



# MONTHLY AIR QUALITY REPORT FOR OCTOBER 2010

## AOI COLOR SCALE

<b>GOOD</b>	<b>MODERATE</b>	<b>UNHEALTHY FOR SENSITIVE GROUPS</b>	<b>UNHEALTHY</b>
<b>0-50</b>	<b>51-100</b>	<b>101-150</b>	<b>151-200</b>

## Calendar of maximum AQI values & their corresponding color for October 2010\*

\*Preliminary data

## SAMPLE POLLUTANT REPORTING BOX

<b>1</b> (day of month)	<b>O3</b>	<b>CO</b>
	<b>PM10</b>	<b>PM2.5</b>

SUN			MON			TUES			WED			THU			FRI			SAT		
															1	71	09	2	54	09
																48	35		83	40
3	45	10	4	40	10	5	35	09	6	40	09	7	42	10	8	51	13	9	77	17
	29	24		31	23		30	35		29	29		35	30		34	38		37	42
10	50	15	11	50	10	12	49	13	13	50	16	14	48	13	15	49	13	16	49	11
	31	40		44	37		43	41		54	43		91	38		103	43		79	33
17	48	13	18	39	09	19	36	07	20	31	06	21	38	06	22	39	07	23	42	09
	55	37		74	31		34	29		22	22		15	24		26	39		24	44
24	43	11	25	32	08	26	37	10	27	42	09	28	42	13	29	42	15	30	34	14
	23	48		36	33		33	27		33	25		46	29		54	40		48	33
31	42	10																		
	31	33																		

### Calendar of High Pollution Advisories and Health Watches issued during October 2010

SUN	MON	TUE	WED	THU	FRI	SAT
					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	27	28	29	30
31						

#### LEGEND

##### HIGH POLLUTION ADVISORIES

**A** = PM-10 High Pollution Advisory  
**B** = PM-2.5 High Pollution Advisory  
**C** = Ozone High Pollution Advisory

##### HEALTH WATCHES

**D** = PM-10 Health Watch  
**E** = PM-2.5 Health Watch  
**F** = Ozone Health Watch

### Calendar of Meteorological Conditions observed in Metro Phoenix during October 2010

SUN	MON	TUE	WED	THU	FRI	SAT
					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	27	28	29	30
31						

#### LEGEND

##### ELECTROMETEORS

**A** = Thunderstorm

##### HYDROMETEORS

**B** = Rain/Drizzle/Hail/Snow  
**C** = Fog

##### LITHOMETEORS

**D** = Blowing Dust  
**E** = Haze (vsby <10SM)  
**F** = Smoke

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**Exceedance days during OCT 2010-**

Total=	1	<u>Date</u>	<u>Max AQI</u>	<u>Pollutant</u>	<u>Site/s</u>
		10/15	103	PM-10	Greenwood

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**Health Watches issued during OCT 2010-**

Total=	1	<u>Date</u>	<u>Max AQI</u>	<u>Pollutant</u>	<u>Site/s</u>
		10/01	71	Ozone	North Phoenix

