

# State of Arizona Exceptional Event Documentation for the Events of September 11-12, 2011, for the Phoenix PM<sub>10</sub> Nonattainment Area

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## EXECUTIVE SUMMARY

In 2005, Congress identified a need to account for events that result in exceedances of the National Ambient Air Quality Standards (NAAQS) that are exceptional in nature<sup>1</sup> (e.g., not expected to reoccur or caused by acts of nature beyond man-made controls). In response, EPA promulgated the Exceptional Events Rule (EER) to address exceptional events in 40 CFR Parts 50 and 51 on March 22, 2007 (72 FR 13560). On May 2, 2011, in an attempt to clarify this rule, EPA released draft guidance documents on the implementation of the EER to State, tribal and local air agencies for review. Based on numerous comments EPA received on the May 2011 draft, EPA issued a revised draft guidance document in June 2012. The EER allows for states and tribes to “flag” air quality monitoring data as an exceptional event and exclude those data from use in determinations with respect to exceedances or violations of the NAAQS, if EPA concurs with the demonstration submitted by the flagging agency.

Due to the arid nature of the state, Arizona is highly susceptible to windblown dust events. These events are often captured by various air quality monitoring equipment throughout the state, sometimes resulting in exceedances or violations of the PM10 NAAQS. In the past, the Arizona Department of Environmental Quality (ADEQ) has submitted exceptional event documentation for these events. Due in part to issues within the EER, obtaining concurrence on these events has been a difficult task. The ADEQ is now taking a new approach and focusing exceptional event documentation on events that are believed to be clear-cut exceptional events that are not controllable by human intervention, such as the dust events that frequently occurred during the monsoon season of 2011. This new approach was used for the exceptional event demonstration submitted in March 2012 by ADEQ for several PM10 events that occurred from July 2 – July 8, 2011, in the Phoenix region. In September 2012, EPA concurred that the July 2–8, 2011 events were indeed exceptional. As a result, this document is designed to follow the format used in the July 2–8, 2011 events submission.

This demonstration contains detailed information about the windblown dust events that affected the Phoenix PM10 nonattainment area on September 11 & 12, 2011. On September 11<sup>th</sup>, exceedances of the PM10 NAAQS occurred at four monitors, located at three monitoring sites, within the nonattainment area. On September 12<sup>th</sup>, three additional exceedances were measured at sites within the PM10 nonattainment area. One additional exceedance occurred on September 12<sup>th</sup> outside of the Phoenix PM10 nonattainment area at the Stanfield monitoring site in Pinal County, and additional documentation may be submitted as a separate package at a later time. ADEQ contends that the exceedances that were measured on September 11, 2011, and September 12, 2011, within the Phoenix PM10 nonattainment area, were the result of natural events that were not reasonably controllable or preventable. This assessment report of the September 11 & 12, 2011 dust events was a collaborative effort involving staff from Sierra Research, the Arizona Department of Environmental Quality, Maricopa Association of Governments, Maricopa County Air Quality Department, and Pinal County Air Quality Control District.

Section I of this assessment provides a summary of the exceptional event rules and requirements and lays out how those rules are met within this specific assessment.

Section II of this assessment introduces the conceptual model of the thunderstorm events that transpired on September 11 & 12, 2011, providing a background narrative of the exceptional events.

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<sup>1</sup> Section 319 of the Clean Air Act (CAA), as amended by section 6013 of the Safe Accountable Flexible Efficient-Transportation Equity Act: A Legacy for Users (SAFE-TEA-LU of 2005), required EPA to propose the Federal Exceptional Events Rule (EER) no later than March 1, 2006.

Section III of this assessment provides data summaries and time series graphs that help illustrate that the events of September 11 & 12, 2011, produced PM10 concentrations in excess of normal historical fluctuations.

Section IV of this assessment details the existing area control measures and demonstrates that despite the presence and enforcement of these controls, the events on September 11 & 12, 2011, were not reasonably controllable or preventable.

Section V of this assessment establishes a clear causal connection between the natural events of September 11 & 12, 2011, and the exceedances of the 24-hour PM10 standard at the monitoring stations. The evidence in this section (and the previous section on historical fluctuations) also confirms that the event in question both affected air quality and was the result of natural events.

Section VI of this assessment builds upon the demonstration showing a clear causal connection between the natural events and the exceedances and concludes there would have been no exceedances on September 11 & 12, 2011, but for the presence of the natural events.

Section VII contains conclusions that summarize the exceptional events that occurred on September 11 & 12, 2011, and relates the requirements in the EER to the information within this document.

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## **I. EXCEPTIONAL EVENT RULE (EER) REQUIREMENTS**

In addition to the technical requirements that are contained within the EER, procedural requirements must be met in order for EPA to concur with the flagged air quality monitoring data. This section of the report lays out the requirements of the EER and associated guidance, and discusses how the Arizona Department of Environmental Quality (ADEQ) addressed those requirements.

### **Procedural Requirements**

This section presents a review of the procedural requirements of the EER as required by 40 CFR 50.14 (*Treatment of Air Quality Monitoring Data Influenced by Exceptional Events*) and explains how ADEQ fulfills them. The Federal EER requirements include notifying the public that an event was occurring, placing informational flags on data in EPA's Air Quality System (AQS), notifying EPA of the intent to flag through submission of initial event description, documenting that the public comment process was followed, and submitting a demonstration supporting the exceptional events flag. ADEQ has addressed all of these procedural and documentation requirements.

#### ***Public notification that event was occurring (40 CFR 50.14(c)(1)(i))***

ADEQ issued a Dust Control Action Forecast and an Ensemble Forecast for the Greater Phoenix area for September 11 & 12, 2011, advising citizens of the general potential for high winds and blowing dust due to thunderstorms during the summer of 2011 and a slight chance for thunderstorms and moderate PM10 levels during the two-day period. More information on ADEQ's forecasting program can be found in Section IV. The forecast products that were issued for September 11 & 12, 2011, are included in Appendix B.

#### ***Place informational flag on data in AQS (40 CFR 50.14(c)(2)(ii))***

ADEQ and other operating agencies in Arizona submit data into EPA's AQS. Data from both filter-based and continuous monitors operated in Arizona are submitted to AQS.

When ADEQ and/or another agency operating monitors in Arizona suspects that data may be influenced by an exceptional event, ADEQ and/or the other operating agency expedites analysis of the filters collected from the potentially affected filter-based air monitoring instruments, quality assures the results, and submits the data into AQS. ADEQ and/or other operating agencies also submit data from continuous monitors into AQS after quality assurance is complete.

If ADEQ and/or the operating agency have determined a potential exists that the monitor reading has been influenced by an exceptional event, a preliminary flag is submitted for the measurement in the AQS. The data are not official until they undergo more thorough quality assurance and quality control, leading to certification by May 1 of the year following the calendar year in which the data were collected (40 CFR 58.15(a)(2)). The presence of the flag can be confirmed in AQS.

#### ***Notify EPA of intent to flag through submission of initial event description by July 1 of calendar year following event (40 CFR 50.14(c)(2)(iii))***

ADEQ submitted notice to EPA on August 29, 2012 listing all days from calendar year 2012 that ADEQ intends to analyze under the Exceptional Events Rule and notifying the EPA of which PM10 data were flagged in AQS. Exceedances that occurred on September 11 & 12, 2011, within the Phoenix PM10

nonattainment area were included on that list. This report serves as the demonstration supporting the flagging of these data.

On September 11, 2011, four monitors at three monitoring sites within the boundaries of the Phoenix PM10 nonattainment area exceeded the 24-hour PM10 standard during the high wind and blowing dust event that occurred during the late afternoon/evening hours. The PM10 monitors impacted were the JLG Supersite TEOM<sup>2</sup> and BAM<sup>3</sup> operated by the ADEQ and the North Phoenix and West Phoenix monitors operated by Maricopa County Air Quality Department (MCAQD) in the central/northern portion of the Phoenix metropolitan area.

On September 12, 2011, three monitoring sites within the boundaries of the Phoenix PM10 nonattainment area exceed the 24-hour PM10 standard during the high wind and blowing dust event that occurred during the evening hours. The PM10 monitors impacted were the Durango Complex, West 43<sup>rd</sup>, and West Phoenix monitors operated by the MCAQD on the south-central side of the Phoenix metropolitan area.

***Document that the public comment process was followed for event documentation (40 CFR 50.14(c)(3)(iv))***

ADEQ posted this assessment report on the ADEQ webpage and placed a hardcopy of the report in the ADEQ Records Management Center for public review. ADEQ will open a 30-day public comment period on January 14, 2013. A copy of the public notice certification, along with any comments received, will be submitted to EPA, consistent with the requirements of 40 CFR 50.14(c)(3)(iv). See Appendix D for a copy of the affidavit of public notice.

***Submit demonstration supporting exceptional event flag (40 CFR 50.14(a)(1-2))***

At the close of the comment period, and after ADEQ has had the opportunity to consider any comments submitted on this document, ADEQ will submit this document, the comments received, and ADEQ's responses to those comments to EPA Region IX headquarters in San Francisco, California. The deadline for the submittal of this demonstration package is September 30, 2014.

**Documentation Requirements**

Section 50.14(c)(3)(iii) of the EER states that in order to justify excluding air quality monitoring data, evidence must be provided for the following elements:

- a. The event satisfies the criteria set forth in 40 CFR 501(j) that:
  - (1) the event affected air quality,
  - (2) the event was not reasonably controllable or preventable, and
  - (3) the event was caused by human activity unlikely to recur in a particular location or was a natural event;
- b. There is a clear causal relationship between the measurement under consideration and the event;
- c. The event is associated with a measured concentration in excess of normal historical fluctuations;  
and
- d. There would have been no exceedance or violation but for the event.

Section II of this assessment introduces the conceptual model of the high wind events that transpired on September 11 & 12, 2011, providing a background narrative of the exceptional events and an overall

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<sup>2</sup> TEOM is an acronym for a Tapered Element Oscillating Monitoring system.

<sup>3</sup> BAM is an acronym for a Beta Attenuation Monitoring System.

explanation on how “the event affected air quality” on each day. Further evidence that “the event affected air quality” is provided in Section V for each day. Sections II and V also provide evidence that the events were natural events.

Section III of this assessment provides data summaries and time series graphs that help illustrate that the events on September 11 & 12, 2011, produced PM10 concentrations in excess of normal historical fluctuations.

Section IV of this assessment details the existing area control measures and demonstrates that despite the presence and enforcement of these controls, the events on September 11 & 12, 2011, were not reasonably controllable or preventable.

Section V of this assessment establishes a clear causal connection between the natural events of September 11 & 12, 2011 and the exceedances of the 24-hour PM10 standard at the monitoring stations. The evidence in this section (and the previous section on historical fluctuations) also confirms that the events in question both affected air quality and were the result of natural events.

Section VI of this assessment builds upon the demonstration showing a clear causal connection between the natural events and the exceedances and concludes there would have been no exceedances on September 11 & 12, 2011, but for the presence of the natural events.

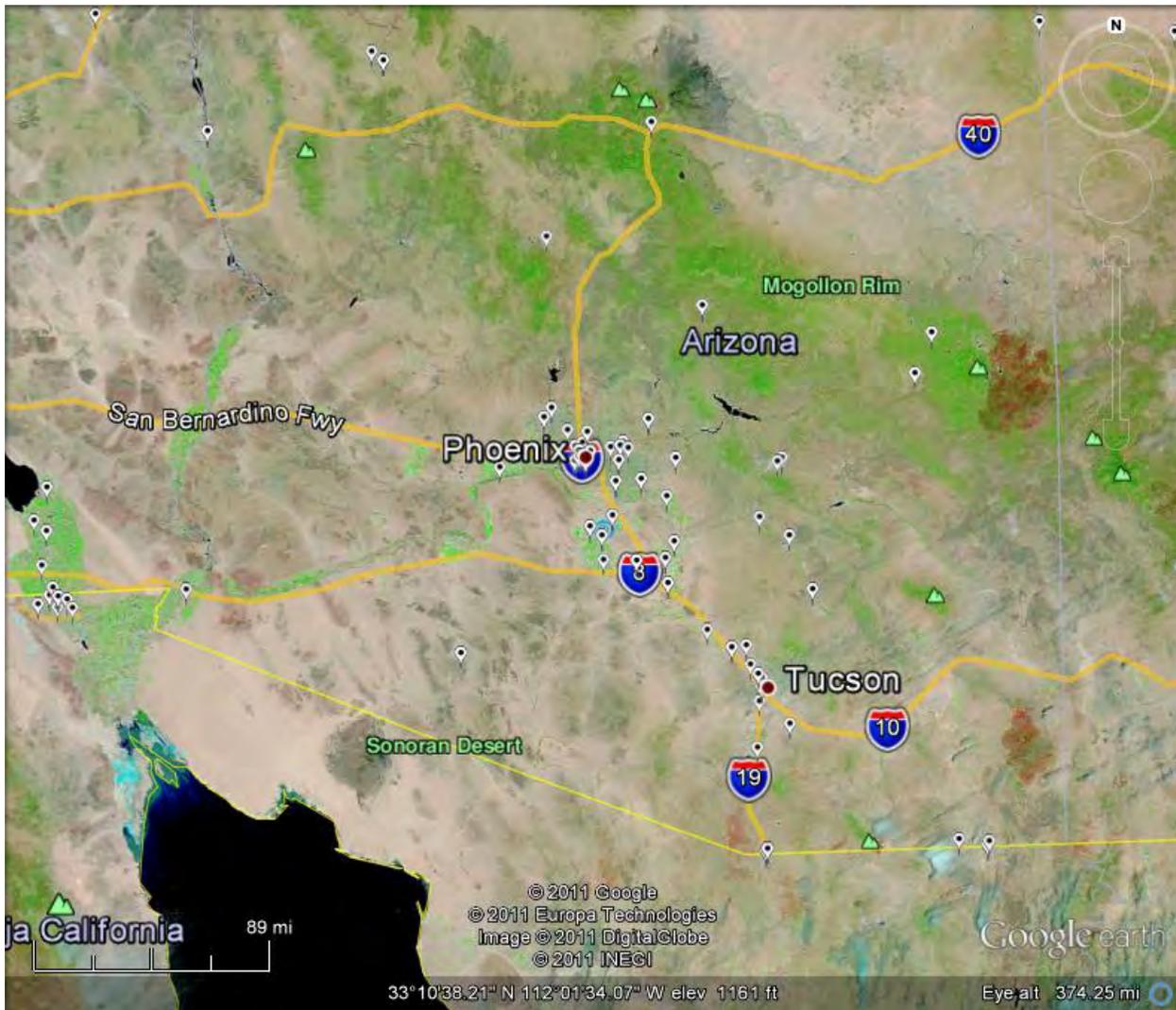
## II. CONCEPTUAL MODEL

### Geographic Setting and Climate

This section describes the geographic and climatic setting of the monitors.

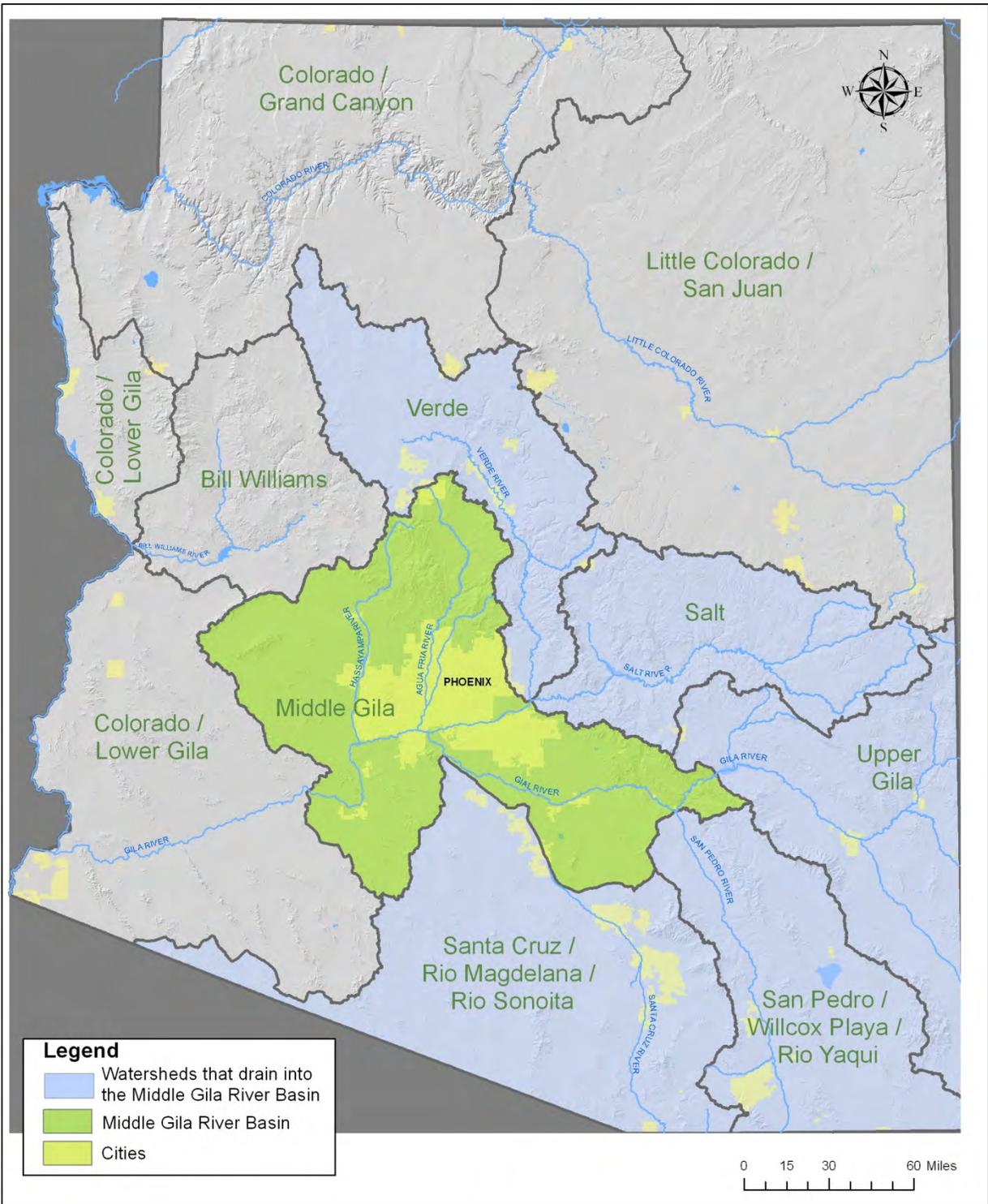
#### *Geographic Setting of Monitors*

Phoenix is located in the Salt River Valley in south-central Arizona. It lies at a mean elevation of 1,090 feet above mean sea level (msl) in the northeastern part of the Sonoran Desert. Other than the mountains in and around the city, the topography of Phoenix is generally flat. The Phoenix area is surrounded by the McDowell Mountains (~4,200 ft msl) to the northeast, the foothills of the Bradshaw (~7,900 ft msl) and Mazataal (~7,900 ft msl) ranges to the north, the White Tank Mountains (~4,500 ft msl) to the west, the Sierra Estrella (~4,450 ft msl) to the southwest, and the Superstition Mountains (~5,000 ft msl) far to the east. Within the City are the Phoenix Mountains (~2,600 ft msl) and South Mountain (~2,600 ft msl). Current development is pushing north, west, and south into Pinal County. The Phoenix metropolitan area contains a fairly dense network of PM10 monitors throughout the area, with a much less dense network of monitors located throughout the rest of the state. Figure 2-1 shows the general geographic setting of Phoenix, as well as the locations of PM10 monitors throughout the state. It should be noted that some of the monitors shown in Figure 2-1 are filter-based monitors; therefore, monitoring data from all locations may be available only for select days (i.e., 1-in-6 run days).



**Figure 2-1.** Phoenix Geographic Setting and PM10 Monitor Locations (source: EPA AQS DataMart, NASA MODIS Satellite, Google Earth). PM10 monitor locations are indicated by the white markers.

Figure 2-2 depicts the drainage systems or watersheds for the State of Arizona. Many of the rivers that form Arizona’s drainage system are dry for most of the year and, consequently, are sources of silt and fine soils that become suspended and add to regional PM10 loadings during high wind events. Much of this alluvial matter and fine soil is deposited in the low lying areas of central and southern Arizona, with larger depositional areas focused in and around the confluences of dry river channels.



**Map 2**  
**Drainage System Phoenix, Arizona**



Author: N. Caroli, March 15, 2010

**Figure 2-2.** Drainage System of Phoenix, Arizona.

### Climate

Phoenix has an arid climate, with very hot summers and temperate winters. The average summer high temperature is among the hottest of any populated area in the United States. The temperature reaches or exceeds 100°F an average of 110 days during the year and highs top 110°F an average of 18 days during the year. Phoenix receives an average of 7.66 inches of rain per year.

As shown in Figure 2-3, precipitation is sparse during the first part of the summer, but the influx of monsoonal moisture, which generally begins in early July and lasts until mid-September, raises humidity levels and can cause heavy localized precipitation and flooding. Although thunderstorms are possible at any time of the year, they are most common during the monsoon season from July to mid-September as humid air is advected from the Gulf of California, Gulf of Mexico, and large thunderstorm complexes that form over the Sierra Madre Occidental Mountains in Mexico. This influx of moisture, combined with intense solar heating, often creates a very unstable environment that is ripe for thunderstorm development. These thunderstorms can bring strong winds and blowing dust, large hail, and heavy rain. Dust storms associated with these thunderstorms typically occur in the early part of the monsoon season (July/August) before soaking rains help keep soil particles bound to one another. However, depending on the amount of precipitation received during the monsoon season, extremely hot temperatures act to dry out the surface quickly, and dust storms can occur at any time. During the December through March period, winter storms moving inland from the Pacific Ocean can produce significant rains throughout Arizona. This December–March time period and the July–August time period are typically the wettest parts of the year. Meanwhile, a distinct dry season occurs from April through June for the Phoenix area and the rest of Arizona. While these weather patterns describe the general climatology for the Phoenix area over a long period of time, Phoenix and the entire state of Arizona are also prone to a high degree of variability in these weather patterns from year to year.

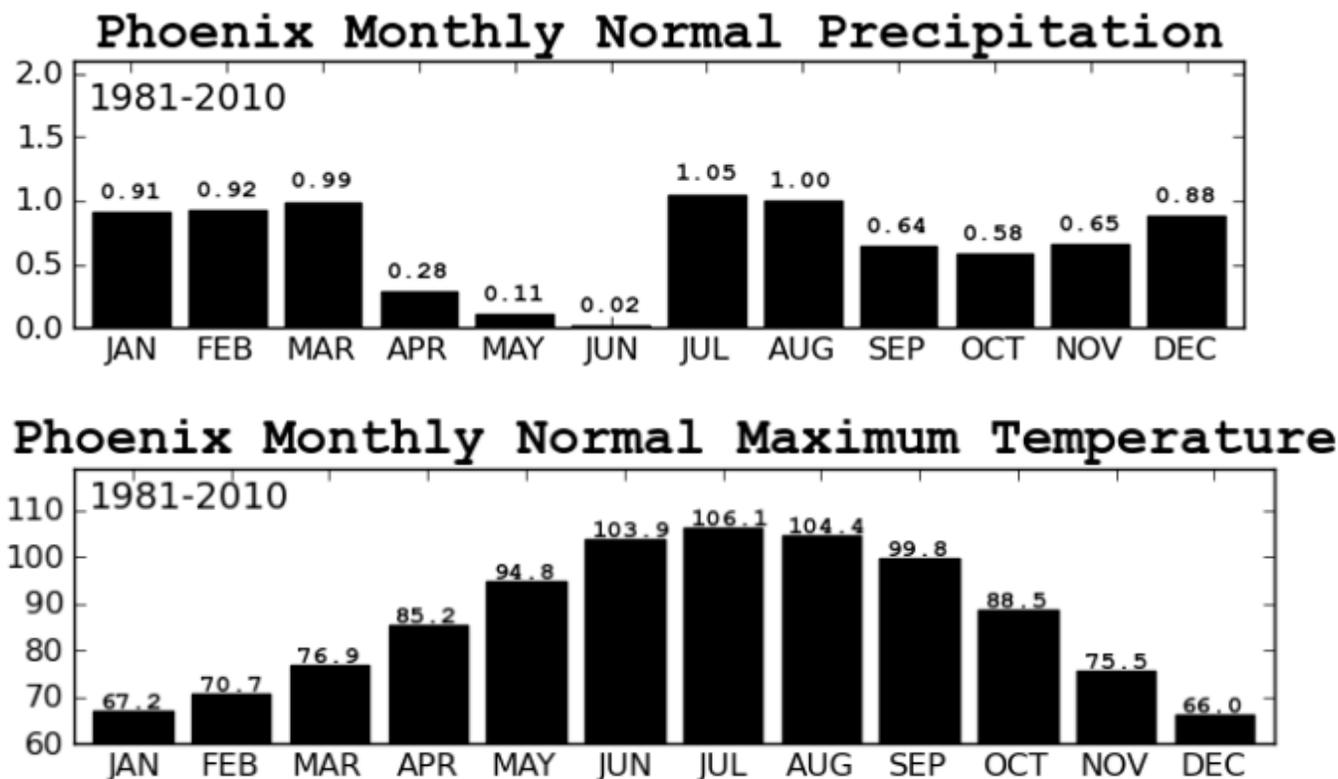


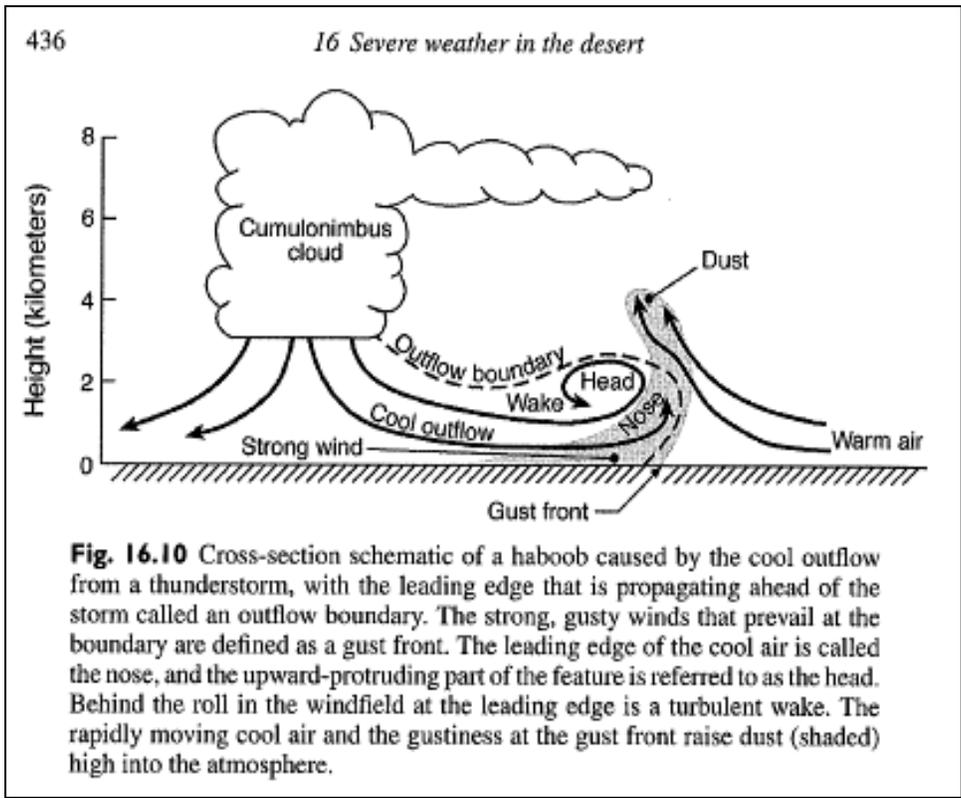
Figure 2-3. Phoenix Monthly Precipitation (top) and Maximum Temperature (bottom) Climatology (source: National Weather Service)

## **Monsoon Season Description and Event Summary**

A multi-day period, including the event days of September 11 & 12, 2011, was characterized by monsoonal thunderstorm activity throughout Arizona. The North American Monsoon is a shift in wind patterns in the summer that occurs as Mexico and the southwest U.S. warm under intense solar heating. As this happens, low level moisture is transported primarily from the Gulf of California and eastern Pacific Ocean into the southwestern U.S. The Gulf of California, a narrow body of water surrounded by mountains, is particularly important for low-level moisture transport into Arizona and Sonora. Mid- and upper-level moisture is also transported into the region, mainly from the Gulf of Mexico by easterly winds aloft. This combination causes a distinct rainy season over large portions of western North America, which develops rather quickly and sometimes dramatically. Rainfall during the monsoon is not continuous and varies considerably, depending on a variety of factors. There are usually distinct “burst” periods of heavy rain during the monsoon, and “break” periods with little or no rain. Even during active monsoon periods, some areas can go without receiving any significant precipitation while other nearby areas experience heavy rains and flooding.

The thunderstorm activity in Arizona on September 11 & 12 was active in and around the desert areas of central and southern Arizona and northern Mexico. These thunderstorms did not result in much precipitation for the Phoenix area, but many of the storms were severe in nature and caused many dust-carrying outflow boundaries. Two of these boundaries were large and dense and propagated into the Phoenix area in the late afternoon on September 11<sup>th</sup> and again on the evening on September 12<sup>th</sup>. Downdrafts associated with heavy precipitation from thunderstorms or from collapsing thunderstorms can end up producing what are called downbursts, or sometimes more concentrated and severe microbursts, which are rapidly descending bursts of air that come through the thunderstorms. These downward bursts of air hit the ground and then disperse away from the storms as areas of outflow. These outflow boundaries from the thunderstorms can kick up large areas of dust, sometimes called haboobs, and transport that dust for long distances from the initiating thunderstorms (see Figure 2-4).

The active monsoon occurring on September 11<sup>th</sup> and 12<sup>th</sup> led to numerous thunderstorms and thunderstorm outflows that produced blowing dust in many parts of Arizona, including the Phoenix Metropolitan area. The windblown dust event produced four PM10 exceedances in the Phoenix PM10 nonattainment area on September 11<sup>th</sup> and three exceedances on September 12<sup>th</sup>. The events were primarily driven by strong outflows from severe thunderstorms producing wind gusts from one prominent direction. The September 11<sup>th</sup> and 12<sup>th</sup> events were widespread dust events with mostly south-southeasterly winds transporting dust from the desert areas of northern Pinal County on the 11<sup>th</sup> and central Pinal County on the 12<sup>th</sup> into the Phoenix PM10 nonattainment area. Further details on the events can be found in Section V.



**Figure 2-4.** Cross-section of a thunderstorm creating an outflow boundary and haboob (Source: Desert Meteorology. Thomas T. Warner. 2004.)

The nature of these monsoonal dust events is such that specific source areas are difficult to determine, as outflow from thunderstorms can carry dust over vast distances encompassing many source areas. Because of this, it is more appropriate to speak of general source regions for these monsoonal dust storms, which typically are identified based upon the locations of the thunderstorms that are believed to have created the dust generating and carrying outflow winds. The majority of the PM<sub>10</sub> impacting the Phoenix area from thunderstorm-driven high winds on September 11 & 12, 2011, originated outside of the Phoenix PM<sub>10</sub> nonattainment area. The contributing source regions to the dust event were somewhat widespread, but a large portion of the PM that was transported into Maricopa County likely came from areas within Pinal County to the south and southeast of Maricopa County. The exact origin of the PM sources is often difficult to determine due to the less dense monitoring networks in the general source area.

Another important factor that led to these significant dust storms was the on-going drought across the region. The most recent U.S. Drought Monitor placed the area between Tucson and Phoenix, the primary dust source region for winds out of the southeast, in D1 (Moderate) to D3 (Extreme) drought (see Figure 2-5). Rainfall in Phoenix since October 1, 2010, had been 57% of normal, and only 47% of normal since January 1, 2011 (see the Daily Climate Report for September 11 and 12 in Appendix D). For additional information pertaining to the 2011 monsoon season in Arizona, see the news media web links provided below.

*2011 Monsoon Season Summary and Review* → <http://bcove.me/krh3qk29>

This video contains information about the monsoon season, the formation of dust storms in Arizona, and the uniqueness of the 2011 monsoon season.

This video contains information about the 2011 monsoon season, focusing on the large number of dust storms that occurred, and a discussion of why there were so many dust storms in 2011.

The abnormally dry conditions that were in place during the early part of the monsoon season (which persisted throughout the duration of the monsoon season) resulted in a large fetch of soils that were vulnerable to particulate suspension. The thunderstorm outflow boundaries that affected Maricopa and Pinal counties on September 11<sup>th</sup> and 12<sup>th</sup> resulted in very little rainfall throughout south-central Arizona, but the high winds associated with the outflows did transport moderate to very high levels of particulate concentrations into the Phoenix area. A timeline summarizing the September 11 & 12 events can be seen in Figure 2-6. This figure shows hourly PM10 concentrations for a four-day period around, and including, the event days. During the 24 hours prior to the events, there were low PM10 concentrations across the Phoenix region for much of the day, but late afternoon thunderstorms produced outflows and moderate to strong winds that caused a one hour spike in PM10 concentrations around 8 p.m., but the spike was not high enough, nor did PM10 concentrations remain elevated long enough, at any monitoring sites to cause an exceedance of the 24-hour standard. On September 11<sup>th</sup>, the first event day, the figure shows low PM10 concentrations through the early afternoon hours and then high PM10 concentrations during the 6-7 p.m. hours when the primary thunderstorm outflow traveled through the Phoenix area. On September 12<sup>th</sup>, the second event day, PM10 concentrations at a few sites remained high during the very early morning hours from the dust event on the 11<sup>th</sup>, but all sites had low PM10 concentrations during the middle of the day. During the evening hours, moderate winds due to various thunderstorms around central Arizona transported moderately high PM10 concentrations into the region ahead of the main outflow boundary which blew through the Phoenix region around 8 p.m. Lastly, the figure shows that PM10 concentrations dropped back down to low levels during the 24 hours after the events, indicating that without the impacts of the thunderstorm outflows, PM10 concentrations at all sites in the Phoenix PM10 nonattainment area on September 11 & 12, 2011, would have been below the 24-hour average PM10 exceedance threshold of 150  $\mu\text{g}/\text{m}^3$ .

Following Figure 2-6, Tables 2-1 and 2-2 detail the PM10 24-hour average concentrations, the daily maximum hourly concentrations and the time at which they occurred, and the flag given to the data in EPA's AQS for all PM10 monitoring sites in Arizona for the two event days.

## **Conclusions**

This Conceptual Model was created to provide a basic description of the general climate and weather patterns that led to the active thunderstorm period on September 11 & 12, 2011, and produced the dust storms and a total of seven PM10 exceedances in the Phoenix PM10 nonattainment area during the two-day event period. A more detailed analysis of the windblown dust events is included in Section V, where a demonstration of the clear causal connection between the uncontrollable natural events and PM10 exceedances is presented.

# U.S. Drought Monitor

September 13, 2011  
Valid 8 a.m. EDT

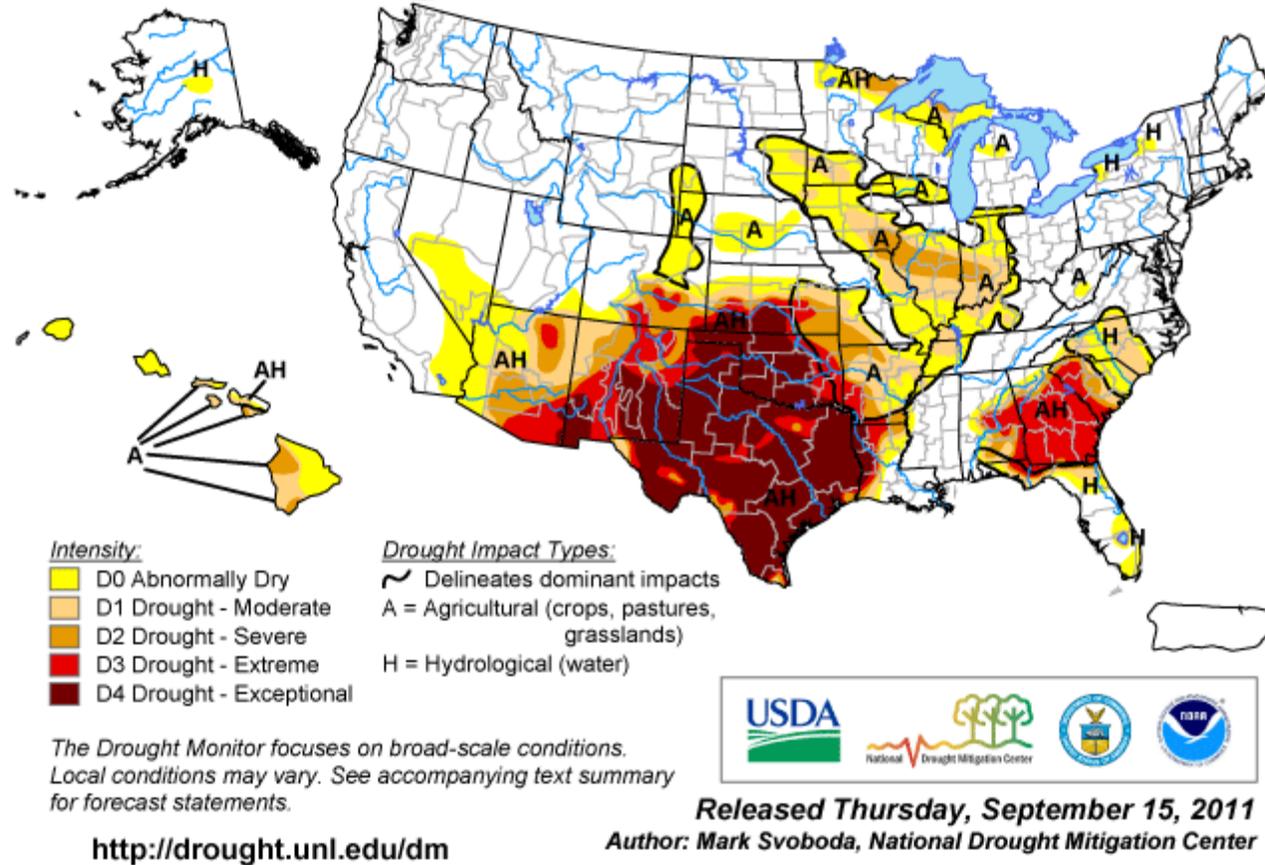
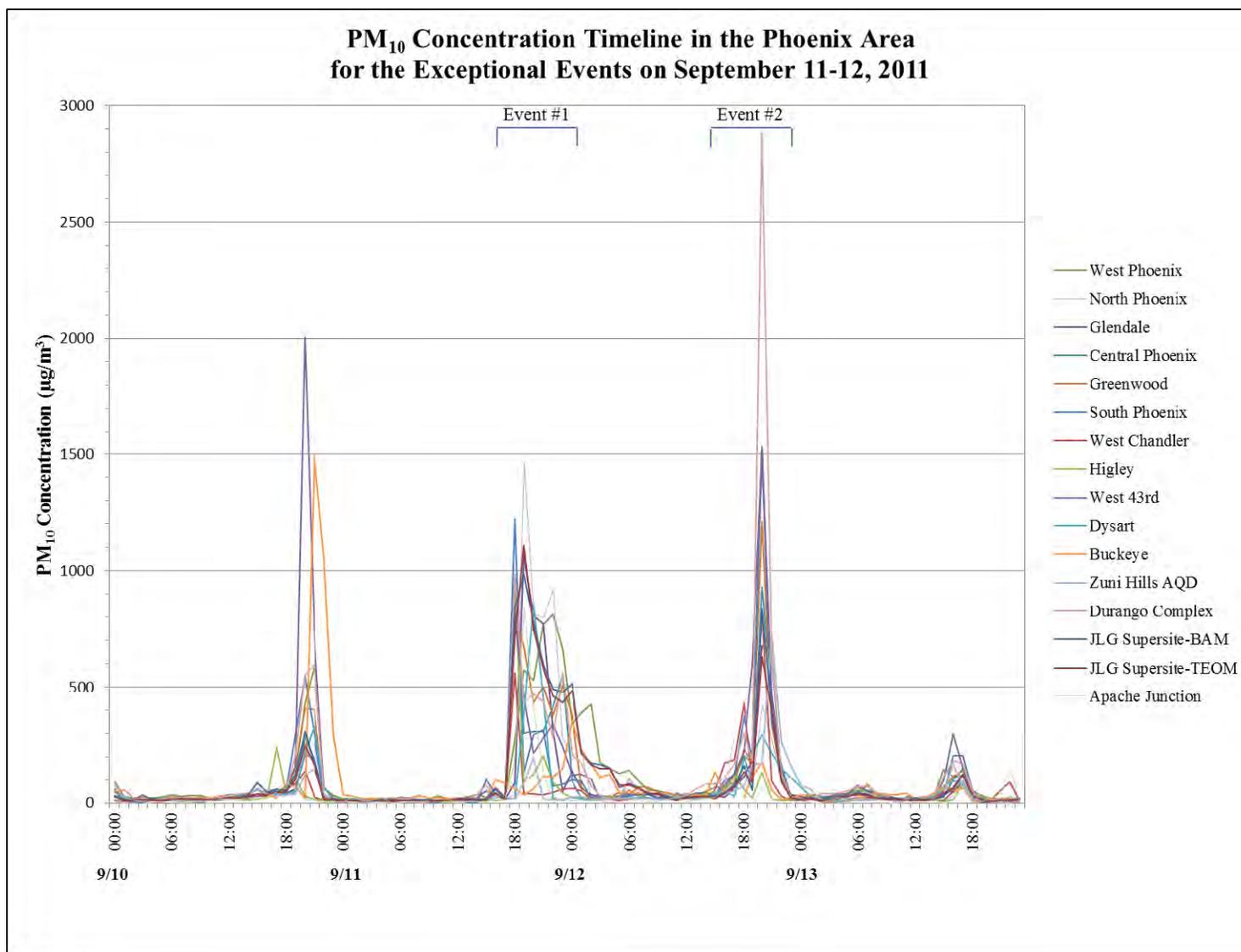


Figure 2-5. U.S. Drought Monitor analysis released during the time period of the exceedances described in this report.



**Figure 2-6.** Timeline of PM<sub>10</sub> concentrations at Phoenix-area monitors during a four-day period including the September 11 & 12, 2011 events.

September 11, 2011

**Table 2-1. Summary of Statewide PM10 Measurements for September 11, 2011.**

Monitor	Monitor Type	Operator	AQS Monitor ID	24-hr Avg PM10 (µg/m <sup>3</sup> )	1-hr Max PM10 (µg/m <sup>3</sup> )	Max Time	AQS Qualifier Flag
<b>Apache County</b>							
N/A	TEOM	WMAT	04-001-1003-81102-1	8	23	0600	
<b>Coconino County</b>							
N/A	TEOM	NN	04-005-1237-81102-1	13	29	2000	
<b>Gila County</b>							
Hayden Old Jail	TEOM	ADEQ	04-007-1001-81102-3	13	43	1600	
<b>Maricopa County</b>							
Buckeye	TEOM	MC	04-013-4011-81102-1	44	150	2300	
Central Phoenix	TEOM	MC	04-013-3002-81102-4	129	980	1800	
Durango Complex	TEOM	MC	04-013-9812-81102-1	145	980	1800	
Dysart	TEOM	MC	04-013-4010-81102-1	82	852	2000	
Fort McDowell/Yuma Frank	TEOM	FMIR	04-013-5100-81102-1	76	N/A	N/A	
Glendale	TEOM	MC	04-013-2001-81102-1	138	1066	1900	
Greenwood	TEOM	MC	04-013-3010-81102-1	148	815	1800	
Higley	TEOM	MC	04-013-4006-81102-1	69	932	1800	
JLG Supersite	BAM	ADEQ	04-013-9997-81102-3	185	985	1900	RJ, EH
JLG Supersite	TEOM	ADEQ	04-013-9997-81102-4	178	1108	1900	RJ
North Phoenix	FRM	MC	04-013-1004-81102-1	184	N/A	N/A	RJ
North Phoenix	BAM	MC	04-013-1004-81102-2	183	1462	1900	RJ
South Phoenix	TEOM	MC	04-013-4003-81102-1	100	1223	1800	
West Chandler	TEOM	MC	04-013-4004-81102-1	42	559	1800	
West Forty Third	TEOM	MC	04-013-4009-81102-1	110	797	1800	
West Phoenix	TEOM	MC	04-013-0019-81102-1	168	814	2200	RJ
Zuni Hills	TEOM	MC	04-013-4016-81102-1	23	193	2000	
<b>Navajo County</b>							
N/A	TEOM	WMAT	04-017-1002-81102-1	8	52	1700	
<b>Pima County</b>							
Ajo	TEOM	ADEQ	04-019-0001-81102-3	21	58	1800	
Geronimo	BAM	PCDEQ	04-019-1113-81102-1	16	56	2000	
Green Valley	BAM	PCDEQ	04-019-1030-81102-1	9	20	1800	
Orange Grove	FRM	PCDEQ	04-019-0011-81102-2	11	N/A	N/A	
Rillito	TEOM	ADEQ	04-019-0020-81102-3	13	32	1800	
South Tucson	FRM	PCDEQ	04-019-1001-81102-1	13	N/A	N/A	
<b>Pinal County</b>							
Apache Junction Fire Stn.	TEOM	PCAQCD	04-021-3002-81102-3	74	841	1900	
Casa Grande Downtown	TEOM	PCAQCD	04-021-0001-81102-3	28	183	1900	
Combs School	TEOM	PCAQCD	04-021-3009-81102-3	33	301	1900	
Cowtown	TEOM	PCAQCD	04-021-3013-81102-3	63	447	1700	
Maricopa	TEOM	PCAQCD	04-021-3010-81102-3	N/A	N/A	N/A	
Pinal County Housing	TEOM	PCAQCD	04-021-3011-81102-3	32	113	2100	
Stanfield	TEOM	PCAQCD	04-021-3008-81102-3	47	464	1700	
<b>Santa Cruz County</b>							
Nogales Post Office	BAM	ADEQ	04-023-0004-81102-3	20	79	2200	
<b>Yuma County</b>							
Yuma Supersite	TEOM	ADEQ	04-027-8011-81102-3	49	167	0600	

Operator Abbreviations:

MC – Maricopa County Air Quality Department  
 PCAQCD – Pinal County Air Quality Control District  
 ADEQ – Arizona Department of Environmental Quality  
 FMIR – Fort McDowell Indian Reservation  
 FMMI – Freeport McMoran Inc  
 NN – Navajo Nation, AZ, NM, UT  
 PCDEQ – Pima County Department of Environmental Quality  
 SRP-MIC – Salt River Pima-Maricopa Indian Community of Salt River Reservation, AZ  
 WMAT – White Mountain Apache Tribe of Fort Apache Reservation, AZ

September 12, 2011

Table 2-2. Summary of Statewide PM10 Measurements for September 12, 2011.

Monitor	Monitor Type	Operator	AQS Monitor ID	24-hr Avg PM10 (µg/m <sup>3</sup> )	1-hr Max PM10 (µg/m <sup>3</sup> )	Max Time	AQS Qualifier Flag
<b>Apache County</b>							
N/A	TEOM	WMAT	04-001-1003-81102-1	7	19	1900	
<b>Cochise County</b>							
Douglas Red Cross	FRM	ADEQ	04-003-1005-81102-1	13	N/A	N/A	
Paul Spur Chemical Lime Plant	FRM	ADEQ	04-003-0011-81102-1	9	N/A	N/A	
Paul Spur Chemical Lime Plant	FRM	ADEQ	04-003-0011-81102-2	9	N/A	N/A	
<b>Coconino County</b>							
Flagstaff Middle School	FRM	ADEQ	04-005-1008-81102-1	7	N/A	N/A	
N/A	TEOM	NN	04-005-1237-81102-1	15	36	1500	
<b>Gila County</b>							
Hayden Old Jail	TEOM	ADEQ	04-007-1001-81102-3	22	77	1700	
Payson Well Site	FRM	ADEQ	04-007-0008-81102-1	8	N/A	N/A	
Payson Well Site	FRM	ADEQ	04-007-0008-81102-2	N/A	N/A	N/A	
Miami Ridgeline	FEM	FMMI	04-007-0009-81102-1	10	N/A	N/A	IT
Miami Golf Course	FEM	FMMI	04-007-8000-81102-1	10	N/A	N/A	IT
Miami Golf Course	FEM	FMMI	04-007-8000-81102-2	11	N/A	N/A	IT
<b>Maricopa County</b>							
Buckeye	TEOM	MC	04-013-4011-81102-1	83	355	0000	
Central Phoenix	TEOM	MC	04-013-3002-81102-4	102	928	2000	
Durango Complex	TEOM	MC	04-013-9812-81102-1	229	2881	2000	RJ
Dysart	TEOM	MC	04-013-4010-81102-1	66	292	2000	
Fort McDowell/Yuma Frank	TEOM	FMIR	04-013-5100-81102-1	N/A	N/A	N/A	
Glendale	TEOM	MC	04-013-2001-81102-1	101	679	2000	
Greenwood	TEOM	MC	04-013-3010-81102-1	133	1211	2000	
High School Air Monitoring Station	FRM	SRP-MIC	04-013-7024-81102-1	72	N/A	N/A	
Higley	TEOM	MC	04-013-4006-81102-1	36	131	2000	
JLG Supersite	BAM	ADEQ	04-013-9997-81102-3	140	832	2000	IJ
JLG Supersite	TEOM	ADEQ	04-013-9997-81102-4	127	631	2000	IJ
Lehi Air Monitoring Station	FRM	SRP-MIC	04-013-7022-81102-1	45	N/A	N/A	
Mesa	FRM	MC	04-013-1003-81102-1	75	N/A	N/A	
North Phoenix	FRM	MC	04-013-1004-81102-1	70	N/A	N/A	
North Phoenix	BAM	MC	04-013-1004-81102-2	85	419	2000	
Senior Center Air Monitoring Station	FRM	SRP-MIC	04-013-7020-81102-1	73	N/A	N/A	
Senior Center Air Monitoring Station	FRM	SRP-MIC	04-013-7020-81102-2	73	N/A	N/A	
South Phoenix	TEOM	MC	04-013-4003-81102-1	154	1522	2000	
South Scottsdale	FRM	MC	04-013-3003-81102-1	48	N/A	N/A	
West Chandler	TEOM	MC	04-013-4004-81102-1	93	827	2000	
West Forty Third	TEOM	MC	04-013-4009-81102-1	161	1513	2000	RJ
West Phoenix	TEOM	MC	04-013-0019-81102-1	200	1535	2000	RJ
Zuni Hills	TEOM	MC	04-013-4016-81102-1	81	729	2100	
<b>Mohave County</b>							
Bullhead City ADEQ	FRM	ADEQ	04-015-1003-81102-1	14	N/A	N/A	
<b>Navajo County</b>							
N/A	TEOM	WMAT	04-017-1002-81102-1	7	17	2100	
<b>Pima County</b>							
Ajo	TEOM	ADEQ	04-019-0001-81102-3	77	1034	1800	IJ
Corona de Tucson	FRM	PCDEQ	04-019-0008-81102-1	8	N/A	N/A	
Geronimo	BAM	PCDEQ	04-019-1113-81102-1	17	76	1700	
Green Valley	BAM	PCDEQ	04-019-1030-81102-1	11	25	1600	
Orange Grove	FRM	PCDEQ	04-019-0011-81102-2	16	N/A	N/A	
Prince Road	FRM	PCDEQ	04-019-1009-81102-1	15	N/A	N/A	
Rillito	TEOM	ADEQ	04-019-0020-81102-3	70	194	1200	IJ

Monitor	Monitor Type	Operator	AQS Monitor ID	24-hr Avg PM10 (µg/m <sup>3</sup> )	1-hr Max PM10 (µg/m <sup>3</sup> )	Max Time	AQS Qualifier Flag
Santa Clara	FRM	PCDEQ	04-019-1026-81102-1	11	N/A	N/A	
South Tucson	FRM	PCDEQ	04-019-1001-81102-1	13	N/A	N/A	
Tangerine	FRM	PCDEQ	04-019-1018-81102-1	13	N/A	N/A	
<b>Pinal County</b>							
Apache Junction Fire Stn.	FRM	PCAQCD	04-021-3002-81102-1	10	N/A	N/A	
Apache Junction Fire Stn.	TEOM	PCAQCD	04-021-3002-81102-3	26	275	1700	
Casa Grande Downtown	TEOM	PCAQCD	04-021-0001-81102-3	80	1179	1500	
Combs School	TEOM	PCAQCD	04-021-3009-81102-3	44	165	165	
Coolidge	FRM	PCAQCD	04-021-3004-81102-1	33	N/A	N/A	
Cowtown	FRM	PCAQCD	04-021-3013-81102-1	40	N/A	N/A	
Cowtown	TEOM	PCAQCD	04-021-3013-81102-3	N/A	613	1900	
Eloy	FRM	PCAQCD	04-021-3014-81102-1	31	N/A	N/A	
Maricopa	TEOM	PCAQCD	04-021-3010-81102-3	N/A	243	1900	
Pinal Air Park	N/A	PCAQCD	04-021-3007-81102-1	14	N/A	N/A	
Pinal County Housing	FRM	PCAQCD	04-021-3011-81102-1	43	N/A	N/A	
Pinal County Housing	FRM	PCAQCD	04-021-3011-81102-2	56	N/A	N/A	
Pinal County Housing	TEOM	PCAQCD	04-021-3011-81102-3	124	1420	1500	
Stanfield	TEOM	PCAQCD	04-021-3008-81102-3	174	2676	1500	RJ
N/A	FRM	PCAQCD	04-021-7004-81102-1	39	N/A	N/A	
N/A	FRM	PCAQCD	04-021-7004-81102-2	33	N/A	N/A	
<b>Santa Cruz County</b>							
Nogales Post Office	FRM	ADEQ	04-023-0004-81102-1	13	N/A	N/A	
Nogales Post Office	BAM	ADEQ	04-023-0004-81102-3	18	34	0100	
<b>Yavapai County</b>							
Prescott Valley	FRM	ADEQ	04-025-2002-81102-1	N/A	N/A	N/A	
<b>Yuma County</b>							
Yuma Supersite	TEOM	ADEQ	04-027-8011-81102-3	84	1383	1600	IJ

Operator Abbreviations:

- MC – Maricopa County Air Quality Department
- PCAQCD – Pinal County Air Quality Control District
- ADEQ – Arizona Department of Environmental Quality
- FMIR – Fort McDowell Indian Reservation
- FMMI – Freeport McMoran Inc
- NN – Navajo Nation, AZ, NM, UT
- PCDEQ – Pima County Department of Environmental Quality
- SRP-MIC – Salt River Pima-Maricopa Indian Community of Salt River Reservation, AZ
- WMAT – White Mountain Apache Tribe of Fort Apache Reservation, AZ

### III. HISTORICAL FLUCTUATIONS

The PM10 concentrations measured across much of Maricopa County on September 11 & 12, 2011, along with most of the other exceedance days in the summer of 2011, were some of the highest hourly and 24-hour averages measured over the last five years. Time series plots of the 24-hour PM10 concentrations for the period January 1, 2007, through December 31, 2011, were created for all PM10 monitors in the Phoenix PM10 nonattainment area. Additionally, time series plots of the daily maximum hourly average PM10 concentrations were created for two monitors in Maricopa County. These two additional plots were created to provide a deeper understanding of the magnitude of short-term particulate concentrations and their contribution to PM10 exceedances in the Phoenix PM10 nonattainment area. Time series plots for two monitoring sites (West Phoenix and Durango) are included within this section, while the remaining 24-hour average plots are available in Appendix A. The West Phoenix monitor was selected because of its central location in relation to the monitors in Maricopa County that exceeded the 24-hour PM10 standard on September 11<sup>th</sup> and it was the most severely impacted site during the windblown-dust event on that day. Similarly, the Durango monitor was selected because it was the most severely impacted site during the September 12<sup>th</sup> windblown-dust event. The graphs below and in Appendix A show that prior to the numerous windblown-dust events of 2011, the September 11 & 12 events would have been in the top ten most extreme events of the last five years for multiple sites.

