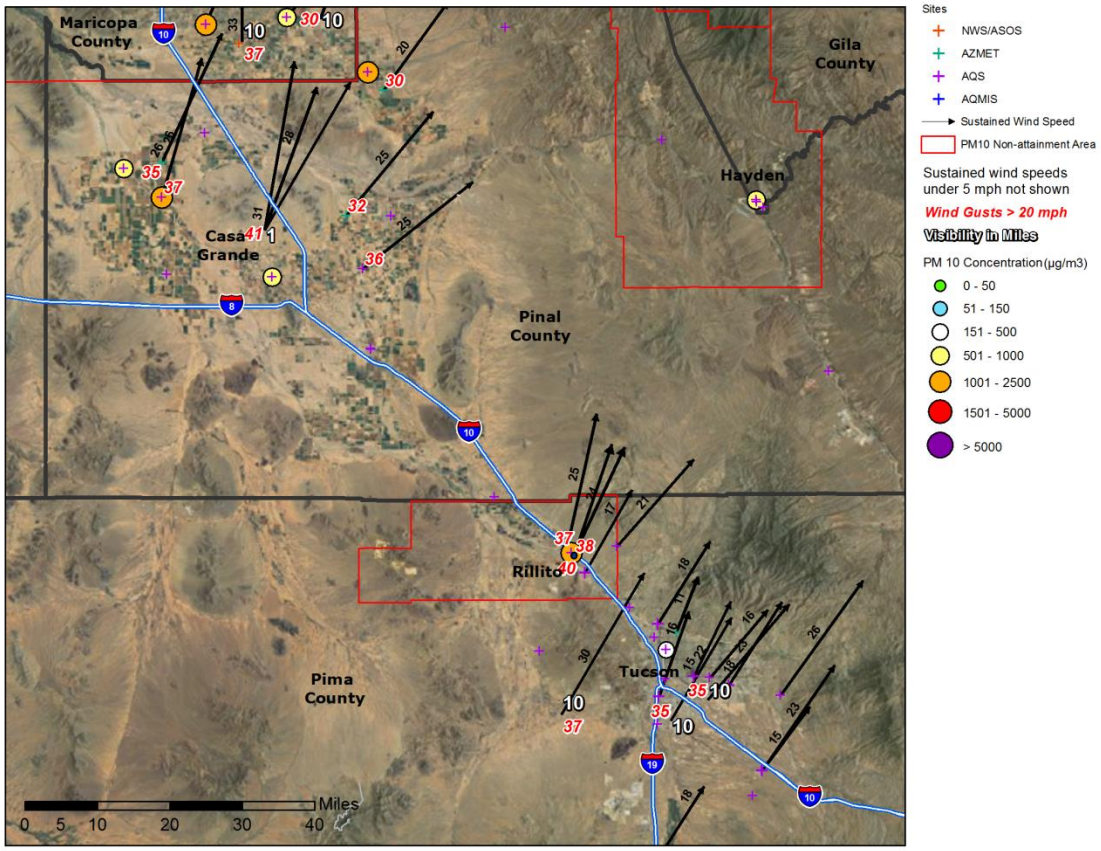
Sonoma Technology, Inc.
Air Quality Research and Innovative Solutions

State of Arizona Exceptional Event Documentation for the Event of February 19, 2011, for the Rillito PM_{10} Nonattainment Area



Final Report Prepared for

Arizona Department of Environmental Quality
Phoenix, AZ

December 2013

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State of Arizona Exceptional Event Documentation for the Event of February 19, 2011, for the Rillito PM_{10} Nonattainment Area

Final Report
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Cover graphic illustrates hourly wind speeds, visibilities, and PM_{10} concentrations in the Rillito, Arizona, area during the February 19, 2011, event. See Section 3 for more information.

Acknowledgments

The authors would like to acknowledge the Arizona Department of Environmental Quality and the U.S. Environmental Protection Agency, Region 9, for helpful discussion and feedback during the preparation of this document.

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1. Introduction

On February 19, 2011, the Rillito monitor recorded a 24-hr average PM_{10} concentration of 242 µg/m^3. This value exceeds the National Ambient Air Quality Standard (NAAQS) of 150 µg/m^3 for 24-hr PM_{10}. This report demonstrates that this exceedance was caused by naturally occurring windblown dust, was not reasonably controllable or preventable, was historically unusual, and would not have occurred "but for" the windblown dust and, therefore, the event is an exceptional event as defined by the U.S. Environmental Protection Agency's (EPA) Exceptional Events Rule (EER).

1.1 Report Contents

Section 2 of this assessment contains a conceptual model of the cold-frontal windblown dust event that occurred on February 19, 2011, providing a background narrative of the exceptional event and an overall explanation of how the event affected air quality. Section 2 also provides evidence that the event was a natural event.

Section 3 of this assessment establishes a clear causal connection between the natural event on February 19, 2011, and the exceedance of the 24-hr PM_{10} standard at the monitoring station. The evidence in this section also confirms that the event in question both affected air quality and was the result of natural events.

Section 4 of this assessment contains data summaries and time-series graphs which help illustrate that the event of February 19, 2011, produced PM_{10} concentrations in excess of normal historical fluctuations.

Section 5 of this assessment details existing dust control measures and demonstrates that despite the presence and enforcement of these controls, the event of February 19, 2011, was not reasonably controllable or preventable.

Section 6 of this assessment builds upon the demonstration, showing a clear causal connection between the natural event and the exceedance, and concludes that the exceedance of the 24-hr PM_{10} standard on February 19, 2011, would not have occurred but for the event.

Appendix A contains time-series graphs and data tables to supplement Section 3. **Appendix B** contains air quality forecasts issued by the Arizona Department of Environmental Quality (ADEQ) and weather statements and warnings issued by the National Weather Service (NWS). **Appendix C** contains a copy of the affidavit of public notice concerning this assessment report.

1.2 Exceptional Event Rule Requirements

In addition to the technical requirements contained in the EER, procedural requirements must also be met for the EPA to concur that the flagged air quality monitoring data is due to an exceptional event. This section of the report contains the requirements of the EER and associated guidance, and discusses how ADEQ has addressed those requirements.

1.2.1 Public Notification That the Event Was Occurring (40 CFR 50.14(c)(1)(i))

ADEQ issued Air Quality Forecasts indicating that gusty southwesterly winds were expected due to the approaching storm system. More information on ADEQ's forecasting program can be found in Section 5.2 of this report. The forecasts and advisories that were issued for February 19, 2011, are included in Appendix B.

1.2.2 Place Informal Flag on Data in AQS (40 CFR 50.14(c)(2)(ii))

ADEQ and other operating air quality agencies in Arizona submit data into the EPA's Air Quality System (AQS), the official repository of ambient air quality data. This data submittal to AQS includes PM data from filter-based and continuous monitors operated in Arizona.

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 other operating air quality agencies determine that the potential exists for a monitor's reading(s) to be influenced by an exceptional event, a preliminary flag is submitted for the measurement in AQS. The data are not official until they undergo more thorough quality assurance and quality control, leading to certification by May 1 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.

1.2.3 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 a letter to EPA on September 11, 2013, listing all days for calendar years 2011-2013 that ADEQ intends to analyze under the EER. The PM_{10} exceedance that occurred at the Rillito monitor on February 19, 2011, in the Rillito PM_{10} Nonattainment Area (RNA) was included on this list. This assessment report demonstrates support for the flagging of these data.

1.2.4 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 hard copy of the report in the ADEQ Records Management Center for public review. ADEQ opened a 30-day public comment period on February 7, 2014. 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 C for a copy of the affidavit of public notice.

1.2.5 Submit Demonstration Supporting Exceptional Event Flag (40 CFR 50.14(a)(1-2))

At the close of the public 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 9 headquarters in San Francisco, California. The deadline for the submittal of this package is March 31, 2014.

1.2.6 Documentation Requirements (40 CFR 50.14(c)(3)(iii))

The EER states that in order to justify the exclusion of air quality monitoring data, evidence must be provided for the following elements:

1. The event satisfies the criteria set forth in 40 CFR 50.1(j) that
    a. the event affected air quality,
    b. the event was not reasonably controllable or preventable, and
    c. the event was caused by human activity unlikely to recur in a particular location or was a natural event;
2. There is a clear causal relationship between the measurement(s) under consideration and the event;
3. The event is associated with a measured concentration(s) in excess of normal historical fluctuations; and
4. There would have been no exceedance or violation but for the event.

1.3 Guide to New Material in This Report

Naturally occurring dust events occur several times per year in Arizona, with each event requiring the preparation of exceptional events documentation. Some text in this documentation is required by the EER and is common to all the demonstrations. The text, figures, and tables unique to this event are outlined in **Table 1-1**.

Table 1-1. Summary of information unique to the Rillito February 19, 2011, event.

Section	Unique Material
Throughout the report	Event date(s) updated
Section 2.4	Event day summary
Chapter 3	Clear causal relationship
Chapter 4	Historical norm
Section 5.1.6 through Section 5.4	Source-permitted inspections and public complaints, forecasts and warnings, and wind observations
Chapters 6 and 7	But-for analysis and conclusion
Appendices A and B	Additional data and forecasts

2. Conceptual Model

This section provides a narrative background and summarizes the meteorological and air quality conditions in Rillito on February 19, 2011. This section includes

- A description and map of the geographic setting of the air quality and meteorological monitors.
- A description of Rillito's regional climate.
- An overall description of meteorological and air quality conditions on the event day.

2.1 Geographic Setting and Monitor Locations

Rillito is an unincorporated community in Pima County in southern Arizona, approximately 88 miles southeast of Phoenix and 20 miles northwest of Tucson (**Figure 2-1**). Rillito is bordered on all sides by the incorporated town of Marana. The region, along with much of southern Arizona, is in the Sonoran Desert. Rillito and Marana are flanked by the foothills of the Tortolita Mountains to the east, the Tucson Mountains to the south, and the Silver Bell Mountains to the west. Rillito and Marana lie at an elevation of approximately 1,900 feet above sea level, while peaks in each of the surrounding mountain ranges exceed 4,500 feet above sea level.

The RNA encompasses 324 square miles and nine townships. Much of the RNA comprises undeveloped land, and approximately 30% of the RNA consists of land cleared for agricultural purposes. Interstate 10 traverses the northeastern corner of the RNA, and the Silver Bell copper mine is in the southwestern corner of the RNA. Saguaro National Park is south of the RNA.

Over the past 20 years, the RNA has undergone a transformation from a predominantly rural, agricultural area to an area of substantial population growth. The town of Marana has annexed large sections of the RNA and has grown from an estimated population of just over 2,000 in 1990 to over 30,000 in 2010. The population of Rillito has also grown during this period, but because of its very small geographic area, Rillito's population was only 97 as of 2010.

The air quality and meteorological monitors used in this analysis are shown in Figure 2-1. AQS monitors measure air quality and meteorological data; Arizona Meteorological Network (AZMET) and NWS monitors measure meteorological data only. The PM_{10} exceedance on February 19, 2011, was recorded at the Rillito monitor, which has been operational since 1985 (**Figure 2-2**). In 2005, the monitor was moved to a new location less than 1,000 feet from its original location. In 2005, the monitor was moved to a new location less than 1,000 feet from its original location. The site is close to residential and industrial areas (chiefly, the CalPortland Cement plant). Collocated wind data are available from the Rillito monitor. One AZMET monitor was in operation near the Rillito monitor during the February 19, 2011, dust event. There are no official NWS monitors in the immediate vicinity of Rillito. However, data from two NWS monitors in Tucson (about 15 to 20 miles away) and Casa

Grande (about 50 miles away) are used in this report to illustrate regional weather conditions.However, data from two NWS monitors in Tucson (about 15 to 20 miles away) and Casa Grande (about 50 miles away) are used in this report to illustrate regional weather conditions.

Recent analyses have determined that the I-10 corridor between Marana/Rillito and Casa Grande is particularly susceptible to dust storms and fatal traffic accidents due to the associated low visibilities.[1] These analyses identify this region as particularly susceptible to dust storms because much of the land was originally used for agricultural purposes. That land has since been largely abandoned and allowed to revert to open desert. Desert soil that has been farmed and then abandoned in this manner takes a long time to recover. As a result, there is a dearth of vegetation to hold down or catch blowing dust. Most of this land is located from Rillito northward into Pinal County.

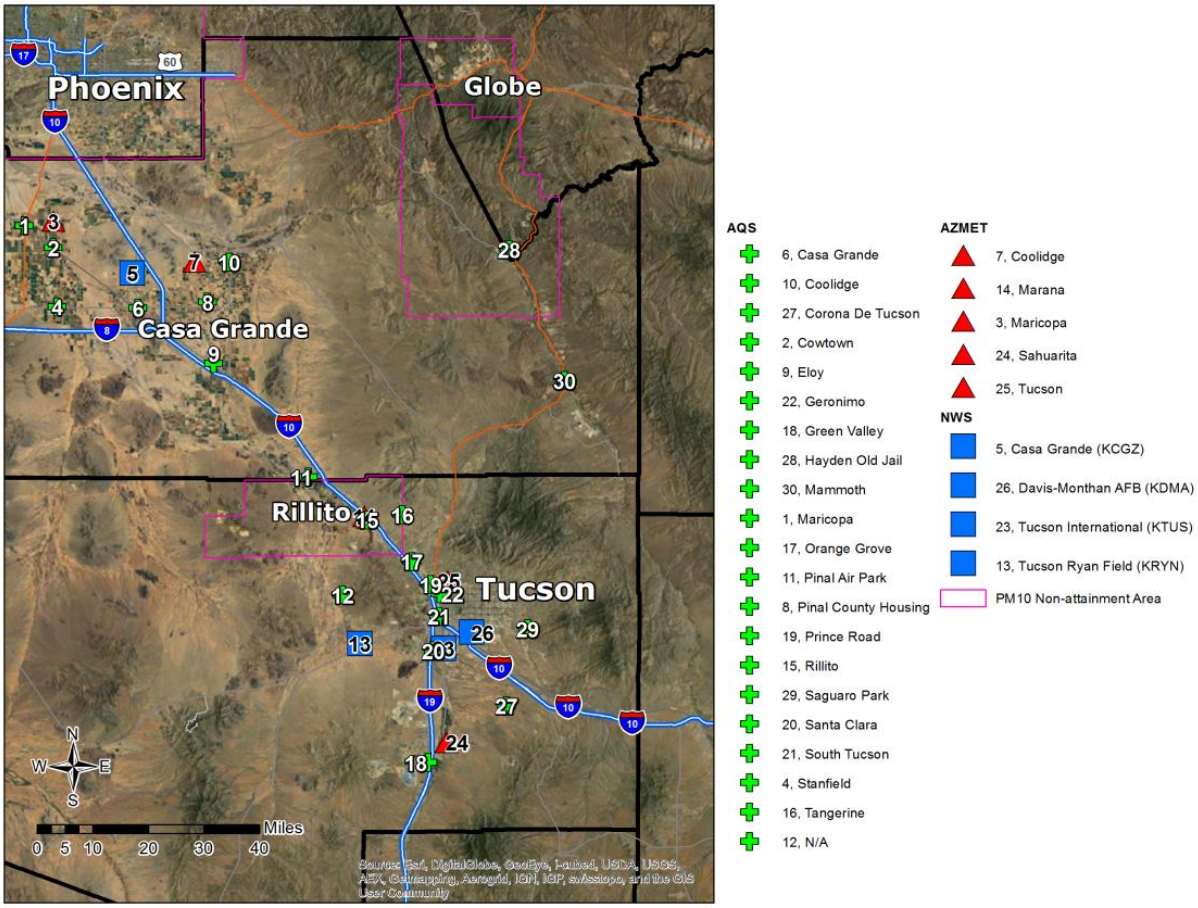

Figure 2-1. Air quality and meteorological monitors in Pima and Pinal counties.

[1] Several media outlets reported on the I-10 corridor dust storm analyses, including http://bit.ly/1gClpJq.

