VI. FUMIGATION OF CONIFER SEEDLINGS WITH OZONE AND SULFUR DIOXIDE MIXTURES IN OUTDOOR OPEN-TOP CHAMBERS

PURPOSE

Pollutant mixtures transported from the Bakersfield-Oildale area to downwind areas are expected to contain relatively low concentrations of sulfur dioxide along with ozone (Duckworth and Crowe, 1979). There is no evidence to explain how important montane tree species may react to pollutant mixtures. Therefore, several single and mixed gas fumigations of conifer seedlings were carried out to investigate possible ozone-sulfur dioxide interactions at concentrations similar to those monitored at remote sites east of Bakersfield-Oildale.

Two objectives were defined for the fumigation experiments. First, the effects of single and mixed gas treatments on dry weight of the shoots and roots of recently germinated conifer seedlings were examined in two experiments. Second, we included in the first of these experiments two- to three-year-old *Pinus ponderosa* and *P. Jeffreyi* and six-month-old *Sequoiadendron giganteum* (giant Sequoia) seedlings, in order to determine the types of symptoms that may appear on secondary foliage that is similar to that of adult trees. The designs and durations of the fumigation experiments are shown in Table VI-1.

Table VI-1. Design Characteristics and Durations of Single and Mixed Ozone and Sulfur Dioxide Fumigations of Conifer Seedlings

Inclusive Dates	Total Days	Fumigation Days	Exposure/ Fumigation Day	Plant Material	Single Gases O_3 (pphm)	Single Gases SO_2 (pphm)	Single Gases Chamber Replications	Combined Gases O_3+SO_2 (pphm)	Combined Gases Chamber Replications
2/18/82 to 5/26/82	97	64	7.5	Recently germinated seedlings: *P. ponderosa*	0	0	2	–	–
					10		1	10 + 5	1
				P. jeffreyi	20		1	10 + 10	1
				S. giganteum		5	1	20 + 5	1
						10	1	20 + 10	1
4/1/82 to 6/2/82	63	51	7.5	2- to 3-year-old seedlings:	0	0	2	–	–
				P. ponderosa	10		1	10 + 5	1
				P. jeffreyi	20		2	10 + 10	1
				4-month-old seedlings:	30		1	10 + 20	1
				S. giganteum	40		1	20 + 5	1
						5	1	20 + 10	1
						10	1	20 + 20	2
						15	1		
						20	2		
						25	1		
11/16/82 to 4/11/83	145	92	7.0	Recently germinated seedlings:	0	0	4	–	–
					10		2	10 + 5	2
				P. ponderosa	20		2	10 + 10	2
				P. jeffreyi		5	2	20 + 5	2
				P. sabiniana		10	2	20 + 10	2
				S. giganteum					

PROCEDURES

Processing and Germination of Pine Seed in Preparation for the Fumigations Starting February 18, 1982 and November 16, 1982

Activities included extraction of conifer seed from cones collected in the Greenhorn District of the Sequoia National Forest in 1981 and 1982. The separation of sound seed from defective or insect parasitized seed was accomplished by flotation methods. Defective ponderosa and jeffrey pine seeds were floated in 70% ethanol. Defective Pinus sabiniana (digger pine) seeds were floated in water. Ponderosa and jeffrey pine seeds were soaked for 30 minutes in 30% hydrogen peroxide and placed on moist filter paper in petri dishes for germination at 24°C. Germination was slower than expected. During a three- to six-week period, the germinating seeds were removed daily and placed in other petri dishes held at 5°C.

In preparation for the seedling fumigation beginning February 18, 1982, we followed the recommended procedure of cutting away a small portion of the narrow end of the digger pine seed coat in order to stimulate germination. The seeds were stored under moist conditions at 5-10°C for 30 days. Digger pine seeds were sown in flats placed in the greenhouse and later in a growth chamber at a warmer temperature. Some difficulties were encountered. An infestation of root gnats (Mycetophilidae) developed suddenly in the greenhouse. Their appearance is similar to the harmless fungus gnats that normally inhabit the surfaces of soil mixes high in organic matter, so no precautions were taken against them. Larvae invaded the exposed endosperm and embryo of the digger seeds, and many were destroyed in spite of subsequent drenches with insecticide. As a result, there were an insufficient number of seedlings available for the first

fumigation experiment. Even without the insect problem, digger pine seeds are quite difficult to germinate on a predictable basis (Griffin, 1962). After considerable experimentation with different durations and concentrations of hydrogen peroxide treatments of digger pine seed, we found a combination that improved the germination of seed collected in the autumn of 1982.

