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Governor

# ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

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Stephen A. Owens  
Director

## Assessment of Qualification for Treatment under the Arizona Natural and Exceptional Events Policy for the High Particulate (PM<sub>10</sub>) Concentration Events in the Yuma Area on May 21, 2006

### Background

The Arizona Department of Environmental Quality (ADEQ) issues Dust Control Action Forecasts for the Yuma and Phoenix areas as part of the Natural Events Action Plan for these areas. In anticipation of a high wind event for Sunday, May 21<sup>st</sup> and Monday, May 22<sup>nd</sup>, ADEQ Air Quality Forecasters first mentioned the threat of dense blowing dust in their forecast issued on Thursday, May 18<sup>th</sup>. The Maricopa County Dust Control Action Forecast for this day indicated a high risk of exceeding the PM<sub>10</sub> National Ambient Air Quality Standards (NAAQS) for Sunday May 21<sup>st</sup>. While the Yuma Wind Forecast was not archived at that time, the weather discussion from the May 18<sup>th</sup> forecast did mention the possibility of a region-wide “high wind and dust event.” A high risk of exceeding the PM<sub>10</sub> NAAQS was also issued on Sunday May 21<sup>st</sup> for the following day as high winds and blowing dust evident in southeastern California and southwestern Arizona on Sunday was forecasted to affect the rest of the state on Monday, May 22<sup>nd</sup> (see attachments). The forecasts/advisories satisfy the requirement in 40 CFR 51.920(a)(1).

Strong winds were observed during the late morning hours of May 21<sup>st</sup> in Yuma and continued through the afternoon and into the evening hours as an upper level trough and its associated surface frontal boundary approached from the west (see bottom right corner of Figure 1). Both Arizona Meteorological Network (AZMET) and National Weather Service (NWS) monitors in Yuma reported significant

sustained winds and wind gusts of 20 to 34 mph for over ten hours starting at approximately 9 a.m. This prolonged period of high winds was caused by a tight pressure gradient in place over the region due to an approaching upper level trough and its associated surface frontal boundary. Prefrontal, southerly winds persisted for much of the day in Yuma, while areas in southeastern California experienced strong westerly winds behind the surface cold front. High winds were reported in Palm Springs, CA, while strong gusts, reduced visibility, and haze were reported at the NWS station approximately 50 miles west of Yuma in Imperial, CA. While the Yuma area was impacted by the post frontal westerly winds the following day, the prefrontal southerly winds on May 21<sup>st</sup> persisted for a longer period of time, allowing PM<sub>10</sub> levels to remain elevated for a prolonged period. All appropriate state implementation plan (SIP) control measures were in place during the event demonstrating, per 40 CFR 50.1(j), that the event “is not reasonably controllable or preventable.”

The event brought significant wind and elevated ambient concentrations of PM<sub>10</sub> that exceeded the NAAQS at the Yuma Courthouse monitor operated by ADEQ. The fact that ambient concentrations exceed the NAAQS satisfies the criteria in 40 CFR 50.1(j) that the event “affects air quality.”

The following are the key PM<sub>10</sub> monitor readings for the monitors examined in this report:

Monitor (Operator/Type)	AQS ID*	24-hr Avg PM <sub>10</sub>	1-hr Max PM <sub>10</sub>	Time of Max 1-hr	Flag**
<b>YUMA AREA</b>					
<b>Yuma Courthouse (ADEQ/BAM)</b>	<b>04-027-0004*</b>	<b>194</b>	<b>703</b>	<b>1300</b>	<b>A or RJ</b>

\* EPA Air Quality System Identification Number

\*\* 24-hr PM<sub>10</sub> concentration influenced by natural or exceptional event to be flagged.

Type Abbreviations: BAM – Beta-Attenuation Mass Monitor (Continuous monitor)

The preliminary findings from this analysis were presented at a stakeholders meeting on November 13, 2007, and were made available for public review during a comment period that ended November 30, 2007. During that time, no comments were received from the public. ADEQ presented and discussed this final demonstration at a stakeholder

meeting on May 28, 2008. ADEQ has finalized this demonstration, which was made available for public comment from August 11, 2008 through September 10, 2008. Any comments that were received were forwarded to EPA with this demonstration pursuant to 40 CFR 51.14(c)(3)(i).

### NWS-Palm Springs, CA

Hr	T(F)	VR	Dust	Spd	Gust	Dir
1	78	10		7	7	NW
2	75	10		4	4	N
3	76	10		6	6	NE
4	72	10		0	0	N
5	75	10		0	0	N
6	77	10		0	0	N
7	82	10		3	3	S
8	87	10		0	0	N
9	90	10		0	0	N
10	93	10		4	4	VR
11	95	10		0	0	VR
12	95	10		3	3	VR
1	97	10		17	23	NW
2	95	10		17	27	NW
3	94	10		22	27	NW
4	87	10		25	32	NW
5	84	10		17	31	NW
6	80	10		25	31	NW
7	80	10		14	26	NW
8	81	10		13	22	NW
9	78	10		17	17	NW
10	77	10		15	27	N
11	73	10		24	24	NW
12	72	10		19	30	NW