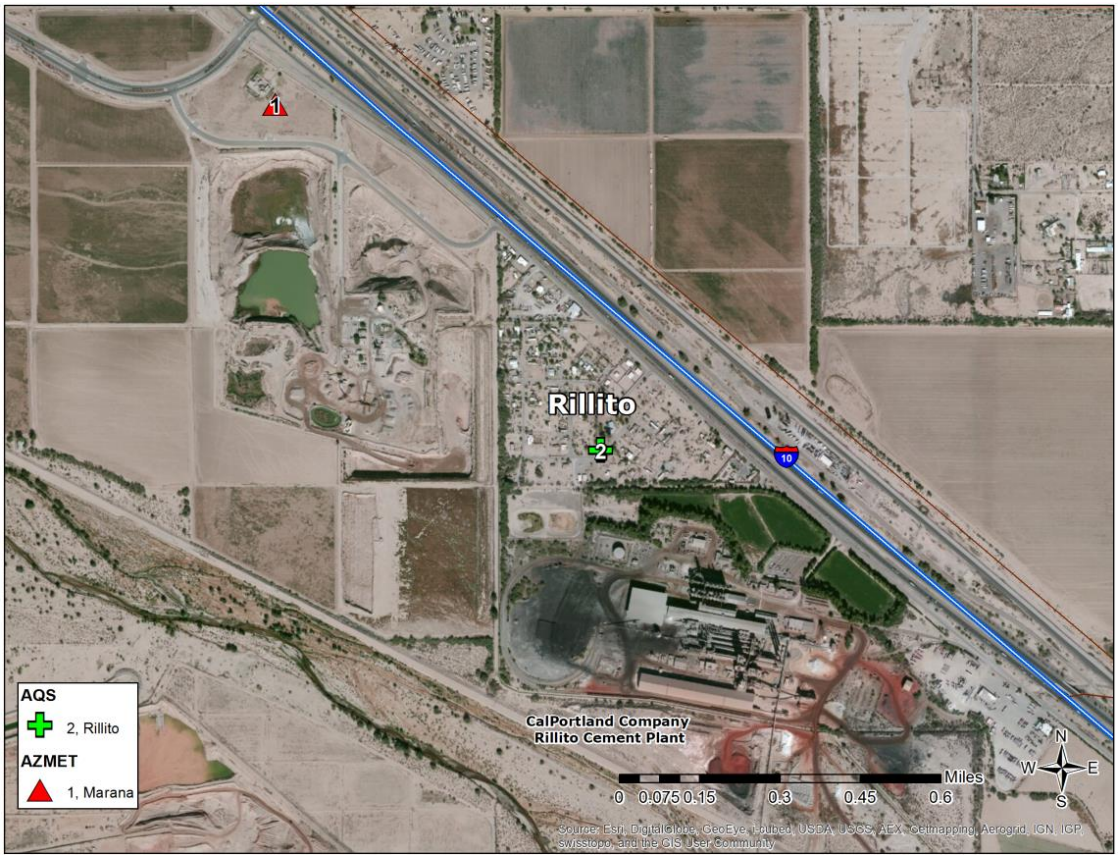

Figure 2-2. Air quality and meteorological monitors in the immediate Rillito region.

2.2 History of PM_{10} Attainment Status for Rillito

ADEQ began monitoring PM in what is now the RNA in 1971. The original measurement standard for PM, known as total suspended particulate matter (TSP), included a size range of particles collected by high-volume samplers (generally particles up to 40 microns in diameter). PM_{10} monitoring began in the RNA in 1985 on a sampling schedule of once every six days. Daily PM_{10} monitoring in the RNA began on April 1, 2010. On July 1, 1987, EPA revised PM standards to include only PM_{10} (52 FR 24634). As part of the implementation policy for the new standards, where insufficient observational PM_{10} data were available, EPA categorized areas of the country according to their probability of violating the standards: (1) Group I areas have a high probability of violating the standards, (2) Group II areas have a moderate probability of violating the standards, and (3) Group III areas are unlikely to violate the standards.

EPA listed Rillito as a Group I area. As a result, the state of Arizona was required to submit a State Implementation Plan (SIP) within nine months of the promulgation of the NAAQS (52 FR 24672, July 1, 1987, and 52 FR 29383, August 7, 1987).

Prior to the state of Arizona's submission of a SIP, EPA updated its initial geographic descriptions for the Group I and Group II areas. Consistent with EPA's PM_{10} grouping scheme, the Rillito Group I Area was designated and classified as a moderate PM_{10} nonattainment area

upon enactment of the 1990 Clean Air Act (CAA) amendments, effective November 15, 1990. This action included requirements for submittal of an attainment demonstration and reasonably available control measures (RACM) implementation provisions by November 15, 1991.

ADEQ submitted a PM_{10} moderate nonattainment area attainment demonstration for the RNA on November 14, 1991. In a letter dated May 14, 1992, EPA found this plan to be incomplete because it lacked an emissions inventory. On April 22, 1994, ADEQ submitted a revised PM_{10} attainment plan for Rillito. In a letter dated August 18, 1994, EPA found the revised plan to be incomplete because of a lack of RACM. EPA has not taken further action on the 1994 PM_{10} plan.

No exceedances of the 24-hr PM_{10} NAAQS occurred in the RNA from 1990 through 2006. As a result, EPA determined that the RNA had met the PM_{10} NAAQS and issued a "clean data" finding for the area in 2006. Subsequently, ADEQ submitted to EPA a PM_{10} Limited Maintenance Plan (LMP) and a request for redesignation of the area to attainment. The LMP is a streamlined alternative to the reporting required under a regular Maintenance Plan.

2.3 Climate

Rillito's climate is typical of the desert region of the southwestern United States. The warmest months of the year are June through August, when average daily maximum temperatures are near 100°F (**Figure 2-3**). Average annual rainfall in Rillito is nearly 12 inches. The bulk of this rain usually falls during July through September, with a secondary maximum during December through February. During December through February, winter storms originating from the Pacific Ocean can produce significant rains in southern Arizona. During July through September, monsoonal moisture originating from the Gulf of California and Gulf of Mexico, as well as large thunderstorm complexes over the Sierra Madre Occidental Mountains in Mexico, move northward into Arizona. Prevailing winds in the Tucson/Rillito area are from the southeast.

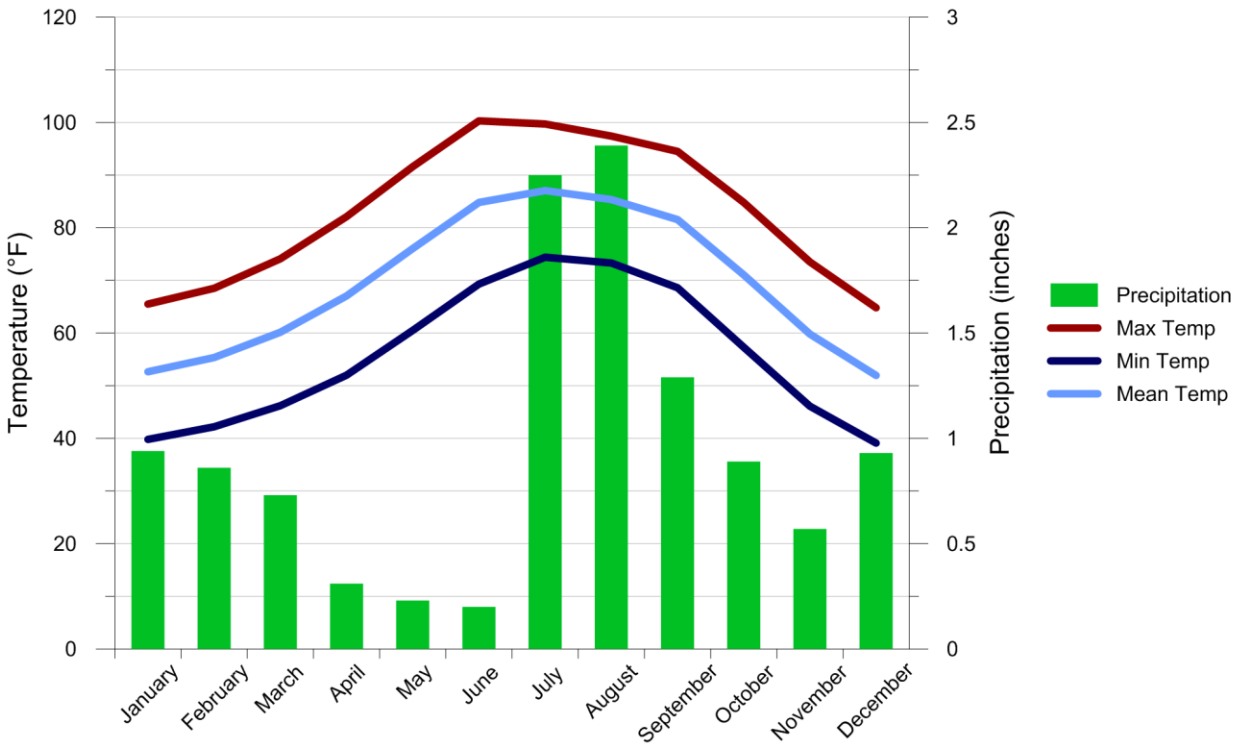

Figure 2-3. Average monthly temperatures and precipitation for Tucson, 1981–2010. Rillito does not have an official NWS climate site. The nearest NWS climate site is in Tucson, approximately 15 miles southeast of Rillito .

While windblown dust events in Arizona during the summer monsoon season are often due to outflow winds from thunderstorms, windblown dust events in the fall, winter, and spring are usually due to strong winds associated with low-pressure systems and cold fronts moving southeast across California and Arizona. These winds are the result of strong surface pressure gradients between the approaching low-pressure system (or cold front) and higher pressure ahead of it. As the low-pressure system (or cold front) approaches and passes, gusty southwesterly winds typically shift to northwesterly. Gusty easterly winds can also develop in the Tucson/Rillito area when strong surface high pressure builds southward along the Rocky Mountains, resulting in a strong pressure gradient over Arizona. The strong winds can loft dust into the air and transport it over long distances, especially if soils in the region are dry.

2.4 Event Day Summary

On February 19, 2011, strong southwesterly winds generated by an approaching Pacific storm system transported dust northeastward into Rillito (**Figure 2-4**). The windblown dust resulted in a 24-hr average PM_{10} concentration of 242 µg/m^3 at the Rillito monitor (**Table 2-1**); this value exceeds the NAAQS. The hourly and 24-hr average PM_{10} concentrations measured at the Rillito monitor were in excess of normal historical fluctuations. The dust was naturally occurring and likely originated over undeveloped lands southwest of Rillito outside the RNA. Sustained winds of up to 30 mph with wind gusts in excess of 40 mph overwhelmed reasonable dust control measures. PM_{10} monitors in nearby Pinal and Maricopa counties also recorded

PM_{10} concentrations in exceedance of the NAAQS, illustrating the regional nature of this event. The Tucson International Airport surface meteorological site reported blowing dust (BLDU) for several hours on February 19, 2011, coincident with strong winds and peak PM_{10} concentrations (see Appendix A).

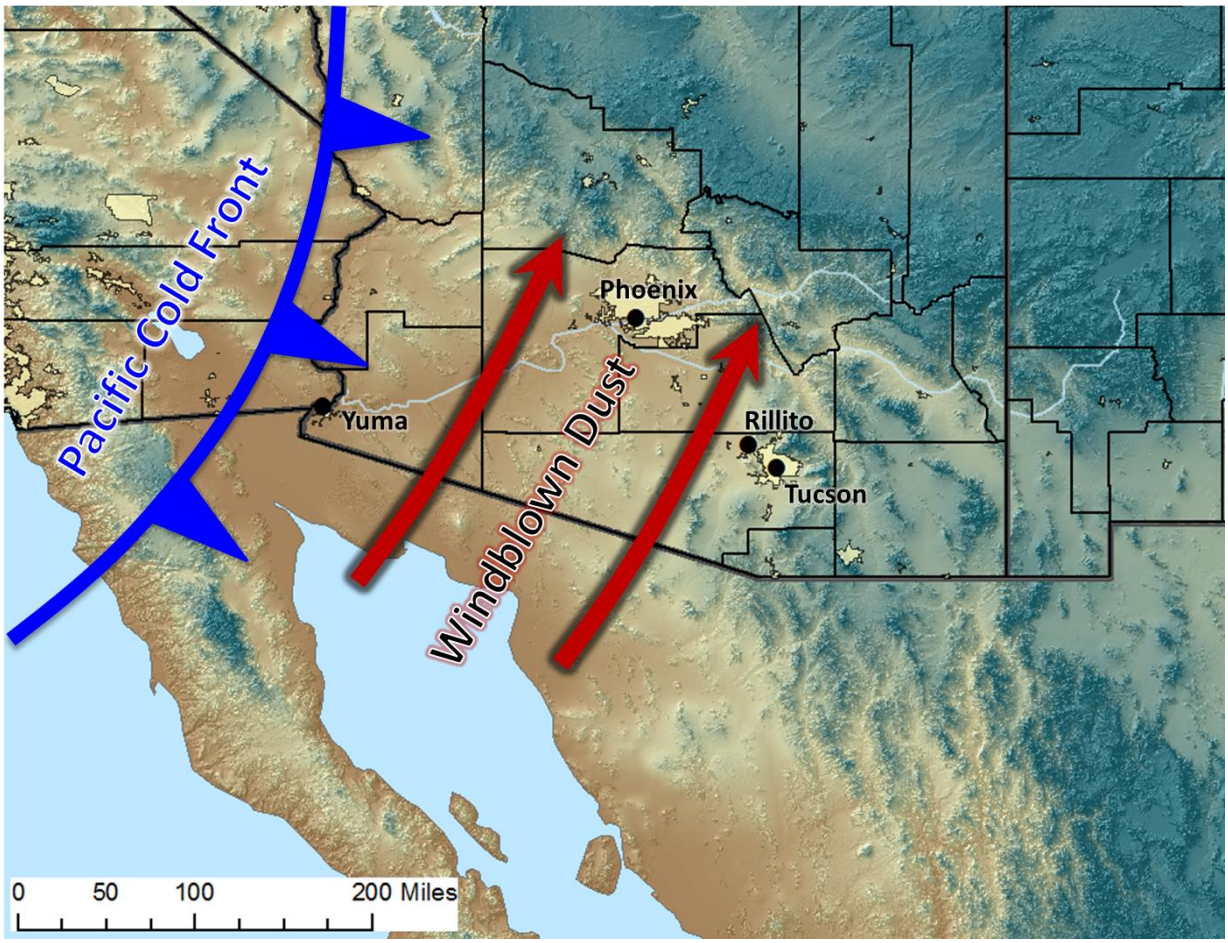

Figure 2-4. Strong southwesterly winds ahead of an approaching Pacific storm system transported dust into the Rillito area on February 19, 2011.

Table 2-1. PM_{10} measurements collected in Arizona on February 19, 2011. Data from the Rillito monitor are shown in **bold green**.