Giant sequoia was substituted for digger pine in the fumigation starting February 18, 1982. This species was selected because it is a highly valued species in the Sequoia-Kings Canyon National Parks, and little is known about the sensitivity of the seedling stage to air pollutants. A bulk seed lot was available from the Institute of Forest Genetics at Placerville, California. Seeds germinated abundantly on moist paper towels with a minimum of pretreatment. For the fumigation beginning November 16, 1982, sequoia seed were obtained from six groves in the Sequoia-Kings Canyon National Parks, namely, Atwell Mill, Redwood Meadow, Garfield Grove, Redwood Mountain, Giant Forest and Muir Grove. Seed from the Placerville source was used again. At the beginning of each fumigation, the sequoia seedlings were between 1.0-1.5 cm high. The cotyledonary needles were free from the seed and between 1.0-1.5 cm long. Primary needles were beginning to form and were between 0.0-0.8 cm in length.

In preparation for the fumigation beginning February 18, 1982, all seedlings were planted in a steam sterilized (160-180 C for 3 hr) 1:1 mix of vermiculite and peat moss amended with 1 gm of hydrated lime per liter of soil mix. The containers for recently germinated seedlings were plastic "pine cells," 8-1/2 in. high by 1-1/2 in. in diameter. These seedlings were not fertilized during the first two to three weeks after planting, but were fertilized weekly thereafter with a balanced nutrient

solution. A portable drip system for applying equal amounts of nutrient solution to each container was fabricated specially for this purpose. The transport of the system from chamber to chamber turned out to be difficult and time consuming.

For the second fumigation of newly germinated seedlings, beginning November 6, 1982, the nutrient addition was handled differently. A complete nutrient mix was blended into the steam sterilized vermiculite-peat moss mix. Two weeks after planting, seedlings were top dressed with Osmocote™ time-release granules, 14-14-14 (NPK) at 0.27 gm per container. Later in the fumigation seedlings received a balanced nutrient solution through a 1:100 proportioner during watering. There were a total of two applications between January 21 and March 17. The electrical conductivity of the leachate from selected containers was monitored, and it remained within acceptable limits.

During warm, rainless periods, the plants were watered twice weekly. Only occasional watering was required during periods of intermittent rain and cool temperatures.

Procurement and Planting Ponderosa, Jeffrey Pines and Giant Sequoia for the Fumigation beginning April 1, 1982

In late December 1981, we obtained about 700 each of bare root one-year-old ponderosa pines and two-year-old jeffrey pines. We were given permission to remove the plants from the nursery beds at the U. S. Forest Service Placerville nursery. This precaution was followed to prevent smaller plants from being culled, as is the usual practice during packing. This was done to obtain a better representation of the species natural population. In mid-January 1982, seedlings were removed from cold

storage (1°C) and planted in the same 50-50 vermiculite-peat moss mix used for small seedlings. Containers were 4 in.^{2} at the top and 14 in. high. A galvanized wire screen was placed in the semi-open bottom of each container. The pine seedlings were kept in an air conditioned greenhouse at the Riverside Fire Laboratory of the Pacific Southwest Forest and Range Experiment Station until April 1 when both species had new secondary needles that had grown to about 50% of their expected final length. *S. giganteum* seedlings were obtained by seeding a bulk source of seed from the Institute of Forest Genetics in clay pots in December 1981. In January and February 1982 seedlings were transplanted to the 4 x 14 in. containers. In late March 1982 all plants were transferred to the fumigation chambers.

Fumigation Facility

Each of the three experiments indicated in Table VI-1 were done in the California Air Resources Board's 20 open-top chamber facility during the winter and spring months. Chambers are grouped in four rows with five in each row. Each chamber has a filtered air intake, independent gas delivery and pollutant monitoring system. Fumigations were scheduled for 7.5 hours day^{-1}, 6 days week^{-1} but were halted when rain or foggy conditions prevailed.