### NWS-Imperial, CA

Hr	T(F)	VR	Dust	Spd	Gust	Dir
1	77	10		7	7	W
2	73	10		3	3	W
3	72	10		0	0	N
4	72	10		0	0	N
5	67	9		4	4	W
6	76	10		0	0	N
7	83	10		4	4	VR
8	87	10		6	6	W
9	91	10		6	6	N
10	92	10		8	8	E
11	94	10		7	7	VR
12	95	10		10	10	SE
1	95	10		8	8	SE
2	97	10		8	8	W
3	100	6	HZ	21	21	SE
4	97	4	HZ	19	30	S
5	90	10		15	15	W
6	85	10		15	15	W
7	82	10		17	17	W
8	79	10		17	17	W
9	78	10		21	27	W
10	78	10		21	26	W
11	78	10		15	15	W
12	74	10		4	4	S

### NWS-Yuma Intl Airport

Hr	T(F)	VR	Dust	Spd	Gust	Dir
1	81	7		9	9	SE
2	80	7		3	3	SE
3	79	7		11	11	SE
4	79	7		10	10	SE
5	76	7		3	3	NE
6	76	7		3	3	NE
7	78	7		3	3	N
8	82	7		3	3	SW
9	88	7		15	20	S
10	88	7		13	13	SE
11	95	7		17	25	S
12	97	7		23	29	S
1	100	7		30	34	S
2	101	7		25	33	SE
3	99	7		25	32	S
4	n/a	n/a	n/a	n/a	n/a	n/a
5	96	7		24	34	S
6	93	7		27	34	SE
7	91	7		17	17	S
8	88	7		21	27	S
9	84	7		13	13	S
10	82	7		15	15	SE
11	80	7		18	18	SE
12	79	7		14	14	SE

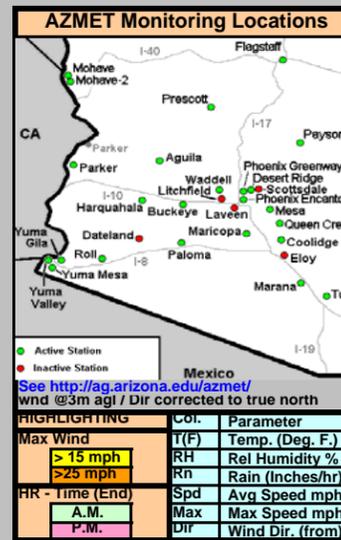
### Event Contrib. Analysis

Hourly PM<sub>10</sub> Conc. (µg/m<sup>3</sup>)

MONITORS:	Hr	1
1-YUMA-CH	1	52
1-YUMA-CH	2	35
1-YUMA-CH	3	21
1-YUMA-CH	4	23
1-YUMA-CH	5	22
1-YUMA-CH	6	35
1-YUMA-CH	7	38
1-YUMA-CH	8	22
1-YUMA-CH	9	18
1-YUMA-CH	10	32
1-YUMA-CH	11	94
1-YUMA-CH	12	535

24-Hr. Avg PM<sub>10</sub> with W/O Event: 194

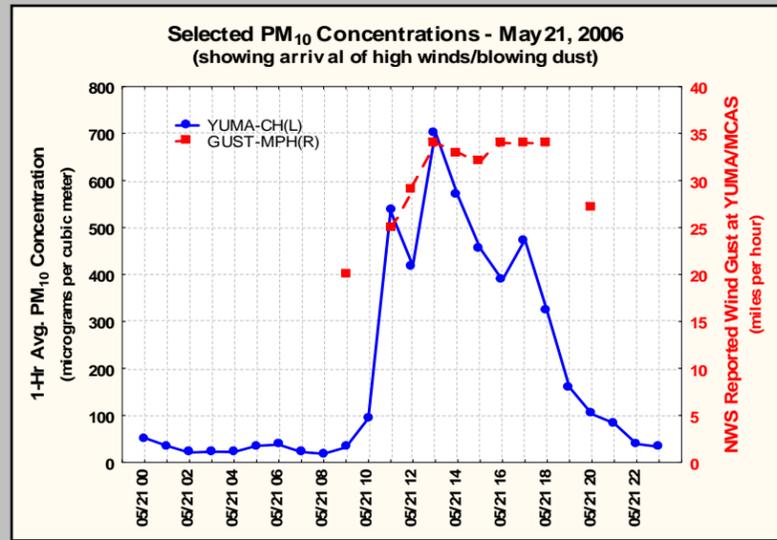
Conclusion: As shown above, the PM<sub>10</sub> concentration would have been below the NAAQS "BUT FOR" the event contribution (hours highlighted in pink).



### Figure 1. Key Data for Event of May 21, 2006

MISC DATA	KEY	PM10 PLOT
CEN. AZ WINDS	SAT IMAGES	MAP AND CHARTS
SO AZ WINDS	MAP AND CHARTS	

**SUMMARY OF EVENT**  
An approaching frontal system affected the Yuma area beginning at 10:00 a.m. Strong gusty winds were reported by the National Weather Service causing elevated PM<sub>10</sub> concentrations in the area. PM<sub>10</sub> concentrations subsided when the winds died down.