Monitor	Monitor Type	Operator	AQS Monitor ID	24-hr Avg PM_{10} ($\mu g/m^3$)	1-hr Max PM_{10} ($\mu g/m^3$)	Time of Max 1-hr PM_{10} (MST)	AQS Qualifier Flag
Apache County							
N/A	TEOM	WMAT	04-001-1003-81102-1	9	28	1700	
Gila County							
Hayden Old Jail	TEOM	ADEQ	04-007-1001-81102-3	211	861	1200	RJ
Maricopa County							
West Phoenix	BAM	MCAQD	04-013-0019-81102-1	41	303	1100	
Glendale	TEOM	MCAQD	04-013-2001-81102-1	28	168	1100	
Central Phoenix	TEOM	MCAQD	04-013-3002-81102-4	55	387	1000	
Greenwood	TEOM	MCAQD	04-013-3010-81102-1	44	355	1000	
South Phoenix	TEOM	MCAQD	04-013-4003-81102-1	62	387	1000	
West Chandler	TEOM	MCAQD	04-013-4004-81102-1	168	1933	1100	RJ
Higley	TEOM	MCAQD	04-013-4006-81102-1	127	1101	1200	
West 43rd Ave	TEOM	MCAQD	04-013-4009-81102-1	87	908	1100	
Dysart	TEOM	MCAQD	04-013-4010-81102-1	42	382	1000	
Buckeye	TEOM	MCAQD	04-013-4011-81102-1	36	295	1000	
Zuni Hills	TEOM	MCAQD	04-013-4016-81102-1	45	429	1100	
Durango Complex	TEOM	MCAQD	04-013-9812-81102-1	90	1036	1100	
JLG Supersite	BAM	ADEQ	04-013-9997-81102-3	32	221	1000	
JLG Supersite	TEOM	ADEQ	04-013-9997-81102-4	31	202	1100	
Navajo County							
N/A	TEOM	WMAT	04-017-1002-81102-1	20	104	1200	
Pima County							
Ajo	TEOM	ADEQ	04-019-0001-81102-3	13	34	0800	
Orange Grove	GRAV	PCDEQ	04-019-0011-81102-2	57	N/A	N/A	
Rillito	**TEOM**	**ADEQ**	**04-019-0020-81102-3**	**242**	**1988**	**1100**	**RJ**
South Tucson	GRAV	PCDEQ	04-019-1001-81102-1	60	N/A	N/A	
Green Valley	TEOM	PCDEQ	04-019-1030-81102-1	35	186	1600	
Geronimo	TEOM	PCDEQ	04-019-1113-81102-1	64	439	1200	

TEOM: Tapered Element Oscillating Microbalance
GRAV: Gravimetric Analysis
BAM: Beta Attenuation Monitor
FRM: Federal Reference Method
WMAT: White Mountain Apache Tribe
ADEQ: Arizona Department of Environmental Quality
MCAQD: Maricopa County Air Quality Department
PCDEQ: Pima County Dept of Environmental Quality
PCAQCD: Pinal County Air Quality Control District
RJ: data exclusion qualifier flag for high winds

Table 2-1. PM_{10} measurements collected in Arizona on February 19, 2011. Data from the Rillito monitor are shown in **bold green**.

Monitor	Monitor Type	Operator	AQS Monitor ID	24-hr Avg PM_{10} ($\mu g/m^3$)	1-hr Max PM_{10} ($\mu g/m^3$)	Time of Max 1-hr PM_{10} (MST)	AQS Qualifier Flag
Pinal County							
Casa Grande Downtown	TEOM	PCAQCD	04-021-0001-81102-3	165	N/A	N/A	RJ
Stanfield	TEOM	PCAQCD	04-021-3008-81102-3	311	N/A	N/A	RJ
Combs	TEOM	PCAQCD	04-021-3009-81102-3	170	N/A	N/A	RJ
Maricopa	TEOM	PCAQCD	04-021-3010-81102-3	181	N/A	N/A	RJ
Cowtown	TEOM	PCAQCD	04-021-3013-81102-3	364	N/A	N/A	RJ
Santa Cruz County							
Nogales Post Office	BAM	ADEQ	04-023-0004-81102-3	79	193	1600	
Yuma County							
Yuma Supersite	TEOM	ADEQ	04-027-8011-81102-3	11	41	0600	

TEOM: Tapered Element Oscillating Microbalance
GRAV: Gravimetric Analysis
BAM: Beta Attenuation Monitor
FRM: Federal Reference Method
WMAT: White Mountain Apache Tribe
ADEQ: Arizona Department of Environmental Quality
MCAQD: Maricopa County Air Quality Department
PCDEQ: Pima County Dept of Environmental Quality
PCAQCD: Pinal County Air Quality Control District
RJ: data exclusion qualifier flag for high winds

3. Causal Relationship

3.1 Discussion

Meteorological and air quality observations indicate that dust carried by gusty winds generated by a strong Pacific storm system and attendant cold front approaching Arizona was directly responsible for the high PM_{10} concentrations observed in Rillito on February 19, 2011 (**Figure 3-1**). A strong pressure gradient associated with this front led to the development of a prolonged period of widespread, gusty, southwesterly winds across much of southern Arizona, including the Rillito area. The likely source region for PM_{10} during the February 19, 2011, event was the vast Arizona desert region southwest of Rillito. This region consists largely of natural, undisturbed desert. The last time the Rillito area recorded any measurable rainfall leading up to the February 19, 2011, high-wind event was on December 30, 2010, when showers associated with a cold front produced 0.15 inches of rain at Tucson International Airport. This combination of geography and lack of rainfall preceding the event resulted in a large fetch of soils that were particularly vulnerable to particulate suspension.

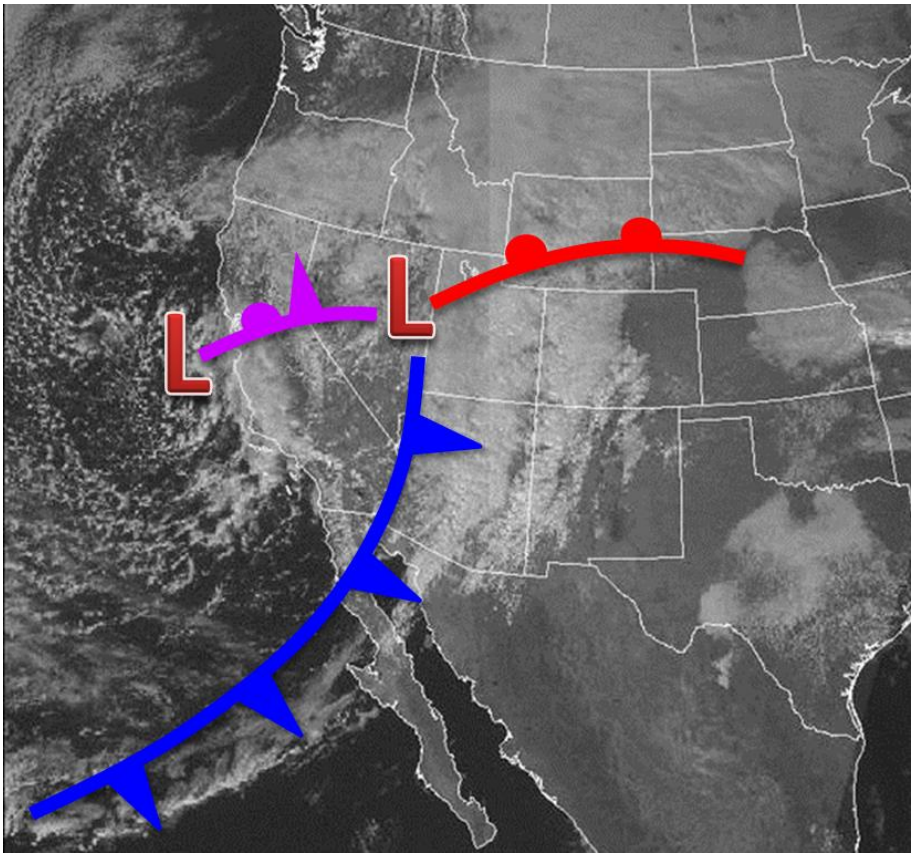

Figure 3-1. Visible satellite image from 15:00 Mountain Standard Time (MST) on February 19, 2011 (GOES-West). A cold front associated with a strong Pacific storm system was approaching Arizona. Strong southwesterly winds ahead of this front transported dust and PM_{10} into Rillito. "L" denotes the locations of surface low-pressure systems. The blue line indicates the location of the cold front.

The cold front produced widespread, gusty southwesterly winds across southern Arizona, affecting both the Phoenix and Tucson metropolitan areas. **Figures 3-2 through 3-4** illustrate wind, visibility, and PM_{10} data across Pima and Pinal counties before, during, and after the peak wind speeds and PM_{10} concentrations. At 07:00 MST, wind speeds throughout the region were generally light from the southeast and PM_{10} concentrations were below 50 $\mu g/m^3$. As the Pacific storm system moved into Arizona, winds rapidly increased from the southwest, with widespread gusts over 35 mph reported at 11:00 MST (Figure 3-3). This period coincided with the highest PM_{10} concentrations at the Rillito monitor and other monitors in the region. Visibilities down to 1 mile were also reported at the Casa Grande Airport (although visibilities of 10 miles were still reported in the Tucson area). As the storm system moved east, wind speeds and PM_{10} concentrations gradually decreased throughout the region (Figure 3-4). The National Weather Service in Tucson issued a Wind Advisory for Pima and Pinal counties, including Rillito, during this event (Appendix B). The advisory indicated that sustained winds of 25 to 35 mph, wind gusts of up to 50 mph, and blowing dust with reduced visibilities were expected. While south-southwesterly winds are favorable for transport of emissions from the nearby CalPortland cement factory to the Rillito monitor, the fact that strong winds, high PM_{10} concentrations, and low visibilities were observed regionwide indicates that the exceedance of the NAAQS recorded at the Rillito monitor was not directly attributable to local sources. South-southwesterly or southwesterly winds are not favorable for transport of emissions from the Silver Bell Mine (located about 20 miles west of Rillito). Furthermore, an evaluation of inspection and compliance reports indicates no evidence of unusual anthropogenic-based PM_{10} emissions in association with this event.

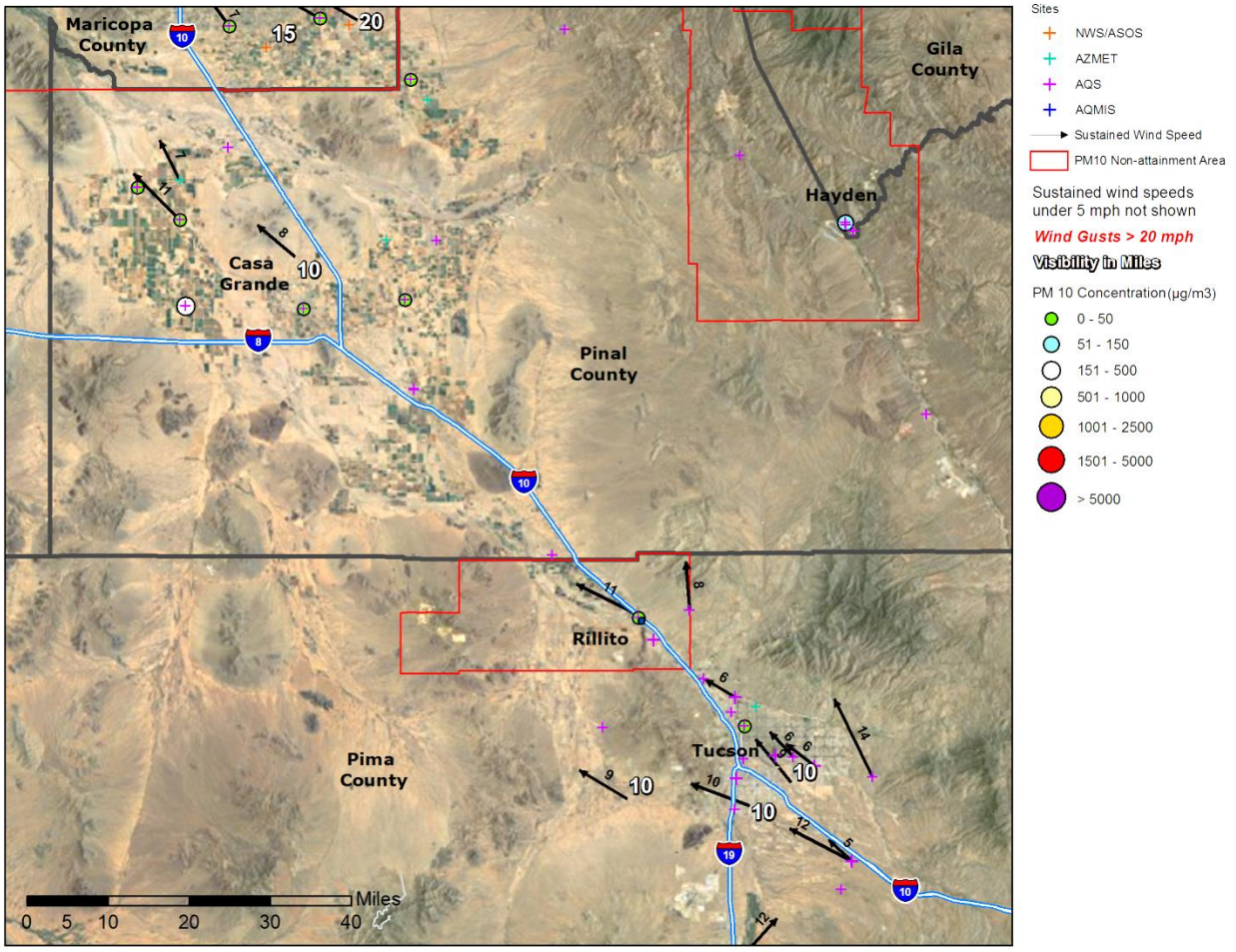

Figure 3-2. Hourly PM_{10} concentrations (colored circles), wind speed and direction (black arrows), and minimum visibility (white numbers) observations at Pima and Pinal county monitors between 07:00 and 08:00 MST on February 19, 2011. Winds were generally light, PM_{10} concentrations were low, and visibilities were high throughout the region at this time.

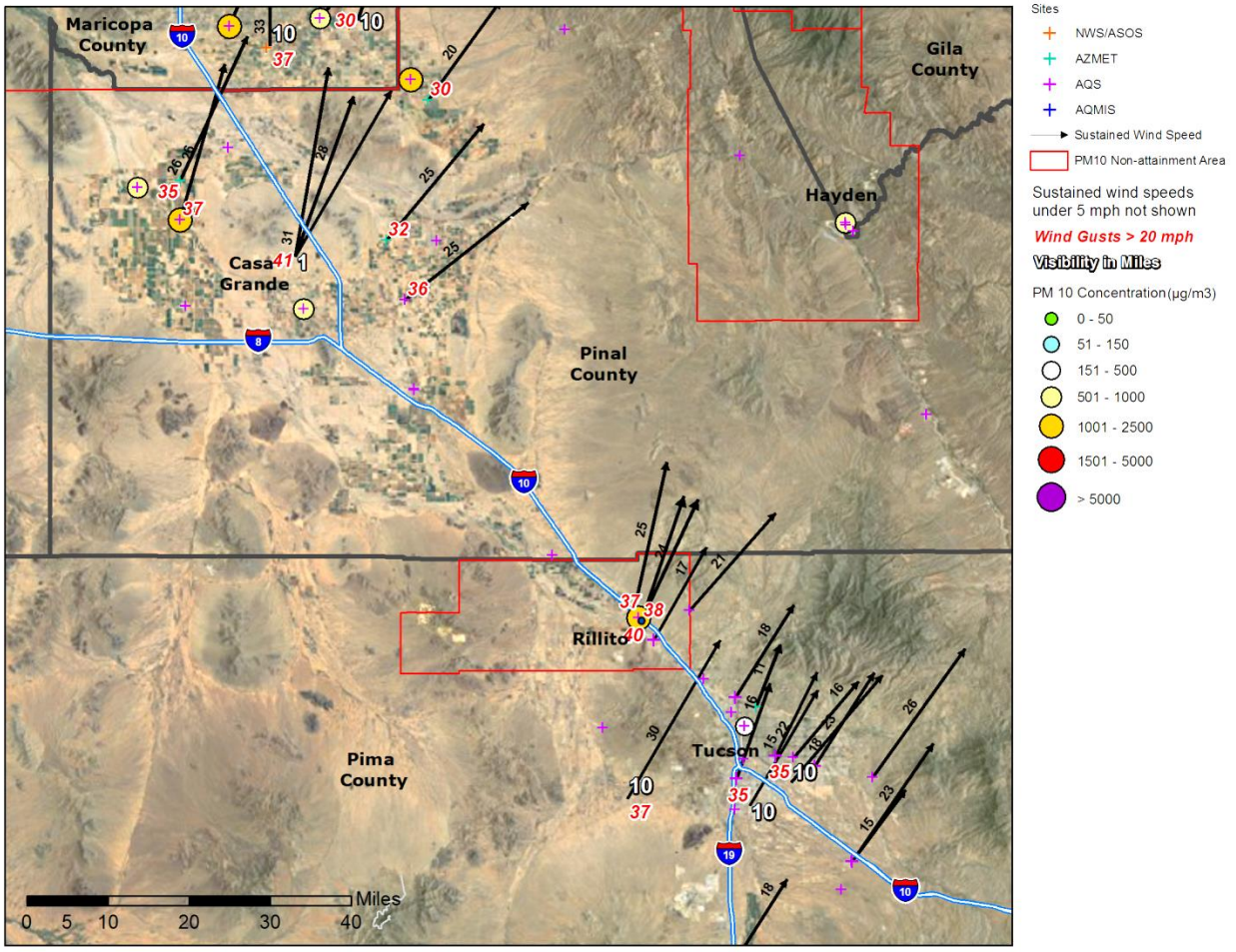

Figure 3-3. Hourly PM_{10} concentrations (colored circles), wind speed and direction (black arrows), maximum wind gusts (red numbers), and minimum visibility (white numbers) observations at Pima and Pinal county monitors between 11:00 and 12:00 MST on February 19, 2011. Strong southwesterly winds and high PM_{10} concentrations were reported throughout the region.