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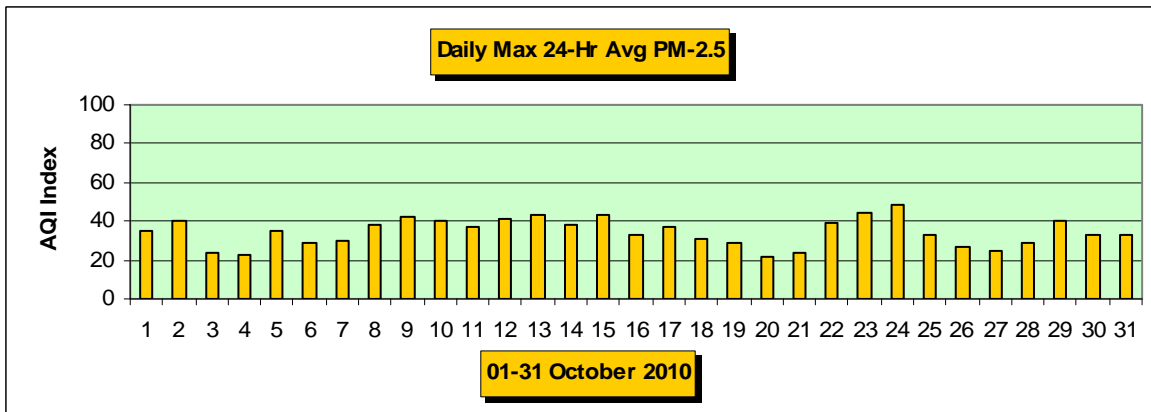
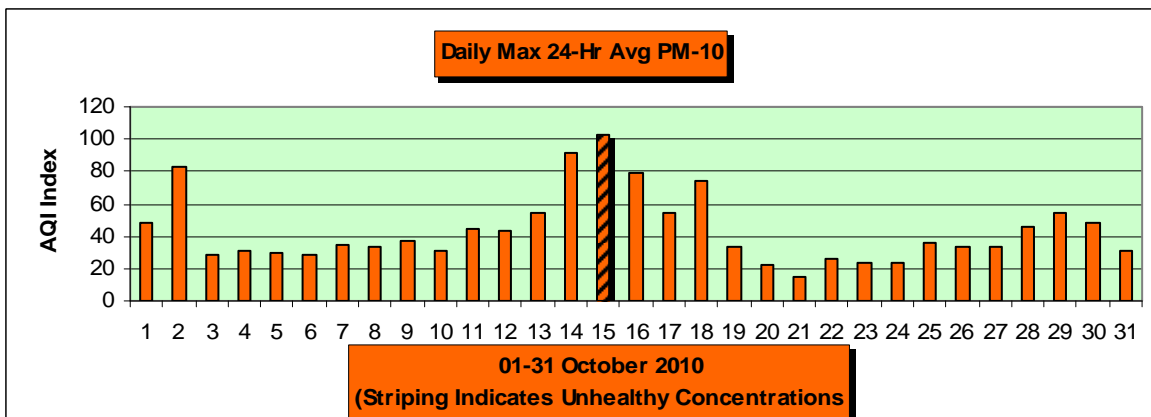
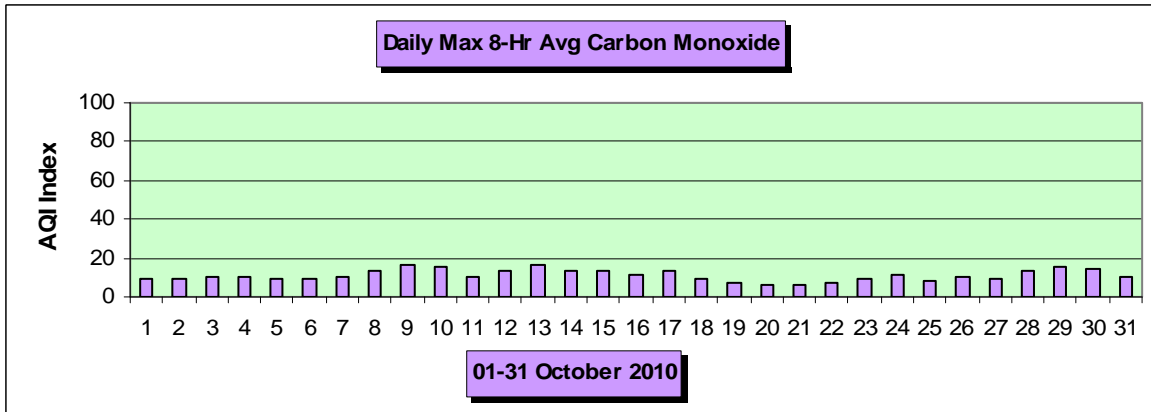
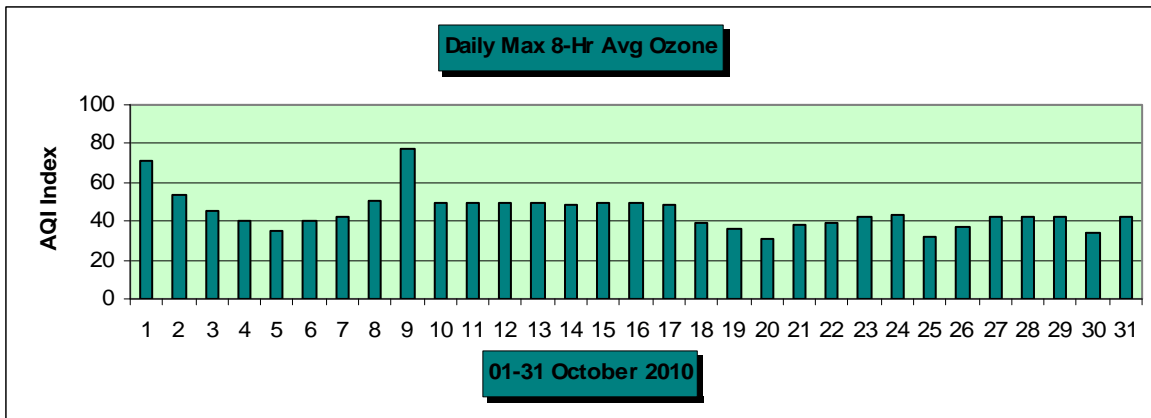
**High Pollution Advisories issued during OCT 2010-**

