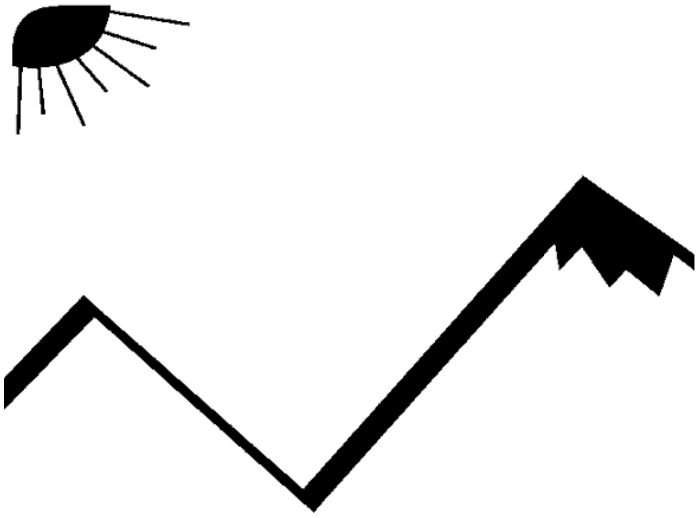
Natural Event Documentation

Corcoran and Bakersfield, California
December 8, 2006



San Joaquin Valley Unified
Air Pollution Control District

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Prepared By
Gary Arcemont, Air Quality Specialist/Meteorologist

Reviewed By
Scott Nester, Director of Planning
Steve Shaw, Supervising Air Quality Specialist

San Joaquin Valley Unified Air Pollution Control District
1990 E. Gettysburg Avenue
Fresno, California 93726

(559) 230-5800

www.valleyair.org

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. SUMMARY

PM10 exceedances recorded in the San Joaquin Valley on December 8, 2006 meet the criteria for natural events as defined by federal policies. High winds, reaching a one-minute average of 56 miles per hour in the Southwestern San Joaquin Valley, entrained dust from the desiccated soil in the area. This report demonstrates that without the natural event, there would not have been an exceedance of the PM10 National Ambient Air Quality Standard (NAAQS) on December 8, 2006.

A blowing dust event is comprised of entrainment of dust by high winds in the dust source area, and then deposition of dust in receptor areas with lower wind speeds. Once dust is suspended, it can be carried downwind by winds that are below the dust entrainment wind speed threshold. The strongest winds and blowing dust were observed in western Kern County.

The District investigated emission-generating activities during the episode, and found PM10 emissions for BACM controlled sources were approximately constant before, during and after the event. The District concludes that the PM10 exceedance would not have occurred without the high winds and wind-entrained dust.

2. BACKGROUND

The San Joaquin Valley Unified Air Pollution Control District (District) adopted its *Natural Events Action Plan (NEAP) for High Wind Events in the San Joaquin Valley Air Basin* in February 2006. The 1996 EPA memorandum, *Areas Affected by PM10 Natural Events*, describes the requirements for natural event data flagging as well as the requirements for a NEAP. The policy allows air quality data to be flagged so that it does not count toward an area's attainment status if it can be shown that there was a clear, causal relationship between the data and one of three categories of natural events: volcanic and seismic activity, unwanted wildland fires, and high wind events.

The purpose of this report is to demonstrate that there was a clear, causal relationship between the exceedance of the PM10 standard on December 8, 2006 in the San Joaquin Valley Air Basin and a high wind event and blowing dust, and demonstrate that without the high winds and blowing dust, PM10 would not have exceeded the standard. Although a combination of several factors contributed to the total PM10 concentrations, the District concludes that the exceedance would not have occurred in the absence of high winds and blowing dust.

Data flagging serves multiple purposes. According to the 1986 U. S. Environmental Protection Agency (EPA) guidance document, *Guideline on the Identification and Use of Air Quality Data Affected by Exceptional Events*, knowledge and understanding of what data represent are critical in the overall air quality process. The major thrust of a data flagging system is information exchange, and data flags are meant to prevent the misuse of data. Flagging the December 8, 2006 exceedance will ensure that the data is not misinterpreted.

3. NEAP CRITERIA

The NEAP requires the District, in consultation with California Air Resources Board (CARB) meteorologists, to declare a NEAP episode if criteria five and most or all of criteria one through four are met:

1. **There has been no recent, measurable precipitation in the potential source region for fugitive dust**
2. **The National Weather Service in Hanford and/or Sacramento has issued either a High Wind Warning, Wind Advisory, or Blowing Dust Advisory for certain parts of the San Joaquin Valley, and the predicted duration of high winds is sufficient to establish a NEAP episode**
3. **The surface weather maps show a potential for high winds to occur in the near future.**
4. **Strong winds exist higher in the atmosphere in conjunction with other weather phenomena that can drive the higher wind speeds closer to the surface**
5. **The 24-hour average PM10 level is forecast to be above the National Ambient Air Quality Standard at one or more San Joaquin Valley sites.**

On December 8, 2006 all of the NEAP criteria were met:

Criteria 1. Precipitation had not been reported in the valley for ten days prior to the event. Precipitation was much below normal for six months prior to the event.

Criteria 2. The National Weather Service in Hanford issued a Blowing Dust Advisory for the Central and Southern San Joaquin Valley.

Criteria 3 and Criteria 4. Strong winds were reported in the San Joaquin Valley Air Basin. The Maricopa air monitoring station recorded a one-minute average wind speed of 56 mph.

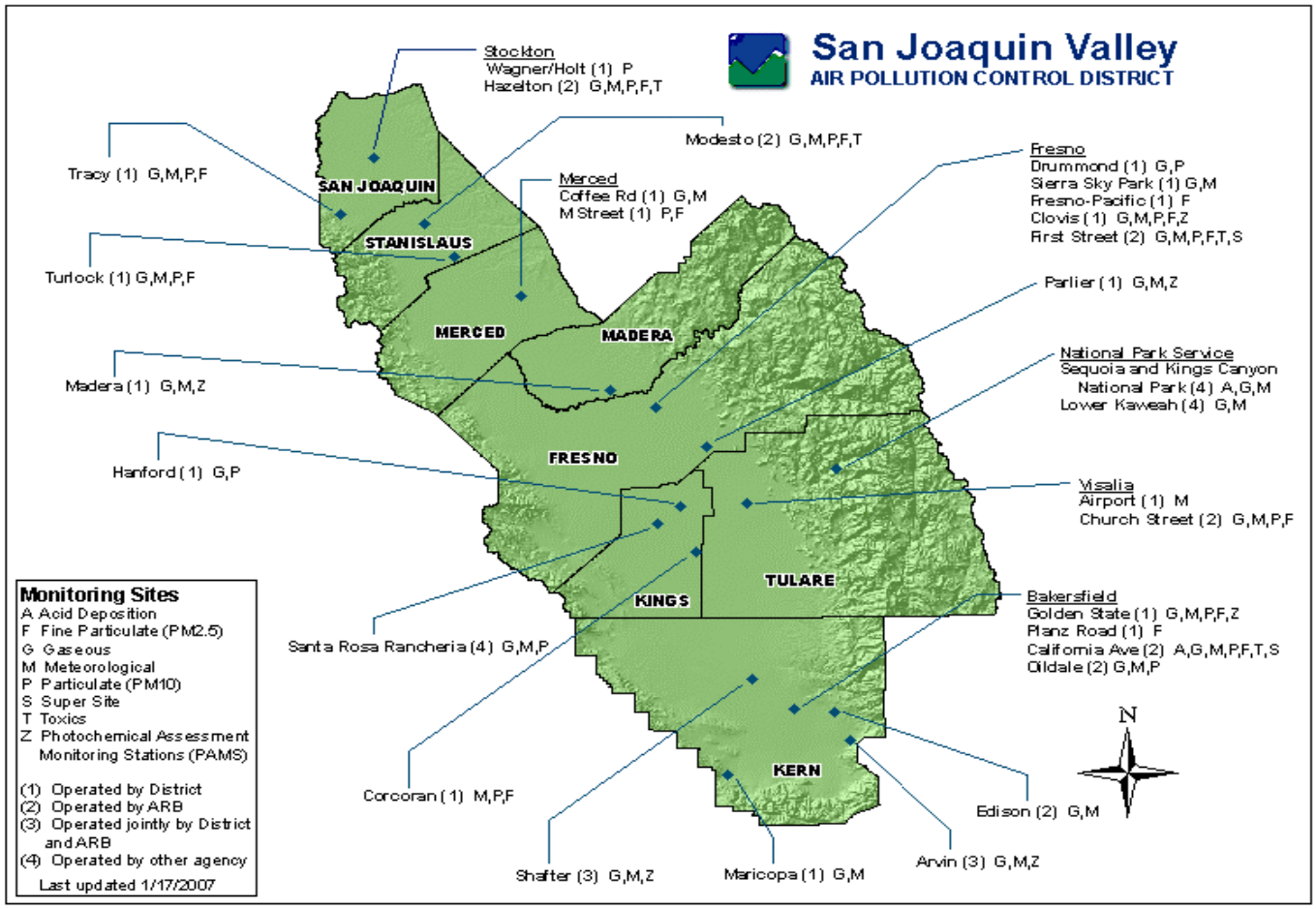
Criteria 5. The PM10 NAAQS was exceeded at Bakersfield and Corcoran.

4. SUMMARY OF NATURAL EVENT

4.1 PM10 Data Summary

On December 8, 2006, Federal Equivalent Method (FEM) samplers recorded concentrations in excess of the 24-hour NAAQS for PM10 in the San Joaquin Valley. The NAAQS is 150 μg/m^3 rounded to the nearest 10 μg/m^3, which equates to 155 μg/m^3. A map of San Joaquin Valley monitoring stations is provided in Figure 1.

Figure 1. San Joaquin Valley PM10 monitors.



The District collects hourly PM10 concentrations using PM10 Tapered Element Oscillating Microbalance (TEOM) type FEM monitors and Beta Attenuation Mass (BAM) type monitors. PM10 concentrations for continuous analyzers are presented Table 1. The PM10 concentration exceeded the NAAQS at Corcoran and Bakersfield-Golden State Highway on December 8.

EPA certifies TEOM type monitors to be equivalent to FRM monitors (EQPM-1090-079). TEOM monitors are located at Tracy, Corcoran and Bakersfield-Golden State. EPA does not consider BAM

monitors to be equivalent to FRM monitors. BAM monitors are used for forecasting purposes, but are not used for attainment determinations. A BAM monitor was located at the Fresno-First Street monitoring station.

Station	Type	Dec 4	Dec 5	Dec 6	Dec 7	Dec 8	Dec 9	Dec 10
Tracy	TEOM-FEM	16	27	27	30	28	4	8
Corcoran	TEOM-FEM	60	74	90	101	162	32	6
Fresno - First St.	BAM	87	89	110	136	129	23	18
Bakersfield - Golden State	TEOM-FEM	70	83	85	104	213	68	9

Table 1. PM10 daily averages in μg/m^3 recorded by continuous samplers.

PM10 concentrations for Federal Reference Method (FRM) sampler measurements on December 7, 2006 are shown in Table 2. The Santa Rosa Rancheria Tribal EPA operates the Santa Rosa Rancheria monitor. Filter measurements were made every six days in December. The District will submit particulate data into the CARB database by the required deadline. The NAAQS was not exceeded on December 7, 2006 because the PM10 daily average did not reach 155 μg/m^3 at any site.

Station	December 7, 2006
Stockton - Wagner Holt.	62
Stockton -Hazelton	79
Modesto	96
Turlock	83
Merced	69
Fresno- Drummond	132
Fresno- First St.	117
Clovis	97
Corcoran	136
Hanford	142
Santa Rosa Rancheria	141
Visalia	145
Oildale	Scheduled, but not collected
Bakersfield - Golden State Hwy.	154
Bakersfield -California Ave.	153

Table 2. PM10 daily averages in μg/m^3 recorded by filter samplers on December 7, 2006 (Federal Reference Method).

Table 1 shows the PM10 was gradually increasing from December 4 to December 7 due to stagnant weather conditions. On December 8, a frontal passage accompanied by high winds, caused the stagnant conditions to rapidly come to an end and a blowing dust event to begin.

4.2 Cause of PM10 NAAQS Exceedance

As described in the District's NEAP and in EPA policy, the following sources of documentation, if available, may be used to establish a clear, causal relationship between an exceedance and a natural event:

- Meteorological data (e.g., wind speed and wind direction to support a source receptor relationship)
- Modeling and receptor analysis
- Videos and/or photographs of the event and the resulting emissions
- Maps of the areas showing sources of emissions and the area affected by the event
- News accounts of the event
- Filter analysis
- In the case of high-wind events, states must document that BACM were required for anthropogenic sources at the time of the high-wind event

In consultation with the ARB, the District compiled documentation of the causal relationship between the PM10 NAAQS exceedance and the natural event. The District has determined that the cause of this PM10 event was wind entrained dust from local sources. PM10 emissions for BACM controlled sources were approximately constant before, during and after the event, indicating the significant increase in PM10 concentrations was caused by the wind entrained dust. This report will provide evidence of high winds in the Southern San Joaquin Valley on December 8, 2006, coinciding with an increase in PM10 at Corcoran and Bakersfield.

A report for the San Joaquin Air Quality Study Agency (Bush, 2004) concluded that winds at speeds at 8 m/s (17.6 mph) could be sufficient to entrain surface soil into the atmosphere. The Maricopa air monitoring station recorded a one-minute average wind speed of 56 mph, which clearly indicates wind was entraining dust into the atmosphere.

PM10 at Bakersfield rapidly increased from 30 $\mu g/m^3$ at hour 4 to 164 $\mu g/m^3$ at hour 5, as shown in Table 3 and Figure 2. The increase in Bakersfield PM10 concentrations coincided with a significant increase in wind speed at Bakersfield, which reported wind gusts to 28 mph from the ESE during hour 6. Winds then decreased and PM10 deposition occurred at Bakersfield. Strong winds returned to Bakersfield at midday, with gusts to 35 mph, and PM10 increased to 595 $\mu g/m^3$. Kettleman Hills (WSW of Corcoran, see Figure 3) reported gusts of 20 mph or greater from 6 am on December 8, 2006 to 4 am on December 9, 2006. PM10 peaked at hour 14 at Bakersfield, and hour 15 at Corcoran and hour 15 at Fresno. Fresno recorded the highest hourly PM10 concentration of 645 $\mu g/m^3$, but did not exceed the 24-hour NAAQS for PM10.

Table 3. December 8, 2006 PM10, wind direction and wind speed (mph).