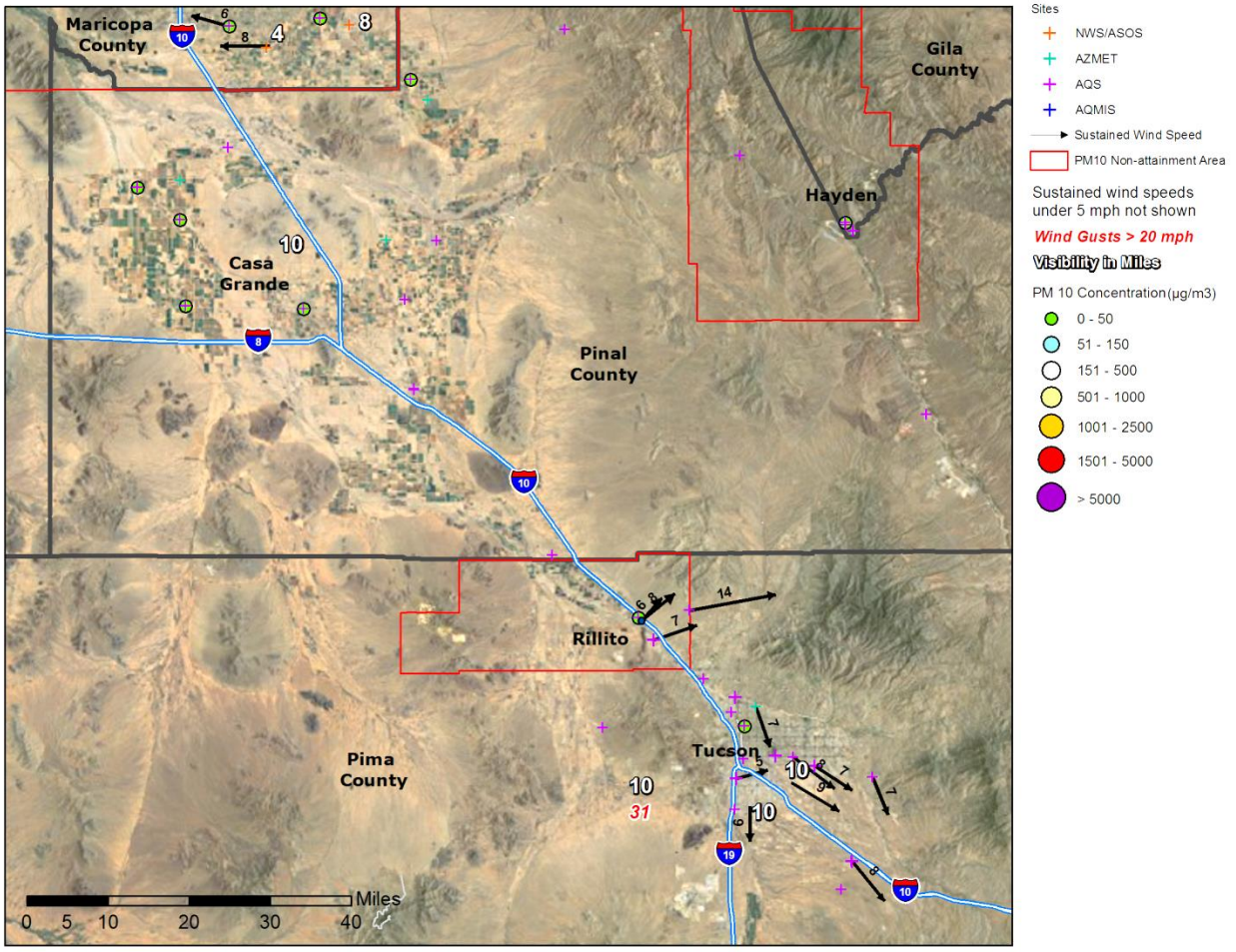

Figure 3-4. Hourly PM_{10} concentrations (colored circles), wind speed and direction (black arrows), maximum wind gusts (red numbers), and minimum visibility (white numbers) observations at Pima and Pinal county monitors between 20:00 and 21:00 MST on February 19, 2011. Wind speeds and PM_{10} concentrations throughout the region were much lower at this time compared to earlier in the day.

Gusty winds were reported regionwide for several hours during the late morning and afternoon on February 19. A summary of maximum sustained winds and peak wind gusts at monitors in Pinal and Pima counties is shown in **Table 3-1**, including a peak gust of 47 mph at Tucson International Airport and a peak gust of 40 mph at the Rillito monitor. Monitors in the Rillito area and surrounding areas showed a sharp increase in wind speeds coincident with a sharp increase in PM_{10} concentrations (**Figure 3-5, Figure 3-6,** and Appendix A). Visibility at the Casa Grande Airport (50 miles northwest from Rillito) also decreased significantly when high PM_{10} concentrations were reported at Rillito, illustrating the widespread nature of this event (**Figure 3-7**). Furthermore, blowing dust was reported at Tucson International Airport. The storm system eventually produced rain across southern Arizona, but the period of strongest winds preceded the rain by several hours. Thus, the rain was too late to effectively wet the surface soils and prevent lofting.

The NWS office in Tucson issued Short Term Forecasts and a Wind Advisory for the Rillito area about the potential for strong winds and reduced visibilities due to blowing dust during this event (Appendix B). The Short Term Forecasts specifically warned the public of reduced visibilities due to blowing dust along the Interstate 10 corridor near Marana.

Table 3-1. Peak observed wind speeds and wind gusts at Pima and Pinal county monitors on February 19, 2011. The Rillito monitor reported a 1-hr PM_{10} concentration of 1,988 µg/m^3 at 11:00 MST.

Monitor	Maximum Wind Speed (mph)	Wind Direction (degrees)	Time (MST)	Maximum Wind Gust (mph)	Time (MST)
Tucson Ryan Field	30	210	11:53	37	11:53
Casa Grande	31	200	11:55	44	11:55
Rillito	24	215	12:00	40	12:00
Marana	26	198	12:00	38	12:00
Tucson International Airport	27	210	12:53	47	12:53
Tucson Davis Monthan AFB	28	240	14:20	44	14:20

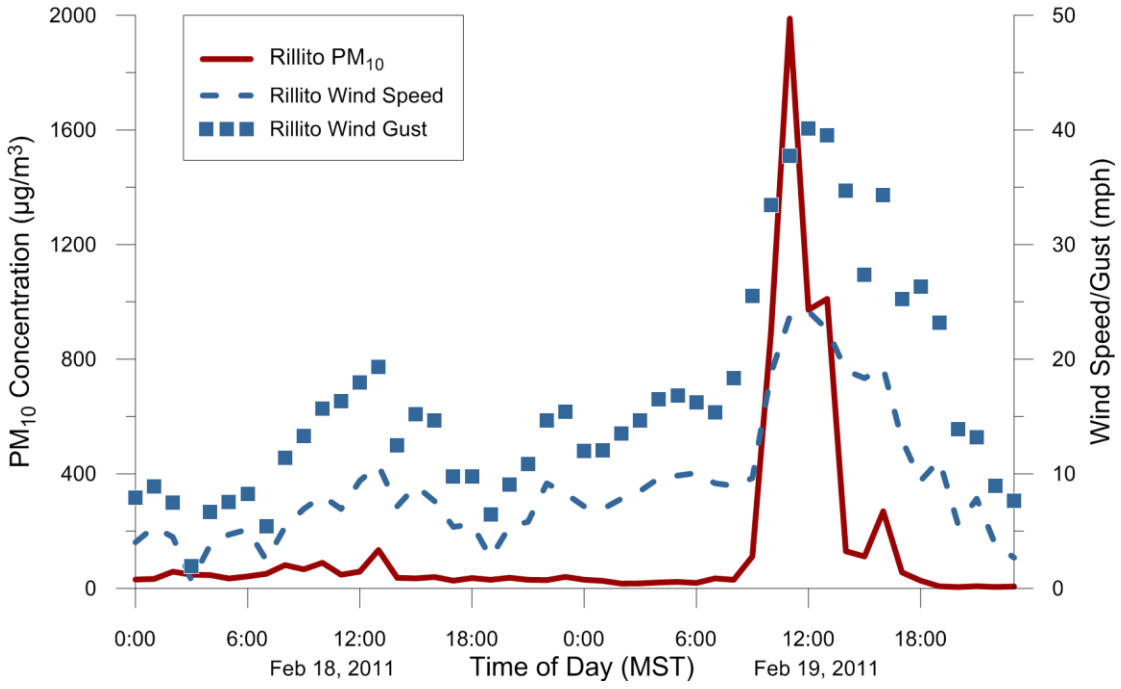

Figure 3-5. Hourly PM_{10} concentrations and wind speeds at the Rillito monitor on February 18 and 19, 2011. PM_{10} concentrations and wind speeds sharply increased at 10:00 MST on February 19, 2011, indicating the arrival of windblown dust.

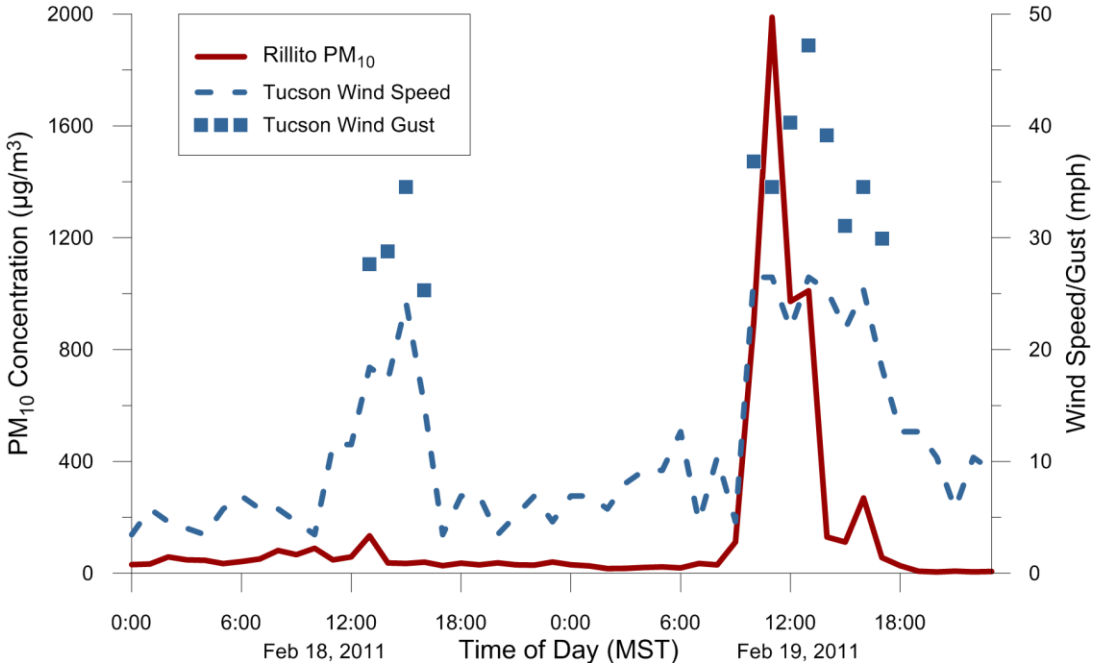

Figure 3-6. Hourly PM_{10} concentrations at the Rillito monitor and wind speeds at Tucson International Airport on February 18 and 19, 2011. PM_{10} concentrations and wind speeds sharply increased at 10:00 MST on February 19, 2011, indicating the arrival of windblown dust. Winds were briefly gusty in Tucson during the afternoon on February 18, 2011, but winds were lighter at Rillito (Figure 3-5); thus, PM_{10} concentrations at the Rillito monitor remained low.

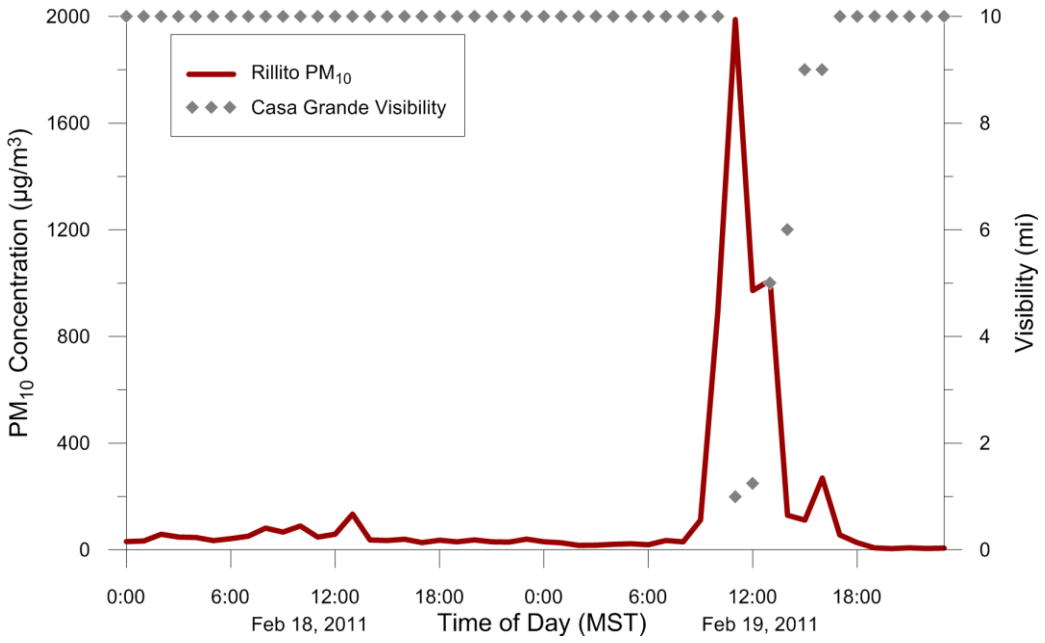

Figure 3-7. Hourly PM_{10} concentrations at the Rillito monitor and visibility at Casa Grande Airport on February 18 and 19, 2011. Visibility was greatly reduced coincident with the sharp increase in PM_{10} concentrations at the Rillito monitor, indicating the arrival of windblown dust.