Total=	0	<u>Date</u>	<u>Max AQI</u>	<u>Pollutant</u>	<u>Site/s</u>
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<b><u>Concentration Recap:</u></b>	Days in the <b>Good</b> category:	20
	Days in the <b>Moderate</b> category:	10
	Days in the <b>Unhealthy for Sensitive Groups</b> category:	1
	Days in the <b>Unhealthy</b> category:	<u>0</u>
	Total Forecast Days:	31

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**Narrative:**

Unofficially, the month of October begins the “cool-season” for air quality forecasting in the Phoenix metro area with the emphasis switching from ozone to coarse and fine particulate matter (PM-10 and PM-2.5). Although the amount of ozone precursor emissions remains roughly the same, due to lower sun angles, shorter days, and decreasing temperatures, local ozone levels usually drop off rapidly in October and this year was no exception with highest concentrations staying in the good range of the Air Quality Index beginning on the 10th. On the other hand, particle pollutant levels tend to trend upward in the Valley – especially during periods of air mass stagnation – contributed to by stronger overnight inversion formation and lower mixing depths associated with colder air at the surface and warm air aloft. October 2010 was unusual on several counts, however. First, a moist southerly flow aloft and very warm afternoons early in the month led to the formation of thunderstorms over the nearby higher terrain that then moved over the desert areas and produced a few light showers on the 2nd and 3rd as well as dense outflow boundary-generated blowing dust on the 2nd. Figures 1-4 are a sequence of photographs looking east from the local VISNET array showing the approaching dust wall and Figure 5 shows thick dust over downtown Phoenix.