### PARKER

Hr	T(F)	RH	Rn	Spd	Max	Dir
1	76	36	-	7	9	S
2	72	43	-	7	9	S
3	71	44	-	4	7	S
4	68	57	-	4	6	NE
5	68	51	-	3	5	E
6	66	57	-	2	3	N
7	70	57	-	1	4	NE
8	77	45	-	3	6	NE
9	84	31	-	2	6	NE
10	90	29	-	4	9	S
11	92	27	-	5	8	S
12	94	26	-	5	8	S
1	96	24	-	7	11	S
2	95	21	-	13	21	SW
3	97	18	-	13	22	S
4	95	19	-	15	24	S
5	94	17	-	15	24	S
6	89	20	-	13	19	S
7	87	20	-	12	18	S
8	81	24	-	8	12	S
9	80	22	-	9	15	SW
10	76	25	-	8	12	S
11	75	29	-	7	11	S
12	74	31	-	5	10	S

### BUCKEYE

Hr	T(F)	RH	Rn	Spd	Max	Dir
1	75	25	-	2	6	NE
2	74	28	-	1	5	N
3	73	27	-	2	5	NE
4	71	24	-	4	6	NE
5	70	25	-	2	3	NE
6	69	25	-	2	4	NE
7	75	21	-	2	5	NE
8	79	27	-	4	7	E
9	86	26	-	3	6	SE
10	90	21	-	3	5	E
11	92	17	-	3	5	E
12	94	16	-	3	6	SE
1	96	14	-	2	5	SE
2	99	11	-	3	9	E
3	99	14	-	6	14	SE
4	100	12	-	11	24	S
5	97	12	-	15	23	SW
6	94	13	-	13	22	SW
7	91	14	-	12	21	SW
8	87	14	-	13	19	SW
9	84	15	-	13	20	SW
10	81	15	-	11	19	SW
11	77	18	-	8	15	SW
12	76	18	-	4	11	S

### MARICOPA

Hr	T(F)	RH	Rn	Spd	Max	Dir
1	76	21	-	4	6	S
2	76	19	-	6	8	S
3	75	20	-	5	7	S
4	73	20	-	4	6	S
5	71	19	-	5	7	S
6	69	22	-	2	5	SE
7	74	21	-	4	8	S
8	82	13	-	7	11	S
9	88	10	-	8	11	S
10	92	9	-	5	10	S
11	95	9	-	3	8	S
12	98	9	-	5	12	SE
1	100	9	-	9	19	S
2	102	10	-	11	21	SE
3	102	10	-	9	18	S
4	104	10	-	13	22	S
5	103	9	-	16	24	S
6	101	10	-	16	23	S
7	96	13	-	12	19	SW
8	91	14	-	13	19	SW
9	87	14	-	12	19	SW
10	84	13	-	12	20	SW
11	82	10	-	10	16	SW
12	82	11	-	10	24	SW

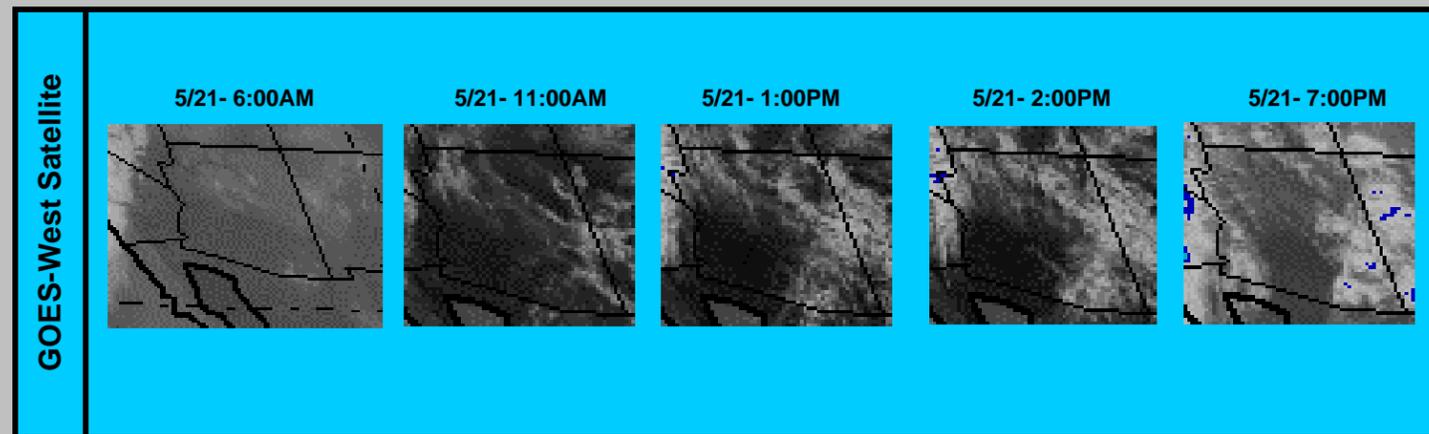
### Historical Distribution

5-Yr. Dist. of Values (µg/m<sup>3</sup>)