Hour	Bakersfield PM10 μg/m^3	Bakersfield Meadows WD/WS	Corcoran PM10 μg/m^3	Fresno PM10 μg/m^3	Kettleman Hills WD/WS	Maricopa WD/WS
0	89	VRBL 5	99	127	S 4G13	WSW 8
1	95	CALM	104	93	SE 5G10	WSW 9
2	56	E 7	89	93	SE 1G10	SW 7
3	26	SE 6	73	60	S 3G4	SW 8
4	30	SE 7	44	28	SSE 13*	WSW 10
5	164	SE 14	58	25	S 18*	WSW 6
6	107	ESE 21G28	74	41	S 16G25	SW 9
7	118	ESE 20G26	120	72	SSW 19G27	SW 14
8	83	SSE 16	111	62	SSW 14G27	SE 8
9	309	VRBL 3	98	67	SSE 11G24	ESE 9
10	312	CALM	105	125	SSE 21*	ESE 10
11	178	SSW 10	137	87	SE 19G29	NNE 15
12	195	ESE 22G25	115	40	SE 9G29	NNW 7
13	337	SE 18	385	65	ESE 10G20	SSW 35 M54
14	595	SSE 22G35	493	207	SSE 22*	SSW 38 M56
15	203	SSE 25G32	598	645	SW 24G34	S 31 M45
16	90	SSE 21G26	193	365	WSW 26G34	SW 27 M48
17	251	SE 14	160	98	SW 33G46	WSW 24 M41
18	581	W 20G26	199	133	S 24G50	SW 22 M34
19	411	ENE 16	161	154	SSE 16G47	WSW18
20	268	N 5	161	165	SSW 23G38	S 15
21	240	NNE 3	173	133	S 13G34	WSW 11
22	195	N 7	100	122	SSW 24G25	SW 24 M35
23	173	CALM	46	81	SW 16G30	SW 20 M30
Avg.	**213**	**-**	**162**	**129**	**-**	**-**

Hour 0 is Midnight to 12:59:59 AM, Pacific Standard Time. WS = Wind speed. WD = Wind direction. PM10 data is preliminary. An asterisk indicates data is considered suspect. For Bakersfield-Meadows and Kettleman Hills, G = Gust is a peak 3 second average and sustained wind is a 10 minute average. For Maricopa, wind speed is an hourly average and the M denotes the peak minute average for that hour. Kettleman Hills is WSW of Corcoran (see Figure 3). Maricopa is SW of Bakersfield (see Figure 3). Weather data at Kettleman Hills and Bakersfield-Meadows was obtained from the National Weather Service website (weather.gov).

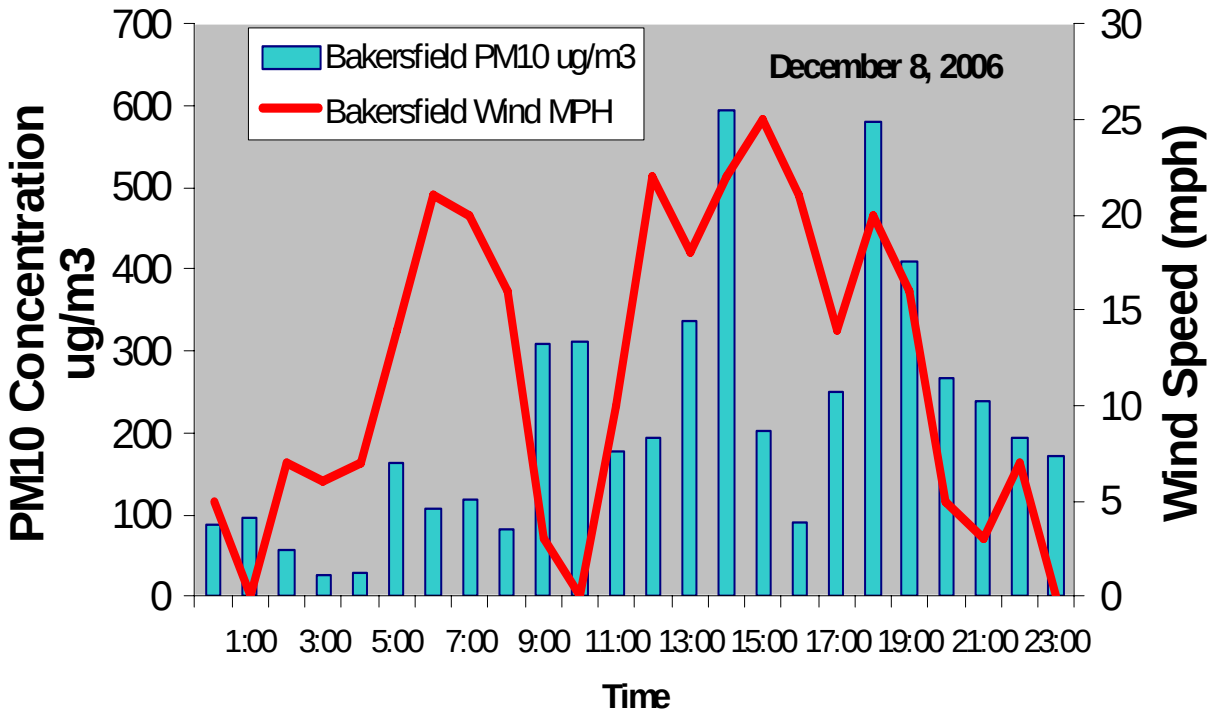


Figure 2. Hourly PM10 concentrations at Bakersfield-Golden State Highway and hourly wind speed at Bakersfield-Meadows Airport on December 8, 2006.

Figure 3. Map of Central California, showing San Joaquin Valley Air Basin boundary in blue.

5. NEAP CRITERIA - METEOROLOGICAL DATA

The following meteorological information is presented to demonstrate that the NEAP meteorological flagging criteria were met.

Criteria 1 - No recent, measurable precipitation in the potential source region for fugitive dust

Precipitation data is provided to demonstrate that the period preceding the blowing dust event was much drier than normal. Moisture content of soils is a very significant factor in a blowing dust event. Soils that have lower than normal moisture content during the driest time of the year would be more easily entrained by strong winds.

Precipitation

There had been ten consecutive days without measurable precipitation before the December 8, 2006 event. As shown in Table 4, precipitation was much below normal in the San Joaquin Valley for six months prior to the blowing dust event. Climate records indicate precipitation totals were 15 to 30 percent of normal for the five month period of July to November 2006.

Table 4. Days with precipitation recorded at Hanford, Bakersfield and Fresno for six months prior to December 8, 2006 (precipitation in inches).

Date	Hanford	Bakersfield	Fresno
November 27, 2006	0.15	0.02	0.04
November 26, 2006	0.01	Trace	0.02
November 14, 2006	0	0	0.04
November 13, 2006	Trace	0	0.12
November 11, 2006	Trace	Trace	Trace
November 2, 2006	0	0	0.01
October 14, 2006	0.01	0	0
October 13, 2006	0.01	0.18	Trace
October 5, 2006	0.03	0	0.08
October 2, 2006	0.02	0.10	0
October 1, 2006	0.02	0.01	Trace
July 29, 2006	Trace	0	0
July 22, 2006	0	Trace	0
July 20, 2006	0	Trace	0
July 18, 2006	0	0	Trace
6 month precip. Jun 8 - Dec 8, 06	**0.23**	**0.31**	**0.31**
% normal Jul-Nov	**17%**	**29%**	**17%**

No precipitation was recorded at Hanford, Bakersfield and Fresno during June, August and September 2006.

Because the Southern San Joaquin Valley reported much below normal precipitation before the dust event, the soils were dry enough to become entrained into the atmosphere during the high winds.

Figure 4 is a map of annual precipitation for the San Joaquin Valley Air Basin. The map

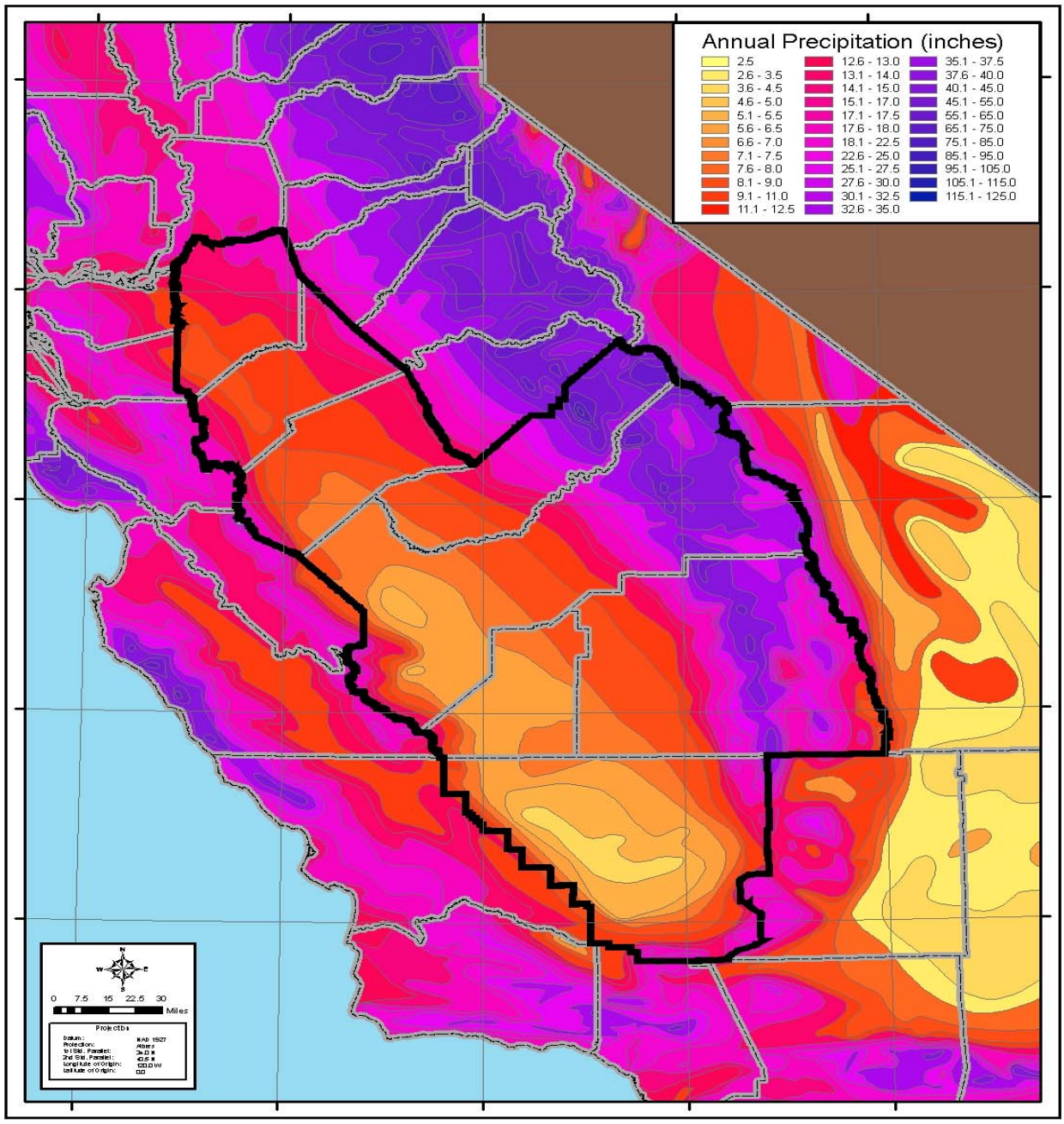


Figure 4. Central California annual average precipitation in inches. The San Joaquin Valley Air Basin is outlined in black.

demonstrates that the west side of the Central and Southern San Joaquin Valley has the lowest annual precipitation of any area west of the desert areas of Owens Valley, Mojave Desert and Antelope Valley. Since the west side of Kern County has the lowest annual precipitation in the San Joaquin Valley, the undisturbed soils, on the average, are drier than other parts of the valley.

Criteria 2 - Blowing dust advisory issued by the National Weather Service

The National Weather Service in Hanford, CA issued a Blowing Dust Advisory at 3:22 pm PST on December 8, 2006 to notify the public that gusty southeast winds had created areas of blowing dust in the Central and Southern San Joaquin Valley (see Figure 5).

Figure 5. Blowing Dust Advisory issued by the National Weather Service in Hanford, CA on December 8, 2006.

URGENT - WEATHER MESSAGE
NATIONAL WEATHER SERVICE HANFORD CA
322 PM PST FRI DEC 8 2006

CAZ089>092-090600-
/O.NEW.KHNX.DU.Y.0002.061208T2322Z-061209T0600Z/
WEST CENTRAL SAN JOAQUIN VALLEY-EAST CENTRAL SAN JOAQUIN VALLEY-
SOUTHWESTERN SAN JOAQUIN VALLEY-SOUTHEASTERN SAN JOAQUIN VALLEY-
322 PM PST FRI DEC 8 2006

...BLOWING DUST ADVISORY IN EFFECT UNTIL 10 PM PST THIS EVENING
FOR THE CENTRAL AND SOUTHERN SAN JOAQUIN VALLEY..

THE NATIONAL WEATHER SERVICE IN HANFORD HAS ISSUED A BLOWING DUST
ADVISORY...WHICH IS IN EFFECT UNTIL 10 PM THIS EVENING FOR THE
CENTRAL AND SOUTHERN SAN JOAQUIN VALLEY.

GUSTY SOUTHEAST WINDS TO 30 MPH HAVE CREATED AREAS OF BLOWING DUST
WITH VISIBILITIES FALLING TO NEAR ZERO AT TIMES. THE BLOWING DUST
WILL BE MOST WIDESPREAD IN RURAL AREAS OF THE SOUTHERN SAN JOAQUIN
VALLEY...WHERE THE SOIL IS EXCEPTIONALLY DRY. IN THE CENTRAL SAN
JOAQUIN VALLEY...BLOWING DUST WILL BE MOST LIKELY ENCOUNTERED IN
FRESNO COUNTY.

DRIVERS IN THE CENTRAL AND SOUTHERN SAN JOAQUIN VALLEY SHOULD EXERCISE CAUTION DURING THE EVENING COMMUTE. VISIBILITIES WILL CHANGE RAPIDLY AND SHARPLY AS WIND GUSTS PICK UP THE DUST...AND COULD FALL FROM SEVERAL MILES TO ONLY A FEW FEET IN A MATTER OF MINUTES.

A BLOWING DUST ADVISORY MEANS THAT BLOWING DUST WILL RESTRICT VISIBILITIES. TRAVELERS ARE URGED TO USE CAUTION.

$$
STAY TUNED TO NOAA WEATHER RADIO...OR YOUR FAVORITE WEATHER SOURCE...LATER MORE INFORMATION ON THIS HAZARDOUS EVENT.

WEATHER.GOV/HANFORD

SANGER

Criteria 3 and 4 - Strong winds

As shown in Tables 5, 6, 7 and 8, strong gusty winds occurred in many parts of the Central and Southern San Joaquin Valley during the December 8, 2006 blowing dust event. In addition, the high winds persisted for many hours. The high wind event resulted in entrainment of dust followed by deposition of dust as the plume moved to the northwest through the San Joaquin Valley, from the Southern San Joaquin Valley to the Central San Joaquin Valley.

During the blowing dust event, Bakersfield reported sustained SSE winds to 25 mph with gusts to 35 mph. Kettleman Hills, located on the west side of the San Joaquin Valley, reported gusts to 50 mph. Kettleman Hills also reported a twenty-two hour period with gusts of 20 mph or greater (from 6 am on December 8, 2006 to 4 am on December 9, 2006). Maricopa, located on the southwest side of the San Joaquin Valley, reported a one-minute average wind speed of 56 mph.

Long-term wind monitoring data from the Department of Water Resources measured on the southwest side of the San Joaquin Valley indicates that hourly averaged winds above 13 mph hour occur 3.7 % of the time in Taft and winds above 16 mph occur 1.6% of the time in Wasco and 3.3 % of the time in Coalinga. These statistics indicate that windy conditions are rare and unusual in the southwestern part of the San Joaquin Valley, but do occur at times. Department of Water Resources extreme annual wind statistics indicates that the mean annual peak gust for Lemoore is 42 mph. For this event, the peak gust was 38 mph at Lemoore.

Table 5. Peak wind speeds for December 8, 2006, recorded by National Weather Service stations.