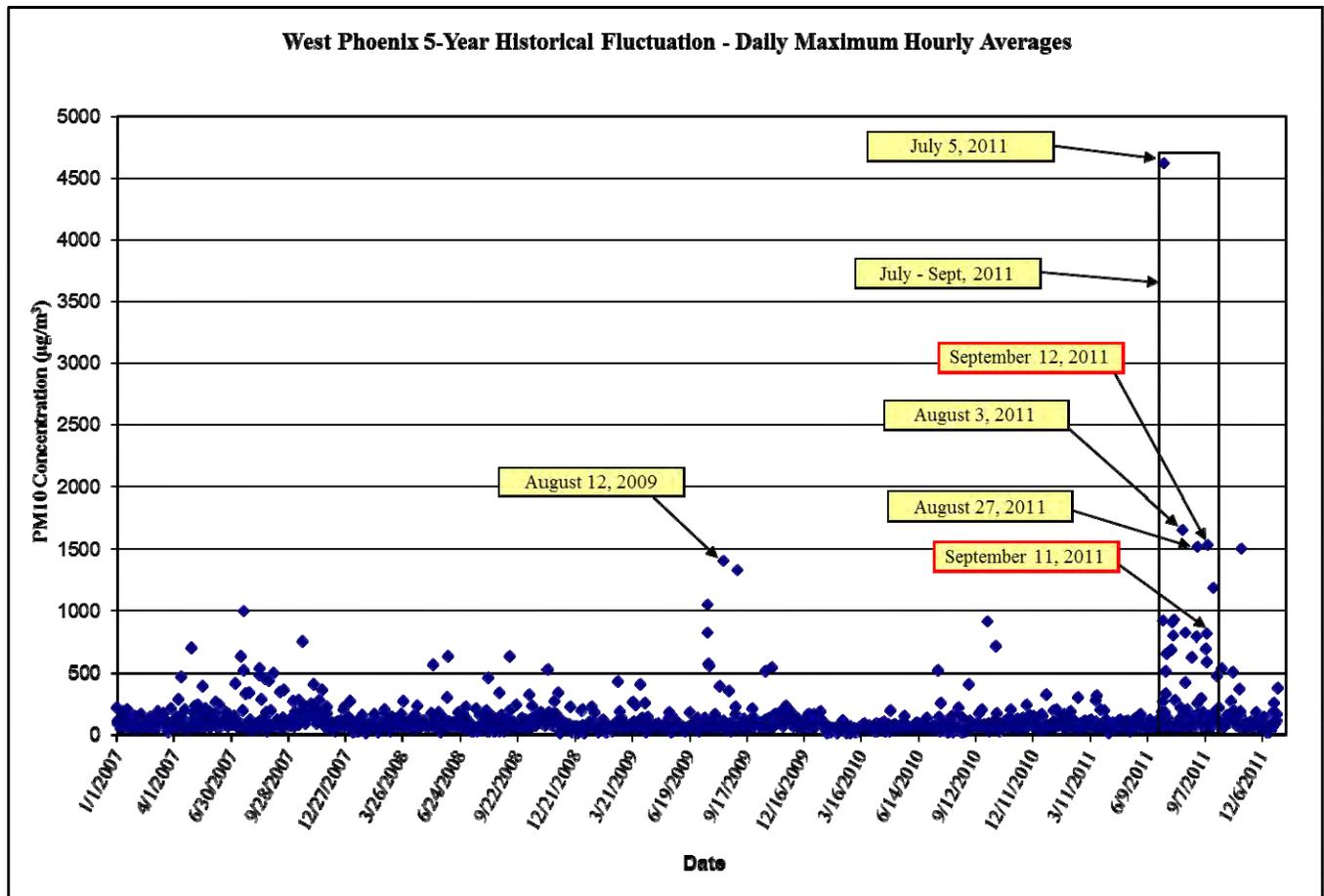
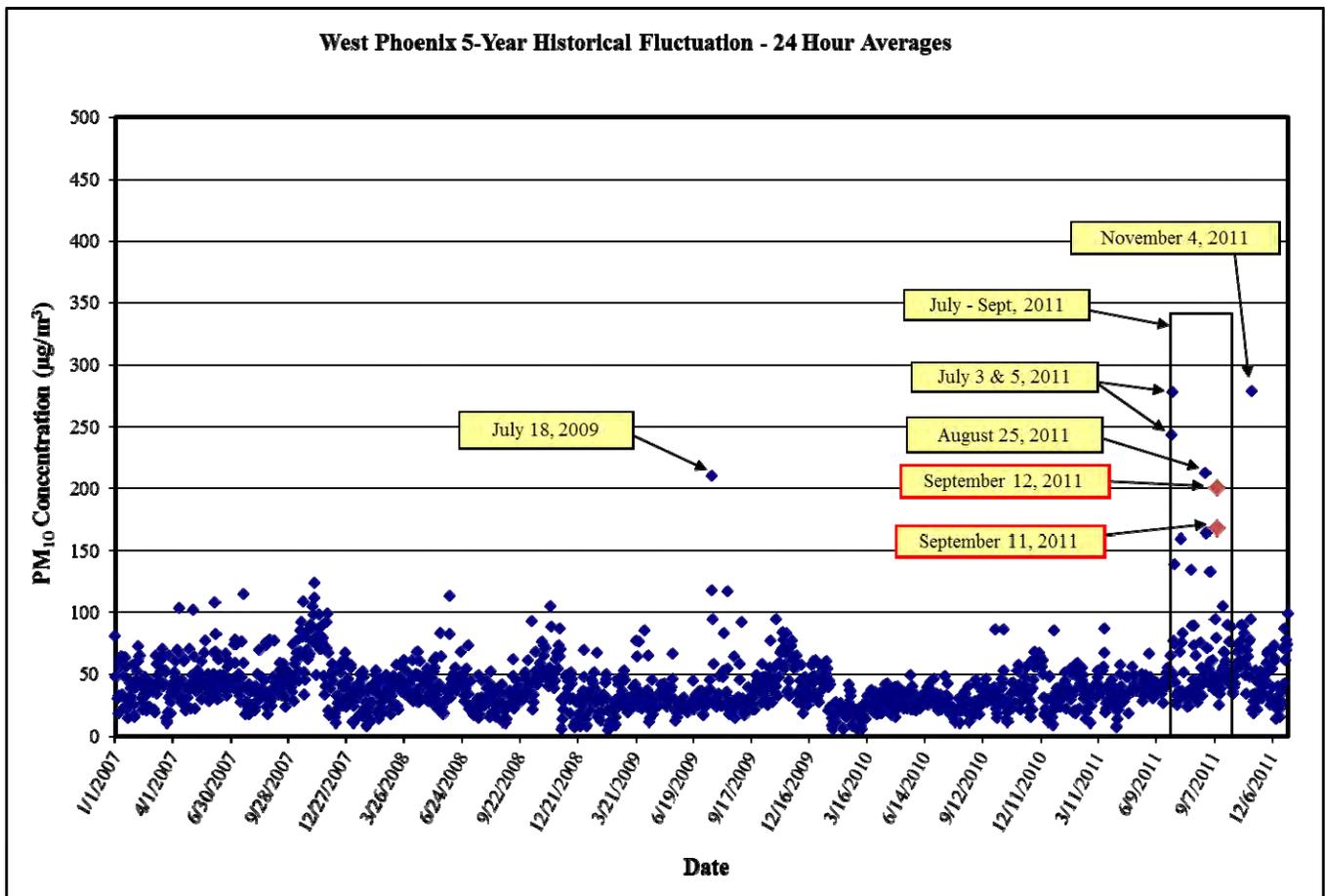


Figure 3-1. Plot of daily maximum hourly average PM10 concentrations (2007 – 2011) at the West Phoenix monitoring site.

Figure 3-1 shows the daily maximum hourly averages from the West Phoenix PM10 monitor. The plot shows that the hourly average PM10 concentrations from the September 11 event were surpassed only by four dust storms that occurred in 2009 and 2010 and eight days in July, August, and November 2011, which was one of the most severe monsoon seasons on record. The plot also shows that the September 12<sup>th</sup> hourly average of 1535  $\mu\text{g}/\text{m}^3$  was the third highest hourly PM10 concentration recorded in the last five years and was greater than that observed during the July 3, 2011, haboob event which recently received EPA concurrence.

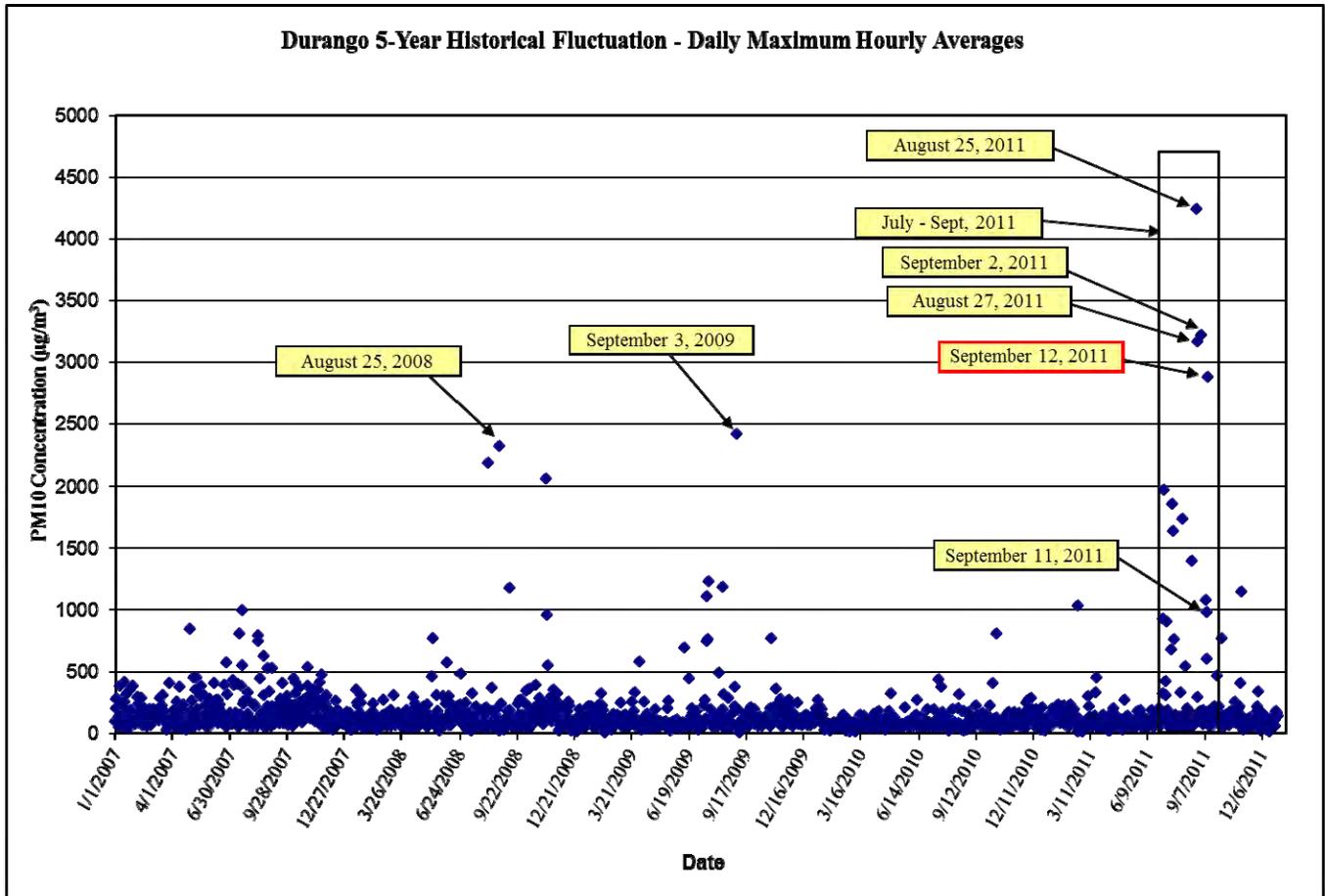
Figure 3-2 shows the daily 24-hour averages from the West Phoenix PM10 monitor and indicates that the September 11<sup>th</sup> and 12<sup>th</sup> events produced the sixth and seventh highest 24-hour average PM10 concentrations, respectively, measured in the last five years. Similar to haboob events that occurred in July 2009 and during the first week of July 2011, the last week of August 2011 and on November 4, 2011, the September 11 & 12 events experienced PM10 concentrations that were well above the 24-hour exceedance threshold.



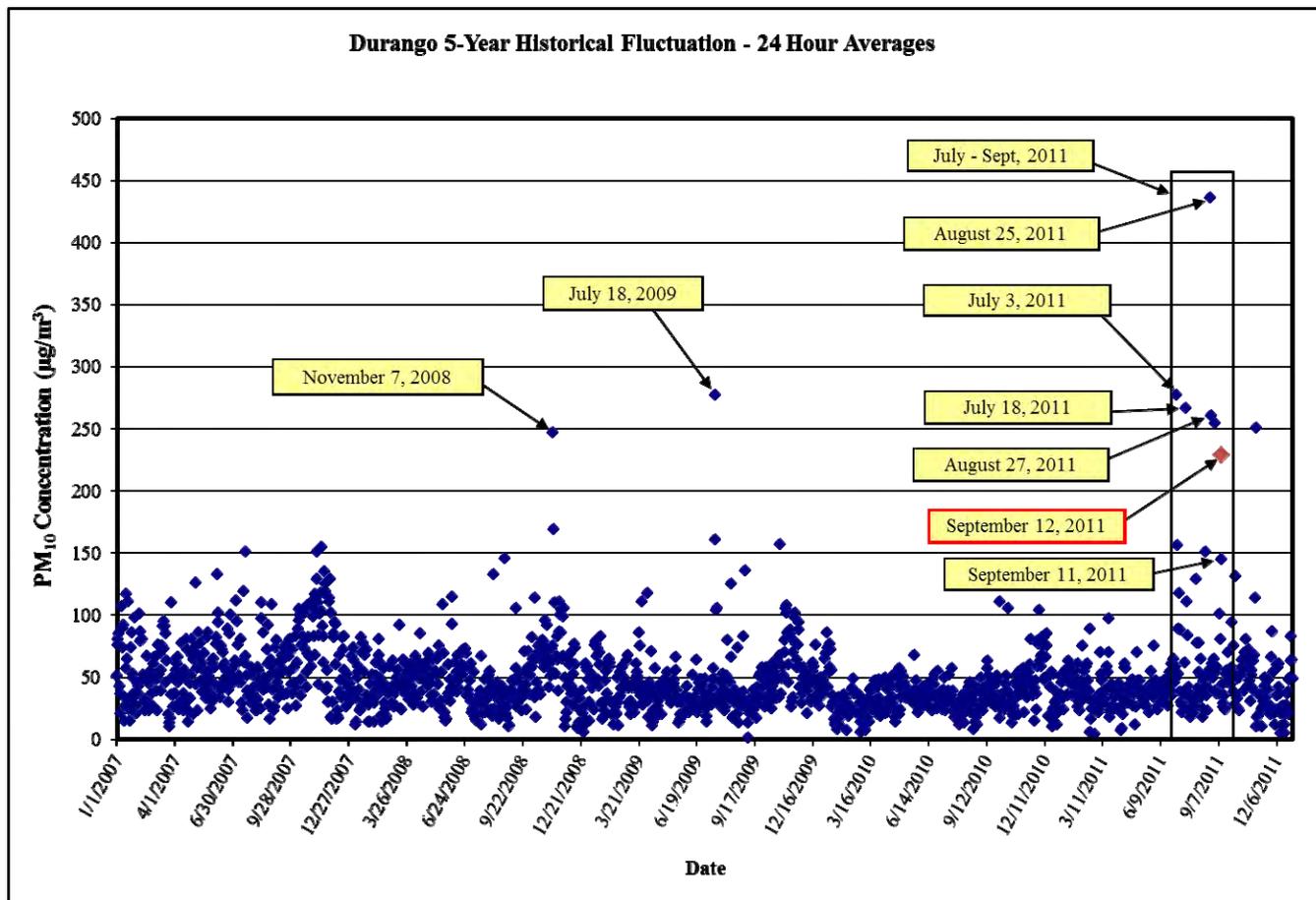
**Figure 3-2.** Plot of 24-hour average PM10 concentrations (2007 – 2011) at the West Phoenix monitoring site.

Figures 3-3 and 3-4 provide an historical look at the daily maximum hourly averages and daily 24-hour averaged PM10 concentrations from the Durango monitor. The plots also show that the maximum hourly concentration (2881  $\mu\text{g}/\text{m}^3$ ) and exceedance (229  $\mu\text{g}/\text{m}^3$ ) measured at the Durango monitor on the second event day, September 12, were the fourth highest 1-hour and ninth highest 24-hour average PM10 concentrations, respectively, measured over the last five years. As was the case for the West Phoenix

monitor, the most significant hourly average PM10 concentrations at the Durango monitor typically occur during the July through September time frame, a period during which the monsoon season is most active and the Phoenix region is frequently impacted by haboob events, and that the entire summer of 2011 was an extreme period relative to the previous 4 years.



**Figure 3-3.** Plot of daily maximum hourly average PM10 concentrations (2007 – 2011) at the Durango monitoring site.



**Figure 3-4.** Plot of 24-hour average PM10 concentrations (2007 – 2011) at the Durango monitoring site.

### Conclusions

The plots within this section provide an historical perspective of PM10 concentrations since 2007. These plots, along with those in Appendix A, show that the haboob events that occurred on September 11 & 12, 2011, resulted in one of the top ten highest 24-hour average PM10 concentrations seen in the last five years at the West Phoenix, Durango, North Phoenix, and JLG Supersite monitoring sites. This equates to PM10 concentrations in the 99.5<sup>th</sup> percentile when compared to historic data. While some of the PM10 concentrations measured on September 11<sup>th</sup> and 12<sup>th</sup> were extreme, the plots also show that similar events are not uncommon during the monsoon season. As documented in several published journals and academic text books, haboobs generated from thunderstorm outflow boundaries are a phenomenon that Arizona deals with every year, some years more so than others, namely in 2007, 2009, and 2011.

## **IV. NOT REASONABLY CONTROLLABLE OR PREVENTABLE**

Section 50.1(j) of Title 40 CFR Part 50 requires that an event must be “not reasonably controllable or preventable” in order to be defined as an exceptional event. This requirement is met by demonstrating that despite reasonable control measures in place within Maricopa County and the Phoenix PM10 nonattainment area, high wind conditions overwhelmed all reasonably available controls. The events occurring on September 11 & 12, 2011, were the direct result of strong and gusty winds generated by thunderstorm outflow boundaries. The strong winds overwhelmed all reasonably available controls, and were also responsible for transporting PM into the Phoenix PM10 nonattainment area from areas outside of the nonattainment area. As explained in the conceptual model, downdrafts from collapsing thunderstorms produce outflow boundaries that contain gusty, turbulent wakes that raise dust from the desert surfaces that can be as wide as 100 miles in severe cases. As shown in Section V, the source region for all of the dominant thunderstorm outflows and associated transported dust on September 11 & 12, 2011, generally came from areas outside of the Phoenix PM10 nonattainment area—primarily from the deserts of Pinal County. While it is likely that some dust was generated within the PM10 nonattainment area as gusts from the thunderstorm outflows passed through the southern portion of the area, the amount of dust generated locally was easily overwhelmed by, and largely unnoticeable as compared to, the dust transported in from the source regions of the thunderstorm outflows. Strict controls on local sources of fugitive dust were in place and enforced on September 11 & 12, 2011, but were not capable of controlling transported dust and PM10 raised by the gusty and turbulent thunderstorm outflows on these dates.

The following sections describe the BACM- and MSM-level PM10 control measures in place on September 11 & 12, 2011, and the robustness of the programs designed to enforce these measures. Proactive response and analysis of each event as it occurred verified the uncontrollable nature of each event, while inspections of local sources performed before, during, and after the September 11 & 12, 2011, events confirmed that no unusual anthropogenic PM10-producing activities occurred in Maricopa County, the Phoenix PM10 nonattainment area, or the local areas surrounding the exceeding monitors.

### **Regulatory Measures and Control Programs**

ADEQ and MCAQD are responsible for implementing regulatory measures to control emissions from agricultural sources, stationary sources, fugitive dust sources, and open burning within Maricopa County. Three major programs provide or contribute to air pollution control measures for the Greater Phoenix area:

1. ADEQ’s Agricultural Best Management Program (AgBMP);
2. Maricopa County’s Inspection and Compliance Program; and
3. ADEQ’s Air Quality Forecasting Program.

Specifically, ADEQ is responsible for compliance assistance and enforcement of Agricultural Best Management Practices developed by the Governor’s Agricultural Best Management Practices Committee, while MCAQD is responsible for compliance assurance for all other significant sources of PM10 emissions. In addition to routine inspections and inspections driven by complaints, inspections are often increased when (1) ADEQ forecasters issue a High Risk for the Maricopa County Dust Control Forecast, (2) ADEQ forecasters issue a High Pollution Advisory, or (3) near-real-time monitoring data indicate unique activity via high PM concentrations. The forecasting program and inspection/compliance programs work together so that resources can be best utilized during days that are of greatest risk for elevated PM emissions.

On July 25, 2002, EPA took initial action to finalize approval of the Best Available Control Measure (BACM) and the Most Stringent Measure (MSM) demonstrations in the Serious Area PM10 plan for the Maricopa County portion of the metropolitan Phoenix PM10 nonattainment area (67 FR 48718). These BACM and MSM demonstrations were again approved by EPA on July 14, 2006 (71 FR 43979). The Agricultural Best Management Practices General Permit rule and related definitions have been approved into the Arizona Administrative Code as R18-2-610 and R18-2-611 pursuant to Arizona Revised Statutes § 49-457.<sup>4</sup> Maricopa County regulations of PM10 emissions are listed in Table 4-1.

**Table 4-1. Rules and Ordinances Regulating Particulate Matter Emissions in Maricopa County**

<b>Rule/Ordinance Number &amp; Title</b>	<b>Description</b>
<b>Rule 300:</b> Visible Emissions	Establishes standards for visible emissions and opacity.
<b>Rule 310:</b> Fugitive Dust from Dust-Generating Operations	Establishes limits for the emissions of particulate matter into the ambient air from any property, operations, or activity that may serve as a fugitive dust source
<b>Rule 310.01:</b> Fugitive Dust from Non-Traditional Sources of Fugitive Dust	Establishes limits for the emissions of particulate matter into the ambient air from open areas, vacant lots, unpaved parking lots, and unpaved roadways that are not regulated by Rule 310 and that are not required to have either a permit or a dust control plan
<b>Rule 311:</b> Particulate Matter from Process Industries	Establishes emission rates based on process weight applicable to any affected operations not subject to Rule 316.
<b>Rule 312:</b> Abrasive Blasting	Establishes limits for particulate emissions from abrasive blasting operations
<b>Rule 314:</b> Open Outdoor Fires and Indoor Fireplaces at Commercial and Institutional Establishments	Establishes limits for the emissions of air contaminants produced from open burning
<b>Rule 316:</b> Nonmetallic Mineral Processing	Establishes limits for the emissions of particulate matter into the ambient air from any nonmetallic mining operation or rock product processing plant
<b>Rule 317:</b> Hospital/Medical/ Infectious Waste Incinerators	Establishes limits for the emissions of air pollutants from medical waste incinerators
<b>Rule 322:</b> Power Plant Operations	Establishes limits for the emissions of nitrogen oxides, sulfur oxides, carbon monoxide and particulate matter from existing power plants and cogeneration plants
<b>Rule 323:</b> Fuel Burning Equipment from Industrial/Commercial/ Institutional (ICI) Sources	Establishes limits for the emissions of nitrogen oxides, sulfur oxides, carbon monoxide and particulate matter from ICI sources

<sup>4</sup> Updates to the AgBMP program in December, 2011, clarified BMPs for crop and added BMPs for animal operations. Effective 12/29/2011, R18-2-611 was renumbered to R18-2-610.01 **Agricultural PM10 General Permit for Crop Operations** and R18-2-611.01 **Animal Operations PM10 General Permit** was added. Definitions for Crop Operations were revised at R18-2-610, and new definitions for Animal Operations were added at R18-2-611.

<b>Rule/Ordinance Number &amp; Title</b>	<b>Description</b>
<b>Rule 324:</b> Stationary Internal Combustion (IC) Engines	Establishes limits for the emissions of carbon monoxide, nitrogen oxides, sulfur oxides, volatile organic compounds, and particulate matter from stationary internal combustion engines, including stationary IC engines used in cogeneration
<b>Rule 325:</b> Brick and Structural Clay Products (BSCP) Manufacturing	Establishes limits for particulate matter emissions from the use of tunnel kilns for curing in the brick and structural clay product (BSCP) manufacturing processes
<b>Ordinance P-25:</b> Leaf Blower Restriction	Establishes restrictions for leaf blowers in incorporated and unincorporated sections of Area A in Maricopa County
<b>Ordinance P-26:</b> Residential Woodburning Restriction	Establishes restrictions for residential woodburning
<b>Ordinance P-27:</b> Vehicle Parking and Use on Unstabilized Vacant Lots	Establishes restrictions for vehicle parking and use on unstabilized vacant lots in unincorporated sections of Area A in Maricopa County
<b>Ordinance P-28:</b> Off-Road Vehicle Use in Unincorporated Areas of Maricopa County	Establishes restrictions for operating vehicles on unpaved property in unincorporated areas of Maricopa County
<b>Arizona Administrative Code R18-2-611 &amp; 610:</b> Agricultural PM10 General permit	Establishes a requirement for commercial farmers to implement best management practices and maintain a record demonstrating compliance

In addition to the rules and regulations listed in Table 4-1, other PM10 reducing control measures (e.g., paving of unpaved roads, PM10 certified street sweepers, controlling unpaved parking lots, etc.) have been committed to, and implemented by, local jurisdictions throughout the PM10 nonattainment area, and incorporated into the Arizona SIP through PM10 plans such as the Revised MAG 1999 Serious Area Particulate Plan for PM10 for the Maricopa County Nonattainment Area. The Pinal County Air Quality Control District (PACQCD) also implements regulatory control measures on emissions from existing and new non-point sources within Pinal County (see Table 4-2). Additionally, the PACQCD implements specific nonattainment rules for that part of the Phoenix PM10 nonattainment area that resides in Pinal County (see Table 4-3).

**Table 4-2. Pinal County Rules Regulating Existing and New Non-point Sources in Pinal County**

<b>Article Number &amp; Title</b>	<b>Description</b>
<b>Chapter 4, Article 2:</b> Fugitive Dust	Provides a mechanism to reasonably regulate operations which periodically may cause fugitive dust emissions into the atmosphere
<b>Chapter 4, Article 3:</b> Construction Sites – Fugitive Dust	Improves the control of excessive fugitive dust emissions that have been traditionally associated with construction, earthwork, and land development, and thereby minimize nuisance impacts

**Table 4-3. Pinal County Rules Regulating Fugitive Dust in Pinal County Portion of Maricopa County PM10 Nonattainment Area**

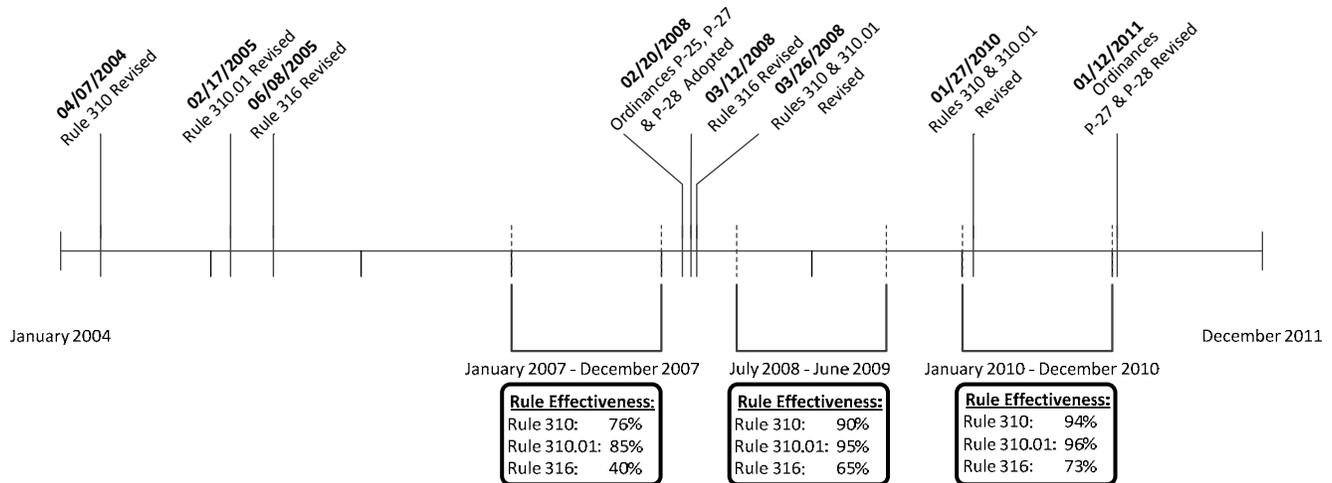
<b>Article Number &amp; Title</b>	<b>Description</b>
<b>Chapter 4, Article 4:</b> Nonattainment Area Rules; Dustproofing for Commercial Parking, Drives and Yards	Establishes rules to avoid violations of the prevailing PM10 standard and additionally minimize nuisance impacts by improving control of excessive fugitive dust emissions from unpaved parking lots
<b>Chapter 4, Article 5:</b> Nonattainment Area Rules; Stabilization for Residential Parking and Drives	Establishes rules for stabilizing residential properties
<b>Chapter 4, Article 6:</b> Restrictions on Vehicle Parking and Use on Vacant Lots	Establishes rules for unpaved or unstabilized vacant lots (valid in Pinal County portion of Area A)
<b>Chapter 4, Article 7:</b> Construction Sites in Nonattainment Areas – Fugitive Dust	Establishes rules to avoid violations of the prevailing PM10 standard and additionally minimize nuisance impacts by improving control of excessive fugitive dust emissions from activities associated with construction, earthwork, or land development
<b>Chapter 4, Article 8:</b> Nonattainment Area Rules, Requirement for Stabilization of Disturbed Areas at Vacant Lots	Establishes rules for stabilizing disturbed areas at vacant lots

### **PM10 Rule Effectiveness**

MCAQD analyzed the effectiveness of its fugitive dust rules (Rules 310, 310.01 and 316) in terms of permit compliance rates. This rule effectiveness (RE) study was designed to assess how many sources regulated by MCAQD during the subject time period received no PM10 emissions-related violations. As a basis for comparison, the percentage of permitted sources in compliance during calendar year 2007 was 76% for sources subject to Rule 310, 85% for Rule 310.01 sources, and 40% for Rule 316 sources. In early 2008, Rules 310, 310.01, and 316 were strengthened, and new ordinances (covering additional source categories such as leaf blowers, vacant lots, and off-road vehicles) were adopted. These enhancements resulted from MCAQD department’s obligations under such agreements as the 2005 Revised PM10 State Implementation Plan for the Salt River Area and the Maricopa Association of Governments (MAG) 2007 Five Percent Plan for PM10 for the Maricopa County Nonattainment Area to reduce PM10 emissions throughout the county. Three major areas that contributed to increased compliance were an increase in departmental staffing (especially inspectors), a robust training program, and regulatory changes that broadened and strengthened control measures under Rules 310, 310.01, and 316.

Source compliance rates were re-assessed for FY 2009 (July 2008–June 2009), a period that allowed time for the new and revised regulations to take effect. The results showed significant increases in compliance compared with the earlier period: to 90% (from 76%) for Rule 310 sources, to 95% compliance (from 85%) for Rule 310.01 sources, and to 65% (from 40%) for Rule 316 sources. These improvements continued into calendar year 2010 with compliance rates of 94% for Rule 310 sources, 96% for Rule 310.01, and 73% for Rule 316 sources. The timeline provided in Figure 4-1 illustrates the improvements

in RE over the last several years, and also points out significant revisions to previous rules, as well as newly adopted rules and ordinances.



**Figure 4-1.** Timeline of Maricopa County Fugitive Dust Rules and Ordinances.

**Compliance and Enforcement Activities**

MCAQD is proactively prepared to respond to high wind events and to protect human health and well-being. MCAQD’s approach consists of two primary components: routine proactive inspections and surveillance inspections, conducted both during and after significant events. MCAQD proactively inspects dust control-permitted sites, and increases the frequency for larger sites of 10 acres or more. Rule 316 sources are also proactively inspected multiple times every year. Maricopa County also responds to the majority of complaints within 24 hours.

Maricopa County monitors the ADEQ Five-Day Dust Control Forecast to identify the potential for elevated PM10 pollution levels due to high winds or stagnant conditions. When a High Pollution Advisory (HPA) is issued for Maricopa County, MCAQD conducts additional surveillance before, during, and after the forecast event(s). MCAQD also conducts event surveillance and post-event activities on exceedance days that had not been forecast (i.e., those instances in which an HPA had not been issued).

Pre-event surveillance consists of surveying high-risk areas for any dust-generating activities; educating sources of the impending HPA event; and issuing violations for failure to comply with local, state, or federal regulations. During the event, MCAQD inspectors survey high-risk areas to confirm that control measures are in place, document any violations, and contact other regulatory agencies if necessary. Post-event activities include continued surveys of high-risk areas, re-inspection of sources that had received violations within two business days, and an internal MCAQD debriefing of event activities.

Recently, a total of 12 MCAQD air monitoring sites have been updated with new equipment that allows the monitoring sites to report automatically monitored readings at five-minute intervals, where previously only hourly data were available. The real-time monitoring data programming includes threshold triggers that cause the system to send alerts to MCAQD staff that the PM concentrations are elevated. The system allows MCAQD responders to review concentrations at the monitor and to consult the National Weather

Service website to check for weather event activity. This capability allows the responder to identify regional events and monitor specific issues. If necessary, the MCAQD responders can inform nearby stakeholders and local governments of the elevated PM10 concentrations.

For September 11, 2011, a Maricopa County Dust Control Forecast was issued by ADEQ indicating a low risk level for unhealthy PM10 with southwest winds between 5 and 10 mph and a 30% chance of showers and thunderstorms. For September 12, 2011, a Maricopa County Dust Control Forecast was issued by ADEQ indicating a moderate risk level for unhealthy PM10 with southwest winds between 5 and 10 mph and a 40% chance of showers and thunderstorms.

An evaluation of all inspection reports, air quality complaints, compliance reports, and other documentation do not indicate any evidence of unusual anthropogenic-based PM10 emissions. During the time period of September 8th through September 15th, 2011, MCAQD inspectors conducted a total of 230 inspections at permitted facilities, of which 179 were at fugitive dust sources. Additionally, MCAQD conducted 6 inspections on vacant lots and unpaved parking lots during this period.

During this 8-day period, a total of 29 violations were issued county-wide for PM10- and non-PM10-related violations. One violation was observed during a complaint inspection for PM10 emissions within a 4-mile radius of the exceeding West 43rd Avenue monitor. A violation was observed at a vacant lot on which off-road vehicle use had created disturbed areas. The location of the violation is 3.3 miles southwest of the West 43rd monitor. The vacant lot is located in a residential area with surrounding buildings and fences. These structures would have significantly limited the wind speeds and PM10 emissions from the vacant lot. The wind direction at the exceeding West 43rd Ave monitor was from the southeast while the vacant lot was southwest of the monitor. The vacant lot was outside the wind profile of the exceeding West 43rd monitor.

MCAQD was prepared for any complaints received due to the high wind event. During the 8-day period from September 8th through September 15th, 2011, MCAQD received 33 complaints, of which 29 were windblown dust-related. Each complaint was assigned and investigated by a MCAQD inspector. A review of all pertinent records from this period indicates that MCAQD inspectors observed only one emission violation, as discussed in the previous paragraph, of local, state, or federal PM10 regulations within a 4-mile radius of the exceeding monitors.

In addition to MCAQD's efforts in pre-event surveillance and proactive inspections, ADEQ's Agricultural Best Management Practice Program (Ag BMP) inspector monitors the ADEQ Five-Day Dust Control Forecast and the MCAQD air monitoring sites that include real-time data. The ADEQ Ag BMP inspector uses specific knowledge of seasonal activities and associations with the local growers and dairymen to communicate the importance of limiting dust-generating activities, especially during high-wind events. Additional outreach is conducted with facility representatives prior to forecasted high-wind alert days. Should the PM10 readings at a MCAQD air monitoring site show notable increases, the ADEQ Ag BMP inspector is dispatched to contact the owners and operators of agriculture fields in the area to discern if their activities are causing negative impacts. The Ag BMP inspector is prepared to respond to most agriculture complaints within 24 hours.

Based on a review of the inspection reports and site visit documentation, there is no evidence to suggest that agricultural activities produced unusual PM10 emissions. From September 9 through September 13, 2011, the ADEQ Ag BMP inspector received one complaint and performed site visits at three agricultural operations. The agriculture fields visited had established crops which would not have contributed to PM10 emissions.

## **Conclusions**

The thunderstorm outflow events of September 11 & 12, 2011, first described in Section II and discussed in more detail in Section V, produced strong gusts and turbulent wakes that transported dust and PM10 into the Phoenix PM10 nonattainment area. The source region of the outflows that caused the exceedances was largely located in areas outside the Phoenix PM10 nonattainment area, primarily the desert areas of Pinal County. The Phoenix area is designated as a serious nonattainment area for PM10 and is required to have BACM for all significant sources of PM10. BACM-approved control measures on significant anthropogenic sources were in place and enforced during the events, and pro-active tracking and response to the events by regulatory agencies and local governments confirmed the uncontrollable nature of the dust emissions; therefore, these pre-existing/prior approved required controls are adequate for meeting the requirements of an exceptional event and should be considered “reasonable” for these purposes.

Despite the deployment of comprehensive control measures and sophisticated response programs and one localized, low-impact violation of the dust control rules, high wind conditions associated with thunderstorms and thunderstorm outflows brought high concentrations of PM10 emissions into, and also overwhelmed controls within, the Phoenix PM10 nonattainment area. Strong thunderstorm outflows with sustained winds ranging from 20-30 mph, and even greater speeds nearest the source regions, as discussed in Section V, were enough to overwhelm all available efforts to limit PM10 concentrations from the events. The fact that these were natural events involving strong thunderstorm outflow winds that transported PM10 emissions into the Phoenix PM10 nonattainment area, with a majority of the PM10 emissions recorded by Maricopa County area monitors coming from sources to the south and southeast of the nonattainment area, provides strong evidence that the events and exceedances of September 11 & 12, 2011, recorded within the Phoenix PM10 nonattainment area, were not reasonably controllable or preventable.

## V. CLEAR CAUSAL RELATIONSHIP

### Introduction

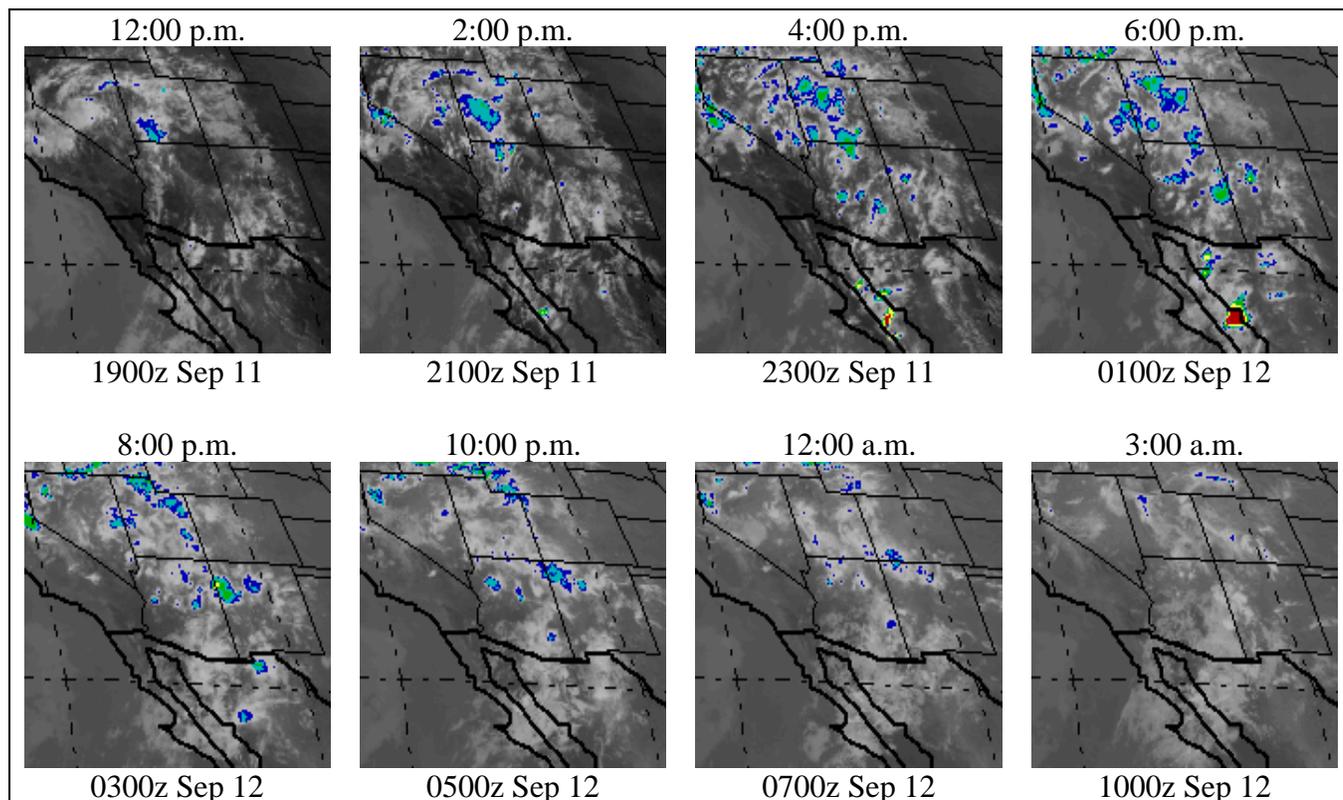
A demonstration of the clear causal connection between uncontrollable natural events or uncontrollable emissions associated with thunderstorm outflows and PM10 exceedances on September 11 & 12, 2011, is presented in the following time series graphs, infrared satellite imagery, GIS time series maps, and National Weather Service (NWS) data tables for selected, representative airports. These various pieces of information contain data on sustained wind speed, wind speed gusts, PM10 concentrations, visibility, weather observations, and thunderstorm development areas and provide the causal connection between the uncontrollable emissions associated with thunderstorm outflows and elevated PM10 concentrations. For reference, Appendix D provides additional NWS text products issued for September 11<sup>th</sup> and 12<sup>th</sup> containing forecasts and warnings of blowing dust due to thunderstorms outflows. A summary of the event days are provided below.

### Event – September 11, 2011

On September 11, 2011, the Phoenix region experienced typical late summertime weather conditions with a maximum temperature of 99°F, relative humidity of 20-40%, winds generally between 5-10 miles per hour (mph) from various directions, and visibility at 10 miles all day, as reported at the Phoenix Sky Harbor Airport. The previous day, September 10<sup>th</sup>, experienced gusty late-evening winds and large spikes in PM10 concentrations at several sites within the Phoenix area, with the maximum reaching 2,000  $\mu\text{g}/\text{m}^3$  at the West 43<sup>rd</sup> site, but the spikes were limited to 1-2 hours in duration and were not enough to produce exceedances of the PM10 standard. Without any significant PM10 carryover from the 10<sup>th</sup>, PM10 concentrations on September 11<sup>th</sup> were generally very low through the afternoon ( $<20 \mu\text{g}/\text{m}^3$ ). Between 5 p.m. Mountain Standard Time (MST) and 6 p.m. MST on the 11<sup>th</sup>, thunderstorms developed to south of the Phoenix region (as indicated in the satellite images in Figure 5-1 and the radar data in Figure 5-4), producing wind speed gusts of 30-40 mph at the Cowtown and Stanfield monitoring sites in Pinal County, just a few miles east of the thunderstorm formation area (see Figure 5-4). By 6 p.m., outflows from the thunderstorms had entrained dust from desert areas of northern Pinal County and southern Maricopa County generating a haboob that progressed northward into Maricopa County, transporting large amounts of PM10 into the Phoenix PM10 nonattainment area. Due to the storm formation area and the predominant northward outflow direction, monitoring sites in Pinal County were minimally affected by this dust event.

As shown in Figure 5-2, once the haboob reached the Phoenix area, southerly winds increased to 20 mph, with gusts up to 25 mph, and visibility dropped from 10 miles to 1 mile at the Phoenix Sky Harbor Airport. Correspondingly, hourly PM10 concentrations increased to 1,224  $\mu\text{g}/\text{m}^3$  at the South Phoenix monitoring site during the 6 p.m. hour and exceeded 1,400  $\mu\text{g}/\text{m}^3$  at the North Phoenix site during the 7 p.m. hour. Additionally, the National Weather Service (NWS) issued a dust storm warning at 6:15 p.m. to alert the public to dense blowing dust, ¼-mile visibility, and 20-40 mph winds, with higher gusts (see Appendix D). Thus, wind speeds near the collapsing thunderstorm and the area of formation of the outflow boundary were likely much higher than those recorded at the Phoenix Sky Harbor Airport. The winds decreased as the outflow boundary moved northward and subsided soon after the passage of the dust front, but PM10 concentrations remained high for several hours in the central Phoenix area, resulting in 24-hour average concentrations above 165  $\mu\text{g}/\text{m}^3$  at four monitors located at three monitoring sites. Two additional sites, Durango Complex and Greenwood, nearly exceeded the standard with 24-hour averages of 145  $\mu\text{g}/\text{m}^3$  and 148  $\mu\text{g}/\text{m}^3$ , respectively. Additional details of this event are described below

in the time series graphs, the GIS time series maps, and the NWS data tables. Without the existence of the emissions generated by the thunderstorm outflows, there would not have been any exceedances of the 24-hour PM10 standard in the Phoenix PM10 nonattainment area.



**Figure 5-1.** Satellite imagery showing scattered thunderstorms developing over Arizona and dissipating as they moved northeastward. Strong localized storms over central Arizona are believed to have been responsible for the thunderstorm outflow boundary that caused PM10 exceedances in Maricopa county on September 11.

Figure 5-2 depicts the dust event that occurred in Maricopa County impacting the Phoenix area on September 11<sup>th</sup>. Hourly averaged PM10 concentrations at monitors throughout Maricopa County are shown along with visibility readings (blue diamonds) and wind speeds reported at the Phoenix Sky Harbor Airport. Measurements at Sky Harbor were used due to its close proximity to the monitors that measured exceedances on September 11. As can be seen in the graph, visibility was reduced down to 1 mile at the Sky Harbor Airport during the windblown dust event, and this visibility reduction coincided with rapidly increasing PM10 concentrations and sustained wind speeds up to 20 mph and gusts up to 25 mph in the Phoenix area. The NWS data table after Figure 5-11 shows multiple reports during the 6 p.m. hour, when PM10 concentrations were the highest.

A review of the 5-minute wind data at the Central Phoenix site, the nearest site to the four which exceeded the PM10 standard on September 11<sup>th</sup> (none of which were equipped to collect 5-minute data at that time), and PM10 data at several of the Maricopa County monitoring sites shown in Figure 5-3, indicate that wind speed increases associated with the arrival of the thunderstorm outflow boundary produced very rapid spikes in PM10 concentrations. For example, the Central Phoenix site had 5-minute average winds at only 2 mph out of the west and a PM10 concentration of 26  $\mu\text{g}/\text{m}^3$  at 6:15 p.m. By 6:30 p.m., the 5-minute wind speed average had increased to about 17 mph out of the south and PM10 concentrations

reached 2,543  $\mu\text{g}/\text{m}^3$ . Winds remained between 10-15 mph for 30 minutes at the Central Phoenix site, but by 7:15 p.m. had dropped to nearly 0 mph. The graphs also show the progression of the dust front as it traveled northward from site-to-site, from a selection of sites with 5-minute data available. The abrupt decrease in winds limited the transport of PM10 out of the region and allowed PM10 concentrations to remain high at the central and northern Phoenix monitoring sites. As a result, it was clearly evident that a thunderstorm outflow boundary had passed through the Phoenix region and the direction of flow caused the greatest increases in PM10 concentrations in the central portion of the Phoenix PM10 nonattainment area. Additional evidence of the transport of windblown dust into the region and the subsequent stagnation is presented in the GIS time series maps in Figure 5-4 through Figure 5-11 below.