MONITORS:	Column Index
1-YUMA-CH	Yr - All Data (5-Yrs)
	Sea - Data for Spring season only (5-Yrs)
Cum. Freq.	Mon 1
Min	8
0.5%	12
1.0%	14
2.5%	16
5%	19
10%	23
25%	31
50%	42
75%	57
90%	77
95%	96
97.5%	127
99.0%	186
99.5%	211
Max	349

Flagged Value: 194

Conclusion: Flagged Value is exceptional in nature (eg. greater than 95% of all data)



### YUMA

Hr	T(F)	RH	Rn	Spd	Max	Dir
1	73	48	-	1	3	NE
2	71	48	-	1	3	N
3	67	60	-	1	3	NE
4	67	55	-	1	3	N
5	68	51	-	2	4	N
6	66	55	-	1	4	NE
7	69	55	-	1	2	W
8	78	38	-	2	4	SW
9	83	26	-	3	7	SW
10	86	25	-	5	9	S
11	91	22	-	8	15	SE
12	94	22	-	11	18	S
1	96	18	-	12	18	SE
2	98	13	-	14	21	SE
3	98	12	-	15	22	S
4	97	13	-	14	21	S
5	94	13	-	14	22	S
6	90	14	-	13	22	S
7	87	14	-	11	20	S
8	83	19	-	9	15	S
9	80	23	-	9	15	S
10	78	30	-	8	13	SE
11	74	39	-	4	9	SE
12	72	42	-	1	3	NW

### PALOMA

Hr	T(F)	RH	Rn	Spd	Max	Dir
1	75	21	-	6	9	SW
2	69	33	-	3	6	W
3	68	36	-	3	7	S
4	67	31	-	3	6	S
5	67	37	-	2	6	E
6	64	46	-	2	4	NE
7	69	37	-	3	5	E
8	78	28	-	3	5	N
9	85	21	-	2	4	N
10	91	17	-	2	5	NW
11	95	14	-	4	7	N
12	97	13	-	4	7	N
1	95	24	-	5	17	S
2	94	22	-	11	19	S
3	93	22	-	13	21	SW
4	92	20	-	16	25	SW
5	90	21	-	16	23	SW
6	89	19	-	16	24	SW
7	87	17	-	14	20	SW
8	84	17	-	10	17	SW
9	81	16	-	11	18	S
10	80	14	-	12	21	S
11	76	17	-	8	11	S
12	75	20	-	6	12	S

### MARANA

Hr	T(F)	RH	Rn	Spd	Max	Dir
1	73	28	-	5	6	SE
2	71	31	-	4	6	E
3	70	30	-	4	6	SE
4	70	28	-	4	7	SE
5	69	32	-	4	7	E

## Assessment under the Technical Criteria Document (TCD)

1. Properly qualify and validate the air quality measurement to be flagged. As this was not a filter sampling date (1-in-6 run day), only data from the continuous analyzers were examined. The air quality monitoring data were reviewed by the agency responsible for operation of the monitor. Data from the Yuma Supersite and Mexico Supersite monitors operated by ADEQ were found to be invalid due to instrument malfunctions that began on May 18<sup>th</sup> and 19<sup>th</sup>, respectively. Valid data collection resumed on May 24<sup>th</sup> at the Mexico Supersite and June 8<sup>th</sup> at the Yuma Supersite. All hourly PM<sub>10</sub> readings from the Yuma Courthouse monitor were valid during the May 21<sup>st</sup> event. Audits of the analyzers revealed operations were within acceptable tolerance. No local sources were reported as significantly contributing to the air quality episode. Exceedances of the NAAQS were recorded at the Yuma Courthouse monitor operated by ADEQ.

2. Review suspected contributing sources. The AzMET and NWS surface data from Yuma, as well as the NWS surface data for Imperial, CA, provide a good explanation of the meteorological conditions that were in place during the afternoon and evening hours of May 21, 2006. Strong, gusty winds allowed for dry and loose soils to be easily picked up and transported. The Yuma area was impacted by the strong winds starting at about 9 a.m. local time and continued through the evening hours. Reduced visibility and haze reports from the NWS Imperial station, located west of Yuma in California, in conjunction with even stronger winds in Yuma, provide proof that high winds with the ability to pick up and transport dust and soils were occurring in and around the Yuma area (see attachments). The plot of hourly PM<sub>10</sub> concentration data in the upper right corner of Figure 1, in conjunction with the wind data, confirms the identical timing of the wind and elevated PM<sub>10</sub> concentrations. Concentrations were consistently at or below 50 µg/m<sup>3</sup> from midnight to about 9 a.m. Thereafter, as the winds began to increase, PM<sub>10</sub> concentrations began to rise. As the winds decreased late at night on May 21<sup>st</sup>, so too did the concentrations.