3.2 Summary

The information presented in this section demonstrates a clear causal relationship between the windblown dust and the PM_{10} exceedance measured at the Rillito monitor on February 19, 2011. The PM_{10}, wind, and visibility data shown in this section illustrate the spatial and temporal location of the dust storm as it moved through southern Arizona. Strong southwesterly winds likely lofted large amounts of dust and PM_{10} into the lower atmosphere. This dust likely originated in open desert areas southwest of Rillito and blew into Rillito ahead of an approaching Pacific storm system. In addition, the time-series plots of air quality and meteorological data found in this section and in Appendix A show that the sharp increase in PM_{10} concentrations coincided with the onset of strong southwesterly winds, and that the strong winds were experienced over a large area. Finally, PM_{10} concentrations at the Rillito monitor were low immediately before and after the period of strong winds associated with this event.

4. Historical Norm

4.1 Analysis

PM_{10} concentrations measured at the Rillito monitor on February 19, 2011, were unusual and in excess of normal historical fluctuations. Time-series plots of the 24-hr average PM_{10} concentrations for the period January 1, 2007, through December 31, 2011, provide a historical perspective of PM_{10} concentrations at Rillito (**Figure 4-1**). The 24-hr average PM_{10} concentration on February 19, 2011, is the highest daily average measured at Rillito during this five-year period. (Please note that prior to April 1, 2010, the Rillito monitor operated on a one-in-six day schedule.)

Historical daily cumulative distributions of the 24-hr average PM_{10} concentrations were created for the Rillito monitor for the same five-year data set to provide additional evidence in establishing the severity of this event. **Figure 4-2**, a histogram of 24-hr average PM_{10} concentrations at the Rillito monitor, shows that the concentration on February 19, 2011, was three times higher than the 95th percentile. Concentrations in excess of the 95th percentile are considered to be unusual.[2]

4.2 Summary

Given the recorded values and using a methodology similar to the one accepted by EPA, it is clear that the PM_{10} concentrations observed at the Rillito monitor on February 19, 2011, were well above normal historical fluctuations. This analysis provides evidence that the event affected air quality on a historic scale.

[2] Excluding days on which concentrations caused by exceptional events exceed the 95th percentile threshold employs a general test of statistical significance and has the effect of ensuring that such concentrations would clearly fall beyond the range of normal expectations for air quality during a particular time of year. Source: "The Treatment of Data Influenced by Exceptional Events," 71 FR 12598.

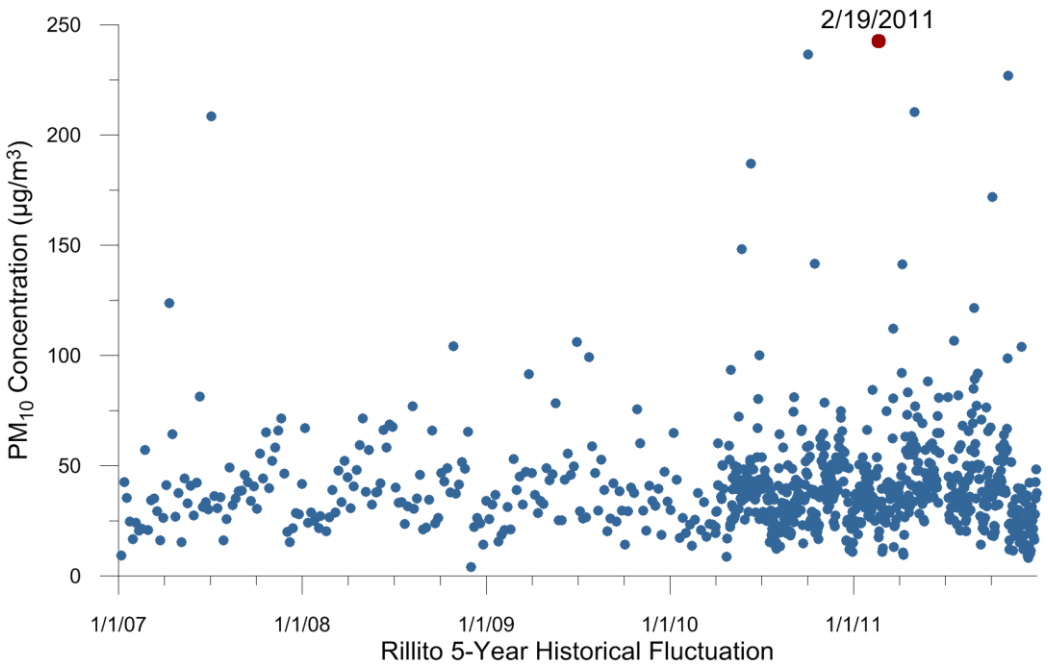

Figure 4-1. 24-hr average PM_{10} concentrations at the Rillito monitor (2007-2011). The 24-hr average PM_{10} concentration on February 19, 2011, is highlighted in red. Prior to April 1, 2010, the Rillito monitor operated on a one-in-six day schedule.

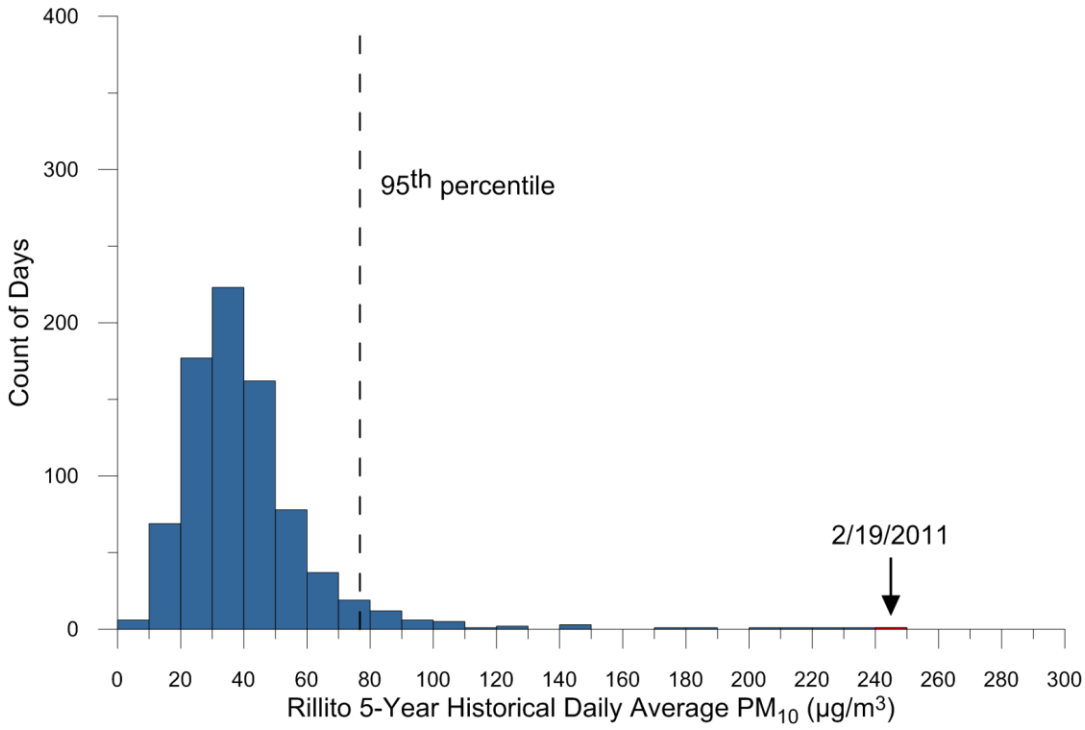

Figure 4-2. 24-hr average PM_{10} concentrations at the Rillito monitor for 2007-2011. The 24-hr average PM_{10} concentration on February 19, 2011, was far in excess of the 95th percentile. The value is also above the 95th percentile when only the continuous data since April 1, 2010, are considered.

5. Not Reasonably Controllable or Preventable

5.1 Background

Rillito was designated as a moderate PM_{10} nonattainment area by operation of the 1990 CAA. In 2006, following several years of improved air quality, EPA determined that the RNA had met the PM_{10} NAAQS and issued a clean data finding for the RNA. EPA's Clean Data Policy relieves the state of Arizona from certain demonstrations of attainment because qualifying for a clean data finding indicates that attainment has already been achieved. This section of the exceptional events demonstration describes the RACM implemented to bring the RNA into attainment and maintain attainment status.

5.1.1 Control Measures

Details of the RACM implemented in the RNA can be found in the *2008 RNA PM_{10} LMP and Request for Redesignation to Attainment*. The 1994 SIP submitted to EPA contained a series of control measures designed to mitigate PM_{10} emissions. Since then, the RNA has become more urbanized and less agricultural. Thus, some of the control measures included in the 1994 SIP have been discontinued or were one-time actions. **Table 5-1** provides the status of these measures.

Table 5-1. Status of control measures implemented in the RNA from the 1994 Rillito PM_{10} SIP.

Control Measure	Details	Current Status
1. CalPortland cement plant and quarry operations	Comprehensive road stabilization plan to mitigate emissions.	In effect, included in the CPC operating permit issued October 7, 2003
2. Pima County Grading Ordinance, Chapter 18.81 of the Pima County Zoning Code (January 2001)	Permits for earth moving require stabilization to mitigate fugitive emissions.	In effect
3. Bank stabilization of the Santa Cruz River	One-time control measure implemented in 1988 during the development of nearby residential neighborhoods.	Complete
4. Reduced tillage program	United States Department of Agriculture (DOA) pilot program.	Discontinued by U.S. DOA
5. Dust stabilization – Rillito community	Approximately one mile total of dirt road segments within the community are now paved.	Complete
6. Avra Valley road shoulder dust stabilization	Once per year, 2.5 miles of road shoulders undergo blading and rolling, followed by application of magnesium chloride.	In effect on an as-needed basis

The implementation of these control measures helped bring the RNA into timely attainment of the 24-hr standard; thus, the measures meet the CAA requirement for RACM for moderate PM_{10} nonattainment areas. In addition to these RACM, the Arizona Department of Transportation's (ADOT) Standard Specification Section 810 mandates that state contractors use a comprehensive series of control measures designed to mitigate airborne PM_{10} emissions during road construction projects.

5.1.2 Permanent and Enforceable Control Measures

The CAA requires that all types of maintenance plans demonstrate that measures credited with bringing an area into attainment are federally enforceable and continue into the future. Measures 1, 2, and 6 in Table 5-1 meet these requirements. Measure 4 was discontinued by the U.S. DOA and was not replaced, and measures 3 and 5 are no longer necessary because the affected public roadways have since been paved.

New major emissions sources or major modifications to existing sources in nonattainment areas are subject to AAC R18-2-403 (*Permits for Sources Located in Nonattainment Areas*). After an area is redesignated, AAC R18-2-406 (*Permit Requirements for Sources Located in Attainment and Unclassifiable Areas*) will apply for any major source(s) within the maintenance area.

5.1.3 Contingency Measures

Section 175A of the CAA requires a maintenance plan's contingency provisions to be enacted should a violation of the PM_{10} standard occur following redesignation to attainment. EPA's memo, *Limited Maintenance Plan Option for Moderate PM_{10} Nonattainment Areas* (Lydia Wegman, August 9, 2001),[3] states that contingency measures do not have to be fully adopted at the time of redesignation, but that the LMP should identify measures to be implemented if necessary.

The state commits to act promptly if an exceedance of the area's design value occurs following redesignation to attainment. Specifically, the state commits to determine that an exceedance has occurred within six months of the end of the calendar year in which that exceedance occurred. The state also commits to identify and implement the appropriate control measure(s) needed to remedy the situation by the end of the same calendar year.

A redesignated area with an LMP is also required to annually recalculate the average design value for the area to determine whether the area has continued to qualify for an LMP. If, after performing the annual recalculation, the state determines that the area no longer qualifies for an LMP, the state will commit to take actions to reduce PM_{10} concentrations sufficiently to requalify for an LMP, or will prepare a Maintenance Plan.

[3] The EPA memo regarding the LMP option for Moderate PM_{10} Nonattainment Areas can be found at http://www.epa.gov/ttn/oarpg/t1/memoranda/lmp_final.pdf.

5.1.4 Contingency Measure Trigger

The state will consider implementing the contingency measures featured in **Table 5-2** should an exceedance of the critical design value (CDV) occur. In order to prevent an exceedance from occurring, ADEQ opted to identify a specific indicator, or trigger, if PM_{10} concentrations reach a level that signals an imminent exceedance. The trigger will be used by ADEQ to determine the need to implement contingency measures in order to prevent an exceedance.

Table 5-2. Rillito area contingency control measures.

Contingency Control Measure	Implementing Entity
1. If any PM_{10} generating source within the maintenance area is found to be contributing to monitored readings above the LMP allowable limits, ADEQ will review existing air quality permits and/or applicable rules to identify additional control measures that may be needed. If a PM_{10} source does not have a permit, ADEQ will determine whether a permit and PM_{10} controls are needed.	ADEQ
2. Review and revise dust control measures for material storage piles to determine whether additional action is needed.	ADEQ
3. Pave any new unpaved public roads, vacant lots, and unpaved parking lots located in the PM_{10} maintenance area subject to limits of statutory authority.	Pima County
4. Review and, if necessary, revise existing grading ordinances.	Pima County
5. Reduce PM by paving or stabilizing unpaved or unimproved shoulders and alleys.	Pima County and Town of Marana
6. Review and, if necessary, revise standards for installation and maintenance of landscaping and screening.	Pima County
7. Review and, if necessary, revise roadway maintenance practices following exceptional events.	Pima County

Per the LMP submitted in 2008, contingency measures will be considered if ambient concentrations reach 95% of the CDV. The current CDV for the RNA is 135 $\mu g/m^3$. The causes that activated the trigger will help the state to determine the appropriate contingency measure(s) to be implemented. ADEQ believes that identifying a trigger, although not required, will increase protection of public health and help assure that the area continues to qualify for an LMP.

5.1.5 Conformity

The Transportation Conformity Rule (40 CFR Parts 51 and 93) and General Conformity Rule (58 FR 63214; November 30, 1993) apply to nonattainment areas and maintenance areas operating under maintenance plans. Under transportation conformity rules, one way to demonstrate conformity is to indicate that expected emissions from planned actions are

consistent with the emissions budget for the area. Emissions budgets in LMP areas can be treated as essentially non-constraining for the length of the maintenance period because it is unreasonable to expect that an LMP area would experience so much growth during that period of time that a violation of the PM_{10} NAAQS would result. This does not exempt an LMP area from the need to affirm conformity, but it does allow the area to demonstrate conformity without following certain requirements. For transportation conformity purposes, EPA would most likely conclude that emissions in these areas do not require a cap for the duration of the maintenance period and, therefore, that a regional emissions analysis will not be required.

General conformity requires that non-transportation-based projects in areas that have nonattainment or maintenance plans submit a description of the project to the state. The description must show either that the project will not increase the relevant emissions for the area, or that specific control measures will be applied for the duration of the project in order to prevent increased emissions.

5.1.6 Review of Source-Permitted Inspections and Public Complaints

ADEQ's Arizona Unified Repository for Information Tracking of the Environment (AZURITE) database was queried to compile a list of inspections for the permitted sources in the Rillito area around the time of the February 19, 2011, PM_{10} exceedance. An evaluation of all inspection reports, air quality complaints, compliance reports, and other documentation indicate no evidence of unusual anthropogenic-based PM_{10} emissions.

5.2 Forecasts and Warnings

Dust forecasts were released prior to the event by both ADEQ and the NWS office in Phoenix (Appendix B). The ADEQ Forecast issued on February 18, 2011, stated that gusty southwesterly winds were expected due to the approaching cold front, but that sufficient rain would fall to prevent widespread blowing dust issues. However, gusty winds preceded the rain by several hours, allowing for areas of blowing dust. The NWS issued a Wind Advisory warning of the potential for strong winds with sustained wind speeds of between 25 and 35 mph, wind gusts of up to 50 mph, and reduced visibilities due to windblown dust throughout Pima and Pinal counties, including Rillito, on February 19, 2011.

5.3 Wind Observations

Sustained wind speeds of up to 24 mph and wind gusts of up to 40 mph were reported at the Rillito monitor during this windblown dust event. Sustained wind speeds of up to 30 mph and wind gusts of up to 47 mph were reported at nearby monitors in the Tucson area. Wind speeds of over 25 mph are normally sufficient to overcome most PM_{10} control measures.

