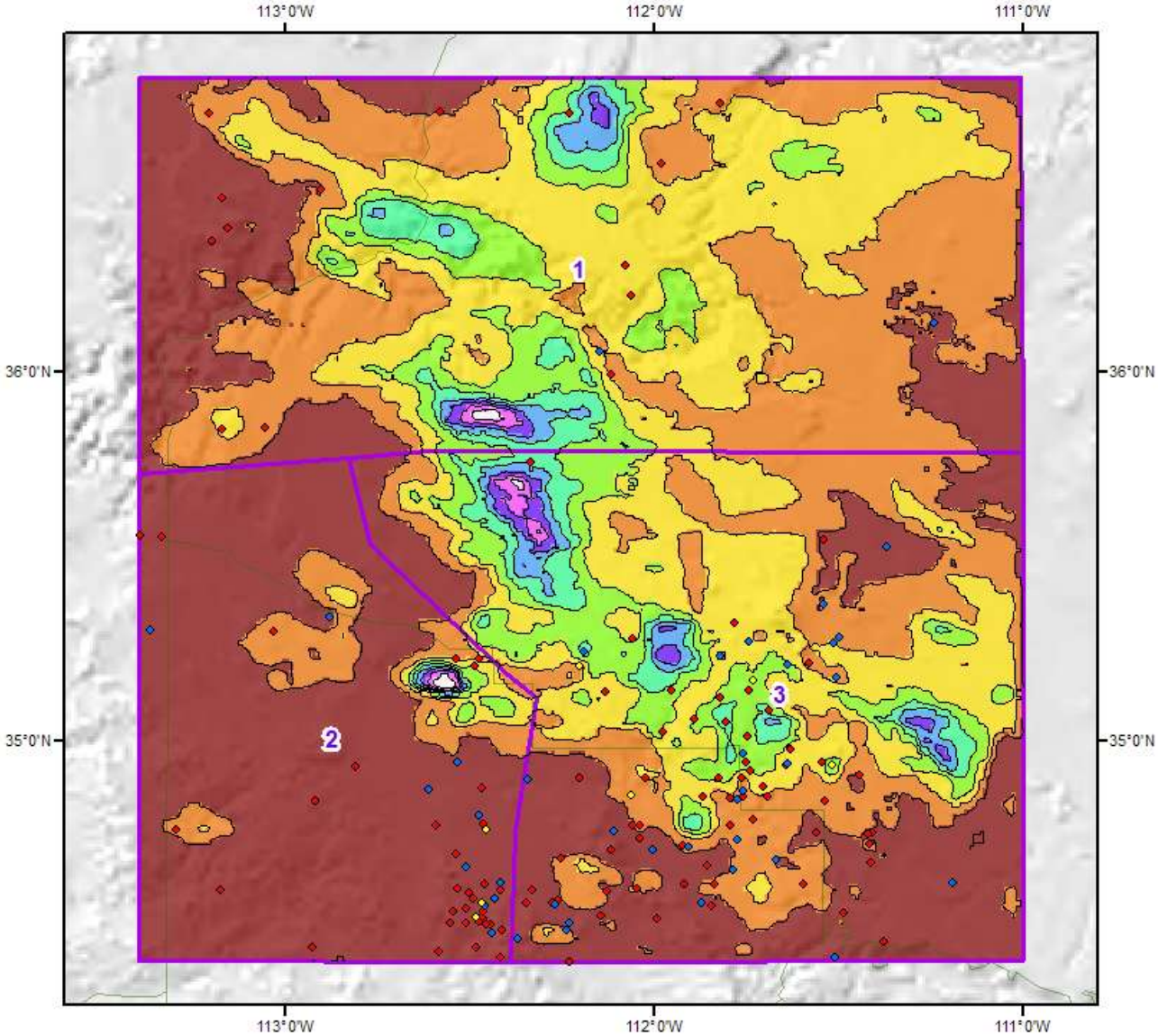
Storm 1128 - August 15 (2100 UTC) - August 18, 2008 (0000 UTC)

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

	Duration (hours)									
Area (mi^2)	1	3	6	12	18	24	36	48	52	Total
0.39	2.33	4.19	4.28	4.28	4.28	4.36	4.45	4.45	4.49	4.49
1	2.27	4.09	4.18	4.18	4.19	4.29	4.29	4.30	4.37	4.37
10	2.07	3.81	3.89	3.90	3.90	3.96	4.04	4.06	4.14	4.14
25	1.41	3.30	3.38	3.41	3.41	3.45	3.55	3.55	3.65	3.65
50	1.11	2.05	2.60	2.71	2.71	2.73	2.85	2.85	2.95	2.95
100	0.80	1.83	2.03	2.06	2.06	2.06	2.20	2.20	2.31	2.31
150	0.58	1.39	1.47	1.47	1.47	1.73	1.73	1.73	1.98	1.98
200	0.46	0.98	1.44	1.44	1.44	1.48	1.51	1.53	1.76	1.76
300	0.38	0.90	1.03	1.03	1.03	1.19	1.31	1.32	1.50	1.50
400	0.33	0.68	0.95	0.95	0.95	0.95	1.05	1.06	1.36	1.36
500	0.28	0.46	0.64	0.64	0.66	0.66	0.93	0.99	1.22	1.22
1,000	0.20	0.23	0.35	0.35	0.35	0.43	0.44	0.66	0.93	0.93
2,000	0.16	0.20	0.29	0.30	0.30	0.33	0.39	0.50	0.73	0.73
4,768	0.05	0.11	0.17	0.18	0.18	0.21	0.28	0.29	0.31	0.31




SPAS 1128 Storm Center Mass Curve: Zone 2
August 15 (2100UTC) to August 18 (0000 UTC), 2008
Lat: 35.155 Lon: -112.575
Incremental
Accumulated
4.49"
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
Index Hour
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
1
2
3
4
5
0
10
20
30
40
50



Total Rainfall (52-hours)
SPAS Storm # 1128
August 15 (2100 UTC) to 18 (0000 UTC), 2008

Gauges

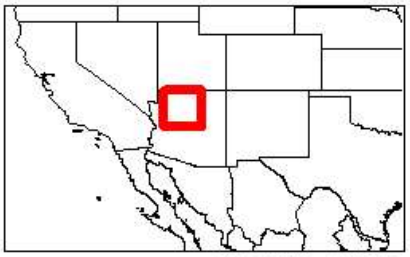
- Daily
- Hourly
- Supplemental

Miles: 0 10 20 40
Kilometers: 0 15 30 60 90

Precipitation (inches)

0.00 - 0.50	1.51 - 2.00	3.01 - 3.50
0.51 - 1.00	2.01 - 2.50	3.51 - 4.00
1.01 - 1.50	2.51 - 3.00	4.01 - 4.50

N



MetstatAWA March 16, 2010

Wenden and Bouse, AZ

August 26, 2008

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1085
SPAS-NEXRAD Analysis

General Storm Location: Wenden and Bouse, Arizona

Storm Dates: August 25-26, 2008

Event: Remnants of Julio

Latitude: 33.9150

Longitude: -113.9050

Max. Grid/Radar Rainfall Amount: 4.82

Max. Observed Rainfall Amount: 3.96”

Max. Grid/Radar 1-hour Rainfall Amount: 3.77”

Max. Observed 1-hour Rainfall Amount: 2.52”

Number of Stations: 417 (Daily-25, Hourly-385, Supplemental-7)

SPAS Version: 7.0

Base Map Used: Yes, conus_prism_ppt_in_1971_2000_08

Spatial resolution: 0.40 mi^2 (0.01dd)

Radar Included: Yes

Depth-Area-Duration (DAD) analysis: Yes, 1, 2, 3, 4, 5, 6,9,12, and 14-hours

Comments:

- Created 3-supplemental stations, used to lower total storm precipitation (based on WSSRD images) where no station data were available.

Storm Name:	**SPAS-1085-Wenden Bouse**
Storm Date:	**August 26, 2008**
AWA Analysis Date:	**5/25/2013**

Storm Adjustment for Grid Point 1

Temporal Transposition Date **15-Aug**

	Lat	Long
Storm center location	**33.92**	**-113.91**
Storm Rep dew point location	**33.20**	**-114.00**
Transposition dewpoint location	**30.255**	**-110.465**
Basin location	**30.975**	**-110.375**

Moisture Inflow Direction:	**S @ 50**	miles
Grid Point Elevation	**6,977**	feet
Storm Center Elevation	**1,200**	feet
Storm Analysis Duration	**3**	hours

The storm representative dew point is	**73.0 F**	with total precipitable water above sea level of			**2.60**	inches.
The in-place maximum dew point is	**82.0 F**	with total precipitable water above sea level of			**3.92**	inches.
The transpositioned maximum dew point is	**82.0 F**	with total precipitable water above sea level of			**3.92**	inches.
The in-place storm elevation is	**1,200**	which subtracts	**0.28**	inches of precipitable water at	**73.0 F**	
The in-place storm elevation is	**1,200**	which subtracts	**0.37**	inches of precipitable water at	**82.0 F**	
The in-place storm elevation is	**1,200**	which subtracts	**0.37**	inches of precipitable water at	**82.0 F**	

The in-place maximization factor is	**1.50**
The moisture transposition factor is	**1.00**
The orographic transposition factor is	**1.06**
The total adjustment factor is	**1.59**

Notes: In-place max. factor held to 1.50.