3. Examine all air quality monitoring information. Data from all monitors in the network were reviewed. Monitors from the affected areas are summarized in the table in the Background section of this assessment. Pursuant to 40 CFR 50.14(c)(3)(iii)(C), the “Historical Distribution” Table in Figure 1 has been included to demonstrate that the event is associated with a measured concentration in excess of normal historical fluctuations, including background (e.g.,

concentrations greater than the 95<sup>th</sup> percentile). Monitors with readings greater than that of the NAAQS, which should be flagged, include the Yuma Courthouse monitor for May 21, 2006.

4. Examine the meteorological conditions before and during the event. The AzMET meteorological data are summarized in Figure 1. The wind data are highlighted yellow if the max wind speed in the hour exceeds 15 mph and orange if it exceeds 25 mph. An upper level trough and passing frontal system caused strong, gusty winds over southwestern Arizona beginning on May 21<sup>st</sup>. As a result, elevated PM<sub>10</sub> values occurred first in the southwestern portion of the state (Yuma) during the afternoon and evening of May 21<sup>st</sup> followed by elevated PM<sub>10</sub> values in central Arizona on May 22<sup>nd</sup>.

5. Perform a qualitative attribution to emission source(s). All evidence indicates the elevated PM<sub>10</sub> concentrations in the Yuma area can be attributed to soil emissions that were transported over a broad area. No source specific emission allocation is possible based on the data available for analysis. The hourly concentration data does not show any significant source other than the major wind-blown dust event over the two day period. Observational reports of haze and blowing dust from trained officials are further proof that the elevated PM<sub>10</sub> concentrations were attributed to soil emissions.

6. Estimation of Contribution from Source or Event. The primary source appears to be wind-blown dust over a wide geographic region in the southwestern portion of Arizona and the southeastern portion of California for which there is not an effective or efficient method to estimate the relative contributions from specific sources. The demonstration analysis contained in this report establishes the linkage between the measurements to be flagged and the event, thus satisfying the requirement in 40 CFR 50.14(c)(3)(iii)(B). Pursuant to 40 CFR 50.14(c)(3)(iii)(D), the “Event Contrib. Analysis” Table in Figure 1 has been included to demonstrate that there would have been no exceedance or violation but for the event (e.g., the contribution during the event overwhelmed the 24-hour average).

7. Determination that a Natural or Exceptional Event Contributed To an Exceedance. Based on this analysis, the event satisfies the requirement in 40 CFR 50.1(j) that the elevated concentrations at the Yuma Courthouse monitoring site were attributed to a natural event.

## Conclusion

Long-range transport of dust from soils. The elevated PM<sub>10</sub> event on May 21, 2006 in Yuma was the result of long-range transport of dust and soils from high winds that suspended natural soils and soils from areas where Best Available Control Measures are in place and should be

flagged for air quality planning purposes. The “high wind” flag (A or RJ) should be applied to the monitor reading indicated in the table at the beginning of this report, as the monitor would have been below the NAAQS but for the contribution of the event.

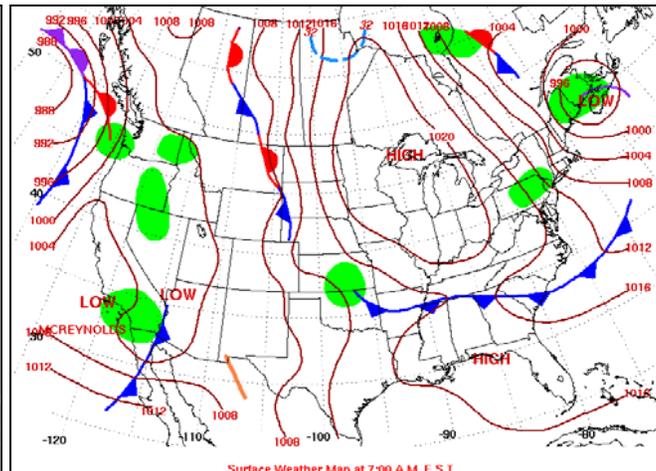
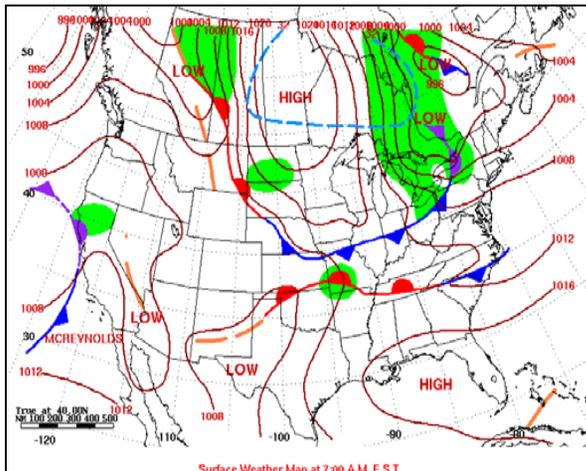
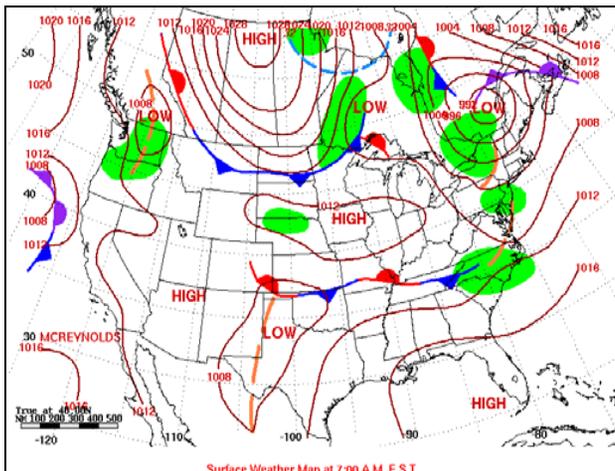
# Weather Charts for May 20-22, 2006