Monitoring Station	Peak Gust (mph)	Peak Sustained Wind (mph)
Stockton	25	18
Modesto	23	15
Merced	26	18
Madera	28	20
Fresno	31	22
Hanford	37	24
Lemoore	38	26
Visalia	30	22
Porterville	31	22
Bakersfield	35	25

(ASOS/AWOS: Gust is peak 3 second average, Sustained is 10 minute average)

Table 6. Peak wind data for December 8, 2006, from Remote Automatic Weather Stations (RAWS).

Monitoring Station	Peak Gust (mph)	Peak Sustained Wind (mph)
San Luis NWR	24	15
Santa Rita	50	27
Los Banos	40	22
Kettleman Hills	50	33
Bear Peak	28	17

(RAWS: Gust is hourly peak, Sustained is a 10 minute average)

Table 7. Maximum hourly averaged wind data for December 8, 2006.

Monitoring Station	Maximum Hourly Averaged Wind Speed (mph) on December 8, 2006	Maximum Minute Averaged Wind Speed (mph) on December 8, 2006
Tracy	18	26
Stockton	12	Not Available
Modesto	12	Not Available
Turlock	13	17
Merced	17	21
Madera	14	22
Fresno - First St.	14	Not Available
Clovis	13	21
Parlier	19	32
Corcoran	15	21
Maricopa	38	56
Bakersfield - Golden State Highway	14	20

Hourly averaged wind speed is typically much lower than peak gust
Minute averaged wind speed is not considered a peak gust
Data source: District and CARB

Table 8. Hourly averaged wind data for December 8, 2006, from California Irrigation Management Information System (CIMIS) monitors.

Monitoring Station	Location	Maximum Hourly Averaged Wind Speed (mph)
Stratford	WNW of Corcoran	19.8
Kettleman	WSW of Corcoran	15.1
Alpaugh	SE of Corcoran, Between Corcoran and Bakersfield	17.6
Delano	Between Corcoran and Bakersfield	14.0
Shafter	Between Corcoran and Bakersfield	16.7
Arvin-Edison	SE of Bakersfield	12.8

Hourly averaged data is typically much lower than peak gust. Sensor height is 2m above ground level (AGL). Wind speed measured at 2 meters would typically be would be lower than wind speed measured at 10 meters at the same location.

Wind profiles documenting strong winds aloft in the San Joaquin Valley on December 8, 2006 are provided in the appendix. Strong winds associated with the frontal passage are evident in the wind profiles.

Surface weather maps for the event are also provided in the appendix. Closely packed isobars, which are indicators of strong surface winds, are evident in these maps.

Wind monitoring sampling parameters

Wind monitoring sampling parameters vary with sensor height and sampling and averaging interval. To make a meaningful comparison of wind speed between locations, the wind monitoring should have consistent sampling height and averaging interval. Unfortunately, wind sensor heights and averaging periods vary with network and station, as presented in Table 9. Wind measurements for air quality monitoring are typically made at 10 meters above ground level.

Monitoring Network	Sensor Height (m)	'Sustained Wind' Definition	'Gust' Definition
District and CARB	10	Hourly or Minute Average.	Gust Not Reported
National Weather Service AWOS/ASOS	9 to 10	10-Minute Average.	3 Second Average
RAWS	6	10-Minute Average	Instantaneous Peak
CIMIS	2	Hourly Average	Gust Not Reported

Table 9. Wind monitoring network sampling parameters.

Caution should be exercised when comparing wind statistics from different stations because hourly averaged wind speeds can be significantly lower than the peak gust. For example, the peak hourly averaged wind speed recorded at the Maricopa air monitoring station on December 8 was 38 mph and the peak one-minute average was 56 mph during the same hour. The peak hourly averaged wind speed recorded at the District air-monitoring station in Bakersfield was 14 mph and the three-second average peak gust recorded at Bakersfield Meadows Airport was 35 mph. Strong gusts entrain dry soils into the air, creating the blowing dust event.

Variation in wind speed with height

Over a flat surface with no obstructions and a well-mixed atmosphere, wind speed typically varies logarithmically with height above ground (Department of Water Resources, 1978). This relationship can be modeled using the equation:

$$V_1/ V_2 = (Z_1/ Z_2)^p$$

where:

V = wind speed,

Z = height above ground,

p is approximately 0.143 for flat terrain and 0.4 for rough terrain,

and the subscripts 1 and 2 denote two different sampling heights above ground level (AGL). It should be noted that there are some weather conditions where this equation is not representative of the vertical wind structure. However, it is appropriate to use this equation for the strong wind conditions that occurred on December 8, 2006.

Using this equation, if a wind speed of 14 mph was reported at 2 meters AGL in flat terrain, then the wind speed would be 17.6 mph at 10 meters AGL at the same location and the same time. As stated previously, a report for the San Joaquin Air Quality Study Agency (Bush, 2004) concluded that winds at speeds at 8 m/s (17.6 mph at 10 meters AGL) could be sufficient to entrain surface soil into the atmosphere. Therefore, the dust entrainment wind speed threshold is 14 mph at 2 meters AGL and a wind speed of 14 mph at CIMIS stations is required for dust entrainment.

6. SOURCE-RECEPTOR RELATIONSHIP

District staff examined the source-receptor relationship for this blowing dust event. Observers in the field indicated that the blowing dust originated in the Southern San Joaquin Valley. An observer in Alpaugh (located between Corcoran and Bakersfield, see Figure 6) reported seeing a 'giant dust cloud' to the south, towards Bakersfield. The observer reported that the cloud was 'brown and dusty' and was rising to several thousand feet.

Figure 6. Map of California, showing location of Alpaugh. San Joaquin Valley Air Basin boundary is in blue.

District employees observed the cloud moving northwest across Central Fresno County in the afternoon. Winds were from the southeast at the time, so the dust plume first influenced the Bakersfield monitor and then traveled northwestward where it influenced the Corcoran and Fresno-First Street monitor several hours later. With time, the plume spread throughout the Central and Southern San Joaquin Valley. The Northern San Joaquin Valley does not appear to have been as influenced by the dust plume as the Central and Southern regions.

The District performed a backward trajectory analysis using the NOAA HYSPLIT Numerical Model to examine the air parcel trajectory during the event. Figure 7 is a plot of the trajectory showing the parcel path over the Southern San Joaquin Valley, where the blowing dust was reported, to the Corcoran and Bakersfield particulate monitors.

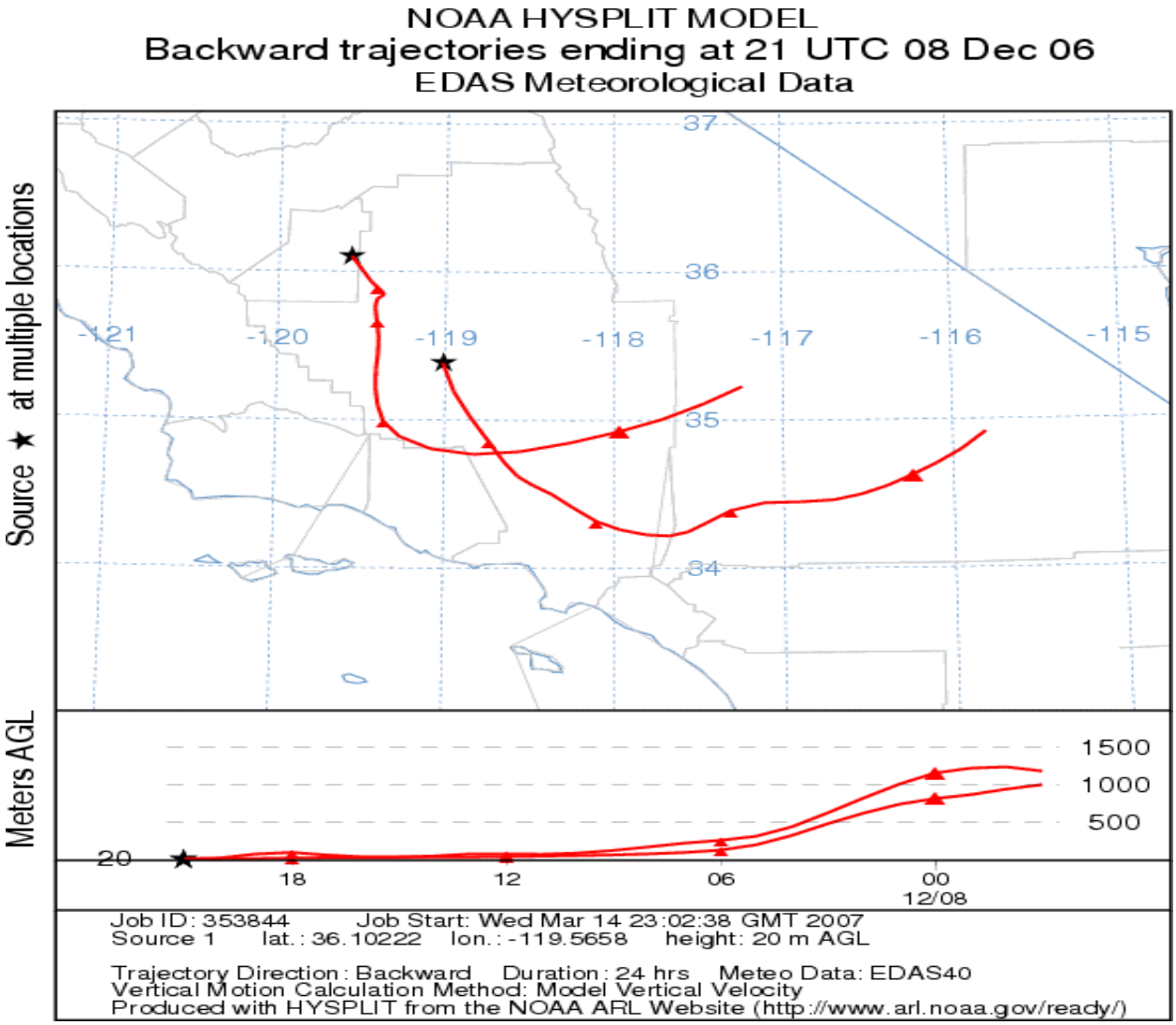


Figure 7. Backward trajectory for 1 PM PST on December 8, 2006, showing air parcel trajectories to the Corcoran and Bakersfield receptors during the blowing dust event.

The trajectory shows that before arriving in the San Joaquin Valley, the trajectory passed over the Tehachapi Mountains, and Mount Pinos and the mountains of Northern Ventura County. This type of trajectory can enhance the strong winds as they drop from high elevations to lower elevations where the strong winds encounter dry soils, producing a dust cloud that was witnesses by observers in the Southern San Joaquin Valley. The National Weather Service reported blowing dust at the Bakersfield Meadows Field Airport in weather observations taken at 2:05 pm, 2:25 pm and 2:50 pm. Winds were from the SSE gusting to 35 mph and relative humidity was 8 to 9 percent at the time the blowing dust observations were reported.

From December 4 to December 7, PM10 gradually increased due to stagnant conditions (see Table 1). On the morning of December 8, a frontal passage accompanied by high winds, caused the stagnant conditions to rapidly come to an end and a blowing dust event to begin. Later in the day on December 8, precipitation was reported in some parts of the valley. PM10 concentrations dropped significantly in the clean air mass behind the front, as evident in December 9 and December 10 PM10 concentrations (see Table 1).

The PM 2.5 to PM10 ratio was very small during the high PM10 event (approximately 0.01 to 0.10), which is characteristic of a blowing dust event and indicates more coarse particulate was present.

7. EMISSIONS SOURCES AND ACTIVITY DATA

The District has best available control measures (BACM) in place as described in the *2006 PM10 Plan*, the NEAP, and previous plans. Most notable among the District's dust controls are Regulation VIII (the fugitive dust rules, which were last amended in August 2004), and Conservation Management Practices (CMPs, District Rule 4550, adopted May 2004 and re-adopted August 2004), through which the District has documented CMPs on over three million acres of agricultural land in the San Joaquin Valley Air Basin.

Agricultural burning was permitted in the San Joaquin Valley on December 8, 2006 as part of the District's Smoke Management Allocation System (Rule 4103); however burning was not allowed in the vicinity of Corcoran or Bakersfield. On December 8, 2006, agricultural burning was not permitted in Merced, Madera, Fresno, Kings, Tulare Counties and the valley portion of Kern County.

Rule 4901, Wood Burning Fireplaces and Wood Burning Heaters, includes episodic wood burning curtailment during the months of November through February. This rule prohibits anyone from operating a wood burning fireplace or wood burning heater whenever the District notifies the public that an episodic curtailment is in effect, as determined by the Air Quality Index (AQI). The District issues curtailments by county, and the District may prohibit or discourage burning. On December 8, 2006, residential wood combustion was discouraged in Stanislaus, Merced, Madera, Fresno, Kings, Tulare Counties and the valley portion of Kern County.

Based on a survey of the available information, there is no evidence of unusual emissions on December 8, 2006, other than the blowing dust event. Smoke from agricultural burns and residential wood combustion does not appear to have added any significant amount of PM10 to the samples recorded at Corcoran and Bakersfield.

PM10 was emitted from BACM controlled sources. BACM controls were overwhelmed by the high winds. The Conservation Management Practices program was in place for agricultural operations on December 8. Based on reports from District field staff and from industry and agricultural operations, the District estimates that activities that generate anthropogenic fugitive PM10 were approximately constant before, during and after the event, indicating the significant increase in PM10 concentrations was caused by the wind entrained dust. A summary of the dust related complaints reported on December 8 in the Central and Southern San Joaquin Valley Air Basin is provided in Table 10.

Location	Time Reported	Nature Of Complaint
Bakersfield	8:15 AM	Construction without water truck operating. Wind was causing some dust problems. Wind gusts to 40 mph.
Bakersfield	10:45 AM	Blowing dust at construction site.
Bakersfield	11:13 AM	Dust at construction site. Earth moving equipment was operating during a windstorm.
Bakersfield	11:53 AM	Blowing dust and sand. Dust event from strong winds. Blowing dust in dirt lot.
Bakersfield	2:03 PM	Blowing dust at construction site. Earth moving equipment was operating.
Bakersfield	2:16 PM	Dust at construction site.
Bakersfield	2:21 PM	Blowing dust at construction site. Whenever winds blow, dust is a problem.
Bakersfield	2:48 PM	Dust at construction site.

Table 10. Summary of dust-related complaints for December 8, 2006.

8. REFERENCES

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National Oceanic and Atmospheric Administration (NOAA): Surface weather maps

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9. APPENDIX - SUPPORTING DOCUMENTS

9.1 Newspaper Article

-

Newspaper Article Discussing Dust Event (Fresno Bee)

Storm blows in

Valley takes on a Dust Bowl look Friday as high winds whip up parched fields and turn skies murky brown
By Jim Guy / The Fresno Bee
Friday, December 9, 2006

It's been late in arriving, but rain is on the way, the National Weather Service says. Not a moment too soon, either, with the central San Joaquin Valley down 2 inches from its normal levels for this time of year.

The first hint of changing weather, which ended a fine run of crisp and clear fall days, began Friday as strong winds swept in, raising dust clouds from the parched Valley floor and prompting a dust advisory from the weather service. The California Highway Patrol said there was no uptick in collisions during the period the advisory was in effect.

The winds were born of a clash between the vanguard of the storm and a high pressure system over the nation's Great Basin, which includes portions of eastern Nevada, western Utah and northwest Arizona, said Gary Sanger, a meteorologist with the weather service.

The first wave of the storm pushed rapidly through the Valley, dropping little rainfall because the air is so dry, Sanger said. Another band of rain moving down from the Bay Area was on a course to arrive after midnight and be gone by sunrise, he added.