A nearby building houses the pollutant generating and monitoring equipment. Ozone was generated by passing tank oxygen through an OREC™ silent discharge ozone generator. Oxygen flow remained constant and ozone output was controlled by regulating voltage into the generator. Sulfur dioxide was metered from a heated cylinder (33 C) into a stainless steel mixing tank where it was diluted with compressed air previously dried with

a heatless air dryer. Each gas passed through flowmeters and Teflon lines to the fumigation chambers, where it was mixed with charcoal-filtered air. Concentration of gases in the chambers were sampled by an automatic sequencing system every six minutes. Ozone was monitored by a Dasibi 1003-AH O_3 analyzer and SO_2 was monitored by a Teco Series 43 SO_2 analyzer. Both instruments were calibrated by the California Air Resources Board, Division of Technical Services. Temperature and relative humidity were monitored in two chambers and outside between two chambers with wet-dry thermocouples. Rainfall amount and pH were recorded at the site beginning February 24, 1983. Solar radiation, cal cm^{-2} min^{-1}, was also recorded.

Evaluation of Visible Injury Symptoms

Plants were inspected for injury symptoms at weekly intervals (November 20, 1982 to February 22, 1983) or a final visual inspection of seedlings was made prior to harvest. Percentage of the total leaf area or percentage of the total population with injury symptoms was recorded for each plant of each species. Injury symptoms were categorized in terms of increasing injury severity: chlorotic mottle, tip necrosis, spotting necrosis, necrotic bands, distal necrosis, basal necrosis, red discoloration and purple discoloration. The age of affected needles, cotyledonary, primary or older, was also recorded.

Harvesting Procedure

Seedlings were harvested March 21, 1983 following the last visible injury inspection. The shoot of each seedling, including needles and main

stem, was severed at the soil line and desiccated at 70° C for three days. Soil was washed from the corresponding root systems, and they were processed like the shoots. Shoots and roots were weighed on ARBOR™ top-loading balances with accuracy to 1 milligram.

Experimental Design and Data Analysis

The experiments with newly germinated seedlings conducted from 2/18/82 to 5/26/82 and 11/16/82 to 4/11/83, respectively, were designed to determine if single and mixed gas treatments have significantly different effects on root and shoot growth. The secondary goal was to describe the visible symptoms resulting from several concentrations of single and mixed gases. The first of these experiments (2/18/82 to 5/26/82) was used to explore the concentration range in which effects might be observed. The second experiment, 11/16/82 to 4/11/83, used the same concentrations as the first except that each pollutant treatment was replicated in two chambers and controls were replicated in four chambers. Both experiments were 3 x 3 factorial designs (Table VI-1).

The experiment with one- to two-year-old ponderosa and Jeffrey pines and three- to four-month-old giant sequoia seedlings was intended to determine the concentrations of single and mixed gases which might cause visible injury to secondary (adult) needles of pines and primary leaves of giant sequoia. Furthermore, the kinds of symptoms were described. The design included ozone alone in the range of 10 to 40 pphm and sulfur dioxide alone at 5 to 25 pphm. Mixed gas treatments formed a 4 x 4 factorial design (Table VI-1).

The SAS, GLM package was used for the analysis of variance of all experiments. In two experiments, there were equal numbers of plants per

treatment and in two others the numbers were unequal, requiring that the balanced and unbalanced GLM versions be applied (Table VI-2).

Table VI-2. Number of Within-Chamber Replications and the Types of Statistical Analyses Required

Fumigation Dates	Species	No. of Plants per Treatment	ANOVA	Mean Separation
2/18/82 to 5/26/82	*P. ponderosa* *P. jeffreyi* *S. giganteum*	30-40 30-40 30-40	SAS, Inc. GLM (unbalanced)	Bonferroni[a] t-test
4/1/82 to 6/2/82	*P. ponderosa* *P. jeffreyi* *S. giganteum*	30 30 30	SAS, Inc. GLM (balanced)	LSD for Pairs
11/16/82 to 4/11/83	*P. ponderosa* *P. jeffreyi* *P. sabiniana*	20 20 20	SAS, Inc. GLM (balanced)	LSD for Pairs
11/16/82 to 3/17/83	*S. giganteum* (6 groves)	12-20	SAS, Inc. GLM (unbalanced)	Bonferroni t-test

[a]With Satterthwaite's approximation for comparison of variances.