Observed Storm Depth-Area-Duration

	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**3.7**	**3.8**	**3.9**	**4.1**	**4.1**	**4.3**	**4.7**	-	-
10 sq miles	**3.2**	**3.5**	**3.7**	**3.8**	**3.9**	**4.3**	**4.6**	-	-
50 sq miles	**2.6**	**3.1**	**3.2**	**3.5**	**3.7**	**3.9**	**4.3**	-	-
100 sq miles	**2.3**	**2.8**	**3.0**	**3.3**	**3.4**	**3.7**	**4.0**	-	-
200 sq miles	**2.1**	**2.5**	**2.8**	**3.1**	**3.1**	**3.4**	**3.8**	-	-
500 sq miles	**1.6**	**2.1**	**2.4**	**2.7**	**2.8**	**3.1**	**3.4**	-	-
1000 sq miles	**1.3**	**1.8**	**2.1**	**2.3**	**2.5**	**2.7**	**3.0**	-	-
2000 sq miles	**1.0**	**1.4**	**1.7**	**2.0**	**2.1**	**2.3**	**2.6**	-	-
5000 sq miles	**0.6**	**1.0**	**1.1**	**1.4**	**1.6**	**1.8**	**2.0**	-	-

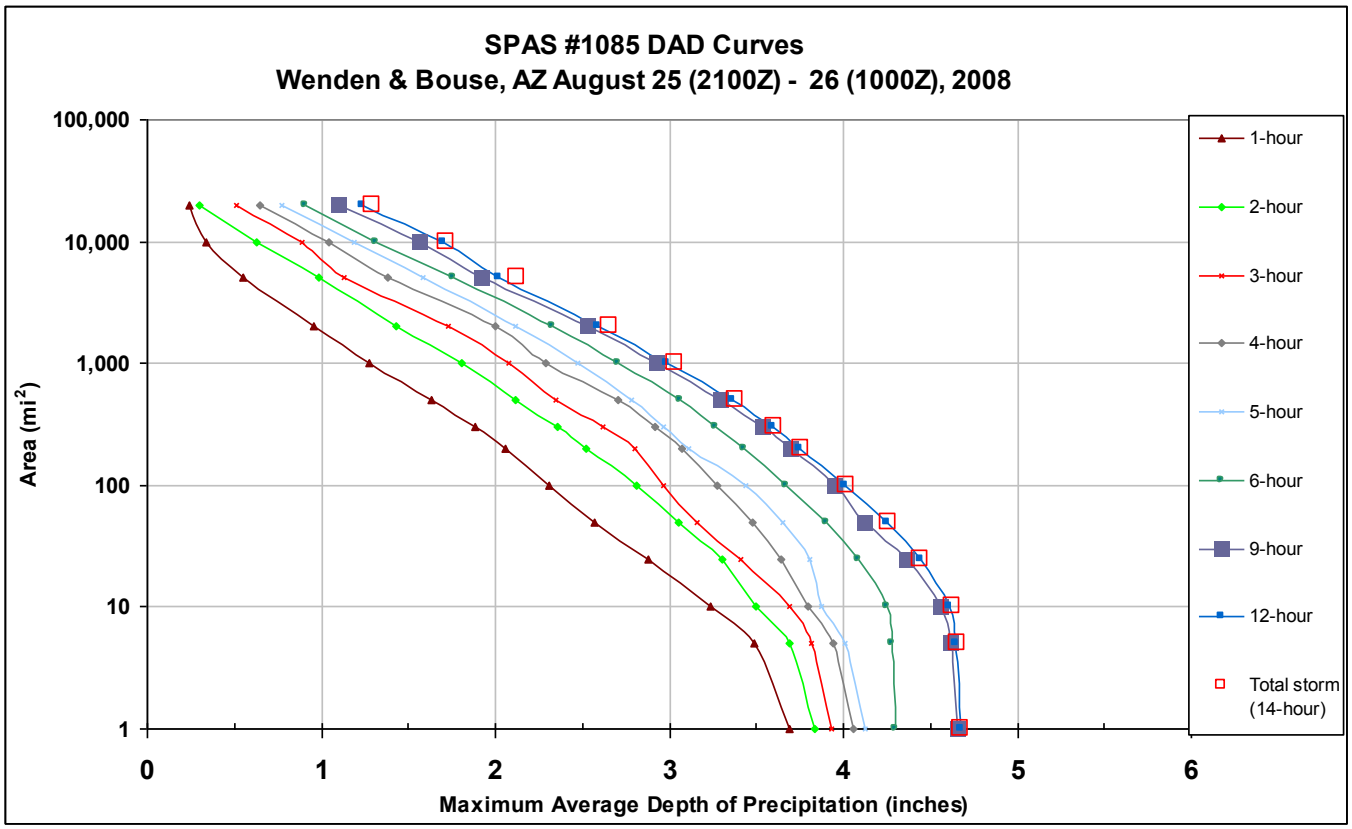
Adjusted Storm Depth-Area-Duration

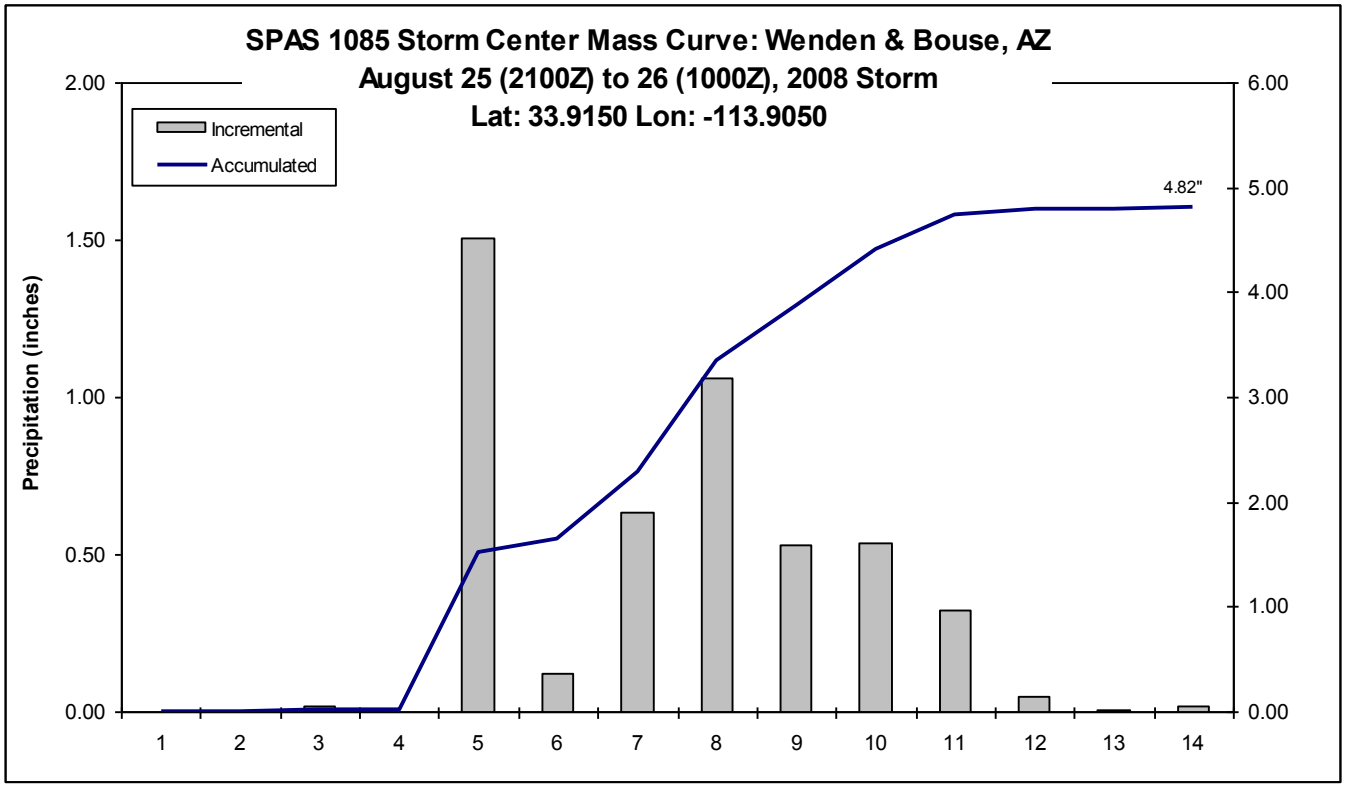
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**5.9**	**6.1**	**6.2**	**6.5**	**6.6**	**6.8**	**7.4**	-	-
10 sq miles	**5.2**	**5.6**	**5.9**	**6.0**	**6.2**	**6.8**	**7.3**	-	-
50 sq miles	**4.1**	**4.8**	**5.0**	**5.5**	**5.8**	**6.2**	**6.8**	-	-
100 sq miles	**3.7**	**4.5**	**4.7**	**5.2**	**5.5**	**5.8**	**6.4**	-	-
200 sq miles	**3.3**	**4.0**	**4.5**	**4.9**	**4.9**	**5.5**	**6.0**	-	-
500 sq miles	**2.6**	**3.4**	**3.7**	**4.3**	**4.4**	**4.9**	**5.3**	-	-
1000 sq miles	**2.0**	**2.9**	**3.3**	**3.6**	**3.9**	**4.3**	**4.8**	-	-
2000 sq miles	**1.5**	**2.3**	**2.8**	**3.2**	**3.4**	**3.7**	**4.1**	-	-
5000 sq miles	**0.9**	**1.6**	**1.8**	**2.2**	**2.5**	**2.8**	**3.2**	-	-