## Surface Analyses

05/20 - 12z

05/21 - 12z

05/22 - 12z

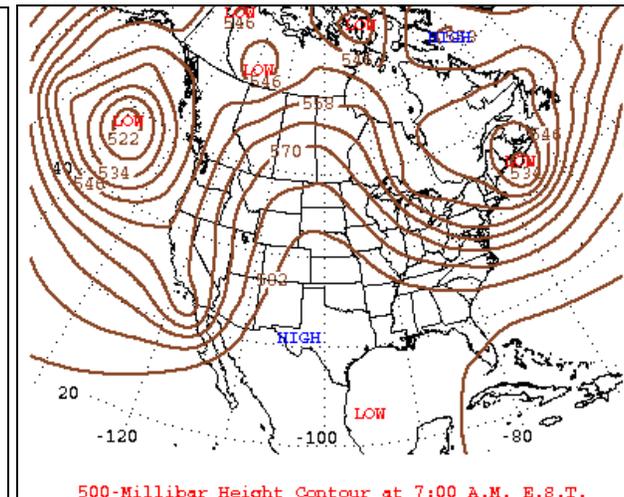
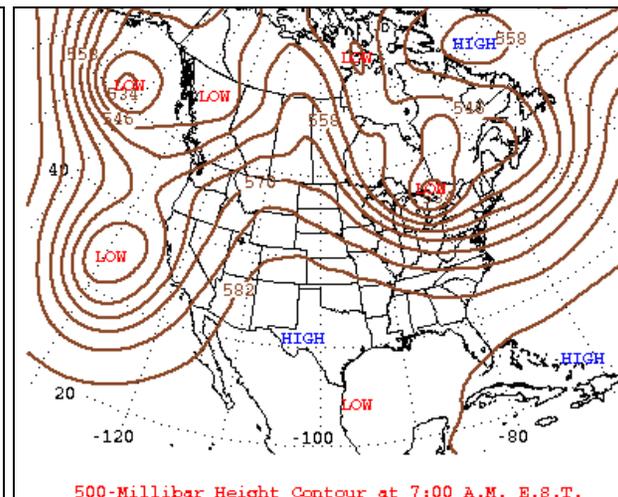
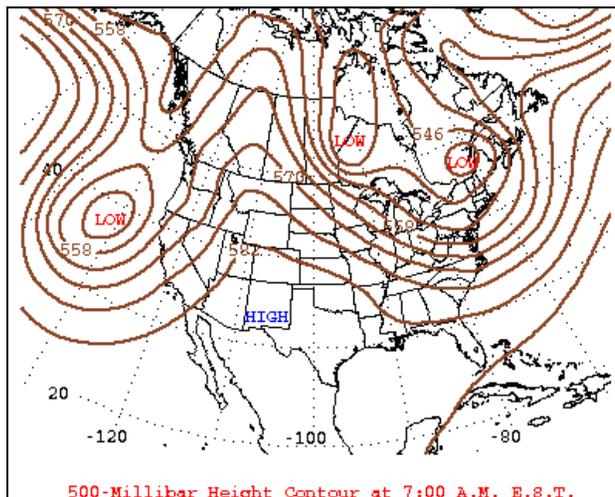


## 500mb Charts

05/20 - 12z

05/21 - 12z

05/22 - 12z



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

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA  
(final)  
HOURLY OBSERVATIONS TABLE  
IMPERIAL COUNTY AIRPORT (03144)  
IMPERIAL , CA  
(05/2006)**