5.4 Summary

The weather and air quality forecasts and warnings outlined in this section demonstrate that strong winds ahead of an approaching Pacific storm system caused uncontrollable PM_{10} emissions. The RACM outlined in the Rillito PM_{10} Maintenance Plan were in place at the time of

the event. These control measures are required for areas such as Rillito that are designated as moderate non-attainment for PM_{10}. Thus, the RACM in place at the time of the event were reasonable. In addition, surface wind measurements in the immediate Rillito area during the event were high enough (wind gusts of up to 40 mph) that most reasonable PM_{10} control measures would have been overwhelmed.

6. But-For Analysis

6.1 Discussion

Section 50.14(c)(3)(iv)(D) in 40 CFR Part 50 requires that an exceptional event demonstration satisfies 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, in regard to the PM_{10} exceedance at the Rillito monitor on February 19, 2011,

- the exceedance was not reasonably controllable or preventable, and
- there was a clear causal relationship between PM_{10} transported by strong southwesterly winds originating in desert areas outside the Rillito Nonattainment Area and the measured PM_{10} exceedance in Rillito.

The weight of evidence in these sections demonstrates that, but for the existence of dust emissions generated by strong southwesterly winds ahead of a Pacific storm system, and the associated transport of PM_{10}, there would have been no exceedance of the NAAQS for 24-hr average PM_{10}.

As shown in Section 3, time-series plots of PM_{10} and wind speeds establish a clear causal relationship between the arrival of dust-laden winds and elevated PM_{10} concentrations at the Rillito monitor. Multiple independent measurements of wind speed, wind direction, and visibility all point to the presence of southwesterly winds as the mechanism for transport of PM_{10} into the RNA. Elevated PM_{10} concentrations and gusty winds were also reported in neighboring counties, illustrating the regional nature of this event. In addition, PM_{10} concentrations were well below the NAAQS on days immediately before and after the windblown dust event. The source regions for the PM_{10} are clearly identified as open desert southwest of the RNA. The weight of evidence presented in this submittal provides no alternative that could tie the exceedance of February 19, 2011, to any causal source except PM_{10} transported by southwesterly winds, confirming that there would have been no exceedance but for the presence of these uncontrollable natural events.

As detailed in Section 5, all reasonable control measures were in place and/or implemented on a continual basis. Air quality-related inspection and compliance data revealed no violations or complaints in the three days before and after the event. Local regulatory agencies, industry, and the general public were alerted to the possibility of dust storms due to strong winds ahead of an approaching Pacific storm system via daily forecasts and media reports.

6.2 Summary

The weight of evidence presented in this submittal provides no alternative that could tie the exceedance of February 19, 2011, to any causal source except PM_{10} transported by strong southwesterly winds, confirming that there would have been no exceedance but for the presence of these uncontrollable natural events.

7. Conclusions

The PM_{10} exceedance that occurred on February 19, 2011, satisfies the criteria of the EER, which states that in order to justify the exclusion of air quality monitoring data, evidence must be provided for the following elements:

1. The event satisfies the criteria set forth in 40 CFR 50.1(j) that
    a. the event affected air quality,
    b. the event was not reasonably controllable or preventable, and
    c. the event was caused by human activity unlikely to recur in a particular location or was a natural event;
2. There is a clear causal relationship between the measurement(s) under consideration and the event;
3. The event is associated with a measured concentration(s) in excess of normal historical fluctuations; and
4. There would have been no exceedance or violation but for the event.

7.1 Affects Air Quality

As stated in the preamble to the EER, 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 2, 3, 4, and 5, we can reasonably conclude that the event in question affected air quality.

7.2 Not Reasonably Controllable or Preventable

Section 50.1(j) of 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 the Rillito PM_{10} Nonattainment Area, high winds overwhelmed all reasonably available controls. The PM_{10} exceedance discussed in this report was caused by naturally occurring southwesterly winds that transported dust into Rillito from areas largely outside the Rillito PM_{10} Nonattainment Area. These facts provide strong evidence that the PM_{10} exceedance on February 19, 2011, was not reasonably controllable or preventable.

7.3 Natural Event

As discussed above, the PM_{10} exceedance in Rillito on February 19, 2011, was caused by transport of PM_{10} into Rillito by strong southwesterly winds ahead of a Pacific storm system. The event therefore qualifies as a natural event.

7.4 Clear Causal Relationship

The following points demonstrate that the high PM_{10} concentrations were caused by windblown dust:

- Time-series plots of PM_{10} concentrations show that the timing of high PM_{10} concentrations at the Rillito monitor was consistent with gusty winds at Rillito-area meteorological stations and low visibilities at Casa Grande (Section 3).
- High PM_{10} concentrations and gusty winds were reported at other monitors in southern Arizona, illustrating the regional, uncontrollable nature of this event (Section 3).
- PM_{10} concentrations were well below the NAAQS on days immediately before and after the windblown dust event (Section 3).
- Dry conditions preceding the event resulted in soils that were particularly susceptible to particulate suspension by high winds (Section 3).

7.5 Historical Norm

The 24-hr average PM_{10} values measured at the Rillito monitor were historically unusual compared to a multi-year data set (Section 4).

7.6 But For

On the basis of the weight of evidence described above and in Section 6, the exceedance of the federal 24-hr PM_{10} standard on February 19, 2011, at the Rillito monitor would not have occurred but for the strong southwesterly winds that transported dust from open desert areas southwest of Rillito into the Rillito PM_{10} Nonattainment Area.

Appendix A:
Air Quality and Meteorological Data for the Rillito Area

This section contains time-series of air quality and meteorological data for Rillito and other regional monitors on February 19, 2011. The data show a regionwide increase in wind speeds and wind gusts coincident with the arrival of dust and high PM_{10} concentrations.

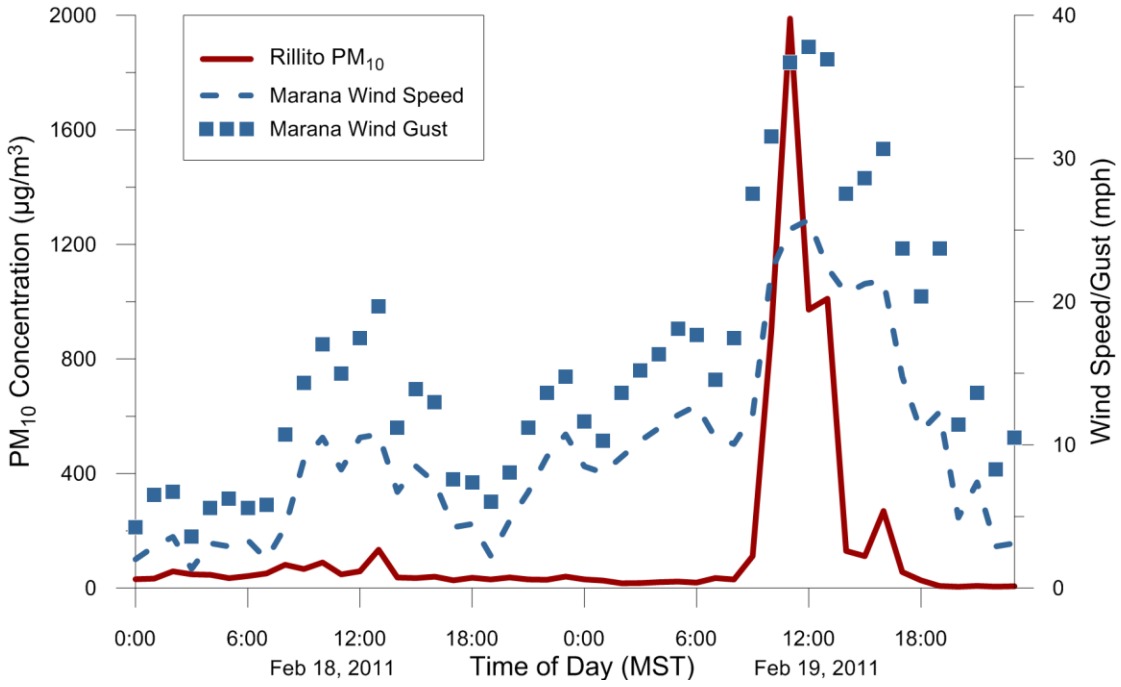

Figure A-1. Hourly PM_{10} concentrations at the Rillito monitor and wind speeds at the Marana monitor on February 18 and 19, 2011. PM_{10} concentrations and wind speeds sharply increased at 10:00 MST on February 19, 2011, indicating the arrival of windblown dust.

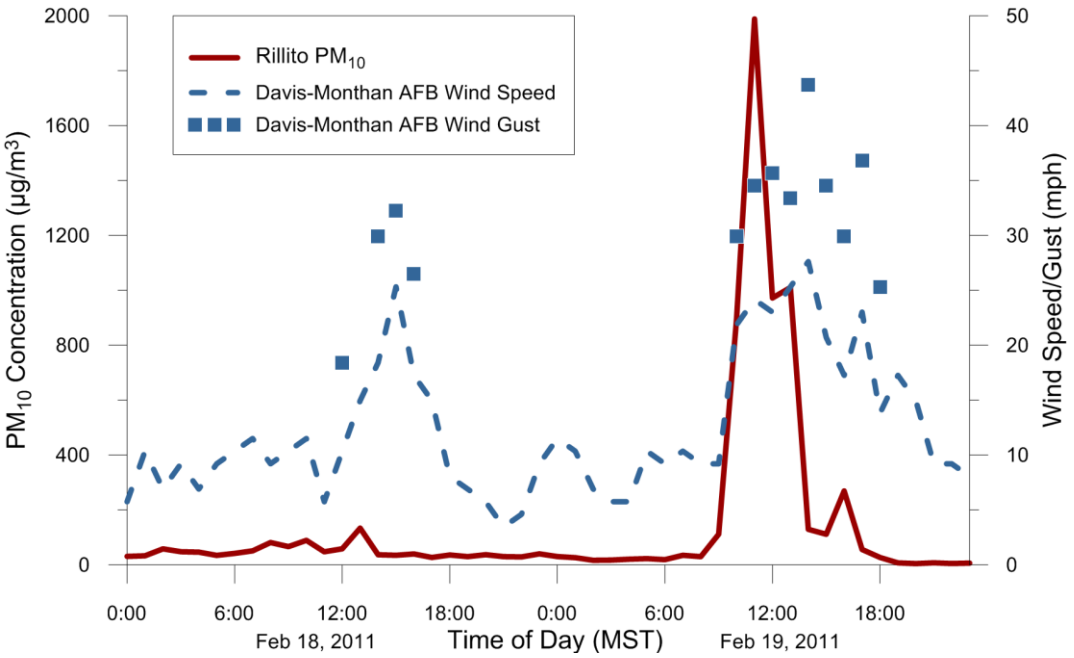

Figure A-2. Hourly PM_{10} concentrations at the Rillito monitor and wind speeds at the Davis-Monthan AFB Airport monitor on February 18 and 19, 2011. PM_{10} concentrations and wind speeds sharply increased at 10:00 MST on February 18, 2011, indicating the arrival of windblown dust.

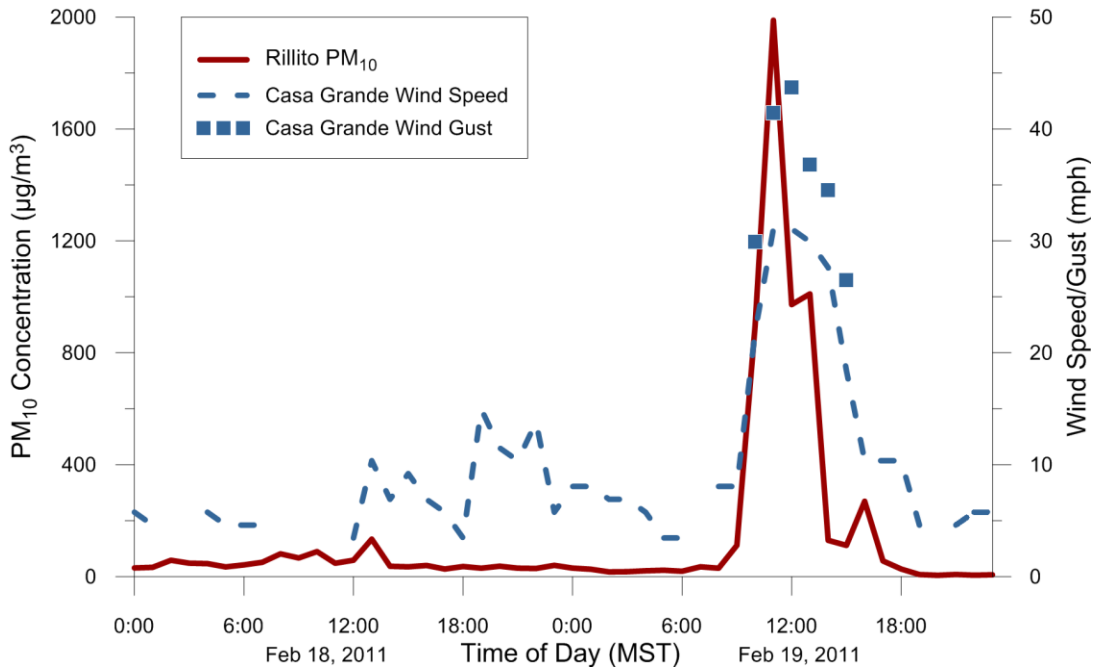

Figure A-3. Hourly PM_{10} concentrations at the Rillito monitor and wind speeds at the Casa Grande Airport monitor on February 18 and 19, 2011. PM_{10} concentrations and wind speeds sharply increased at 10:00 MST on February 18, 2011, indicating the arrival of windblown dust.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)
HOURLY OBSERVATIONS TABLE
TUCSON INTERNATIONAL AIRPORT (23160)
TUCSON, AZ (02/19/2011)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 2549 ft. above sea level
Latitude: 32.131
Longitude: -110.955
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
19	0053	11	FEW120	10.00		58	14.4	46	7.6	32	0.0	37	7	130		27.37			29.94	AA		30.04
19	0153	11	SCT120	10.00		59	15.0	46	7.9	32	0.0	36	6	120		27.35			29.92	AA		30.02
19	0253	11	OVC120	10.00		57	13.9	46	7.5	33	0.6	40	8	140		27.33			29.90	AA		30.00
19	0353	11	BKN110	10.00		57	13.9	46	7.7	34	1.1	42	9	140		27.31			29.89	AA		29.98
19	0453	11	OVC110	10.00		57	13.9	47	8.2	36	2.2	46	9	140		27.30			29.88	AA		29.97
19	0553	11	FEW120	10.00		58	14.4	47	8.4	36	2.2	44	13	150		27.29			29.87	AA		29.96
19	0653	11	CLR	10.00		56	13.3	46	7.9	36	2.2	47	5	140		27.28			29.87	AA		29.95
19	0753	11	CLR	10.00		61	16.1	49	9.2	36	2.2	39	10	110		27.28			29.87	AA		29.95
19	0853	11	CLR	10.00		65	18.3	50	10.0	35	1.7	33	5	040		27.28			29.86	AA		29.95
19	0937	11	CLR	10.00		70	21.0	52	10.9	34	1.0	27	21	190	34	27.27			M	SP		29.94
19	0953	11	CLR	10.00		71	21.7	52	11.2	34	1.1	26	26	200	37	27.27			29.83	AA		29.93
19	1053	11	CLR	10.00		73	22.8	53	11.6	34	1.1	24	26	200	34	27.26			29.83	AA		29.92
19	1153	11	CLR	10.00		75	23.9	54	12.1	34	1.1	22	22	210	40	27.26			29.82	AA		29.92
19	1253	11	FEW110	5.00		74	23.3	53	11.9	34	1.1	23	26	210	47	27.24			29.80	AA		29.90
19	1353	11	SCT100	10.00	BLDU	74	23.3	53	11.9	34	1.1	23	25	230	39	27.22			29.78	AA		29.88
19	1453	11	BKN095	10.00	BLDU	72	22.2	53	11.4	34	1.1	25	22	230	31	27.21			29.77	AA		29.87
19	1553	11	CLR	10.00	BLDU	71	21.7	53	11.4	35	1.7	27	25	230	34	27.21			29.78	AA		29.87
19	1653	11	FEW090	10.00	BLDU	68	20.0	52	10.9	36	2.2	31	18	250	30	27.22			29.80	AA		29.88
19	1753	11	FEW095 SCT110	10.00	BLDU	59	15.0	51	10.6	44	6.7	58	13	290		27.24			29.83	AA		29.90
19	1853	11	BKN100	10.00		54	12.2	49	9.6	45	7.2	72	13	300		27.27			29.88	AA		29.94
19	1953	11	FEW026 BKN031 OVC043	10.00		55	12.8	50	9.8	45	7.2	69	10	330		27.29			29.90	AA		29.96
19	2053	11	FEW029 BKN050	10.00		55	12.8	48	8.8	41	5.0	59	6	VR		27.30			29.90	AA		29.97
19	2153	11	BKN039 OVC047	10.00		55	12.8	47	8.3	39	3.9	55	10	270		27.30			29.88	AA		29.97
19	2253	11	BKN043 BKN055	10.00		55	12.8	47	8.3	39	3.9	55	9	270		27.30			29.88	AA		29.97
19	2353	11	SCT045 BKN055 BKN085	10.00		54	12.2	46	7.8	38	3.3	55	7	310		27.30			29.88	AA		29.97