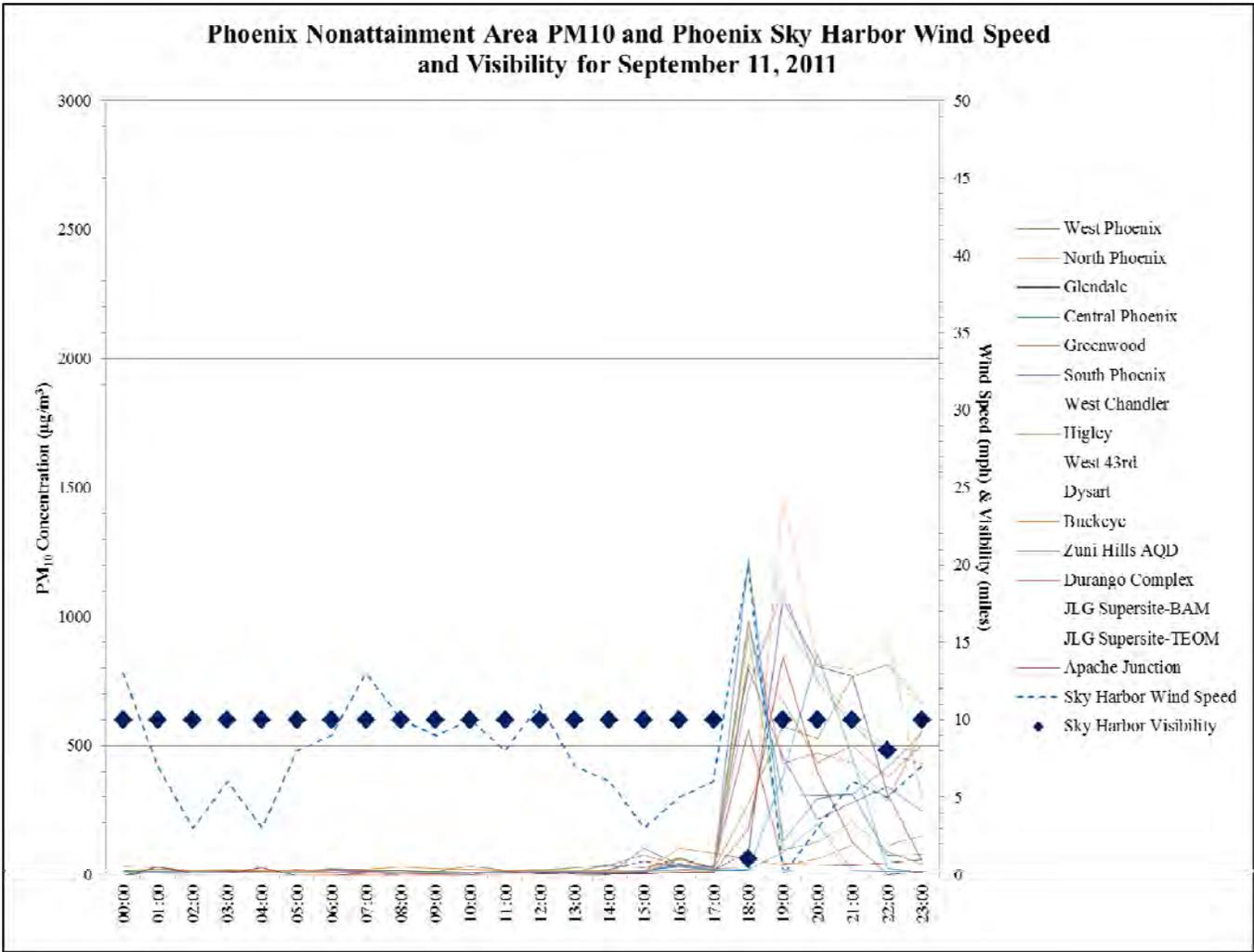
A visualization of this dust event was created using Phoenix visibility camera images that can be viewed as an animation here:

Looking south toward Phoenix, with South Mountain in the distance:

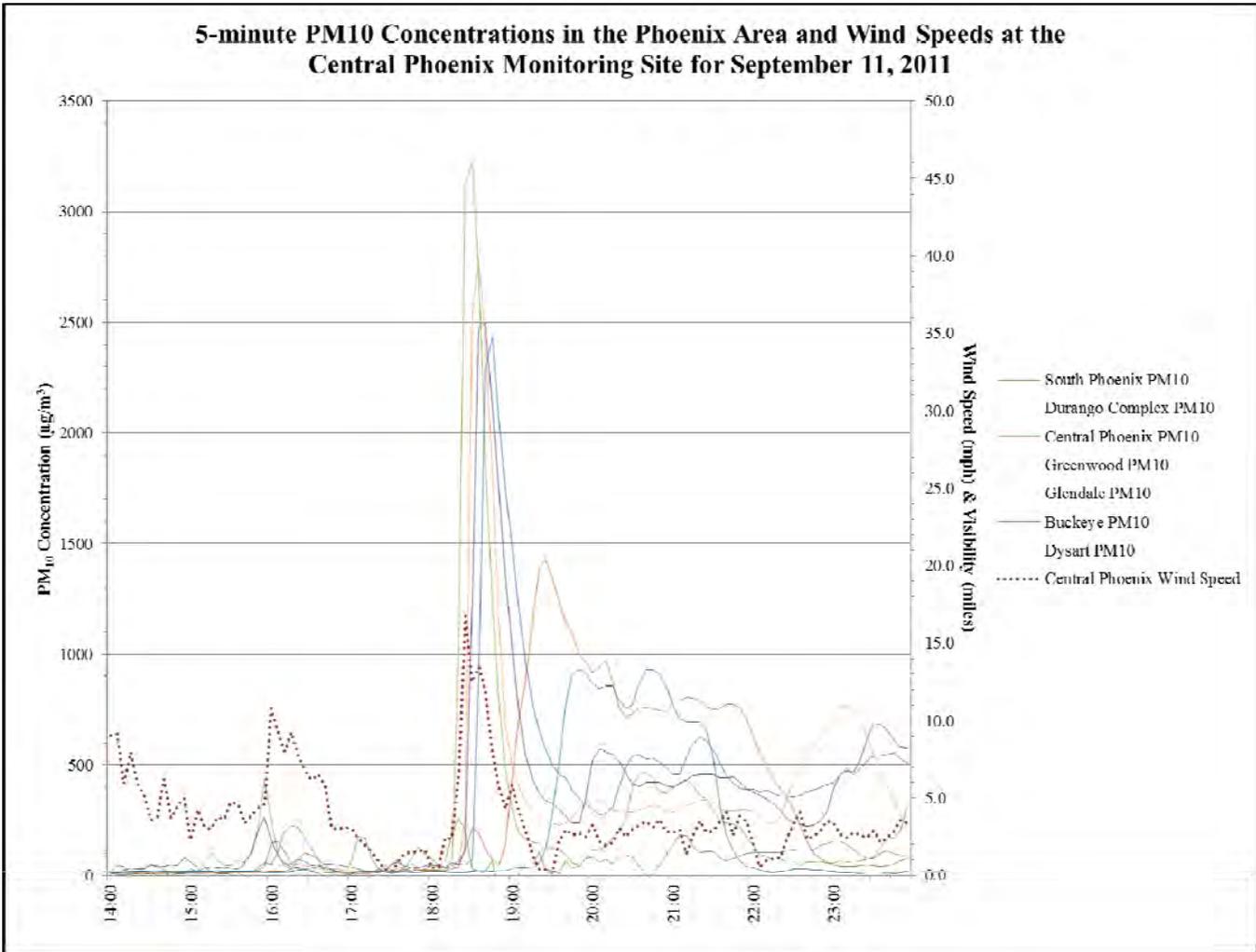
[www.phoenixvis.net/videos/mpeg4/SOMT\\_09112011.mp4](http://www.phoenixvis.net/videos/mpeg4/SOMT_09112011.mp4)

This video from September 11<sup>th</sup> is a view of the Phoenix from North Mountain, looking toward the south, and clearly shows the wall of dust blowing northward over South Mountain, into the Phoenix region in the late afternoon/early evening of September 11, 2011. The snapshot on the cover of this report was taken from the 6:30 p.m. mark of the video and coincides exactly with the PM10 concentration spikes seen in the 5-minute data from the PM10 monitoring sites in the central Phoenix area. The dust front eventually reaches the camera site and the visibility abruptly drops to less than one mile.

Videos showing other views across the Valley on this date are also available (see the Visibility Cameras section).



**Figure 5-2.** Phoenix nonattainment area PM10 monitor readings and Sky Harbor wind speed and visibility for September 11, 2011.



**Figure 5-3.** Five-minute average PM10 monitor readings between 2 p.m. and midnight from select Phoenix nonattainment area monitors and five-minute average wind speed from the Central Phoenix monitoring site for September 11, 2011.

***GIS Time Series Maps***

Figures 5-4 through 5-11 provide a time series GIS-based visualization of the meteorology and PM10 concentrations associated with the thunderstorm outflow. The data displayed in the following maps were gathered from five data sources. All available meteorological and air quality data was used in order to present the most complete story of the event. Table 5-1 displays the types of data used from each agency in creating the maps.

**Table 5-1. Data Sets Used in the Creation of Time Series GIS Maps**

<b>Agency</b>	<b>Data Sets</b>
Arizona Department of Environmental Quality (ADEQ)	Hourly PM10 Concentrations, Wind Speed, Wind Direction and Wind Gusts
Arizona Meteorological Network (AZMET)	Hourly Wind Speed, Wind Direction and Wind Gusts
Maricopa County Air Quality Department (MCAQD)	5-Minute PM10 Concentrations, Wind Speed, Wind Direction, and Wind Gusts (hourly data used when 5-minute was unavailable)
Pinal County Air Quality Control District (PCAQCD)	Hourly PM10 Concentrations, 5-Minute and Hourly Wind Speed, Wind Direction and Wind Gusts
National Weather Service (NWS)	Point in Time Wind Speed, Wind Direction, Wind Gusts, Visibility and Base Velocity Radar

***Map Descriptions***

A description of each time series map is provided to highlight important data in each map and explain the progression of the meteorology and PM10 concentrations through time. Taken as a whole, the maps and associated explanatory text describe the clear causal connection between the windblown dust generated and transported by the thunderstorm outflow winds and the PM10 exceedances at the nonattainment area monitors.

September 11, 2011, 5:30 PM – 6:00 PM

At 5:19 PM, the National Weather Service issued a Special Weather Statement (see Appendix D) regarding a strong thunderstorm detected just south of the town of Maricopa in northwest Pinal County. The small, but powerful, thunderstorm was predicted to generate gusts up to 50 mph and areas of dense blowing dust. By about 5:45 PM the outflow from this thunderstorm is visible on base velocity radar, as depicted Figure 5-4. The thunderstorm outflow generated a significant wall of dust as it crossed the open desert areas of northwest Pinal and southern Maricopa counties, moving northeastward into the nonattainment area at about 15 mph.

September 11, 2011, 6:00 PM – 6:30 PM

Effects from the thunderstorm outflow are easily identifiable as it reached the southern monitoring stations in the nonattainment area. Five-minute average PM10 concentrations over 2,500  $\mu\text{g}/\text{m}^3$  were recorded at multiple monitors during this period. In central Phoenix, visibility was reduced to 1.5 miles at Sky Harbor Airport while visibility in the southeast portion of the nonattainment area was reduced to 0.8 miles at Williams Gateway Airport. The thunderstorm outflow was still relatively energetic at this point, generating gusts up to 34 mph and sustained winds of 19 mph.

September 11, 2011, 6:30 PM – 7:00 PM

The thunderstorm outflow continued to move northward over the central Phoenix monitors and northeastward across eastern portion of the nonattainment area. Visibility dropped further to 1.0 miles at Sky Harbor Airport and the Phoenix Goodyear Airport in the southwest portion of the nonattainment area reported visibility down to 2.0 miles. The strongest winds during this period were blowing the heart of the dust wall almost directly northward under sustained winds as high as 20 mph.

September 11, 2011, 7:00 PM – 7:30 PM

Wind energy from the thunderstorm outflow rapidly decreased during this period, although the remains of the outflow were still visible in the radar base velocity data. Only a few monitoring stations reported sustained winds speeds above 5 mph, and only one station in the eastern portion of the nonattainment area recorded gusts above 20 mph. PM10 concentrations remained high, with multiple monitors recording 5-minute average values over 1,000  $\mu\text{g}/\text{m}^3$ . The slow northward movement of the dust storm could still be seen in reduced visibilities of 2.5 miles at the Scottsdale Airport and 4.0 miles at Luke Air Force Base. The rapid drop-off of wind speeds from the thunderstorm outflow left suspended dust trapped in the central Phoenix area. It took several hours for the dust to deposit out, keeping PM10 concentrations high at the West Phoenix, JLG Supersite, and North Phoenix sites, eventually leading to exceedances of the PM10 standard by the four monitors located at those three sites.

September 11, 2011, 7:30 PM – 8:00 PM

Under very light southerly winds, suspended dust from the thunderstorm outflow impacted the northern most portions of the nonattainment area during this time period. The Dysart monitor recorded 5-minute average PM10 concentrations over 500  $\mu\text{g}/\text{m}^3$  and visibility was reduced to 2.5 miles at the Deer Valley Airport. Conditions improved substantially in the southeastern portions of the nonattainment area, with visibilities and PM10 concentrations back to normal levels. However, on the eastern side of the region, the Apache Junction monitor still recorded elevated PM10 concentrations, as this area was the eastern-most edge of the thunderstorm outflow and was subject to suspended dust as the outflow lost the wind energy needed to push the dust out of the nonattainment area.

September 11, 2011, 8:00 PM – 8:30 PM

Very calm conditions throughout the nonattainment provided no opportunity for the suspended dust from the earlier outflow to exit the nonattainment area. As a result, the central and northern nonattainment area monitors experienced a slow deposition of the trapped windblown dust. PM10 concentrations in this area remained high, with most area monitors recording 5-minute average PM10 concentrations above 500  $\mu\text{g}/\text{m}^3$ .

September 11, 2011, 8:30 PM – 9:00 PM

Light northerly winds during this period further trapped the suspended dust in the central Phoenix area, but caused the northern-most monitor, Zuni Hills, to begin a return to normal PM10 concentrations. Visibility remained poor at the Deer Valley and Scottsdale Airports, with reports of 3.0 and 4.0 miles, respectively. The south-central Phoenix area monitors also begin returning to normal PM10 concentrations, as the bulk of the suspended dust remained trapped over north-central Phoenix. Similar conditions persisted through the 9:00 PM to 9:30 PM as well.

September 11, 2011, 9:30 PM – 10:00 PM

Winds picked up slightly around the urban fringe of the nonattainment area, allowing visibility to improve to 10.0 miles at the Deer Valley Airport. However, winds were predominantly calm in the central Phoenix area, exacerbating the slow deposition of windblown dust at the monitors in this area.

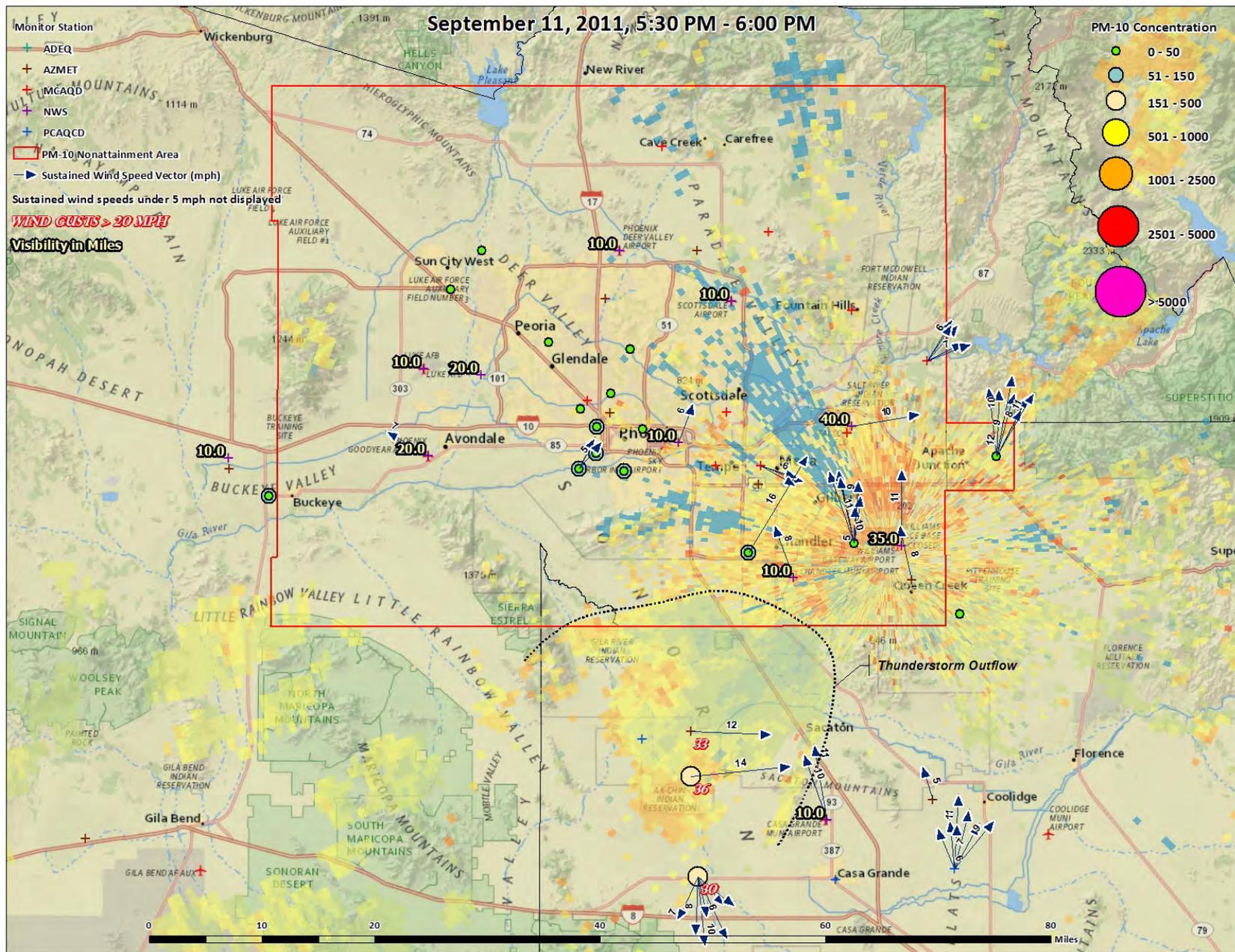


Figure 5-4. GIS Time Series Map for September 11, 2011, 5:30 PM – 6:00 PM.

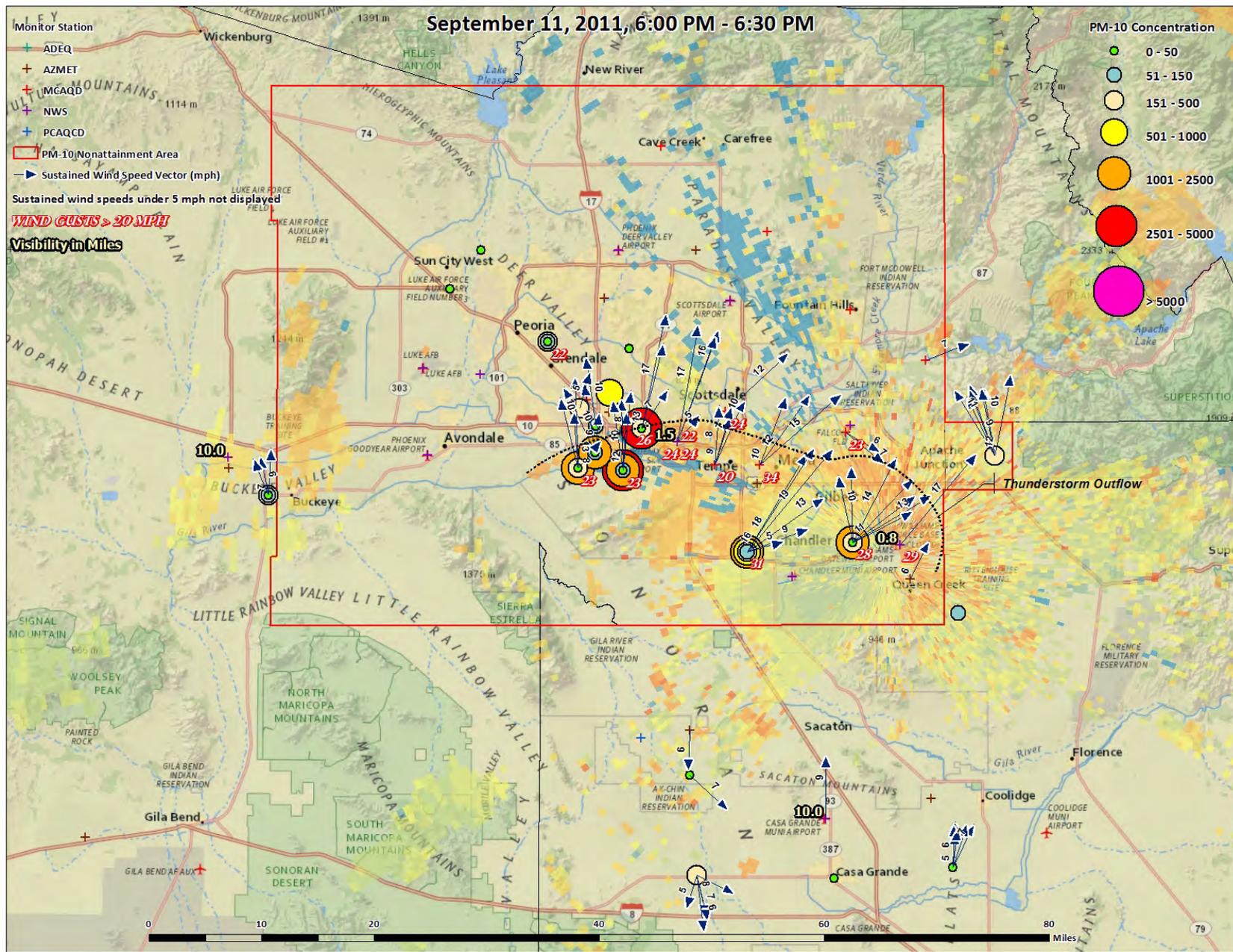


Figure 5-5. GIS Time Series Map for September 11, 2011, 6:00 PM – 6:30 PM.



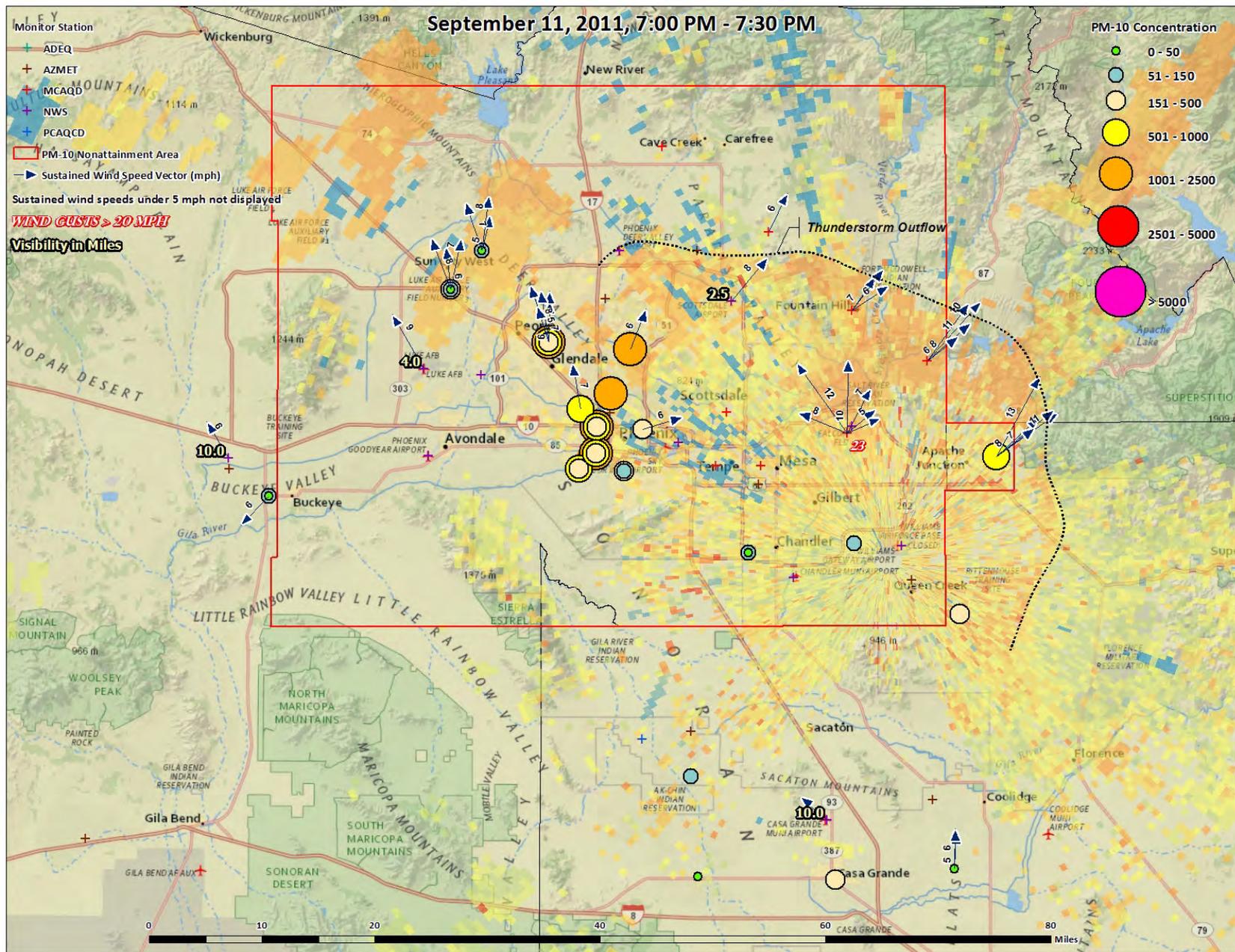


Figure 5-7. GIS Time Series Map for September 11, 2011, 7:00 PM – 7:30 PM.

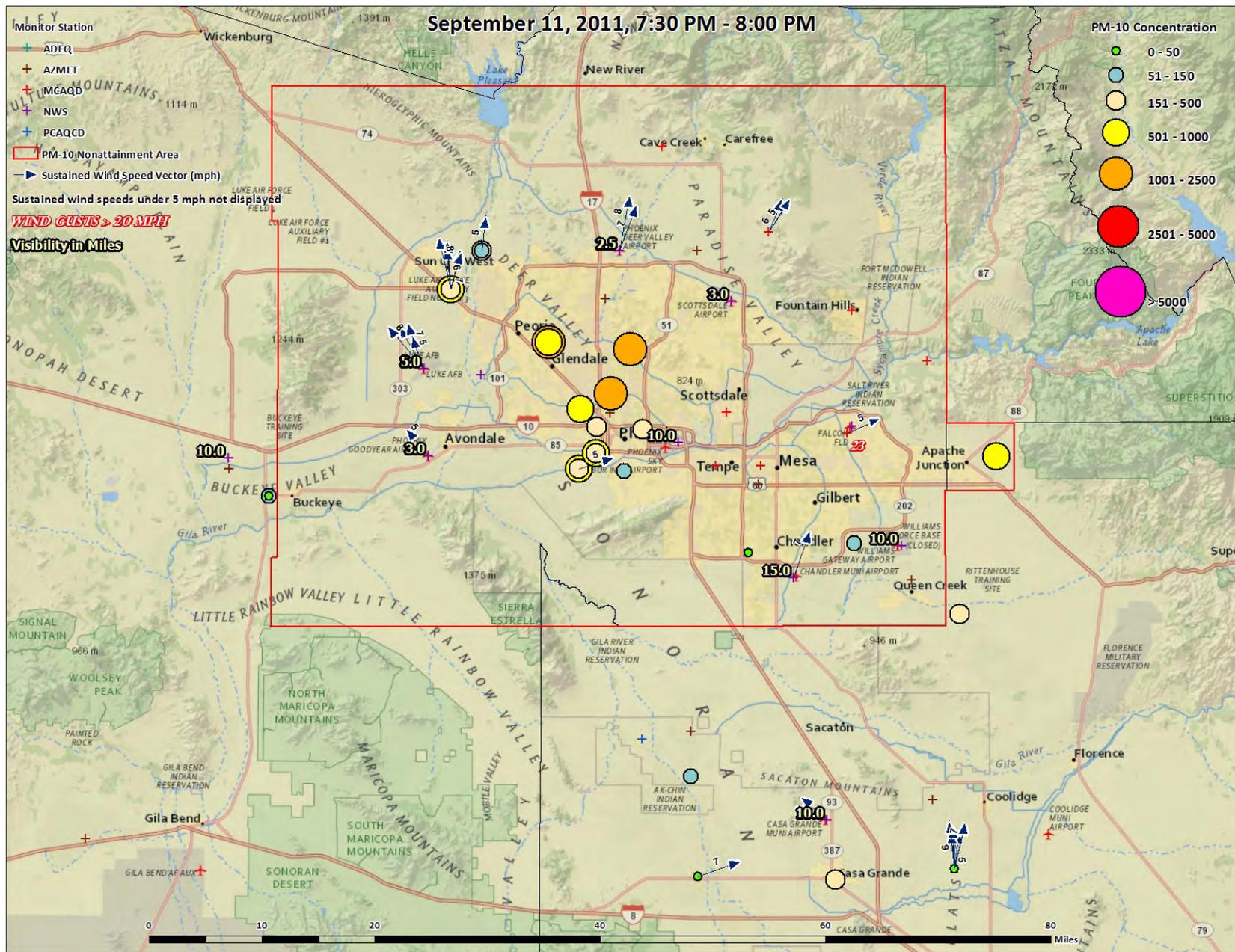


Figure 5-8. GIS Time Series Map for September 11, 2011, 7:30 PM – 8:00 PM.

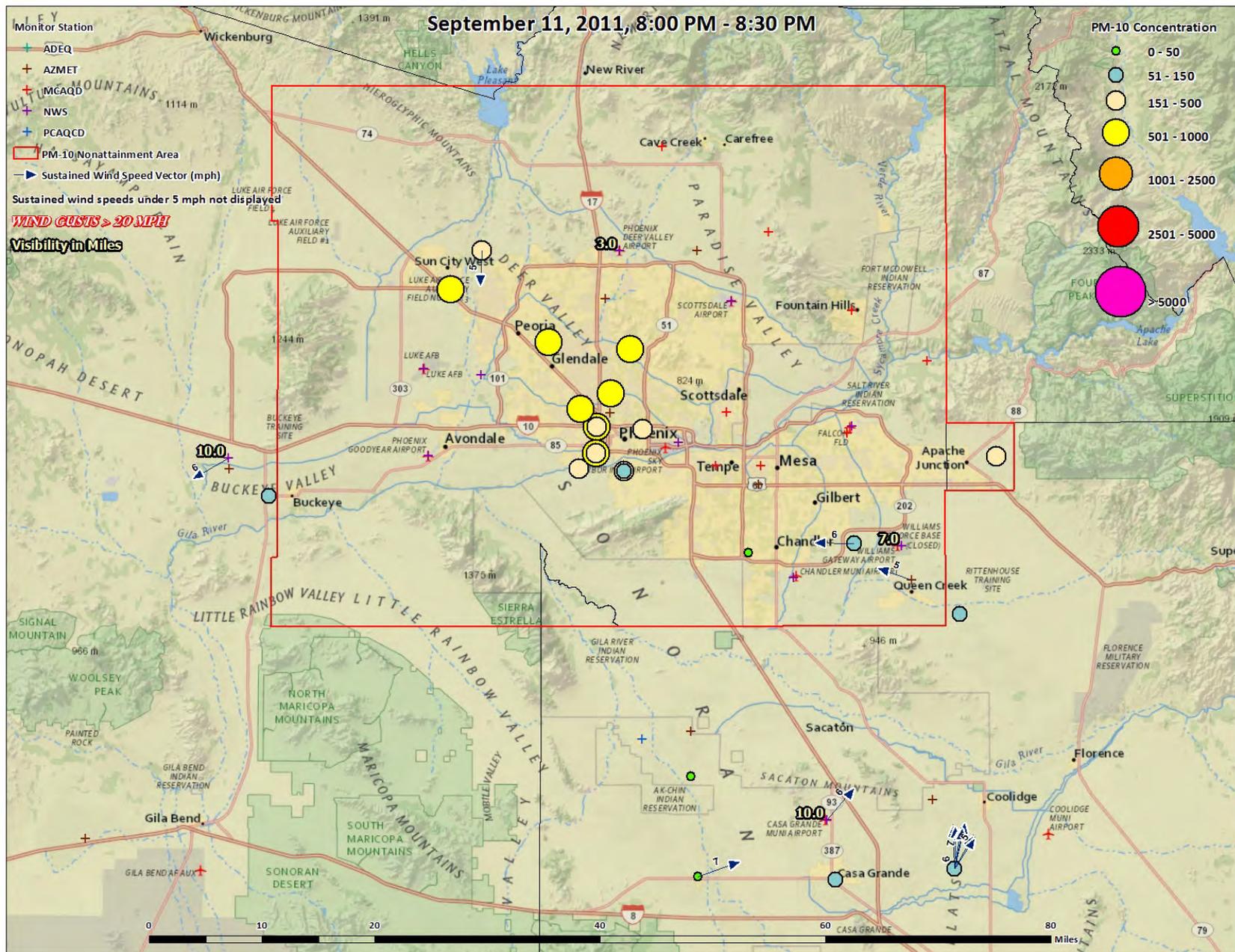


Figure 5-9. GIS Time Series Map for September 11, 2011, 8:00 PM – 8:30 PM.

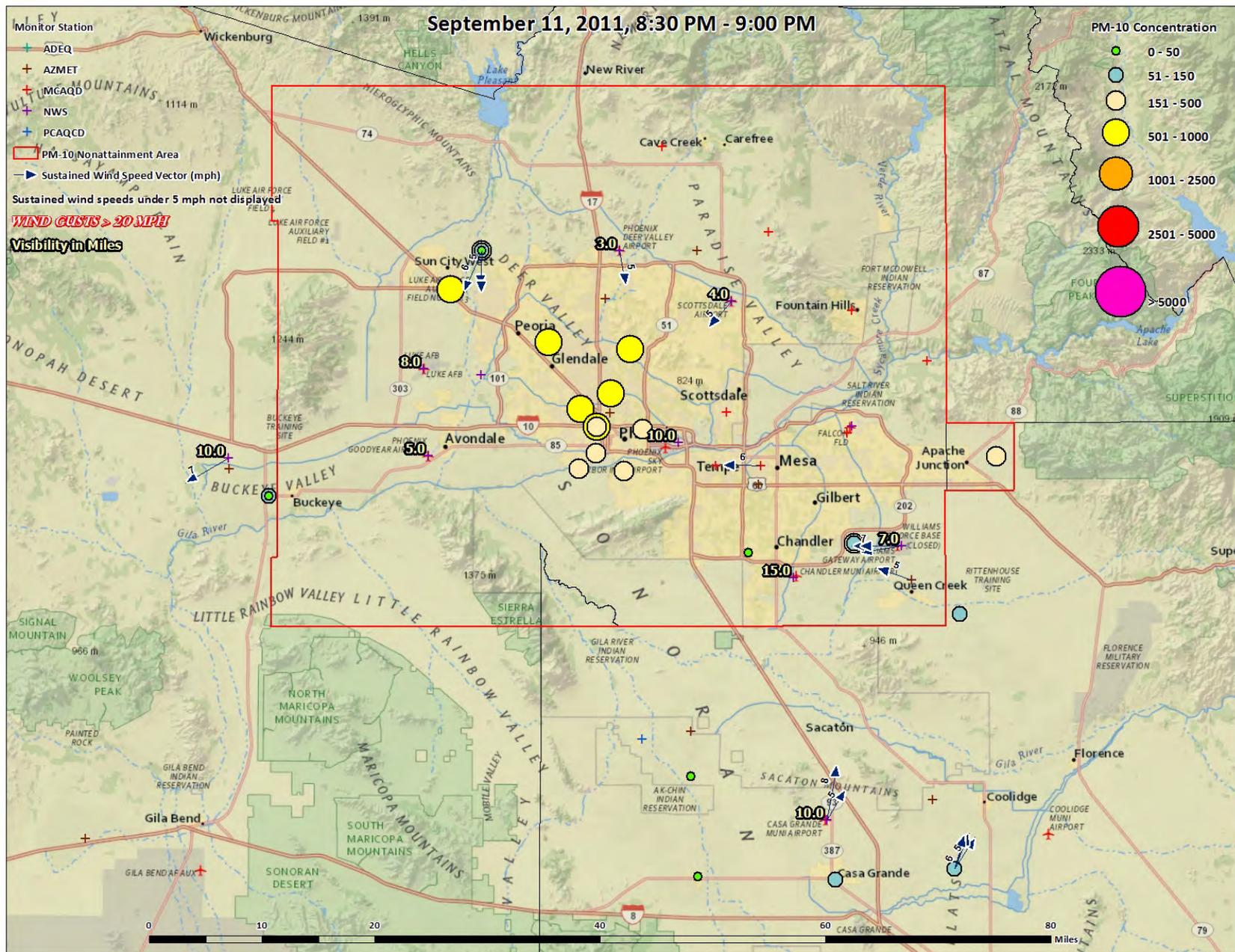


Figure 5-10. GIS Time Series Map for September 11, 2011, 8:30 PM – 9:00 PM.

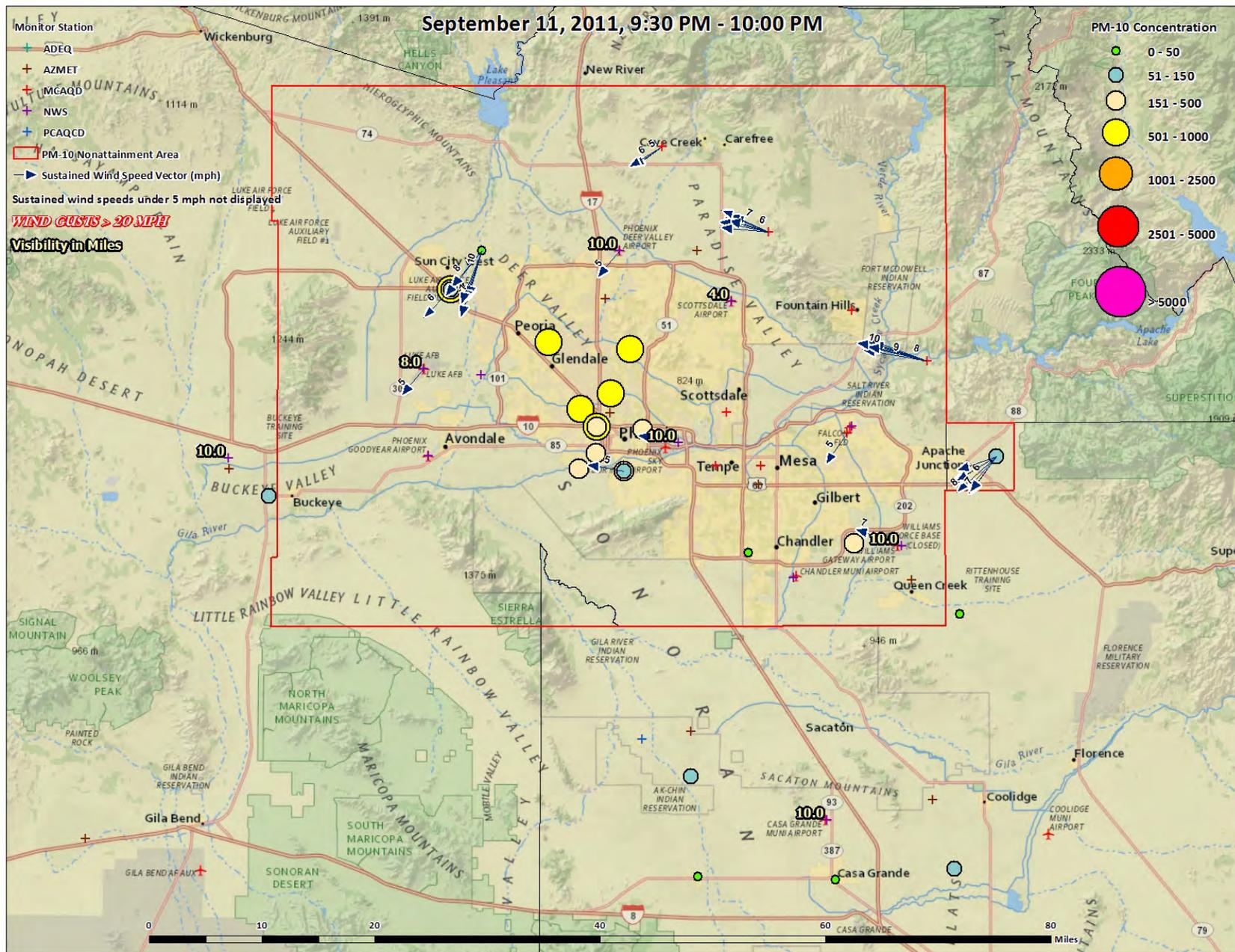


Figure 5-11. GIS Time Series Map for September 11, 2011, 9:30 PM – 10:00 PM.

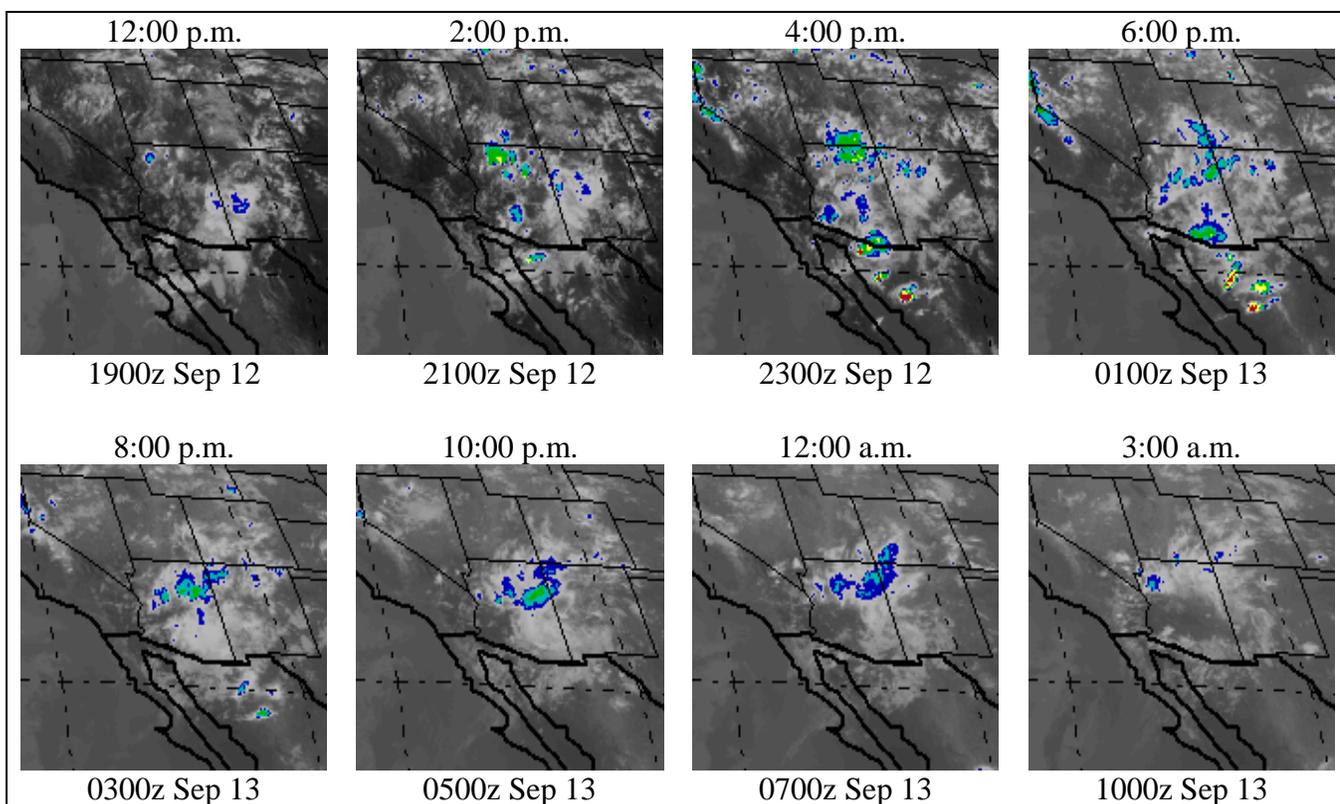
**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA  
(final)  
HOURLY OBSERVATIONS TABLE  
PHOENIX SKY HARBOR INTL AIRPORT (23183)  
PHOENIX, AZ  
(09/2011)**

Elevation: 1107 ft. above sea level  
Latitude: 33.427  
Longitude: -112.003  
Data Version: VER3

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
11	0051	11	FEW130 SCT250	10.00		79	26.1	65	18.5	57	13.9	47	13	100		28.76			29.88	AA		29.94
11	0151	11	FEW130 SCT250	10.00		79	26.1	65	18.5	57	13.9	47	7	140		28.78	3	002	29.90	AA		29.96
11	0251	11	FEW130 SCT250	10.00		78	25.6	65	18.3	57	13.9	49	3	100		28.78			29.90	AA		29.96
11	0351	11	FEW150 SCT250	10.00		77	25.0	65	18.1	57	13.9	50	6	080		28.78			29.90	AA		29.96
11	0451	11	FEW100 SCT200	10.00		78	25.6	65	18.3	57	13.9	49	3	100		28.79	3	004	29.91	AA		29.97
11	0551	11	FEW100 SCT170	10.00		77	25.0	65	18.1	57	13.9	50	8	130		28.81			29.93	AA		29.99
11	0651	11	FEW070 SCT100 SCT150	10.00		78	25.6	65	18.3	57	13.9	49	9	080		28.81			29.93	AA		29.99
11	0751	11	FEW080 SCT100 SCT140	10.00		81	27.2	66	18.6	56	13.3	42	13	090		28.81	0	006	29.93	AA		29.99
11	0851	11	FEW080 SCT100 SCT140	10.00		85	29.4	66	18.8	54	12.2	35	10	090		28.82			29.94	AA		30.00
11	0951	11	SCT100 SCT140 SCT180	10.00		88	31.1	67	19.3	54	12.2	31	9	100		28.82			29.95	AA		30.00
11	1051	11	FEW100 SCT140 SCT180	10.00		92	33.3	68	19.8	53	11.7	27	10	120		28.82	0	002	29.94	AA		30.00
11	1151	11	FEW100 SCT140 SCT180	10.00		94	34.4	69	20.4	54	12.2	26	8	130		28.79			29.92	AA		29.97
11	1251	11	FEW070 SCT100 SCT140	10.00		97	36.1	70	20.8	54	12.2	24	11	160		28.78			29.90	AA		29.96
11	1351	11	FEW070 SCT150 SCT180	10.00		99	37.2	70	20.9	53	11.7	21	7	VR	16	28.75	8	022	29.87	AA		29.93
11	1400	11	FEW070 SCT150 SCT180	10.00		97	36.0	70	20.8	54	12.0	24	10	140		28.75			M	SP		29.93
11	1451	11	FEW070 SCT150 BKN220	10.00		94	34.4	68	20.1	53	11.7	25	6	090		28.73			29.85	AA		29.91
11	1551	11	FEW090 SCT110 SCT150	10.00		94	34.4	68	20.1	53	11.7	25	3	170		28.71			29.83	AA		29.89
11	1651	11	FEW090 SCT110 SCT150	10.00		93	33.9	69	20.7	56	13.3	29	5	280		28.70	6	016	29.82	AA	T	29.88
11	1751	11	FEW090 SCT120 SCT170	10.00		94	34.4	69	20.3	54	12.2	26	6	200		28.69			29.82	AA		29.87
11	1806	11	FEW009 SCT090 SCT120	10.00		93	34.0	69	20.4	55	13.0	28	5	220		28.69			M	SP		29.87
11	1822	11	FEW009CB SCT090CB	8.00		93	34.0	69	20.4	55	13.0	28	17	200		28.72			M	SP		29.90
11	1828	11	SCT016CB SCT090CB	2.50		91	33.0	68	20.1	55	13.0	30	17	190		28.72			M	SP		29.90
11	1830	11	SCT013CB BKN100CB	1.50		90	32.0	68	19.9	55	13.0	31	16	200		28.72			M	SP		29.90
11	1836	11	SCT013CB BKN100CB	1.00		90	32.0	68	19.9	55	13.0	31	17	190		28.72			M	SP		29.90
11	1840	11	SCT013 SCT100 BKN140	1.00		90	32.0	69	20.5	57	14.0	33	20	170		28.72			M	SP		29.90
11	1842	11	SCT013 SCT100 BKN140	2.00		88	31.0	68	20.1	57	14.0	35	16	170		28.72			M	SP		29.90
11	1849	11	FEW023 SCT100 BKN140	9.00		90	32.0	69	20.5	57	14.0	33	11	170		28.72			M	SP		29.90
11	1851	11	FEW023 SCT100 BKN140	7.00		89	31.7	69	20.3	57	13.9	34	9	170		28.72			29.85	AA		29.90
11	1951	11	FEW100 SCT140 BKN190	10.00		90	32.2	68	19.9	55	12.8	31	0	000		28.73	3	012	29.85	AA		29.91
11	2051	11	FEW100 SCT140 BKN220	10.00		91	32.8	68	20.1	55	12.8	30	3	040		28.76			29.88	AA		29.94
11	2151	11	FEW100 SCT140 SCT200	10.00		88	31.1	68	20.1	57	13.9	35	6	100		28.78			29.90	AA		29.96
11	2251	11	FEW100 SCT140 SCT200	8.00		87	30.6	69	20.2	58	14.4	37	5	090		28.79	1	018	29.91	AA		29.97
11	2351	11	FEW160 SCT200	10.00		87	30.6	68	19.7	56	13.3	35	7	080		28.78			29.90	AA		29.96

## Event – September 12, 2011

On September 12, 2011, the Phoenix region experienced typical late summertime weather conditions with a maximum temperature of 100°F, relative humidity of 20-40%, variable to southeasterly winds at 5-12 miles per hour (mph) through the afternoon, and visibility at 10 miles all day, as reported at the Phoenix Sky Harbor Airport. Despite the spikes in PM10 concentrations at most of the PM10 monitoring sites in the region on September 11<sup>th</sup> and a few hours of elevated PM10 concentrations in the very early morning hours, PM10 concentrations on September 12<sup>th</sup> were generally low during the day ( $<50 \mu\text{g}/\text{m}^3$ ). Between 6 p.m. MST and 8 p.m. MST on the 12<sup>th</sup>, thunderstorms developed over portions of Arizona to the south of the Phoenix region (as indicated in Figure 5-12) and by 7 p.m., outflows from the thunderstorms entrained dust from desert areas of Pinal County and progressed northwestward into Maricopa County by 8 p.m., transporting large amounts of PM10 into the south-central portion of the Phoenix nonattainment area. As shown in Figure 5-13, the arrival of the dust front had the following impacts in the Phoenix area: south-southeasterly winds increased to 20-25 mph, with gusts up to 32 mph; visibility dropped from 10 miles to 6 miles; and hourly PM10 concentrations increased to nearly  $3000 \mu\text{g}/\text{m}^3$  at the Durango Complex monitoring site and exceeded  $1000 \mu\text{g}/\text{m}^3$  at three additional sites. However, once the winds subsided by the 10 p.m. hour, visibility returned to 10 miles and PM10 concentrations rapidly decreased, resulting in exceedances of the 24-hour PM10 standard at only three monitoring sites on September 12. As a result, it is very clear that without the existence of the emissions generated by the thunderstorm outflows, there would not have been any exceedances of the 24-hour PM10 standard in the Phoenix PM10 nonattainment area.



**Figure 5-12.** Satellite imagery showing thunderstorms developing much of Arizona through the afternoon and evening and dissipating as they moved northeastward. Strong storms over southern/central Arizona are believed to have been responsible for the thunderstorm outflow boundary that caused PM10 exceedances in Maricopa and Pinal counties on September 12.

Figure 5-13 depicts the dust event that occurred in Maricopa County impacting the Phoenix area on September 12, 2011. Hourly averaged PM10 concentrations at monitors throughout Maricopa County are shown along with visibility readings (blue diamonds) and wind speeds reported at the Phoenix Sky Harbor Airport. Measurements at Sky Harbor were used due to its close proximity to the monitors that experienced exceedances on September 12. As can be seen in the graph, visibility was reduced to 6 miles at the Sky Harbor Airport during the windblown dust event, and this visibility reduction coincided with rapidly increasing PM10 concentrations and sustained wind speeds up to 25 mph in the Phoenix area during the 8 p.m. hour. Maps of the PM10 concentrations, sustained wind speeds, and wind gusts in Figures 5-15 to 5-27 also show the rapid increases in PM10 concentrations and wind speeds as the primary outflow boundary reached the Phoenix area during that hour.

As shown in the graph in Figure 5-14 and on the map in Figure 5-15, several monitoring sites in Pinal County measured increased 1-hour average PM10 concentrations during the 3 p.m. hour on September 12<sup>th</sup> due to sustained thunderstorm outflow winds over 25 mph. However, the winds were primarily out of the west-southwest, limiting dust impacts to the Pinal County monitoring sites. During the next few hours, PM10 concentrations were generally low, but there were missing PM10 data at a few of the monitoring sites for multiple hours. By 7 p.m., a second spike in PM10 concentrations due to a thunderstorm outflow boundary with sustained southerly winds between 20-25 mph and gusts above 30 mph, can be seen. The peak monitoring site—Cowtown—had a maximum 1-hour average PM10 concentration of 613  $\mu\text{g}/\text{m}^3$ , and the Maricopa and Stanfield monitoring sites also measured increased PM10 concentrations of 243  $\mu\text{g}/\text{m}^3$  and 346  $\mu\text{g}/\text{m}^3$ , respectively. These spikes preceded the PM10 concentration spikes at the monitoring sites in Maricopa by 1-1.5 hours, which is consistent with wind speeds and directions observed at the Phoenix Sky Harbor Airport in Maricopa County and the Casa Grande Airport in Pinal County for the propagation of the thunderstorm outflow boundary across the region. The increase in PM10 concentrations between the Pinal County sites and the Maricopa County sites indicates that the winds were strong enough to entrain additional dust into the atmosphere as the winds traveled over the same northern desert areas of Pinal County as they did on the previous day. Only monitoring sites in Maricopa and Pinal counties exceeded the NAAQS due to thunderstorm outflows on this day, but the broad range of sites and the high hourly- and daily-averaged PM10 concentrations reflect the magnitude of the dust storm. Additionally, the NWS airport meteorological data tables for the Phoenix Sky Harbor and Casa Grande airports show that the strongest winds associated with the outflow boundary were out of the south. These winds, combined with the high PM10 concentrations in Pinal County, indicate that PM10 was already entrained into the atmosphere outside of the Phoenix PM10 nonattainment area and then transported into the Phoenix region by the strong winds. Additional evidence of the transport of windblown dust into the region is presented in the GIS time series maps in Figure 5-15 through Figure 5-27 below.