The real weather is likely to hit tonight, bringing rain most of tonight and well into Sunday, Sanger said. In the Sierra, a winter storm watch was issued for areas north of Kings Canyon National Park. That could mean as much as a foot of snow with levels down to about 5,000 feet.

As usually happens, the rainfall will be followed by a high pressure system over the Valley, bringing seasonal fog, which covers much of the Valley floor during winter months, Sanger said.

A long-range forecast shows the possibility of another storm front next weekend, he added.

9.2 Meteorological Data

Climate Summaries

BAKERSFIELD WSO AIRPORT, CALIFORNIA (040442)

Period of Record Monthly Climate Summary

Period of Record: 10/1/1937 to 12/31/2005

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	57.4	63.6	68.8	75.8	84.2	92.1	98.6	96.6	90.9	80.7	67.3	57.9	77.8
Average Min. Temperature (F)	38.5	42.1	45.4	49.7	56.5	63.1	69.0	67.5	62.9	54.0	44.0	38.5	52.6
Average Total Precipitation (in.)	1.08	1.17	1.16	0.66	0.22	0.08	0.01	0.04	0.11	0.30	0.61	0.80	6.23
Average Total SnowFall (in.)	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

Percent of possible observations for period of record:

Max. Temp.: 99.6% Min. Temp.: 99.6% Precipitation: 99.7% Snowfall: 92.4% Snow Depth: 92.2%

Western Regional Climate Center, wrcc@dri.edu

FRESNO WSO AIRPORT, CALIFORNIA (043257)

Period of Record Monthly Climate Summary

Period of Record: 7/ 1/1948 to 12/31/2005

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	54.4	61.5	66.9	74.6	83.4	91.6	98.1	96.2	90.5	79.8	65.2	54.6	76.4
Average Min. Temperature (F)	37.6	40.6	43.7	47.8	54.1	60.2	65.4	63.7	59.3	50.9	42.2	37.2	50.2
Average Total Precipitation (in.)	2.13	1.88	1.94	1.00	0.37	0.15	0.01	0.01	0.17	0.53	1.17	1.58	10.94
Average Total SnowFall (in.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

Percent of possible observations for period of record:

Max. Temp.: 100% Min. Temp.: 100% Precipitation: 100% Snowfall: 91.2% Snow Depth: 91.3%

Western Regional Climate Center, wrcc@dri.edu

HANFORD 1 S, CALIFORNIA (043747)

Period of Record Monthly Climate Summary

Period of Record: 12/1/1927 to 12/31/2005

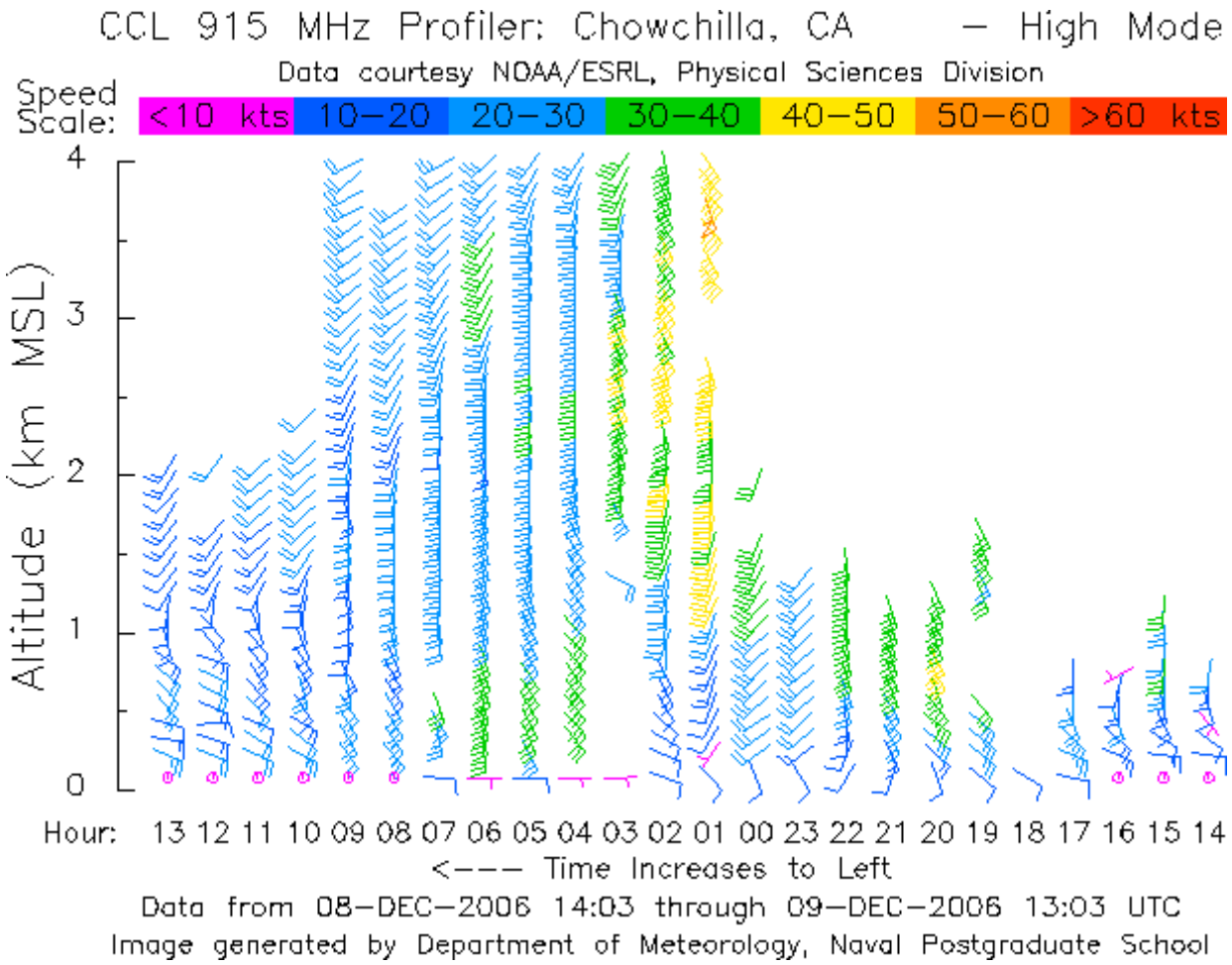
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	54.4	61.5	67.6	75.3	83.7	91.0	97.4	95.7	90.1	80.4	66.2	55.2	76.6
Average Min. Temperature (F)	35.7	38.8	42.4	46.6	52.7	58.3	62.6	60.6	55.8	47.8	38.8	35.0	47.9
Average Total Precipitation (in.)	1.58	1.53	1.46	0.72	0.24	0.08	0.01	0.01	0.13	0.37	0.82	1.28	8.22
Average Total SnowFall (in.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

Percent of possible observations for period of record

Max. Temp.: 98.4% Min. Temp.: 98.1% Precipitation: 98.8% Snowfall: 98.2% Snow Depth: 98.2%

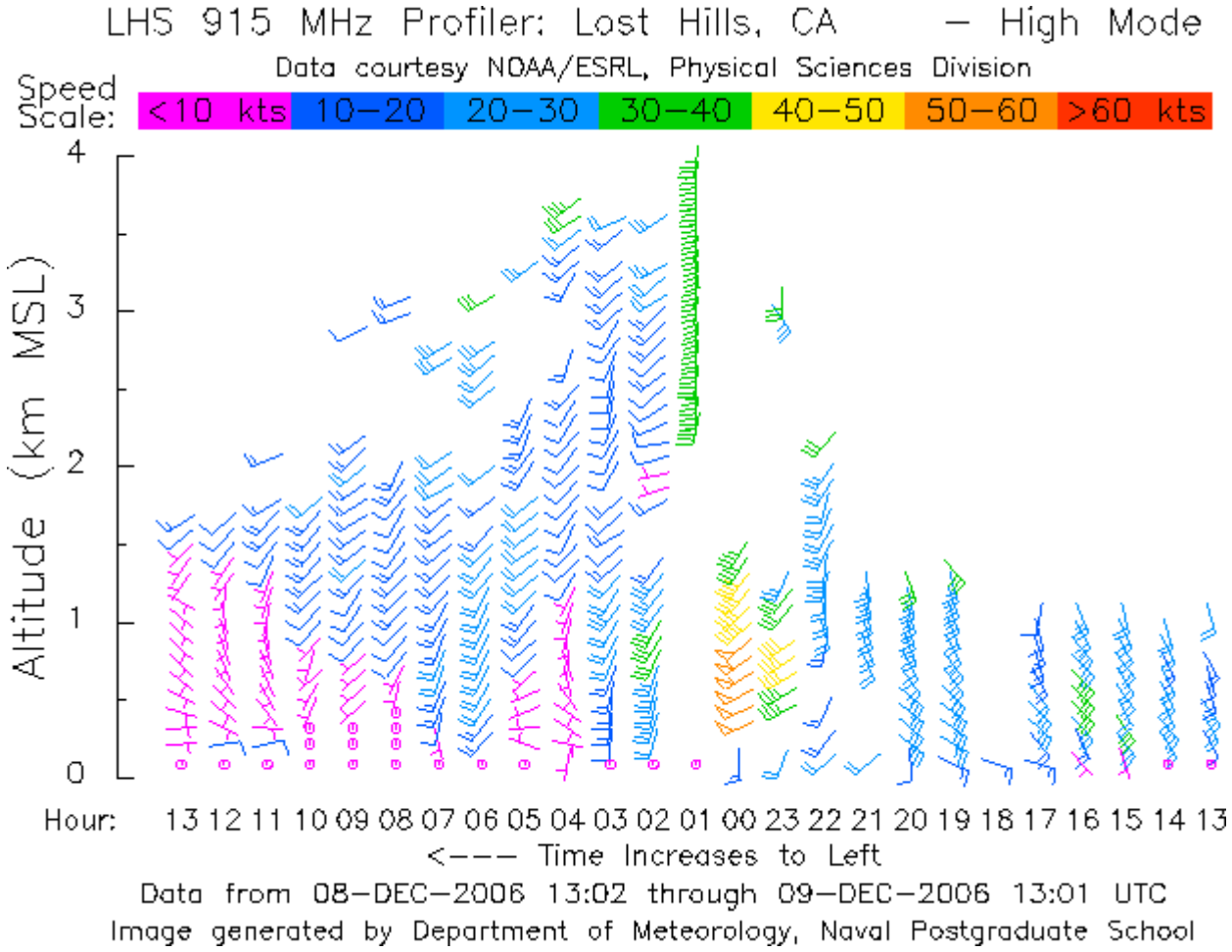
Western Regional Climate Center, wrcc@dri.edu

Wind Profiles

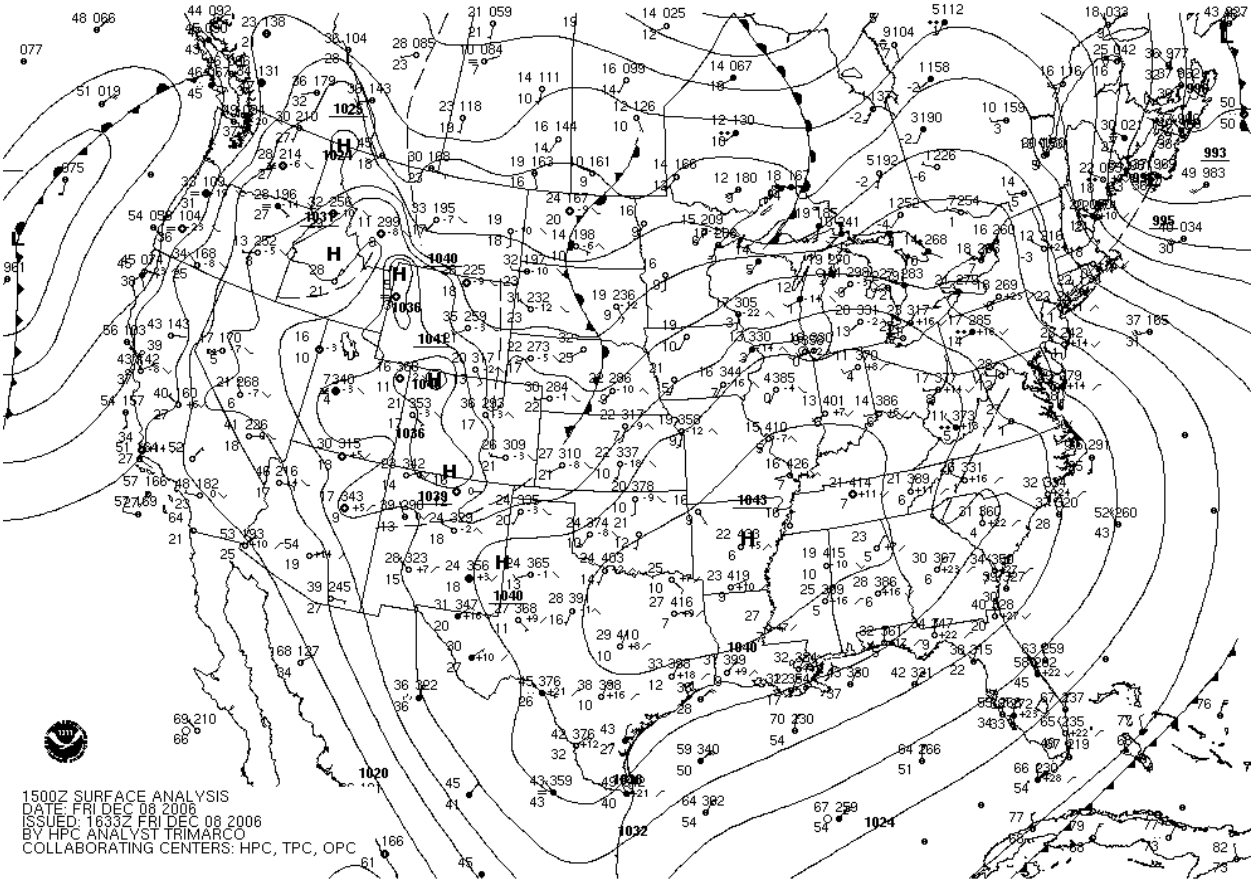


Time in UTC (Coordinated Universal Time, also abbreviated with "Z" or "GMT") is also called Greenwich Mean Time (Mean Solar Time at the Royal Observatory in Greenwich, England). Greenwich Mean Time is eight hours ahead of Pacific Standard Time (PST) and seven hours ahead of Pacific Daylight Time (PDT). For example, 12 UTC or 12 Z is 4 AM PST or 5 AM PDT.