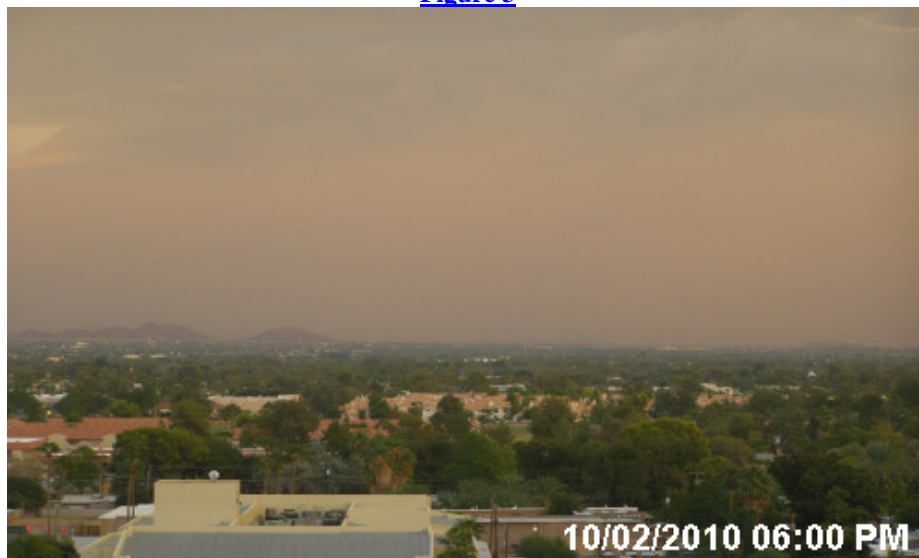
**Figure 1**



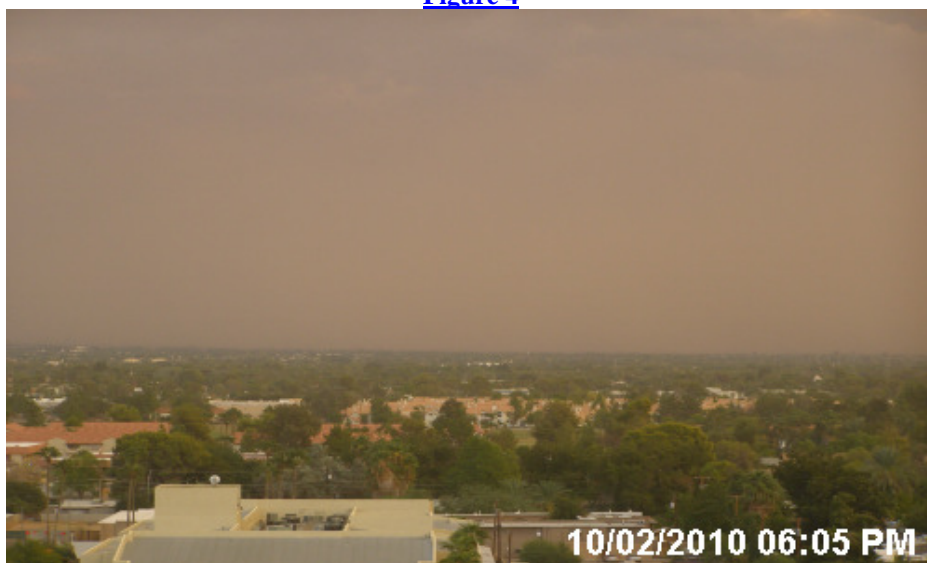
**Figure 2**



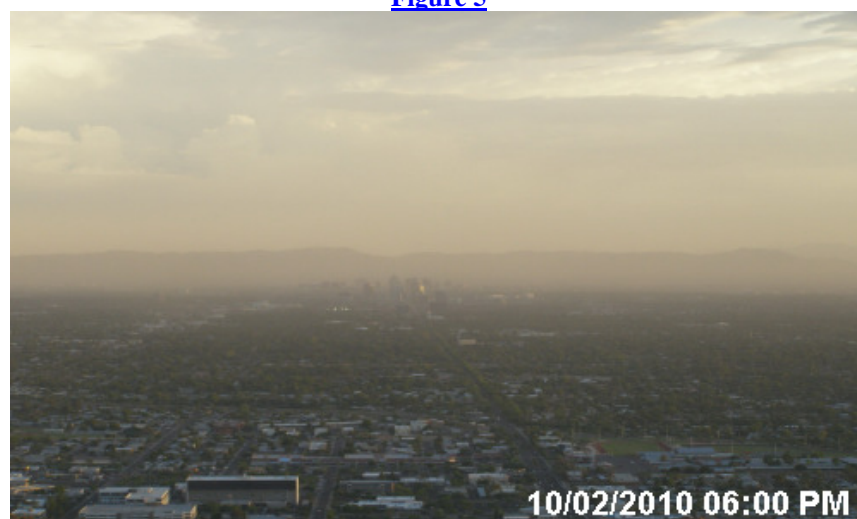
[Figure 3](#)



[Figure 4](#)