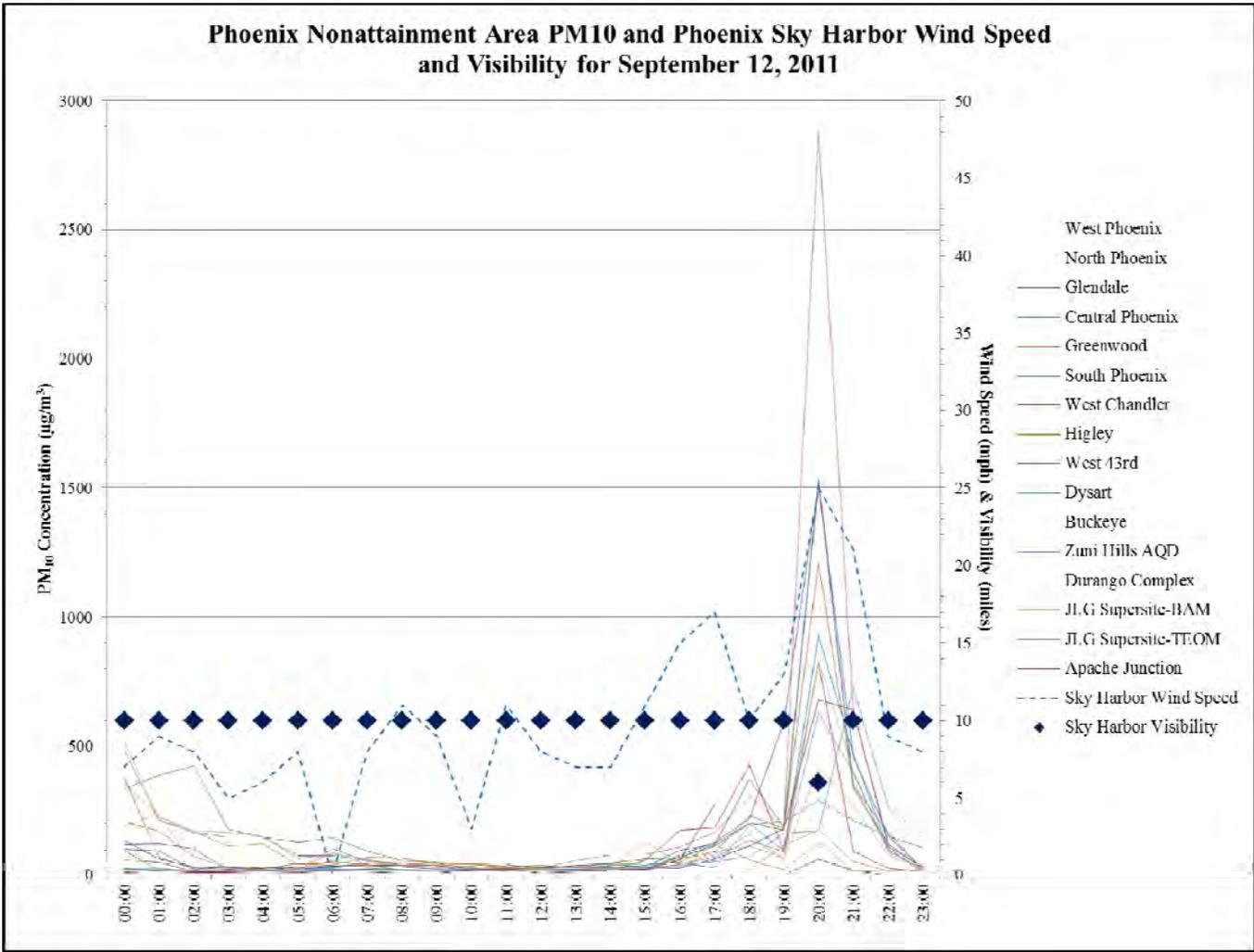
A visualization of this dust event was created using Phoenix visibility camera images that can be viewed as an animation here:

Looking south toward Phoenix, with South Mountain in the distance:

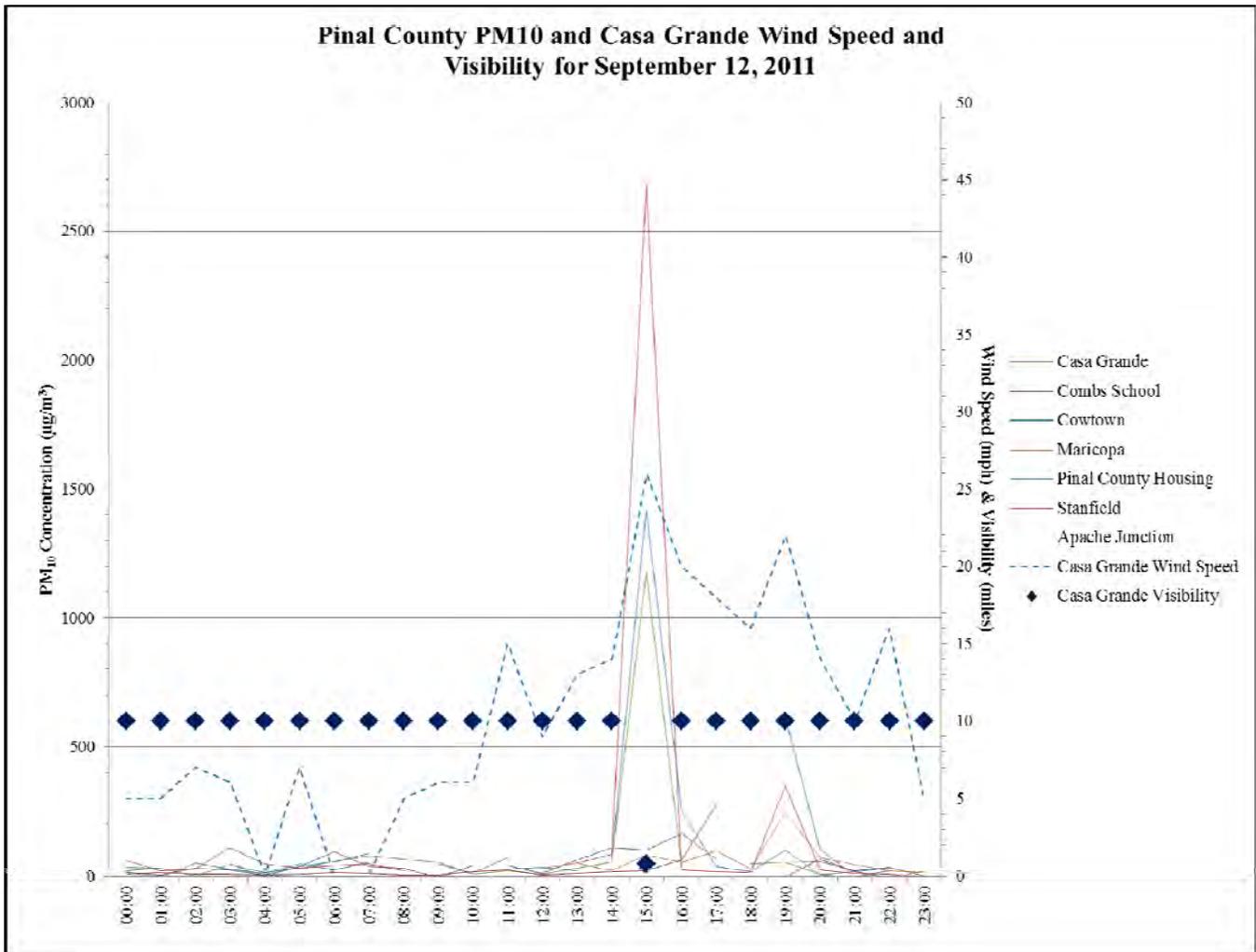
[www.phoenixvis.net/videos/mpeg4/SOMT\\_09122011.mp4](http://www.phoenixvis.net/videos/mpeg4/SOMT_09122011.mp4)

This video from September 12<sup>th</sup> is from the same camera view as the video from the 11<sup>th</sup> and shows multiple moderate dust plumes blowing into the Phoenix area in the afternoon and then the main dust front moving into the region from the south around 8 p.m., exactly when the hourly average PM10 data showed sharp spikes in the PM10 concentrations.

Videos showing other views across the Valley on this date are also available (see the Visibility Cameras section).



**Figure 5-13.** Phoenix nonattainment area PM10 monitor readings and Sky Harbor wind speed and visibility for September 12, 2011.



**Figure 5-14.** Pinal County PM10 monitor readings and Casa Grande visibility and wind speed for September 12, 2011.

### *GIS Time Series Maps*

Figures 5–15 through 5–27 provide a time series GIS-based visualization of the meteorology and PM10 concentrations associated with the thunderstorm outflows observed on September 12, 2012. The data displayed in the following maps were gathered from the same five data sources listed in Table 5-1. All available meteorological and air quality data was used in order to present the most complete story of the event.

### *Map Descriptions*

A description of each time series map is provided to highlight important data in each map and explain the progression of the meteorology and PM10 concentrations through time. Taken as a whole, the maps and associated explanatory text describe the clear causal connection between the windblown dust generated and transported by the thunderstorm outflow winds and the PM10 exceedances at the nonattainment area monitors.

September 12, 2011, 3:00 PM – 4:30 PM

Figures 5-15 through 5-17 show light to moderate southeasterly winds and low PM10 concentrations throughout the Phoenix region and the strong westerly winds previously mentioned in Pinal County that generated high PM10 concentrations during the 3 p.m. hour. By 4:30 p.m., the strong winds had subsided and PM10 concentrations decreased back to low levels again.

September 12, 2011, 5:30 PM – 7:00 PM

Figures 5-18 through 5-20 show gusty, east-southeasterly winds that developed across southeastern Maricopa County and central Pinal County due to outflows from thunderstorms that formed over the Coolidge area between 5 and 6 p.m. During the 6-7 p.m. hour, dust entrained into the atmosphere began to impact PM10 monitors on the southern edge of the Phoenix PM10 nonattainment area, which had hourly concentrations shown in the graph in Figure 5-13 reaching  $400 \mu\text{g}/\text{m}^3$  during the 6-7 p.m. hour. The plumes of dust transported into the Phoenix area can also be seen in the visibility camera video linked above.

September 12, 2011, 7:00 PM – 8:00 PM

Figures 5-21 through 5-22 show lingering elevated PM10 concentrations in the central Phoenix area and the development of strong southerly winds at the Pinal County monitoring sites and airports due to thunderstorms to the south. PM10 concentrations also spiked at the Pinal County monitors closest to the strong winds during this hour.

September 12, 2011, 8:00 PM – 9:30 PM

Figures 5-23 through 5-25 show the arrival of the winds that impacted the Pinal County sites in the previous hour and very large, abrupt increases in PM10 concentrations at nearly every monitoring site in the central Phoenix area, which coincides with the dust front that is clearly evident in the visibility camera videos and is shown on the cover of this report.

September 12, 2011, 9:30 PM – 10:30 PM

Figures 5-26 and 5-27 show subsiding winds across the region and rapidly decreasing PM10 concentrations behind the outflow boundary and as deposition of windblown dust occurred.

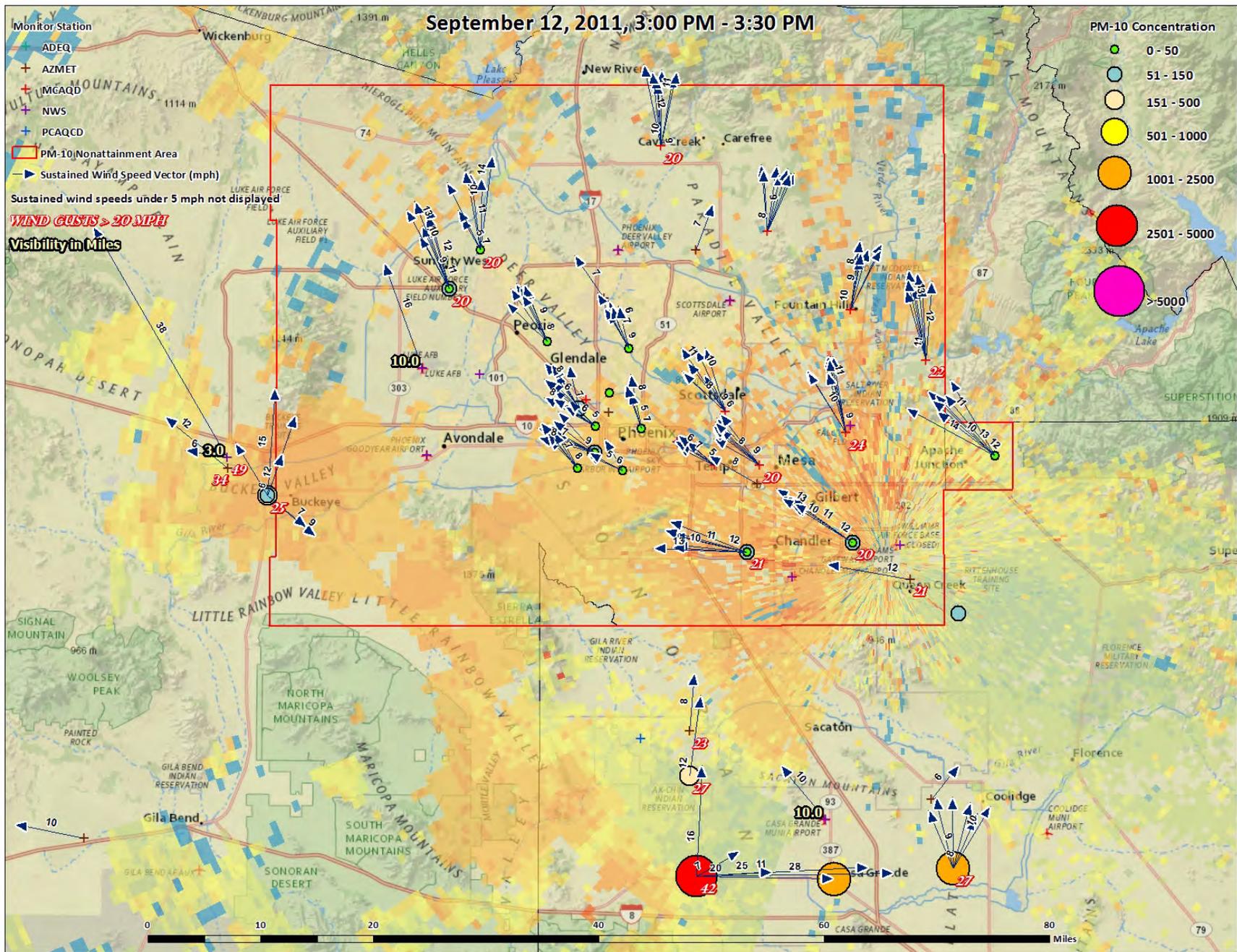


Figure 5-15. GIS Time Series Map for September 12, 2011, 3:00 PM – 3:30 PM.

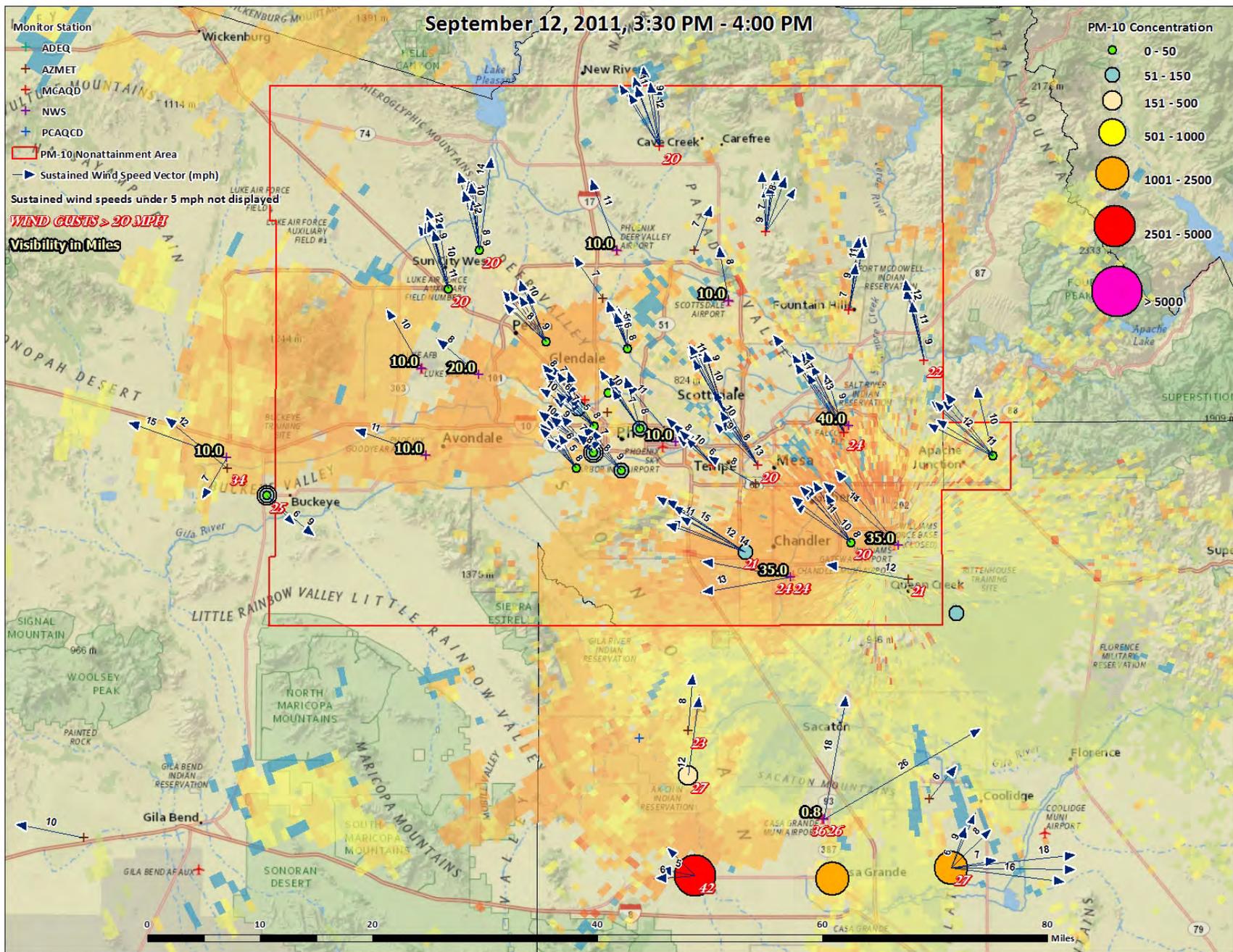


Figure 5-16. GIS Time Series Map for September 12, 2011, 3:30 PM – 4:00 PM.

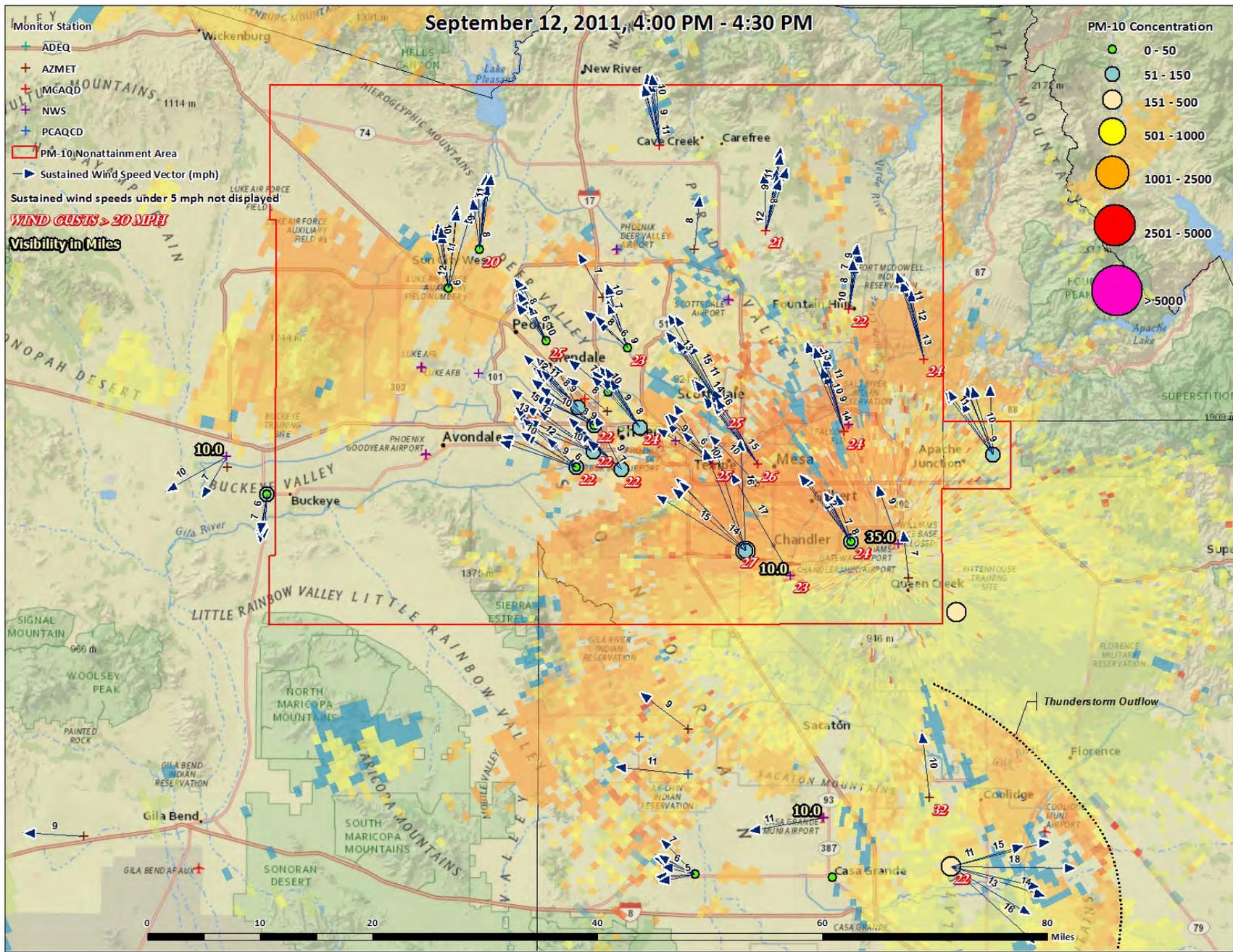


Figure 5-17. GIS Time Series Map for September 12, 2011, 4:00 PM – 4:30 PM.

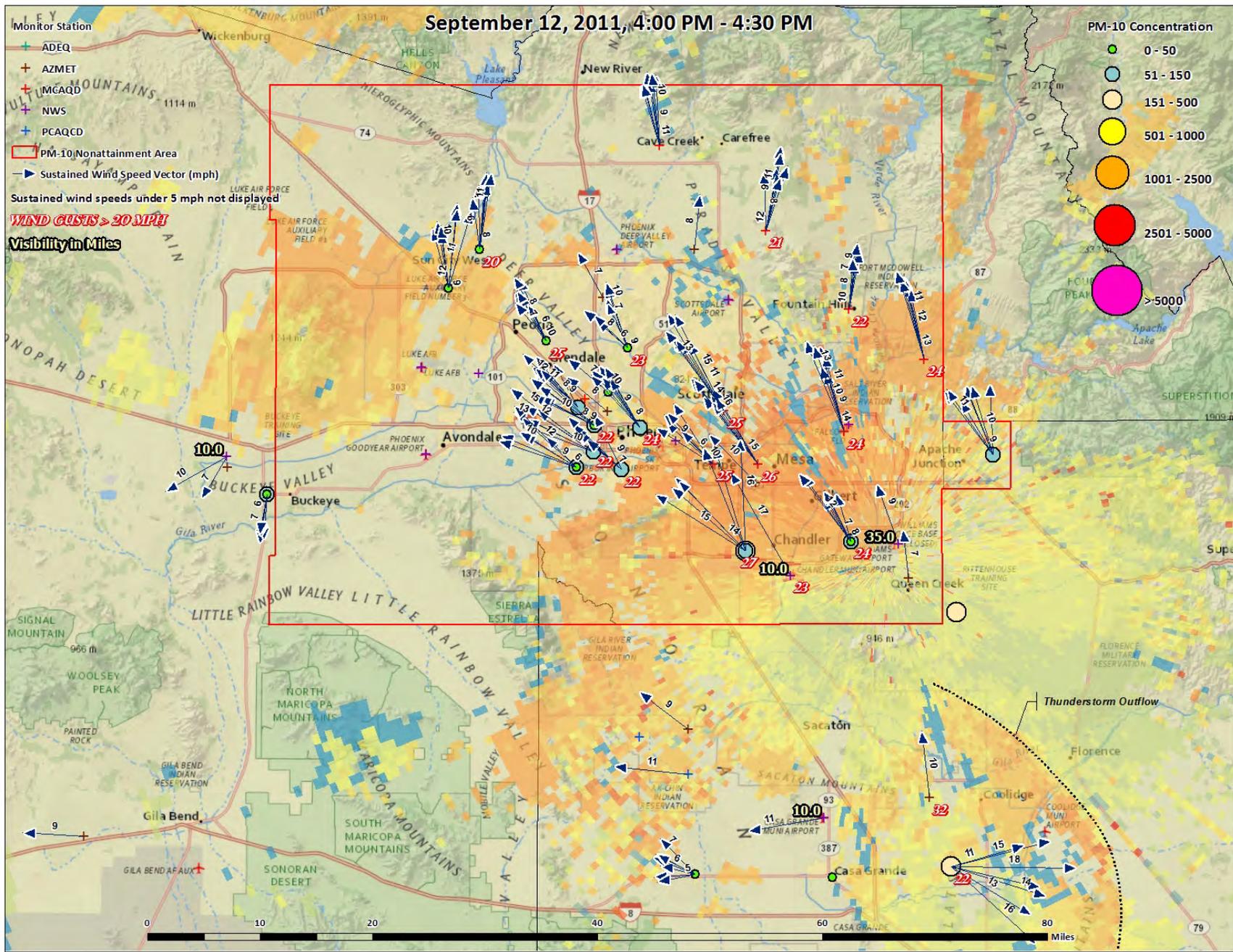


Figure 5-18. GIS Time Series Map for September 12, 2011, 4:00 PM – 4:30 PM.

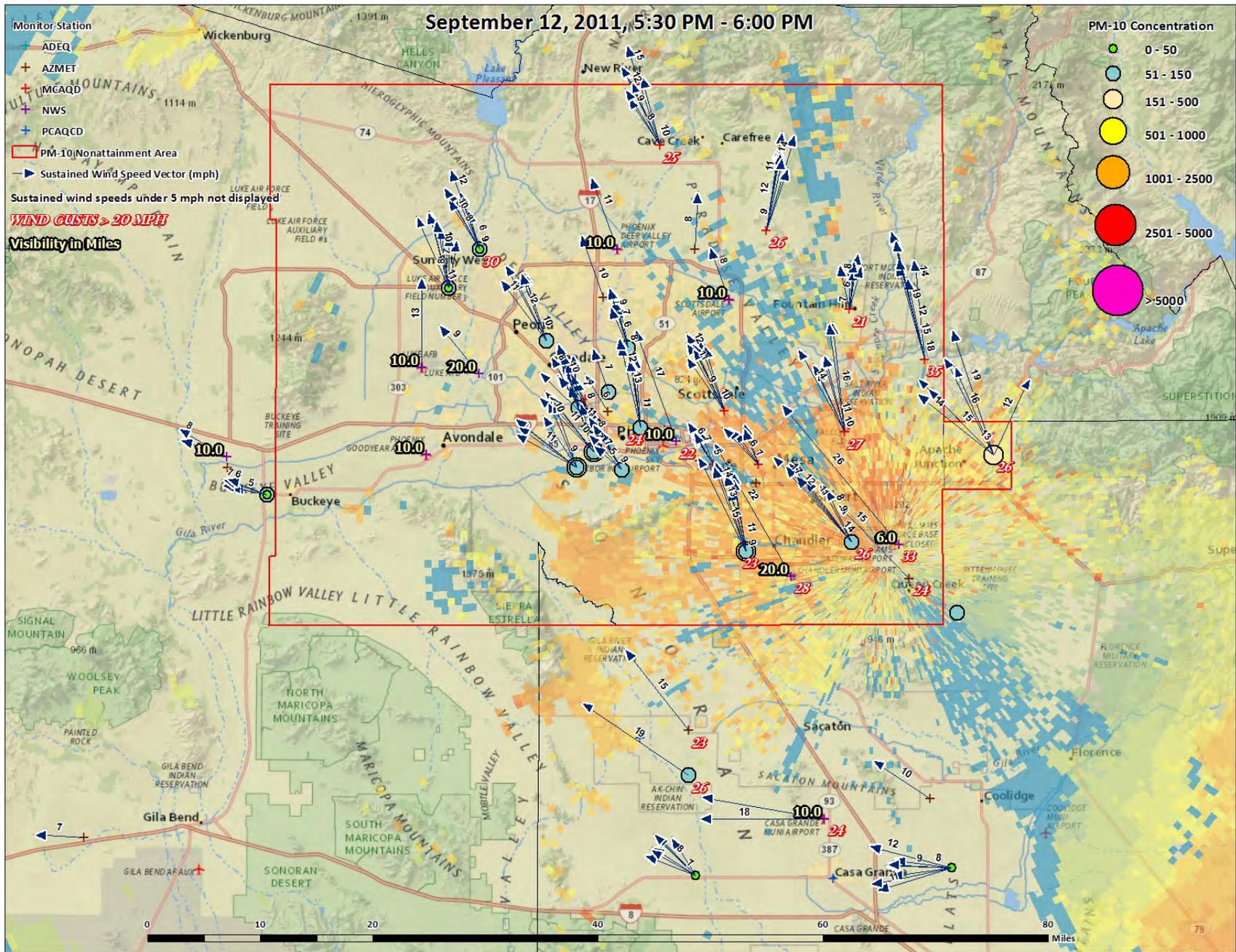


Figure 5-19. GIS Time Series Map for September 12, 2011, 5:30 PM – 6:00 PM.

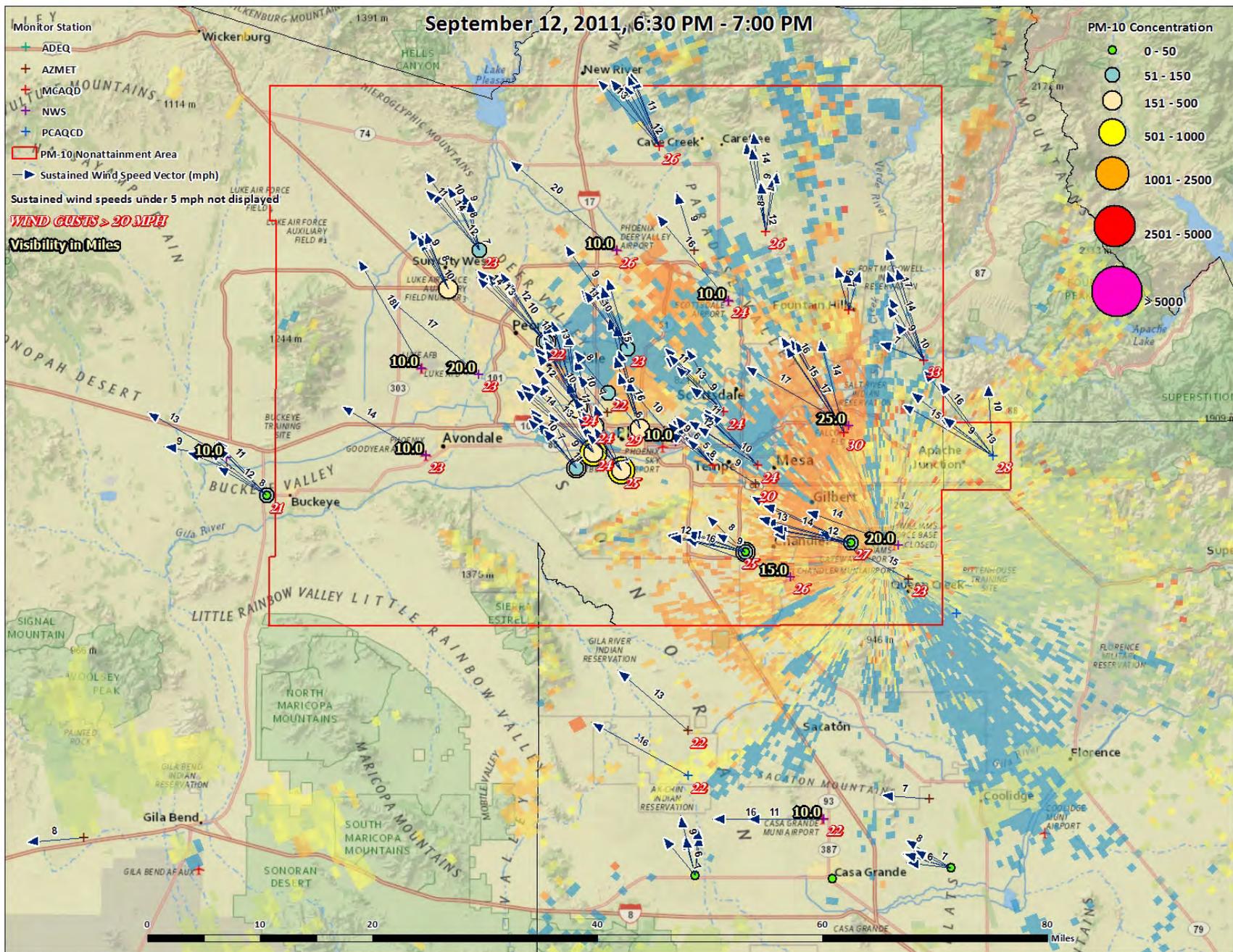


Figure 5-20. GIS Time Series Map for September 12, 2011, 6:30 PM – 7:00 PM.

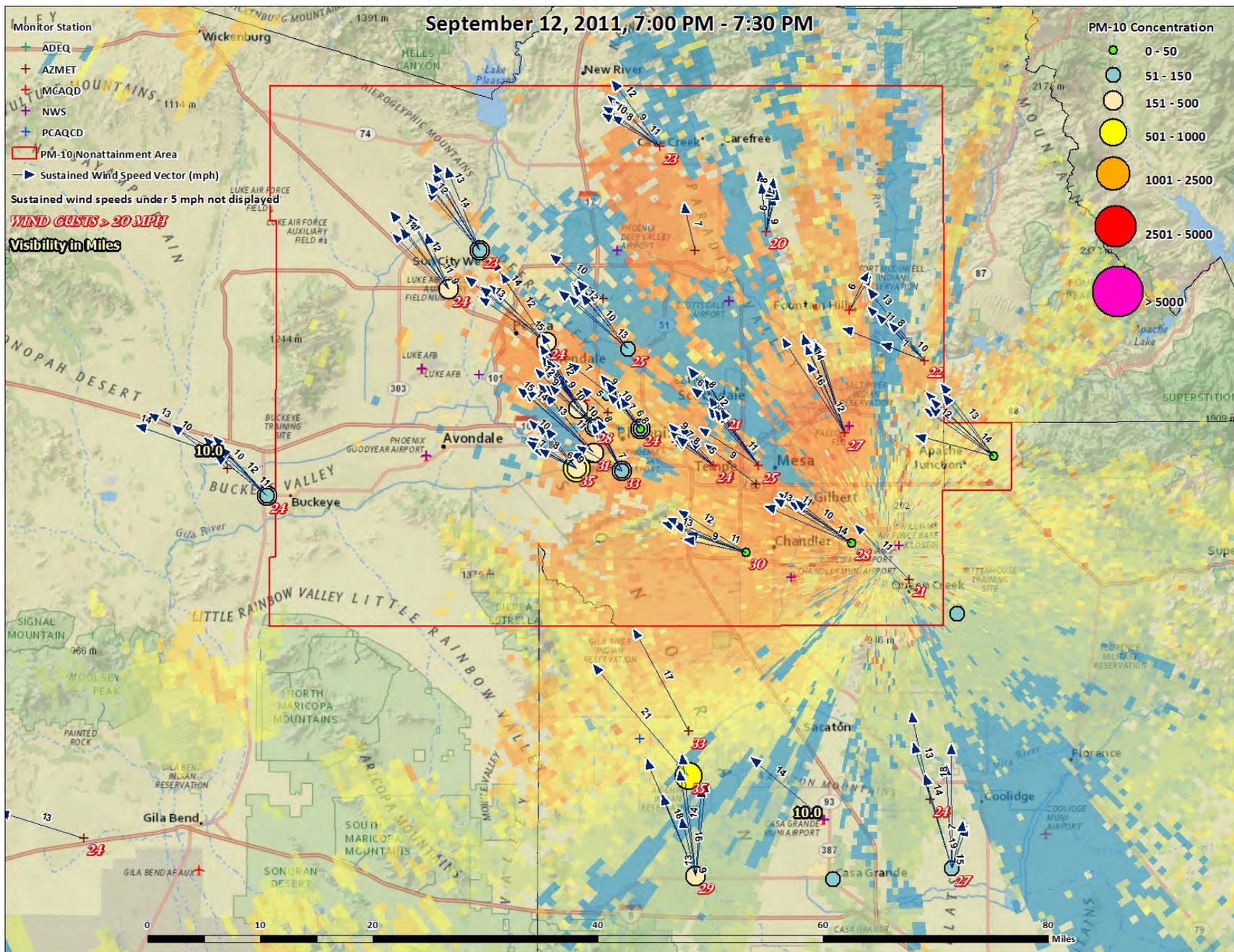


Figure 5-21. GIS Time Series Map for September 12, 2011, 7:00 PM – 7:30 PM.

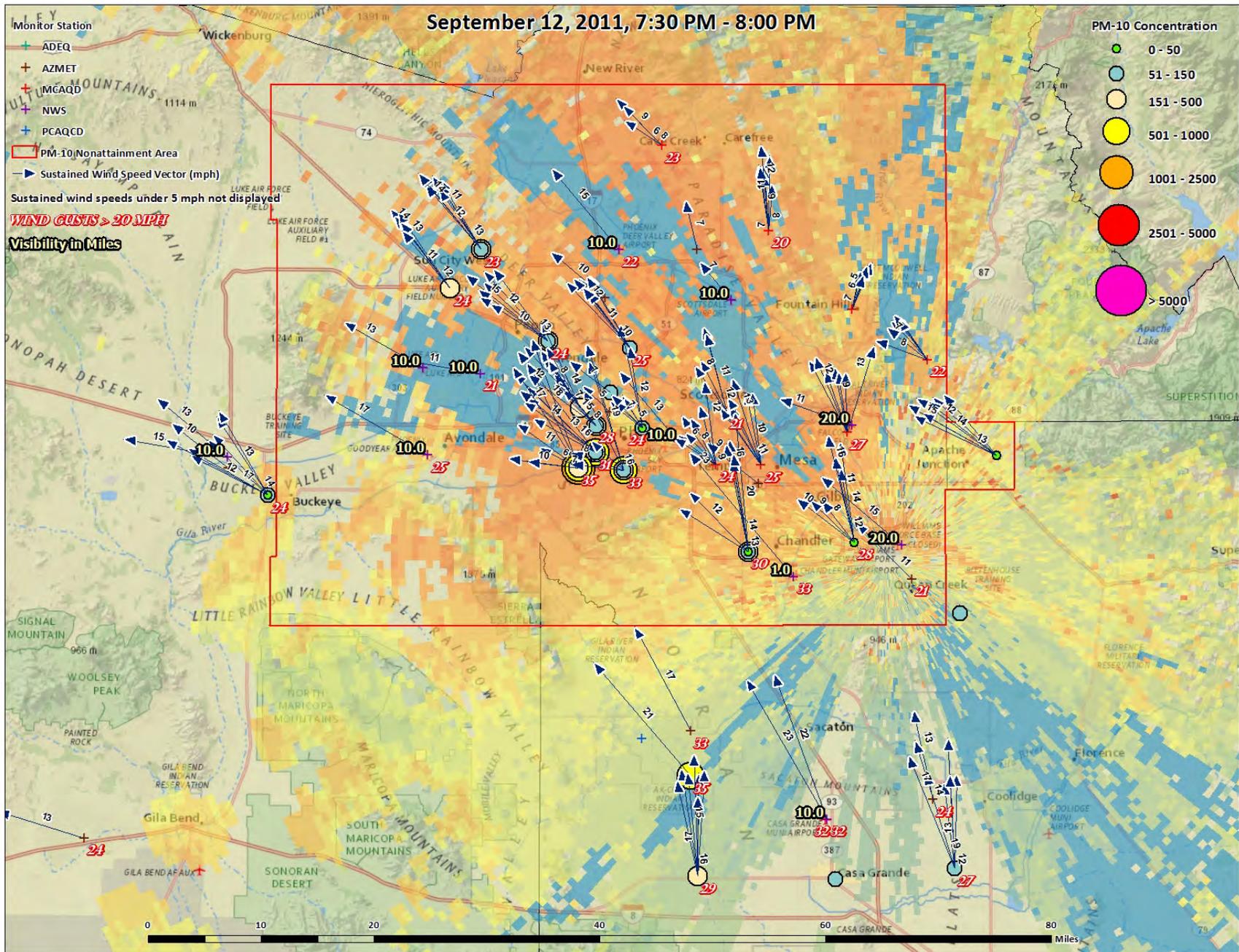


Figure 5-22. GIS Time Series Map for September 12, 2011, 7:30 PM – 8:00 PM.

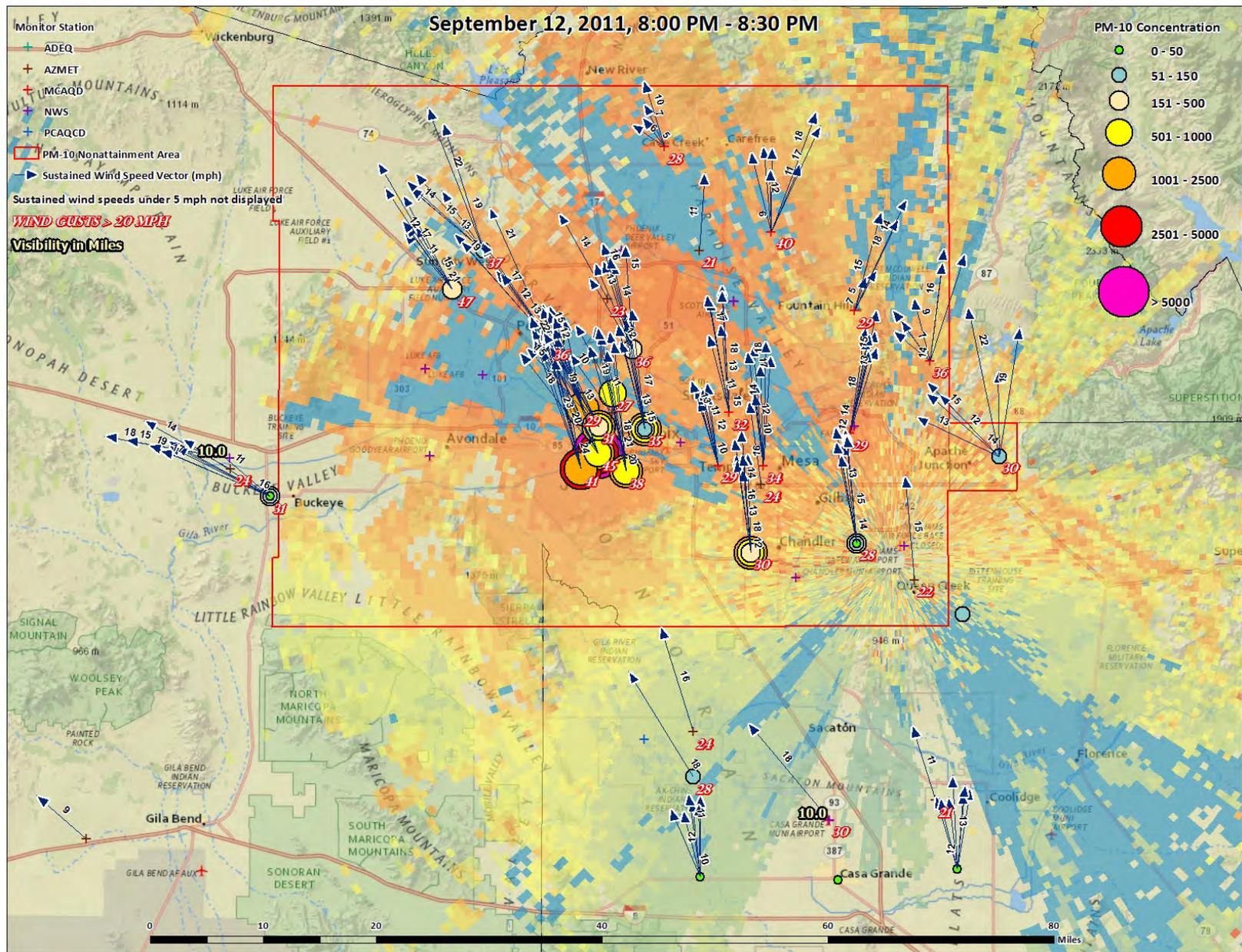


Figure 5-23. GIS Time Series Map for September 12, 2011, 8:00 PM – 8:30 PM.

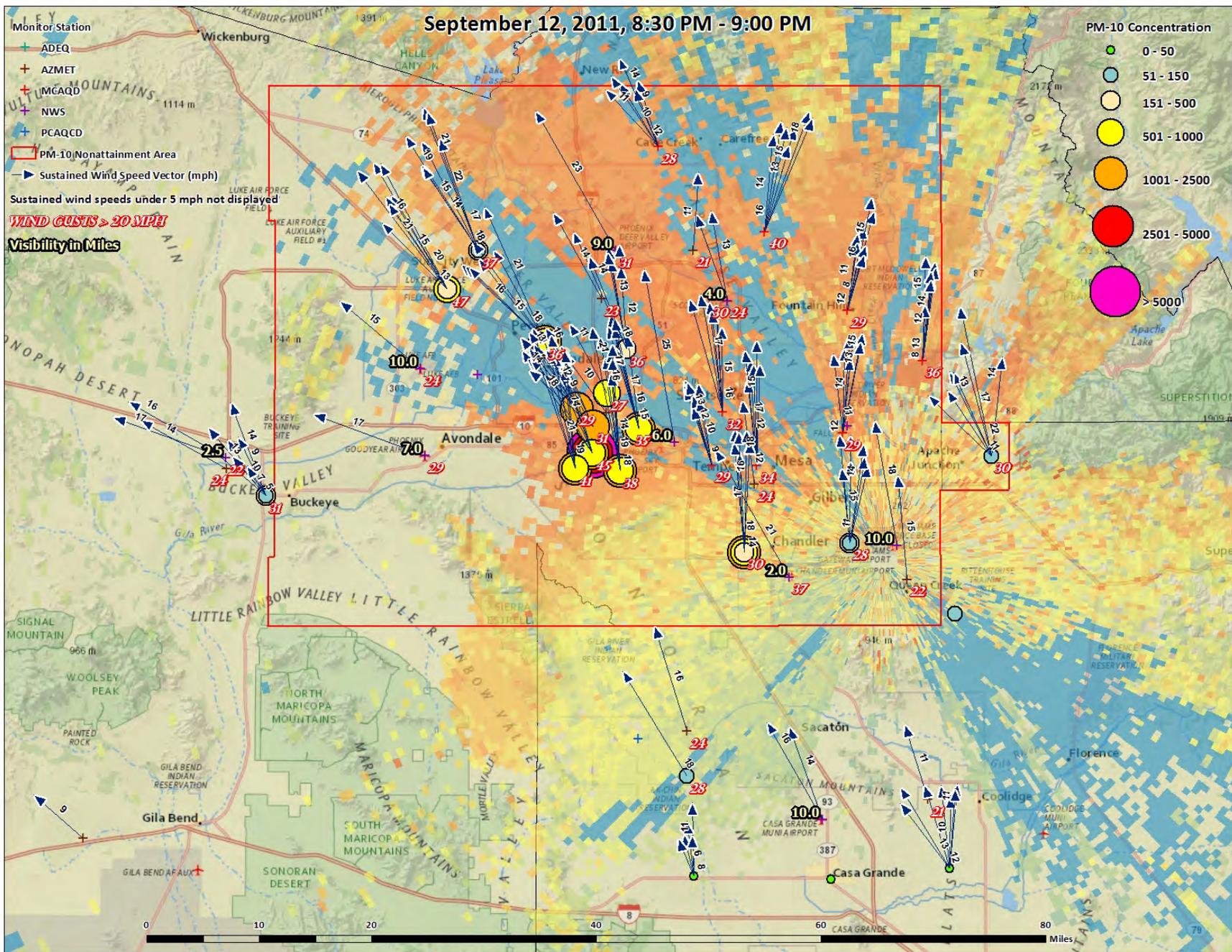


Figure 5-24. GIS Time Series Map for September 12, 2011, 8:30 PM – 9:00 PM.

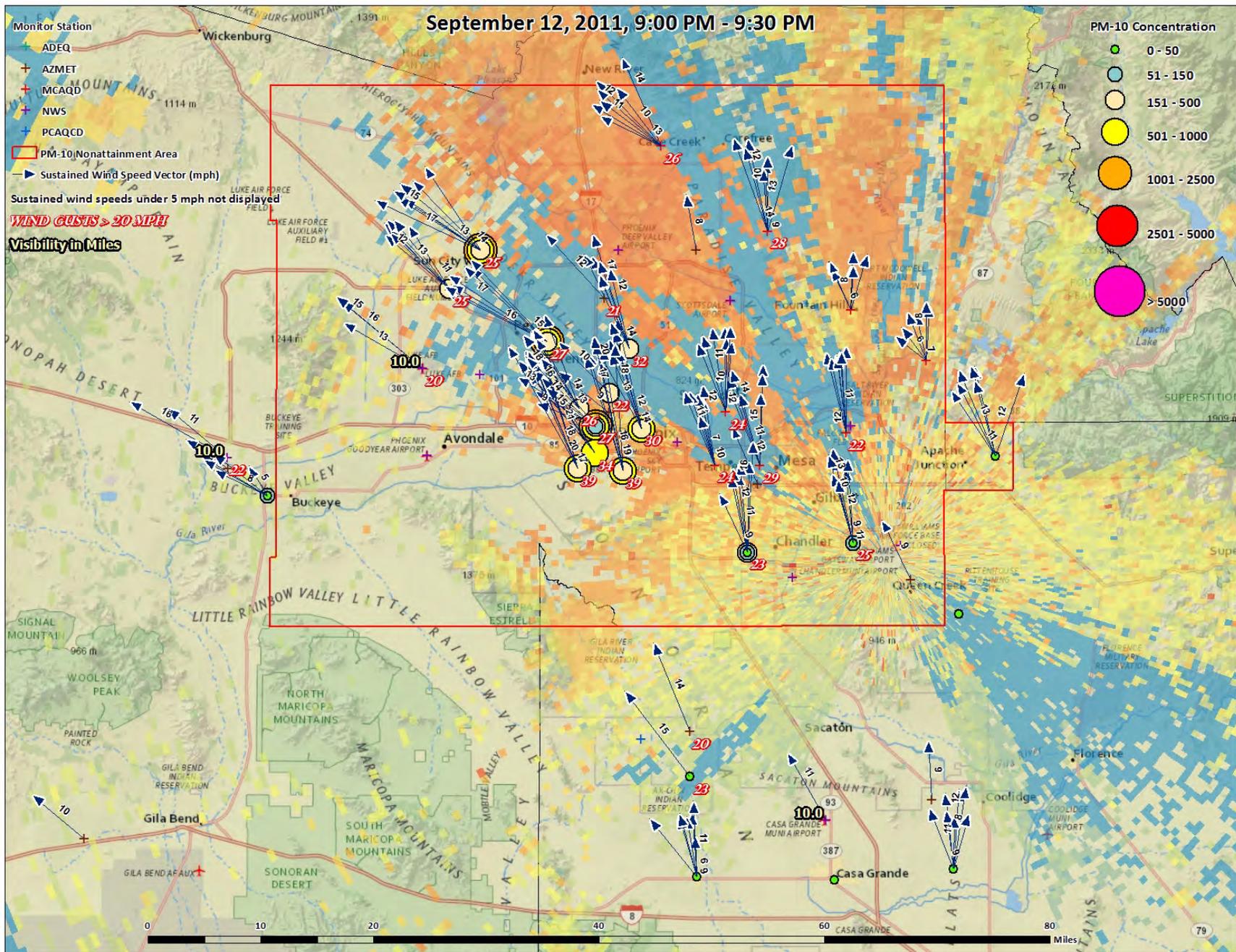


Figure 5-25. GIS Time Series Map for September 12, 2011, 9:00 PM – 9:30 PM.