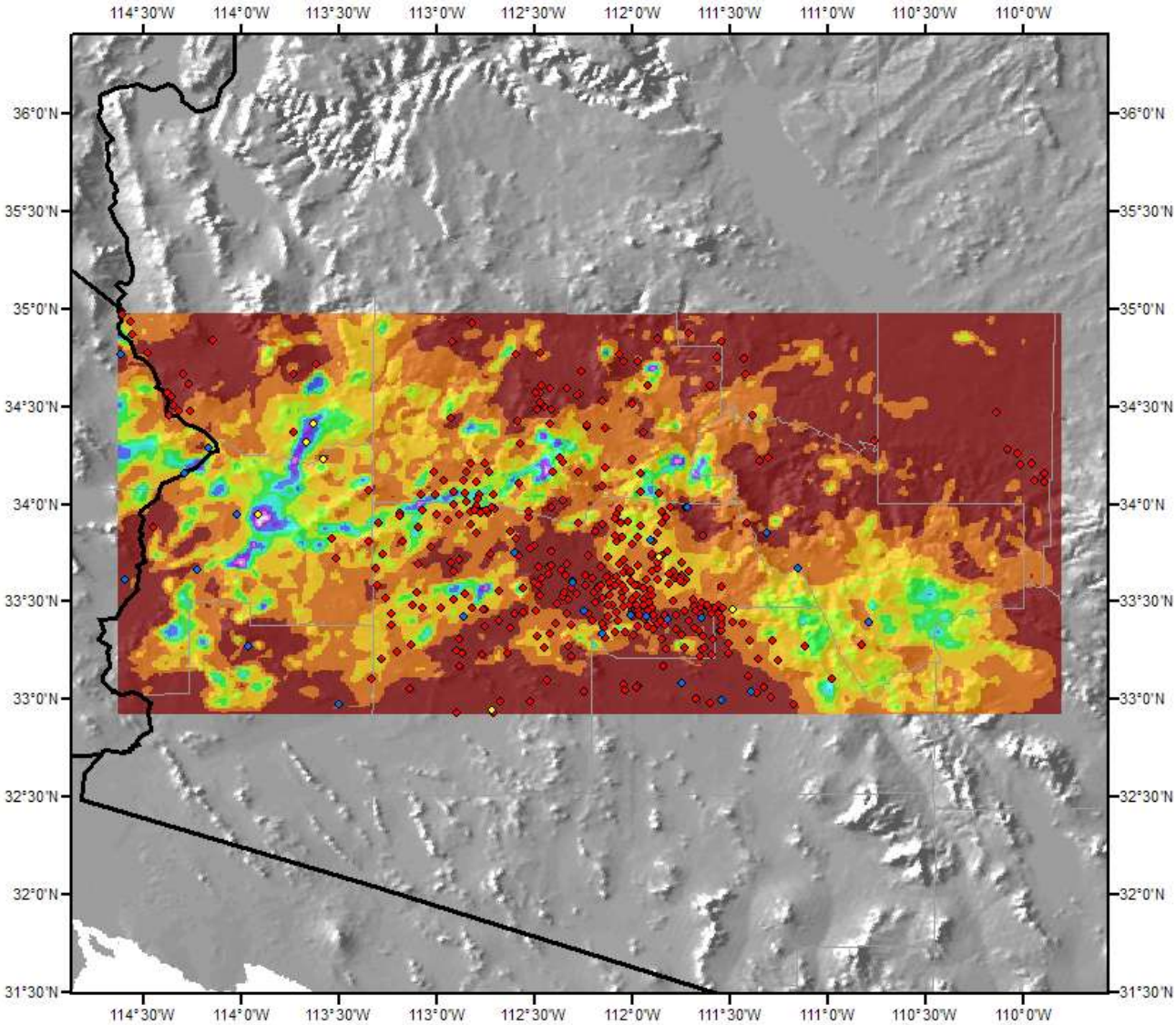
Storm or Storm Center Name	**SPAS-1085-Wenden Bouse**		
Storm Date(s)	8/26/08		
Storm Type	Local Storm		
Storm Location	33.92	-113.91	
Storm Center Elevation	1200		
Precipitation Total & Duration (10 sq mi)	3.78 inches 1 hour 4.01" in 3hrs (SPAS 1085 DAD)		
Storm Representative Dewpoint	73.0 F	3	hr ave KNYL, KBLH, KGBN
Storm Representative Dewpoint Location	33.2	-114	
In-place Maximum Dewpoint	82.0 F		
Moisture Inflow Vector	S @ 50		
In-place Maximization Factor	1.50		
Temporal Transposition (Date)	15-Aug		
Transposition Dewpoint Location	30.26	-110.47	
Transposition Maximum Dewpoint	82.0 F		
Transposition Adjustment Factor	1.00		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	1.59		

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)

Area (mi^2)	Duration (hours) 1	2	3	4	5	6	9	12	total
0.28	3.78	3.92	4.01	4.15	4.17	4.42	4.78	4.81	4.82
1	3.69	3.84	3.93	4.06	4.13	4.30	4.66	4.68	4.68
5	3.49	3.69	3.82	3.94	4.01	4.28	4.62	4.65	4.66
10	3.24	3.50	3.69	3.80	3.87	4.25	4.56	4.61	4.63
25	2.88	3.30	3.41	3.64	3.81	4.09	4.37	4.44	4.44
50	2.57	3.05	3.16	3.48	3.65	3.90	4.13	4.25	4.26
100	2.31	2.81	2.97	3.28	3.44	3.67	3.95	4.01	4.02
200	2.06	2.52	2.80	3.07	3.11	3.43	3.70	3.75	3.76
300	1.88	2.36	2.62	2.92	2.97	3.27	3.54	3.59	3.60
500	1.63	2.12	2.35	2.71	2.78	3.06	3.29	3.36	3.38
1,000	1.28	1.81	2.08	2.29	2.47	2.71	2.93	2.99	3.03
2,000	0.96	1.43	1.73	2.00	2.12	2.33	2.53	2.59	2.66
5,000	0.55	0.99	1.13	1.38	1.58	1.76	1.92	2.02	2.13
10,000	0.34	0.63	0.89	1.04	1.19	1.31	1.57	1.70	1.72
20,000	0.24	0.30	0.51	0.65	0.77	0.91	1.10	1.24	1.29




SPAS 1085 Storm Center Mass Curve: Wenden & Bouse, AZ
August 25 (2100Z) to 26 (1000Z), 2008 Storm
Lat: 33.9150 Lon: -113.9050
Incremental
Accumulated
4.82"
Precipitation (inches)
2.00
1.50
1.00
0.50
0.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1
2
3
4
5
6
7
8
9
10
11
12
13
14



Total Rainfall (14-hours)
Wenden & Bouse, AZ 2008 Storm
Storm #1085 August 25 (2100 Z) to 26 (1000 Z), 2008

Gauging Stations

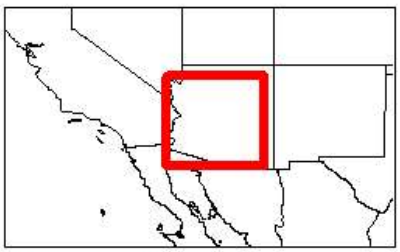
- Daily
- Supplemental
- Hourly

Miles: 0 20 40 80
Kilometers: 0 30 60 120 180

N

Precipitation (inches)

- 0.00 - 0.50
- 0.51 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00
- 2.01 - 2.50
- 2.51 - 3.00
- 3.01 - 3.50
- 3.51 - 4.00
- 4.01 - 4.50
- 4.51 - 5.00



Coordinate system: GCS North American 1983
Scale: 1:3,175,582
Metstat/AWA August 03, 2009

Wagon Bow, AZ

July 3-4, 2009

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1166

General Storm Location: Wagon Bow, Arizona

Storm Dates: July 3-4, 2009

Event: Local convective

Latitude: 34.8650

Longitude: -113.4550

Max. Grid/Radar Rainfall Amount: 7.67”

Max. Observed Rainfall Amount: 6.93”

Max. Grid/Radar 1-hour Rainfall Amount: 3.80”

Max. Observed 1-hour Rainfall Amount: 3.41”

Number of Stations: 171 (10-daily, 150-hourly, 1-hourly estimated, 1-hourly pseudo, 10-supplementals)

SPAS Version: 7.0

Base Map Used: Yes, conus_prism_ppt_in_1971_2000_07

Spatial resolution: 0.39 mi^2

Radar Included: Yes

Depth-Area-Duration (DAD) analysis: Yes, 1, 2, 3, 4, 5, 6, 9, 12, and 15-hour

Storm Name:	**SPAS-1166-Wagon Bow**
Storm Date:	**July 3, 2009**
AWA Analysis Date:	**5/25/2013**

Storm Adjustment for Grid Point 1

Temporal Transposition Date	**18-Jul**	

	Lat	Long
Storm center location	**34.87**	**113.46**
Storm Rep dew point location	**33.62**	**113.72**
Transposition dewpoint location	**29.725**	**-110.115**
Basin location	**30.975**	**-110.375**

Moisture Inflow Direction:	**SW @ 112**	miles
Grid Point Elevation	**6,977**	feet
Storm Center Elevation	**5,600**	feet
Storm Analysis Duration	**3**	hours

The storm representative dew point is	**73.0 F**	with total precipitable water above sea level of			**2.60**	inches.
The in-place maximum dew point is	**80.0 F**	with total precipitable water above sea level of			**3.60**	inches.
The transpositioned maximum dew point is	**80.0 F**	with total precipitable water above sea level of			**3.60**	inches.
The in-place storm elevation is	**5,600**	which subtracts	**1.10**	inches of precipitable water at	**73.0 F**	
The in-place storm elevation is	**5,600**	which subtracts	**1.40**	inches of precipitable water at	**80.0 F**	
The in-place storm elevation is	**5,600**	which subtracts	**1.40**	inches of precipitable water at	**80.0 F**	

The in-place maximization factor is	**1.47**
The moisture transposition factor is	**1.00**
The orographic transposition factor is	**0.88**
The total adjustment factor is	**1.29**

Notes:

Observed Storm Depth-Area-Duration

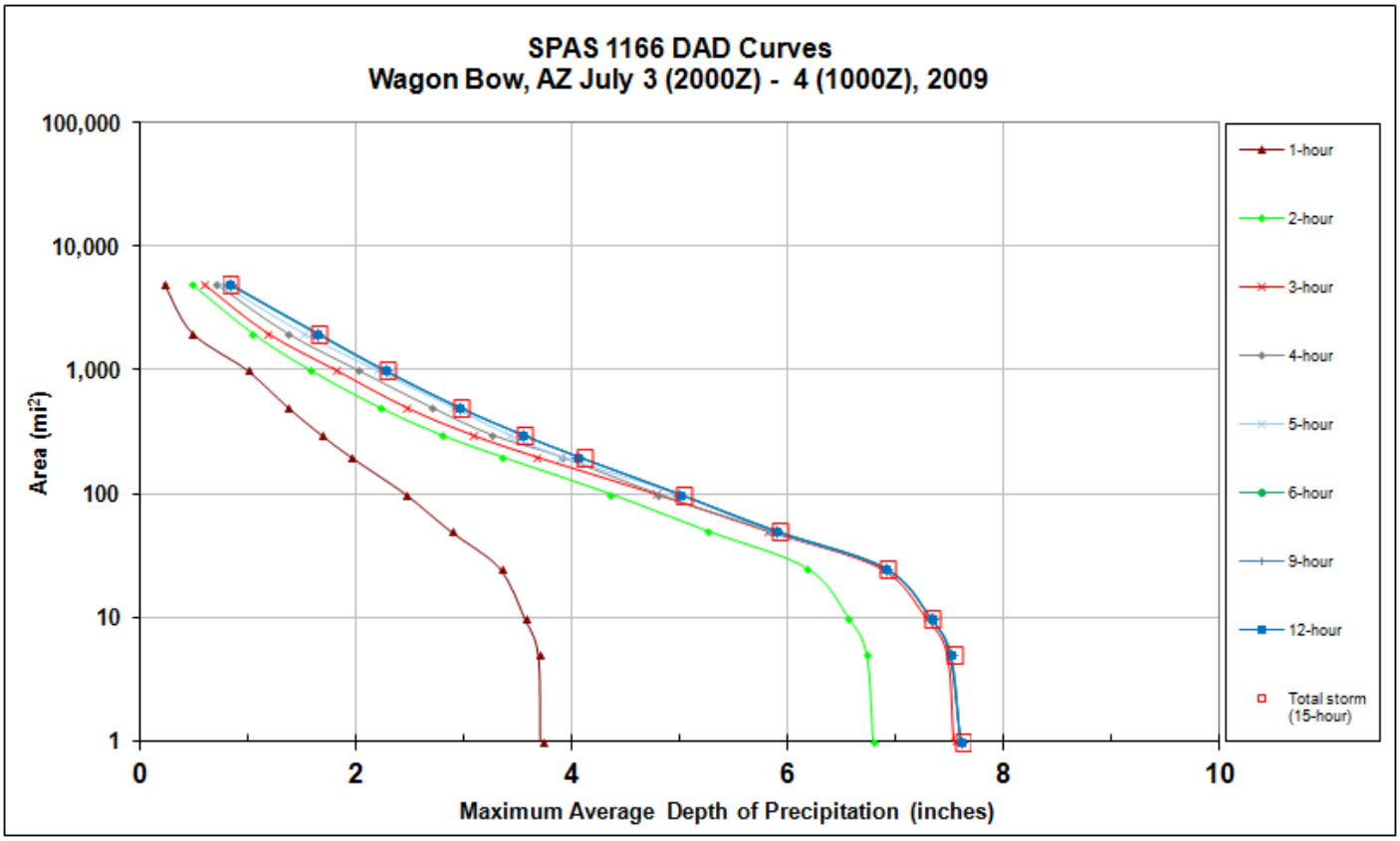
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**3.7**	**6.8**	**7.5**	**7.6**	**7.6**	**7.6**	**7.6**	-	-
10 sq miles	**3.6**	**6.6**	**7.3**	**7.3**	**7.3**	**7.3**	**7.3**	-	-
50 sq miles	**2.9**	**5.3**	**5.8**	**5.8**	**5.8**	**5.9**	**5.9**	-	-
100 sq miles	**2.5**	**4.4**	**4.8**	**4.8**	**5.0**	**5.0**	**5.0**	-	-
200 sq miles	**1.9**	**3.3**	**3.7**	**3.9**	**3.9**	**4.1**	**4.1**	-	-
500 sq miles	**1.4**	**2.2**	**2.5**	**2.7**	**2.9**	**2.9**	**3.0**	-	-
1000 sq miles	**1.0**	**1.6**	**1.8**	**2.0**	**2.2**	**2.2**	**2.3**	-	-
2000 sq miles	**0.5**	**1.0**	**1.2**	**1.4**	**1.5**	**1.6**	**1.6**	-	-
5000 sq miles	**0.2**	**0.5**	**0.6**	**0.7**	**0.7**	**0.8**	**0.8**	-	-