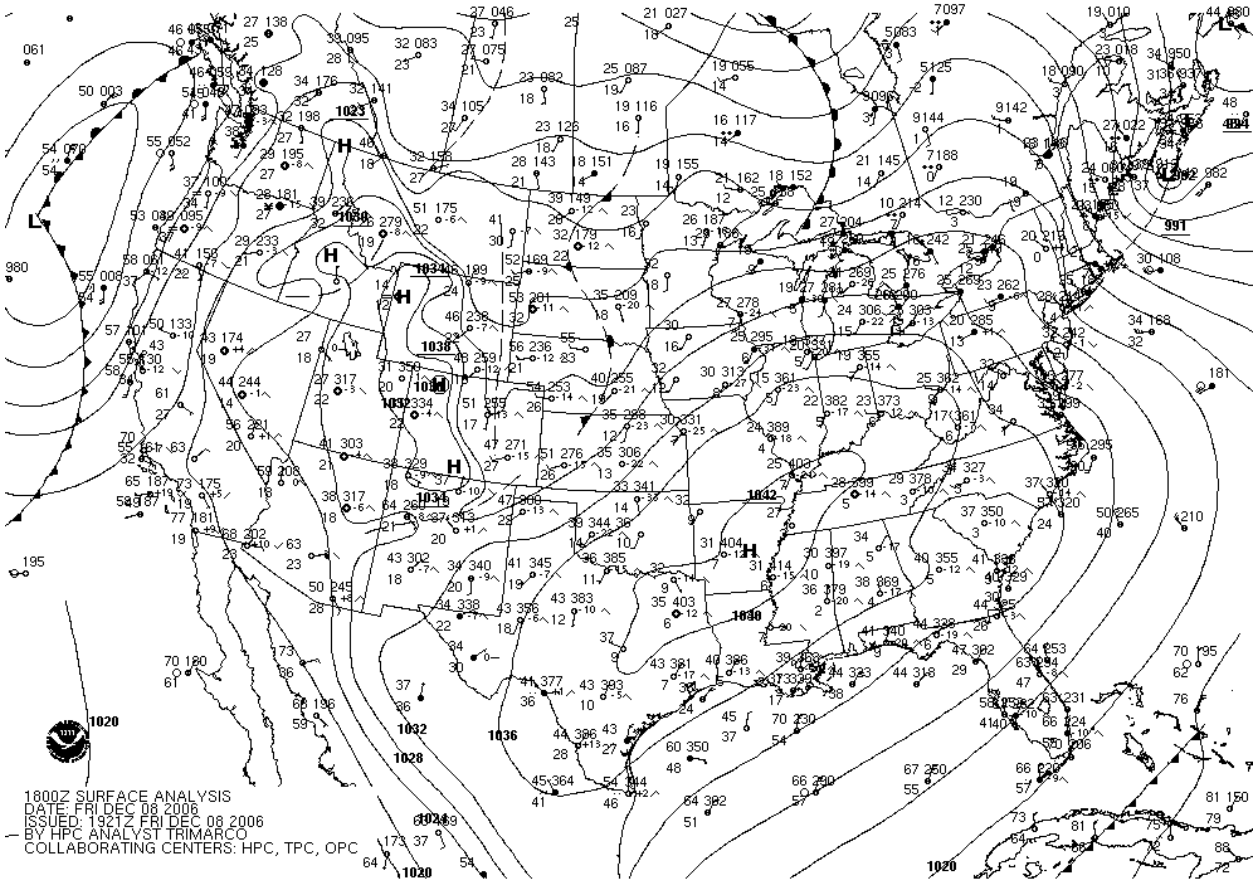
Wind barbs point in the direction "from" which the wind is blowing. A circle represents calm conditions. Flags (straight lines) attached at the end of the wind barbs indicate wind speed. Each short flag represents 5 knots, and each long flag represents 10 knots. A long flag and a short flag represent 15 knots, simply by adding the value of each flag together (10 knots + 5 knots = 15 knots). The color-coded speed scale is also provided on top of the plot. A triangular flag at the end of a wind barb represents a 50-knot wind. This wind barb is color-coded orange in the plot shown above.


LHS 915 MHz Profiler: Lost Hills, CA — High Mode
Data courtesy NOAA/ESRL, Physical Sciences Division
Speed Scale:
<10 kts
10–20
20–30
30–40
40–50
50–60
>60 kts
Altitude (km MSL)
4
3
2
1
0
Hour: 13 12 11 10 09 08 07 06 05 04 03 02 01 00 23 22 21 20 19 18 17 16 15 14 13
<--- Time Increases to Left
Data from 08–DEC–2006 13:02 through 09–DEC–2006 13:01 UTC
Image generated by Department of Meteorology, Naval Postgraduate School

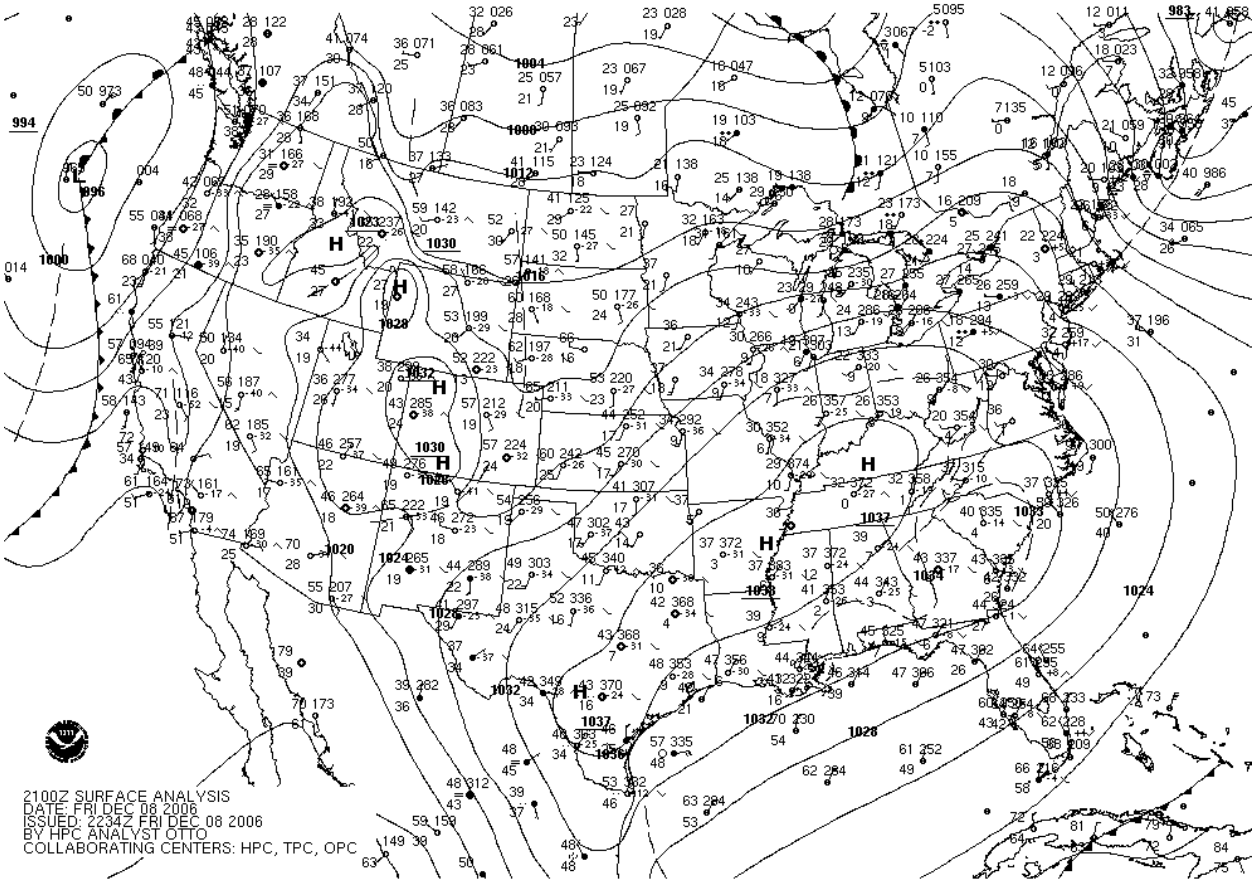
Surface Weather Maps



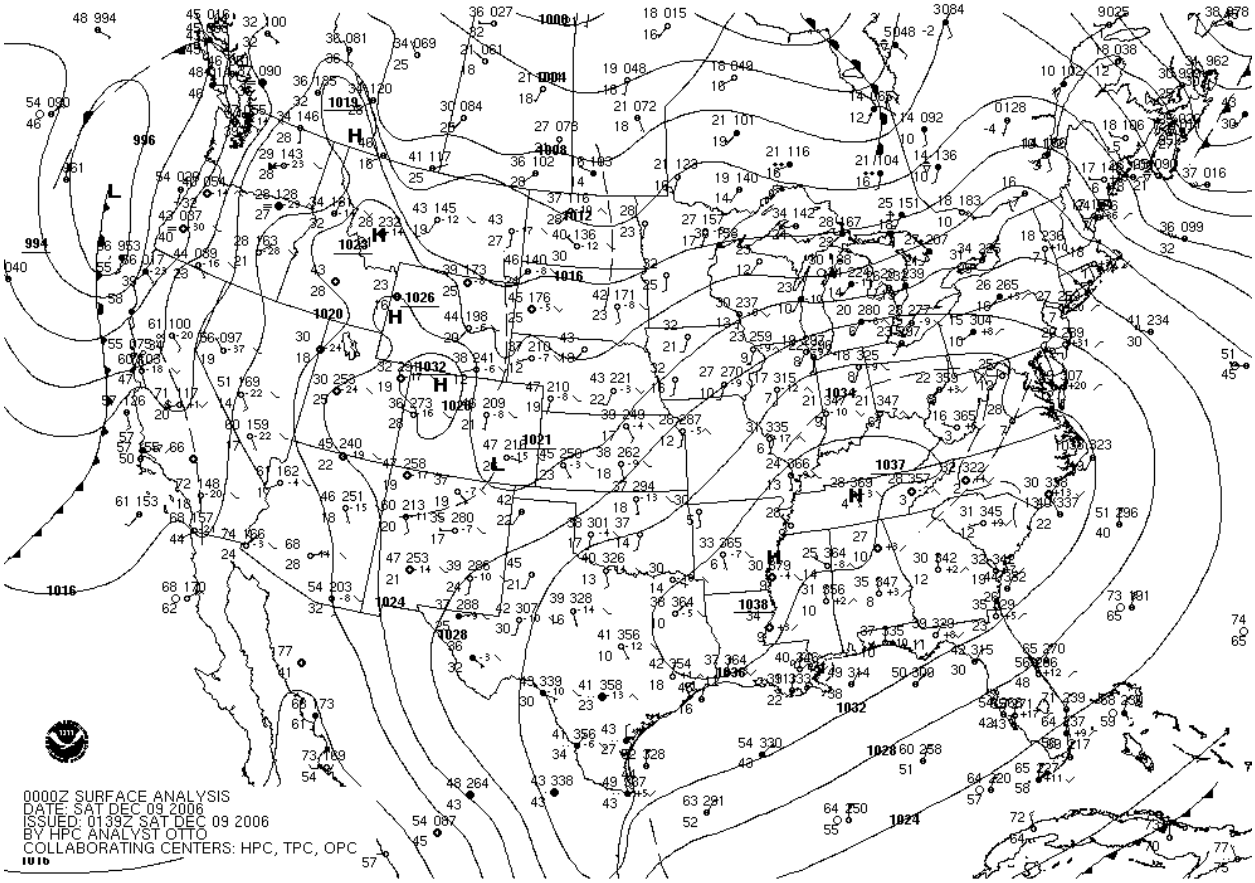
Surface weather map for 7 AM PST on December 8, 2006. Closely packed isobars are evident over Central California, which is an indicator of strong surface winds.



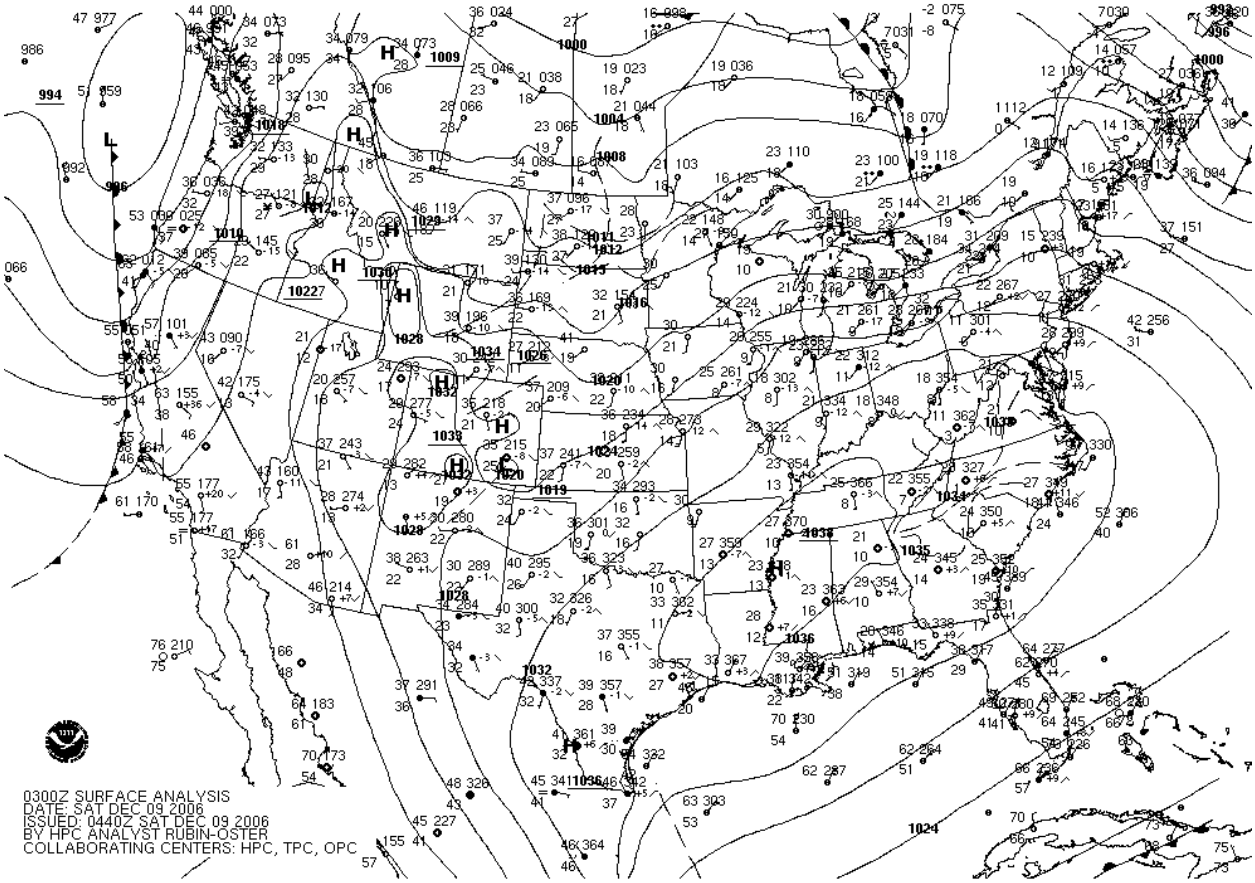
Surface weather map for 10 AM PST on December 8, 2006.