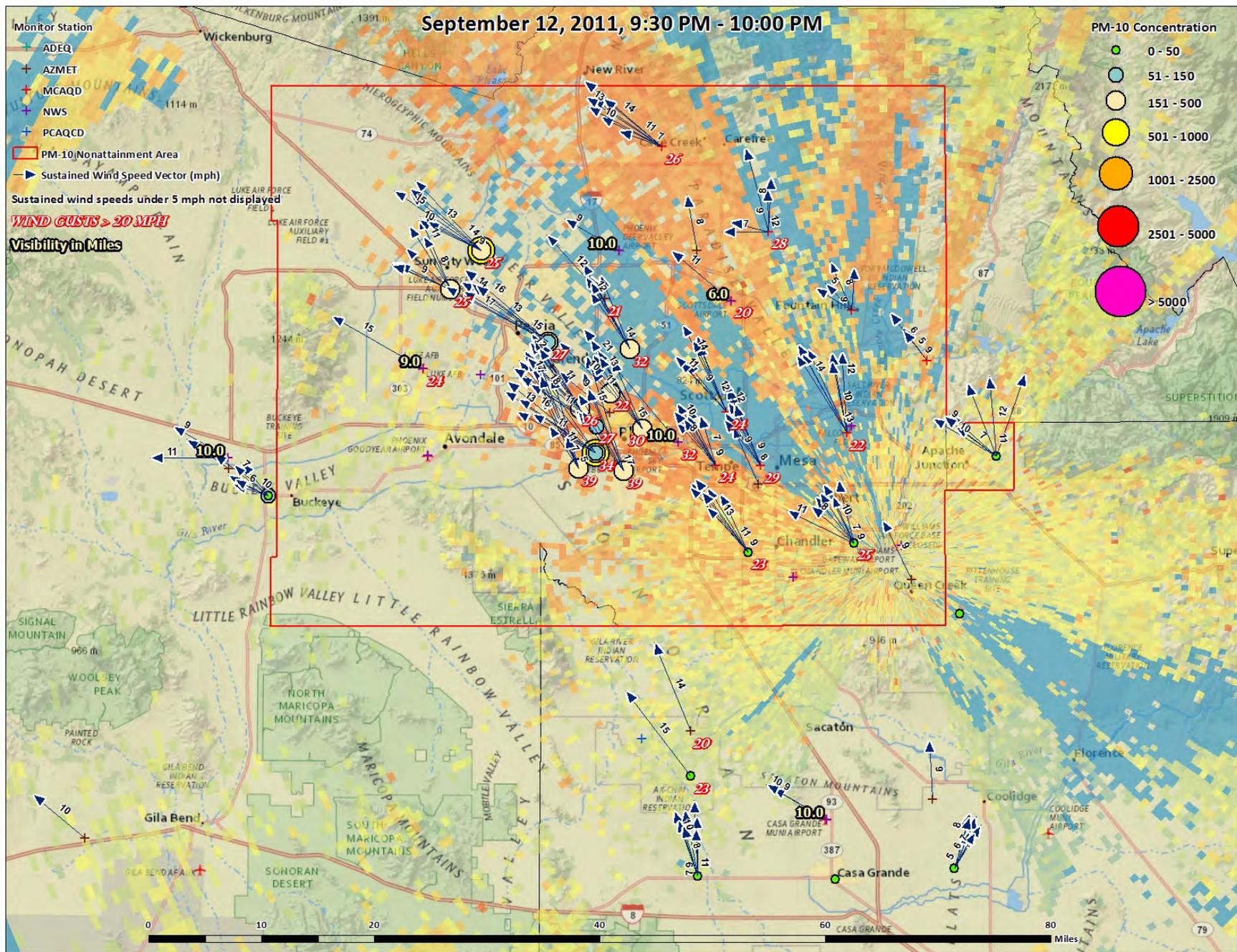


Figure 5-26. GIS Time Series Map for September 12, 2011, 9:30 PM – 10:00 PM.

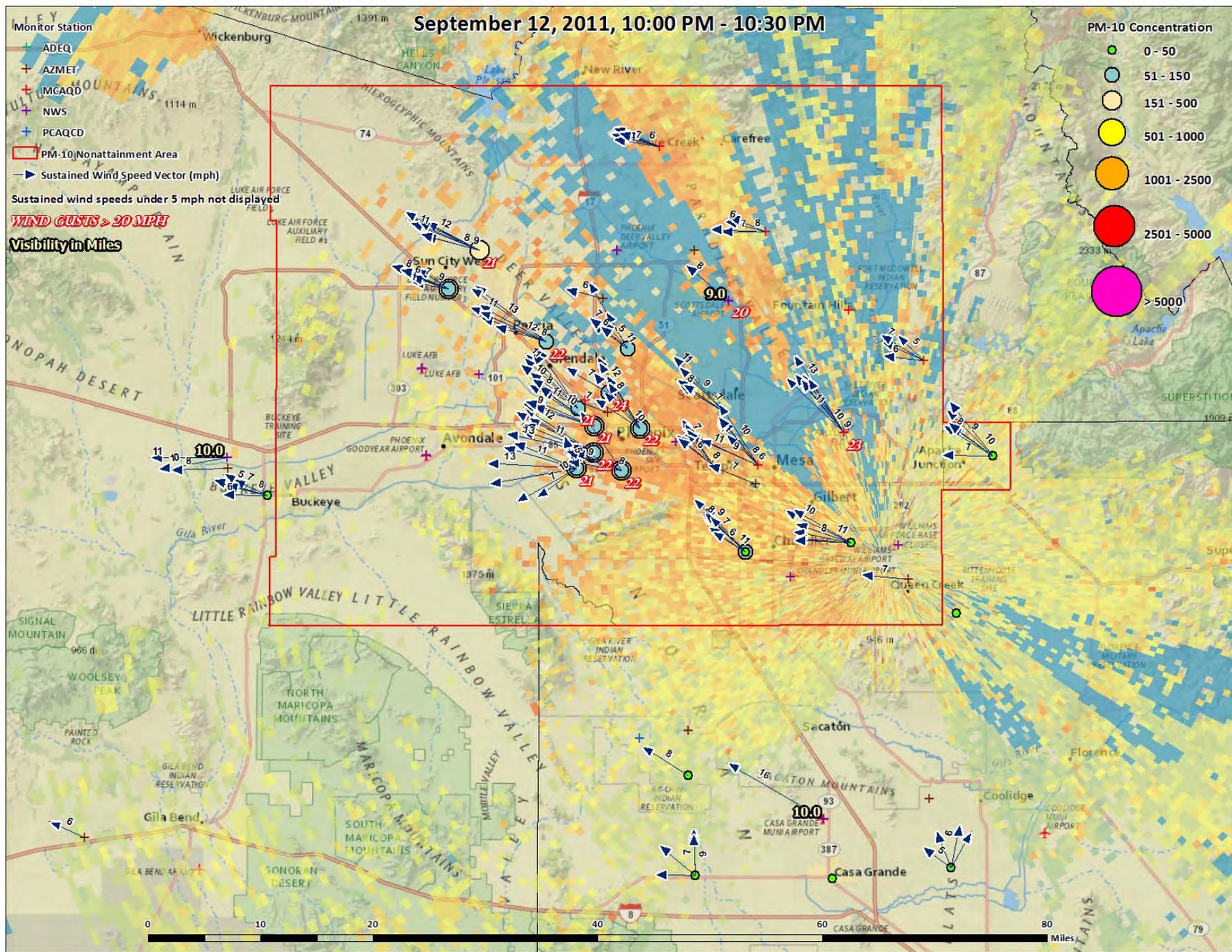


Figure 5-27. GIS Time Series Map for September 12, 2011, 10:00 PM – 10:30 PM.

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA  
(final)  
HOURLY OBSERVATIONS TABLE  
PHOENIX SKY HARBOR INTL AIRPORT (23183)  
PHOENIX, AZ  
(09/2011)**

Elevation: 1107 ft. above sea level  
Latitude: 33.427  
Longitude: -112.003  
Data Version: VER3

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
12	0051	11	SCT170 BKN200	10.00		85	29.4	67	19.3	56	13.3	37	7	090		28.79						29.97
12	0151	11	SCT170 BKN200	10.00		85	29.4	66	19.1	55	12.8	36	9	090		28.78	6	002	29.90	AA		29.96
12	0251	11	SCT170 BKN200	10.00		84	28.9	66	18.9	55	12.8	37	8	080		28.79			29.91	AA		29.97
12	0351	11	SCT170 BKN200	10.00		84	28.9	66	18.9	55	12.8	37	5	110		28.79			29.91	AA		29.97
12	0451	11	SCT170 BKN200	10.00		83	28.3	66	18.7	55	12.8	38	6	110		28.80	3	004	29.92	AA		29.98
12	0551	11	SCT170 BKN210	10.00		83	28.3	66	18.7	55	12.8	38	8	080		28.81			29.93	AA		29.99
12	0651	11	FEW170 SCT210	10.00		83	28.3	66	18.7	55	12.8	38	0	000		28.83			29.95	AA		30.01
12	0751	11	FEW170 SCT210	10.00		85	29.4	66	19.1	55	12.8	36	8	110		28.84	1	015	29.96	AA		30.02
12	0851	11	FEW170 BKN210	10.00		89	31.7	67	19.3	53	11.7	29	11	070		28.84			29.96	AA		30.02
12	0951	11	FEW170 SCT210	10.00		91	32.8	67	19.6	53	11.7	27	9	080		28.85			29.97	AA		30.03
12	1051	11	FEW095 SCT170 SCT210	10.00		94	34.4	68	19.9	52	11.1	24	3	140		28.85	3	003	29.97	AA		30.03
12	1151	11	FEW100 SCT170 BKN210	10.00		97	36.1	68	20.1	51	10.6	21	11	080		28.83			29.95	AA		30.01
12	1251	11	FEW100 SCT170 SCT210	10.00		100	37.8	70	20.9	52	11.1	20	8	160	22	28.80			29.92	AA		29.98
12	1351	11	FEW100 SCT180 SCT210	10.00		97	36.1	70	20.8	54	12.2	24	7	150	16	28.79	8	021	29.90	AA		29.97
12	1451	11	FEW090 SCT140 BKN180	10.00		96	35.6	69	20.4	53	11.7	23	7	140		28.77			29.89	AA		29.95
12	1551	11	FEW070 SCT100 BKN140	10.00		95	35.0	68	19.8	51	10.6	22	11	140		28.77			29.88	AA		29.95
12	1651	11	FEW070 SCT100 SCT140	10.00		92	33.3	69	20.5	56	13.3	30	15	150	24	28.78	5	003	29.90	AA		29.96
12	1751	11	FEW070 SCT100 SCT140	10.00		90	32.2	68	20.2	56	13.3	32	17	160	22	28.78			29.90	AA		29.96
12	1851	11	FEW070 SCT100 BKN150	10.00		88	31.1	67	19.6	55	12.8	33	10	140		28.82			29.94	AA		30.00
12	1951	11	FEW070 SCT100 BKN150	10.00		86	30.0	67	19.5	56	13.3	36	13	140	18	28.86	3	027	29.98	AA		30.04
12	2051	11	FEW090 BKN130 BKN180	6.00		81	27.2	69	20.4	62	16.7	53	25	170	32	28.89			30.01	AA		30.07
12	2151	11	FEW090 SCT130 BKN210	10.00		80	26.7	67	19.6	60	15.6	51	21	140		28.88			30.00	AA		30.06
12	2251	11	FEW090 SCT130 BKN210	10.00		80	26.7	67	19.3	59	15.0	49	9	120		28.89			30.01	AA		30.07
12	2351	11	FEW170 SCT250	10.00		79	26.1	67	19.4	60	15.6	52	8	050		28.90	1	009	30.02	AA		30.08

Dynamically generated Wed Nov 14 21:18:58 EST 2012 via <http://cdo.ncdc.noaa.gov/qclcd/QCLCD>

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA  
(final)  
HOURLY OBSERVATIONS TABLE  
CASA GRANDE MUNICIPAL ARPT (03914)  
CASA GRANDE, AZ  
(09/2011)**

Elevation: 1462 ft. above sea level  
Latitude: 32.95  
Longitude: -111.766  
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
12	0015	0	CLR	10.00		82	28.0	65	18.5	55	13.0	40	5	030		28.45			M	AA		30.00
12	0035	0	CLR	10.00		81	27.0	65	18.3	55	13.0	41	5	020		28.45			M	AA		30.00
12	0055	0	CLR	10.00		81	27.0	65	18.3	55	13.0	41	5	030		28.45			M	AA		30.00
12	0115	0	CLR	10.00		82	28.0	65	18.2	54	12.0	38	6	080		28.46			M	AA		30.01
12	0135	0	CLR	10.00		82	28.0	65	18.5	55	13.0	40	6	070		28.45			M	AA		30.00
12	0155	0	CLR	10.00		81	27.0	65	18.0	54	12.0	39	5	030		28.45	7	003	M	AA		30.00
12	0215	0	CLR	10.00		79	26.0	64	17.6	54	12.0	42	3	040		28.45			M	AA		30.00
12	0235	0	CLR	10.00		81	27.0	65	18.0	54	12.0	39	6	050		28.45			M	AA		30.00
12	0255	0	CLR	10.00		81	27.0	65	18.0	54	12.0	39	7	060		28.45			M	AA		30.00
12	0315	0	CLR	10.00		81	27.0	65	18.0	54	12.0	39	7	050		28.45			M	AA		30.00
12	0335	0	CLR	10.00		81	27.0	65	18.0	54	12.0	39	6	060		28.45			M	AA		30.00
12	0355	0	CLR	10.00		81	27.0	65	18.0	54	12.0	39	6	090		28.46			M	AA		30.01
12	0415	0	CLR	10.00		81	27.0	65	18.0	54	12.0	39	6	050		28.45			M	AA		30.00
12	0435	0	CLR	10.00		81	27.0	65	18.3	55	13.0	41	0	000		28.46			M	AA		30.01
12	0455	0	CLR	10.00		81	27.0	65	18.0	54	12.0	39	0	000		28.46	2	003	M	AA		30.01
12	0515	0	CLR	10.00		81	27.0	65	18.0	54	12.0	39	0	000		28.47			M	AA		30.02
12	0535	0	CLR	10.00		81	27.0	65	18.0	54	12.0	39	6	060		28.47			M	AA		30.02
12	0555	0	CLR	10.00		81	27.0	65	18.0	54	12.0	39	7	060		28.47			M	AA		30.02
12	0615	0	CLR	10.00		81	27.0	65	18.0	54	12.0	39	8	050		28.47			M	AA		30.02
12	0635	0	CLR	10.00		79	26.0	64	17.6	54	12.0	42	0	000		28.48			M	AA		30.03
12	0655	0	CLR	10.00		79	26.0	64	17.6	54	12.0	42	0	000		28.48			M	AA		30.04
12	0715	0	CLR	10.00		81	27.0	65	18.3	55	13.0	41	0	000		28.48			M	AA		30.04
12	0735	0	CLR	10.00		81	27.0	65	18.3	55	13.0	41	0	000		28.48			M	AA		30.04
12	0755	0	CLR	10.00		81	27.0	65	18.3	55	13.0	41	0	000		28.48			M	AA		30.04
12	0815	0	CLR	10.00		84	29.0	66	18.6	54	12.0	36	3	070		28.49			M	AA		30.05
12	0835	0	CLR	10.00		84	29.0	66	18.6	54	12.0	36	9	070		28.51			M	AA		30.06
12	0855	0	CLR	10.00		84	29.0	66	18.6	54	12.0	36	5	080		28.51			M	AA		30.06
12	0915	0	CLR	10.00		86	30.0	67	19.2	55	13.0	35	5	110		28.51			M	AA		30.06
12	0935	0	CLR	10.00		86	30.0	66	18.9	54	12.0	33	0	000		28.51			M	AA		30.06
12	0955	0	CLR	10.00		88	31.0	67	19.3	54	12.0	31	6	100		28.51			M	AA		30.07
12	1015	0	CLR	10.00		90	32.0	68	19.9	55	13.0	31	7	120		28.51			M	AA		30.07
12	1035	0	CLR	10.00		91	33.0	69	20.6	57	14.0	32	9	110		28.51			M	AA		30.07
12	1055	0	CLR	10.00		91	33.0	69	20.6	57	14.0	32	6	120		28.51	2	007	M	AA		30.06
12	1115	0	CLR	10.00		93	34.0	69	20.4	55	13.0	28	14	150		28.51			M	AA		30.06

12	1135	0	CLR	10.00		93	34.0	69	20.4	55	13.0	28	15	130	22	28.51			M	AA	30.06
12	1155	0	CLR	10.00		93	34.0	69	20.4	55	13.0	28	15	120	23	28.49			M	AA	30.05
12	1215	0	CLR	10.00		95	35.0	69	20.7	55	13.0	26	15	110	18	28.49			M	AA	30.05
12	1235	0	CLR	10.00		95	35.0	69	20.7	55	13.0	26	15	120		28.48			M	AA	30.04
12	1255	0	CLR	10.00		97	36.0	70	21.0	55	13.0	24	9	110	21	28.48			M	AA	30.03
12	1315	0	CLR	10.00		95	35.0	69	20.7	55	13.0	26	17	080		28.47			M	AA	30.02
12	1335	0	CLR	10.00		97	36.0	70	20.8	54	12.0	24	13	080	20	28.46			M	AA	30.01
12	1355	0	CLR	10.00		97	36.0	69	20.3	52	11.0	22	13	120	21	28.45	7	020	M	AA	30.00
12	1415	0	CLR	10.00		97	36.0	69	20.3	52	11.0	22	10	090	20	28.44			M	AA	29.99
12	1435	0	CLR	10.00		95	35.0	68	20.0	52	11.0	23	13	100		28.44			M	AA	29.99
12	1455	0	CLR	10.00		93	34.0	67	19.6	52	11.0	25	14	130	17	28.44			M	AA	29.99
12	1515	0	CLR	10.00		93	34.0	67	19.6	52	11.0	25	10	140		28.44			M	AA	29.99
12	1535	0	BKN006 BKN011 OVC120	0.75	TS	88	31.0	68	20.1	57	14.0	35	26	240	36	28.46			M	AA	30.01
12	1555	0	SCT009 SCT036 BKN100	10.00	TS	82	28.0	70	20.8	63	17.0	53	18	190	26	28.48			M	AA	30.04
12	1615	0	FEW032 SCT047 BKN100	10.00	VCTS	81	27.0	69	20.7	63	17.0	54	11	080	16	28.47			M	AA	30.02
12	1635	0	CLR	10.00		86	30.0	69	20.3	59	15.0	40	10	070		28.48			M	AA	30.03
12	1655	0	CLR	10.00		88	31.0	71	21.8	63	17.0	43	20	120	24	28.48	2	014	M	AA	30.04
12	1715	0	CLR	10.00		84	29.0	69	20.6	61	16.0	46	21	110	26	28.48			M	AA	30.03
12	1735	0	CLR	10.00		82	28.0	66	19.0	57	14.0	43	18	090	24	28.47			M	AA	30.02
12	1755	0	CLR	10.00		82	28.0	67	19.6	59	15.0	46	18	100		28.47			M	AA	30.02
12	1815	0	CLR	10.00		82	28.0	66	19.0	57	14.0	43	15	100		28.48			M	AA	30.03
12	1835	0	CLR	10.00		81	27.0	66	18.9	57	14.0	44	11	090	22	28.48			M	AA	30.04
12	1855	0	CLR	10.00		81	27.0	66	18.9	57	14.0	44	16	090		28.49			M	AA	30.05
12	1915	0	CLR	10.00		79	26.0	68	19.7	61	16.0	54	14	130		28.53			M	AA	30.09
12	1935	0	CLR	10.00		79	26.0	68	19.7	61	16.0	54	23	150	32	28.54			M	AA	30.10
12	1955	0	CLR	10.00		79	26.0	68	19.7	61	16.0	54	22	160	32	28.56	2	027	M	AA	30.12
12	2015	0	CLR	10.00		77	25.0	67	19.3	61	16.0	58	18	140	30	28.57			M	AA	30.13
12	2035	0	CLR	10.00		77	25.0	67	19.3	61	16.0	58	16	150		28.57			M	AA	30.13
12	2055	0	CLR	10.00		75	24.0	66	18.9	61	16.0	62	14	160		28.57			M	AA	30.13
12	2115	0	CLR	10.00		75	24.0	66	18.9	61	16.0	62	11	150		28.57			M	AA	30.13
12	2135	0	CLR	10.00		75	24.0	66	18.9	61	16.0	62	9	120		28.55			M	AA	30.11
12	2155	0	CLR	10.00		75	24.0	66	18.9	61	16.0	62	10	120		28.54			M	AA	30.10
12	2215	0	CLR	10.00		75	24.0	65	18.3	59	15.0	58	16	120		28.52			M	AA	30.08
12	2235	0	CLR	10.00		75	24.0	64	17.7	57	14.0	54	14	120	21	28.52			M	AA	30.08
12	2255	0	CLR	10.00		75	24.0	65	18.3	59	15.0	58	16	100	21	28.51	7	017	M	AA	30.07
12	2315	0	CLR	10.00		75	24.0	65	18.3	59	15.0	58	8	090		28.52			M	AA	30.08
12	2335	0	CLR	10.00		73	23.0	64	17.9	59	15.0	62	8	060		28.52			M	AA	30.08
12	2355	0	CLR	10.00		73	23.0	64	17.9	59	15.0	62	5	040		28.52			M	AA	30.08

Dynamically generated Wed Nov 14 22:07:12 EST 2012 via <http://cdo.ncdc.noaa.gov/qclcd/QCLCD>

A description of the fields and data codes/abbreviations used in these tables can be found here:  
<http://cdo.ncdc.noaa.gov/qclcd/qclcddocumentation.pdf>

## **Visibility Cameras**

Visibility camera images were compiled into time lapse photography videos in order to visually show the dust impacts on portions of Maricopa County on September 11 and 12. The animations are available online for each event and for each of the visibility camera sites in Maricopa County. These views can be accessed using the camera site codes SOMT (South Mountain), CAME (Camelback Mountains), SUPM (Superstition Mountains), ESMO (Estrella Mountains), and WHTM (White Tank Mountains). It should be noted that these time lapse photography videos may require the installation of a mp4 viewer.

The video files can be accessed as follows:

[http://www.phoenixvis.net/videos/mpeg4/xxxx\\_mmddyyyy.mp4](http://www.phoenixvis.net/videos/mpeg4/xxxx_mmddyyyy.mp4)

xxxx = 4-character site code (ie. SOMT)

mm = 2-character month (ie. 09)

dd = 2-character day (ie. 11)

yyyy = 4-character year (ie. 2011)

## **Conclusion**

The information presented within this section has demonstrated a clear causal relationship between the emissions generated by uncontrollable natural events and the exceedances measured at the PM10 monitors. The satellite images, time series graphs, and meteorological data tables provided in this section for September 11 & 12, 2011, show the temporal progression of the dust events from the development of the thunderstorms, to the increase in wind speeds, and to the rise in PM10 concentrations. The GIS maps for September 11<sup>th</sup> also showed how soon after the main outflow boundary passed through the Phoenix area, that stagnation allowed PM10 concentrations to remain high at a few sites. The GIS maps for September 12<sup>th</sup> showed how strong winds and high PM10 concentrations in Pinal County traveled northward into Maricopa County, leading to a subsequent increase in wind speeds and PM10 concentrations at the Phoenix area PM10 monitors. The combination of the PM10 concentrations and wind data from Maricopa County on September 11<sup>th</sup>, and from Maricopa and Pinal Counties on September 12<sup>th</sup>, supports the conclusion that the events were primarily caused by windblown dust from emission sources outside of Maricopa County and the transport of PM10 into the Phoenix PM10 nonattainment area.

## VI. “BUT FOR” ANALYSIS

Section 50.14(c)(3)(iv)(D) in 40 CFR part 50 requires that an exceptional event demonstration must satisfy that “[t]here would have been no exceedance or violation but for the event.” The prior sections of this submittal have provided detailed information that the exceedances on September 11 & 12, 2011, were not reasonably controllable or preventable and there is a clear causal relationship between transported PM10 from thunderstorm outflows originating in the desert areas outside of the Phoenix PM10 nonattainment area and the measured exceedances within the nonattainment area. The weight of evidence in these sections demonstrates that but for the existence of emissions generated by these thunderstorm outflows and associated transported PM10, there would have been no exceedances of the 24-hour PM10 standard.

As detailed in Section IV, all reasonable control measures were in place and actively enforced before, during, and after the exceedances of September 11 & 12, 2011. Inspection and compliance data of local fugitive dust sources during this time period revealed that PM10 from anthropogenic activities was well controlled and constant. Local regulatory agencies, industry, and the general public were alerted to the possibility of dust storms due to thunderstorm activity through daily forecasts and media reports. Heightened, real-time surveillance of PM10 monitoring stations during the events established a clear link between rapidly rising PM10 concentrations and the arrival of the thunderstorm outflows. On-the-ground observations recorded during the events consistently identify transported or re-entrained PM10 as the cause of the elevated concentrations near the exceeding monitors.

As shown in Section V, detailed, time series data and the GIS maps establish a clear causal relationship between the arrival of emissions generated by thunderstorm outflows and elevated PM10 concentrations at the monitors. Multiple, independent measurements of wind speed, wind direction, visibility, and radar base velocity all point to the presence of thunderstorm outflows as the delivery vehicle for transported PM10 into the nonattainment area. Any local PM10 emissions generated during the arrival of the thunderstorm outflows are linked to the turbulent and gusty outflow front of the storm and pale in comparison to the amount of transported PM10 originating outside the nonattainment area. The source regions for the thunderstorm outflows and transported PM10 are clearly identified as the desert areas outside of the Phoenix PM10 nonattainment area.

The body of evidence presented in this submittal provides no alternative that could tie the exceedances of September 11 & 12, 2011, to any other causal source but transported and re-entrained PM10 generated from thunderstorm outflows, confirming that there would have been no exceedances but for the presence of these uncontrollable natural events.

## **VII. CONCLUSIONS**

The exceedances that occurred on September 11 & 12, 2011, satisfy the following criteria of 40 CFR 50.1(j) and meet the definition of an exceptional event:

- The event affects air quality;
- The event is not reasonably controllable or preventable; and
- The event is unlikely to reoccur at a particular location or [is] a natural event.

### **Affects Air Quality**

As stated in the preamble to the Exceptional Events Rule, the event in question is considered to have affected air quality if it can be shown that there is a clear causal relationship between the monitored exceedance and the event, and that the event is associated with a measured concentration in excess of normal historical fluctuations. Given the information presented in Sections II, III, IV, and V, we can reasonably conclude that the event in question affected air quality.

### **Not Reasonably Controllable or Preventable**

Section 50.1(j) of Title 40 CFR Part 50 requires that an event must be “not reasonably controllable or preventable” in order to be defined as an exceptional event. This requirement is met by demonstrating that, despite reasonable control measures in place within Maricopa County and the Phoenix PM10 nonattainment area, high wind conditions overwhelmed all reasonably available controls. Despite the deployment of comprehensive control measures and sophisticated response programs, high wind conditions associated with thunderstorms and thunderstorm outflows brought high concentrations of PM10 emissions into, and also overwhelmed controls within, the Phoenix PM10 nonattainment area. The event discussed in this document that caused the exceedances in this request (see Sections II and V) were caused by thunderstorm-driven outflow winds that transported dust into Maricopa County from areas largely outside of the Phoenix PM10 nonattainment area. The fact that these were natural events involving strong thunderstorm outflow winds that transported PM10 emissions into Maricopa County, with a majority of the PM10 emissions recorded by Maricopa County area monitors coming from sources outside of the Phoenix PM10 nonattainment area, provides strong evidence that the event and exceedances of September 11 & 12, 2011 recorded within the nonattainment area were not reasonably controllable or preventable.

### **Natural Event**

As discussed above, the events shown to cause these exceedances were emissions of PM10 driven by high winds caused by thunderstorm activity and related outflow boundaries on September 11 & 12, 2011. The events therefore qualify as natural events.

### **Summary**

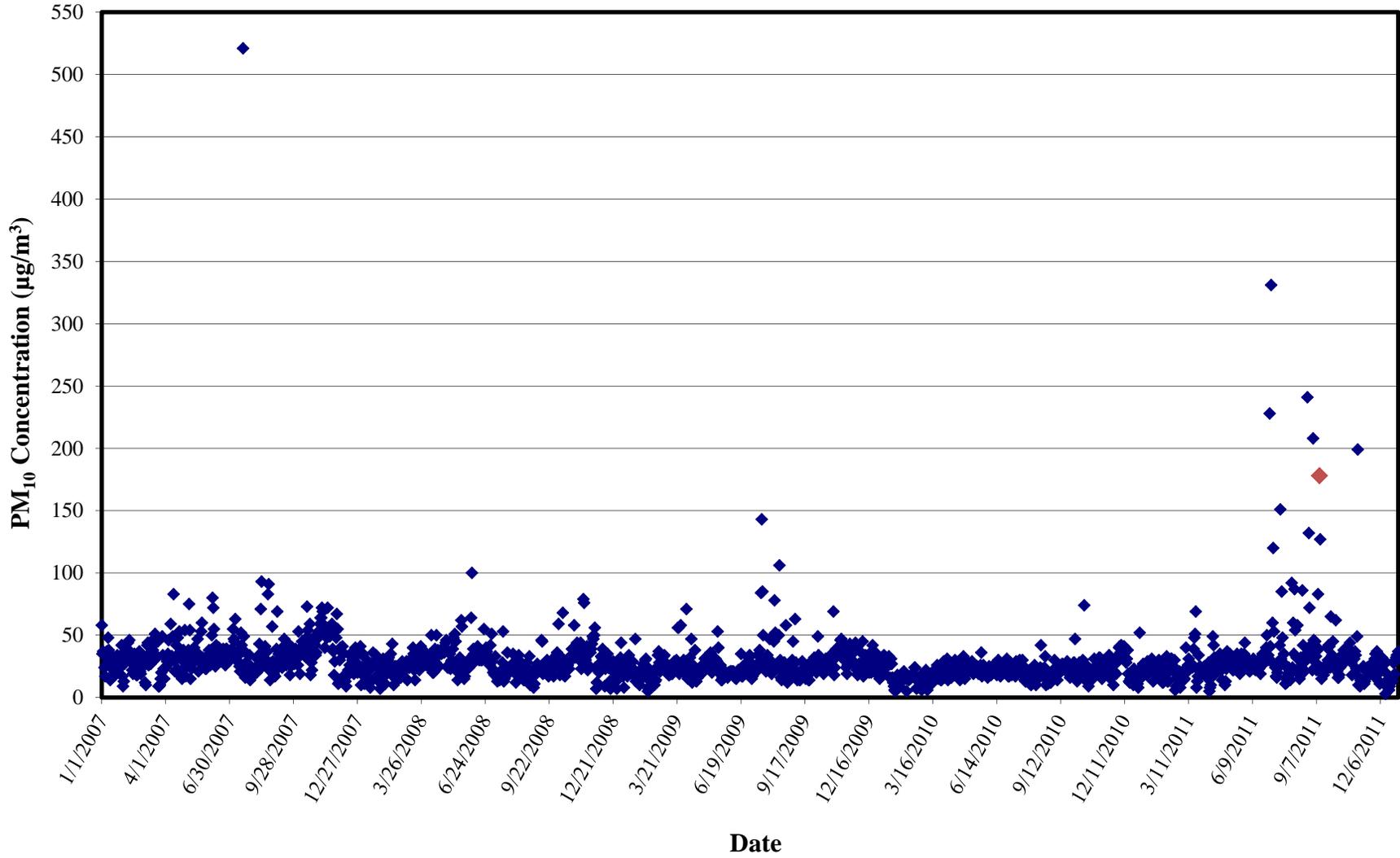
In summary, the exceedances of the federal 24-hour PM10 standard on September 11 & 12, 2011, would not have occurred but for the monsoonal thunderstorm-driven high winds and windblown dust transport from areas largely outside the Phoenix PM10 nonattainment area, based on the weight of evidence summarized below.

- Graphs of PM10 at various Phoenix area monitors in Section V and the tables containing meteorological data for representative NWS airport sites show that the timing of elevated PM10 events was consistent with decreased visibility and high winds at the NWS sites.
- Visibility camera imagery discussed in Section V indicates that large quantities of PM10 were transported into the Phoenix Metro area during the September 11<sup>th</sup> and 12<sup>th</sup> events. The timing of the dust storms depicted in the visibility camera imagery is consistent with the PM10 concentration measurements, elevated winds, and reduced visibility reported during the events.
- Historical Fluctuation analyses and graphs in Section III and Appendix A showing five years of 24-hour average data for each of the Phoenix PM10 nonattainment area monitors which exceeded on either day depict numerous atypically high PM10 concentrations during the third quarter of 2011, including the days of September 11 & 12. The sudden increase in the frequency of elevated PM10 concentrations during this time period was exceptional from an historical perspective.
- Each of the exceedances of the PM10 standard recorded on September 11 & 12 is tied to thunderstorm activity and thunderstorm generated outflow winds, as can be seen in data and analyses in Section V.
- Figures, tables, and GIS maps in Section V show that the timing of thunderstorm-generated outflow boundary passages and increases in wind speeds at air monitoring locations and National Weather Service stations during each of the events is consistent with the timing of elevated PM10 concentrations recorded at the monitoring locations in the Phoenix PM10 nonattainment area.
- Wind speeds and directions, thunderstorm-generated outflow boundary propagation, and PM10 concentration patterns, all depicted in Section V, help show that the majority of the dust that impacted Phoenix PM10 nonattainment area monitors originated in Pinal County and other areas located generally to the south-southeast of the Phoenix PM10 nonattainment area.
- Section IV discusses rules that are in place in the Phoenix PM10 nonattainment area as well as inspections that were conducted in the area to verify compliance with those rules in order to show that the events are not reasonably controllable or preventable. Additionally, the visibility webcam time lapse photography videos referenced in Section V help illustrate the magnitude and scale of these events, which supports the claim that the exceedances recorded during this period were not reasonably controllable or preventable.

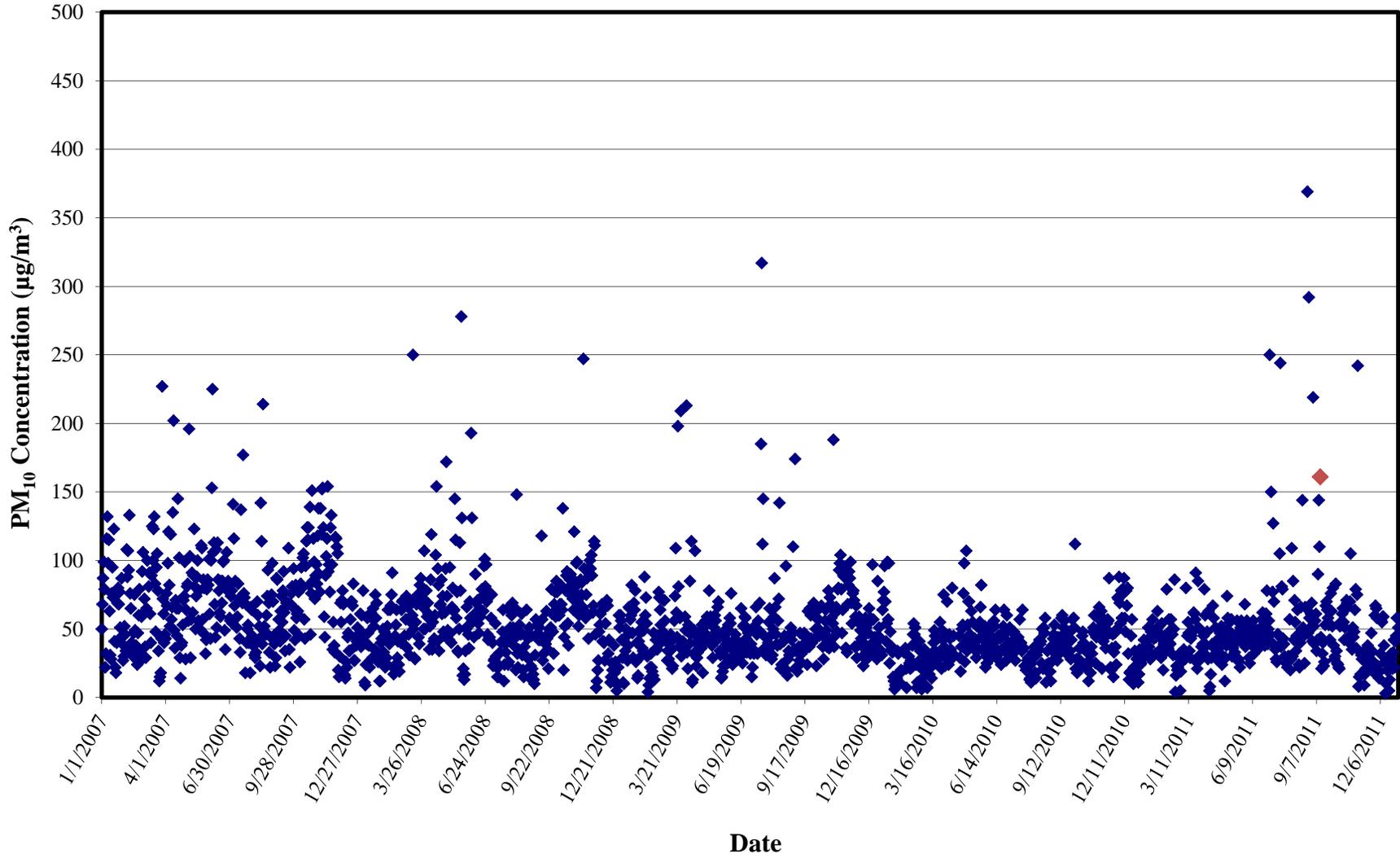
**APPENDIX A**

**5-YEAR HISTORICAL FLUCTUATION GRAPHS FOR  
THE PHOENIX PM10 NONATTAINMENT AREA MONITORING SITES**

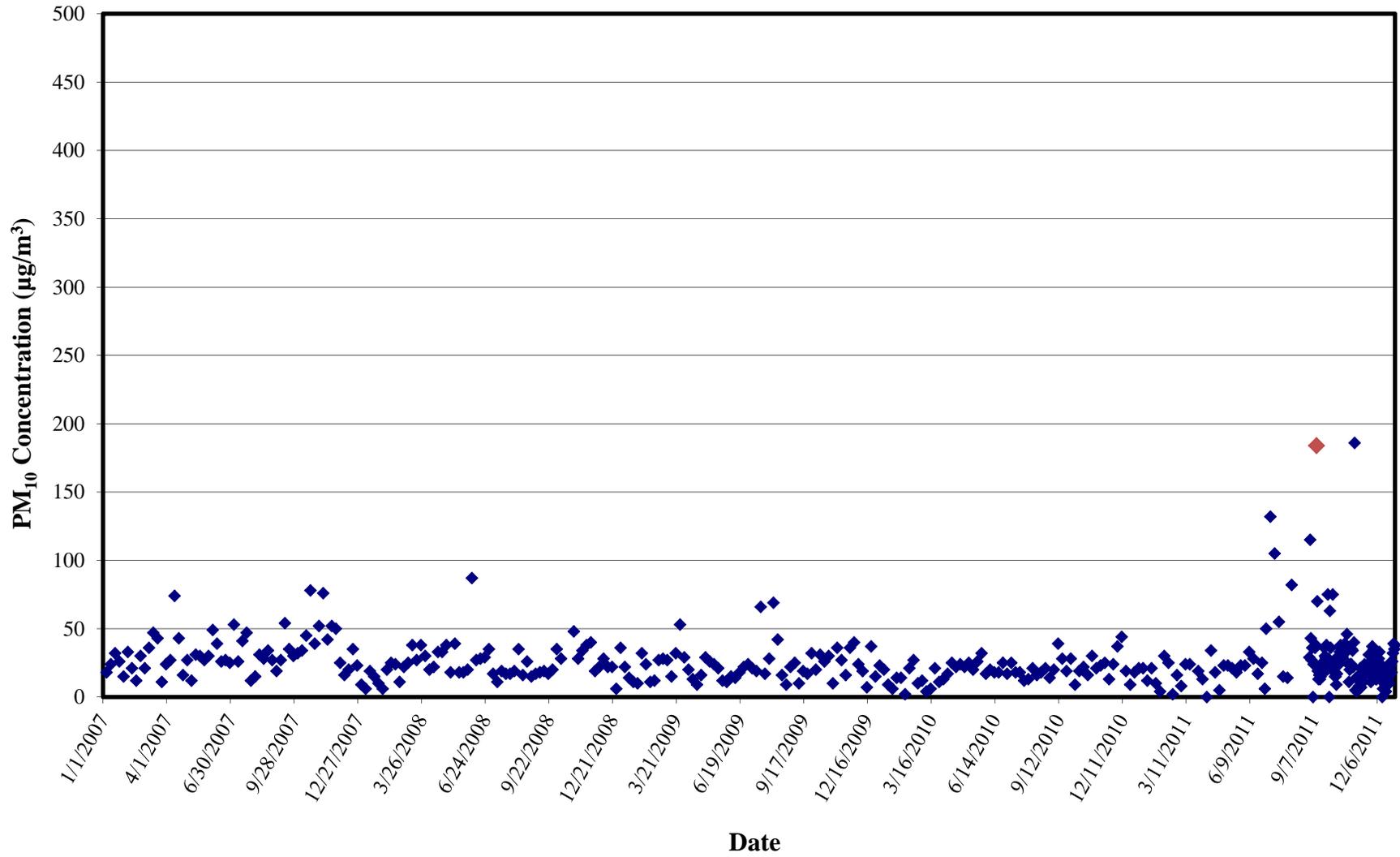
JLG Supersite 5-Year Historical Fluctuation - 24 Hour Averages



West 43rd 5-Year Historical Fluctuation - 24 Hour Averages



North Phoenix 5-Year Historical Fluctuation - 24 Hour Averages



APPENDIX B

ADEQ FORECAST PRODUCTS FOR PHOENIX,  
MARICOPA COUNTY, AND PINAL COUNTY



## MARICOPA COUNTY DUST CONTROL FORECAST ISSUED FRIDAY, SEPTEMBER 9, 2011

### Three-day weather outlook:

**DURING ACTIVE SUMMER MONSOON EPISODES STRONG GUSTY WINDS AND DENSE BLOWING DUST ARE POSSIBLE, EVEN FROM DISTANT THUNDERSTORMS**

Low pressure over California will move close to the AZ/CA/NV border this weekend. Clashing with high pressure to the south, thunderstorm activity will be enhanced over Arizona late Friday through Saturday. Some cells may become severe, producing large hail and damaging straight-line winds. This also increases the possibility of blowing dust Saturday. Storm activity decreases through next week, but chances remain around 20% each day as low pressure lingers through next Friday. Daytime temperatures will be near normal, around 100°F Sunday through the middle of next week. The risk of exceeding the 24-hr PM10 health standard in Phoenix will be **MODERATE** on Saturday, dropping to **LOW** by Sunday.

### R I S K F A C T O R S

	<u>WINDS</u>	+	<u>STAGNATION</u>	=	<u>UNHEALTHY PM-10 RISK LEVEL</u>
<b>Day 1: Sat 09/10/2011</b>	Southwest winds between 5 and 10 mph are expected (40-50% chance of showers and t-storms late).		Rather stagnant conditions are likely early, improving late.		<b>MODERATE</b>
<b>Day 2: Sun 09/11/2011</b>	Southwest winds between 5 and 10 mph are expected (30% chance of showers and t-storms late).		Rather stagnant conditions are likely early, improving late.		<b>LOW</b>
<b>Day 3: Mon 09/11/2011</b>	Southwest winds between 5 and 10 mph are expected (20% chance of showers and t-storms early).		Rather stagnant conditions are likely early, improving late.		<b>LOW</b>

### EXTENDED OUTLOOK

<b>Day 4: Tue 09/13/2011</b>	Southwest winds between 5 and 10 mph are expected (20% chance of showers and t-storms early).	+	Rather stagnant conditions are likely early, improving late.	=	<b>LOW</b>
<b>Day 5: Wed 09/14/2011</b>	Southwest winds between 5 and 10 mph are expected (20-30% chance of showers and t-storms).	+	Rather stagnant conditions are likely early, improving late.	=	<b>LOW</b>

The Maricopa County Dust Control Action Forecast is issued to assist in the planning of work activities to help reduce dust pollution. A recorded message of this forecast can be accessed at [602-771-2368](tel:602-771-2368). To review the complete air quality forecast for the Phoenix metropolitan area, as well as the health impacts and reduction methods for different air pollutants, call [602-771-2367](tel:602-771-2367) for recorded forecast information or click on ADEQ's Air Quality Forecast at <http://www.azdeq.gov/environ/air/ozone/ensemble.pdf>.



**VERY UNHEALTHY (201-300)**  
**UNHEALTHY (151-200)**  
**UNHEALTHY FOR SENSITIVE GROUPS (101-150)**  
**MODERATE (51-100)**  
**GOOD (0-50)**

For more information visit:  
<http://www.airnow.gov/index.cfm?action=aqibasics.aqi>

**NEW!!! CLICK HERE FOR UPDATED OZONE SEASON STATS NEW!!!**

**AIR QUALITY FORECAST FOR SATURDAY, SEPTEMBER 10, 2011**

This report is updated by 1:00 p.m. Sunday thru Friday and is valid for areas within and bordering Maricopa County in Arizona

FORECAST DATE	YESTERDAY THU 09/08/2011	TODAY FRI 09/09/2011	TOMORROW SAT 09/10/2011	EXTENDED SUN 09/11/2011
<b>NOTICES</b> (*SEE BELOW FOR DETAILS)	 <b>(Ozone)</b>			
AIR POLLUTANT	<b>DUST</b> Highest AQI Reading/Site (Preliminary data only)	<b>P.M. DUST Possible</b>	<b>P.M. DUST Possible</b>	
<b>O3*</b>	<b>71</b> <b>PHOENIX SUPERSITE</b>	<b>61</b> <b>MODERATE</b>	<b>50</b> <b>GOOD</b>	<b>54</b> <b>MODERATE</b>
<b>CO*</b>	<b>8</b> <b>GREENWOOD</b>	<b>6</b> <b>GOOD</b>	<b>2</b> <b>GOOD</b>	<b>5</b> <b>GOOD</b>
<b>PM-10*</b>	<b>54</b> <b>BUCKEYE</b>	<b>64</b> <b>MODERATE</b>	<b>36</b> <b>GOOD</b>	<b>33</b> <b>GOOD</b>
<b>PM-2.5*</b>	<b>35</b> <b>WEST PHOENIX</b>	<b>39</b> <b>GOOD</b>	<b>28</b> <b>GOOD</b>	<b>28</b> <b>GOOD</b>

\* O3 = Ozone    CO = Carbon Monoxide    PM-10 = Particles 10 microns & smaller    PM-2.5 = Particles smaller than 2.5 microns  
 \*\*“Ozone Health Watch” means that the highest concentration of OZONE may approach the federal health standard.  
 \*\*\*“PM-10 or PM-2.5 Health Watch” means that the highest concentration of PM-10 or PM-2.5 may approach the federal health standard.  
 \*\*\*\*“High Pollution Advisory” means that the highest concentration of OZONE, PM-10, or PM-2.5 may exceed the federal health standard.  
 \*\*\*\*\*“DUST” means that short periods of high PM-10 concentrations caused by outflow from thunderstorms are possible.

**Health message for Friday, September 9: Unusually Sensitive People should consider limiting prolonged exertion outdoors.**

**Health message for Saturday, September 10: Unusually Sensitive People should consider limiting prolonged exertion outdoors.**

Showers and thunderstorms will increase later Friday afternoon and evening with peak intensity between 6 and 11 pm. Another round is possible Saturday afternoon and evening. These storm are driven by an area of low pressure dropping south near the AZ/CA/NV border. With this feature in play, storms are more likely to be sustained in through the overnight hours without the help of the sun's surface heating. Modeled soundings indicate the possibility of some cells producing hail and damaging straight-line winds. With cooler weather expected Saturday and Sunday, many people are planning outdoor activities. It's important to stay tuned to the local weather reports as storms can build rapidly. Conditions will improve Sunday through early next week, though the Valley will still have about a 20% chance for isolated storms each of those days.

The clouds from the forecasted storms and the resulting winds from the up/down drafts will help to keep ozone production down. Highest concentrations across the Valley may be held to the GOOD range of the Air Quality Index (AQI) on Saturday and no higher than the lower MODERATE on Sunday. Dust is always a concern when thunderstorms are in the forecast. It's fairly unusual to see a classic dust storm (Haboob) coming from the west-northwest, but there could be some isolated pockets of dust kicked up around the Valley, especially since some agriculture fields have recently been plowed. Rain should help reduce the likelihood of blowing dust. Thus, we are forecasting PM10 and PM2.5 levels to be in the GOOD range Saturday and Sunday.

Check back on Sunday for the latest. Until then, have a great weekend! -J.Paul

<b>MONITORING SITE MAPS</b>	
<b>STATIC MAP</b>	<a href="http://www.azdeq.gov/environ/air/monitoring/images/map.jpg">http://www.azdeq.gov/environ/air/monitoring/images/map.jpg</a>
<b>INTERACTIVE MAPS</b>	<a href="http://aqwww.maricopa.gov/AirMonitoring/SitePollutionMap.aspx">http://aqwww.maricopa.gov/AirMonitoring/SitePollutionMap.aspx</a> <a href="http://www.airnow.gov/">http://www.airnow.gov/</a>

**POLLUTION MONITOR READINGS FOR THURSDAY, SEPTEMBER 8, 2011**

**O3 (OZONE)**

Info on current 8-hour ozone standard: [http://www.epa.gov/air/ozonepollution/pdfs/2008\\_03\\_aqi\\_changes.pdf](http://www.epa.gov/air/ozonepollution/pdfs/2008_03_aqi_changes.pdf)  
For archived AQI maps go to: <http://www.airnow.gov/index.cfm?action=airnow.maps>

SITE NAME	MAX 8-HR VALUE (PPB)	MAX AQI	AQI COLOR CODE
Alamo Lake (La Paz County)	59	50	
Apache Junction (Pinal County)	55	47	
Blue Point	60	51	
Buckeye	55	47	
Casa Grande	53	45	
Cave Creek	63	61	
Central Phoenix	60	51	
Dysart	60	51	
Falcon Field	54	46	
Fountain Hills	62	58	
Glendale	63	61	
Humboldt Mountain	57	48	
North Phoenix	64	64	
Phoenix Supersite	66	71	
Pinal Air Park (Pinal County)	56	47	
Pinnacle Peak	58	49	
Queen Valley (Pinal County)	59	50	

Rio Verde	59	50	
South Phoenix	59	50	
South Scottsdale	61	54	
Tempe	55	47	
Tonto Nat'l Mon. (Gila County)	57	48	
West Chandler	57	48	
West Phoenix	62	58	
Yuma	NOT AVBL	NOT AVBL	NOT AVBL

### CO (CARBON MONOXIDE)

SITE NAME	MAX 8-HR VALUE (PPM)	MAX AQI	AQI COLOR CODE
Central Phoenix	0.3	3	
Greenwood	0.7	8	
West Phoenix	0.6	7	

### PM-10 (PARTICLES)

SITE NAME	MAX 24-HR VALUE (µg/m3)	MAX AQI	AQI COLOR CODE
Buckeye	60.4	54	
Central Phoenix	35.6	32	
Combs School (Pinal County)	62.1	54	
Durango	38.6	35	
Dysart	31.9	29	
Glendale	24.0	22	
Greenwood	35.4	32	
Higley	28.4	26	
Maricopa (Pinal County)	54.9	50	
Phoenix Supersite	27.4	25	
South Phoenix	36.9	34	
West Chandler	35.0	32	
West Forty Third	42.7	39	
West Phoenix	47.6	43	
Zuni Hills	41.4	38	

### PM-2.5 (PARTICLES)

(Some data derived from light-scattering equipment)

For maps go to: <http://www.airnow.gov/>

SITE NAME	MAX 24-HR VALUE (µg/m3)	MAX AQI	AQI COLOR CODE
Durango	NOT AVBL	NOT AVBL	NOT AVLB (data suspect)
Dysart	5.8	19	
Estrella Mountain Park	6.9	22	
Glendale	5.4	18	
Phoenix Supersite	7.6	25	
North Phoenix	6.4	21	
South Phoenix	6.2	20	
Vehicle Emissions Lab	3.9	13	
West Phoenix	10.7	35	

## LOCAL AIR POLLUTANTS IN DETAIL



### **O3 (OZONE):**

**Description** – This is a secondary pollutant that is formed by the reaction of other primary pollutants (precursors) such as VOCs (volatile organic compounds) and NO<sub>x</sub> (Nitrogen Oxides) in the presence of heat and sunlight.

**Sources** – VOCs are emitted from motor vehicles, chemical plants, refineries, factories, and other industrial sources. NO<sub>x</sub> is emitted from motor vehicles, power plants, and other sources of combustion.

**Potential health impacts** – Exposure to ozone can make people more susceptible to respiratory infection, result in lung inflammation, and aggravate pre-existing respiratory diseases such as asthma. Other effects include decrease in lung function, chest pain, and cough.

**Unit of measurement** – Parts per billion (ppb).

**Averaging interval** – Highest eight-hour period within a 24-hour period (midnight to midnight).

**Reduction tips** – Curtail daytime driving, refuel cars and use gasoline-powered equipment as late in the day as possible.

### **CO (CARBON MONOXIDE):**

**Description** – A colorless, odorless, poisonous gas formed when carbon in fuels is not burned completely.

**Sources** – In cities, as much as 95 percent of all CO emissions emanate from automobile exhaust. Other sources include industrial processes, non-transportation fuel combustion, and natural sources such as wildfires. Peak concentrations occur in colder winter months.

**Potential health impacts** – Reduces oxygen delivery to the body's organs and tissues. The health threat is most serious for those who suffer from cardiovascular disease.