Synergistic (greater-than-additive) additive and antagonistic (less-than-additive) effects of mixtures of pollutant gases were evaluated for the experiment conducted from 11/16/82 to 4/11/83 by calculating the difference from control for the top dry weight (TDW) and root dry weight (RDW) of plants exposed to the gas mixtures. The general formula to compare single and mixed gas treatments was:

Δ Single and Mixed Gas Treatments =

$$(\text{Control} - O_3 \cdot SO_2) - (\text{Control} - O_3 + \text{Control} - SO_2)$$

RESULTS

Fumigation of Recently Germinated Conifer Seedlings, February 18 to May 26, 1982

Conditions During Fumigation

On February 23, 1982, the sixth day of the fumigation, the pollutant generators were accidentally left on during the night when the chamber ventilation system was normally off. This accident was the result of a simple misunderstanding about who would turn off the equipment at the end of the day. An evaluation was subsequently made of every seedling in each chamber after several days of filtered air treatment. At concentrations of single and mixed gases of 10 pphm or less, there was no significant visible injury. Injury was present on a few seedlings in two mixtures, namely 5 pphm SO_2 + 20 pphm O_3 and 10 pphm SO_2 + 20 pphm O_3. Injured seedlings were replaced.

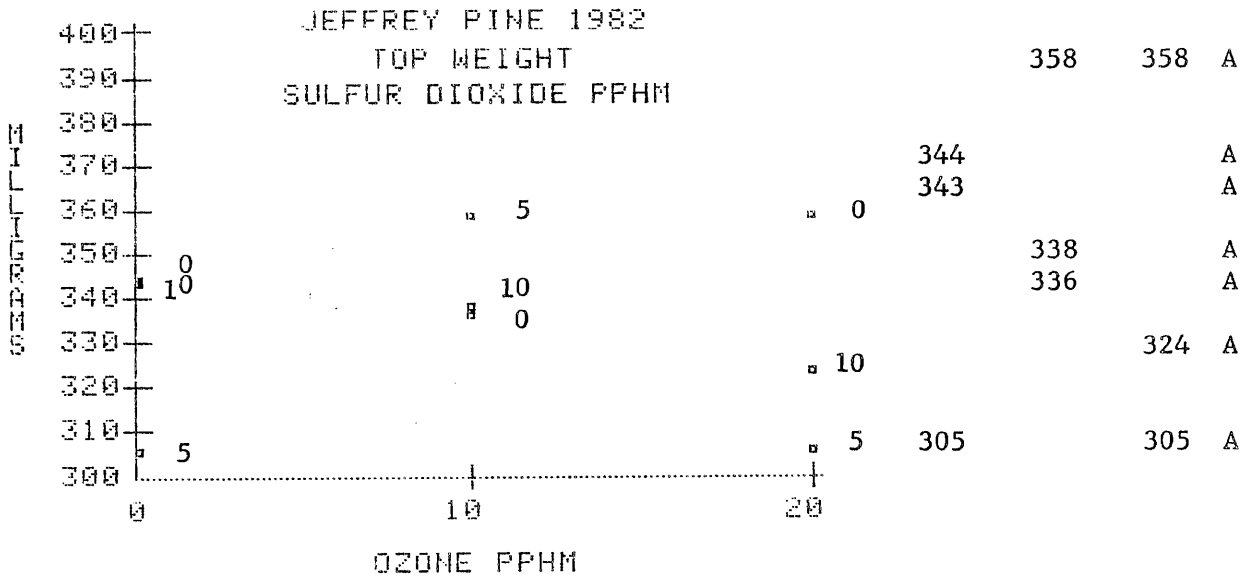
After consultation with the CARB Project Officer, the fumigation was restarted on March 10, 1982 excluding those treatments that had received severe injury, namely any single or mixed gas treatment equal to or greater than 30 pphm ozone and 15 pphm sulfur dioxide (see Table VI-1). An agreement was reached to evaluate the results of the truncated experimental design with an understanding that the experiment would be repeated in 1982-83.

On May 26, 1982 the seedlings were removed from the chambers to a filtered air greenhouse where the top and root harvest was completed.