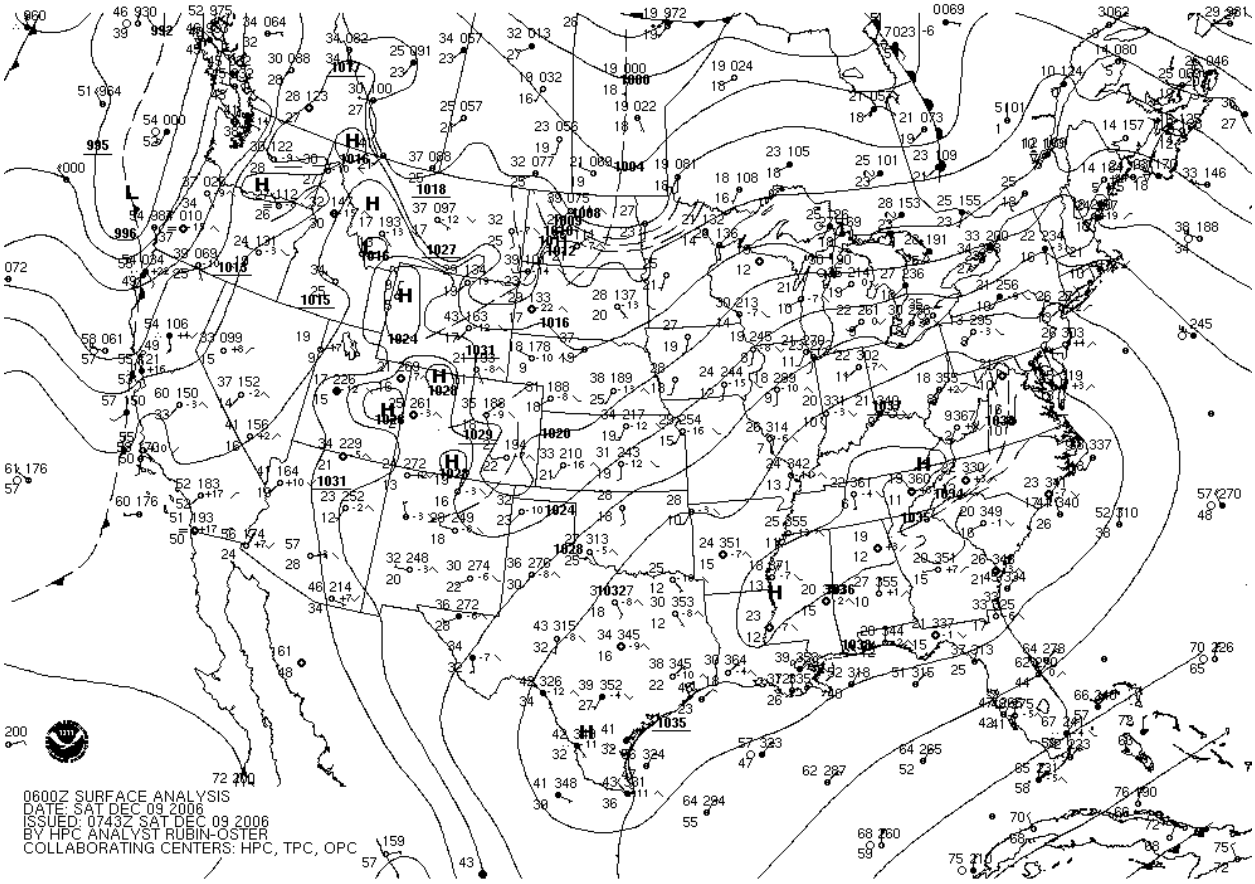
Surface weather map for 1 PM PST on December 8, 2006.



Surface weather map for 4 PM PST on December 8, 2006.



Surface weather map for 7 PM PST on December 8, 2006



Surface weather map for 10 PM PST on December 8, 2006.

Surface Weather Observations

From National Weather Service Website

Key:

T = Temperature (F)
DP = Dew Point (F)
RH = Relative Humidity (%)
WD = Wind Direction
WS = Wind Speed (mph)
VIS = Visibility (miles)
Wx = Weather
SKY = Sky Conditions
PRESSURE = Surface Pressure in mb and inches of Hg and Altimeter setting
MN/MX T = Periodic Minimum Maximum Temperature (F)
FLAG = Data Quality Control Flag
Prec = Precipitation

G = Wind Gust (mph)
15G25 = 15 mph sustained wind with gust to 25 mph
HZ = Haze
BLDU = Blowing Dust
RA = Moderate Rain (- denotes light, + denotes heavy, no sign denotes moderate)
N = North
E = East
S = South
W = West

CLOUD AMOUNT AND HEIGHT OF CLOUD BASE:
CLR = Clear
FEW = Few, 1-2 octas (1/8 to 2/8 of sky covered)
SCT = Scattered, 3-4 octas
BKN = Broken, 5-7 octas
OVC = Overcast, 8 octas

Example:

OVC010CB = Specifies cloud amount, height of cloud base and cloud type. This example is decoded as sky is OVERCAST, 010 denotes a cloud base of 1000 feet, cloud type CB is cumulonimbus.

Weather Conditions for:

Bakersfield, Meadows Field Airport, CA (KBFL)

Elev: 509 ft; Latitude: 35.43361; Longitude: -119.05667

DATE/TIME	T	DP	RH	WD	WS	VIS	Wx	SKY	PRESSURE			MN/MX		T	FLAG
09 Dec 2:50 am	50	27	40	CALM		10.00		CLR	1016.5	30.03	29.491				Caution
09 Dec 1:50 am	49	23	36	CALM		10.00		CLR	1016.0	30.01	29.471				Caution
09 Dec 12:50 am	50	21	32	NE	5	10.00		CLR	1015.4	30.00	29.461				Caution
08 Dec 11:50 pm	55	21	26	N	5	10.00		CLR	1015.5	30.00	29.461			81 44	Caution
08 Dec 10:50 pm	52	21	29	CALM		10.00		CLR	1015.3	29.99	29.451				OK
08 Dec 9:50 pm	60	20	21	N	7	10.00		CLR	1015.1	29.99	29.451	76	50		OK
08 Dec 8:50 pm	54	20	26	NNE	3	10.00		CLR	1014.6	29.97	29.432				OK
08 Dec 7:50 pm	62	23	22	N	5	10.00		BKN100	1014.4	29.97	29.432				OK
08 Dec 6:50 pm	62	29	28	ENE	16	4.00	HZ	BKN110	1014.8	29.98	29.442				Caution
08 Dec 5:50 pm	64	24	22	W	20G26	6.00	HZ	CLR	1014.8	29.98	29.442				Caution
08 Dec 5:30 pm	66	19	16	W	14	7.00		CLR		29.96	29.422				Caution
08 Dec 4:50 pm	73	16	11	SE	14	10.00		CLR	1012.1	29.90	29.363				Caution
08 Dec 3:50 pm	76	15	10	SSE	21G26	10.00		CLR	1010.8	29.86	29.323	81	71		OK
08 Dec 2:50 pm	78	14	9	SSE	25G32	4.00	BLDU	CLR	1010.4	29.85	29.313				OK
08 Dec 2:25 pm	79	14	9	SSE	18G28	4.00	BLDU	CLR		29.85	29.313				OK
08 Dec 2:05 pm	79	12	8	SSE	22G35	2.50	BLDU	CLR		29.86	29.323				OK
08 Dec 1:50 pm	79	13	8	SE	24G33	3.00		CLR	1010.8	29.86	29.323				OK
08 Dec 12:50 pm	79	14	8	SE	18	10.00		CLR	1011.6	29.89	29.353				OK
08 Dec 11:50 am	78	17	10	ESE	22G25	10.00		CLR	1013.1	29.93	29.392				OK
08 Dec 10:50 am	75	18	11	SSW	10	10.00		CLR	1016.6	30.03	29.491				OK
08 Dec 9:50 am	71	20	14	CALM		10.00		CLR	1016.8	30.04	29.501	71	54		OK
08 Dec 8:50 am	67	20	16	VRBL	3	10.00		CLR	1016.8	30.04	29.501				OK
08 Dec 7:50 am	65	19	17	SSE	16	10.00		CLR	1015.5	30.00	29.461				OK
08 Dec 6:50 am	69	17	14	ESE	20G26	10.00		CLR	1014.6	29.97	29.432				OK
08 Dec 5:50 am	66	18	16	ESE	21G28	10.00		CLR	1014.4	29.97	29.432				OK
08 Dec 4:50 am	59	21	23	SE	14	10.00		CLR	1014.3	29.96	29.422				OK
08 Dec 3:50 am	54	22	28	SE	7	10.00		CLR	1015.1	29.99	29.451	62	44		OK
08 Dec 2:50 am	55	23	29	SE	6	10.00		CLR	1016.4	30.03	29.491				OK
08 Dec 1:50 am	58	25	28	E	7	8.00		CLR	1016.4	30.03	29.491				OK
08 Dec 12:50 am	51	27	39	CALM		5.00	HZ	CLR	1016.9	30.04	29.501				OK
07 Dec 11:50 pm	50	30	46	VRBL	5	4.00	HZ	CLR	1017.3	30.05	29.511			71 36	OK
07 Dec 10:50 pm	50	30	46	CALM		4.00	HZ	CLR	1017.7	30.06	29.520				OK
07 Dec 9:50 pm	46	30	53	CALM		4.00	HZ	CLR	1018.3	30.08	29.540	67	45		OK
07 Dec 8:50 pm	52	32	46	E	6	4.00	HZ	CLR	1018.9	30.09	29.550				OK

Weather Conditions for:
KETTLEMAN HILLS, CA (KTLC1)
Elev: 810 ft; Latitude: 36.0333; Longitude: -120.0569

Time (PST)	Temp. (f)	Dew Point (f)	Relative Humidity (%)	Wind Direction	Wind Speed (mph)	Fuel Temp (f)	Solar Radiation (W/m*m)	Solar Pct of psbl	Precip Accumulated (inches)	Precip 1 hour (inches)	Precip 6 hour (inches)	Precip 24 hour (inches)	Quality Control
09 Dec 6:50 am	55	46	72	S	17**G24**	54	0	--	0.02				OK
09 Dec 5:50 am	56	48	75	S	9G18	53	0	--	0.02				OK
09 Dec 4:50 am	56	46	70	SSW	11G19	56	0	--	0.02				OK
09 Dec 3:50 am	58	48	68	SW	12**G20**	55	0	--	0.02				OK
09 Dec 2:50 am	58	48	69	SSW	11**G23**	57	0	--	0.02				OK
09 Dec 1:50 am	57	47	69	SW	15**G43**	58	0	--	0.02				OK
09 Dec 12:50 am	58	48	70	S	**20G39**	57	0	--	0.02				OK
08 Dec 11:50 pm	59	47	64	SSW	**20G34**	58	0	--	0.02				OK
08 Dec 10:50 pm	59	48	68	SW	16**G30**	57	0	--	0.02				OK
08 Dec 9:50 pm	54	47	76	SSW	**24G25**	53	0	--	0.02				OK
08 Dec 8:50 pm	59	42	54	S	13**G34**	60	0	--	0.02				OK
08 Dec 7:50 pm	59	41	52	SSW	**23G38**	57	0	--	0.02				OK
08 Dec 6:50 pm	58	37	45	SSE	16**G47**	57	0	--	0.02				OK
08 Dec 5:50 pm	60	36	41	S	**24G50**	61	0	--	0.02				OK
08 Dec 4:50 pm	61	42	49	SW	**33G46**	61	10	7%	0.02				OK
08 Dec 3:50 pm	63	28	26	WSW	**26G34**	65	130	32%	0.02				OK
08 Dec 2:50 pm	70	15	12	SW	**24G34**	73	318	51%	0.02				OK
08 Dec 1:50 pm	77	18	11	SSE	**22G21**	81	408	53%	0.02				OK
08 Dec 12:50 pm	72	26	18	ESE	10**G20**	81	370	44%	0.02				OK
08 Dec 11:50 am	67	28	23	SE	9**G29**	70	240	29%	0.02				OK
08 Dec 10:50 am	68	20	16	SE	19**G29**	71	276	38%	0.02				OK
08 Dec 9:50 am	73	17	12	SSE	**21**G15	74	287	51%	0.02				Suspect
08 Dec 8:50 am	68	15	13	SSE	11**G24**	70	158	49%	0.02				OK
08 Dec 7:50 am	68	17	14	SSW	14**G27**	67	41	106%	0.02				OK
08 Dec 6:50 am	64	21	19	SSW	19**G27**	60	0	--	0.02				OK
08 Dec 5:50 am	62	20	20	S	16**G25**	61	0	--	0.02				OK
08 Dec 4:50 am	62	23	22	S	18G16	61	0	--	0.02				Suspect
08 Dec 3:50 am	54	26	33	SSE	13G11	51	0	--	0.02				Suspect
08 Dec 2:50 am	51	22	32	S	3G04	47	0	--	0.02				OK
08 Dec 1:50 am	55	24	30	SE	1G10	50	0	--	0.02				OK
08 Dec 12:50 am	59	24	26	SE	5G10	55	0	--	0.02				OK
07 Dec 11:50 pm	56	21	25	S	4G13	52	0	--	0.02				OK
07 Dec 10:50 pm	60	20	21	SSE	4G14	53	0	--	0.02				OK
07 Dec 9:50 pm	61	18	19	S	11G14	58	0	--	0.02				OK
07 Dec 8:50 pm	61	23	23	SSW	11G18	58	0	--	0.02				OK

Weather Conditions for:
Hanford, Hanford Municipal Airport, CA (KHJO)
Elev: 243 ft; Latitude: 36.31861; Longitude: -119.62889

Date/Time	T	DP	RH	WD	WS	VIS	Wx	SKY	PRESSURE			MN/MX T		Flag
08 Dec 10:50 pm	54	37	53	SSW	6	10.00		CLR	1016.1	30.00	29.746			OK
08 Dec 9:50 pm	56	38	51	S	7	10.00		CLR	1015.9	30.00	29.746	67	55	OK
08 Dec 8:50 pm	57	37	47	SW	5	10.00		SCT100	1015.7	29.99	29.736			OK
08 Dec 7:50 pm	57	39	51	SE	3	10.00		FEW095	1015.9	29.99	29.736			OK
08 Dec 6:50 pm	63	39	41	SE	12G18	10.00		FEW080	1015.4	29.98	29.727			OK
08 Dec 5:50 pm	62	41	46	SSW	10	10.00		FEW110	1013.6	29.92	29.667			OK
08 Dec 5:15 pm	63	43	48	WSW	16G28	5.00	HZ	FEW001		29.93	29.677			OK
08 Dec 4:50 pm	64	41	43	WSW	18G35	2.00	HZ	FEW001	1013.5	29.92	29.667			OK
08 Dec 4:45 pm	64	39	39	WSW	21G30	2.50	HZ	CLR		29.92	29.667			OK
08 Dec 4:30 pm	66	23	19			3.00	HZ	CLR		29.92	29.667			OK
08 Dec 4:00 pm	66	19	16	SW	10G32	2.00	HZ	SCT006		29.90	29.647			OK
08 Dec 3:55 pm	66	19	16	SSE	13G32	1.75	HZ	BKN006		29.90	29.647			OK
08 Dec 3:50 pm	67	19	16	NE	15G32	1.50	HZ	BKN006	1012.7	29.90	29.647	80	57	OK
08 Dec 3:45 pm	68	19	16	W	13G29	1.25	HZ	BKN006 BKN014		29.89	29.637			OK
08 Dec 3:25 pm	72	18	13	WSW	18G29	1.25	HZ	BKN004 BKN014		29.86	29.607			OK
08 Dec 3:20 pm	73	19	13	WSW	16G37	0.75	HZ	SCT004 BKN014		29.86	29.607			OK
08 Dec 3:15 pm	73	21	14	WSW	24G37	1.00	HZ	VV005		29.85	29.597			OK
08 Dec 3:10 pm	75	21	13	WSW	17G31	2.50	HZ	SCT007		29.84	29.588			OK
08 Dec 2:50 pm	79	18	10	SSE	20G28	3.00	HZ	SCT009	1010.0	29.82	29.568			OK
08 Dec 2:40 pm	81	18	9	SSE	21G29	2.00	HZ	SCT009		29.82	29.568			OK
08 Dec 2:30 pm	81	19	10	SSE	17G26	2.50	HZ	BKN011		29.82	29.568			OK
08 Dec 2:15 pm	81	21	11	S	20G26	3.00	HZ	SCT013		29.83	29.578			OK
08 Dec 2:05 pm	81	19	10	SSE	17G25	2.00	HZ	BKN013		29.83	29.578			OK
08 Dec 1:50 pm	79	20	11	SSE	21G25	3.00	HZ	FEW015	1010.6	29.84	29.588			OK
08 Dec 12:50 pm	71	28	20	ESE	5	10.00		CLR	1011.9	29.88	29.627			OK
08 Dec 11:50 am	69	25	19	ESE	9	7.00		CLR	1013.7	29.93	29.677			OK
08 Dec 10:50 am	65	26	23	E	7	8.00		CLR	1015.8	29.99	29.736			OK
08 Dec 9:50 am	57	31	37	E	6	6.00	HZ	CLR	1017.4	30.04	29.786	57	29	OK
08 Dec 8:50 am	50	32	50	E	3	4.00	HZ	CLR	1017.4	30.04	29.786			OK
08 Dec 8:05 am	43	32	65	CALM		3.00	HZ	CLR		30.03	29.776			Caution
08 Dec 7:50 am	36	29	75	CALM		2.50	HZ	CLR	1017.3	30.03	29.776			Caution
08 Dec 7:00 am	30	27	86	CALM		2.00	BR	CLR		30.00	29.746			OK
08 Dec 6:50 am	30	26	85	CALM		3.00	BR	CLR	1016.3	30.00	29.746			OK
08 Dec 5:50 am	31	27	85	CALM		3.00	BR	CLR	1015.7	29.98	29.727			OK
08 Dec 4:50 am	32	28	85	CALM		3.00	BR	CLR	1015.5	29.98	29.727			OK