**Unit of measurement** – Parts per million (ppm).

**Averaging interval** – Highest eight-hour period within a 24-hour period (midnight to midnight)

**Reduction tips** – Keep motor vehicle tuned properly and minimize nighttime driving.

### **PM-10 & PM-2.5 (PARTICLES):**

**Description** – The term “particulate matter” (PM) includes both solid particles and liquid droplets found in air. Many manmade and natural sources emit PM directly or emit other pollutants that react in the atmosphere to form PM. Particles less than 10 micrometers in diameter tend to pose the greatest health concern because they can be inhaled into and accumulate in the respiratory system. Particles less than 2.5 micrometers in diameter are referred to as “fine” particles and are responsible for many visibility degradations such as the “Valley Brown Cloud” (see <http://www.phoenixvis.net/>). Particles with diameters between 2.5 and 10 micrometers are referred to as “coarse”.

**Sources** – Fine = All types of combustion (motor vehicles, power plants, wood burning, etc.) and some industrial processes. Coarse = crushing or grinding operations and dust from paved or unpaved roads.

**Potential health impacts** – PM can increase susceptibility to respiratory infections and can aggravate existing respiratory diseases, such as asthma and chronic bronchitis.

**Units of measurement** – Micrograms per cubic meter (ug/m<sup>3</sup>)

**Averaging interval** – 24 hours (midnight to midnight).

[Reduction tips](#) – Stabilize loose soils, slow down on dirt roads, carpool, and use public transit.

{Updated 03/23/2010}

APPENDIX C

NOTICE OF PUBLIC COMMENT PERIOD



# PUBLIC NOTICE

## **Request for Public Comments on Exceptional Events in the Greater Phoenix Area**

In 2005, Congress identified a need to account for events that result in exceedances of the National Ambient Air Quality Standards (NAAQS) that are exceptional in nature (e.g., not expected to reoccur or caused by acts of nature beyond man-made controls.) In response, EPA promulgated the Exceptional Events Rule (EER) to address exceptional events in 40 CFR Parts 50 and 51 on March 22, 2007 (72 FR 13560). On May 2, 2011, EPA released draft guidance documents on the implementation of the EER to State, tribal and local air agencies for review. The EER allows for states and tribes to “flag” air quality monitoring data as an exceptional event. If flagged, these data can be excluded from consideration in air quality planning if EPA concurs with the demonstration submitted by the flagging agency documenting that all procedural and technical requirements have been met.

Pursuant to 40 CFR 50.14(c)(3)(i), the Arizona Department of Environmental Quality (ADEQ) is soliciting comments on its final demonstrations of events that have caused elevated concentrations of PM<sub>10</sub> in the Greater Phoenix area on September 11 & 12, 2011 and June 16; June 27; July 11; August 11; August 14; and September 6, 2012. ADEQ has decided to flag these episodes based on these analyses. Copies of the demonstrations are available for review beginning Monday, January 14, 2013, on the ADEQ website at [www.azdeq.gov/environ/air/plan/](http://www.azdeq.gov/environ/air/plan/). Interested parties can submit written comments throughout the comment period which will end at 5:00 p.m. on Tuesday, February 12, 2013. Any comments received will be responded to and forwarded to EPA with the final demonstrations.

Written comments should be addressed, faxed, or e-mailed to:

Andra Juniel, Air Assessment Section, Arizona Department of Environmental Quality, 1110 W. Washington Street, 3415-A, Phoenix, AZ 85007, PHONE: (602) 771-4417; FAX: (602) 771-2366, E-mail: [juniel.andra@azdeq.gov](mailto:juniel.andra@azdeq.gov).

In addition to being available on-line, copies of the analyses are available for review, Monday through Friday, 8:30 a.m. to 4:30 p.m., at the ADEQ Records Management Center, 1110 W. Washington St., Phoenix, AZ, 85007, Attn: Records Center, (602) 771-4380, email: [recordscenter@azdeq.gov](mailto:recordscenter@azdeq.gov).

Persons with a disability may request reasonable accommodations by contacting Linda Morrison at (602) 771-4793 or 1-800-234-5677 ext. 771-4793. This document is available in alternative formats by contacting ADEQ TDD phone number at (602) 771-4829.

ADEQ  
AIR QUALITY DIVISION

13 JAN 18 PM 12:49

# THE ARIZONA REPUBLIC

**Request for Public Comments on Exceptional Events in the Greater Phoenix Area**

In 2005, Congress identified a need to account for events that result in exceedances of the National Ambient Air Quality Standards (NAAQS) that are exceptional in nature (e.g., not expected to reoccur or caused by acts of nature beyond man-made controls). In response, EPA promulgated the Exceptional Events Rule (EER) to address exceptional events in 40 CFR Parts 50 and 51 on March 22, 2007. (72 FR 13560). On May 2, 2011, EPA released draft guidance documents on the implementation of the EER to State, tribal and local air agencies for review. The EER allows for states and tribes to "flag" air quality monitoring data as an exceptional event. If flagged, these data can be excluded from consideration in air quality planning if EPA concurs with the demonstration submitted by the flagging agency. Documenting that all procedural and technical requirements have been met.

Pursuant to 40 CFR 50.14(c)(3)(i), the Arizona Department of Environmental Quality (ADEQ) is soliciting comments on its final demonstrations of events that have caused elevated concentrations of PM10 in the Greater Phoenix area on September 11 & 12, 2011 and June 16; June 27; July 11; August 11; August 14; and September 6, 2012. ADEQ has decided to flag these episodes based on these analyses. Copies of the demonstrations can be viewed online beginning Monday, January 14, 2013, on the ADEQ website at <http://www.azdeq.gov/airquality/index.html> by selecting Air Quality - Public Notices, Meetings and Hearings. Interested parties can submit written comments throughout the comment period which will end at 5:00 p.m. on Tuesday, February 12, 2013. Any comments received will be responded to and forwarded to EPA with the final demonstrations. Written comments should be addressed, faxed, or e-mailed to: Andra Juniel, Air Assessment Section, Arizona Department of Environmental Quality, 1110 W. Washington Street, 3415-A, Phoenix, AZ 85007. PHONE: (602) 771-4417; FAX: (602) 771-2366, E-mail: [juniel.andra@azdeq.gov](mailto:juniel.andra@azdeq.gov).

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Pub: January 14, 2013.

STATE OF ARIZONA }  
COUNTY OF MARICOPA } SS.

Tabitha Weaver, being first duly sworn, upon oath deposes and says: That she is a legal advertising representative of the Arizona Business Gazette, a newspaper of general circulation in the county of Maricopa, State of Arizona, published at Phoenix, Arizona, by Phoenix Newspapers Inc., which also publishes The Arizona Republic, and that the copy hereto attached is a true copy of the advertisement published in the said paper on the dates as indicated.

The Arizona Republic

January 14, 2013

Sworn to before me this  
14<sup>th</sup> day of  
January A.D. 2013

 **MANUEL VARGAS**  
Notary Public - State of Arizona  
MARICOPA COUNTY  
My Commission Expires  
November 30, 2016

  
Notary Public

APPENDIX D

NATIONAL WEATHER SERVICE FORECASTS,  
WARNINGS, AND ALERTS

380  
CDUS45 KPSR 120821  
CLIPHX

CLIMATE REPORT  
NATIONAL WEATHER SERVICE PHOENIX AZ  
121 AM MST MON SEP 12 2011

.....

...THE PHOENIX AZ CLIMATE SUMMARY FOR SEPTEMBER 11 2011...

CLIMATE NORMAL PERIOD 1981 TO 2010  
CLIMATE RECORD PERIOD 1895 TO 2011

WEATHER ITEM	OBSERVED VALUE	TIME (LST)	RECORD VALUE	YEAR	NORMAL VALUE	DEPARTURE FROM NORMAL	LAST YEAR
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TEMPERATURE (F)

YESTERDAY

MAXIMUM	99	152 PM	112	1990	102	-3	100
MINIMUM	77	625 AM	58	1912	79	-2	72
AVERAGE	88				90	-2	

PRECIPITATION (IN)

YESTERDAY	T		1.08	1939	0.02	-0.02	0.00
MONTH TO DATE	T				0.27	-0.27	0.00
SINCE OCT 1	4.36				7.66	-3.30	7.75
SINCE JAN 1	2.62				5.55	-2.93	7.27

SNOWFALL (IN)

YESTERDAY	0.0
MONTH TO DATE	0.0
SINCE JAN 1	0.0
SINCE JUL 1	0.0
SNOW DEPTH	0

DEGREE DAYS

HEATING

YESTERDAY	0	0	0
MONTH TO DATE	0	0	0
SINCE SEP 1	0	0	0
SINCE JUL 1	0	0	0

COOLING

YESTERDAY	23	25	-2	21
MONTH TO DATE	335	289	46	298
SINCE SEP 1	335	289	46	298
SINCE JAN 1	3963	3758	205	3641

.....

WIND (MPH)

HIGHEST WIND SPEED 21 HIGHEST WIND DIRECTION S (170)

HIGHEST GUST SPEED 25 HIGHEST GUST DIRECTION S (180)  
AVERAGE WIND SPEED 7.0

SKY COVER

POSSIBLE SUNSHINE MM  
AVERAGE SKY COVER 0.5

WEATHER CONDITIONS

THE FOLLOWING WEATHER WAS RECORDED YESTERDAY.  
THUNDERSTORM  
HAZE  
SANDSTORM

RELATIVE HUMIDITY (PERCENT)

HIGHEST 50 400 AM  
LOWEST 22 200 PM  
AVERAGE 36

.....

THE PHOENIX AZ CLIMATE NORMALS FOR TODAY

	NORMAL	RECORD	YEAR
MAXIMUM TEMPERATURE (F)	101	110	2001 1971
MINIMUM TEMPERATURE (F)	78	58	1920 1916

SUNRISE AND SUNSET

SEPTEMBER 12 2011.....SUNRISE 609 AM MST SUNSET 639 PM MST  
SEPTEMBER 13 2011.....SUNRISE 610 AM MST SUNSET 637 PM MST

- INDICATES NEGATIVE NUMBERS.  
R INDICATES RECORD WAS SET OR TIED.  
MM INDICATES DATA IS MISSING.  
T INDICATES TRACE AMOUNT.

&&  
.....

DEW POINT

HIGHEST DEW POINT 58  
LOWEST DEW POINT 53  
AVERAGE DEW POINT 56  
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CLIMATE REPORT  
 NATIONAL WEATHER SERVICE PHOENIX AZ  
 128 AM MST TUE SEP 13 2011

.....

...THE PHOENIX AZ CLIMATE SUMMARY FOR SEPTEMBER 12 2011...

CLIMATE NORMAL PERIOD 1981 TO 2010  
 CLIMATE RECORD PERIOD 1895 TO 2011

WEATHER ITEM	OBSERVED VALUE	TIME (LST)	RECORD VALUE	YEAR	NORMAL VALUE	DEPARTURE FROM NORMAL	LAST YEAR
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.....  
 TEMPERATURE (F)

YESTERDAY

MAXIMUM	102	107 PM	110	2001	101	1	99
				1971			
MINIMUM	79	1156 PM	58	1920	78	1	75
				1916			
AVERAGE	91				90	1	

PRECIPITATION (IN)

YESTERDAY	0.00		1.90	1897	0.02	-0.02	0.00
MONTH TO DATE	T				0.29	-0.29	0.00
SINCE OCT 1	4.36				7.68	-3.32	7.75
SINCE JAN 1	2.62				5.57	-2.95	7.27

SNOWFALL (IN)

YESTERDAY	0.0
MONTH TO DATE	0.0
SINCE JAN 1	0.0
SINCE JUL 1	0.0
SNOW DEPTH	0

DEGREE DAYS

HEATING

YESTERDAY	0	0	0
MONTH TO DATE	0	0	0
SINCE SEP 1	0	0	0
SINCE JUL 1	0	0	0

COOLING

YESTERDAY	26	25	1	22
MONTH TO DATE	361	314	47	320
SINCE SEP 1	361	314	47	320
SINCE JAN 1	3989	3783	206	3663

.....  
 WIND (MPH)

HIGHEST WIND SPEED	30	HIGHEST WIND DIRECTION	S (170)
HIGHEST GUST SPEED	41	HIGHEST GUST DIRECTION	S (160)

AVERAGE WIND SPEED 9.9

SKY COVER

POSSIBLE SUNSHINE MM  
AVERAGE SKY COVER 0.7

WEATHER CONDITIONS

THE FOLLOWING WEATHER WAS RECORDED YESTERDAY.  
HAZE  
SANDSTORM

RELATIVE HUMIDITY (PERCENT)

HIGHEST 54 900 PM  
LOWEST 19 100 PM  
AVERAGE 37

THE PHOENIX AZ CLIMATE NORMALS FOR TODAY

	NORMAL	RECORD	YEAR
MAXIMUM TEMPERATURE (F)	101	109	2000
MINIMUM TEMPERATURE (F)	78	55	1900

SUNRISE AND SUNSET

SEPTEMBER 13 2011.....	SUNRISE	610 AM MST	SUNSET	637 PM MST
SEPTEMBER 14 2011.....	SUNRISE	611 AM MST	SUNSET	636 PM MST

- INDICATES NEGATIVE NUMBERS.
- R INDICATES RECORD WAS SET OR TIED.
- MM INDICATES DATA IS MISSING.
- T INDICATES TRACE AMOUNT.

&&

DEW POINT

HIGHEST DEW POINT 62  
LOWEST DEW POINT 51  
AVERAGE DEW POINT 56

\$\$

400  
FLUS45 KPSR 111933  
HWOPSR

HAZARDOUS WEATHER OUTLOOK  
NATIONAL WEATHER SERVICE PHOENIX AZ  
1230 PM MST SUN SEP 11 2011

AZZ021>023-026>028-121315-  
WEST CENTRAL DESERTS-NORTHWEST MARICOPA COUNTY-GREATER PHOENIX AREA-  
SOUTHWEST DESERTS-SOUTHWEST MARICOPA COUNTY-  
NORTHWEST AND NORTH CENTRAL PINAL COUNTY-  
1230 PM MST SUN SEP 11 2011

THIS HAZARDOUS WEATHER OUTLOOK IS FOR SOUTH-CENTRAL  
ARIZONA...SOUTHWEST ARIZONA AND WEST-CENTRAL ARIZONA.

.DAY ONE...TODAY AND TONIGHT.

SHOWERS AND THUNDERSTORMS ARE LIKELY LATE THIS AFTERNOON AND THIS  
EVENING. STRONGER STORMS WILL PROBABLY PRODUCE LOCALIZED AREAS OF  
DAMAGING WINDS...HAIL...AND HEAVY RAIN ALONG WITH FREQUENT  
LIGHTNING. BLOWING DUST WITH REDUCED VISIBILITY IS ALSO POSSIBLE  
AHEAD OF THE STORMS.

SEE THE SPECIAL WEATHER STATEMENT ISSUED FOR THIS AFTERNOON AND THIS  
EVENING.

.DAYS TWO THROUGH SEVEN...MONDAY THROUGH SATURDAY.

THERE IS AT LEAST A SLIGHT CHANCE OF MAINLY AFTERNOON AND EVENING  
THUNDERSTORMS THROUGH WEDNESDAY. THE POTENTIAL WILL REMAIN FOR THE  
STRONGEST STORMS TO PRODUCE LOCALIZED AREAS OF DAMAGING  
WIND...HAIL...HEAVY RAIN...AND FREQUENT LIGHTNING. HOWEVER...THE  
PROBABILITY OF SEVERE STORMS WILL DECREASE SIGNIFICANTLY BY  
WEDNESDAY.

.SPOTTER INFORMATION STATEMENT...

SPOTTER ACTIVATION WILL LIKELY BE NEEDED THIS EVENING.

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166  
FLUS45 KPSR 121242  
HWOPSR

HAZARDOUS WEATHER OUTLOOK  
NATIONAL WEATHER SERVICE PHOENIX AZ  
542 AM MST MON SEP 12 2011

AZZ021>023-026>028-131245-  
WEST CENTRAL DESERTS-NORTHWEST MARICOPA COUNTY-GREATER PHOENIX AREA-  
SOUTHWEST DESERTS-SOUTHWEST MARICOPA COUNTY-  
NORTHWEST AND NORTH CENTRAL PINAL COUNTY-  
542 AM MST MON SEP 12 2011

THIS HAZARDOUS WEATHER OUTLOOK IS FOR SOUTH-CENTRAL  
ARIZONA...SOUTHWEST ARIZONA AND WEST-CENTRAL ARIZONA.

.DAY ONE...TODAY AND TONIGHT.

THERE WILL BE A CHANCE OF MAINLY AFTERNOON AND EVENING THUNDERSTORMS.

THERE WILL BE POTENTIAL FOR THE STRONGER STORMS TO PRODUCE LOCALIZED AREAS OF DAMAGING WINDS...HAIL...AND HEAVY RAIN ALONG WITH FREQUENT LIGHTNING.

.DAYS TWO THROUGH SEVEN...TUESDAY THROUGH SUNDAY.

THE CHANCE FOR SEVERE WEATHER CONTINUES TUESDAY WITH SOME OF THE STORMS CAPABLE OF LOCALIZED AREAS OF DAMAGING WIND...HAIL...HEAVY RAIN...AND FREQUENT LIGHTNING. THERE WILL BE ONLY A SLIGHT CHANCE OF THUNDERSTORMS WEDNESDAY BEFORE STORM CHANCES DISSIPATE ALTOGETHER THURSDAY THROUGH SUNDAY.

.SPOTTER INFORMATION STATEMENT...

SPOTTER ACTIVATION MAY BE NEEDED TODAY AND TUESDAY.

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059  
FPUS75 KPSR 112007  
NOWPSR

SHORT TERM FORECAST  
NATIONAL WEATHER SERVICE PHOENIX AZ  
107 PM MST SUN SEP 11 2011

AZZ027-112230-  
SOUTHWEST MARICOPA COUNTY-  
INCLUDING THE CITY OF...GILA BEND  
107 PM MST SUN SEP 11 2011

.NOW...  
SHOWERS AND THUNDERSTORMS DEVELOPING IN SOUTHWEST MARICOPA COUNTY WILL AFFECT INTERSTATE 8 AND THE GILA BEND AREA. STORMS HAVE THE POTENTIAL TO PRODUCE BRIEF HEAVY RAINFALL...STRONG GUSTY WINDS UP TO 45 MPH...SMALL HAIL...AND BLOWING DUST. MOTORISTS TRAVELING THROUGH THE AREA SHOULD BE PREPARED FOR RAPID DECREASES IN VISIBILITY.

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NATIONAL WEATHER SERVICE PHOENIX IS ON THE INTERNET AT  
  
WEATHER.GOV/PHOENIX

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208  
FPUS75 KPSR 112217  
NOWPSR

SHORT TERM FORECAST  
NATIONAL WEATHER SERVICE PHOENIX AZ  
317 PM MST SUN SEP 11 2011

AZZ022-023-027-028-120000-  
NORTHWEST MARICOPA COUNTY-GREATER PHOENIX AREA-

SOUTHWEST MARICOPA COUNTY-NORTHWEST AND NORTH CENTRAL PINAL COUNTY-  
INCLUDING THE CITIES OF...BUCKEYE...LAKE PLEASANT...MORRISTOWN...  
NEW RIVER...TONOPAH...WICKENBURG...CAREFREE...CAVE CREEK...  
CHANDLER...FOUNTAIN HILLS...GILBERT...GLENDALE...MESA...PEORIA...  
PHOENIX...SCOTTSDALE...SUN CITY...TEMPE...GILA BEND...  
APACHE JUNCTION...CASA GRANDE...COOLIDGE...AND FLORENCE  
317 PM MST SUN SEP 11 2011

.NOW...  
ISOLATED THUNDERSTORMS WILL CONTINUE TO DEVELOP ACROSS THE SOUTH  
CENTRAL DESERTS THROUGH AT LEAST 5 PM THIS AFTERNOON. SOME STORMS  
WILL AFFECT THE GREATER PHOENIX METROPOLITAN AREA. THE STRONGER  
STORMS WILL PRODUCE GUSTY WINDS IN EXCESS OF 50 MPH...LOCALLY HEAVY  
RAIN...SMALL HAIL AND DENSE BLOWING DUST. THE STORMS WILL MOVE  
TOWARDS THE NORTHEAST AT 20 MPH. OTHERWISE PARTLY SUNNY SKIES WILL BE  
IN EFFECT THIS AFTERNOON.

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NATIONAL WEATHER SERVICE PHOENIX IS ON THE INTERNET AT

WEATHER.GOV/PHOENIX

CJB

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109  
FPUS75 KPSR 120008  
NOWPSR

SHORT TERM FORECAST  
NATIONAL WEATHER SERVICE PHOENIX AZ  
508 PM MST SUN SEP 11 2011

AZZ027-028-120200-  
SOUTHWEST MARICOPA COUNTY-NORTHWEST AND NORTH CENTRAL PINAL COUNTY-  
INCLUDING THE CITIES OF...GILA BEND...APACHE JUNCTION...  
CASA GRANDE...COOLIDGE...AND FLORENCE  
508 PM MST SUN SEP 11 2011

.NOW...  
ISOLATED TO SCATTERED SHOWERS AND THUNDERSTORMS WILL CONTINUE TO  
DEVELOP ACROSS PORTIONS OF SOUTHWEST MARICOPA AND NORTHWEST PINAL  
COUNTIES THROUGH AT LEAST 7 PM THIS EVENING. ALTHOUGH MANY STORMS  
WILL BE OVER OPEN COUNTRY...SOME MAY AFFECT GILA BEND AS WELL AS  
COMMUNITIES WEST OF CASA GRANDE. THE STRONGER STORMS HAVE THE  
POTENTIAL TO PRODUCE GUSTY WINDS IN EXCESS OF 50 MPH...LOCALLY HEAVY  
RAIN...MODERATE HAIL AND DENSE BLOWING DUST. MOTORISTS ON AREA ROADS  
INCLUDING INTERSTATE 8 FROM CASA GRANDE TO GILA BEND SHOULD BE ALERT  
FOR SUDDEN REDUCTION IN VISIBILITY DUE TO BLOWING DUST...AND DRIVE  
WITH CAUTION.

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NATIONAL WEATHER SERVICE PHOENIX IS ON THE INTERNET AT

WEATHER.GOV/PHOENIX

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109  
FPUS75 KPSR 120008  
NOWPSR

SHORT TERM FORECAST  
NATIONAL WEATHER SERVICE PHOENIX AZ  
508 PM MST SUN SEP 11 2011

AZZ027-028-120200-  
SOUTHWEST MARICOPA COUNTY-NORTHWEST AND NORTH CENTRAL PINAL COUNTY-  
INCLUDING THE CITIES OF...GILA BEND...APACHE JUNCTION...  
CASA GRANDE...COOLIDGE...AND FLORENCE  
508 PM MST SUN SEP 11 2011

.NOW...  
ISOLATED TO SCATTERED SHOWERS AND THUNDERSTORMS WILL CONTINUE TO  
DEVELOP ACROSS PORTIONS OF SOUTHWEST MARICOPA AND NORTHWEST PINAL  
COUNTIES THROUGH AT LEAST 7 PM THIS EVENING. ALTHOUGH MANY STORMS  
WILL BE OVER OPEN COUNTRY...SOME MAY AFFECT GILA BEND AS WELL AS  
COMMUNITIES WEST OF CASA GRANDE. THE STRONGER STORMS HAVE THE  
POTENTIAL TO PRODUCE GUSTY WINDS IN EXCESS OF 50 MPH...LOCALLY HEAVY  
RAIN...MODERATE HAIL AND DENSE BLOWING DUST. MOTORISTS ON AREA ROADS  
INCLUDING INTERSTATE 8 FROM CASA GRANDE TO GILA BEND SHOULD BE ALERT  
FOR SUDDEN REDUCTION IN VISIBILITY DUE TO BLOWING DUST...AND DRIVE  
WITH CAUTION.

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NATIONAL WEATHER SERVICE PHOENIX IS ON THE INTERNET AT  
[WEATHER.GOV/PHOENIX](http://WEATHER.GOV/PHOENIX)

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294  
FPUS75 KPSR 120248  
NOWPSR

SHORT TERM FORECAST  
NATIONAL WEATHER SERVICE PHOENIX AZ  
748 PM MST SUN SEP 11 2011

AZZ022-120500-  
NORTHWEST MARICOPA COUNTY-  
INCLUDING THE CITIES OF...BUCKEYE...LAKE PLEASANT...MORRISTOWN...  
NEW RIVER...TONOPAH...AND WICKENBURG  
748 PM MST SUN SEP 11 2011

.NOW...  
ISOLATED SHOWERS AND THUNDERSTORMS WILL CONTINUE OVER NORTHWESTERN  
MARICOPA COUNTY...ESPECIALLY THE AREA BETWEEN WICKENBURG AND LAKE  
PLEASANT...THROUGH AT LEAST 9 PM THIS EVENING. THE STRONGER STORMS  
MAY PRODUCE GUSTY WINDS IN EXCESS OF 50 MPH...LOCALLY HEAVY RAIN...  
SMALL HAIL AND DENSE BLOWING DUST. SOME STORMS MAY AFFECT MOTORISTS  
ON HIGHWAY 74 BETWEEN MORRISTOWN AND LAKE PLEASANT. OTHERWISE SKIES  
WILL BE PARTLY CLOUDY THIS EVENING.

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NATIONAL WEATHER SERVICE PHOENIX IS ON THE INTERNET AT  
WEATHER.GOV/PHOENIX

CB

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738  
FPUS75 KPSR 122006  
NOWPSR

SHORT TERM FORECAST  
NATIONAL WEATHER SERVICE PHOENIX AZ  
106 PM MST MON SEP 12 2011

AZZ027-122215-  
SOUTHWEST MARICOPA COUNTY-  
INCLUDING THE CITY OF...GILA BEND  
106 PM MST MON SEP 12 2011

.NOW...  
SHOWERS AND THUNDERSTORMS WILL AFFECT PORTIONS OF SOUTHWEST MARICOPA  
COUNTY INCLUDING THE AREAS OF INTERSTATE 8 AND GILA BEND THROUGH 3  
PM. STORMS HAVE THE POTENTIAL TO PRODUCE BRIEF HEAVY RAINFALL...STRONG  
GUSTY WINDS UP TO 45 MPH...SMALL HAIL...AND AREAS OF BLOWING DUST.  
MOTORISTS TRAVELING THROUGH THE AREA SHOULD EXERCISE CAUTION AND BE  
PREPARED FOR RAPIDLY CHANGING WEATHER CONDITIONS.

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NATIONAL WEATHER SERVICE PHOENIX IS ON THE INTERNET AT  
WEATHER.GOV/PHOENIX

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300  
FPUS75 KPSR 130243  
NOWPSR

SHORT TERM FORECAST  
NATIONAL WEATHER SERVICE PHOENIX AZ  
743 PM MST MON SEP 12 2011

AZZ023-027-028-130430-  
GREATER PHOENIX AREA-SOUTHWEST MARICOPA COUNTY-  
NORTHWEST AND NORTH CENTRAL PINAL COUNTY-  
INCLUDING THE CITIES OF...BUCKEYE...CAREFREE...CAVE CREEK...  
CHANDLER...FOUNTAIN HILLS...GILBERT...GLENDALE...MESA...PEORIA...  
PHOENIX...SCOTTSDALE...SUN CITY...TEMPE...GILA BEND...  
APACHE JUNCTION...CASA GRANDE...COOLIDGE...AND FLORENCE  
743 PM MST MON SEP 12 2011

.NOW...  
AN AREA OF GUSTY 25 TO 35 MPH SOUTH WINDS...GENERATED FROM DISTANT

THUNDERSTORMS...WILL MOVE THROUGH THE DESERTS FROM PHOENIX TO CASA GRANDE BETWEEN 745 AND 930 PM. AREAS OF BLOWING DUST WITH VISIBILITIES UNDER 2 MILES COULD ALSO ACCOMPANY GUSTY WINDS.

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NATIONAL WEATHER SERVICE PHOENIX IS ON THE INTERNET AT  
WEATHER.GOV/PHOENIX

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857  
FXUS65 KPSR 111056  
AFDPSR

AREA FORECAST DISCUSSION  
NATIONAL WEATHER SERVICE PHOENIX AZ  
355 AM MST SUN SEP 11 2011

.SYNOPSIS...

A SLOW MOVING AREA OF LOW PRESSURE WILL BRING A CONTINUED CHANCE OF SHOWERS AND THUNDERSTORMS TO MOST OF THE REGION THROUGH EARLY THIS WEEK. THE BEST CHANCES WILL BE TODAY AND MONDAY WITH POTENTIAL FOR SOME OF THE STORMS TO BE SEVERE. A GRADUAL DRYING TREND WILL BEGIN MID WEEK WITH DECREASING CLOUDS AND CHANCES OF SHOWERS. HIGH TEMPERATURES ARE EXPECTED TO REMAIN SLIGHTLY BELOW NORMAL FOR THE NEXT SEVERAL DAYS WITH GRADUAL WARMING LATE IN THE WEEK.

&&

.DISCUSSION...

TODAY AND TONIGHT...WATER VAPOR IMAGERY SHOWS THE UPPER LOW CENTERED OVER THE SOUTHERN CALIFORNIA COAST AND VORT LOBES CAUSING IT TO ROTATE IN A DUMBELL FASHION. THE MODELS RESOLVE A COUPLE OF DIFFERENT UPPER LEVEL SPEED MAXIMUMS/JET STREAKS AND THIS IS REFLECTED IN THE WATER VAPOR IMAGERY WITH TWO SEPARATE NARROW DRY SLOTS. ONE IS CLOSELY ASSOCIATED WITH THE LOW CENTER ON THE SOUTHWESTERN/WESTERN SIDE OVER THE LOW AND IS OVER SOUTHERN CALIFORNIA. THE OTHER IS JUST TO THE SOUTHEAST OF THE FIRST ONE AND IS NOSING INTO FAR SOUTHEAST ARIZONA EARLY THIS MORNING. THE LEFT EXIT REGION OF THIS JET STREAK WILL BE OVER SOUTHEAST ARIZONA THIS AFTERNOON. THE STRONGER JET TO THE NORTHWEST WILL MOVE INTO WESTERN ARIZONA AND SOUTHERN NEVADA DURING THE DAY TODAY. THERE IS RELATIVELY GOOD MODEL AGREEMENT THAT DEEP MOISTURE WILL EXPAND WESTWARD INTO SOUTHWEST ARIZONA THIS AFTERNOON. WITH THE JET ENERGY AND THE MOIST ADVECTION...CHANCE CATEGORY POPS WERE EXPANDED INTO SOUTHWEST ARIZONA FOR THIS EVENING. POPS OVER SOUTH-CENTRAL ARIZONA WERE NUDGED UPWARD AS WELL. A FLY IN THE OINTMENT WILL BE THE BOUNDARY LAYER COOLING FROM LAST EVENINGS STRONG OUTFLOW. THIS COULD LEAD TO GREATER CONVECTIVE INHIBITION THAN THE MODELS FORECAST. SREF MODEL INDICATES EFFECTIVE SHEAR UP TO 30 KTS WILL BE IN PLACE OVER SOUTH-CENTRAL ARIZONA. SO...ONCE AGAIN STORMS WILL HAVE POTENTIAL TO BE SEVERE AND PRODUCE LOCALLY HEAVY RAIN AS WELL. POPS ARE LOWER OVER SOUTHEAST CALIFORNIA DUE TO LESS MOISTURE AVAILABILITY. IF NOT FOR THE PRESENCE OF THE LOW AND ASSOCIATED JET...POPS WOULD PROBABLY BE ZERO THERE. HIGH TEMPS WILL BE CLOSE TO OR EVEN SLIGHTLY BELOW

NORMAL.

MONDAY AND TUESDAY...THE UPPER LOW IS FORECAST TO WOBBLE AROUND A BIT AS SHORT WAVE ENERGY MOVES THROUGH. THE MODELS HOLD ON TO MOISTURE OVER SOUTH-CENTRAL ARIZONA MONDAY...WITH A BIT LESS FOR TUESDAY - ESPECIALLY THE NAM. HOWEVER...THERE IS SOMETHING OF A WESTWARD EXPANSION OF THE MOISTURE. JET STREAM ENERGY WILL STILL BE MOVING ACROSS SOUTHERN ARIZONA AS WELL. THUS STORM CHANCES WILL CONTINUE BUT WITH A GRADUAL DECLINE...MORE NOTICEABLY OVER SOUTH-CENTRAL ARIZONA. DEPENDING ON CONVECTIVE ACTIVITY...ANTICIPATE LITTLE CHANGE IN TEMPS.

WEDNESDAY THROUGH SATURDAY...BY WEDNESDAY THE LOW IS PROGGED TO HAVE SHIFTED INLAND BECOMING CENTERED NEAR LAS VEGAS AND THEN WEAKEN THURSDAY AND FRIDAY AS A NEW LOW TAKES SHAPE ALONG AND WEST OF THE CALIFORNIA COAST BY SATURDAY. MOISTURE WILL DECREASE FURTHER FOR A DECLINE IN POPS SUCH THAT STORM CHANCES WILL BE CONFINED TO ZONE 24 THURSDAY ONWARD AND WILL BE IN THE SLIGHT CHANCE CATEGORY AT BEST. MAX TEMPS WILL VERY SLOWLY INCREASE DURING THIS PERIOD AS DRIER AIR MOVES IN AND HEIGHTS/THICKNESSES SLOWLY REBOUND.

&&

.AVIATION...

SOUTH-CENTRAL ARIZONA INCLUDING KPHX AND KIWA... THUNDERSTORM PROBABILITIES WILL BE ELEVATED ACROSS THE PHOENIX METRO AREA BEGINNING SUNDAY AFTERNOON AND CONTINUING INTO THE EVENING. TYPICAL MONSOON AVIATION HAZARDS INCLUDING HEAVY RAIN...FREQUENT LIGHTNING...GUSTY WINDS AND BLOWING DUST WILL BE POSSIBLE AT KPHX AND KIWA. EXACT LOCATION OF THE STORMS IS STILL UNCERTAIN AT THIS TIME SO THE THREAT WILL BE HANDLED WITH A VCTS IN THE TAFS.

SOUTHEAST CA AND SOUTHWEST AZ...INCLUDING KIPL AND KBLH.... AN ISOLATED THUNDERSTORM OR OUTFLOW BOUNDARY WILL BE POSSIBLE AS FAR WEST AS KBLH SUNDAY AFTERNOON AND EVENING. OTHERWISE...CONDITIONS WILL REMAIN GENERALLY BENIGN WITH PERSISTENT WINDS OUT OF THE SOUTHWEST AT KIPL AND SOUTH AT KBLH REMAINING BELOW 15 KT.

&&

.FIRE WEATHER...

TUESDAY THROUGH SATURDAY... CHANCES FOR THUNDERSTORMS THIS COMING WEEK WILL BE BEST ON TUESDAY...AND DRIER AIR WORKS INTO THE REGION FOR THE MIDDLE PART OF THE WEEK. A SLOW MOVING UPPER LEVEL TROUGH ACROSS SOUTHERN CALIFORNIA WILL WEAKEN AND MOVE ACROSS ARIZONA BY WEDNESDAY. THIS WILL LEAD TO SOUTHWEST FLOW BRINGING IN THE DRIER AIR. TEMPERATURES ARE SHAPING UP TO BE NEAR SEASONAL NORMALS NEXT WEEK.

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.PSR WATCHES/WARNINGS/ADVISORIES...

AZ...NONE.

CA...NONE.

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NATIONAL WEATHER SERVICE PHOENIX IS ON THE INTERNET AT  
WEATHER.GOV/PHOENIX

DISCUSSION...AJ  
AVIATION...HIRSCH  
FIRE WEATHER...KUHLMAN

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944  
FXUS65 KPSR 111753  
AFDPSR

AREA FORECAST DISCUSSION  
NATIONAL WEATHER SERVICE PHOENIX AZ  
1050 AM MST SUN SEP 11 2011

.SYNOPSIS...

A LOW PRESSURE SYSTEM IS EXPECTED TO REMAIN CENTERED NEAR THE SOUTHERN CALIFORNIA COAST THROUGH MONDAY NIGHT THEN MOVE ONLY SLOWLY EAST THE FIRST HALF OF THE WEEK. THIS MEANS A CONTINUED CHANCE OF MAINLY AFTERNOON AND EVENING SHOWERS AND THUNDERSTORMS ACROSS MOST OF THE AREA THROUGH EARLY THIS WEEK. SHOWERS AND THUNDERSTORMS ARE LIKELY IN SOUTH-CENTRAL ARIZONA INCLUDING THE GREATER PHOENIX AREA BY THIS EVENING. STRONG GUSTY DAMAGING WINDS...HAIL...AND HEAVY RAIN ARE PROBABLE WITH SOME STORMS ALONG WITH BLOWING DUST AHEAD OF THE STORMS. DRIER AIR IS EXPECTED TO BRING A DECREASE IN THE CHANCE OF STORMS WEDNESDAY WITH DRY AND GRADUALLY WARMER WEATHER THE LATTER PART OF THE WEEK.

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.DISCUSSION...

THERE WAS A BAND OF CLOUDINESS EXTENDING FROM SOUTH TO NORTH ACROSS YUMA AND LA PAZ COUNTIES AND SOME CLOUDINESS SOUTHEAST OF PHOENIX AT MID MORNING. THERE WERE ISOLATED LIGHT SHOWERS WITH THE BAND OF CLOUDINESS OVER YUMA COUNTY AND LA PAZ COUNTY. MEANWHILE...IT WAS MOSTLY SUNNY ACROSS THE REST OF SOUTHEAST CALIFORNIA AND SOUTH-CENTRAL ARIZONA INCLUDING THE GREATER PHOENIX AREA AT MID MORNING. TEMPERATURES WERE GENERALLY CLOSE TO THE SAME TO A COUPLE OF DEGREES LOWER IN SOUTH-CENTRAL AND SOUTHWEST ARIZONA TO THE LOWER COLORADO RIVER VALLEY...AND 3 TO 5 DEGREES COOLER IN SOUTHEAST CALIFORNIA INCLUDING THE EL CENTRO-IMPERIAL AREA.

THE LOW PRESSURE SYSTEM THAT HAS BEEN CENTERED NEAR THE SOUTHERN CALIFORNIA COAST THE PAST COUPLE OF DAYS IS EXPECTED TO CONTINUE THERE THROUGH MONDAY NIGHT. MOISTURE FROM WESTERN MEXICO IS EXPECTED TO CONTINUE OVER SOUTH-CENTRAL ARIZONA AND HAS EXPANDED SOMEWHAT FARTHER WEST. THIS MEANS SOME CHANCE OF SHOWERS AND THUNDERSTORMS AS FAR WEST AS THE LOWER COLORADO RIVER VALLEY AT LEAST TODAY AND TONIGHT. IN ADDITION...A PLUME OF TROPICAL MOISTURE FROM OFF THE COAST OF BAJA CALIFORNIA IS EXPECTED TO MOVE FROM THE SOUTHWEST OVER SOUTHWEST AND SOUTH-CENTRAL ARIZONA TONIGHT.

THIS MOISTURE IN COMBINATION WITH JET STREAM DYNAMICS ASSOCIATED WITH THE LOW PRESSURE SYSTEM IS EXPECTED TO RESULT IN A SIGNIFICANT INCREASE IN THE LIKELIHOOD OF SHOWERS AND THUNDERSTORMS IN SOUTH-CENTRAL ARIZONA ESPECIALLY SOUTH AND WEST OF PHOENIX THIS AFTERNOON SPREADING ACROSS MUCH OF SOUTH-CENTRAL ARIZONA INCLUDING THE GREATER PHOENIX AREA THIS EVENING.

SOME SEVERE THUNDERSTORMS ARE PROBABLE IN SOUTH-CENTRAL ARIZONA INCLUDING THE GREATER PHOENIX AREA BY THIS EVENING. THESE STORMS ARE EXPECTED TO PRODUCE STRONG GUSTY DAMAGING WINDS...HAIL...AND HEAVY RAIN. BLOWING DUST WITH REDUCED VISIBILITY IS ALSO POSSIBLE AHEAD OF THE STORMS.

HAVE ALREADY ADJUSTED THE FORECAST TO SHOW THE ABOVE SCENARIO AND PLAN ON ISSUING A SPECIAL WEATHER STATEMENT REGARDING THIS EXPECTED WEATHER.

PREVIOUS DISCUSSION...

MONDAY AND TUESDAY...THE UPPER LOW IS FORECAST TO WOBBLE AROUND A BIT AS SHORT WAVE ENERGY MOVES THROUGH. THE MODELS HOLD ON TO MOISTURE OVER SOUTH-CENTRAL ARIZONA MONDAY...WITH A BIT LESS FOR TUESDAY - ESPECIALLY THE NAM. HOWEVER...THERE IS SOMETHING OF A WESTWARD EXPANSION OF THE MOISTURE. JET STREAM ENERGY WILL STILL BE MOVING ACROSS SOUTHERN ARIZONA AS WELL. THUS STORM CHANCES WILL CONTINUE BUT WITH A GRADUAL DECLINE...MORE NOTICEABLY OVER SOUTH-CENTRAL ARIZONA. DEPENDING ON CONVECTIVE ACTIVITY...ANTICIPATE LITTLE CHANGE IN TEMPS.

WEDNESDAY THROUGH SATURDAY...BY WEDNESDAY THE LOW IS PROGGED TO HAVE SHIFTED INLAND BECOMING CENTERED NEAR LAS VEGAS AND THEN WEAKEN THURSDAY AND FRIDAY AS A NEW LOW TAKES SHAPE ALONG AND WEST OF THE CALIFORNIA COAST BY SATURDAY. MOISTURE WILL DECREASE FURTHER FOR A DECLINE IN POPS SUCH THAT STORM CHANCES WILL BE CONFINED TO ZONE 24 THURSDAY ONWARD AND WILL BE IN THE SLIGHT CHANCE CATEGORY AT BEST. MAX TEMPS WILL VERY SLOWLY INCREASE DURING THIS PERIOD AS DRIER AIR MOVES IN AND HEIGHTS/THICKNESSES SLOWLY REBOUND.

&&

.AVIATION...

SOUTH-CENTRAL ARIZONA INCLUDING KPHX AND KIWA...  
UPPER LEVEL LOW REMAINS NEARLY STATIONARY OVER SOUTHERN CALIFORNIA PROVIDING SOUTHWEST UPPER FLOW ACROSS ARIZONA. MODEST INSTABILITY IN COMBINATION WITH UPPER LEVEL JET ENERGY ACROSS SOUTHERN ARIZONA IS EXPECTED TO LEAD TO THUNDERSTORM DEVELOPMENT THIS AFTERNOON AND EVENING. THE MAIN FOCUS AREA SHOULD BE ACROSS SOUTH-CENTRAL ARIZONA WHERE THE GREATEST INSTABILITY AND UPPER LEVEL SUPPORT IS SHOWN. ISOLATED TO SCATTERED THUNDERSTORMS WITH GUSTY WINDS AND POSSIBLY BLOWING DUST WILL LIKELY AFFECT PORTIONS OF THE PHOENIX METRO AREA EARLY THIS EVENING. STORM MOVEMENT WILL GENERALLY BE TO THE NORTH NORTHEAST LIKELY RESULTING A SOUTHWESTERLY OUTFLOW WIND DIRECTION. A BRIEF PERIOD OF RESTRICTED VISIBILITIES MAY OCCUR DUE TO BLOWING DUST...BUT NOT CONFIDENT ENOUGH TO ADD TO TAFS AT THIS TIME.

SOUTHEAST CA AND SOUTHWEST AZ...INCLUDING KIPL AND KBLH...  
UPPER LEVEL LOW OVER SOUTHERN CALIFORNIA WILL BRING GENERALLY DRY

CONDITIONS ACROSS SOUTHEAST CALIFORNIA AS MID LEVEL SOUTHWESTERLY FLOW CONTINUES TO BRING IN DRY AIR. A FEW THUNDERSTORMS ACROSS SOUTHWEST ARIZONA MAY BRUSH CLOSE TO KBLH...BUT EXPECTING STORMS TO STAY TO THE EAST.

AVIATION DISCUSSION NOT UPDATED FOR AMENDED TAFS.

&&

.FIRE WEATHER...  
TUESDAY THROUGH SATURDAY...  
THUNDERSTORM CHANCES WILL GRADUALLY DECREASE AS THE WEEK PROGRESSES ALTHOUGH SCATTERED SHOWERS AND STORMS REMAIN POSSIBLE THROUGH MID WEEK. BEST CHANCES ARE ACROSS ARIZONA...ESPECIALLY EAST OF PHOENIX. DRIER AIR WILL MOVE IN FROM THE WEST THIS WEEK BUT AFTERNOON HUMIDITIES WILL ONLY DROP TO AROUND 20 PERCENT WITH GOOD OVERNIGHT RECOVERY. NO SIGNIFICANT DRYING TRENDS AND WIND EVENTS EXPECTED THROUGH THE UPCOMING WEEK.

&&

.PSR WATCHES/WARNINGS/ADVISORIES...

AZ...NONE.

CA...NONE.

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NATIONAL WEATHER SERVICE PHOENIX IS ON THE INTERNET AT

WEATHER.GOV/PHOENIX

DISCUSSION...ELLIS  
PREVIOUS DISCUSSION...AJ  
AVIATION...KUHLMAN  
FIRE WEATHER...LEINS

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868

FXUS65 KPSR 120325

AFDPSR

AREA FORECAST DISCUSSION  
NATIONAL WEATHER SERVICE PHOENIX AZ  
825 PM MST SUN SEP 11 2011

.SYNOPSIS...

A LOW PRESSURE SYSTEM IS EXPECTED TO REMAIN CENTERED NEAR THE SOUTHERN CALIFORNIA COAST THROUGH MONDAY NIGHT THEN MOVE ONLY SLOWLY EAST THE FIRST HALF OF THE WEEK. THIS MEANS A CONTINUED CHANCE OF MAINLY AFTERNOON AND EVENING SHOWERS AND THUNDERSTORMS ACROSS MOST OF THE AREA THROUGH EARLY THIS WEEK. DRIER AIR IS EXPECTED TO BRING A DECREASE IN THE CHANCE OF STORMS WEDNESDAY WITH DRY AND GRADUALLY WARMER WEATHER THE LATTER PART OF THE WEEK.

&&

.DISCUSSION...RELATIVELY COOL AIR (HIGH OF 99 DEGREES AT KPHX) IN THE WAKE OF YESTERDAYS STORMS INHIBITED CONVECTION SOMEWHAT ACROSS THE PHOENIX METRO AREA THIS AFTERNOON. NEVERTHELESS...SCATTERED THUNDERSTORMS DEVELOPED ACROSS AZ AND CONTINUED TO BE HAIL PRODUCERS...WITH HAIL AS LARGE AS AN INCH AND A HALF REPORTED IN WINTERSBURG. ALSO OF NOTE WAS A STRONG STORM IN MARICOPA THAT FELLED SOME TREES AND GENERATED A DUST STORM THAT MOVED NORTH INTO THE VALLEY.

NOT MUCH POSITIVE VORTICITY ADVECTION TO SPEAK OF AT THIS HOUR AS THE LOW ACROSS SOUTHERN CA GENERALLY REMAINS CUT OFF. CIN IS INCREASING WITH THE LOSS OF HEATING SO SHOWER AND THUNDERSTORM ACTIVITY CONTINUES TO DISSIPATE. FORECAST WILL BE UPDATED TO REMOVE THE OVERNIGHT MENTION OF PRECIPITATION AS WELL AS FOR MINOR ADJUSTMENTS TO TEMPS/DEWPOINTS/RHS.

&&

.PREVIOUS DISCUSSION...

THE LOW PRESSURE SYSTEM THAT HAS BEEN CENTERED NEAR THE SOUTHERN CALIFORNIA COAST THE PAST COUPLE OF DAYS IS EXPECTED TO CONTINUE THERE THROUGH MONDAY NIGHT. MOISTURE FROM WESTERN MEXICO IS EXPECTED TO CONTINUE OVER SOUTH-CENTRAL ARIZONA AND HAS EXPANDED SOMEWHAT FARTHER WEST. THIS MEANS SOME CHANCE OF MAINLY AFTERNOON AND EVENING SHOWERS AND THUNDERSTORMS AS FAR WEST AS THE LOWER COLORADO RIVER VALLEY THROUGH TUESDAY. IN ADDITION...A PLUME OF TROPICAL MOISTURE FROM OFF THE COAST OF BAJA CALIFORNIA IS EXPECTED TO MOVE FROM THE SOUTHWEST OVER SOUTHWEST AND SOUTH-CENTRAL ARIZONA TONIGHT.

IT LOOKS AS IF ONLY ENOUGH MOISTURE WILL MAKE IT TO SOUTHEAST CALIFORNIA WEST OF THE LOWER COLORADO RIVER VALLEY FOR A SLIGHT CHANCE OF SHOWERS AND THUNDERSTORMS THERE TUESDAY AFTERNOON. HOWEVER...WITH THE LOW PRESSURE SYSTEM MOVING VERY LITTLE THROUGH MONDAY NIGHT AND ONLY MOVING SLOWLY EAST TUESDAY...HAVE KEPT A CHANCE OF MAINLY AFTERNOON AND EVENING SHOWERS AND THUNDERSTORMS IN SOUTH-CENTRAL ARIZONA INCLUDING THE GREATER PHOENIX AREA THROUGH TUESDAY.

THE LOW PRESSURE SYSTEM IS EXPECTED TO MOVE EAST TO SOUTHERN UTAH WEDNESDAY. DRIER AIR FROM THE SOUTHWEST IS EXPECTED TO COVER SOUTHEAST CALIFORNIA AND FILTER INTO THE REST OF THE AREA FROM THE SOUTHWEST. THIS MEANS LESS OF A CHANCE...BUT STILL SOME CHANCE OF AFTERNOON AND EVENING SHOWERS AND THUNDERSTORMS OVER SOUTH-CENTRAL ARIZONA MAINLY OVER THE HIGHER TERRAIN WEDNESDAY.

THE LOW PRESSURE SYSTEM IS EXPECTED TO CONTINUE WEAKENING WITH DRIER SPREADING OVER MOST OF THE AREA. THE DRY AIR IS EXPECTED TO CONFINE A SLIGHT CHANCE OF AFTERNOON AND EVENING SHOWERS AND THUNDERSTORMS TO THE HIGHER TERRAIN EAST OF THE GREATER PHOENIX AREA THURSDAY. THEN DRY AND SLIGHTLY WARMER IS EXPECTED ACROSS THE ENTIRE AREA FRIDAY AND NEXT WEEKEND.

&&

.AVIATION...

SOUTH-CENTRAL ARIZONA INCLUDING KPHX AND KIWA...

THUNDERSTORM ACTIVITY IS EXPECTED TO BE FOCUSED MAINLY SOUTH AND EAST OF THE PHOENIX METRO AREA MONDAY. HOWEVER...CHANCES REMAIN ELEVATED FOR AN OUTFLOW BOUNDARY CAPABLE OF GENERATING BLOWING DUST AND REDUCED VSBYS TO AFFECT KIWA AND POSSIBLY KPHX.

SOUTHEAST CA AND SOUTHWEST AZ...INCLUDING KIPL AND KBLH....

NO AVIATION WX CONCERNS. THUNDERSTORMS WILL REMAIN CONFINED TO AZ. WITH AN AREA OF LOW PRESSURE OFF THE SOUTHERN CA COAST...SOUTHERLY FLOW AT KBLH AND WESTERLY FLOW AT KIPL WILL PERSIST THROUGH EARLY THIS WEEK.

AVIATION DISCUSSION NOT UPDATED FOR AMENDED TAFS.

&&

.FIRE WEATHER...

WEDNESDAY THROUGH SUNDAY...

THE THUNDERSTORM CHANCE WILL DECREASE WEDNESDAY...ALTHOUGH SCATTERED SHOWERS AND STORMS REMAIN POSSIBLE MAINLY EAST OF PHOENIX WEDNESDAY AND EAST OF THE GREATER PHOENIX AREA THURSDAY. DRY WEATHER IS EXPECTED OVER THE ENTIRE AREA FRIDAY AND NEXT WEEKEND. DRIER AIR WILL MOVE IN FROM THE WEST THIS WEEK BUT AFTERNOON HUMIDITIES WILL ONLY DROP TO AROUND 20 PERCENT WITH GOOD OVERNIGHT RECOVERY. NO SIGNIFICANT DRYING TRENDS AND WIND EVENTS EXPECTED THROUGH THE UPCOMING WEEK.

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.PSR WATCHES/WARNINGS/ADVISORIES...

AZ...NONE.

CA...NONE.

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NATIONAL WEATHER SERVICE PHOENIX IS ON THE INTERNET AT

WEATHER.GOV/PHOENIX

DISCUSSION...HIRSCH

PREVIOUS DISCUSSION...ELLIS/AJ

AVIATION...HIRSCH

FIRE WEATHER...ELLIS/LEINS

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423

FXUS65 KPSR 121120

AFDPSR

AREA FORECAST DISCUSSION

NATIONAL WEATHER SERVICE PHOENIX AZ

420 AM MST MON SEP 12 2011

.SYNOPSIS...