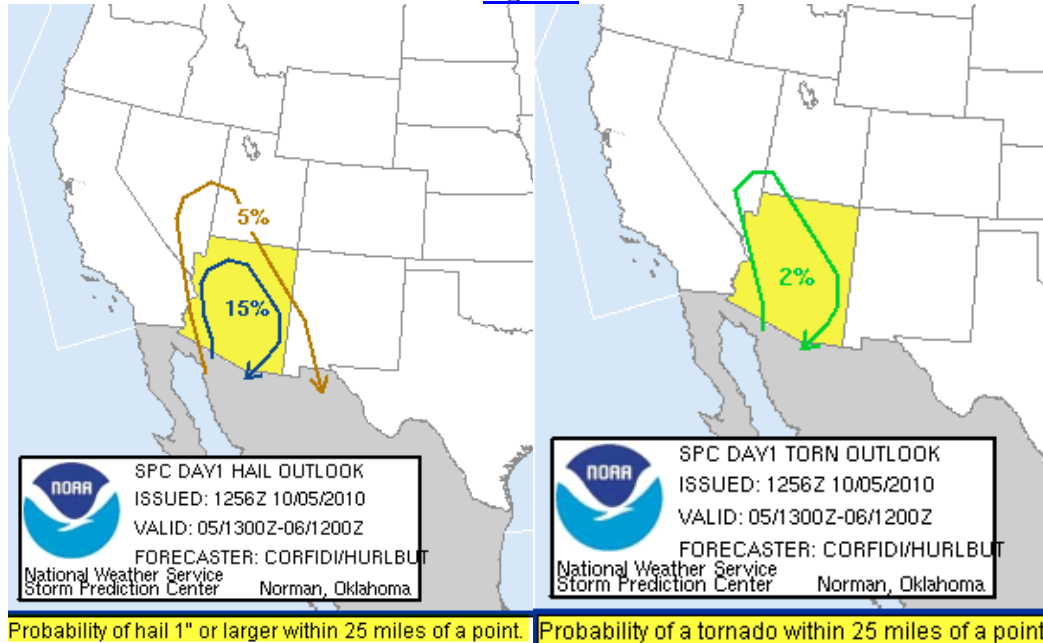


[Figure 5](#)

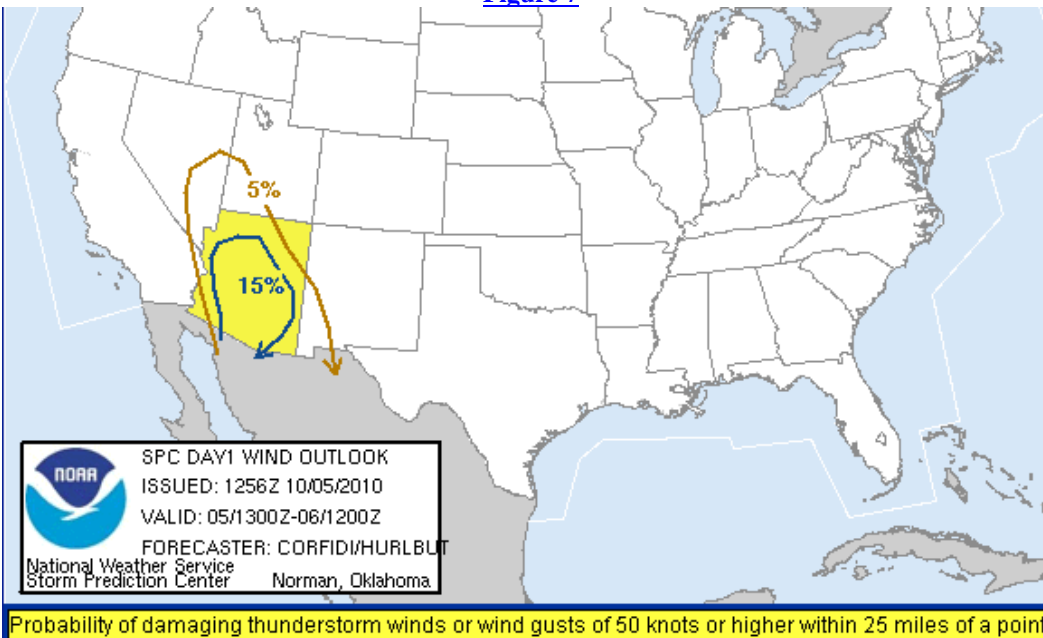


Second, from the 4th thru 7th a low-latitude major short wave trough in the mid-latitude storm track approached and arrived overhead. The combination of unusually high moisture levels and very strong dynamics associated with the system resulted in a significant severe outbreak over mainly the western half of AZ, including the Phoenix metro area, on the 5th. Severe thunderstorms in the Valley produced hail stones up to 2 1/2" in diameter, rainfall totals of over two inches, and wind gusts up to 52 mph. The following Figures 6-11 illustrate the gravity of the situation before and after:

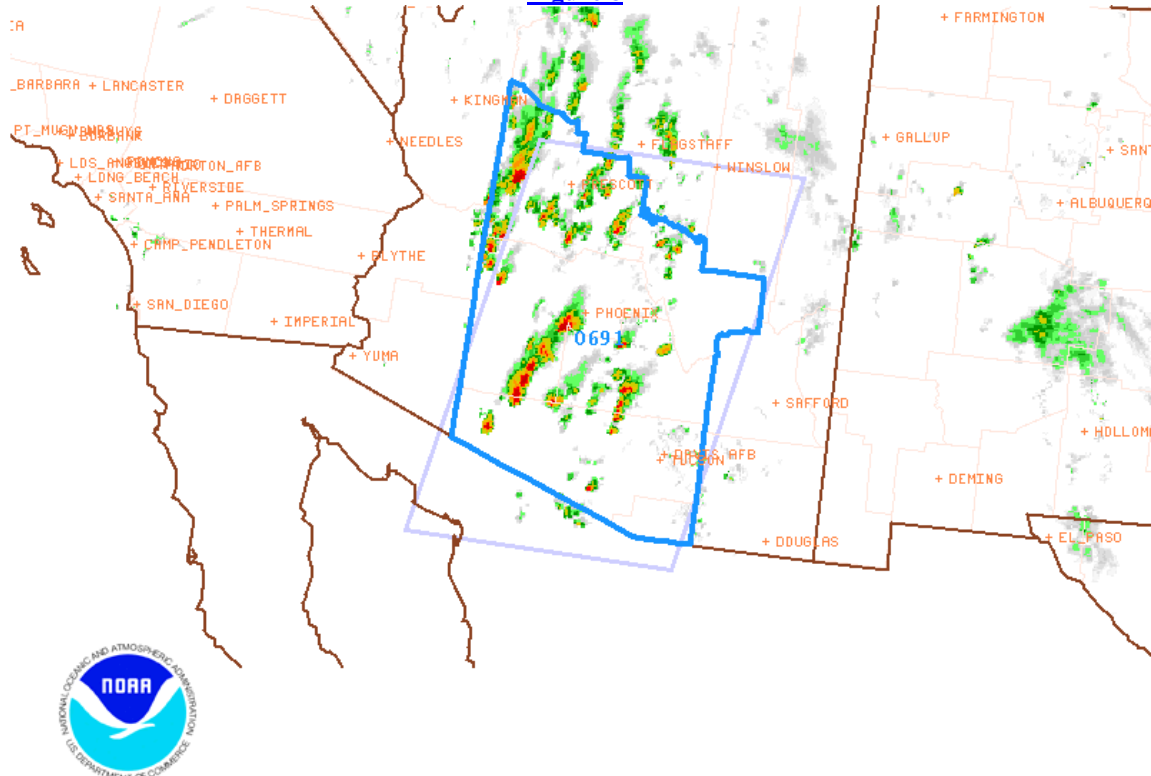
**Figure 6**



**Figure 7**



**Figure 8**



**Severe Thunderstorm Watch # 691 - Valid from 1155 AM until 700 PM MST**

NOAA/NWS/Storm Prediction Center

Updated: 20101005/1857 UTC

**Figure 9**

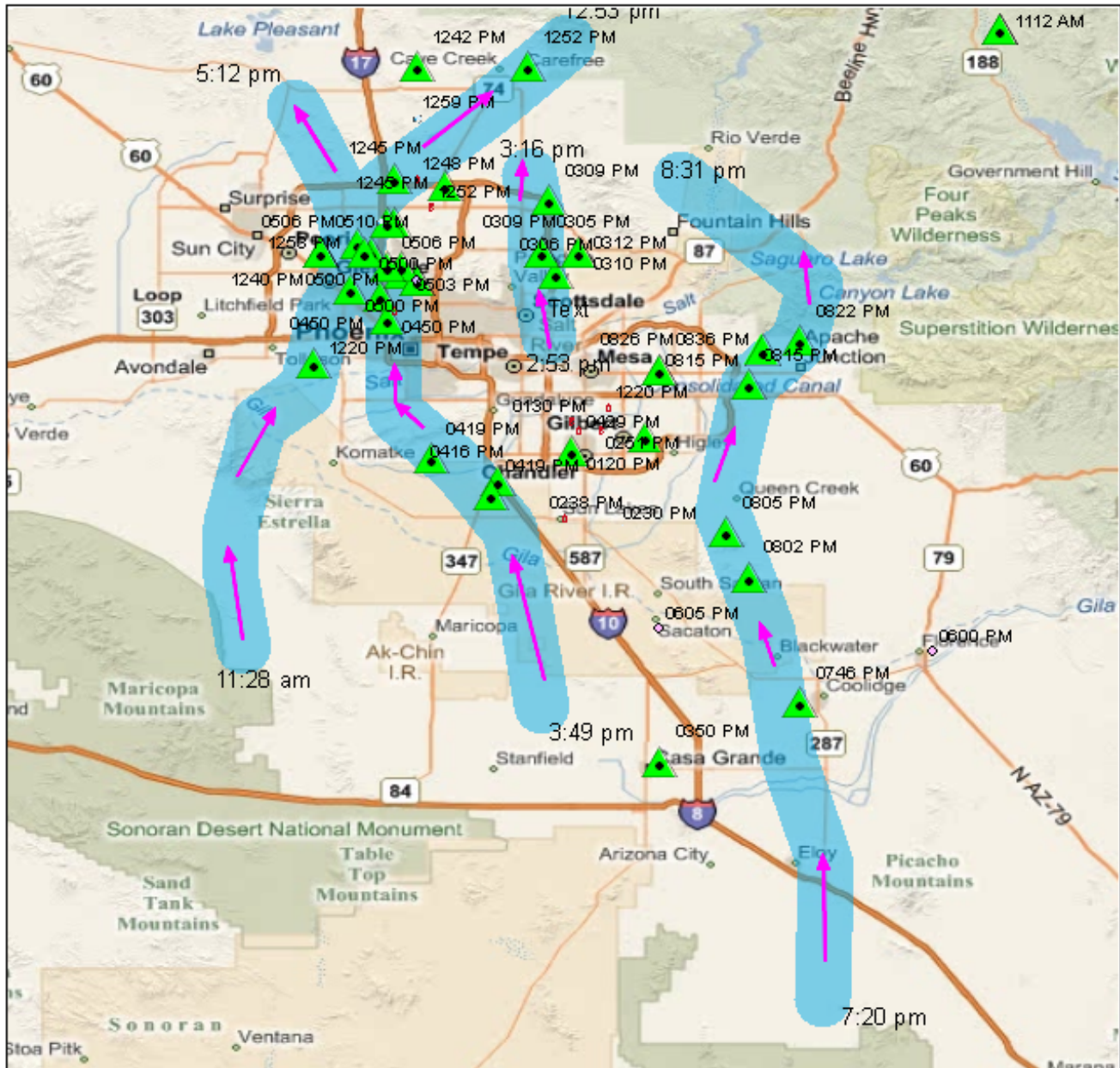
**Hail Reports 10/05/2010**

Time	Size	Location	County	State	Lat	Lon	Comments
1940	100	6 NNW PHOENIX	MARICOPA	AZ	3362	11210	1 INCH HAIL MEASURED (PSR)  HAIL OF 1.5 INCHES IN DIAMETER FELL IN CAVE CREEK NEAR DYNAMITE ROAD AND CAVE CREEK ROAD. HEAVY RAIN ALSO FELL WITH 0.90 INCHES IN 15 MINUTES BETWEEN 1255 PM AND 110 PM (PSR)
1955	150	8 WNW SCOTTSDALE	MARICOPA	AZ	3374	11199	(PSR)
2030	100	GILBERT	MARICOPA	AZ	3333	11176	(PSR)
2212	250	7 WSW FOUNTAIN HILLS	MARICOPA	AZ	3358	11185	(PSR)
2319	200	1 SSW FIREBIRD LAKE	MARICOPA	AZ	3325	11197	(PSR)
2350	175	3 WSW PHOENIX	MARICOPA	AZ	3352	11212	BETHANY AND CAMELBACK (PSR)
0002	250	5 N GLENDALE	MARICOPA	AZ	3365	11220	NWS OFFICE RCVD PHOTO OF MEASURED HAIL. CORRECTED DATE. (PSR)
0326	100	E MESA	MARICOPA	AZ	3342	11174	BROWN AND ELLSWORTH ROADS (PSR)



**Figure 10**

## Hail Swath Tracks and Spotter Reports October 5, 2010



Hail Swath Paths as deferred from radar imagery. Green triangle are actual spotter hail reports.