Preliminary Ozone and Sulfur Dioxide Fumigation of Recently Germinated Ponderosa Pine, Jeffrey Pine and Giant Sequoia Fumigated from February 18, 1982 to May 26, 1982

The results of a preliminary fumigation of Jeffrey Pine Ponderosa Pine and Giant Sequoia with single or mixed gas treatments, including 0, 5 and 10 pphm SO_2 and 0, 10 and 20 pphm O_3 are presented in Figures VI-1a, 1b and 1c. The effects observed for jeffrey and ponderosa pine are questionable because of the accidental incident of overnight exposure to pollutants when there was no air flow in the chambers. A new cohort of giant sequoia seedlings was added after the accidental exposure, so the effects observed on that group are valid. Both the TDW and RDW of giant sequoia showed significant ($p < 0.05$) differences from control. The TDW was significantly less than the control for two single gas treatments (10 pphm SO_2 and 20 pphm O_3) and all four of the combined gas treatments (5 and 10 pphm SO_2 plus 10 and 20 pphm O_3). The same response was observed in giant sequoia RDW. The changes in RDW were of a larger magnitude than those in TDW.

The results (Figure VI-1a, 1b and 1c) of the fumigation done from February 18, 1982 to May 26, 1982 were used primarily for selecting pollutant concentrations and combinations of concentrations to be used in the second fumigation (November 16, 1982 to April 11, 1983) of recently germinated seedlings. Preliminary results suggested that significant effects may appear with 5 or 10 pphm sulfur dioxide mixed with 10 or 20 pphm ozone. The concentrations chosen for the second experiment, beginning November 16, 1982 were centered around these values, and there were two chamber replications.



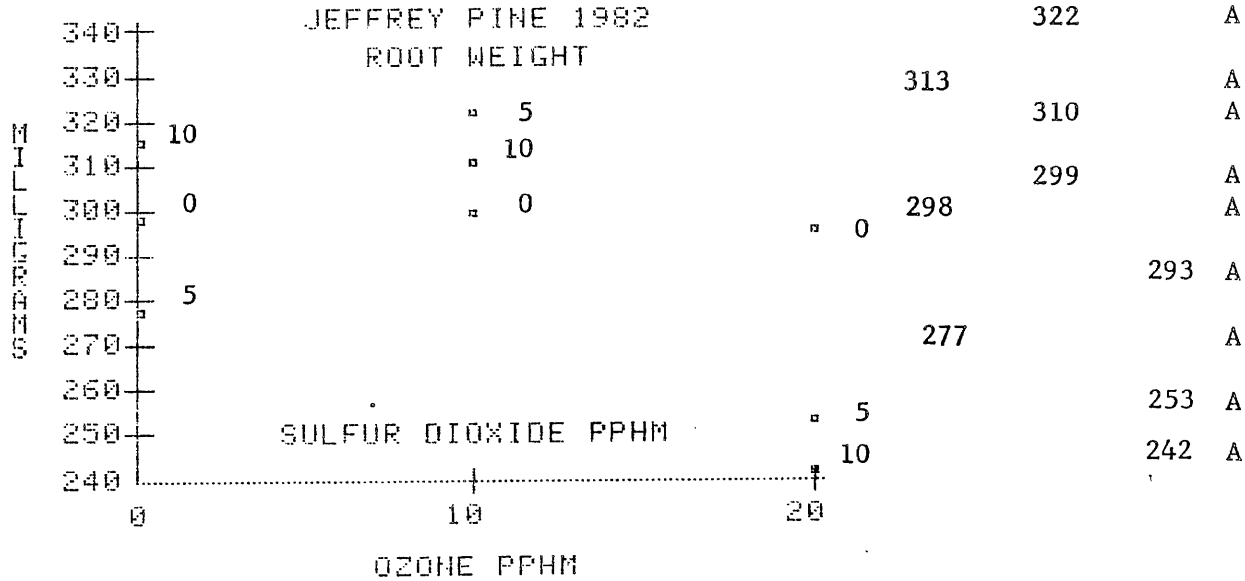
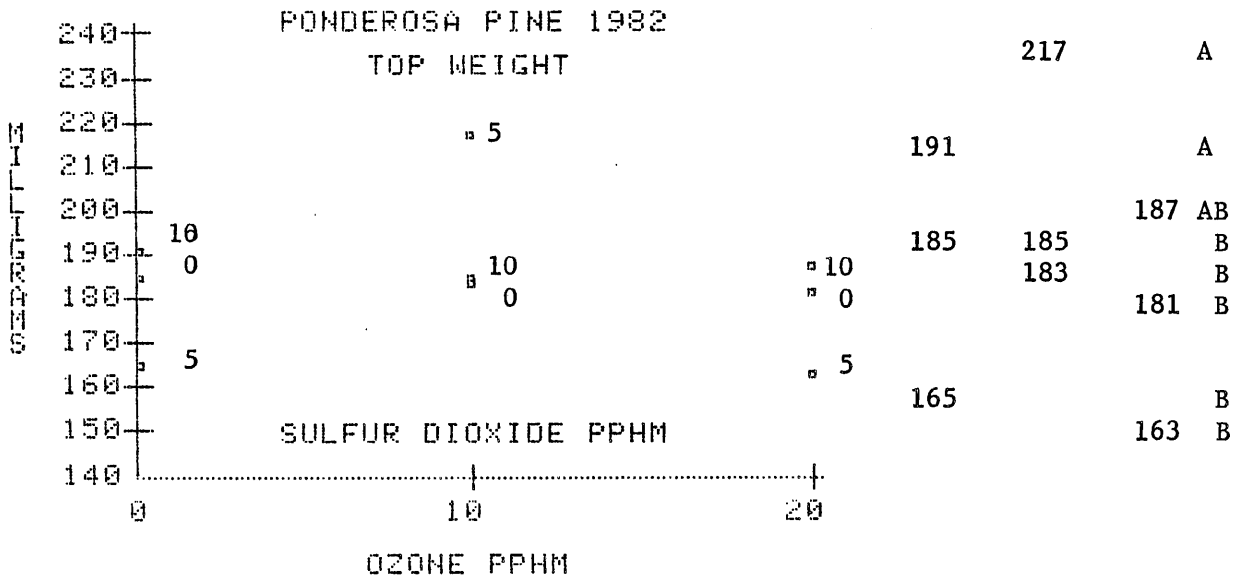