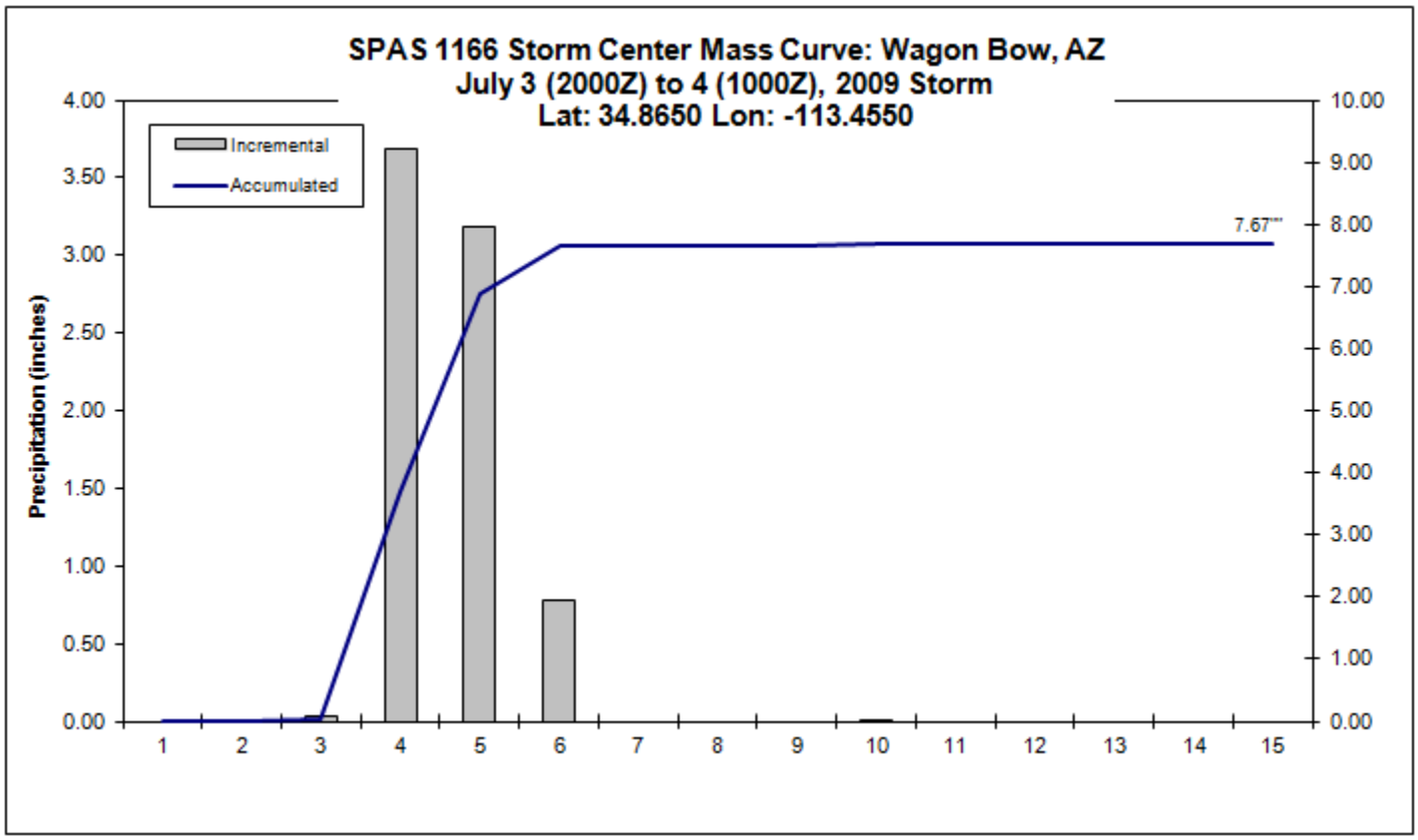
Adjusted Storm Depth-Area-Duration

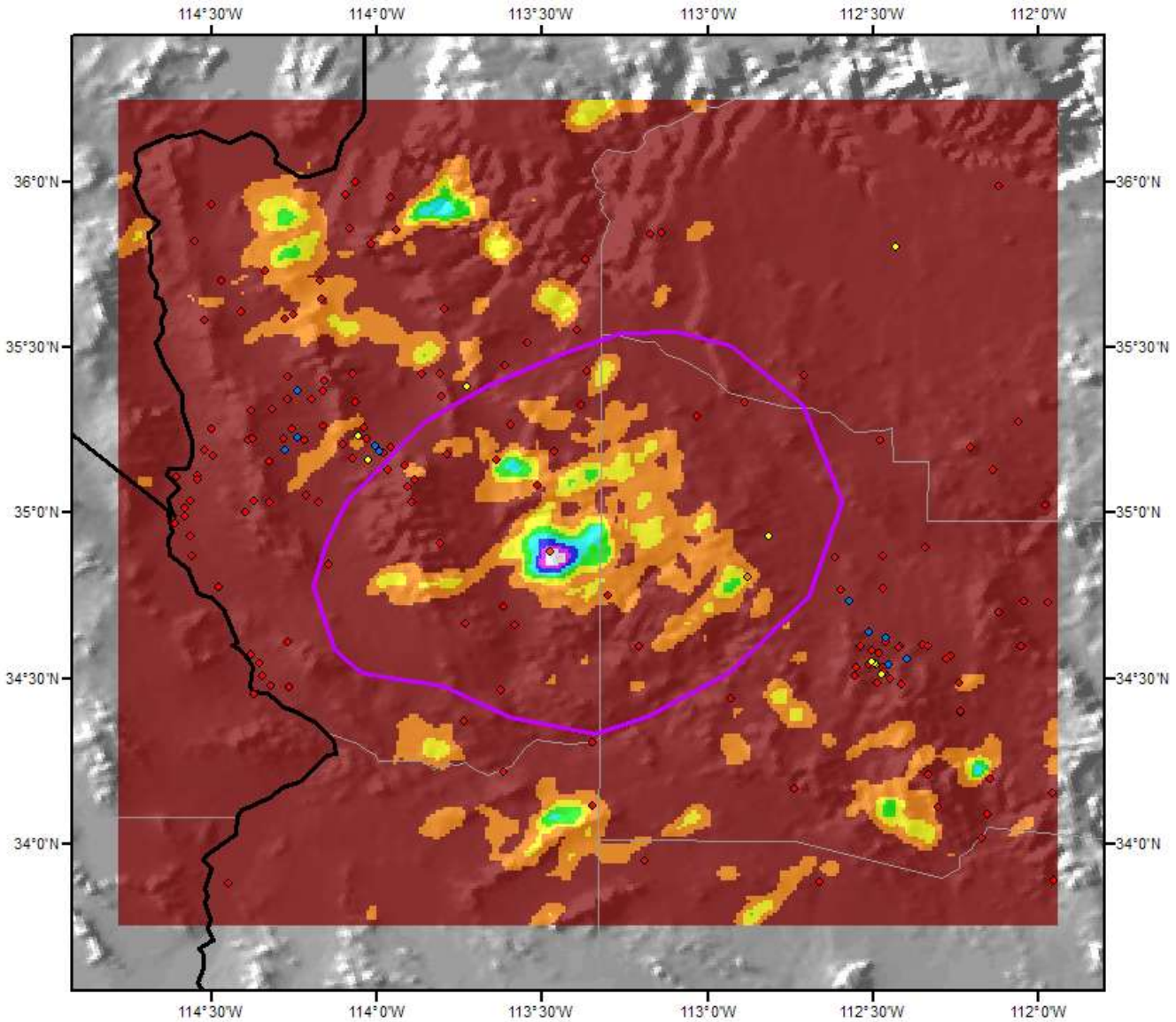
	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**4.8**	**8.8**	**9.7**	**9.8**	**9.8**	**9.8**	**9.8**	-	-
10 sq miles	**4.6**	**8.5**	**9.4**	**9.4**	**9.4**	**9.4**	**9.4**	-	-
50 sq miles	**3.7**	**6.8**	**7.5**	**7.5**	**7.5**	**7.6**	**7.6**	-	-
100 sq miles	**3.2**	**5.6**	**6.2**	**6.2**	**6.4**	**6.4**	**6.4**	-	-
200 sq miles	**2.5**	**4.3**	**4.7**	**5.0**	**5.0**	**5.2**	**5.2**	-	-
500 sq miles	**1.8**	**2.9**	**3.2**	**3.5**	**3.7**	**3.8**	**3.8**	-	-
1000 sq miles	**1.3**	**2.0**	**2.3**	**2.6**	**2.8**	**2.9**	**2.9**	-	-
2000 sq miles	**0.6**	**1.3**	**1.5**	**1.7**	**1.9**	**2.1**	**2.1**	-	-
5000 sq miles	**0.3**	**0.6**	**0.7**	**0.9**	**1.0**	**1.0**	**1.1**	-	-

Storm or Storm Center Name	**SPAS-1166-Wagon Bow**		
Storm Date(s)	7/3/09		
Storm Type	Local Storm		
Storm Location	34.87	113.46	
Storm Center Elevation	5600		
Precipitation Total & Duration (10 sq mi)	3.68 inches 1 hour 7.67" in 3hrs (SPAS 1166 DAD)		
Storm Representative Dewpoint	73.0 F	3	hr ave KBLH
Storm Representative Dewpoint Location	33.62	113.72	
In-place Maximum Dewpoint	80.0 F		
Moisture Inflow Vector	SW @ 112		
In-place Maximization Factor	1.47		
Temporal Transposition (Date)	18-Jul		
Transposition Dewpoint Location	29.73	-110.12	
Transposition Maximum Dewpoint	80.0 F		
Transposition Adjustment Factor	1.00		
Grid Point Location	30.975	-110.375	
Grid Point Elevation	6,977		
Total Adjustment Factor	1.29		

MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)									
	Duration (hours)								
Area (mi^2)	1	2	3	4	5	6	9	12	total
0.39	3.80	6.86	7.63	7.67	7.67	7.67	7.67	7.67	7.67
1	3.71	6.78	7.54	7.59	7.59	7.59	7.60	7.60	7.60
5	3.69	6.72	7.48	7.50	7.50	7.50	7.50	7.50	7.52
10	3.56	6.55	7.28	7.31	7.31	7.31	7.32	7.32	7.32
25	3.33	6.17	6.86	6.89	6.90	6.90	6.90	6.90	6.91
50	2.87	5.25	5.81	5.82	5.84	5.89	5.88	5.88	5.90
100	2.45	4.35	4.77	4.79	4.97	4.98	4.98	4.99	5.02
200	1.94	3.34	3.66	3.89	3.89	4.05	4.05	4.05	4.09
300	1.67	2.78	3.07	3.25	3.41	3.53	3.54	3.54	3.55
500	1.36	2.21	2.46	2.69	2.89	2.94	2.95	2.95	2.96
1,000	0.98	1.57	1.81	2.01	2.18	2.24	2.26	2.26	2.27
2,000	0.47	1.03	1.17	1.35	1.50	1.61	1.63	1.63	1.64
5,000	0.21	0.47	0.58	0.69	0.74	0.80	0.82	0.82	0.82




SPAS 1166 Storm Center Mass Curve: Wagon Bow, AZ
July 3 (2000Z) to 4 (1000Z), 2009 Storm
Lat: 34.8650 Lon: -113.4550
Incremental
Accumulated
Precipitation (inches)
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
7.67"
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15



Total Rainfall (15-hours)
Wagon Bow, AZ 2009 Storm
Storm #1166 July 3 (2000 Z) to 4 (1000 Z), 2009

Gauging Stations

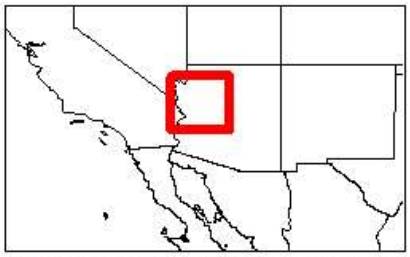
- Daily
- Hourly
- Hourly Estimated
- Hourly Pseudo
- Supplemental

Miles: 0 10 20 40
Kilometers: 0 12.5 25 50 75 100

N

Precipitation (inches)

- 0.00 - 1.00
- 1.01 - 2.00
- 2.01 - 3.00
- 3.01 - 4.00
- 4.01 - 5.00
- 5.01 - 6.00
- 6.01 - 7.00
- 7.01 - 8.00



Coordinate system: GCS North American 1983
Scale: 1:1,867,216
Metstat/AWA August 25, 2009

Peterson Ranch, AZ

January 19-22, 2010

Storm Type: General Frontal

Storm Precipitation Analysis System (SPAS) For Storm #1200

General Storm Location: Arizona

Storm Dates: January 19 0100 UTC – January 22, 2010 2300 UTC (95 hours)

Event: Synoptic/Winter Storm

DAD Zone 1 – Southwestern Deserts

Latitude: 34.08

Longitude: -112.16

Max. Grid Rainfall Amount: 7.77″

DAD Zone 2 – Mogollon Rim

Latitude: 33.81

Longitude: -110.91

Max. Grid Rainfall Amount: 14.93″

DAD Zone 3 – Northern and Northwestern Arizona (Colorado Plateau)

Latitude: 35.99

Longitude: -113.84

Max. Grid Rainfall Amount: 5.38″

DAD Zone 4 – Southeastern Arizona Basin and Range

Latitude: 31.76

Longitude: -110.84

Max. Grid Rainfall Amount: 6.63″

Number of Stations: 1228 (362 Daily, 503 Hourly, 47 Hourly Estimated, 10 Hourly Estimated Pseudo, 108 Hourly Pseudo, 181 Supplemental, and 17 Supplemental Estimated)

SPAS Version: 8.5

Base Map Used: Mean (1971-2000) PRISM January Precipitation

Spatial resolution: 36 seconds (0.4 sq-mi grid cells)

Radar Included: Yes

Depth-Area-Duration (DAD) analysis: Yes

Storm Name:	SPAS-1200-Peterson Ranch-Zone
Storm Date:	1/19-22/2010
AWA Analysis Date:	5/25/2013

Storm Adjustment for Grid Point 1

Temporal Transposition Date	5-Jan	
	Lat	Long
Storm center location	33.81	-110.91
Storm Rep SST location	23.50	-123.00
Transposition SST location	20.665	-122.465
Basin location	30.975	-110.375

Moisture Inflow Direction:	SW @ 1020	miles
Grid Point Elevation	6,977	feet
Storm Center Elevation	7,450	feet
Storm Analysis Duration	24	hours

The storm representative SST is	69.5 F	with total precipitable water above sea level of			2.20	inches.
The in-place maximum SST is	70.5 F	with total precipitable water above sea level of			2.31	inches.
The transpositioned maximum SST is	74.0 F	with total precipitable water above sea level of			2.73	inches.
The in-place storm elevation is	7,450	which subtracts	1.23	inches of precipitable water at	69.5 F	
The in-place storm elevation is	7,450	which subtracts	1.28	inches of precipitable water at	70.5 F	
The in-place storm elevation is	7,450	which subtracts	1.45	inches of precipitable water at	74.0 F	

The in-place maximization factor is	1.07
The moisture transposition factor is	1.24
The orographic transposition factor is	0.63
The total adjustment factor is	0.83

Notes: Storm representative SST value was based on SST values on January 16-17, along with Hysplit backward trajectory. Values were selected in region where temperature did not vary more than a degree over a large area.