Weather Conditions for:
Visalia, Visalia Municipal Airport, CA (KVIS)
Elev: 295 ft; Latitude: 36.31667; Longitude: -119.4

Date/Time	T	DP	RH	WD	WS	VIS	SKY	PRESSURE	MN/MX	T	Flag
08 Dec 8:15 pm	59	34	39	CALM		10.00	CLR	29.99 29.681			OK
08 Dec 7:55 pm	61	34	36	ESE	7	10.00	CLR	29.98 29.671			OK
08 Dec 7:35 pm	61	34	36	ESE	9	10.00	CLR	29.99 29.681			OK
08 Dec 7:15 pm	63	32	32	E	10	10.00	CLR	30.00 29.691			OK
08 Dec 6:55 pm	64	28	26	E	13**G22**	10.00	CLR	29.99 29.681			OK
08 Dec 6:35 pm	63	30	29	ENE	13**G21**	10.00	CLR	30.00 29.691			OK
08 Dec 6:15 pm	63	36	36	E	12**G26**	10.00	CLR	29.98 29.671			OK
08 Dec 5:55 pm	61	43	51	ENE	13	**5.00**	CLR	29.97 29.661			OK
08 Dec 5:35 pm	63	41	45	W	5	10.00	CLR	29.96 29.651			OK
08 Dec 5:15 pm	64	28	26	W	10	10.00	CLR	29.95 29.641			OK
08 Dec 4:55 pm	64	25	22	WSW	10	9.00	CLR	29.93 29.621			OK
08 Dec 4:35 pm	64	23	20	WSW	10	**4.00**	CLR	29.92 29.611			OK
08 Dec 4:15 pm	66	21	18	W	14**G23**	**2.50**	**BKN001**	29.91 29.601			OK
08 Dec 3:55 pm	70	25	18	WSW	**22G30**	**1.75**	**OVC001**	29.89 29.581	81	57	OK
08 Dec 3:35 pm	79	21	12	WSW	16**G30**	7.00	CLR	29.86 29.552			OK
08 Dec 3:15 pm	79	23	13	S	16**G24**	7.00	CLR	29.82 29.512			OK
08 Dec 2:55 pm	81	23	12	S	**20G28**	**2.00**	**BKN001**	29.82 29.512			OK
08 Dec 2:35 pm	81	27	14	S	17**G26**	**1.50**	**BKN001**	29.82 29.512			OK
08 Dec 2:15 pm	79	28	16	SSE	12G17	9.00	CLR	29.83 29.522			OK
08 Dec 1:55 pm	79	28	16	S	14	8.00	CLR	29.84 29.532			OK
08 Dec 1:35 pm	75	28	18	SSE	10	10.00	CLR	29.84 29.532			OK
08 Dec 1:15 pm	73	27	17	SE	8	10.00	CLR	29.86 29.552			OK
08 Dec 12:55 pm	73	28	19	SSE	12	10.00	CLR	29.88 29.572			OK
08 Dec 12:35 pm	72	28	20	SE	9	10.00	CLR	29.89 29.581			OK
08 Dec 12:15 pm	72	28	20	SE	9	10.00	CLR	29.91 29.601			OK
08 Dec 11:55 am	70	28	21	E	10	10.00	CLR	29.92 29.611			OK
08 Dec 11:35 am	68	27	21	E	13	7.00	CLR	29.93 29.621			OK
08 Dec 11:15 am	68	27	21	E	12	9.00	CLR	29.97 29.661			OK
08 Dec 10:55 am	66	28	24	E	10	10.00	CLR	29.99 29.681			OK
08 Dec 10:35 am	64	28	26	E	7	9.00	CLR	30.02 29.710			OK
08 Dec 10:15 am	63	30	29	ENE	9	10.00	CLR	30.03 29.720			OK
08 Dec 9:55 am	57	32	38	E	8	7.00	CLR	30.04 29.730	57	34	OK
08 Dec 9:35 am	54	34	47	E	9	**5.00**	CLR	30.04 29.730			OK

Weather Conditions for:
LOS BANOS, CA (SLRC1)
Elev: 350 ft; Latitude: 37.0547; Longitude: -121.0531

Date/Time	T	DP	RH	WD	WS	PRESSURE							Flag
09 Dec 3:00 am	57	56	97	SW		29.86	29.493	56	13	0	--	0.88	OK
09 Dec 2:00 am	58	56	92	SSW	10G14	29.84	29.473	57	13	0	--	0.88	OK
09 Dec 1:00 am	59	53	81	SSW	10G18	29.82	29.453	57	13	0	--	0.88	OK
09 Dec 12:00 am	61	56	85	SE	10G19	29.82	29.453	60	12	0	--	0.88	OK
08 Dec 11:00 pm	60	54	82	SE	14**G20**	29.81	29.443	58	13	0	--	0.88	OK
08 Dec 10:00 pm	61	54	77	ESE	8**G20**			59	12	0	--	0.88	OK
08 Dec 9:00 pm	60	52	74	SSE	11G16	29.79	29.424	59	11	0	--	0.88	OK
08 Dec 8:00 pm	62	53	72	SSE	14**G21**	29.78	29.414	60	12	0	--	0.88	OK
08 Dec 7:00 pm	61	51	69	S	19**G26**	29.79	29.424	59	13	0	--	0.88	OK
08 Dec 6:00 pm	61	47	60	SSW	**22G37**	29.75	29.384	58	13	0	--	0.88	OK
08 Dec 5:00 pm	63	40	43	SSW	**20G40**	29.74	29.374	62	14	0	0	0.88	OK
08 Dec 4:00 pm	65	51	60	WSW	17**G30**	29.75	29.384	63	12	14	4%	0.88	OK
08 Dec 3:00 pm	64	29	27	SW	10**G29**	29.75	29.384	64	9	44	8%	0.88	OK
08 Dec 2:00 pm	72	29	20	S	18**G29**	29.74	29.374	75	10	95	13%	0.88	OK
08 Dec 1:00 pm	74	50	43	S	10**G32**	29.76	29.394	77	13	428	53%	0.88	OK
08 Dec 12:00 pm	69	62	78	W	**G26**	29.78	29.414	69	15	221	27%	0.88	OK
08 Dec 11:00 am	47	41	79	ENE	1G10	29.82	29.453	48	13	59	8%	0.88	OK
08 Dec 10:00 am	47	42	82	NNE	5G08			50	13	127	23%	0.88	OK
08 Dec 9:00 am	47	42	82	SSE	G11	29.86	29.493	49	14	134	41%	0.88	OK
08 Dec 8:00 am	48	44	85	ESE	G11	29.86	29.493	47	14	100	186%	0.88	OK
08 Dec 7:00 am	47	40	76	ESE		29.85	29.483	43	14	2	--	0.88	OK
08 Dec 6:00 am	48	40	75	SSW		29.86	29.493	44	14	0	--	0.88	OK
08 Dec 5:00 am	50	46	85	SSW		29.86	29.493	46	14	0	--	0.88	OK
08 Dec 4:00 am	48	43	83	WSW		29.87	29.503	43	14	0	--	0.88	OK
08 Dec 2:00 am	42	38	85	ESE				35	14	0	--	0.88	OK
08 Dec 1:00 am	46	40	79	W	G03	29.91	29.542	40	13	0	--	0.88	OK
08 Dec 12:00 am	47	42	82	SW		29.93	29.562	40	13	0	--	0.88	OK
07 Dec 11:00 pm	49	41	73	SSW		29.95	29.582	41	13	0	--	0.88	OK
07 Dec 10:00 pm	49	41	73	SW	3G04	29.96	29.592	41	13	0	--	0.88	

Weather Conditions for:
SAN LUIS NWR, CA (SLWC1)
Elev: 65 ft; Latitude: 37.1822; Longitude: -120.7939

Date/Time	T	DP	RH	WD	WS						Flag
09 Dec 3:30 am	55	52	88	SSE	3G11	54	21	0	--	0.00	OK
09 Dec 2:30 am	55	52	90	ESE	7G14	54	23	0	--	0.00	OK
09 Dec 1:30 am	55	52	91	SE	10G15	54	24	0	--	0.00	OK
09 Dec 12:30 am	55	52	90	SE	8G16	53	23	0	--	0.00	OK
08 Dec 11:30 pm	55	51	85	SE	12G19	54	24	0	--	0.00	OK
08 Dec 10:30 pm	55	50	84	SE	13**G24**	53	24	0	--	0.00	OK
08 Dec 9:30 pm	56	52	85	SE	15**G22**	52	22	0	--	0.00	OK
08 Dec 8:30 pm	56	46	68	ESE	12G17	53	17	0	--	0.00	OK
08 Dec 7:30 pm	57	48	72	SE	13**G20**	56	17	0	--	0.00	OK
08 Dec 6:30 pm	56	49	78	SE	9G17	53	12	0	--	0.00	OK
08 Dec 5:30 pm	59	37	44	S	12G17	57	8	0	--	0.00	OK
08 Dec 4:30 pm	63	46	54	WSW	10G15	61	8	26	11%	0.00	OK
08 Dec 3:30 pm	64	39	39	WSW	7**G22**	63	8	101	21%	0.00	OK
08 Dec 2:30 pm	74	40	29	SSW	8G16	79	8	348	53%	0.00	OK
08 Dec 1:30 pm	69	35	28	SE	13**G22**	75	10	463	59%	0.00	OK
08 Dec 12:30 pm	62	43	49	SSE	12G15	64	11	168	21%	0.00	OK
08 Dec 11:30 am	53	36	52	SSE	8G14	53	12	116	15%	0.00	OK
08 Dec 10:30 am	54	39	56	S	8G16	54	14	143	22%	0.00	OK
08 Dec 9:30 am	48	38	68	ESE	10G14	49	16	178	39%	0.00	OK
08 Dec 8:30 am	44	38	80	E	6G14	46	20	72	36%	0.00	OK
08 Dec 7:30 am	40	37	89	ESE	4G09	38	21	11	--	0.00	OK
08 Dec 6:30 am	36	36	100	ENE	2G06	34	22	0	--	0.00	OK
08 Dec 5:30 am	34	34	100	ESE	3G04	30	22	0	--	0.00	OK
08 Dec 4:30 am	32	32	100	SE	1G04	23	21	0	--	0.00	OK
08 Dec 3:30 am	33	33	100	SW	1G05	24	19	0	--	0.00	OK
08 Dec 2:30 am	33	33	100	S	4G06	29	17	0	--	0.00	OK
08 Dec 1:30 am	33	33	100	ESE	4G05	27	17	0	--	0.00	OK
08 Dec 12:30 am	35	35	100	E	3G04	29	15	0	--	0.00	OK
07 Dec 11:30 pm	34	34	100	ESE	1G04	25	13	0	--	0.00	OK
07 Dec 10:30 pm	35	35	100	SW	2G03	25	12	0	--	0.00	OK
07 Dec 9:30 pm	37	37	100	ENE	2G04	28	11	0	--	0.00	OK

Weather Conditions for:
Lemoore, Naval Air Station, CA (KNLC)
Elev: 233 ft; Latitude: 36.30361; Longitude: -119.93806

Date/Time	T	DP	RH	WD	WS	VIS	Wx	SKY	PRESSURE			MN/MX	T	Flag		
08 Dec 11:55 pm	56	45	67	SE	7	10.00		FEW110	1015.8	30.00	29.757			78	29	OK
08 Dec 10:55 pm	59	45	60	S	16	10.00		CLR	1015.0	29.98	29.737					OK
08 Dec 9:55 pm	60	42	51	S	6	10.00		CLR	1015.8	30.00	29.757		T	67	58	OK
08 Dec 8:55 pm	58	40	51	SSE	9	10.00		SCT050 SCT065 BKN080	1015.9	30.00	29.757					OK
08 Dec 7:55 pm	62	40	44	SSE	8G24	10.00		CLR	1016.1	30.00	29.757					OK
08 Dec 7:45 pm	63	39	42	SE	14G25	10.00		FEW085		30.00	29.757					OK
08 Dec 6:55 pm	60	39	46	S	14	10.00		CLR	1014.0	29.94	29.698		T			OK
08 Dec 5:55 pm	63	41	45	S	12G20	9.00	-RA	SCT040 BKN100 BKN200	1013.4	29.93	29.688		T			OK
08 Dec 4:55 pm	63	42	46	WSW	13G24	9.00		SCT050 BKN120 BKN200	1013.3	29.92	29.678					OK
08 Dec 3:55 pm	66	23	19	WSW	24G32	3.00	HZ	FEW080 BKN120 BKN200	1012.3	29.89	29.648			78	60	OK
08 Dec 3:25 pm	66	21	18	WSW	21G36	3.00	HZ	SCT120 BKN200		29.88	29.638					OK
08 Dec 3:10 pm	70	21	16	WSW	26G38	1.00	HZ	SCT120 BKN200		29.87	29.628					OK
08 Dec 2:55 pm	74	20	13	SW	25G32	2.00	HZ	SCT120 BKN200	1010.8	29.85	29.608					OK
08 Dec 2:45 pm	75	21	13	SW	25G32	2.00	HZ	SCT120 BKN200		29.85	29.608					OK
08 Dec 1:55 pm	77	33	20	SSE	16	10.00		SCT120 SCT200	1010.2	29.83	29.588					OK
08 Dec 12:55 pm	71	30	22	SSE	8	7.00		FEW080 BKN120 BKN200	1011.6	29.87	29.628					OK
08 Dec 11:55 am	65	31	28	SE	10	5.00	HZ	BKN080 BKN120 BKN200	1013.4	29.93	29.688					OK
08 Dec 10:55 am	63	29	28	ESE	17	6.00	HZ	FEW065 BKN080 BKN120 OVC200	1014.4	29.96	29.717					OK
08 Dec 10:35 am	63	32	32	ESE	20	5.00	HZ	BKN080 BKN120 OVC200		29.97	29.727					OK
08 Dec 9:55 am	60	33	36	SE	10	4.00	HZ	FEW080 BKN120 BKN200	1016.5	30.02	29.777			60	29	OK
08 Dec 8:55 am	48	33	56	E	3	6.00	HZ	FEW120 SCT200	1016.8	30.02	29.777					Caution
08 Dec 7:55 am	39	30	70	E	7	6.00	HZ	BKN100 BKN140	1016.4	30.01	29.767					Caution