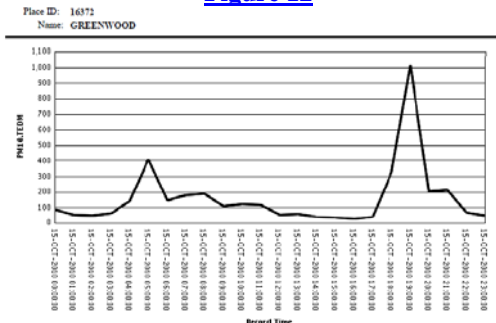
**Figure 11**

**Wind Reports 10/05/2010**

Time	Speed	Location	County	State	Lat	Lon	Comments
1920	UNK	4 NW GILBERT	MARICOPA	AZ	3337	11181	HIGH WIND WITH NICKEL SIZED HAIL CAUSED DAMAGE TO CARS ... TREES UP TO 18 IN DIAMETER DOWNED ... POWER POLE TILTED CLOSING GUADALUPE RD BETWEEN COOPER AND NEELY. (PSR)
1925	UNK	3 SSW PHOENIX	MARICOPA	AZ	3350	11210	TREES DOWN ON CARS, PEOPLE TRAPPED IN CARS (PSR)
1948	UNK	1 SE GLENDALE	MARICOPA	AZ	3357	11219	SMALL TREES AND BRANCHES DOWN (PSR)
1952	60	7 N PHOENIX	MARICOPA	AZ	3364	11205	DEBRIS FROM 1/2 INCH HAIL (PSR)
2012	75	4 N CHANDLER	MARICOPA	AZ	3335	11186	FENCE BLOWN OVER, MULBERRY TREE BLOWN OVER, PEA SIZE HAIL (PSR)
2024	UNK	4 N CHANDLER	MARICOPA	AZ	3336	11187	THIRTEEN POWER POLES KNOCKED DOWN ALONG THE WESTERN CANAL BETWEEN ALMA SCHOOL ROAD AND DOBSON ROAD IN MESA. THIS INCLUDES ONE STEEL POLE. NEARLY ALL OF THE DOWNED POLES (PSR)
2030	75	4 N CHANDLER	MARICOPA	AZ	3335	11186	FENCE BLOWN OVER, MULBERRY TREE BLOWN DOWN, PEA SIZE HAIL. CORRECTED TIME TO PREVIOUS LSR. (PSR)
2050	UNK	3 NNE CHANDLER	MARICOPA	AZ	3334	11185	12 INCH PLUS DIAMETER TREE UPROOTED, ESTIMATED LOCATION (PSR)
2138	UNK	5 S CHANDLER	MARICOPA	AZ	3322	11187	LARGE EUCALYPTUS TREE BLOWN DOWN (PSR)
2151	70	4 NE CHANDLER	MARICOPA	AZ	3334	11182	(PSR)

Third, despite this heavy rainfall event, a severe blowing dust episode occurred only 10 days later on the 15th in conjunction with a closed and cut-off upper level low that approached the area from central Baja. This feature produced another round of large convective clouds that produced outflow winds up to 46 mph in the Valley along with areas of visibility as low as 1/4 mile but no rainfall. A Dust Storm Warning was issued for parts of the metro area by the National Weather Service and one consequence was that PM-10 (coarse particle) levels exceeded the federal standard at the Greenwood monitoring site. Figure 12 below shows the PM-10 time series graph for this location:

**Figure 12**



The storm track remained active over the region thru about the 26th with rainfall reported locally each day from the 18th thru the 22nd. A rather stagnant weather pattern finally set up late in the month and by the 27th trapped airborne particles produced the scene shown in Figure 13 below. Surface-based radiation inversions between 6 and 8 degrees C occurred over the metro area between the 28th and 30th but mixing depths remained relatively high. Although 24-hour average PM-10 and PM-2.5 concentrations were quite low, high hourly readings did occur at some sites as seen in Figure 14. -Reith

**Figure 13**



**Figure 14**