Observed Storm Depth-Area-Duration

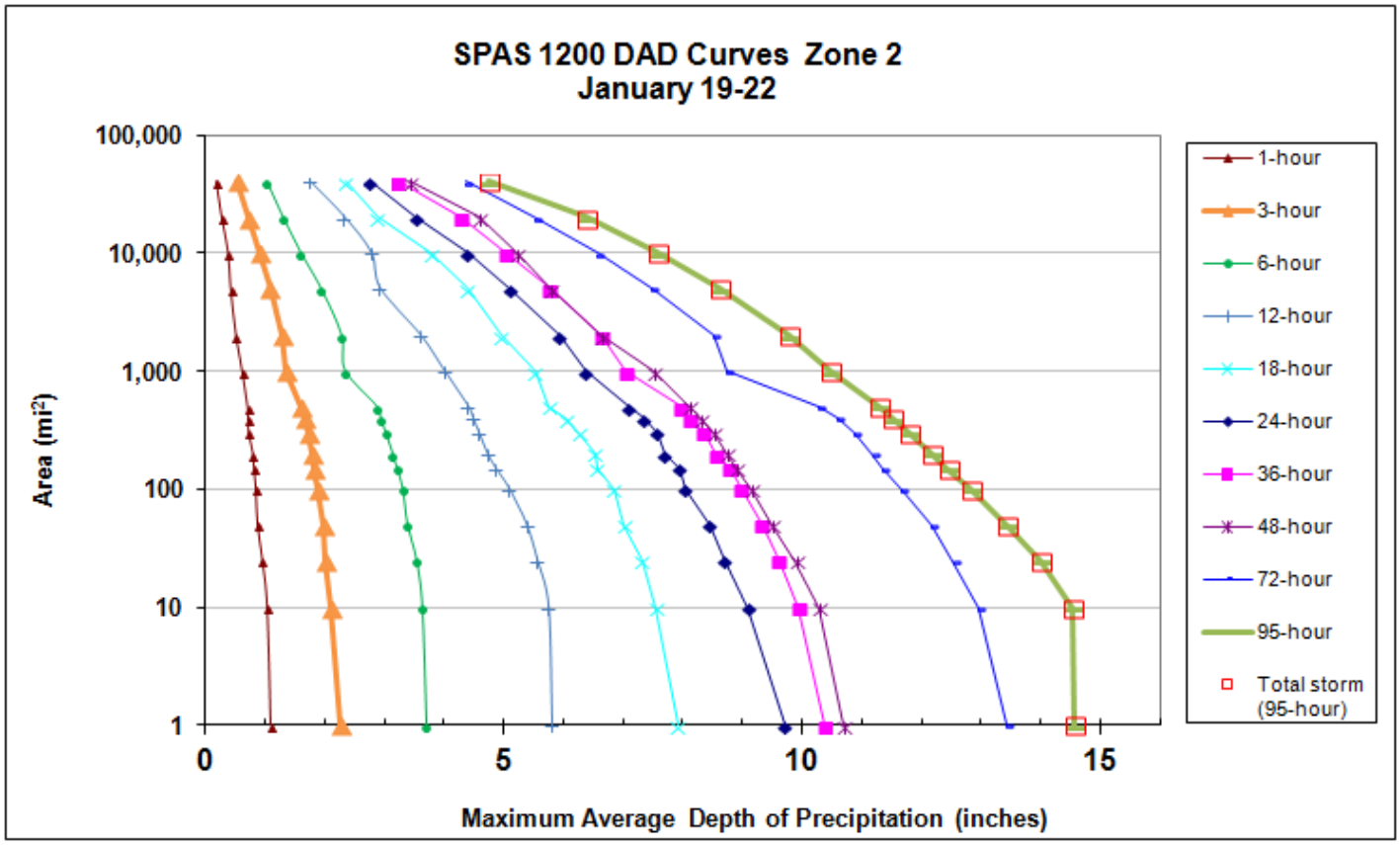
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	1.1	3.7	5.8	7.9	9.7		10.4	10.7		13.4
10 sq miles	1.0	3.6	5.8	7.6	9.1		9.9	10.3		13.0
100 sq miles	0.9	3.3	5.1	6.8	8.1		9.0	9.2		11.7
200 sq miles	0.8	3.1	4.7	6.5	7.7		8.6	8.7		11.2
500 sq miles	0.7	2.9	4.4	5.8	7.1		8.0	8.1		10.3
1000 sq miles	0.6	2.3	4.0	5.5	6.4		7.1	7.5		8.8
2000 sq miles	0.5	2.3	3.6	5.0	5.9		6.6	6.6		8.5
5000 sq miles	0.4	1.9	2.9	4.4	5.1		5.8	5.8		7.5
10000 sq miles	0.4	1.6	2.8	3.8	4.4		5.0	5.2		6.6
20000 sq miles	0.3	1.3	2.3	2.9	3.5		4.3	4.6		5.5