Figure A-4. Quality-controlled local climatological data hourly observations table for Tucson International Airport, Tucson, Arizona (02/19/2011). Note in the Weather Type column that blowing dust (BLDU) was reported during the afternoon hours coincident with strong southwesterly winds, indicating the presence of windblown dust. Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)
HOURLY OBSERVATIONS TABLE
DAVIS-MONTHAN AFB AIRPORT (23109)
TUCSON, AZ (02/19/2011)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 2704 ft. above sea level
Latitude: 32.166
Longitude: -110.883

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
19	0055	0	BKN120 OVC150	10.00		62	16.8	49	9.2	35	1.4	37	10	150		27.20			29.91	AA		30.02
19	0155	0	OVC130	10.00		61	15.9	49	9.2	36	2.1	39	7	170		27.19			29.90	AA		30.01
19	0255	0	SCT120 OVC150	10.00		59	14.8	48	8.7	36	2.1	42	6	170		27.16			29.88	AA		29.98
19	0355	0	OVC140	10.00		57	14.1	46	7.9	35	1.5	44	6	170		27.16			29.86	AA		29.97
19	0455	0	OVC150	10.00		59	14.8	48	8.9	37	2.8	44	10	160		27.15			29.87	AA		29.96
19	0555	0	BKN130 OVC150	10.00		58	14.2	48	8.6	37	2.7	46	9	160		27.14			29.86	AA		29.95
19	0655	0	FEW130 SCT150	10.00		58	14.5	48	8.6	37	2.8	46	10	140		27.12			29.86	AA		29.93
19	0755	0	CLR	10.00		60	15.7	48	8.9	36	2.4	41	9	140		27.13			29.87	AA		29.94
19	0855	0	FEW170	10.00		67	19.3	51	10.4	35	1.4	31	9	190		27.13			29.86	AA		29.94
19	0955	0	CLR	10.00		71	21.6	52	11.2	34	1.0	26	22	200	30	27.11			29.83	AA		29.92
19	1055	0	CLR	10.00		73	22.5	53	11.6	34	1.3	24	24	190	34	27.09			29.81	AA		29.90
19	1155	0	CLR	10.00		74	23.2	54	12.0	35	1.8	24	23	220	36	27.10			29.80	AA		29.91
19	1255	0	FEW095	10.00		73	22.9	53	11.8	35	1.6	25	25	230	33	27.07			29.77	AA		29.88
19	1355	0	FEW100 SCT120	10.00		73	22.5	53	11.8	35	1.8	25	25	240	37	27.05			29.75	AA	0.14	29.86
19	1420	0	SCT090	8.00	-DZ	72	22.0	53	11.8	36	2.0	27	28	230	44	27.05			29.77	AA	0.06	29.86
19	1441	0	FEW080 SCT090	10.00		70	21.0	52	11.3	36	2.0	29	21	220	31	27.04			29.76	AA	0.06	29.85
19	1450	0	FEW075	10.00	-DZ	72	22.0	53	11.8	36	2.0	27	18	240	34	27.04			29.75	AA	0.06	29.85
19	1455	0	FEW075 SCT095	10.00	-DZ	71	21.5	53	11.5	36	2.0	28	21	230	32	27.04			29.76	AA	0.06	29.85
19	1459	0	FEW080 SCT100	10.00		70	21.0	52	11.3	36	2.0	29	21	260	32	27.04			29.75	AA	0.06	29.85
19	1555	0	FEW085 SCT140	10.00		70	21.0	52	11.3	36	2.0	29	17	250	30	27.04			29.76	AA	T	29.85
19	1655	0	FEW120	10.00		67	19.6	51	10.6	36	2.2	32	23	240	37	27.05			29.78	AA		29.86
19	1755	0	BKN090 OVC110	10.00		61	16.1	52	11.0	44	6.5	54	14	300	25	27.08			29.83	AA	0.01	29.89
19	1855	0	FEW060 BKN095 OVC110	10.00		54	12.4	49	9.6	45	7.4	72	17	340		27.11			29.88	AA		29.92
19	1955	0	BKN047 OVC085	10.00		53	11.8	48	9.0	44	6.8	72	15	340		27.14			29.90	AA		29.95
19	2055	0	BKN039 BKN047 OVC075	10.00		54	12.2	47	8.5	41	5.0	62	9	300		27.14			29.88	AA		29.95
19	2155	0	OVC034	10.00		55	12.7	47	8.6	40	4.4	57	9	280		27.15			29.87	AA		29.96
19	2255	0	OVC035	10.00		55	12.5	47	8.3	39	4.1	55	8	290		27.14			29.87	AA		29.95
19	2355	0	OVC043	10.00		53	11.6	46	7.8	39	3.7	59	10	340		27.14			29.87	AA		29.95

Figure A-5. Quality-controlled local climatological data hourly observations table for Davis-Monthan AFB, Tucson, Arizona (02/19/2011). Note that strong southwesterly winds occurred during the late morning and afternoon hours. Light drizzle (-DZ) was also reported, but gusty winds preceding the rainfall resulted in areas of blowing dust. Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)
HOURLY OBSERVATIONS TABLE
CASA GRANDE MUNICIPAL ARPT (03914)
CASA GRANDE, AZ (02/19/2011)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

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

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
19	0015	0	BKN120	10.00		63	17.0	48	8.6	30	-1.0	29	6	110		28.42			M	AA		29.97
19	0035	0	OVC120	10.00		61	16.0	47	8.1	30	-1.0	31	6	130		28.41			M	AA		29.96
19	0055	0	OVC120	10.00		61	16.0	47	8.5	32	0.0	34	6	120		28.41			M	AA		29.96
19	0115	0	BKN120	10.00		61	16.0	47	8.5	32	0.0	34	8	130		28.40			M	AA		29.95
19	0135	0	OVC120	10.00		61	16.0	47	8.5	32	0.0	34	7	120		28.40			M	AA		29.95
19	0155	0	OVC120	10.00		61	16.0	47	8.5	32	0.0	34	5	120		28.39			M	AA		29.94
19	0215	0	BKN120	10.00		61	16.0	47	8.5	32	0.0	34	6	110		28.38			M	AA		29.93
19	0235	0	SCT120	10.00		61	16.0	47	8.5	32	0.0	34	7	110		28.37			M	AA		29.92
19	0255	0	CLR	10.00		61	16.0	47	8.5	32	0.0	34	7	120		28.36			M	AA		29.91
19	0315	0	CLR	10.00		61	16.0	47	8.5	32	0.0	34	6	120		28.36			M	AA		29.91
19	0335	0	CLR	10.00		61	16.0	48	8.9	34	1.0	36	6	140		28.35			M	AA		29.90
19	0355	0	CLR	10.00		63	17.0	49	9.4	34	1.0	34	6	150		28.35			M	AA		29.90
19	0415	0	CLR	10.00		63	17.0	49	9.4	34	1.0	34	5	130		28.34			M	AA		29.89
19	0435	0	CLR	10.00		61	16.0	48	8.9	34	1.0	36	0	000		28.34			M	AA		29.89
19	0455	0	CLR	10.00		61	16.0	48	8.9	34	1.0	36	0	000		28.34			M	AA		29.89
19	0515	0	CLR	10.00		61	16.0	48	8.9	34	1.0	36	3	120		28.34			M	AA		29.89
19	0535	0	CLR	10.00		61	16.0	48	8.9	34	1.0	36	0	000		28.34			M	AA		29.89
19	0555	0	CLR	10.00		59	15.0	47	8.4	34	1.0	39	0	000		28.34			M	AA		29.89
19	0615	0	CLR	10.00		57	14.0	46	7.8	34	1.0	42	3	080		28.33			M	AA		29.88
19	0635	0	CLR	10.00		57	14.0	46	7.8	34	1.0	42	0	000		28.33			M	AA		29.88
19	0655	0	CLR	10.00		57	14.0	46	7.8	34	1.0	42	0	000		28.33			M	AA		29.88
19	0715	0	FEW120	10.00		57	14.0	47	8.2	36	2.0	46	0	000		28.33			M	AA		29.88
19	0735	0	FEW120	10.00		57	14.0	47	8.2	36	2.0	46	0	000		28.32			M	AA		29.87
19	0755	0	FEW120	10.00		61	16.0	49	9.3	36	2.0	39	8	130		28.32			M	AA		29.87
19	0815	0	FEW120	10.00		61	16.0	49	9.3	36	2.0	39	8	110		28.32			M	AA		29.87
19	0835	0	CLR	10.00		61	16.0	49	9.3	36	2.0	39	7	110		28.32			M	AA		29.87
19	0855	0	CLR	10.00		63	17.0	50	9.8	36	2.0	37	6	130		28.33			M	AA		29.88
19	0915	0	CLR	10.00		64	18.0	51	10.2	37	3.0	37	8	160		28.33			M	AA		29.88
19	0935	0	CLR	10.00		66	19.0	51	10.7	37	3.0	34	14	200	20	28.33			M	AA		29.88
19	0955	0	CLR	10.00		68	20.0	52	11.2	37	3.0	32	21	200	28	28.33			M	AA		29.88
19	1015	0	CLR	10.00		70	21.0	53	11.7	37	3.0	30	22	200	30	28.32			M	AA		29.87
19	1115	0	M	1.00		70	21.0	50	9.9	27	-3.0	20	31	210	41	28.33			M	AA		29.88
19	1135	0	CLR	3.00		70	21.0	53	11.5	36	2.0	29	28	200	36	28.32			M	AA		29.87
19	1155	0	CLR	1.25		70	21.0	53	11.7	37	3.0	30	31	190	44	28.32			M	AA		29.87

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
19	1215	0	CLR	5.00		70	21.0	53	11.7	37	3.0	30	26	190	36	28.31			M	AA		29.86
19	1235	0	CLR	5.00		70	21.0	53	11.7	37	3.0	30	30	190	37	28.30			M	AA		29.85
19	1255	0	CLR	6.00		68	20.0	53	11.6	39	4.0	35	26	200	37	28.31			M	AA		29.86
19	1315	0	FEW060 SCT080	8.00		68	20.0	53	11.6	39	4.0	35	26	190	31	28.30			M	AA		29.85
19	1335	0	SCT060 SCT080	7.00		66	19.0	55	12.5	45	7.0	47	28	210	33	28.31			M	AA		29.86
19	1355	0	SCT060 BKN070 BKN080	6.00		55	13.0	50	10.1	46	8.0	72	25	280	34	28.33			M	AA		29.88
19	1415	0	BKN050 BKN060	10.00		52	11.0	49	9.4	46	8.0	80	20	280	25	28.34			M	AA	0.02	29.89
19	1435	0	SCT029 BKN045 OVC060	10.00		52	11.0	50	9.9	48	9.0	86	18	290	26	28.35			M	AA	0.02	29.90
19	1455	0	FEW015 SCT030 BKN040	9.00		50	10.0	48	8.8	46	8.0	86	17	290	23	28.35			M	AA	0.02	29.90
19	1515	0	FEW029 SCT034 BKN043	10.00		50	10.0	49	9.4	48	9.0	93	8	300		28.34			M	AA	0.11	29.89
19	1535	0	BKN030 BKN035 OVC041	9.00		50	10.0	49	9.4	48	9.0	93	8	290		28.35			M	AA	0.11	29.90
19	1555	0	SCT030 BKN035 OVC055	10.00		50	10.0	49	9.4	48	9.0	93	10	300		28.35			M	AA	0.11	29.90
19	1615	0	FEW030 BKN040 OVC055	10.00		50	10.0	49	9.4	48	9.0	93	7	280		28.35			M	AA	0.07	29.90
19	1635	0	FEW030 SCT038 BKN046	10.00		50	10.0	49	9.4	48	9.0	93	0	000		28.35			M	AA	0.07	29.90
19	1655	0	SCT019 BKN043 OVC055	10.00		52	11.0	50	9.9	48	9.0	86	3	330		28.36			M	AA	0.07	29.91
19	1715	0	BKN007 BKN014 OVC020	10.00		50	10.0	49	9.4	48	9.0	93	10	350		28.36			M	AA	0.01	29.91
19	1735	0	FEW009 OVC014	10.00		50	10.0	49	9.4	48	9.0	93	10	360		28.36			M	AA	0.01	29.91
19	1755	0	OVC014	10.00		52	11.0	50	9.9	48	9.0	86	5	360		28.38			M	AA	0.01	29.93
19	1815	0	BKN018 OVC037	10.00		52	11.0	50	9.9	48	9.0	86	7	020		28.37			M	AA		29.92
19	1835	0	FEW020 SCT031 BKN039	10.00		50	10.0	49	9.4	48	9.0	93	5	350		28.36			M	AA		29.91
19	1855	0	FEW018 SCT030 BKN047	10.00		50	10.0	49	9.4	48	9.0	93	0	000		28.37			M	AA		29.92
19	1915	0	FEW018 SCT033 BKN041	10.00		50	10.0	49	9.4	48	9.0	93	0	000		28.38			M	AA		29.93
19	1935	0	FEW039 BKN045 OVC055	10.00		50	10.0	49	9.4	48	9.0	93	0	000		28.39			M	AA		29.94
19	1955	0	SCT039 OVC050	10.00		52	11.0	50	9.9	48	9.0	86	0	000		28.39			M	AA		29.94
19	2015	0	BKN020 BKN029 OVC050	10.00		50	10.0	49	9.4	48	9.0	93	0	000		28.39			M	AA		29.94
19	2035	0	BKN020 OVC027	10.00		52	11.0	50	9.9	48	9.0	86	0	000		28.40			M	AA		29.95
19	2055	0	FEW018 SCT032 BKN047	10.00		50	10.0	49	9.4	48	9.0	93	5	090		28.40			M	AA		29.95
19	2115	0	CLR	10.00		50	10.0	49	9.4	48	9.0	93	5	100		28.40			M	AA		29.95
19	2135	0	CLR	10.00		50	10.0	49	9.4	48	9.0	93	6	080		28.40			M	AA		29.95
19	2155	0	CLR	10.00		48	9.0	47	8.3	46	8.0	93	6	100		28.40			M	AA		29.95
19	2215	0	CLR	10.00		48	9.0	47	8.3	46	8.0	93	6	100		28.40			M	AA		29.95
19	2235	0	CLR	10.00		48	9.0	47	8.3	46	8.0	93	6	100		28.40			M	AA		29.95
19	2255	0	CLR	10.00		48	9.0	47	8.3	46	8.0	93	0	000		28.40			M	AA		29.95
19	2315	0	CLR	10.00		48	9.0	47	8.3	46	8.0	93	5	120		28.40			M	AA		29.95
19	2335	0	CLR	10.00		48	9.0	47	8.3	46	8.0	93	7	100		28.40			M	AA		29.95
19	2355	0	CLR	10.00		48	9.0	47	8.3	46	8.0	93	7	100		28.40			M	AA		29.95

Figure A-6. Quality-controlled local climatological data hourly observations table for Casa Grande Municipal Airport, Casa Grande, Arizona (02/19/2011). Note that strong south-southwesterly winds occurred during the late morning to afternoon hours coincident with reduced visibilities, indicating the presence of windblown dust. Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

Appendix B:
ADEQ and NWS Forecast Products

ADEQ Arizona Department of Environmental Quality

MARICOPA COUNTY
DUST CONTROL ACTION FORECAST
ISSUED FRIDAY, FEBRUARY 18, 2011

Three-day weather outlook:

A cool, wet system will move through Arizona this week, bringing rain to western Arizona Saturday. Showers will move east Saturday night providing rain for central and eastern Arizona deserts and snow in the mountains above 5,000 feet. Winds will be breezy Saturday as the associated front pushes through, but moisture should cancel the potential for blowing dust. Thus, the risk of exceeding the 24-hr PM10 health standard in Phoenix will be "Low" through Monday.