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

Elevation: -59 ft. below sea level  
Latitude: 32.834  
Longitude: -115.579  
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
21	0053	12	CLR	10.00		77	25.0	58	14.3	41	5.0	28	7	250		29.77	8	006	29.72	AA		29.71
21	0153	12	CLR	10.00		73	22.8	58	14.3	45	7.2	37	3	250		29.76			29.70	AA		29.70
21	0253	12	CLR	10.00		72	22.2	58	14.3	46	7.8	40	0	000		29.76			29.70	AA		29.70
21	0353	12	CLR	10.00		72	22.2	58	14.3	46	7.8	40	0	000		29.76	6	006	29.70	AA		29.70
21	0453	12	CLR	9.00		67	19.4	55	12.7	44	6.7	44	4	270		29.77			29.71	AA		29.71
21	0553	12	CLR	10.00		76	24.4	59	15.1	46	7.8	35	0	000		29.78			29.72	AA		29.72
21	0653	12	CLR	10.00		83	28.3	61	16.2	44	6.7	25	4	VR		29.79	1	010	29.73	AA		29.73
21	0753	12	CLR	10.00		87	30.6	60	15.3	35	1.7	16	6	270		29.78			29.72	AA		29.72
21	0853	12	CLR	10.00		91	32.8	61	15.9	34	1.1	13	6	010		29.77			29.72	AA		29.71
21	0953	12	CLR	10.00		92	33.3	63	17.1	40	4.4	16	8	070		29.76	8	011	29.70	AA		29.70
21	1053	12	CLR	10.00		94	34.4	63	17.2	38	3.3	14	7	VR		29.73			29.67	AA		29.67
21	1153	12	CLR	10.00		95	35.0	68	19.7	50	10.0	22	10	140		29.70			29.64	AA		29.64
21	1253	12	CLR	10.00		95	35.0	68	19.7	50	10.0	22	8	130		29.66	8	032	29.60	AA		29.60
21	1353	12	CLR	10.00		97	36.1	69	20.7	53	11.7	23	8	280		29.63			29.57	AA		29.57
21	1453	12	CLR	10.00		99	37.2	69	20.4	50	10.0	19	10	270		29.59			29.54	AA		29.54
21	1527	12	CLR	6.00	HZ	100	38.0	64	17.9	36	2.0s	11	21	140		29.59			M	SP		29.54
21	1553	12	CLR	4.00	HZ	97	36.1	64	17.7	38	3.3	13	19	180	30	29.61	5	018	29.55	AA		29.55
21	1653	12	CLR	10.00		90	32.2	64	17.5	44	6.7	20	15	270		29.61			29.55	AA		29.55
21	1753	12	CLR	10.00		85	29.4	61	15.9	41	5.0	21	15	280		29.61			29.55	AA		29.55
21	1853	12	CLR	10.00		82	27.8	59	14.9	39	3.9	22	17	290		29.63	3	007	29.57	AA		29.57
21	1953	12	CLR	10.00		79	26.1	58	14.5	40	4.4	25	17	290		29.64			29.58	AA		29.58
21	2053	12	CLR	10.00		78	25.6	57	14.0	39	3.9	25	21	280	27	29.63			29.57	AA		29.57
21	2153	12	CLR	10.00		78	25.6	56	13.5	36	2.2	22	21	280	26	29.63	8	001	29.57	AA		29.57
21	2253	12	CLR	10.00		78	25.6	56	13.1	34	1.1	20	15	280		29.63			29.57	AA		29.57
21	2353	12	CLR	10.00		74	23.3	58	14.2	44	6.7	34	4	160		29.63			29.57	AA		29.57

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

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA**

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

**(final)  
HOURLY OBSERVATIONS TABLE  
PALM SPRINGS INTL AIRPORT (93138)  
PALM SPRINGS , CA  
(05/2006)**

Elevation: 406 ft. above sea level  
Latitude: 33.828  
Longitude: -116.505  
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
21	0053	12	CLR	10.00		78	25.6	57	13.8	38	3.3	24	6	310		29.27	8	008	29.74	AA		29.75
21	0153	12	CLR	10.00		75	23.9	57	14.0	42	5.6	31	4	020		29.26			29.73	AA		29.74
21	0253	12	CLR	10.00		76	24.4	57	13.8	40	4.4	27	6	030		29.25			29.72	AA		29.73
21	0353	12	CLR	10.00		72	22.2	57	13.8	44	6.7	37	0	000		29.24	6	009	29.71	AA		29.72
21	0453	12	CLR	10.00		75	23.9	57	14.0	42	5.6	31	0	000		29.25			29.71	AA		29.73
21	0553	12	FEW200 SCT250	10.00		77	25.0	59	14.8	44	6.7	31	0	000		29.25			29.72	AA		29.73
21	0653	12	SCT200 BKN250	10.00		82	27.8	59	15.0	40	4.4	22	3	170		29.25	3	003	29.72	AA		29.73
21	0753	12	SCT200 BKN250	10.00		87	30.6	60	15.5	37	2.8	17	0	000		29.25			29.72	AA		29.73
21	0853	12	CLR	10.00		90	32.2	61	16.3	38	3.3	16	0	000		29.24			29.71	AA		29.72
21	0953	12	CLR	10.00		93	33.9	62	16.7	37	2.8	14	0	000		29.22	8	011	29.69	AA		29.70
21	1053	12	CLR	10.00		95	35.0	62	16.8	35	1.7	12	4	VR		29.20			29.67	AA		29.68
21	1153	12	SCT200 BKN250	10.00		95	35.0	62	16.7	35	1.7	12	3	VR		29.17			29.64	AA		29.65
21	1253	12	CLR	10.00		97	36.1	64	18.0	40	4.4	14	17	320	23	29.14	8	027	29.61	AA		29.62
21	1353	12	CLR	10.00		95	35.0	65	18.5	45	7.2	18	17	320	27	29.12			29.59	AA		29.60
21	1453	12	SCT100 OVC200	10.00		94	34.4	66	19.0	48	8.9	21	22	320	27	29.09			29.56	AA		29.57
21	1553	12	FEW100 OVC200	10.00		87	30.6	64	17.7	48	8.9	26	25	320	32	29.08	6	018	29.55	AA		29.56
21	1653	12	FEW100 OVC200	10.00		84	28.9	63	16.9	47	8.3	28	17	330	31	29.08			29.55	AA		29.56
21	1753	12	FEW100 OVC200	10.00		80	26.7	61	16.1	47	8.3	31	25	330	31	29.08			29.55	AA		29.56
21	1853	12	CLR	10.00		80	26.7	59	15.0	42	5.6	26	14	320	26	29.09	3	003	29.56	AA		29.57
21	1953	12	SCT100 OVC200	10.00		81	27.2	58	14.4	38	3.3	21	13	330	22	29.10			29.56	AA		29.58
21	2053	12	SCT100 BKN200	10.00		78	25.6	59	15.0	44	6.7	30	17	330		29.11			29.57	AA		29.59
21	2153	12	CLR	10.00		77	25.0	58	14.6	43	6.1	30	15	350	27	29.11	1	004	29.57	AA		29.59
21	2253	12	CLR	10.00		73	22.8	59	14.9	48	8.9	41	24	320		29.10			29.57	AA		29.58
21	2353	12	CLR	10.00		72	22.2	58	14.2	46	7.8	40	19	320	30	29.10			29.56	AA		29.58