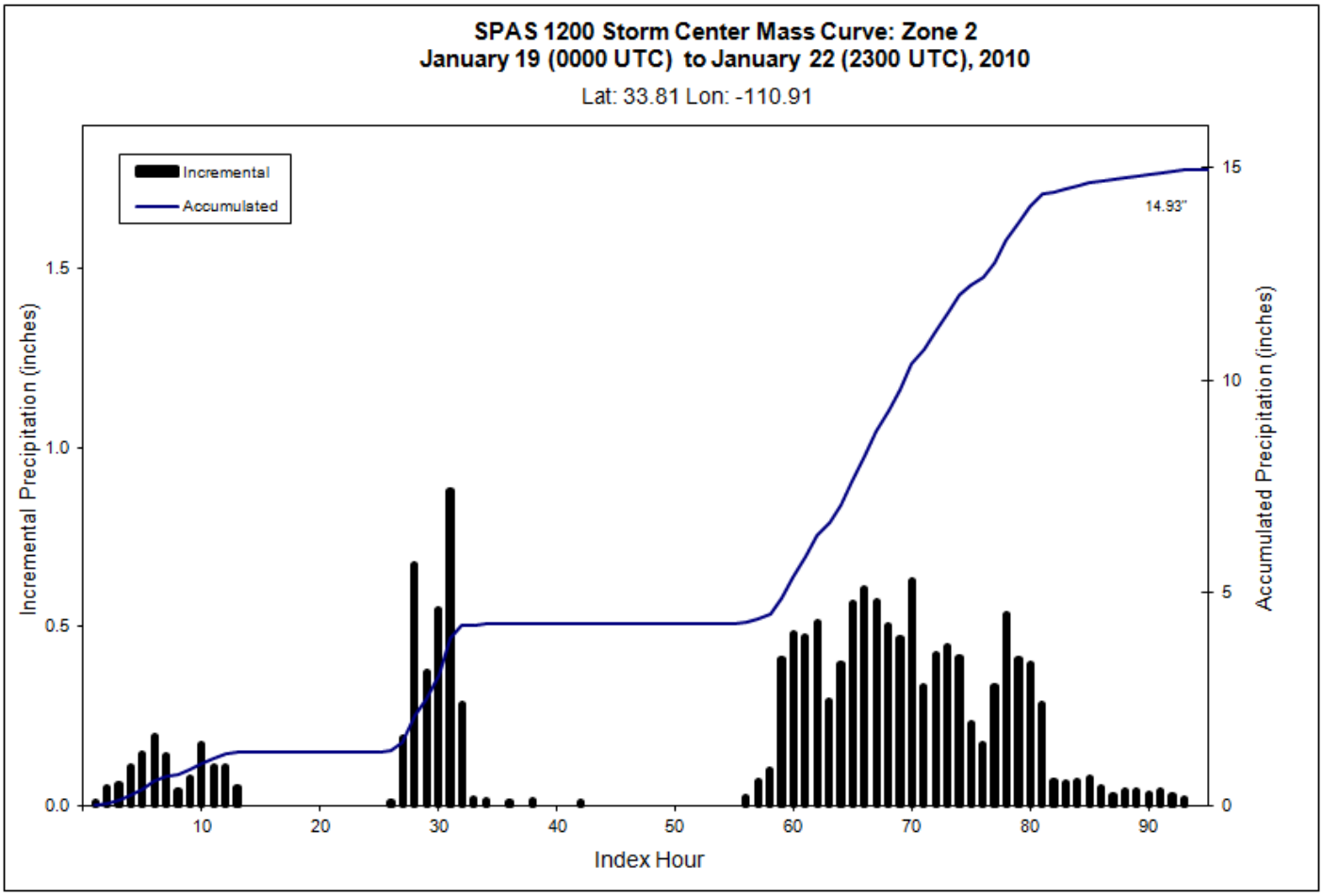
Adjusteded Storm Depth-Area-Duration

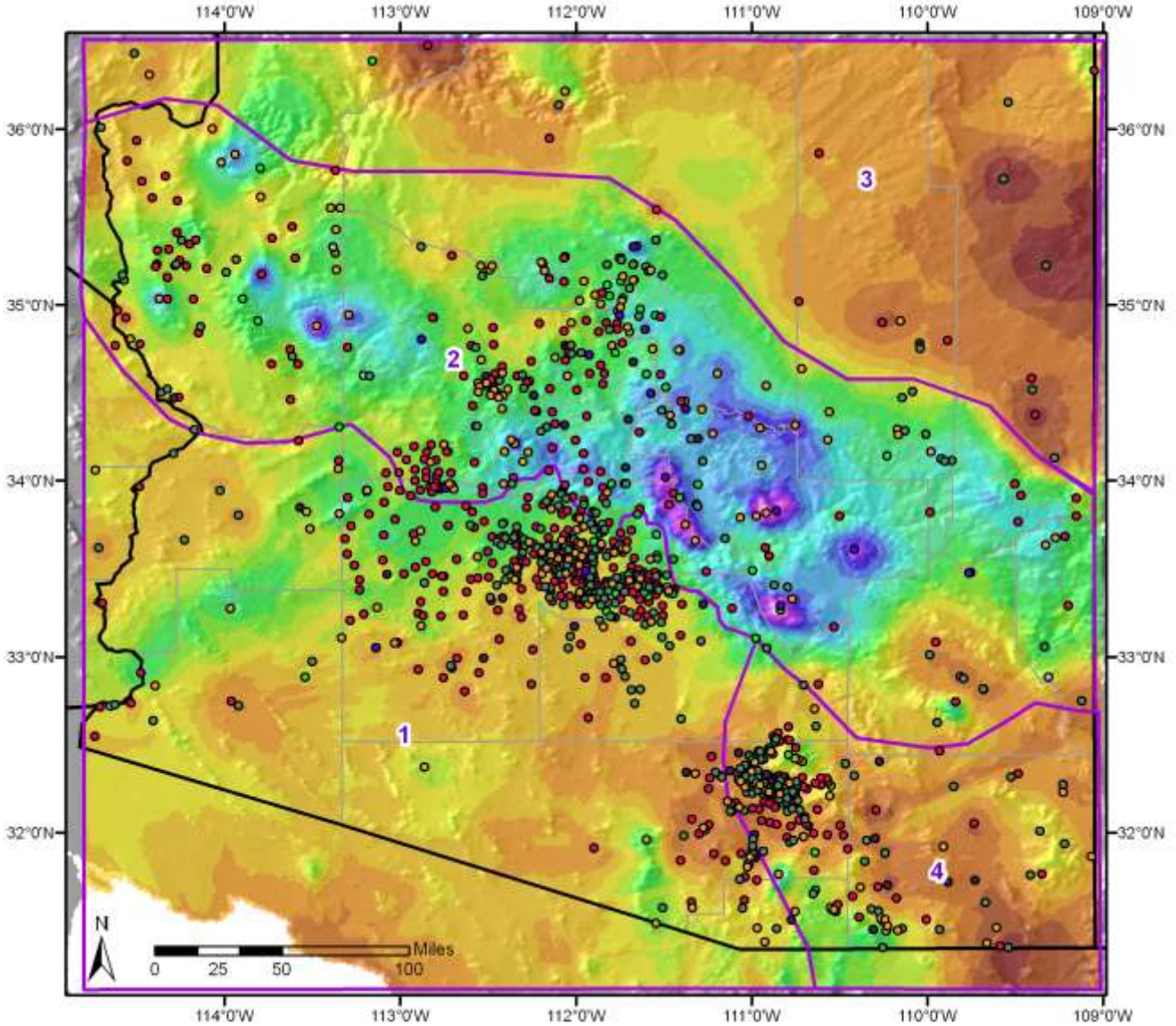
	1 Hours	6 Hours	12 Hours	18 Hours	24 Hours	30 Hours	36 Hours	48 Hours	60 Hours	72 Hours
1 sq miles	0.9	3.1	4.8	-	8.1	-	8.6	8.9	-	11.2
10 sq miles	0.9	3.0	4.8	-	7.6	-	8.3	8.5	-	10.8
100 sq miles	0.7	2.8	4.2	-	6.7	-	7.5	7.6	-	9.7
200 sq miles	0.7	2.6	3.9	-	6.4	-	7.1	7.3	-	9.3
500 sq miles	0.6	2.4	3.7	-	5.9	-	6.6	6.8	-	8.6
1000 sq miles	0.5	1.9	3.3	-	5.3	-	5.9	6.2	-	7.3
2000 sq miles	0.4	1.9	3.0	-	4.9	-	5.5	5.5	-	7.1
5000 sq miles	0.4	1.6	2.4	-	4.2	-	4.8	4.8	-	6.2
10000 sq miles	0.3	1.3	2.3	-	3.6	-	4.2	4.3	-	5.5
20000 sq miles	0.2	1.1	1.9	-	2.9	-	3.6	3.8	-	4.6

Storm or Storm Center Name	SPAS-1200-Peterson Ranch-Zone 2	
Storm Date(s)	1/19-22/2010	
Storm Type	General	
Storm Location	33.81	-110.91
Storm Center Elevation	7,450	
Precipitation Total & Duration (10 sq mi)	14.93 inches 95 hours (SPAS 1200 DAD)	
Storm Representative SST	69.5 F	24
Storm Representative SST Location	23.5	-123
In-place Maximum SST	70.5 F	
Moisture Inflow Vector	SW @ 1020	
In-place Maximization Factor		
Temporal Transposition (Date)	5-Jan	
Transposition SST Location	20.67	-122.47
Transposition Maximum SST	74.0 F	
Transposition Adjustment Factor	1.24	
Grid Point Location	30.975	-110.375
Grid Point Elevation	6,977	
Total Adjustment Factor	0.83	

Storm 1200 - January 19, 2010 (0000 UTC) - January 22, 2010 (0400 UTC)											
MAXIMUM AVERAGE DEPTH OF PRECIPITATION (INCHES)											
	Duration (hours)										
Area (mi^2)	1	3	6	12	18	24	36	48	72	95	Total
0	1.15	2.33	3.8	6.03	8.09	9.98	10.6	10.99	13.66	14.93	14.93
1	1.1	2.26	3.71	5.81	7.92	9.72	10.39	10.7	13.43	14.57	14.57
10	1.04	2.09	3.64	5.75	7.56	9.1	9.94	10.27	12.95	14.52	14.52
25	0.96	2.01	3.54	5.56	7.31	8.7	9.62	9.89	12.53	13.99	13.99
50	0.88	1.97	3.39	5.38	7.02	8.46	9.33	9.51	12.16	13.44	13.44
100	0.85	1.89	3.31	5.09	6.84	8.05	8.98	9.15	11.67	12.82	12.82
150	0.82	1.83	3.21	4.86	6.57	7.95	8.79	8.9	11.34	12.44	12.44
200	0.8	1.79	3.14	4.72	6.53	7.7	8.56	8.73	11.18	12.18	12.18
300	0.73	1.72	3.02	4.58	6.26	7.57	8.36	8.52	10.89	11.79	11.79
400	0.72	1.66	2.94	4.48	6.04	7.36	8.14	8.31	10.6	11.51	11.51
500	0.71	1.61	2.87	4.4	5.76	7.1	7.97	8.12	10.29	11.28	11.28
1,000	0.62	1.34	2.34	4	5.53	6.37	7.05	7.51	8.75	10.48	10.48
2,000	0.52	1.29	2.28	3.6	4.95	5.93	6.64	6.64	8.51	9.78	9.78
5,000	0.43	1.08	1.93	2.92	4.4	5.1	5.78	5.78	7.49	8.6	8.60
10,000	0.39	0.9	1.59	2.77	3.78	4.39	5.04	5.21	6.57	7.58	7.58
20,000	0.28	0.71	1.29	2.32	2.88	3.53	4.28	4.59	5.51	6.37	6.37
40,231	0.19	0.53	1.02	1.74	2.35	2.77	3.23	3.43	4.36	4.74	4.74




SPAS 1200 Storm Center Mass Curve: Zone 2
January 19 (0000 UTC) to January 22 (2300 UTC), 2010
Lat: 33.81 Lon: -110.91
Incremental
Accumulated
14.93"
Incremental Precipitation (inches)
Accumulated Precipitation (inches)
Index Hour
0.0
0.5
1.0
1.5
0
5
10
15
10
20
30
40
50
60
70
80
90



Hourly and daily station data extraction information:
SPAS storm number: 1200
Begin: 01/19/2010 0000Z
End: 01/22/2010 2359Z
Domain: 36.5 -114.8 31.1 -109.0

Precipitation (inches)

0.00 - 0.50	3.51 - 4.00	10.01 - 11.00	Daily
0.51 - 1.00	4.01 - 5.00	11.01 - 12.00	Hourly
1.01 - 1.50	5.01 - 6.00	12.01 - 13.00	Hourly Estimated
1.51 - 2.00	6.01 - 7.00	13.01 - 14.00	Hourly Estimated Pseudo
2.01 - 2.50	7.01 - 8.00	14.01 - 15.00	Hourly Pseudo
2.51 - 3.00	8.01 - 9.00		Supplemental
3.01 - 3.50	9.01 - 10.00		Supplemental Estimated

Anthem, AZ

July 31, 2012

Storm Type: Local Convective

Storm Precipitation Analysis System (SPAS) For Storm #1262

General Storm Location: Anthem, AZ

Storm Dates: July 31, 2012

Event: Isolated severe thunderstorm

DAD Zone 1

Latitude: 33.85874791

Longitude: -112.14125211

Max. Grid Rainfall Amount: 6.38”

Max. Observed Rainfall Amount: 5.53” (Anthem School, AZ)

Number of Stations: 77 (0 Daily, 34 Hourly, 0 Hourly Estimated, 0 Hourly Estimated Pseudo, 2 Hourly Pseudo, 41 Supplemental, and 0 Supplemental Estimated)

SPAS Version: 9.5

Base Map Used: KIWA Dual Pol total storm precipitation grid, then non-radar total storm grid for SPAS-NEXRAD basemap

Spatial resolution: 9 seconds (0.02 sq-miles/250 meters) ** Used high resolution reflectivity from Dual Pol**

Radar Included: Yes

Depth-Area-Duration (DAD) analysis: Yes

Reliability of Results:

Reliable, very high resolution (250m) radar data, coupled with decent rain gauge coverage at/near the storm center allows the results of this analysis to carry a high degree of confidence.