R I S K F A C T O R S

	WINDS		STAGNATION		RISK LEVEL
Day #1: Sat 02/19/2011	Southwest winds around 10 to 20 mph are expected, gusting to 30 mph at times. (90% chance of showers)	+	Little to no stagnation is epected.	=	LOW
Day #2: Sun 02/20/2011	Southwest winds around 5 to 10 mph are expected. (40% chance of showers)	+	Slightly stagnant conditions are expected early, improving by the afternoon.	=	LOW
Day #3: Mon 02/21/2011	Mostly light winds are expected.	+	Rather stagnant conditions are expected early, improving by the afternoon.	=	LOW

ADEQ Arizona Department of Environmental Quality

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

LINK TO EXCEEDANCE & HEALTH STATEMENT INFO FOR THE 2009-10 & 2008-09 FORECAST SEASON

AIR QUALITY FORECAST FOR SATURDAY, FEBRUARY 19, 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 NOTICES (*SEE BELOW FOR DETAILS) AIR POLLUTANT	YESTERDAY THU 02/17/2011 Highest AQI Reading/Site (Preliminary data only)	TODAY FRI 02/18/2011	TOMORROW SAT 02/19/2011	EXTENDED SUN 02/20/2011
O3*	40 SOUTH PHOENIX	34 GOOD	27 GOOD	28 GOOD
CO*	13 NORTH PHOENIX	12 GOOD	6 GOOD	13 GOOD
PM-10*	33 BUCKEYE	43 GOOD	30 GOOD	18 GOOD
PM-2.5*	39 PHOENIX SUPERSITE	36 GOOD	23 GOOD	16 GOOD

* 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, February 18: No health impacts are expected.

Health message for Saturday, February 19: No health impacts are expected.

Another strong system will push through Arizona this weekend, bringing the Valley some much needed rain Saturday and Sunday. Clouds will continue to thicken through Saturday morning ahead of the system. Winds will start to increase out of the southwest Saturday morning with gusts possibly exceeding 25 mph at times during the afternoon. Rain amounts will generally be around a quarter to a half an inch in the lower desert elevations, pushing an inch in the upslope foothills in the north and east part of the forecast area. Mountains of Arizona will receive a fresh round snow with levels falling to 5,000 feet by Sunday morning.

Though winds can be strong at times Saturday afternoon and Sunday morning, the moisture associated with the system should negate the affects of the wind on they dry soil. Thus, particulate levels are forecast to remain in the GOOD range of the air quality index this weekend, especially once the rain hits the ground.

Check back on Sunday for the latest on this system and a look ahead to next weeks weather and air quality. Until then, have a great weekend! -J.Paul

MONITORING SITE MAPS: STATIC MAP - http://www.azdeq.gov/environ/air/monitoring/images/map.jpg
INTERACTIVE MAPS - http://agwww.maricopa.gov/AirMonitoring/SitePollutionMap.aspx
http://www.airnow.gov/

POLLUTION MONITOR READINGS FOR THURSDAY, FEBRUARY 17, 2011

O3 (OZONE)

SITE NAME	MAX 8-HR VALUE (PPB)	MAX AQI	AQI COLOR CODE
Apache Junction (Pinal County)	38	32	
Blue Point	43	36	
Central Phoenix	40	34	
Fountain Hills	38	32	
North Phoenix	43	36	
Phoenix Supersite	43	36	
Pinnacle Peak	43	36	
South Phoenix	47	40	
South Scottsdale	37	31	
West Phoenix	46	39	

CO (CARBON MONOXIDE)

SITE NAME	MAX 8-HR VALUE (PPM)	MAX AQI	AQI COLOR CODE
Buckeye	0.3	3	
Central Phoenix	0.6	7	
Dysart	0.4	5	
Glendale	0.4	5	
Greenwood	0.8	9	
Mesa	0.6	7	
North Phoenix	1.1	13	
Phoenix Supersite	0.6	7	
South Phoenix	0.3	3	
South Scottsdale	0.6	7	
Tempe	0.7	8	
West Chandler	0.4	5	
West Phoenix	0.7	8	

PM-10 (PARTICLES)

SITE NAME	MAX 24-HR VALUE (ug/m3)	MAX AQI	AQI COLOR CODE
Buckeye	36.4	33	
Central Phoenix	26.1	24	
Combs School (Pinal County)	47.3	43	
Durango	33.5	31	
Dysart	30.1	27	
Glendale	24.2	22	
Greenwood	24.3	22	
Higley	27.4	25	
Maricopa (Pinal County)	36.5	33	
Phoenix Supersite	23.0	21	
South Phoenix	32.5	30	
West Chandler	21.2	19	
West Forty Third	31.4	29	
West Phoenix	31.2	28	
Zuni Hills	22.3	20	

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 (ug/m3)	MAX AQI	AQI COLOR CODE
Durango	9.9	32	
Dysart	5.9	19	
Estrella Mountain Park	2.4	8	
Phoenix Supersite	12.0	39	
South Phoenix	3.5	11	
Vehicle Emissions Lab	5.3	17	
West Phoenix	4.0	13	

National Weather Service Tucson Forecast Products

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE TUCSON AZ
920 AM MST SAT FEB 19 2011

.SYNOPSIS...A STRONG PACIFIC STORM WILL IMPACT SOUTHEAST ARIZONA THIS AFTERNOON INTO TONIGHT WITH GUSTY WINDS AND VALLEY RAIN AND MOUNTAIN SNOW SHOWERS. TEMPERATURES WILL BE MUCH COOLER SUNDAY WITH CONSIDERABLY LOWER PRECIPITATION CHANCES...THEN DRY WEATHER RETURNS ON MONDAY. ANOTHER STORM SYSTEM WILL IMPACT THE REGION TOWARD THE MIDDLE TO LATER PORTIONS OF NEXT WEEK.

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.DISCUSSION...LATEST WV SATELLITE IMAGERY THIS MORNING SHOWS WELL ESTABLISHED TROUGH WITH AN AXIS JUST OFF THE CALIFORNIA COAST. THE MAIN PIECE OF ENERGY WE'RE WATCHING IN THE SHORT TERM IS NOW MOVING INTO SRN CA/NRN BAJA. FAIRLY STRONG UPPER LEVEL JET ENERGY AHEAD OF THIS VORT MAX WITH 110+ KT JET AT 300 MB WITH VERY IMPRESSIVE UPPER LEVEL DIFFLUENCE ACROSS WRN/NRN AZ. MOISTURE HAS EASILY BREACHED THE COASTAL MOUNTAIN RANGE WITH THIS SYSTEM AND A NICE FRONTAL BAND WITH WIDESPREAD SHOWERS AND SOME EMBEDDED THUNDERSTORMS NOW ACROSS WESTERN PORTIONS OF AZ. THE BEST DYNAMICS WILL REMAIN TO THE NORTH OF THIS FORECAST AREA...HOWEVER EXPECT FAIRLY WIDESPREAD SHOWER ACTIVITY STARTING LATER THIS MORNING FOR THE WESTERN DESERTS AND MOVING EASTWARD AS THE DAY PROGRESSES INTO THE EVENING HOURS. AT THIS TIME WOULD EXPECT THE GREATEST LIKELIHOOD OF PRECIPITATION IN THE TUCSON METRO FROM ABOUT 3 PM TO 9 PM. CONVECTIVE PARAMETERS WILL BE MOST FAVORABLE TO OUR NORTH WHERE THE LAPSE RATES WILL BE STEEPER WITH COLDER MID LEVEL TEMPS BUT HAVE ALSO ADDED SLIGHT CHANCE OF THUNDERSTORMS TO THE FORECAST MAINLY FROM TUCSON NORTHWARD THIS AFTERNOON INTO EARLY EVENING. PRECIPITATION CHANCES WILL BE CONSIDERABLY LOWER MOVING EASTWARD...ESPECIALLY ACROSS THE EASTERN HALF OF COCHISE COUNTY WITH JUST LOW END CHANCE TYPE POPS FOR THIS AREA. HOWEVER...THESE EASTERN LOCATIONS WILL HAVE THE MOST SUNSHINE AND WARMING WITH THE STRONGEST WINDS (AND AREAS OF BLOWING DUST) TODAY. A WIND ADVISORY REMAINS IN EFFECT MAINLY FOR AREAS SOUTH AND EAST OF TUCSON FROM NOON TO 7 PM. REGARDING SNOW FOR THIS SYSTEM...SNOW LEVELS WILL START HIGH AT ABOUT 8000 FEET BUT LOWER TO AROUND 5000 TO 6000 FEET BY THE TIME THE BULK OF THE PRECIPITATION IS OVER BY EARLY SUNDAY MORNING. HAVE KEPT SNOW AMOUNTS ON THE LOWER END OF WINTER WEATHER ADVISORY CRITERIA FOR THE WHITE MOUNTAIN ZONES AND BELOW ADVISORY CRITERIA FOR THE PINALENO MOUNTAINS/MT GRAHAM AND THE RINCON/CATALINA MOUNTAINS WHERE A FEW INCHES OF SNOW IS EXPECTED.

WILL TAKE A CLOSER LOOK AT SUNDAY AND BEYOND FOR THE AFTERNOON PACKAGE.

SHORT TERM FORECAST
NATIONAL WEATHER SERVICE TUCSON AZ
1127 AM MST SAT FEB 19 2011

AZZ504-192030-
TUCSON METRO AREA-
INCLUDING...TUCSON...GREEN VALLEY...MARANA...VAIL

1127 AM MST SAT FEB 19 2011

.NOW...
AS SOUTHWESTERLY WIND SPEED INCREASES ACROSS MUCH OF THE REGION...DUST WILL BEGIN TO AFFECT AREAS OF INTERSTATE 10 BETWEEN MARANA AND PICACHO. EXPECT VISIBILITY TO BE RESTRICTED TO 3 TO 5 MILES THROUGH 2 PM THEN GRADUALLY DECREASING AT TIMES TO BELOW A MILE BY MID AFTERNOON...AS SUSTAINED WIND SPEED INCREASES TO AROUND 25 MPH.

WIND ADVISORY
URGENT - WEATHER MESSAGE
NATIONAL WEATHER SERVICE TUCSON AZ
1129 AM MST SAT FEB 19 2011

AZZ504>506-200000-
/O.EXB.KTWC.WI.Y.0002.110219T1829Z-110220T0000Z/
TUCSON METRO AREA-SOUTH CENTRAL PINAL COUNTY-
SOUTHEAST PINAL COUNTY-
INCLUDING THE CITIES OF...TUCSON...GREEN VALLEY...MARANA...VAIL...
PICACHO PEAK STATE PARK...MAMMOTH...ORACLE
1129 AM MST SAT FEB 19 2011

...WIND ADVISORY IN EFFECT UNTIL 5 PM MST THIS AFTERNOON...

THE NATIONAL WEATHER SERVICE IN TUCSON HAS ISSUED A WIND ADVISORY...WHICH IS IN EFFECT UNTIL 5 PM MST THIS AFTERNOON.

* TIMING...A PACIFIC STORM SYSTEM WILL IMPACT THE REGION THIS AFTERNOON WITH STRONG AND GUSTY WINDS.

* WINDS...SUSTAINED WIND SPEEDS OF 25 TO 35 MPH WITH GUSTS UP TO 50 MPH. HIGHER GUSTS CAN BE EXPECTED ACROSS THE HIGHER ELEVATIONS.

* IMPACTS...MOTORISTS IN THE ADVISORY AREA ARE URGED TO EXERCISE CAUTION. HIGH WINDS WILL MAKE DRIVING DIFFICULT AT TIMES. HIGH PROFILE VEHICLES WILL BE THE MOST VULNERABLE TO THE STRONG AND GUSTY WINDS. IN ADDITION...BLOWING DUST CAN OCCUR AT TIMES RESULTING IN REDUCED VISIBILITIES UNDER A MILE OVER SOME ROADWAYS IN THE ADVISORY AREA. MOTORISTS ARE ADVISED THAT IF YOU MUST TRAVEL TO AND FROM AREAS UNDER THE WIND ADVISORY THEN REDUCE SPEED AND ALLOW A GREATER DISTANCE BETWEEN YOU AND THE VEHICLE IN FRONT OF YOU.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

A WIND ADVISORY MEANS THAT SUSTAINED WINDS OF 30 MPH OR GREATER ARE EXPECTED...ALONG WITH HIGHER GUSTS. THIS COULD MAKE DRIVING DIFFICULT...ESPECIALLY FOR HIGH PROFILE VEHICLES. USE EXTRA CAUTION.

HAZARDOUS WEATHER OUTLOOK
TUCSON METRO AREA-SOUTH CENTRAL PINAL COUNTY-
SOUTHEAST PINAL COUNTY-
1141 AM MST SAT FEB 19 2011

THIS HAZARDOUS WEATHER OUTLOOK IS FOR PORTIONS OF SOUTHEAST ARIZONA.

.DAY ONE...THIS AFTERNOON AND TONIGHT

A WIND ADVISORY HAS BEEN ISSUED THROUGH 5 PM THIS EVENING FOR WINDS OF 25 TO 35 MPH AND GUSTS TO NEAR 50 MPH. THESE STRONG WINDS WILL ALSO LOWER VISIBILITIES DUE TO BLOWING DUST. SHOWER ACTIVITY IS EXPECTED TO GRADUALLY INCREASE THROUGH THE DAY INTO THIS EVENING.

.DAYS TWO THROUGH SEVEN...SUNDAY THROUGH FRIDAY

A SLIGHT CHANCE OF SHOWERS IS EXPECTED SUNDAY WITH MUCH COOLER TEMPERATURES.

SHORT TERM FORECAST
NATIONAL WEATHER SERVICE TUCSON AZ
148 PM MST SAT FEB 19 2011

AZZ504-192300-
TUCSON METRO AREA-
INCLUDING...TUCSON...GREEN VALLEY...MARANA...VAIL
148 PM MST SAT FEB 19 2011

.NOW...
STRONG SOUTHWEST WINDS WILL CONTINUE ACROSS THE REGION THROUGH MUCH OF THE AFTERNOON WITH GUSTS UP TO 50 MPH. AREAS OF BLOWING DUST WILL CONTINUE THROUGH THE AFTERNOON AS WELL REDUCING VISIBILITY ON ROADWAYS TO LESS THAN ONE MILE AT TIMES. MOTORISTS ARE URGED TO EXERCISE CAUTION AS CONDITIONS CAN CHANGE RAPIDLY.

Appendix C:
Affidavit of Public Notice