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

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

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA  
(final)  
HOURLY OBSERVATIONS TABLE  
YUMA MARINE CORPS AIR STATION/YUMA INTL  
AIRPORT (23195)  
YUMA , AZ  
(05/2006)**

Elevation: 0 ft. above sea level  
Latitude: 32.657  
Longitude: -114.606  
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
21	0056	0	FEW200	7.00		81	27.0	61	15.9	45	7.0	28	9	150		29.52			M	AA		29.75
21	0156	0	FEW200	7.00		80	26.7	60	15.5	44	6.7	28	3	120		29.51	7	014	29.72	AA		29.74
21	0256	0	FEW200	7.00		79	26.1	57	13.9	37	2.8	22	11	150		29.50			29.71	AA		29.73
21	0356	0	CLR	7.00		79	26.0	57	13.7	36	2.0	21	10	140		29.49			M	AA		29.72
21	0456	0	CLR	7.00		76	24.4	59	14.9	45	7.2	33	3	040		29.49	6	007	29.70	AA		29.72
21	0556	0	CLR	7.00		76	24.4	59	14.9	45	7.2	33	3	050		29.49			29.71	AA		29.72
21	0656	0	CLR	7.00		78	25.6	59	14.9	43	6.1	29	3	340		29.50			29.71	AA		29.73
21	0756	0	CLR	7.00		82	27.8	59	15.1	40	4.4	22	3	210		29.51	3	010	29.72	AA		29.74
21	0856	0	FEW200	7.00		88	31.0	63	16.9	43	6.0	21	15	160	20	29.52			M	AA		29.75
21	0956	0	FEW200	7.00		88	31.0	63	16.9	43	6.0	21	13	140		29.52			M	AA		29.75
21	1056	0	FEW200	7.00		95	35.0s	64	17.5	39	4.0	14	17	160	25	29.49	8	007	29.70	AA		29.72
21	1156	0	FEW200	7.00		97	36.1	65	18.0	40	4.4	14	23	170	29	29.47			29.68	AA		29.70
21	1256	0	FEW200	7.00		100	37.8	65	18.2	38	3.3	12	30	160	34	29.44			29.65	AA		29.67
21	1356	0	FEW120 FEW200	7.00		101	38.3	63	17.2	30	-1.1	8	25	150	33	29.42	6	007	29.63	AA		29.65
21	1456	0	FEW120 FEW200	7.00		99	37.2	63	17.0	31	-0.5	9	25	160	32	29.37			29.58	AA		29.60
21	1656	0	FEW120 SCT200	7.00		96	35.6	61	16.2	30	-1.1	10	24	170	34	29.37	6	037	29.57	AA		29.60
21	1756	0	SCT120 BKN200	7.00		93	34.0	60	15.2	27	-3.0	9	27	150	34	29.35			M	AA		29.58
21	1856	0	SCT120 BKN200	7.00		91	33.0	59	14.8	27	-3.0	10	17	170		29.35			M	AA		29.58
21	1956	0	SCT120 BKN200	7.00		88	31.1	59	15.1	33	0.6	14	21	160	27	29.36	5	003	29.57	AA		29.59
21	2056	0	SCT120 BKN200	7.00		84	29.0	60	15.3	39	4.0	20	13	180		29.38			M	AA		29.61
21	2156	0	BKN120 BKN200	7.00		82	28.0	61	16.1	45	7.0	27	15	150		29.39			M	AA		29.62
21	2256	0	BKN100 BKN200	7.00		80	26.7	62	16.4	48	8.9	33	18	140		29.38	0	010	29.59	AA		29.61
21	2356	0	BKN100 BKN200	7.00		79	26.0	61	16.2	48	9.0	34	14	140		29.38			M	AA		29.61

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