A LOW PRESSURE SYSTEM WILL REMAIN CENTERED OVER CALIFORNIA TODAY INTO TUESDAY FOR A CONTINUED CHANCE OF MAINLY AFTERNOON AND EVENING SHOWERS AND THUNDERSTORMS ACROSS MOST OF THE AREA. A DRYING TREND BEGINS WEDNESDAY AS THE LOW PRESSURE SYSTEM WEAKENS. STORM CHANCES WILL BE CONFINED TO THE HIGHER TERRAIN OF SOUTH-CENTRAL ARIZONA THURSDAY AND FRIDAY BEFORE DISSIPATING ALTOGETHER OVER THE WEEKEND. HIGH TEMPERATURES WILL REMAIN A BIT BELOW NORMAL THROUGH THE MIDDLE OF THE WEEK BEFORE SLOWLY WARMING TO NORMAL OR SLIGHTLY ABOVE NORMAL OVER THE WEEKEND.

&&

.DISCUSSION...

TODAY AND TONIGHT...WATER VAPOR IMAGERY SHOWS THE UPPER LOW PRESSURE SYSTEM OVER THE WESTERN STATES IS UNDERGOING REORGANIZATION WHERE THE MAIN CIRCULATION HAS SHIFTED OFF TO THE NORTHEAST AND IS WEAKENING. MEANWHILE A NEW CIRCULATION FEATURE IS MOVING SOUTHWARD JUST OFFSHORE TO TAKE THE PLACE OF THE FORMER LOW CENTER. IR IMAGERY SHOWS CONSIDERABLE CLOUDINESS MOVING NORTHWARD OVER ARIZONA EMANATING FROM MEXICO AND OFFSHORE OF THE BAJA PENINSULA. THE CLOUD COVER HAS BEEN UNDERDONE IN MODEL RH FIELDS. UNDERCUT MODEL MAX TEMP GUIDANCE SLIGHTLY TO ACCOUNT FOR THIS. SHOULD STAY BELOW 100 IN THE PHOENIX AREA ONCE AGAIN. MODELS CONTINUE TO SHOW SUFFICIENT MOISTURE AVAILABILITY FOR THUNDERSTORMS ON THE LOWER DESERTS TODAY...NEAR AND EAST OF THE LOWER COLORADO RIVER VALLEY. HOWEVER...THERE WILL BE LESS JET ENERGY AROUND. WITH LESS RAIN COOLED AIR AROUND TODAY COMPARED TO SUNDAY...WOULD ANTICIPATE THAT THERE WILL BE ENOUGH INSTABILITY TO GO WITH CHANCE CATEGORY POPS OVER THE ARIZONA ZONES WITH SLIGHT CHANCE POPS ALONG THE LOWER COLORADO RIVER VALLEY. CLOUD COVER COULD BE A FLY IN THE OINTMENT IF IT INHIBITS SURFACE HEATING SUFFICIENTLY. AS HAS BEEN THE CASE FOR A FEW DAYS NOW...THERE IS ENOUGH VERTICAL WIND SHEAR FOR ORGANIZED STORM STRUCTURES TO DEVELOP THEREBY AIDING SEVERE POTENTIAL. AREAL COVERAGE OF STORMS THAT COULD BE SEVERE IS EXPECTED TO BE SMALL.

TUESDAY AND WEDNESDAY...THE UPPER LOW PRESSURE SYSTEM TAKES ON A MORE DISTINCT STRUCTURE BY TUESDAY AND THE MODELS SHOW SOMETHING OF A CONFLUENCE OF JETSTREAMS OVER SOUTHERN ARIZONA ALONG WITH A BIT OF Q FORCING. THERE IS MODEL DISAGREEMENT ON THE MOISTURE DISTRIBUTION WITH THE NAM TRACKING DECENT MOISTURE WELL WEST INTO SOUTHEAST CALIFORNIA WHILE THE GFS DOESNT TAKE IT QUITE AS FAR WEST. THE SREF IS IN AGREEMENT WITH THE NAM. POPS REFLECT A BLENDED APPROACH WITH CLIMATOLOGY IN MIND. IF TODAY/TONIGHT IS RELATIVELY QUIET...THEN TUESDAY WOULD BE OUR BEST OPPORTUNITY FOR STORMS AND SEVERE POTENTIAL. BUT AGAIN...THE AREAL COVERAGE OF STORMS BEING SEVERE IS WOULD BE SMALL. MODELS AGREE THERE WILL BE A DECLINE IN MOISTURE WEDNESDAY AS THE MAIN LOW MOVES FROM SOUTHERN CALIFORNIA INTO ARIZONA. WITH SOME SUBTLE COOLING ALOFT AND LINGERING MOISTURE...EXPANDED THE SLIGHT CHANCE CHANCE POPS TO INCLUDE THE PHOENIX AREA WEDNESDAY EVENING.

THURSDAY THROUGH SUNDAY...GFS AND ECMWF AGREE THAT TROUGHING WILL LINGER OVER THE WEST BUT IN A MORE TRANSIENT AND WEAKER FASHION THAN WHAT WE HAVE HAD. MOISTURE WILL CONTINUE TO DECLINE WITH SLIGHT CHANCE POPS BEING CONFINED TO ZONE 24 BEFORE DISSIPATING ALTOGETHER

SATURDAY AND SUNDAY. BECAUSE OF THE LINGERING TROUGHING...TEMPS WILL BE SLOW TO CLIMB BUT WILL EVENTUALLY BE ONLY NEAR OR SLIGHTLY ABOVE NORMAL.

&&

.AVIATION...

SOUTH-CENTRAL ARIZONA INCLUDING KPHX AND KIWA...  
THUNDERSTORM ACTIVITY IS EXPECTED TO BE FOCUSED MAINLY SOUTH AND EAST OF THE PHOENIX METRO AREA MONDAY. HOWEVER...CHANCES REMAIN ELEVATED FOR AN OUTFLOW BOUNDARY CAPABLE OF GENERATING BLOWING DUST AND REDUCED VSBYS TO AFFECT KIWA AND POSSIBLY KPHX.

SOUTHEAST CA AND SOUTHWEST AZ...INCLUDING KIPL AND KBLH....  
NO AVIATION WX CONCERNS. THUNDERSTORMS WILL REMAIN CONFINED TO AZ. WITH AN AREA OF LOW PRESSURE OFF THE SOUTHERN CA COAST...SOUTHERLY FLOW AT KBLH AND WESTERLY FLOW AT KIPL WILL PERSIST THROUGH EARLY THIS WEEK.

AVIATION DISCUSSION NOT UPDATED FOR AMENDED TAFS.

&&

.FIRE WEATHER...

WEDNESDAY THROUGH SUNDAY...  
THE THUNDERSTORM CHANCE WILL DECREASE WEDNESDAY...ALTHOUGH SCATTERED SHOWERS AND STORMS REMAIN POSSIBLE MAINLY EAST OF PHOENIX WEDNESDAY AND EAST OF THE GREATER PHOENIX AREA THURSDAY. DRY WEATHER IS EXPECTED OVER THE ENTIRE AREA FRIDAY AND NEXT WEEKEND. DRIER AIR WILL MOVE IN FROM THE WEST THIS WEEK BUT AFTERNOON HUMIDITIES WILL ONLY DROP TO AROUND 20 PERCENT WITH GOOD OVERNIGHT RECOVERY. NO SIGNIFICANT DRYING TRENDS AND WIND EVENTS EXPECTED THROUGH THE UPCOMING WEEK.

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.PSR WATCHES/WARNINGS/ADVISORIES...

AZ...NONE.

CA...NONE.

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NATIONAL WEATHER SERVICE PHOENIX IS ON THE INTERNET AT

WEATHER.GOV/PHOENIX

DISCUSSION...AJ

AVIATION...HIRSCH

FIRE WEATHER...ELLIS/LEINS

AFDPSR

AREA FORECAST DISCUSSION  
NATIONAL WEATHER SERVICE PHOENIX AZ  
1030 AM MST MON SEP 12 2011

.SYNOPSIS...

A LOW PRESSURE SYSTEM WILL REMAIN CENTERED NEAR THE SOUTHERN CALIFORNIA COAST THROUGH THIS EVENING. IT WILL THEN MOVE ONLY SLOWLY EAST...REACHING SOUTHERN NEVADA WEDNESDAY...THEN ACROSS THE ARIZONA-UTAH BORDER WEDNESDAY NIGHT AND THURSDAY. THIS MEANS A CONTINUED CHANCE OF MAINLY AFTERNOON AND EVENING SHOWERS AND THUNDERSTORMS MAINLY IN SOUTH-CENTRAL AND SOUTHWEST ARIZONA THROUGH TUESDAY. STRONG GUSTY DAMAGING WINDS...HAIL...AND HEAVY RAIN ARE PROBABLE WITH SOME STORMS IN SOUTH-CENTRAL ARIZONA ALONG WITH DENSE BLOWING DUST AHEAD OF THE STORMS. DRIER AIR FROM THE SOUTHWEST IS EXPECTED TO BRING A DECREASE IN THE CHANCE OF STORMS WEDNESDAY WITH DRY AND GRADUALLY WARMER WEATHER THE LATTER PART OF THE WEEK.

&&

.DISCUSSION...

UNDER PARTLY TO MOSTLY SUNNY SKIES...TEMPERATURES WERE GENERALLY 2 TO 5 DEGREES WARMER IN THE SOUTH-CENTRAL AND SOUTHWEST ARIZONA TO THE LOWER COLORADO RIVER VALLEY WITH LITTLE CHANGE OR SLIGHTLY LOWER TEMPERATURES IN SOUTHEAST CALIFORNIA LATE THIS MORNING COMPARED WITH THE SAME TIME YESTERDAY. IT WAS DRIER ALONG THE LOWER COLORADO RIVER VALLEY AND IN SOUTHEAST CALIFORNIA INCLUDING YUMA AND EL CENTRO WITH DEW POINT TEMPERATURES GENERALLY 4 TO 15 DEGREES LOWER. WIND WAS GENERALLY FROM THE EAST 5 TO 15 MPH IN SOUTH-CENTRAL ARIZONA INCLUDING THE GREATER PHOENIX AREA AND LIGHT AND VARIABLE OR CALM ELSEWHERE.

A SIGNIFICANT AMOUNT OF CLOUDINESS COVERED THE AREA FROM EAST THROUGH SOUTHEAST OF THE GREATER PHOENIX AREA AND SOUTH OF CASA GRANDE THIS MORNING. THERE WERE ALSO ISOLATED THUNDERSTORMS MAINLY BETWEEN NOGALES AND GLOBE. AN UNSTABLE AND RELATIVELY MOIST AIRMASS CONTINUES OVER OUR AREA AS DOES SUFFICIENT DYNAMICS TO THE EAST OF A LOW PRESSURE CENTERED NEAR THE SOUTHERN CALIFORNIA COAST. THUS...WITH SUNSHINE CURRENTLY TO THE NORTHWEST OF THE CLOUDY AREA...EXPECT THAT ISOLATED SHOWERS AND THUNDERSTORMS OVER SOUTHEAST ARIZONA THIS MORNING WILL DEVELOP FARTHER NORTHWEST INTO SOUTH-CENTRAL ARIZONA ESPECIALLY PINAL COUNTY AND SOUTHWEST MARICOPA THIS AFTERNOON AND TO THE GREATER PHOENIX AREA BY THIS EVENING.

ONCE AGAIN...DENSE BLOWING DUST IS PROBABLE AHEAD OF THE STORMS... PARTICULARLY THE AREA FROM THE CASA GRANDE AREA TO THE GREATER PHOENIX AREA AND GILA BEND LATE THIS AFTERNOON AND THIS EVENING.

ALSO...ONCE AGAIN...STRONG GUSTY DAMAGING WINDS...HAIL...AND HEAVY RAIN ARE ALSO EXPECTED WITH SOME STORMS IN SOUTH-CENTRAL ARIZONA THIS AFTERNOON AND THIS EVENING. THIS WILL POSSIBLY INCLUDE PORTIONS OF THE GREATER PHOENIX AREA BY THIS EVENING.

PREVIOUS DISCUSSION...

TUESDAY AND WEDNESDAY...THE UPPER LOW PRESSURE SYSTEM TAKES ON A MORE DISTINCT STRUCTURE BY TUESDAY AND THE MODELS SHOW SOMETHING OF

A CONFLUENCE OF JETSTREAMS OVER SOUTHERN ARIZONA ALONG WITH A BIT OF Q FORCING. THERE IS MODEL DISAGREEMENT ON THE MOISTURE DISTRIBUTION WITH THE NAM TRACKING DECENT MOISTURE WELL WEST INTO SOUTHEAST CALIFORNIA WHILE THE GFS DOESNT TAKE IT QUITE AS FAR WEST. THE SREF IS IN AGREEMENT WITH THE NAM. POPS REFLECT A BLENDED APPROACH WITH CLIMATOLOGY IN MIND. IF TODAY/TONIGHT IS RELATIVELY QUIET...THEN TUESDAY WOULD BE OUR BEST OPPORTUNITY FOR STORMS AND SEVERE POTENTIAL. BUT AGAIN...THE AREAL COVERAGE OF STORMS BEING SEVERE IS WOULD BE SMALL. MODELS AGREE THERE WILL BE A DECLINE IN MOISTURE WEDNESDAY AS THE MAIN LOW MOVES FROM SOUTHERN CALIFORNIA INTO ARIZONA. WITH SOME SUBTLE COOLING ALOFT AND LINGERING MOISTURE...EXPANDED THE SLIGHT CHANCE CHANCE POPS TO INCLUDE THE PHOENIX AREA WEDNESDAY EVENING.

THURSDAY THROUGH SUNDAY...GFS AND ECMWF AGREE THAT TROUGHING WILL LINGER OVER THE WEST BUT IN A MORE TRANSIENT AND WEAKER FASHION THAN WHAT WE HAVE HAD. MOISTURE WILL CONTINUE TO DECLINE WITH SLIGHT CHANCE POPS BEING CONFINED TO ZONE 24 BEFORE DISSIPATING ALTOGETHER SATURDAY AND SUNDAY. BECAUSE OF THE LINGERING TROUGHING...TEMPS WILL BE SLOW TO CLIMB BUT WILL EVENTUALLY BE ONLY NEAR OR SLIGHTLY ABOVE NORMAL.

&&

.AVIATION...

SOUTH-CENTRAL ARIZONA INCLUDING KPHX AND KIWA... THUNDERSTORM ACTIVITY IS EXPECTED TO BE FOCUSED MAINLY SOUTH AND EAST OF THE PHOENIX METRO AREA MONDAY. HOWEVER...CHANCES REMAIN ELEVATED FOR AN OUTFLOW BOUNDARY CAPABLE OF GENERATING BLOWING DUST AND REDUCED VSBYS TO AFFECT KIWA AND POSSIBLY KPHX. INSERTED PROB30S AND VCTS AT BOTH TAF SITES AFTER 00Z ALONG WITH GUSTY SOUTHWEST /KIWA/ AND SOUTHEAST /KPHX/ WINDS.

SOUTHEAST CA AND SOUTHWEST AZ...INCLUDING KIPL AND KBLH.... NO AVIATION WX CONCERNS. THUNDERSTORMS WILL REMAIN CONFINED TO AZ. WITH AN AREA OF LOW PRESSURE OFF THE SOUTHERN CA COAST...SOUTHERLY FLOW AT KBLH AND WESTERLY FLOW AT KIPL WILL PERSIST THROUGH EARLY THIS WEEK.

AVIATION DISCUSSION NOT UPDATED FOR AMENDED TAFS.

&&

.FIRE WEATHER...

WEDNESDAY THROUGH SUNDAY... THE THUNDERSTORM CHANCE WILL DECREASE WEDNESDAY...ALTHOUGH SCATTERED SHOWERS AND STORMS REMAIN POSSIBLE MAINLY EAST OF PHOENIX WEDNESDAY AND EAST OF THE GREATER PHOENIX AREA THURSDAY. DRY WEATHER IS EXPECTED OVER THE ENTIRE AREA FRIDAY AND NEXT WEEKEND. DRIER AIR WILL MOVE IN FROM THE WEST THIS WEEK BUT AFTERNOON HUMIDITIES WILL ONLY DROP TO AROUND 20 PERCENT WITH GOOD OVERNIGHT RECOVERY. NO SIGNIFICANT DRYING TRENDS AND WIND EVENTS EXPECTED THROUGH THE UPCOMING WEEK.

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.PSR WATCHES/WARNINGS/ADVISORIES...

AZ...NONE.

CA...NONE.

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NATIONAL WEATHER SERVICE PHOENIX IS ON THE INTERNET AT  
WEATHER.GOV/PHOENIX

DISCUSSION...AJ  
AVIATION...HIRSCH/LEINS  
FIRE WEATHER...LEINS

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665  
FXUS65 KPSR 122222  
AFDPSR

AREA FORECAST DISCUSSION  
NATIONAL WEATHER SERVICE PHOENIX AZ  
310 PM MST MON SEP 12 2011

.SYNOPSIS...

A LOW PRESSURE SYSTEM WILL REMAIN CENTERED NEAR THE SOUTHERN CALIFORNIA COAST THROUGH THIS EVENING. IT WILL THEN MOVE ONLY SLOWLY EAST...REACHING SOUTHERN NEVADA WEDNESDAY...THEN ACROSS THE ARIZONA-UTAH BORDER WEDNESDAY NIGHT AND THURSDAY. THIS MEANS A CONTINUED CHANCE OF MAINLY AFTERNOON AND EVENING SHOWERS AND THUNDERSTORMS MAINLY IN SOUTH-CENTRAL AND SOUTHWEST ARIZONA THROUGH TUESDAY. STRONG GUSTY DAMAGING WINDS...HAIL...AND HEAVY RAIN ARE PROBABLE WITH SOME STORMS IN SOUTH-CENTRAL ARIZONA ALONG WITH DENSE BLOWING DUST AHEAD OF THE STORMS. DRIER AIR FROM THE SOUTHWEST IS EXPECTED TO BRING A DECREASE IN THE CHANCE OF STORMS WEDNESDAY WITH DRY AND GRADUALLY WARMER WEATHER THE LATTER PART OF THE WEEK.

&&

.DISCUSSION...

CONSIDERABLE CLOUDINESS COVERED SOUTH-CENTRAL ARIZONA DESERT AREAS WITH SCATTERED SHOWERS AND THUNDERSTORMS SOUTHWEST AND WEST OF PHOENIX MOVING TOWARD THE GREATER PHOENIX AREA EARLY THIS AFTERNOON. IT WAS PARTLY SUNNY ELSEWHERE WITH ISOLATED SHOWERS AND THUNDERSTORMS IN LA PAZ COUNTY AND YUMA COUNTY.

TEMPERATURES WERE GENERALLY SLIGHTLY WARMER IN THE SOUTH-CENTRAL ARIZONA INCLUDING THE GREATER WITH LITTLE CHANGE ELSEWHERE. WITH THE SAME TIME YESTERDAY. WIND WAS GENERALLY FROM THE SOUTHEAST AND SOUTH 10 TO 20 MPH IN SOUTH-CENTRAL ARIZONA INCLUDING THE GREATER PHOENIX AREA TO THE LOWER COLORADO RIVER VALLEY AND LIGHT AND VARIABLE IN SOUTHEAST CALIFORNIA.

EXPECT SCATTERED SHOWERS AND THUNDERSTORMS OVER SOUTH-CENTRAL AND SOUTHWEST ARIZONA THAT WERE TO THE SOUTH AND WEST OF PHOENIX TO

CONTINUE DEVELOPING AND MOVING NORTHEAST INTO THE GREATER PHOENIX AREA THIS EVENING.

ONCE AGAIN...DENSE BLOWING DUST IS PROBABLE AHEAD OF THE STORMS...ESPECIALLY THE AREA FROM THE CASA GRANDE AREA TO THE GREATER PHOENIX AREA AND GILA BEND LATE THIS AFTERNOON AND THIS EVENING.

ALSO...ONCE AGAIN...STRONG GUSTY DAMAGING WINDS...HAIL...AND HEAVY RAIN ARE ALSO EXPECTED WITH SOME STORMS IN SOUTH-CENTRAL ARIZONA THIS AFTERNOON AND THIS EVENING. THIS WILL POSSIBLY INCLUDE PORTIONS OF THE GREATER PHOENIX AREA BY THIS EVENING.

.PREVIOUS DISCUSSION...

TUESDAY AND WEDNESDAY...THE UPPER LOW PRESSURE SYSTEM TAKES ON A MORE DISTINCT STRUCTURE BY TUESDAY AND THE MODELS SHOW SOMETHING OF A CONFLUENCE OF JETSTREAMS OVER SOUTHERN ARIZONA ALONG WITH A BIT OF Q FORCING. THERE IS MODEL DISAGREEMENT ON THE MOISTURE DISTRIBUTION WITH THE NAM TRACKING DECENT MOISTURE WELL WEST INTO SOUTHEAST CALIFORNIA WHILE THE GFS DOESNT TAKE IT QUITE AS FAR WEST. THE SREF IS IN AGREEMENT WITH THE NAM. POPS REFLECT A BLENDED APPROACH WITH CLIMATOLOGY IN MIND. IF TODAY/TONIGHT IS RELATIVELY QUIET...THEN TUESDAY WOULD BE OUR BEST OPPORTUNITY FOR STORMS AND SEVERE POTENTIAL. BUT AGAIN...THE AREAL COVERAGE OF STORMS BEING SEVERE IS WOULD BE SMALL. MODELS AGREE THERE WILL BE A DECLINE IN MOISTURE WEDNESDAY AS THE MAIN LOW MOVES FROM SOUTHERN CALIFORNIA INTO ARIZONA. WITH SOME SUBTLE COOLING ALOFT AND LINGERING MOISTURE...EXPANDED THE SLIGHT CHANCE CHANCE POPS TO INCLUDE THE PHOENIX AREA WEDNESDAY EVENING.

THURSDAY THROUGH SUNDAY...GFS AND ECMWF AGREE THAT TROUGHING WILL LINGER OVER THE WEST BUT IN A MORE TRANSIENT AND WEAKER FASHION THAN WHAT WE HAVE HAD. MOISTURE WILL CONTINUE TO DECLINE WITH SLIGHT CHANCE POPS BEING CONFINED TO ZONE 24 BEFORE DISSIPATING ALTOGETHER SATURDAY AND SUNDAY. BECAUSE OF THE LINGERING TROUGHING...TEMPS WILL BE SLOW TO CLIMB BUT WILL EVENTUALLY BE ONLY NEAR OR SLIGHTLY ABOVE NORMAL.

&&

.AVIATION...

SOUTH-CENTRAL ARIZONA INCLUDING KPHX AND KIWA... AREA OF BEST STORM DEVELOPMENT LIES TO THE SOUTHWEST AND SOUTH OF PHOENIX THROUGH THE EVENING...WITH ALREADY SCATTERED STORMS DEVELOPING IN SOUTHWESTERN MARICOPA COUNTY NEAR GILA BEND. OVERALL STORM MOTION SUPPORTS SHOWERS AND THUNDERSTORMS MOVING NORTH INTO AREAS OF PHOENIX THIS AFTERNOON/EVENING. GUSTY OUTFLOW WINDS CAPABLE OF GENERATING BLDU AND PERIODS OF REDUCED VSBYS AFFECTING KPHX AND KIWA AFTER 12/2300Z. OUTFLOWS ARE EXPECTED TO MOVE THROUGH THE CITY...STILL UNSURE ABOUT THEM INITIATING ADDITIONAL STORMS ACROSS THE METRO AREA. FOR NOW...KEPT VICINITY THUNDER THROUGH THIS EVENING...UNTIL 13/0600Z.

SOUTHEAST CA AND SOUTHWEST AZ...INCLUDING KIPL AND KBLH.... THUNDERSTORMS WILL REMAIN MOSTLY CONFINED TO ARIZONA THIS EVENING. WITH AN AREA OF LOW PRESSURE OFF THE SOUTHERN CA COAST...SOUTHERLY FLOW AT KBLH AND WESTERLY FLOW AT KIPL WILL PERSIST THROUGH EARLY THIS WEEK. EXPECT CLEAR SKIES OVERNIGHT WITH AFTERNOON FAIR WEATHER

CUMULUS IN THE AFTERNOON.

AVIATION DISCUSSION NOT UPDATED FOR AMENDED TAFS.

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.FIRE WEATHER...

THURSDAY THROUGH MONDAY...

DRIER AIR WILL START TO WORK INTO THE REGION LATE THURSDAY AND INTO FRIDAY...LASTING INTO THE BEGINNING OF NEXT WEEK. AFTERNOON HUMIDITIES WILL ONLY DROP TO AROUND 20 PERCENT WITH GOOD OVERNIGHT RECOVERY...DESPITE THE SLOWLY DRYING AIRMASS. NO SIGNIFICANT DRYING TRENDS AND WIND EVENTS EXPECTED THROUGH THE UPCOMING WEEK AS UPPER LEVEL TROUGHING HOLDS OVER THE REGION.

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.PSR WATCHES/WARNINGS/ADVISORIES...

AZ...NONE.

CA...NONE.

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NATIONAL WEATHER SERVICE PHOENIX IS ON THE INTERNET AT

WEATHER.GOV/PHOENIX

DISCUSSION...ELLIS

PREVIOUS DISCUSSION...AJ

AVIATION...NOLTE

FIRE WEATHER...NOLTE

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833

WWUS75 KPSR 120115

NPWPSR

URGENT - WEATHER MESSAGE

NATIONAL WEATHER SERVICE PHOENIX AZ

615 PM MST SUN SEP 11 2011

.DENSE BLOWING DUST OVER THE GREATER PHOENIX AREA.

AZZ023-028-120300-

/O.NEW.KPSR.DS.W.0020.110912T0115Z-110912T0300Z/

GREATER PHOENIX AREA-NORTHWEST AND NORTH CENTRAL PINAL COUNTY-

INCLUDING THE CITIES OF...MESA...PHOENIX...APACHE JUNCTION...

CASA GRANDE...FLORENCE

615 PM MST SUN SEP 11 2011

...DUST STORM WARNING IN EFFECT UNTIL 8 PM MST THIS EVENING...

THE NATIONAL WEATHER SERVICE IN PHOENIX HAS ISSUED A DUST STORM

WARNING...WHICH IS IN EFFECT UNTIL 8 PM MST THIS EVENING.

- \* AFFECTED AREA: SOUTHEAST PORTIONS OF THE GREATER PHOENIX AREA AS WELL AS PORTIONS OF NORTHWEST PINAL COUNTY.
- \* LOCATIONS INCLUDE: MESA...PHOENIX...APACHE JUNCTION...CHANDLER...GILBERT...SUN LAKES...AHWATUKEE...TEMPE...SAN TAN VALLEY...SACATON.
- \* TIMING: DENSE BLOWING DUST AND GUSTY WIND SPREADING TO THE NORTH AND NORTHEAST ACROSS THE SOUTHEAST VALLEY THROUGH AT LEAST 7 PM.
- \* WINDS: GUSTY WINDS BETWEEN 20 AND 40 MPH WITH A FEW HIGHER GUSTS POSSIBLE.
- \* VISIBILITY: WIDESPREAD LESS THAN 3 MILES WITH AREAS BELOW ONE QUARTER MILE.
- \* IMPACTS: STRONG WINDS AND VISIBILITY BELOW ONE QUARTER MILE WILL PRODUCE HAZARDOUS DRIVING CONDITIONS FOR MOTORISTS IN THE SOUTHEAST PORTION OF THE GREATER PHOENIX AREA.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

A DUST STORM WARNING IS ISSUED WHEN WINDS HAVE GENERATED LARGE AREAS OF BLOWING DUST OR BLOWING SAND THAT HAVE SUBSTANTIALLY REDUCED VISIBILITIES...TO 1/4 MILE OR LESS...RESULTING IN HAZARDOUS DRIVING CONDITIONS IN SOME AREAS. BE READY FOR A SUDDEN DROP IN VISIBILITY TO NEAR ZERO. USE EXTRA CAUTION AND SLOW DOWN WHILE DRIVING...AS OBJECTS ON AND NEAR ROADWAYS WILL BE SEEN ONLY AT CLOSE RANGE. IF YOU ENCOUNTER BLOWING DUST OR BLOWING SAND ON THE ROADWAY OR SEE IT APPROACHING...PULL OFF THE ROAD AS FAR AS POSSIBLE AND PUT YOUR VEHICLE IN PARK. TURN THE LIGHTS ALL THE WAY OFF AND KEEP YOUR FOOT OFF THE BRAKE PEDAL.

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NATIONAL WEATHER SERVICE PHOENIX IS ON THE INTERNET AT

WEATHER.GOV/PHOENIX

CJB

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382  
WWUS75 KPSR 120159  
NPWPSR

URGENT - WEATHER MESSAGE  
NATIONAL WEATHER SERVICE PHOENIX AZ  
659 PM MST SUN SEP 11 2011

.DENSE BLOWING DUST OVER THE GREATER PHOENIX AREA.

AZZ023-028-120300-  
/O.CON.KPSR.DS.W.0020.000000T0000Z-110912T0300Z/  
GREATER PHOENIX AREA-NORTHWEST AND NORTH CENTRAL PINAL COUNTY-

INCLUDING THE CITIES OF...MESA...PHOENIX...APACHE JUNCTION...  
CASA GRANDE...FLORENCE  
659 PM MST SUN SEP 11 2011

...DUST STORM WARNING REMAINS IN EFFECT UNTIL 8 PM MST THIS  
EVENING...

A DUST STORM WARNING REMAINS IN EFFECT UNTIL 8 PM MST THIS  
EVENING.

- \* AFFECTED AREA: CENTRAL AND EAST/SOUTHEAST PORTIONS OF THE GREATER  
PHOENIX AREA AS WELL AS PORTIONS OF NORTHWEST PINAL COUNTY.
- \* LOCATIONS INCLUDE: MESA...PHOENIX...APACHE JUNCTION... CHANDLER...  
GILBERT...SUN LAKES...AHWATUKEE...TEMPE...SAN TAN  
VALLEY...SACATON...CENTRAL PHOENIX.
- \* TIMING: DENSE BLOWING DUST AND GUSTY WIND WILL CONTINUE TO SPREAD  
TO THE NORTH AND NORTHEAST ACROSS THE CENTRAL AND EASTERN PORTIONS  
OF THE GREATER PHOENIX AREA THROUGH AT LEAST 730 PM
- \* WINDS: GUSTY WINDS BETWEEN 20 AND 35 MPH WITH A FEW HIGHER GUSTS  
POSSIBLE.
- \* VISIBILITY: WIDESPREAD LESS THAN 3 MILES WITH AREAS BELOW ONE  
QUARTER MILE.
- \* IMPACTS: STRONG WINDS AND VISIBILITY BELOW ONE QUARTER MILE  
WILL PRODUCE HAZARDOUS DRIVING CONDITIONS FOR MOTORISTS IN  
THE SOUTHEAST PORTION OF THE GREATER PHOENIX AREA.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

A DUST STORM WARNING IS ISSUED WHEN WINDS HAVE GENERATED LARGE  
AREAS OF BLOWING DUST OR BLOWING SAND THAT HAVE SUBSTANTIALLY  
REDUCED VISIBILITIES...TO 1/4 MILE OR LESS...RESULTING IN  
HAZARDOUS DRIVING CONDITIONS IN SOME AREAS. BE READY FOR A SUDDEN  
DROP IN VISIBILITY TO NEAR ZERO. USE EXTRA CAUTION AND SLOW DOWN  
WHILE DRIVING...AS OBJECTS ON AND NEAR ROADWAYS WILL BE SEEN ONLY  
AT CLOSE RANGE. IF YOU ENCOUNTER BLOWING DUST OR BLOWING SAND ON  
THE ROADWAY OR SEE IT APPROACHING...PULL OFF THE ROAD AS FAR AS  
POSSIBLE AND PUT YOUR VEHICLE IN PARK. TURN THE LIGHTS ALL THE  
WAY OFF AND KEEP YOUR FOOT OFF THE BRAKE PEDAL.

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NATIONAL WEATHER SERVICE PHOENIX IS ON THE INTERNET AT  
  
WEATHER.GOV/PHOENIX

CJB

NPWPSR

URGENT - WEATHER MESSAGE  
NATIONAL WEATHER SERVICE PHOENIX AZ  
718 PM MST SUN SEP 11 2011

AZZ023-028-120330-  
/O.CAN.KPSR.DS.W.0020.000000T0000Z-110912T0300Z/  
GREATER PHOENIX AREA-NORTHWEST AND NORTH CENTRAL PINAL COUNTY-  
INCLUDING THE CITIES OF...MESA...PHOENIX...APACHE JUNCTION...  
CASA GRANDE...FLORENCE  
718 PM MST SUN SEP 11 2011

...DUST STORM WARNING IS CANCELLED...

THE NATIONAL WEATHER SERVICE IN PHOENIX HAS CANCELLED THE DUST  
STORM WARNING.

WINDS OVER THE WARNING AREA HAVE DECREASED TO BELOW 20 MPH FOR THE  
MOST PART AND VISIBILITIES HAVE CLIMBED TO WELL ABOVE ONE HALF MILE.  
AS A RESULT THE DUST STORM WARNING HAS BEEN CANCELLED. LOCALLY BREEZY  
CONDITIONS AND SUSPENDED DUST WILL KEEP VISIBILITY BELOW 3 MILES  
THROUGH 8 PM ACROSS PARTS OF THE CENTRAL AND EASTERN GREATER PHOENIX  
AREA...HOWEVER DUST STORM CONDITIONS ARE NOT EXPECTED.

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NATIONAL WEATHER SERVICE PHOENIX IS ON THE INTERNET AT  
WEATHER.GOV/PHOENIX

CJB

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174  
WWUS85 KPSR 111839  
SPSPSR

SPECIAL WEATHER STATEMENT  
NATIONAL WEATHER SERVICE PHOENIX AZ  
1139 AM MST SUN SEP 11 2011

AZZ020>023-026>028-CAZ031-120700-  
LOWER COLORADO RIVER VALLEY AZ-WEST CENTRAL DESERTS-  
NORTHWEST MARICOPA COUNTY-GREATER PHOENIX AREA-SOUTHWEST DESERTS-  
SOUTHWEST MARICOPA COUNTY-NORTHWEST AND NORTH CENTRAL PINAL COUNTY-  
LOWER COLORADO RIVER VALLEY CA-  
INCLUDING THE CITIES OF...EHRENBERG...PARKER...BOUSE...QUARTZSITE...  
SALOME...BUCKEYE...LAKE PLEASANT...MORRISTOWN...NEW RIVER...  
TONOPAH...WICKENBURG...CAREFREE...CAVE CREEK...CHANDLER...  
FOUNTAIN HILLS...GILBERT...GLENDALE...MESA...PEORIA...PHOENIX...  
SCOTTSDALE...SUN CITY...TEMPE...DATELAND...TACNA...WELLTON...  
GILA BEND...APACHE JUNCTION...CASA GRANDE...COOLIDGE...FLORENCE...  
AND BLYTHE  
1139 AM MST SUN SEP 11 2011 /1139 AM PDT SUN SEP 11 2011/

...SOME SEVERE THUNDERSTORMS ARE PROBABLE IN SOUTH-CENTRAL ARIZONA INCLUDING THE GREATER PHOENIX AREA LATE THIS AFTERNOON AND THIS EVENING...

A LOW PRESSURE SYSTEM IS EXPECTED TO CONTINUE NEAR THE SOUTHERN CALIFORNIA COAST. TROPICAL MOISTURE AND JET STREAM DYNAMICS AHEAD OF THE LOW PRESSURE SYSTEM ARE EXPECTED TO RESULT IN A SIGNIFICANT INCREASE IN THE LIKELIHOOD OF SHOWERS AND THUNDERSTORMS DEVELOPING IN SOUTH-CENTRAL ARIZONA ESPECIALLY SOUTH AND WEST OF PHOENIX THIS AFTERNOON. SHOWERS AND THUNDERSTORMS ARE THEN EXPECTED TO SPREAD ACROSS MUCH OF SOUTH-CENTRAL ARIZONA INCLUDING THE GREATER PHOENIX AREA BY THIS EVENING. THERE IS ALSO A CHANCE OF SHOWERS AND THUNDERSTORMS IN PORTIONS OF SOUTHWEST ARIZONA MAINLY LA PAZ COUNTY AND THE ADJACENT LOWER COLORADO RIVER VALLEY THIS AFTERNOON AND THIS EVENING.

SOME SEVERE THUNDERSTORMS ARE PROBABLE IN SOUTH-CENTRAL ARIZONA INCLUDING THE GREATER PHOENIX AREA BY THIS EVENING. THESE STORMS ARE EXPECTED TO PRODUCE STRONG GUSTY DAMAGING WINDS...HAIL...AND HEAVY RAIN. BLOWING DUST WITH REDUCED VISIBILITY IS ALSO POSSIBLE AHEAD OF THE STORMS.

IT WOULD BE WISE TO SECURE LOOSE OBJECTS BEFORE STRONG WINDS OCCUR. BE ALERT FOR THREATENING WEATHER. IF THREATENING WEATHER APPROACHES...MOVE TO A SAFE PLACE INDOORS...PREFERABLY INSIDE A STURDY BUILDING TO AVOID DAMAGING WINDS AND DANGEROUS CLOUD-TO-GROUND LIGHTNING.

STAY AWAY FROM LOW-LYING FLOOD PRONE AREAS AND NARROW STEEP-WALLED CANYONS. WATER CAN BE DEEPER THAN YOU THINK AND FLOWING WATER CAN BE MORE POWERFUL THAN YOU REALIZE. IF YOU COME TO A FLOODED AREA...TURN AROUND AND FIND A SAFE WAY TO YOUR DESTINATION.

STAY UP-TO-DATE ON THE LATEST FORECASTS BY LISTENING TO WEATHER RADIO ON THE PUBLIC SERVICE BAND. MORE DETAILED INFORMATION IS AVAILABLE FROM THE NATIONAL WEATHER SERVICE IN PHOENIX ON THE INTERNET AT

WEATHER.GOV/PHOENIX

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ELLIS

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270  
WWUS85 KPSR 120019  
SPSPSR

SPECIAL WEATHER STATEMENT  
NATIONAL WEATHER SERVICE PHOENIX AZ  
519 PM MST SUN SEP 11 2011

AZZ023-028-120100-  
MARICOPA AZ-PINAL AZ-  
519 PM MST SUN SEP 11 2011

THE NATIONAL WEATHER SERVICE IN PHOENIX HAS ISSUED A

SIGNIFICANT WEATHER ADVISORY FOR...

WEST CENTRAL PINAL COUNTY IN SOUTH CENTRAL ARIZONA  
EAST CENTRAL MARICOPA COUNTY IN SOUTH CENTRAL ARIZONA

UNTIL 600 PM MST

AT 513 PM MST...NATIONAL WEATHER SERVICE METEOROLOGISTS DETECTED A  
STRONG THUNDERSTORM SOUTH OF MARICOPA...MOVING NORTHEAST AT 15 MPH  
STATIONARY.

SMALL HAIL...BRIEF HEAVY RAIN...AND WIND GUSTS UP TO 50 MPH CAN BE  
EXPECTED WITH THIS STORM...ALONG WITH AREAS OF BLOWING DUST.

LOCATIONS IMPACTED INCLUDE...

BAPCHULE...MARICOPA...OLBERG...SUN LAKES...AND INTERSTATE 10...

IF THIS STORM INTENSIFIES...A WARNING MAY BE NEEDED. STAY TUNED TO  
NOAA WEATHER RADIO...LOCAL RADIO OR TV FOR THE LATEST UPDATES.

LAT...LON 3326 11205 3320 11176 3289 11190 3295 11213

TIME...MOT...LOC 0016Z 180DEG 0KT 3313 11186

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487

WWUS85 KPSR 120022 CCA  
SPSPSR

SPECIAL WEATHER STATEMENT...CORRECTED  
NATIONAL WEATHER SERVICE PHOENIX AZ  
522 PM MST SUN SEP 11 2011

AZZ023-028-120100-  
MARICOPA AZ-PINAL AZ-  
522 PM MST SUN SEP 11 2011

THE NATIONAL WEATHER SERVICE IN PHOENIX HAS ISSUED A

SIGNIFICANT WEATHER ADVISORY FOR...

WEST CENTRAL PINAL COUNTY IN SOUTH CENTRAL ARIZONA  
EAST CENTRAL MARICOPA COUNTY IN SOUTH CENTRAL ARIZONA

UNTIL 600 PM MST

AT 513 PM MST...NATIONAL WEATHER SERVICE METEOROLOGISTS DETECTED A  
STRONG THUNDERSTORM SOUTH OF MARICOPA...MOVING NORTHEAST AT 15 MPH.

SMALL HAIL...BRIEF HEAVY RAIN...AND WIND GUSTS UP TO 50 MPH CAN BE  
EXPECTED WITH THIS STORM...ALONG WITH AREAS OF BLOWING DUST.

LOCATIONS IMPACTED INCLUDE...

BAPCHULE...MARICOPA...OLBERG...SUN LAKES...AND INTERSTATE 10...

IF THIS STORM INTENSIFIES...A WARNING MAY BE NEEDED. STAY TUNED TO

NOAA WEATHER RADIO...LOCAL RADIO OR TV FOR THE LATEST UPDATES.

LAT...LON 3326 11205 3320 11176 3289 11190 3295 11213  
TIME...MOT...LOC 0016Z 180DEG 0KT 3313 11186

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MEYERS

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058  
WWUS85 KPSR 120111  
SPSPSR

SPECIAL WEATHER STATEMENT  
NATIONAL WEATHER SERVICE PHOENIX AZ  
611 PM MST SUN SEP 11 2011

AZZ023-120200-  
MARICOPA AZ-  
611 PM MST SUN SEP 11 2011

THE NATIONAL WEATHER SERVICE IN PHOENIX HAS ISSUED A  
SIGNIFICANT WEATHER ADVISORY FOR...  
EAST CENTRAL MARICOPA COUNTY IN SOUTH CENTRAL ARIZONA

UNTIL 700 PM MST

AT 605 PM MST...NATIONAL WEATHER SERVICE METEOROLOGISTS DETECTED A  
FEW STRONG THUNDERSTORMS NEAR AHWATUKEE...MOVING NORTHEAST AT 15 MPH.

WIND GUSTS UP TO 55 MPH ARE EXPECTED WITH THIS STORM...ALONG WITH  
HEAVY RAIN BRIEF HEAVY RAIN...AND SMALL HAIL.

LOCATIONS IMPACTED INCLUDE...  
CHANDLER...  
TEMPE...  
SOUTH PHONENIX...

IF THIS STORM INTENSIFIES...A WARNING MAY BE NEEDED. STAY TUNED TO  
NOAA WEATHER RADIO...LOCAL RADIO OR TV FOR THE LATEST UPDATES.

SOME UNSECURED OBJECTS WILL BE BLOWN AROUND...TREE LIMBS COULD BE  
SNAPPED OFF...AND ISOLATED POWER OUTAGES WILL BE POSSIBLE. SEEK  
SHELTER INDOORS UNTIL THE STORM PASSES.

LAT...LON 3353 11207 3349 11173 3321 11188 3326 11215  
TIME...MOT...LOC 0110Z 203DEG 18KT 3331 11200

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MEYERS

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057  
WWUS85 KPSR 120112 CCA

SPSPSR

SPECIAL WEATHER STATEMENT...CORRECTED  
NATIONAL WEATHER SERVICE PHOENIX AZ  
612 PM MST SUN SEP 11 2011

AZZ023-120200-  
MARICOPA AZ-  
612 PM MST SUN SEP 11 2011

THE NATIONAL WEATHER SERVICE IN PHOENIX HAS ISSUED A  
SIGNIFICANT WEATHER ADVISORY FOR...  
EAST CENTRAL MARICOPA COUNTY IN SOUTH CENTRAL ARIZONA

UNTIL 700 PM MST

AT 605 PM MST...NATIONAL WEATHER SERVICE METEOROLOGISTS DETECTED A  
FEW STRONG THUNDERSTORMS NEAR AHWATUKEE...MOVING NORTHEAST AT 15 MPH.

WIND GUSTS UP TO 55 MPH ARE EXPECTED WITH THIS STORM...ALONG WITH  
BRIEF HEAVY RAIN...AND SMALL HAIL.

LOCATIONS IMPACTED INCLUDE...  
CHANDLER...  
TEMPE...  
SOUTH PHONENIX...

IF THIS STORM INTENSIFIES...A WARNING MAY BE NEEDED. STAY TUNED TO  
NOAA WEATHER RADIO...LOCAL RADIO OR TV FOR THE LATEST UPDATES.

SOME UNSECURED OBJECTS WILL BE BLOWN AROUND...TREE LIMBS COULD BE  
SNAPPED OFF...AND ISOLATED POWER OUTAGES WILL BE POSSIBLE. SEEK  
SHELTER INDOORS UNTIL THE STORM PASSES.

LAT...LON 3353 11207 3349 11173 3321 11188 3326 11215  
TIME...MOT...LOC 0110Z 203DEG 18KT 3331 11200

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MEYERS

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819  
WWUS85 KPSR 121859  
SPSPSR

SPECIAL WEATHER STATEMENT  
NATIONAL WEATHER SERVICE PHOENIX AZ  
1159 AM MST MON SEP 12 2011

AZZ021>024-026>028-130700-  
WEST CENTRAL DESERTS-NORTHWEST MARICOPA COUNTY-GREATER PHOENIX AREA-  
SOUTHERN GILA COUNTY/TONTO NATIONAL FOREST FOOTHILLS-  
SOUTHWEST DESERTS-SOUTHWEST MARICOPA COUNTY-  
NORTHWEST AND NORTH CENTRAL PINAL COUNTY-  
INCLUDING THE CITIES OF...BOUSE...QUARTZSITE...SALOME...BUCKEYE...

LAKE PLEASANT...MORRISTOWN...NEW RIVER...TONOPAH...WICKENBURG...  
CAREFREE...CAVE CREEK...CHANDLER...FOUNTAIN HILLS...GILBERT...  
GLENDALE...MESA...PEORIA...PHOENIX...SCOTTSDALE...SUN CITY...TEMPE...  
GLOBE...MIAMI...SAN CARLOS...SUPERIOR...TOP-OF-THE-WORLD...  
ALSO INCLUDING APACHE...BARTLETT...CANYON...HORSESHOE...ROOSEVELT...  
AND SAGUARO LAKES...DATELAND...TACNA...WELLTON...GILA BEND...  
APACHE JUNCTION...CASA GRANDE...COOLIDGE...AND FLORENCE  
1159 AM MST MON SEP 12 2011

...SOME SEVERE THUNDERSTORMS ARE PROBABLE IN SOUTH-CENTRAL ARIZONA  
INCLUDING PORTIONS OF THE GREATER PHOENIX AREA BY LATE THIS  
AFTERNOON AND THIS EVENING...

A LOW PRESSURE SYSTEM IS EXPECTED TO CONTINUE TO BE CENTERED NEAR  
THE SOUTHERN CALIFORNIA COAST THROUGH THIS EVENING...AND A MOIST  
UNSTABLE AIR MASS COVERS ARIZONA. AS A RESULT...SCATTERED  
THUNDERSTORMS ARE EXPECTED TO DEVELOP IN SOUTH-CENTRAL ARIZONA THIS  
AFTERNOON AND THIS EVENING. MOST OF THE SHOWERS AND THUNDERSTORMS  
ARE EXPECTED TO BE OUTSIDE THE GREATER PHOENIX AREA THIS AFTERNOON...  
THEN DEVELOP FROM THE SOUTH AND SOUTHWEST INTO THE GREATER PHOENIX  
AREA BY THIS EVENING. THERE IS ALSO A CHANCE OF SHOWERS AND  
THUNDERSTORMS IN PORTIONS OF SOUTHWEST ARIZONA THIS AFTERNOON AND  
THIS EVENING.

SOME SEVERE THUNDERSTORMS ARE PROBABLE IN SOUTH-CENTRAL ARIZONA THIS  
AFTERNOON AND THIS EVENING. THIS INCLUDES PORTIONS OF THE GREATER  
PHOENIX AREA BY THIS EVENING. THESE STORMS ARE EXPECTED TO PRODUCE  
STRONG GUSTY DAMAGING WINDS...HAIL...AND LOCALLY HEAVY RAIN. DENSE  
BLOWING DUST WITH REDUCED VISIBILITY IS ALSO POSSIBLE AHEAD OF SOME  
STORMS...ESPECIALLY FROM THE CASA GRANDE AREA TO THE GREATER PHOENIX  
AREA AND GILA BEND.

IT WOULD BE WISE TO SECURE LOOSE OBJECTS BEFORE STRONG WINDS OCCUR.  
BE ALERT FOR THREATENING WEATHER. IF THREATENING WEATHER  
APPROACHES...MOVE TO A SAFE PLACE INDOORS...PREFERABLY INSIDE A  
STURDY BUILDING TO AVOID DAMAGING WINDS AND DANGEROUS CLOUD-TO-GROUND  
LIGHTNING. STAY AWAY FROM FLOOD PRONE AREAS.

IF YOU SEE A DUST STORM APPROACHING OR GET CAUGHT IN ONE...PULL OFF  
THE ROAD AS FAR AS SAFELY POSSIBLE...PUT YOUR VEHICLE IN PARK...TAKE  
YOUR FOOT OFF THE BRAKE PEDAL...AND TURN YOUR LIGHTS ALL THE WAY OFF.