CIMIS stations

Delano - San Joaquin Valley - Station 182

Date	Hour	ETo (in)	Precip (in)	Sol Rad (Ly/day)	Vapor Pressure (mBars)	Air Temp (°F)	Rel Hum (%)	Dew Point (°F)	Wind Speed (MPH)	Wind Dir (0-360)	Soil Temp (°F)
12/08/2006	0100	0.00	0.00	1	5.0	35.2	71	26.9	1.9	114.2	46.8
	0200	0.00	0.00	1	4.7	34.3	70	25.6	1.8	86.4	46.6
	0300	0.00	0.00	0	4.8	34.6	70	26.0	2.3	88.3	46.4
	0400	0.00	0.00	0	4.4	36.4	61	24.1	2.8	94.9	46.1
	0500	0.00	0.00	0	4.3	37.2	57	23.5	2.0	161.4	45.9
	0600	0.00	0.00	0	4.6	33.7	70	24.9	2.2	79.4	45.7
	0700	0.00	0.00	3	4.4	33.4	69	24.3	1.6	114.6	45.5
	0800	0.00	0.00	66	4.5	35.4	64	24.6	2.0	219.2	45.2
	0900	0.00	0.00	346	5.2	45.2	51	28.1	2.0	110.5	45.0
	1000	0.01	0.00	650	5.3	61.9	28	28.4	4.2	118.2	44.8
	1100	0.01	0.00	723	5.1	70.5	20	27.6	6.7	104.3	44.7 Y
	1200	0.01	0.00	535	4.8	74.5	17	26.2	6.1	113.9	44.8 Y
	1300	0.01	0.00	587	4.1	78.2	12	22.5	8.1	151.0	45.1 Y
	1400	0.02 Y	0.00	783	3.8	80.5 Y	11 Y	20.8 Y	10.9	141.0	45.5 Y
	1500	0.01	0.00	454	3.7	80.1	11	19.9	10.7	156.5	46.0 Y
	1600	0.01	0.00	207	3.8	76.8	12	20.6	10.0	181.2	46.5 Y
	1700	0.01	0.00	11	4.4	65.1	21	24.0	14.0	250.9	47.0
	1800	0.01	0.00	1	7.4	62.7	38	36.9	12.6	232.7	47.4
	1900	0.00	0.00	1	7.7	61.7	41	37.7	5.2	94.6	47.7
	2000	0.00	0.00	1	6.0	61.8	32	31.4	4.7	97.9	47.9
	2100	0.00	0.00	1	5.1	60.7	28	27.7	2.9	93.6	48.0

Shafter/USDA - San Joaquin Valley - Station 5

Date	Hour	ETo (in)	Precip (in)	Sol Rad (Ly/day)	Vapor Pressure (mBars)	Air Temp (°F)	Rel Hum (%)	Dew Point (°F)	Wind Speed (MPH)	Wind Dir (0-360)	Soil Temp (°F)
12/08/2006	0100	0.00	-- M	1	5.8	35.8	82	30.8	2.5	-- N	-- N
	0200	0.00	-- M	1	6.0	37.8	78	31.7	3.0	-- N	-- N
	0300	0.00	-- M	1	5.9	36.7	79	30.9	2.7	-- N	-- N
	0400	0.00	-- M	1	5.7	35.6	81	30.4	2.5	-- N	-- N
	0500	0.00	-- M	1	5.6	35.0	82	30.0	2.3	-- N	-- N
	0600	0.00	-- M	1	5.6	33.7	85	29.7	2.0	-- N	-- N
	0700	0.00	-- M	1	5.5	33.2	86	29.6	2.6	-- N	-- N
	0800	0.00	-- M	22	5.7	34.3	85	30.1	2.7	-- N	-- N
	0900	0.00	-- M	258	6.6	41.0	76	34.0	3.2	-- N	-- N
	1000	0.01	-- M	567	7.2	57.5	45	36.2	5.1	-- N	-- N
	1100	0.01	-- M	759	6.0	70.0	24	31.7	9.0	-- N	-- N
	1200	0.02	-- M	900	5.5	75.3	18	29.6	10.8	-- N	-- N
	1300	0.02	-- M	668	5.4	75.7	18	28.9	11.0	-- N	-- N
	1400	0.02	-- M	987	4.8	78.3	15	26.2	16.0	-- N	-- N
	1500	0.02	-- M	779	4.5	79.2	13	24.7	16.7	-- N	-- N
	1600	0.01	-- M	500	4.6	78.1	14	24.8	15.0	-- N	-- N
	1700	0.01	-- M	119	4.6	75.1	16	25.2	9.2	-- N	-- N
	1800	0.01	-- M	6	4.9	65.7	23	26.7	14.6	-- N	-- N
	1900	0.00	-- M	1	8.6	62.2	45	40.5	9.8	-- N	-- N
	2000	0.00	-- M	1	7.0	61.6	38	35.5	6.6	-- N	-- N
	2100	0.00	-- M	1	6.4	58.9	38	33.2	4.8	-- N	-- N

Stratford - San Joaquin Valley - Station 15

Date	Hour	ETo (in)	Precip (in)	Sol Rad (Ly/day)	Vapor Pressure (mBars)	Air Temp (°F)	Rel Hum (%)	Dew Point (°F)	Wind Speed (MPH)	Wind Dir (0-360)	Soil Temp (°F)
12/08/2006	0100	0.00	0.00	0	5.4	35.0	79	29.1	2.2	338.0	47.9
	0200	0.00	0.00	0	4.7	33.0	74	25.6	2.3	36.8	47.5
	0300	0.00	0.00	0	4.8	32.0	78	26.0	2.1	71.4	47.3
	0400	0.00	0.00	0	5.2	33.1	82	28.2	3.0	202.7	47.0
	0500	0.00	0.00	0	4.8	31.7	79	25.9	1.6	240.5	46.7
	0600	0.00	0.00	0	4.4	29.8	79	24.0	1.5	63.5	46.5
	0700	0.00	0.00	1	4.4	29.6	79	24.0	3.3	337.2	46.3
	0800	0.00	0.00	92	4.5	31.8	74	24.6	2.8	69.4	46.0
	0900	0.00	0.00	336	5.9	42.6	63	31.1	4.7	98.3	45.9
	1000	0.01	0.00	594	6.2	54.2	43	32.4	7.1	124.1	45.9
	1100	0.01	0.00	454	6.1	60.8	33	31.8	9.6	123.7	46.2
	1200	0.01	0.00	464	6.1	63.7	30	31.9	9.5	120.2	46.7
	1300	0.01	0.00	546	7.4	67.6	32	36.8	6.9	152.5	47.4
	1400	0.01 Y	0.00	653	7.1	74.1 Y	25 Y	35.9 Y	6.9	178.6	48.1
	1500	0.01 Y	0.00	439	4.6	75.9 Y	15 Y	25.2 Y	12.6	187.2	48.9
	1600	0.01	0.00	141	3.0	68.6	13	15.2	16.1	253.2	49.6
	1700	0.01	0.00	16	7.0	65.1	33	35.5	12.6	261.2	50.1
	1800	0.00 Y	0.00	0	8.8	62.9 Y	45 Y	41.3 Y	7.6	192.5	50.4
	1900	0.00 Y	0.00	0	8.7	60.0 Y	49 Y	40.9 Y	7.1	199.4	50.6
	2000	0.00 Y	0.00	0	8.5	58.7 Y	51 Y	40.4 Y	8.4	154.4	50.8
	2100	0.00 Y	0.00	0	8.5	58.6 Y	51 Y	40.3 Y	6.1	143.2	50.9

Kettleman - San Joaquin Valley - Station 21

Date	Hour	ETo (in)	Precip (in)	Sol Rad (Ly/day)	Vapor Pressure (mBars)	Air Temp (°F)	Rel Hum (%)	Dew Point (°F)	Wind Speed (MPH)	Wind Dir (0-360)	Soil Temp (°F)
12/08/2006	0100	0.00	0.00	0	4.6	49.9	37	24.9	3.8	225.8	48.3
	0200	0.00	0.00	0	4.6	43.8	47	24.9	2.4	281.8	48.2
	0300	0.00	0.00	0	4.7	40.7	54	25.5	2.5	243.6	48.1
	0400	0.00	0.00	0	4.5	40.7	52	24.3	2.1	225.6	47.9
	0500	0.00	0.00	0	4.7	43.2	49	25.5	2.9	218.2	47.8
	0600	0.00	0.00	0	4.8	44.4	48	25.9	2.6	234.2	47.6
	0700	0.00	0.00	2	4.3	46.4	40	23.2	4.6	214.9	47.4
	0800	0.00	0.00	107	4.3	48.8	36	23.4	3.0	321.2	47.3
	0900	0.00	0.00	438	4.7	53.6	34	25.7	3.5	158.5	47.3
	1000	0.01 Y	0.00	770	4.4	67.9 Y	19 Y	24.1 Y	6.7	132.8	47.3
	1100	0.01 Y	0.00	620	4.5	71.4 Y	17 Y	24.6 Y	9.7	128.9	47.6
	1200	0.01 Y	0.00	573	5.2	70.9 Y	20 Y	28.1 Y	6.7	105.9	48.0
	1300	0.02 Y	0.00	818	4.2	77.9 Y	13 Y	22.8 Y	11.5	138.6	48.5
	1400	0.02 R	0.00	659	3.9	79.1 R	12 R	21.2 R	11.9	142.2	49.1
	1500	0.01 Y	0.00	289	3.8	75.2 Y	13 Y	20.3 Y	6.6	181.7	49.6
	1600	0.01	0.00	91	4.9	66.4	22	26.7	6.7	282.3	50.1
	1700	0.00	0.00	10	10.0	62.2	53	44.6	7.5	274.6	50.4
	1800	0.00 Y	0.00	0	8.9	61.9 Y	47 Y	41.6 Y	6.4	159.9	50.7
	1900	0.00 Y	0.00	0	7.9	62.9 Y	40 Y	38.5 Y	5.2	178.0	50.9
	2000	0.00 Y	0.00	0	8.0	59.9 Y	45 Y	38.7 Y	3.1	132.0	51.0
	2100	0.00 Y	0.00	0	8.6	60.2 Y	48 Y	40.6 Y	4.7	126.3	51.1

Arvin-Edison - San Joaquin Valley - Station 125

Date	Hour	ETo (in)	Precip (in)	Sol Rad (Ly/day)	Vapor Pressure (mBars)	Air Temp (°F)	Rel Hum (%)	Dew Point (°F)	Wind Speed (MPH)	Wind Dir (0-360)	Soil Temp (°F)
12/08/2006	0100	0.00	0.00	0	5.4	50.8	42	28.7	4.4	174.4	55.1
	0200	0.00	0.00	0	5.4	50.0	44	28.8	4.4	10.8	55.1
	0300	0.00 Y	0.00	0	4.9	54.8 Y	33 Y	26.5 Y	4.8	117.8	55.0
	0400	0.01 R	0.00	0	3.7	67.7 R	16 R	20.0 R	10.7	107.1	55.0
	0500	--	0.00	0	3.3	-- M	-- M	-- M	12.8	83.7	54.9
	0600	--	0.00	0	3.2	-- M	-- M	-- M	11.0	90.3	54.8
	0700	--	0.00	3	3.2	-- M	-- M	-- M	11.4	79.7	54.8
	0800	--	0.00	64	3.2	-- M	-- M	-- M	11.1	96.2	54.8
	0900	--	0.00	438	3.2	-- M	-- M	-- M	10.2	114.0	54.8
	1000	0.01 R	0.00	574	3.6	72.4 R	13 R	19.1 R	6.8	123.0	54.9
	1100	0.01 R	0.00	971	3.8	76.7 R	12 R	20.7 R	4.3	236.8	55.0
	1200	0.01 R	0.00	732	3.4	78.2 R	10 R	17.9 R	6.6	179.2	55.1
	1300	0.01 R	0.00	623	3.1	78.8 R	9 R	15.7 R	6.9	85.0	55.2
	1400	0.02 R	0.00	869	2.7	81.2 R	7 R	12.8 R	12.7	166.2	55.4
	1500	0.02 R	0.00	626	2.8	79.8 R	8 R	13.2 R	10.6	149.2	55.6
	1600	0.01 Y	0.00	326	2.8	77.8 Y	8 Y	13.2 Y	10.4	138.4	55.9
	1700	0.01 R	0.00	37	2.8	74.3 R	10 R	13.5 R	10.7	139.1	56.1
	1800	--	0.00	0	2.8	-- M	-- M	-- M	11.7	165.0	56.4
	1900	0.00 R	0.00	0	3.7	68.0 R	16 R	20.0 R	7.1	277.0	56.5
	2000	0.00 R	0.00	0	3.6	65.0 R	17 R	19.3 R	7.3	36.4	56.7
	2100	0.00 Y	0.00	0	3.8	59.6 Y	22 Y	20.3 Y	2.9	198.1	56.8

Alpaugh - San Joaquin Valley - Station 203

Date	Hour	ETo (in)	Precip (in)	Sol Rad (Ly/day)	Vapor Pressure (mBars)	Air Temp (°F)	Rel Hum (%)	Dew Point (°F)	Wind Speed (MPH)	Wind Dir (0-360)	Soil Temp (°F)
12/08/2006	0100	0.00 Y	0.00	0	4.4	30.0 Y	78 Y	24.1 Y	1.7	87.6	48.3
	0200	0.00 Y	0.00	0	4.6	28.9 Y	85 Y	24.8 Y	3.1	80.8	47.9
	0300	0.00 Y	0.00	0	4.6	29.5 Y	82 Y	24.9 Y	3.2	100.7	47.5
	0400	0.00	0.00	0	4.4	30.1	78	24.2	2.9	203.4	47.2
	0500	0.00	0.00	0	4.3	28.5	81	23.3	1.6	266.2	46.8
	0600	0.00	0.00	0	4.5	29.3	83	24.7	2.5	272.1	46.5
	0700	0.00 Y	0.00	3	4.1	25.6 Y	87 Y	22.3 Y	2.6	81.0	46.2
	0800	0.00 Y	0.00	140	4.3	28.5 Y	81 Y	23.3 Y	1.6	134.8	46.0
	0900	0.00	0.00	404	5.1	39.0	63	27.5	2.1	332.9	45.7
	1000	0.01	0.00	729	6.5	52.3	48	33.4	4.7	50.0	45.6
	1100	0.01	0.00	787	6.1	64.6	29	32.0	7.7	78.2	46.0
	1200	0.02	0.00	553	4.3	75.7	14	23.5	15.5	127.8	46.8
	1300	0.02	0.00	791	4.1	77.5	13	22.2	16.8	143.0	48.1
	1400	0.02	0.00	855	4.0	79.5	11	21.5	17.6	151.7	49.5
	1500	0.02	0.00	590	3.8	79.2	11	20.8	17.4	149.4	50.9
	1600	0.01	0.00	224	3.9	71.2	15	21.1	15.0	235.4	51.8
	1700	0.01	0.00	13	5.6	64.2	27	29.7	12.2	243.7	52.4
	1800	0.00	0.00	0	8.9	61.8	47	41.4	9.2	218.2	52.4
	1900	0.00	0.00	0	7.1	63.3	36	35.9	10.8	167.2	52.5
	2000	0.00	0.00	0	6.9	60.0	39	35.2	8.3	106.9	52.5
	2100	0.00	0.00	0	6.4	56.1	42	33.3	2.5	263.5	52.4