Storm Name:	**SPAS 1262 Anthem, AZ**
Storm Date:	**7/31/2012**
AWA Analysis Date:	**5/25/2013**

Storm Adjustment for Grid Point 1

Temporal Transposition Date	**15-Aug**	
	Lat	**Long**
Storm center location	**33.85**	**-112.14**
Storm Rep dew point location	**33.64**	**-112.05**
Transposition dewpoint location	**30.765**	**-110.285**
Basin location	**30.975**	**-110.375**

Moisture Inflow Direction:	**SSE @ 15**	miles
Grid Point Elevation	**6,977**	feet
Storm Center Elevation	**1,800**	feet
Storm Analysis Duration	**3**	hours

The storm representative dew point is	**75.0 F**	with total precipitable water above sea level of			**2.85**	inches.
The in-place maximum dew point is	**81.0 F**	with total precipitable water above sea level of			**3.76**	inches.
The transpositioned maximum dew point is	**81.5 F**	with total precipitable water above sea level of			**3.84**	inches.
The in-place storm elevation is	**1,800**	which subtracts	**0.44**	inches of precipitable water at	**75.0 F**	
The in-place storm elevation is	**1,800**	which subtracts	**0.53**	inches of precipitable water at	**81.0 F**	
The in-place storm elevation is	**1,800**	which subtracts	**0.54**	inches of precipitable water at	**81.5 F**	

The in-place maximization factor is	**1.34**
The moisture transposition factor is	**1.02**
The orographic transposition factor is	**1.16**
The total adjustment factor is	**1.59**

Notes:

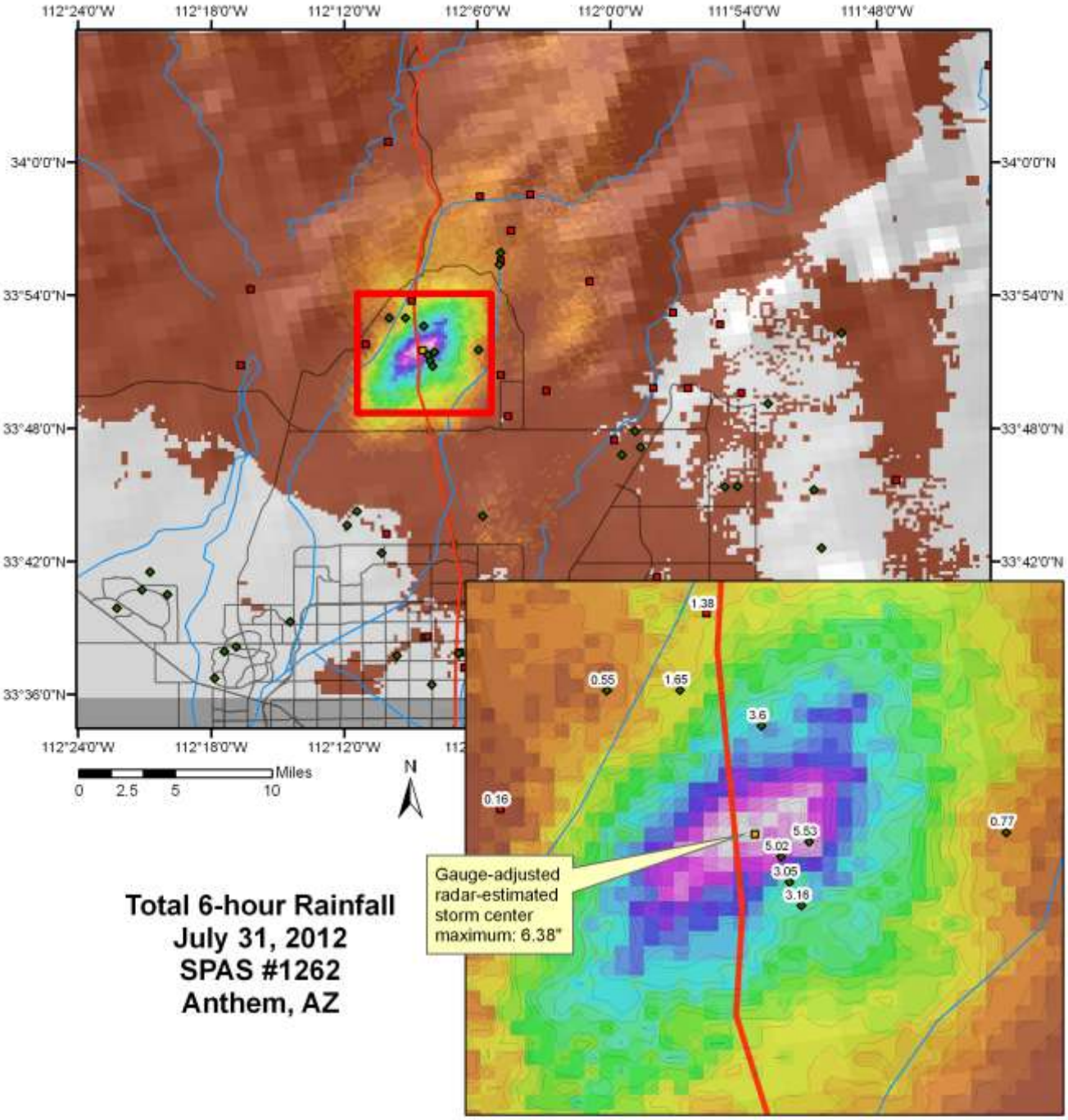
Observed Storm Depth-Area-Duration

	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**3.3**	**5.3**	-	-	-	**5.3**	-	-	-
10 sq miles	**2.3**	**3.7**	-	-	-	**3.7**	-	-	-
50 sq miles	**1.0**	**1.9**	-	-	-	**2.0**	-	-	-
100 sq miles	**0.7**	**1.0**	-	-	-	**1.5**	-	-	-
200 sq miles	**0.6**	**0.6**	-	-	-	**1.4**	-	-	-
500 sq miles	**0.4**	**0.4**	-	-	-	**1.1**	-	-	-
1000 sq miles	**0.2**	**0.3**	-	-	-	**0.6**	-	-	-
2000 sq miles	-	-	-	-	-	-	-	-	-
5000 sq miles	-	-	-	-	-	-	-	-	-

Adjusted Storm Depth-Area-Duration

	1 Hours	2 Hours	3 Hours	4 Hours	5 Hours	6 Hours	12 Hours	18 Hours	24 Hours
1 sq miles	**5.3**	**8.5**	-	-	-	**8.5**	-	-	-
10 sq miles	**3.6**	**5.9**	-	-	-	**5.9**	-	-	-
50 sq miles	**1.5**	**3.0**	-	-	-	**3.1**	-	-	-
100 sq miles	**1.0**	**1.6**	-	-	-	**2.4**	-	-	-
200 sq miles	**0.9**	**0.9**	-	-	-	**2.2**	-	-	-
500 sq miles	**0.7**	**0.7**	-	-	-	**1.7**	-	-	-
1000 sq miles	**0.4**	**0.4**	-	-	-	**0.9**	-	-	-
2000 sq miles	-	-	-	-	-	-	-	-	-
5000 sq miles	-	-	-	-	-	-	-	-	-

Storm or Storm Center Name	**SPAS 1262 Anthem, AZ**	
Storm Date(s)	7/31/2012	
Storm Type	Convective	
Storm Location	33.85	-112.14
Storm Center Elevation	1,800	
Precipitation Total & Duration (10 sq mi)	6.38 Inches 6-hours	
Storm Representative Dewpoint	75.0 F	3
Storm Representative Dewpoint Location	33.64	-112.05
In-place Maximum Dewpoint	81.0 F	
Moisture Inflow Vector	SSE @ 15	
In-place Maximization Factor	1.34	
Temporal Transposition (Date)	15-Aug	
Transposition Dewpoint Location	30.77	-110.29
Transposition Maximum Dewpoint	81.5 F	
Transposition Adjustment Factor	1.02	
Grid Point Location	30.975	-110.375
Grid Point Elevation	6,977	
Total Adjustment Factor	1.59	



Total 6-hour Rainfall
July 31, 2012
SPAS #1262
Anthem, AZ

Rainfall (inches)

0.00	1.21 - 1.40	2.61 - 2.80	4.01 - 4.20	5.41 - 5.60
0.01 - 0.20	1.41 - 1.60	2.81 - 3.00	4.21 - 4.40	5.61 - 5.80
0.21 - 0.40	1.61 - 1.80	3.01 - 3.20	4.41 - 4.60	5.81 - 6.00
0.41 - 0.60	1.81 - 2.00	3.21 - 3.40	4.61 - 4.80	Hourly
0.61 - 0.80	2.01 - 2.20	3.41 - 3.60	4.81 - 5.00	Hourly Pseudo
0.81 - 1.00	2.21 - 2.40	3.61 - 3.80	5.01 - 5.20	Supplemental
1.01 - 1.20	2.41 - 2.60	3.81 - 4.00	5.21 - 5.40	

METSTAT, Inc. 12/07/2012