STAY UP-TO-DATE ON THE LATEST FORECASTS BY LISTENING TO WEATHER  
RADIO ON THE PUBLIC SERVICE BAND. MORE DETAILED INFORMATION IS  
AVAILABLE FROM THE NATIONAL WEATHER SERVICE IN PHOENIX ON THE  
INTERNET AT

WEATHER.GOV/PHOENIX

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ELLIS

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APPENDIX E

ADDITIONAL NATIONAL WEATHER SERVICE METEOROLOGICAL  
DATA TABLES FOR PHOENIX-AREA AIRPORTS

DATA TABLES FOR SEPTEMBER 11, 2011

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA  
(final)  
HOURLY OBSERVATIONS TABLE  
CHANDLER MUNICIPAL AIRPORT (53128)  
CHANDLER, AZ  
(09/2011)**

Elevation: 1243 ft. above sea level

Latitude: 33.268

Longitude: -111.812

Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
11	0547	0	SCT100 SCT200	15.00		72	22.0	65	18.4	61	16.0	68	6	VR		28.68			M	AA		30.00
11	0656	0	SCT100 SCT200	35.00		72	22.0	66	19.0	63	17.0	73	6	VR		28.68			M	AA		30.00
11	0747	0	FEW120 SCT250	40.00		75	24.0	66	18.9	61	16.0	62	8	050		28.69			M	AA		30.01
11	0850	0	SCT120 BKN200	40.00		81	27.0	68	20.0	61	16.0	51	6	050		28.69			M	AA		30.01
11	0947	0	SCT120 BKN200	40.00		82	28.0	66	19.1	57	14.0	43	6	070		28.69			M	AA		30.02
11	1047	0	FEW120 SCT200	40.00		88	31.0	68	20.1	57	14.0	35	8	060		28.69			M	AA		30.02
11	1147	0	FEW120 SCT200	40.00		91	33.0	68	20.1	55	13.0	30	5	090		28.68			M	AA		30.00
11	1250	0	SCT120 BKN200	35.00		93	34.0	68	20.2	54	12.0	27	8	180		28.65			M	AA		29.97
11	1347	0	SCT100 SCT150	35.00		93	34.0	68	20.2	54	12.0	27	6	VR		28.63			M	AA		29.95
11	1450	0	SCT100 BKN150	30.00		97	36.0	69	20.3	52	11.0	22	9	240	17	28.59			M	AA		29.91
11	1550	0	BKN100 BKN180	30.00		97	36.0	69	20.3	52	11.0	22	11	160		28.57			M	AA		29.89
11	1650	0	BKN100 BKN180	30.00		97	36.0	69	20.3	52	11.0	22	7	150		28.57			M	AA		29.89
11	1750	0	SCT100 BKN180	10.00		95	35.0	68	20.0	52	11.0	23	8	160		28.57			M	AA		29.89
11	1850	0	SCT100 BKN150	15.00		88	31.0	67	19.3	54	12.0	31	9	210		28.59			M	AA		29.91
11	1947	0	BKN150	15.00		86	30.0	68	19.8	57	14.0	37	7	200		28.61			M	AA		29.93
11	2047	0	SCT150	15.00		84	29.0	69	20.6	61	16.0	46	0	000		28.64			M	AA		29.96

Dynamically generated Fri Sep 21 12:11:46 EDT 2012 via <http://cdo.ncdc.noaa.gov/qclcd/OCLCD>

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA**  
(final)  
**HOURLY OBSERVATIONS TABLE**  
**GLENDALE MUNICIPAL AIRPORT (53126)**  
**GLENDALE, AZ**  
**(09/2011)**

Elevation: 1066 ft. above sea level  
Latitude: 33.527  
Longitude: -112.295  
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
11	0647	0	FEW100 SCT200	20.00		75	24.0	64	17.7	57	14.0	54	0	000		28.87			M	AA		30.01
11	0747	0	FEW100 SCT200	20.00		81	27.0	66	18.9	57	14.0	44	5	050		28.88			M	AA		30.02
11	0847	0	SCT100 SCT200	20.00		82	28.0	65	18.5	55	13.0	40	6	030		28.88			M	AA		30.02
11	1047	0	FEW150 FEW200	20.00		90	32.0	68	19.9	55	13.0	31	9	090		28.87			M	AA		30.01
11	1147	0	FEW120 SCT200	20.00		93	34.0	69	20.5	55	13.0	28	9	110		28.86			M	AA		30.00
11	1247	0	FEW120 SCT200	20.00		95	35.0	69	20.8	55	13.0	26	11	130		28.83			M	AA		29.97
11	1347	0	FEW150 BKN200	20.00		97	36.0	71	21.6	57	14.0	26	5	160		28.80			M	AA		29.94
11	1447	0	SCT150 BKN200	20.00		95	35.0	69	20.8	55	13.0	26	11	140		28.78			M	AA		29.92
11	1547	0	FEW120 SCT150 BKN200	20.00		97	36.0	70	20.8	54	12.0	24	11	110		28.77			M	AA		29.90
11	1647	0	FEW100 SCT150 BKN200	20.00		95	35.0	65	18.5	45	7.0	18	7	170		28.77			M	AA		29.90
11	1747	0	FEW100 SCT150 BKN200	20.00		93	34.0	66	18.8	48	9.0	21	3	160		28.76			M	AA		29.89
11	1847	0	SCT150 BKN200	20.00		93	34.0	68	19.7	52	11.0	25	0	000		28.77			M	AA		29.91

Dynamically generated Fri Sep 21 12:15:34 EDT 2012 via <http://cdo.ncdc.noaa.gov/qclcd/QCLCD>

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA  
(final)  
HOURLY OBSERVATIONS TABLE  
PHOENIX GOODYEAR AIRPORT (03186)  
GOODYEAR, AZ  
(09/2011)**

Elevation: 968 ft. above sea level  
Latitude: 33.416  
Longitude: -112.383  
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
11	0547	0	BKN100 BKN180	10.00		75	24.0	65	18.3	59	15.0	58	14	100		28.97			M	AA		30.00
11	0647	0	SCT100 BKN150	10.00		75	24.0	65	18.3	59	15.0	58	11	070		28.97			M	AA		30.01
11	0750	0	SCT100 BKN180	15.00		79	26.0	68	19.7	61	16.0	54	8	090		29.00			M	AA		30.03
11	0850	0	SCT100 SCT180	15.00		82	28.0	67	19.7	59	15.0	46	11	080		28.98			M	AA		30.02
11	0947	0	FEW080 SCT150 SCT180	15.00		88	31.0	68	20.1	57	14.0	35	11	100		28.98			M	AA		30.02
11	1047	0	SCT100 SCT200	15.00		88	31.0	68	20.1	57	14.0	35	9	090		28.98			M	AA		30.02
11	1147	0	FEW080 FEW140 SCT200	15.00		91	33.0	69	20.7	57	14.0	32	9	090		28.97			M	AA		30.00
11	1247	0	FEW080 FEW150 SCT200	15.00		93	34.0	71	21.5	59	15.0	32	14	090		28.95			M	AA		29.98
11	1347	0	FEW080 SCT150 SCT200	15.00		95	35.0	71	21.8	59	15.0	30	11	120		28.92			M	AA		29.95
11	1447	0	FEW100 SCT180 BKN200	20.00		95	35.0	70	21.3	57	14.0	28	11	120		28.90			M	AA		29.93
11	1547	0	SCT100 BKN180 BKN200	10.00		95	35.0	72	22.4	61	16.0	32	14	130		28.88			M	AA		29.91
11	1647	0	SCT100 BKN180 BKN220	10.00		93	34.0	68	20.2	54	12.0	27	9	140		28.88			M	AA		29.91
11	1747	0	SCT100 BKN180 BKN220	20.00		91	33.0	68	19.9	54	12.0	29	7	120		28.87			M	AA		29.90
11	1849	0	SCT100 BKN180 BKN200	2.00	BLDU	90	32.0	70	21.0	59	15.0	35	14	140	23	28.89			M	AA		29.92
11	1947	0	SCT100 BKN180 BKN220	3.00	DU	86	30.0	69	20.4	59	15.0	40	5	140		28.91			M	AA		29.94
11	2047	0	SCT100 BKN180 BKN220	5.00	DU	86	30.0	69	20.4	59	15.0	40	3	VR		28.94			M	AA		29.97

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA**  
(final)  
**HOURLY OBSERVATIONS TABLE**  
**LUKE AFB AIRPORT (23111)**  
**GLENDALE, AZ**  
**(09/2011)**

Elevation: 1085 ft. above sea level  
Latitude: 33.55  
Longitude: -112.366  
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
11	0055	0	CLR	10.00		77	24.8	66	19.0	60	15.4	56	0	000		28.79			29.87	AA		29.95
11	0155	0	CLR	10.00		78	25.8	66	18.9	59	15.1	52	6	150		28.80	1	005	29.87	AA		29.96
11	0255	0	FEW120	10.00		78	25.3	66	18.9	59	15.0	52	5	100		28.80			29.88	AA		29.96
11	0355	0	FEW120	10.00		78	25.4	66	18.6	58	14.7	50	6	110		28.81			29.88	AA		29.97
11	0455	0	CLR	10.00		77	25.1	66	18.7	59	14.8	54	5	100		28.81	2	005	29.89	AA		29.97
11	0555	0	CLR	10.00		76	24.6	65	18.2	58	14.6	54	3	110		28.83			29.91	AA		29.99
11	0655	0	CLR	10.00		73	22.9	64	17.9	59	15.1	62	3	340		28.84			29.92	AA		30.00
11	0755	0	CLR	10.00		79	26.2	66	19.1	59	15.2	50	5	360		28.85	1	012	29.93	AA		30.01
11	0855	0	CLR	10.00		83	28.2	67	19.3	57	14.0	41	6	050		28.85			29.93	AA		30.01
11	0955	0	CLR	10.00		87	30.5	68	19.7	56	13.2	35	6	100		28.84			29.93	AA		30.00
11	1055	0	CLR	10.00		91	32.7	69	20.4	56	13.1	31	10	110		28.84	7	003	29.92	AA		30.00
11	1155	0	CLR	10.00		93	34.0	69	20.7	56	13.5	29	9	110		28.82			29.90	AA		29.98
11	1255	0	CLR	10.00		95	34.9	71	21.5	58	14.2	29	9	140		28.80			29.88	AA		29.96
11	1355	0	CLR	10.00		97	36.3	71	21.9	58	14.6	27	10	110		28.77	8	024	29.84	AA		29.93
11	1455	0	CLR	10.00		97	36.0	71	21.6	57	14.0	26	14	160	17	28.74			29.81	AA		29.90
11	1555	0	CLR	10.00		96	35.7	69	20.7	54	12.4	24	14	160		28.74			29.80	AA		29.89
11	1655	0	FEW130	10.00		94	34.7	67	19.2	49	9.3	22	9	150		28.74		012	29.81	AA		29.89
11	1659	0	FEW120	10.00	-DZ	95	35.0	67	19.6	50	10.0	22	9	160		28.74			29.81	AA		29.89
11	1709	0	CLR	10.00		95	35.0	68	20.0	52	11.0	23	5	200		28.72			29.81	AA	T	29.88
11	1755	0	CLR	10.00		94	34.3	67	19.6	51	10.7	23	0	000		28.72			29.80	AA		29.88
11	1855	0	SCT110 SCT140	10.00		93	33.9	68	19.7	52	11.0	25	6	200		28.74			29.83	AA		29.90
11	1923	0	FEW004 SCT110 BKN150	4.00		90	32.0	68	19.9	55	13.0	31	9	150		28.75			29.84	AA		29.91
11	1931	0	BKN004 BKN160	4.00		90	32.0	68	19.9	55	13.0	31	8	140		28.76			29.84	AA		29.92
11	1943	0	BKN004 BKN160	5.00		90	32.0	68	19.9	55	13.0	31	7	150		28.76			29.85	AA		29.92
11	1949	0	SCT004 BKN130 BKN160	5.00		88	31.0	67	19.6	55	13.0	33	5	160		28.76			29.85	AA		29.92
11	1955	0	SCT004 BKN160	5.00		89	31.4	68	20.0	56	13.1	33	7	160		28.77	3	013	29.85	AA		29.93
11	2055	0	FEW170	8.00		87	30.5	67	19.4	55	13.0	34	0	000		28.79			29.87	AA		29.95
11	2155	0	CLR	8.00		84	28.7	68	20.0	59	14.9	43	5	040		28.80			29.88	AA		29.96
11	2255	0	CLR	10.00		82	28.0	67	19.4	58	14.6	44	6	040		28.82	1	015	29.90	AA		29.98
11	2355	0	CLR	10.00		82	27.9	67	19.6	59	15.2	46	5	320		28.81			29.89	AA		29.97

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA  
(final)  
HOURLY OBSERVATIONS TABLE  
FALCON FIELD AIRPORT (03185)  
MESA, AZ  
(09/2011)**

Elevation: 1380 ft. above sea level

Latitude: 33.466

Longitude: -111.733

Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
11	0547	0	SCT080	30.00		73	23.0	64	17.9	59	15.0	62	0	000		28.53			M	AA		30.01
11	0650	0	FEW080 SCT100	40.00		73	23.0	64	17.9	59	15.0	62	0	000		28.53			M	AA		30.01
11	0750	0	FEW100	40.00		77	25.0	65	18.1	57	14.0	50	11	360		28.53			M	AA		30.01
11	0847	0	FEW120 SCT250	50.00		81	27.0	65	18.3	55	13.0	41	9	010	16	28.52			M	AA		30.00
11	1147	0	FEW150 BKN200	40.00		93	34.0	69	20.4	55	13.0	28	7	170		28.52			M	AA		30.00
11	1248	0	FEW100 SCT160	40.00		97	36.0	70	21.0	55	13.0	24	9	070		28.50			M	AA		29.98
11	1350	0	FEW100 SCT200	50.00		95	35.0	69	20.7	55	13.0	26	9	170		28.47			M	AA		29.95
11	1447	0	SCT100 BKN150	40.00		95	35.0	69	20.5	54	12.0	25	9	190		28.44			M	AA		29.92
11	1552	0	FEW080 SCT100 BKN200	40.00		93	34.0	68	20.1	54	12.0	27	9	220		28.43			M	AA		29.91
11	1651	0	SCT080 BKN200	40.00		95	35.0	69	20.7	55	13.0	26	11	270		28.41			M	AA		29.89
11	1748	0	SCT080 BKN200	40.00		93	34.0	68	20.1	54	12.0	27	10	260		28.41			M	AA		29.89
11	1858	0	SCT100 BKN140	8.00		88	31.0	68	20.1	57	14.0	35	8	230		28.44			M	AA		29.92

Dynamically generated Fri Sep 21 12:22:26 EDT 2012 via <http://cdo.ncdc.noaa.gov/qclcd/QCLCD>

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA**  
(final)  
**HOURLY OBSERVATIONS TABLE**  
**SCOTTSDALE AIRPORT (03192)**  
**SCOTTSDALE, AZ**  
(09/2011)

Elevation: 1473 ft. above sea level  
Latitude: 33.622  
Longitude: -111.910  
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
11	0053	12	CLR	10.00		78	25.6	65	18.3	57	13.9	49	6	VR	16	28.35			AA		29.95	
11	0153	12	CLR	10.00		78	25.6	65	18.3	57	13.9	49	8	230		28.37	5	004	AA		29.97	
11	0253	12	CLR	10.00		77	25.0	65	18.1	57	13.9	50	7	130		28.39			AA		29.99	
11	0353	12	CLR	10.00		76	24.4	65	18.2	58	14.4	54	0	000		28.39			AA		29.99	
11	0453	12	CLR	10.00		73	22.8	64	17.9	59	15.0	62	0	000		28.40	1	008	AA		30.00	
11	0553	12	CLR	10.00		75	23.9	65	18.0	58	14.4	56	0	000		28.42			AA		30.02	
11	0653	12	CLR	10.00		78	25.6	64	17.7	55	12.8	45	6	090		28.43			AA		30.03	
11	0753	12	CLR	10.00		81	27.2	66	18.6	56	13.3	42	0	000		28.43	0	009	AA		30.03	
11	0853	12	CLR	10.00		84	28.9	66	19.1	56	13.3	38	3	260		28.43			AA		30.03	
11	0953	12	CLR	10.00		88	31.1	66	19.0	53	11.7	30	8	110		28.44			AA		30.04	
11	1053	12	CLR	10.00		89	31.7	67	19.2	53	11.7	29	7	160		28.43	0	002	AA		30.03	
11	1153	12	CLR	10.00		91	32.8	69	20.3	56	13.3	31	7	VR		28.42			AA		30.02	
11	1253	12	CLR	10.00		92	33.3	70	21.0	58	14.4	32	7	VR		28.40			AA		30.00	
11	1353	12	CLR	10.00		93	33.9	69	20.6	56	13.3	29	9	180		28.37	8	021	AA		29.97	
11	1453	12	CLR	10.00		93	33.9	69	20.4	55	12.8	28	3	VR		28.35			AA		29.95	
11	1553	12	CLR	10.00		92	33.3	68	20.2	55	12.8	29	5	150		28.32			AA		29.92	
11	1653	12	FEW100	10.00		93	33.9	69	20.4	55	12.8	28	5	230		28.32	5	014	AA		29.92	
11	1753	12	CLR	10.00		92	33.3	68	20.0	54	12.2	28	0	000		28.32			AA		29.92	
11	1853	12	CLR	10.00		92	33.3	67	19.2	51	10.6	25	0	000		28.33			AA		29.93	
11	1913	12	BKN022	2.50	HZ	90	32.0	68	19.9	55	13.0	31	8	220		28.35			M	SP		29.95
11	1949	12	SCT024	3.00	HZ	88	31.0	68	20.1	57	14.0	35	3	300		28.36			M	SP		29.96
11	1951	12	BKN024	3.00	HZ	88	31.0	68	20.1	57	14.0	35	3	300		28.36			M	SP		29.96
11	1953	12	BKN024	3.00	HZ	88	31.1	68	20.1	57	13.9	35	3	310		28.36	1	015	AA		29.96	
11	2039	12	FEW020	4.00	HZ	88	31.0	68	20.1	57	14.0	35	3	030		28.39			M	SP		29.99
11	2051	12	BKN018	4.00	HZ	90	32.0	69	20.4	57	14.0	33	5	040		28.39			M	SP		29.99
11	2053	12	BKN018	4.00	HZ	89	31.7	69	20.3	57	13.9	34	5	040		28.39			M	SP		29.99
11	2112	12	BKN012 OVC100	3.00	HZ	88	31.0	68	20.1	57	14.0	35	6	030		28.39			M	SP		29.99
11	2153	12	OVC016	4.00		87	30.6	68	20.2	58	14.4	37	0	000		28.40			M	SP		29.99
11	2251	12	SCT024	10.00		86	30.0	68	19.7	57	14.0	37	0	000		28.41			M	SP		30.01
11	2253	12	SCT024	10.00		86	30.0	68	19.7	57	13.9	37	0	000		28.41	1	015	AA		30.01	
11	2353	12	CLR	10.00		86	30.0	67	19.5	56	13.3	36	0	000		28.40			AA		30.00	

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA  
(final)  
HOURLY OBSERVATIONS TABLE  
WILLIAMS GATEWAY AIRPORT (23104)  
PHOENIX, AZ  
(09/2011)**

Elevation: 1382 ft. above sea level

Latitude: 33.3

Longitude: -111.666

Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
11	0015	0	CLR	10.00		77	25.0	68	19.9	63	17.0	62	0	000		28.50			M	AA		29.97
11	0035	0	CLR	10.00		75	24.0	68	19.9	64	18.0	69	5	210		28.50			M	AA		29.97
11	0055	0	CLR	10.00		77	25.0	69	20.3	64	18.0	64	3	220		28.51			M	AA		29.98
11	0115	0	CLR	10.00		77	25.0	68	19.9	63	17.0	62	13	180		28.52			M	AA		29.99
11	0135	0	CLR	10.00		77	25.0	68	19.9	63	17.0	62	7	150		28.52			M	AA		29.99
11	0155	0	CLR	10.00		77	25.0	67	19.3	61	16.0	58	11	150		28.52			M	AA		29.99
11	0215	0	CLR	10.00		77	25.0	68	19.9	63	17.0	62	11	140		28.52			M	AA		29.99
11	0235	0	CLR	10.00		77	25.0	66	18.7	59	15.0	54	9	130		28.52			M	AA		29.99
11	0255	0	CLR	10.00		77	25.0	66	18.7	59	15.0	54	3	060		28.52			M	AA		29.99
11	0315	0	CLR	10.00		77	25.0	68	19.9	63	17.0	62	5	110		28.52			M	AA		29.99
11	0335	0	CLR	10.00		77	25.0	68	19.9	63	17.0	62	3	130		28.53			M	AA		30.00
11	0355	0	CLR	10.00		73	23.0	67	19.5	64	18.0	74	3	120		28.53			M	AA		30.00
11	0415	0	CLR	10.00		73	23.0	67	19.5	64	18.0	74	0	000		28.53			M	AA		30.00
11	0435	0	CLR	10.00		73	23.0	67	19.5	64	18.0	74	3	110		28.53			M	AA		30.00
11	0455	0	CLR	10.00		73	23.0	67	19.5	64	18.0	74	3	170		28.54			M	AA		30.01
11	0515	0	CLR	10.00		73	23.0	67	19.5	64	18.0	74	0	000		28.55			M	AA		30.02
11	0547	0	SCT120 BKN250	20.00		75	24.0	69	20.6	66	19.0	74	3	VR		28.56			M	AA		30.03
11	0649	0	FEW120 SCT250	45.00		77	25.0	69	20.3	64	18.0	64	5	050		28.56			M	AA		30.03
11	0747	0	FEW120 SCT250	45.00		79	26.0	69	20.6	64	18.0	60	5	VR		28.55			M	AA		30.02
11	0856	0	FEW120 SCT250	45.00		84	29.0	69	20.6	61	16.0	46	0	000		28.56			M	AA		30.03
11	0948	0	FEW150 FEW250	45.00		88	31.0	71	21.8	63	17.0	43	3	VR		28.58			M	AA		30.05
11	1052	0	FEW150 SCT250	45.00		90	32.0	69	20.4	57	14.0	33	3	VR		28.57			M	AA		30.04
11	1147	0	FEW150 SCT250	45.00		91	33.0	69	20.6	57	14.0	32	5	VR		28.55			M	AA		30.02
11	1249	0	FEW200 SCT250	45.00		97	36.0	70	21.1	55	13.0	24	3	VR		28.53			M	AA		30.00
11	1347	0	FEW200 SCT250	35.00		97	36.0	70	21.0	55	13.0	24	7	VR		28.51			M	AA		29.98
11	1449	0	SCT120 BKN200	45.00		99	37.0	70	21.1	54	12.0	22	6	VR		28.48			M	AA		29.95
11	1547	0	SCT110CB BKN200	35.00		100	38.0	70	21.3	54	12.0	21	5	VR		28.46			M	AA		29.93
11	1647	0	SCT120 BKN200	35.00		99	37.0	70	21.1	54	12.0	22	11	160		28.45			M	AA		29.91
11	1747	0	SCT120 BKN200	35.00		97	36.0	70	21.0	55	13.0	24	11	180		28.46			M	AA		29.92
11	1817	0	SCT120 BKN200	0.75	DU	97	36.0	70	21.0	55	13.0	24	17	220	29	28.46			M	AA		29.93
11	1834	0	SCT120 BKN200	3.00	DU	91	33.0	69	20.6	57	14.0	32	17	240	29	28.48			M	AA		29.95
11	1855	0	SCT120 BKN200	20.00		91	33.0	68	20.1	55	13.0	30	5	VR		28.48			M	AA		29.95
11	1947	0	BKN	20.00		90	32.0	M	M	59	15.0	M	3	VR		M			M	AA		29.96
11	1955	0	CLR	10.00		88	31.0	70	21.2	61	16.0	40	3	090		28.50			M	AA		29.97
11	2015	0	CLR	7.00		88	31.0	69	20.7	59	15.0	38	3	100		28.51			M	AA		29.98
11	2035	0	CLR	7.00		88	31.0	69	20.7	59	15.0	38	6	080		28.52			M	AA		29.99
11	2047	0	BKN	20.00		90	32.0	M	M	61	16.0	M	7	090		M			M	AA		29.99

11	2055	0	CLR	7.00		88	31.0	70	21.2	61	16.0	40	6	090	28.53		M	AA	30.00
11	2115	0	CLR	7.00		88	31.0	69	20.7	59	15.0	38	7	110	28.53		M	AA	30.00
11	2135	0	CLR	10.00	TS	88	31.0	69	20.7	59	15.0	38	7	110	28.53		M	AA	30.00
11	2215	0	CLR	10.00		88	31.0	68	20.1	57	14.0	35	7	120	28.54		M	AA	30.01
11	2255	0	CLR	10.00		86	30.0	70	20.9	61	16.0	43	3	070	28.54		M	AA	30.01
11	2315	0	CLR	10.00		86	30.0	69	20.3	59	15.0	40	6	100	28.54		M	AA	30.01
11	2335	0	CLR	10.00		86	30.0	67	19.2	55	13.0	35	5	140	28.54		M	AA	30.01
11	2355	0	CLR	10.00		82	28.0	68	20.2	61	16.0	49	6	130	28.55		M	AA	30.02

Dynamically generated Fri Sep 21 12:26:33 EDT 2012 via <http://cdo.ncdc.noaa.gov/qclcd/QCLCD>

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA  
(final)**

**HOURLY OBSERVATIONS TABLE  
CASA GRANDE MUNICIPAL ARPT (03914)  
CASA GRANDE, AZ  
(09/2011)**

Elevation: 1462 ft. above sea level  
Latitude: 32.95  
Longitude: -111.766  
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
11	0015	0	CLR	10.00		73	23.0	63	17.3	57	14.0	57	16	090		28.43			M	AA		29.98
11	0035	0	CLR	10.00		73	23.0	63	17.3	57	14.0	57	15	110		28.44			M	AA		29.99
11	0055	0	CLR	10.00		73	23.0	63	17.3	57	14.0	57	8	090		28.44			M	AA		29.99
11	0115	0	CLR	10.00		73	23.0	63	17.3	57	14.0	57	9	080		28.44			M	AA		29.99
11	0135	0	CLR	10.00		73	23.0	62	16.7	55	13.0	53	9	070		28.43			M	AA		29.98
11	0155	0	CLR	10.00		75	24.0	63	17.1	55	13.0	50	9	080		28.43	2	003	M	AA		29.98
11	0215	0	CLR	10.00		73	23.0	62	16.7	55	13.0	53	10	070		28.43			M	AA		29.98
11	0235	0	CLR	10.00		75	24.0	63	17.1	55	13.0	50	9	060		28.43			M	AA		29.98
11	0255	0	CLR	10.00		75	24.0	63	17.1	55	13.0	50	9	060		28.43			M	AA		29.98
11	0315	0	CLR	10.00		73	23.0	62	16.7	55	13.0	53	14	050		28.43			M	AA		29.98
11	0335	0	CLR	10.00		73	23.0	62	16.7	55	13.0	53	11	060		28.44			M	AA		29.99
11	0355	0	CLR	10.00		73	23.0	62	16.7	55	13.0	53	11	060		28.44			M	AA		29.99
11	0415	0	CLR	10.00		73	23.0	62	16.7	55	13.0	53	15	080		28.44			M	AA		29.99
11	0435	0	CLR	10.00		75	24.0	63	17.1	55	13.0	50	16	080		28.45			M	AA		30.00
11	0455	0	CLR	10.00		73	23.0	62	16.7	55	13.0	53	14	060		28.45	2	007	M	AA		30.00
11	0515	0	CLR	10.00		73	23.0	62	16.7	55	13.0	53	14	060		28.45			M	AA		30.00
11	0535	0	CLR	10.00		73	23.0	62	16.7	55	13.0	53	13	060		28.45			M	AA		30.00
11	0555	0	CLR	10.00		73	23.0	62	16.7	55	13.0	53	11	070		28.45			M	AA		30.00
11	0615	0	CLR	10.00		73	23.0	62	16.7	55	13.0	53	11	060		28.46			M	AA		30.01
11	0635	0	CLR	10.00		73	23.0	62	16.7	55	13.0	53	13	050		28.46			M	AA		30.01
11	0655	0	CLR	10.00		73	23.0	62	16.7	55	13.0	53	14	070		28.46			M	AA		30.01
11	0715	0	CLR	10.00		75	24.0	63	17.1	55	13.0	50	15	060		28.46			M	AA		30.01
11	0735	0	CLR	10.00		77	25.0	64	17.5	55	13.0	47	15	070		28.47			M	AA		30.02
11	0755	0	CLR	10.00		79	26.0	64	17.9	55	13.0	44	13	070		28.47	2	007	M	AA		30.02
11	0815	0	CLR	10.00		81	27.0	65	18.3	55	13.0	41	16	070		28.47			M	AA		30.02
11	0835	0	CLR	10.00		81	27.0	65	18.3	55	13.0	41	13	070		28.47			M	AA		30.02
11	0855	0	CLR	10.00		81	27.0	65	18.3	55	13.0	41	13	080		28.47			M	AA		30.02
11	0915	0	CLR	10.00		82	28.0	65	18.5	55	13.0	40	7	100		28.48			M	AA		30.03
11	0935	0	CLR	10.00		84	29.0	66	18.8	55	13.0	37	6	080		28.48			M	AA		30.03
11	0955	0	CLR	10.00		84	29.0	66	18.8	55	13.0	37	7	060		28.48			M	AA		30.03
11	1015	0	CLR	10.00		86	30.0	67	19.2	55	13.0	35	9	080		28.48			M	AA		30.03
11	1035	0	CLR	10.00		88	31.0	67	19.6	55	13.0	33	11	100		28.48			M	AA		30.03
11	1055	0	CLR	10.00		88	31.0	67	19.3	54	12.0	31	9	090		28.48	2	007	M	AA		30.04
11	1115	0	CLR	10.00		88	31.0	67	19.3	54	12.0	31	10	130		28.48			M	AA		30.03
11	1135	0	CLR	10.00		90	32.0	67	19.6	54	12.0	29	8	110	18	28.47			M	AA		30.02
11	1155	0	CLR	10.00		90	32.0	67	19.6	54	12.0	29	10	120	16	28.47			M	AA		30.02

11	1215	0	CLR	10.00		91	33.0	68	19.8	54	12.0	29	10	120	16	28.46			M	AA		30.01
11	1235	0	CLR	10.00		91	33.0	68	19.8	54	12.0	29	7	120		28.46			M	AA		30.01
11	1255	0	CLR	10.00		91	33.0	68	20.1	55	13.0	30	9	100		28.45			M	AA		30.00
11	1315	0	CLR	10.00		93	34.0	69	20.4	55	13.0	28	7	140		28.43			M	AA		29.98
11	1335	0	CLR	10.00		93	34.0	69	20.4	55	13.0	28	9	120		28.42			M	AA		29.97
11	1355	0	CLR	10.00		93	34.0	69	20.4	55	13.0	28	5	130		28.41		7	027	M	AA	29.96
11	1415	0	CLR	10.00		93	34.0	69	20.4	55	13.0	28	3	180		28.40			M	AA		29.95
11	1435	0	CLR	10.00		97	36.0	70	21.0	55	13.0	24	10	150	18	28.39			M	AA		29.94
11	1455	0	CLR	10.00		95	35.0	69	20.7	55	13.0	26	9	120		28.39			M	AA		29.94
11	1515	0	CLR	10.00		97	36.0	70	21.0	55	13.0	24	8	080	16	28.38			M	AA		29.93
11	1535	0	CLR	10.00		95	35.0	69	20.5	54	12.0	25	7	160	21	28.38			M	AA		29.93
11	1555	0	CLR	10.00		99	37.0	70	21.1	54	12.0	22	13	140	17	28.37			M	AA		29.92
11	1615	0	CLR	10.00		99	37.0	70	21.1	54	12.0	22	13	150	20	28.36			M	AA		29.91
11	1635	0	CLR	10.00		97	36.0	69	20.8	54	12.0	24	15	160	22	28.36			M	AA		29.91
11	1655	0	FEW090	10.00		95	35.0	69	20.5	54	12.0	25	13	120		28.36		7	017	M	AA	29.91
11	1715	0	FEW090	10.00		93	34.0	68	20.1	54	12.0	27	16	150		28.36			M	AA		29.91
11	1735	0	CLR	10.00		93	34.0	68	20.1	54	12.0	27	10	160		28.36			M	AA		29.91
11	1755	0	CLR	10.00		93	34.0	67	19.6	52	11.0	25	11	170		28.36			M	AA		29.91
11	1815	0	CLR	10.00		93	34.0	66	18.7	48	9.0	21	9	180		28.37			M	AA		29.92
11	1835	0	CLR	10.00		90	32.0	67	19.6	54	12.0	29	3	350		28.39			M	AA		29.94
11	1855	0	CLR	10.00		91	33.0	66	18.8	50	10.0	25	5	120		28.39			M	AA		29.94
11	1915	0	CLR	10.00		91	33.0	65	18.4	48	9.0	23	5	130		28.40			M	AA		29.95
11	1935	0	CLR	10.00		91	33.0	66	18.8	50	10.0	25	5	110		28.40			M	AA		29.95
11	1955	0	CLR	10.00		91	33.0	66	18.8	50	10.0	25	5	130		28.41		2	017	M	AA	29.96
11	2015	0	CLR	10.00		88	31.0	67	19.3	54	12.0	31	6	220		28.42			M	AA		29.97
11	2035	0	CLR	10.00		84	29.0	67	19.4	57	14.0	40	8	190		28.44			M	AA		29.99
11	2055	0	CLR	10.00		82	28.0	66	19.0	57	14.0	43	5	210		28.44			M	AA		29.99
11	2115	0	CLR	10.00		82	28.0	66	19.0	57	14.0	43	3	230		28.45			M	AA		30.00
11	2135	0	CLR	10.00		82	28.0	66	19.0	57	14.0	43	0	000		28.45			M	AA		30.00
11	2155	0	CLR	10.00		82	28.0	66	19.0	57	14.0	43	0	000		28.45			M	AA		30.00
11	2215	0	CLR	10.00		82	28.0	66	19.0	57	14.0	43	0	000		28.45			M	AA		30.00
11	2235	0	CLR	10.00		82	28.0	65	18.5	55	13.0	40	0	000		28.45			M	AA		30.00
11	2255	0	CLR	10.00		84	29.0	66	18.8	55	13.0	37	0	000		28.46		2	017	M	AA	30.01
11	2315	0	CLR	10.00		82	28.0	65	18.5	55	13.0	40	0	000		28.46			M	AA		30.01
11	2335	0	CLR	10.00		84	29.0	67	19.4	57	14.0	40	3	120		28.46			M	AA		30.01
11	2355	0	CLR	10.00		82	28.0	66	19.0	57	14.0	43	0	000		28.46			M	AA		30.01

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DATA TABLES FOR SEPTEMBER 12, 2011

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA**  
(final)  
**HOURLY OBSERVATIONS TABLE**  
**CHANDLER MUNICIPAL AIRPORT (53128)**  
**CHANDLER, AZ**  
**(09/2011)**

Elevation: 1243 ft. above sea level  
Latitude: 33.268  
Longitude: -111.812  
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
12	0650	0	SCT180	40.00		75	24.0	66	18.9	61	16.0	62	0	000		28.69			M	AA		30.02
12	0747	0	SCT180	40.00		79	26.0	68	19.7	61	16.0	54	0	000		28.71			M	AA		30.03
12	0849	0	BKN180	40.00		82	28.0	66	19.1	57	14.0	43	5	340		28.71			M	AA		30.03
12	0947	0	SCT150 BKN200	40.00		86	30.0	68	19.8	57	14.0	37	0	000		28.72			M	AA		30.05
12	1047	0	SCT150 BKN200	30.00		90	32.0	69	20.5	57	14.0	33	11	090		28.72			M	AA		30.05
12	1147	0	SCT150 BKN200	30.00		95	35.0	69	20.8	55	13.0	26	14	110		28.71			M	AA		30.03
12	1252	0	SCT150 BKN200	30.00		97	36.0	71	21.6	57	14.0	26	15	090		28.69			M	AA		30.01
12	1347	0	SCT150 BKN200	30.00		95	35.0	69	20.8	55	13.0	26	11	100	22	28.66			M	AA		29.98
12	1447	0	SCT150 BKN200	25.00s		91	33.0	68	19.8	54	12.0	29	18	080	25	28.65			M	AA		29.97
12	1531	0	SCT100 BKN150 BKN200	35.00s	TS	90	32.0	68	19.9	55	13.0	31	13	080	24	28.65			M	AA		29.97
12	1552	0	FEW080 BKN150 BKN200	35.00s	-TSRA	90	32.0	68	19.9	55	13.0	31	13	100	24	28.66			M	AA		29.98
12	1620	0	FEW080 BKN150 BKN200	10.00	BLDU	90	32.0	68	19.9	55	13.0	31	17	150	23	28.66			M	AA		29.98
12	1654	0	FEW080 BKN150 BKN200	25.00		86	30.0	68	19.8	57	14.0	37	21	140	28	28.64			M	AA		29.96
12	1747	0	SCT080 BKN150 BKN200	20.00		88	31.0	68	20.1	57	14.0	35	22	150	28	28.66			M	AA		29.98
12	1847	0	BKN100 BKN180	15.00		82	28.0	65	18.5	55	13.0	40	16	110	26	28.67			M	AA		29.99
12	1947	0	SCT006 BKN100 BKN180	1.00	BLDU	82	28.0	65	18.5	55	13.0	40	23	140	33	28.75			M	AA		30.08
12	2047	0	FEW005 SCT010 BKN100	2.00	BLDU	79	26.0	68	19.7	61	16.0	54	21	150	37	28.77			M	AA		30.10

Dynamically generated Fri Sep 21 12:12:11 EDT 2012 via <http://cdoncdc.noaa.gov/qclcd/QCLCD>

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA**  
(final)  
**HOURLY OBSERVATIONS TABLE**  
**GLENDALE MUNICIPAL AIRPORT (53126)**  
**GLENDALE, AZ**  
**(09/2011)**

Elevation: 1066 ft. above sea level  
Latitude: 33.527  
Longitude: -112.295  
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
12	0547	0	SCT150 BKN200	20.00		81	27.0	67	19.5	59	15.0	47	0	000		28.86			M	AA		30.00
12	0647	0	SCT150 BKN200	20.00		81	27.0	66	18.9	57	14.0	44	0	000		28.89			M	AA		30.03
12	0750	0	FEW150 SCT200	20.00		84	29.0	67	19.4	57	14.0	40	0	000		28.90			M	AA		30.04
12	0847	0	FEW150 SCT200	20.00		88	31.0	67	19.6	55	13.0	33	5	020		28.90			M	AA		30.04
12	0947	0	FEW150 BKN200	20.00		91	33.0	68	20.1	55	13.0	30	3	080		28.90			M	AA		30.04
12	1047	0	FEW150 SCT200	20.00		93	34.0	69	20.5	55	13.0	28	5	090		28.90			M	AA		30.04
12	1147	0	SCT150 BKN200	20.00		97	36.0	70	20.9	54	12.0	24	6	090		28.89			M	AA		30.03
12	1247	0	FEW120 SCT150 BKN200	20.00		99	37.0	69	20.7	52	11.0	21	8	070		28.87			M	AA		30.01
12	1350	0	FEW120 SCT150 BKN200	20.00		100	38.0	70	20.9	52	11.0	20	11	140		28.83			M	AA		29.97
12	1447	0	SCT120 BKN150 BKN200	20.00		99	37.0	70	21.2	54	12.0	22	9	130		28.82			M	AA		29.96
12	1547	0	SCT120 BKN150 BKN200	20.00s		97	36.0	70	21.1	55	13.0	24	8	130		28.81			M	AA		29.95
12	1647	0	SCT120 BKN150 BKN200	20.00		97	36.0	70	20.8	54	12.0	24	7	170		28.82			M	AA		29.96
12	1747	0	FEW120 BKN150 BKN200	20.00		93	34.0	68	20.2	54	12.0	27	9	140		28.83			M	AA		29.97
12	1847	0	FEW120 SCT150 BKN200	20.00		91	33.0	69	20.6	57	14.0	32	17	130	23	28.85			M	AA		29.99
12	1947	0	SCT150 BKN200	10.00		88	31.0	67	19.6	55	13.0	33	11	100	21	28.89			M	AA		30.03

Dynamically generated Fri Sep 21 12:16:01 EDT 2012 via <http://cdo.ncdc.noaa.gov/qclcd/QCLCD>

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA  
(final)  
HOURLY OBSERVATIONS TABLE  
PHOENIX GOODYEAR AIRPORT (03186)  
GOODYEAR, AZ  
(09/2011)**

Elevation: 968 ft. above sea level  
Latitude: 33.416  
Longitude: -112.383  
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
12	0547	0	SCT150 BKN180	15.00		79	26.0	66	19.1	59	15.0	50	6	VR		28.97			M	AA		30.00
12	0647	0	SCT150 BKN180	15.00		79	26.0	68	19.7	61	16.0	54	5	VR		28.98			M	AA		30.02
12	0747	0	FEW120 BKN180 BKN200	15.00		82	28.0	70	20.9	63	17.0	53	5	VR		29.00			M	AA		30.04
12	0847	0	FEW120 BKN180 BKN200	15.00		86	30.0	68	19.8	57	14.0	37	6	VR		29.00			M	AA		30.04
12	0947	0	FEW120 SCT180 BKN220	15.00		90	32.0	69	20.5	57	14.0	33	5	VR		29.00			M	AA		30.04
12	1047	0	FEW120 SCT180 BKN220	15.00		91	33.0	69	20.7	57	14.0	32	9	130		29.00			M	AA		30.04
12	1147	0	FEW100 BKN180 BKN250	15.00		97	36.0	70	21.1	55	13.0	24	11	130		29.00			M	AA		30.03
12	1247	0	FEW100 BKN180 BKN250	15.00		99	37.0	71	21.4	55	13.0	23	7	120		28.97			M	AA		30.00
12	1347	0	FEW100 BKN150 BKN200	10.00		99	37.0	71	21.4	55	13.0	23	7	090 17		28.94			M	AA		29.97
12	1447	0	FEW100 BKN150 BKN200	10.00		95	35.0	70	21.3	57	14.0	28	11	100 17		28.93			M	AA		29.96
12	1547	0	SCT100 BKN150 OVC200	10.00		95	35.0	71	21.8	59	15.0	30	11	110 17		28.91			M	AA		29.94
12	1647	0	SCT100 BKN150 OVC200	10.00		91	33.0	71	21.8	61	16.0	37	9	270		28.93			M	AA		29.96
12	1747	0	SCT100 BKN150 BKN200	10.00		91	33.0	70	21.2	59	15.0	34	6	VR		28.93			M	AA		29.96
12	1847	0	SCT100 BKN150 BKN200	10.00		88	31.0	68	20.1	57	14.0	35	14	120 23		28.95			M	AA		29.98
12	1947	0	SCT100 BKN150 BKN200	10.00		86	30.0	70	20.9	61	16.0	43	17	120 25		28.97			M	AA		30.01
12	2047	0	SCT100 BKN150 BKN200	7.00		82	28.0	70	21.2	64	18.0	55	17	110 29		29.00			M	AA		30.04

Dynamically generated Fri Sep 21 12:19:49 EDT 2012 via <http://cdo.ncdc.noaa.gov/qclcd/QCLCD>

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA**

**(final)  
HOURLY OBSERVATIONS TABLE  
LUKE AFB AIRPORT (23111)  
GLENDALE, AZ  
(09/2011)**

Elevation: 1085 ft. above sea level

Latitude: 33.55

Longitude: -112.366

Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
12	0055	0	FEW140	10.00		83	28.1	66	19.0	56	13.5	40	7	330		28.82			29.89	AA		29.98
12	0155	0	BKN160	10.00		83	28.5	66	19.0	56	13.6	40	8	010		28.81	7	001	29.88	AA		29.97
12	0255	0	BKN160	10.00		82	28.0	66	19.1	57	13.8	43	6	340		28.82			29.89	AA		29.98
12	0355	0	BKN170	10.00		81	27.4	67	19.2	58	14.3	46	8	320		28.82			29.89	AA		29.98
12	0455	0	BKN200	10.00		80	26.4	66	19.0	58	14.4	47	6	320		28.82	2	004	29.90	AA		29.98
12	0555	0	SCT200	10.00		78	25.5	66	18.6	58	14.2	50	5	350		28.84			29.92	AA		30.00
12	0655	0	SCT210	10.00		80	26.4	66	19.0	58	14.3	47	0	000		28.86			29.93	AA		30.02
12	0755	0	CLR	10.00		84	28.8	67	19.4	57	13.8	40	0	000		28.87	3	015	29.95	AA		30.03
12	0855	0	CLR	10.00		88	31.2	68	19.9	56	13.6	34	6	040		28.87			29.95	AA		30.03
12	0955	0	CLR	10.00		92	33.3	69	20.3	55	13.0	29	5	VR		28.87			29.95	AA		30.03
12	1055	0	CLR	10.00		95	34.8	70	21.0	56	13.1	27	5	VR		28.87	5	000	29.95	AA		30.03
12	1155	0	FEW160	10.00		97	36.0	70	21.1	55	12.9	24	10	140		28.86			29.93	AA		30.02
12	1255	0	CLR	10.00		98	36.4	69	20.8	53	11.9	22	6	VR		28.83			29.90	AA		29.99
12	1355	0	CLR	10.00		100	37.6	70	20.9	52	11.1	20	9	170		28.80	8	024	29.87	AA		29.96
12	1455	0	FEW170	10.00		98	36.7	70	21.2	55	12.5	24	11	160		28.78			29.85	AA		29.94
12	1500	0	FEW170	10.00		97	36.0	70	21.1	55	13.0	24	16	160		28.78			29.85	AA		29.94
12	1500	0	FEW	10.00		97	36.0	M	M	55	13.0	M	16	160		M			29.85	SP		29.94
12	1555	0	FEW140	10.00		96	35.6	70	21.2	56	13.1	26	10	150		28.78			29.85	AA		29.94
12	1655	0	FEW100	10.00		93	33.8	70	21.0	57	14.1	30	13	250		28.79	5	001	29.87	AA		29.95
12	1755	0	CLR	10.00		93	33.9	70	21.0	57	13.8	30	13	180		28.79			29.87	AA		29.95
12	1855	0	BKN150 BKN170	10.00		90	32.0	70	21.0	59	15.0	35	18	150		28.81			29.90	AA		29.97
12	1955	0	CLR	10.00		87	30.6	68	20.0	57	13.8	36	13	120		28.86	3	021	29.94	AA		30.02
12	2055	0	FEW210	10.00		83	28.6	69	20.7	62	16.6	49	15	130	24	28.88			29.96	AA		30.04
12	2108	0	FEW210	10.00		82	28.0	70	20.9	63	17.0	53	13	120		28.87			29.96	AA		30.03
12	2111	0	CLR	10.00		82	28.0	70	20.9	63	17.0	53	15	130		28.87			M	AA		30.03
12	2121	0	CLR	10.00		82	28.0	70	20.9	63	17.0	53	16	130	20	28.86			M	AA		30.02
12	2155	0	SCT005	9.00		81	27.0	69	20.7	63	17.1	54	15	120	24	28.90			29.98	AA		30.06
12	2255	0	CLR	10.00		80	26.9	68	20.2	62	16.5	54	9	060		28.91	3	019	29.99	AA		30.07
12	2355	0	CLR	10.00		79	26.0	68	19.7	61	16.0	54	7	040		28.93			30.01	AA		30.09

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**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA  
(final)  
HOURLY OBSERVATIONS TABLE  
FALCON FIELD AIRPORT (03185)  
MESA, AZ  
(09/2011)**

Elevation: 1380 ft. above sea level

Latitude: 33.466

Longitude: -111.733

Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
12	0557	0	FEW120 BKN250	30.00		79	26.0	64	17.7	54	12.0	42	14	010		28.52			M	AA		30.00
12	0655	0	BKN150	40.00		79	26.0	64	17.9	55	13.0	44	14	360		28.54			M	AA		30.02
12	0754	0	BKN150	40.00		79	26.0	64	17.9	55	13.0	44	11	030		28.56			M	AA		30.04
12	0847	0	BKN150	40.00		82	28.0	65	18.2	54	12.0	38	17	020		28.55			M	AA		30.03
12	0947	0	BKN150	40.00		88	31.0	67	19.6	55	13.0	33	14	010		28.56			M	AA		30.04
12	1047	0	SCT100 BKN200	40.00		93	34.0	68	20.2	54	12.0	27	11	130		28.57			M	AA		30.05
12	1255	0	SCT100 BKN200	40.00		97	36.0	70	20.8	54	12.0	24	16	130		28.53			M	AA		30.01
12	1453	0	BKN100 BKN200	40.00		95	35.0	69	20.5	54	12.0	25	17	150		28.49			M	AA		29.97
12	1552	0	BKN100 BKN200	40.00		93	34.0	67	19.2	50	10.0	23	17	140		28.49			M	AA		29.97
12	1648	0	BKN100 BKN200	25.00		88	31.0	67	19.3	54	12.0	31	17	120		28.49			M	AA		29.97
12	1847	0	BKN100 BKN220	25.00		81	27.0	67	19.4	59	15.0	47	17	120		28.53			M	AA		30.01
12	1947	0	BKN100 BKN200	20.00		82	28.0	66	19.0	57	14.0	43	11	110		28.56			M	AA		30.04

Dynamically generated Fri Sep 21 12:22:54 EDT 2012 via <http://cdo.ncdc.noaa.gov/qclcd/QCLCD>

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA**

**(final)  
HOURLY OBSERVATIONS TABLE  
SCOTTSDALE AIRPORT (03192)  
SCOTTSDALE, AZ  
(09/2011)**

Elevation: 1473 ft. above sea level

Latitude: 33.622

Longitude: -111.910

Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
12	0053	12	CLR	10.00		84	28.9	66	19.1	56	13.3	38	0	000		28.41			AA		30.01	
12	0153	12	CLR	10.00		85	29.4	67	19.3	56	13.3	37	3	060		28.40	6	001	AA		30.00	
12	0253	12	CLR	10.00		82	27.8	67	19.6	59	15.0	46	0	000		28.41			AA		30.01	
12	0353	12	CLR	10.00		83	28.3	66	18.9	56	13.3	40	0	000		28.41			AA		30.01	
12	0453	12	CLR	10.00		81	27.2	67	19.1	58	14.4	46	3	280		28.41	3	002	AA		30.01	
12	0553	12	CLR	10.00		80	26.7	66	18.7	57	13.9	45	0	000		28.42			AA		30.02	
12	0653	12	CLR	10.00		79	26.1	66	18.8	58	14.4	49	0	000		28.44			AA		30.04	
12	0753	12	CLR	10.00		83	28.3	67	19.5	58	14.4	43	0	000		28.45	3	013	AA		30.05	
12	0853	12	CLR	10.00		87	30.6	68	19.9	57	13.9	36	0	000		28.46			AA		30.06	
12	0953	12	CLR	10.00		91	32.8	68	19.8	54	12.2	29	0	000		28.46			AA		30.06	
12	1053	12	CLR	10.00		93	33.9	67	19.7	52	11.1	25	6	VR		28.46	1	004	AA		30.06	
12	1153	12	CLR	10.00		94	34.4	68	19.8	52	11.1	24	6	VR		28.45			AA		30.05	
12	1253	12	CLR	10.00		97	36.1	70	20.8	54	12.2	24	14	140	18	28.43			AA		30.03	
12	1353	12	CLR	10.00		97	36.1	69	20.5	53	11.7	23	8	180	20	28.40	8	020	AA		30.00	
12	1453	12	CLR	10.00		94	34.4	69	20.6	55	12.8	27	9	160		28.39			AA		29.99	
12	1553	12	CLR	10.00		93	33.9	67	19.6	52	11.1	25	8	170	23	28.38			AA		29.98	
12	1653	12	CLR	10.00		92	33.3	68	20.0	54	12.2	28	15	160		28.39	5	004	AA		29.99	
12	1753	12	CLR	10.00		88	31.1	68	20.1	57	13.9	35	8	160		28.40			AA		30.00	
12	1853	12	CLR	10.00		83	28.3	68	19.8	59	15.0	44	16	140	24	28.45			AA		30.05	
12	1953	12	CLR	10.00		82	27.8	67	19.6	59	15.0	46	7	140		28.47	3	025	AA		30.07	
12	2051	12	BKN017	4.00	HZ	81	27.0	68	20.0	61	16.0	51	13	170	30	28.51			M	SP	30.12	
12	2053	12	BKN017	4.00	HZ	81	27.2	68	19.7	60	15.6	49	13	160	24	28.51			AA		30.12	
12	2153	12	BKN017	6.00	HZ	79	26.1	68	19.7	61	16.1	54	11	130	20	28.51			AA		30.11	
12	2203	12	SCT017	9.00		79	26.0	68	19.7	61	16.0	54	8	130	20	28.51			M	SP	30.11	
12	2253	12	CLR	10.00		78	25.6	67	19.2	60	15.6	54	8	080		28.51	1	016	AA		30.12	
12	2353	12	CLR	10.00		79	26.1	67	19.4	60	15.6	52	6	020		28.51			AA		30.12	

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA  
(final)  
HOURLY OBSERVATIONS TABLE  
WILLIAMS GATEWAY AIRPORT (23104)  
PHOENIX, AZ  
(09/2011)**

Elevation: 1382 ft. above sea level

Latitude: 33.3

Longitude: -111.666

Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
12	0015	0	CLR	10.00		82	28.0	68	20.2	61	16.0	49	7	150		28.55			M	AA		30.02
12	0115	0	CLR	10.00		82	28.0	68	20.2	61	16.0	49	6	110		28.54			M	AA		30.01
12	0135	0	CLR	10.00		81	27.0	68	20.0	61	16.0	51	6	120		28.54			M	AA		30.01
12	0155	0	CLR	10.00		81	27.0	69	20.7	63	17.0	54	5	140		28.54			M	AA		30.01
12	0215	0	CLR	10.00		81	27.0	68	20.0	61	16.0	51	0	000		28.54			M	AA		30.01
12	0235	0	CLR	10.00		81	27.0	68	20.0	61	16.0	51	0	000		28.54			M	AA		30.01
12	0255	0	CLR	10.00		81	27.0	68	20.0	61	16.0	51	6	150		28.54			M	AA		30.01
12	0315	0	CLR	10.00		81	27.0	69	20.7	63	17.0	54	5	160		28.54			M	AA		30.01
12	0335	0	CLR	10.00		81	27.0	69	20.7	63	17.0	54	3	130		28.54			M	AA		30.01
12	0355	0	CLR	10.00		79	26.0	69	20.3	63	17.0	58	5	140		28.55			M	AA		30.02
12	0415	0	CLR	10.00		81	27.0	68	20.0	61	16.0	51	0	000		28.55			M	AA		30.02
12	0435	0	CLR	10.00		81	27.0	69	20.7	63	17.0	54	0	000		28.55			M	AA		30.02
12	0455	0	CLR	10.00		81	27.0	69	20.7	63	17.0	54	0	000		28.54			M	AA		30.01
12	0515	0	CLR	10.00		81	27.0	70	21.0	64	18.0	56	0	000		28.55			M	AA		30.02
12	0551	0	SCT150 BKN250	20.00		82	28.0	70	21.1	64	18.0	55	0	000		28.55			M	AA		30.02
12	0647	0	SCT150 BKN250	45.00		79	26.0	69	20.3	63	17.0	58	0	000		28.58			M	AA		30.05
12	0747	0	SCT150 BKN250	45.00		84	29.0	70	21.2	63	17.0	49	3	VR		28.58			M	AA		30.05
12	0847	0	SCT150 BKN250	45.00		88	31.0	69	20.7	59	15.0	38	5	VR		28.59			M	AA		30.06
12	0947	0	SCT150 BKN250	45.00		88	31.0	68	20.1	57	14.0	35	3	VR		28.60			M	AA		30.07
12	1047	0	SCT150 BKN250	45.00		93	34.0	70	20.9	57	14.0	30	15	120		28.61			M	AA		30.08
12	1147	0	SCT150 BKN250	45.00		97	36.0	70	21.1	55	13.0	24	14	130		28.60			M	AA		30.07
12	1247	0	SCT140 SCT250	45.00		97	36.0	70	21.1	55	13.0	24	18	130		28.58			M	AA		30.05
12	1347	0	SCT150 BKN250	35.00		102	39.0	71	21.6	54	12.0	20	17	120		28.55			M	AA		30.02
12	1448	0	SCT150 BKN250	35.00		97	36.0	70	21.1	55	13.0	24	14	130		28.53			M	AA		30.00
12	1531	0	SCT100 BKN250	35.00s	VCTS	93	34.0	69	20.4	55	13.0	28	14	130		28.53			M	AA		30.00
12	1547	0	BKN100CB BKN250	35.00s	-TSRA	91	33.0	68	19.8	54	12.0	29	14	140		28.54			M	AA		30.01
12	1610	0	BKN100 BKN250	35.00s	-RA	90	32.0	73	22.5	64	18.0	42	9	160		28.55			M	AA		30.02
12	1647	0	BKN100 BKN250	30.00s		88	31.0	73	22.8	66	19.0	48	16	140		28.54			M	AA		30.01
12	1747	0	BKN100 BKN250	6.00	BLDU	84	29.0	70	21.2	63	17.0	49	26	140	33	28.54			M	AA		30.01
12	1848	0	BKN120 OVC250	20.00		84	29.0	69	20.6	61	16.0	46	14	110		28.58			M	AA		30.05
12	1947	0	BKN120	20.00		82	28.0	70	20.8	63	17.0	53	15	130		28.60			M	AA		30.07
12	2047	0	BKN120	10.00		82	28.0	68	20.2	61	16.0	49	18	170		28.65			M	AA		30.12