Figure VI-1a. Preliminary single and mixed ozone and sulfur dioxide fumigation of recently germinated conifer seedlings extending from February 18, 1982 to May 26, 1982 to determine concentration ranges where effects on top and root growth may be expected to occur.



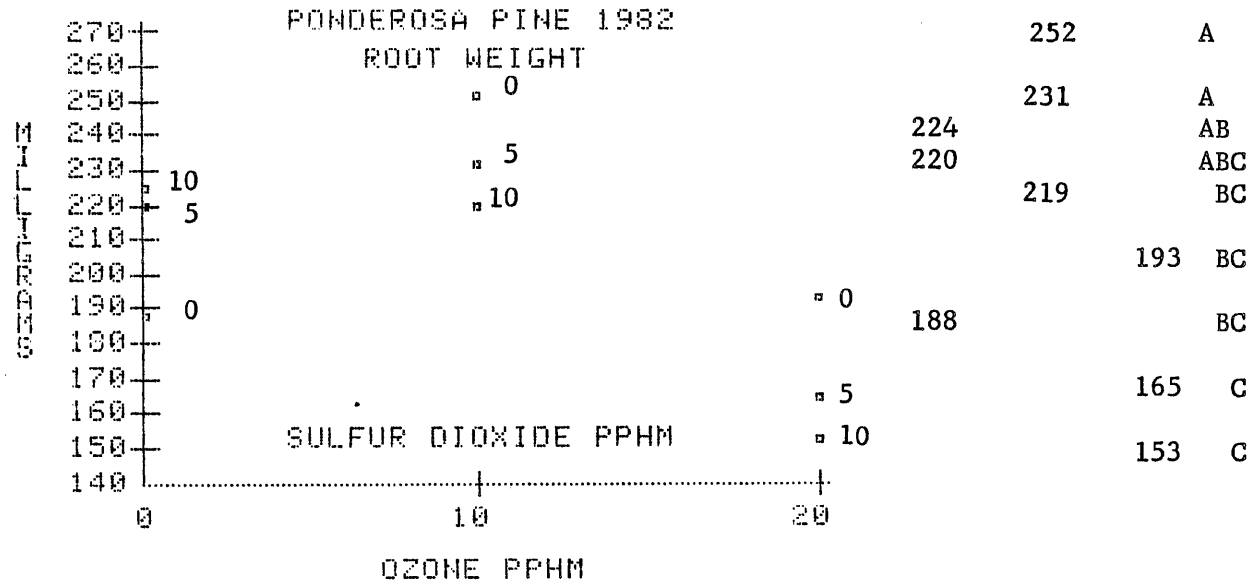
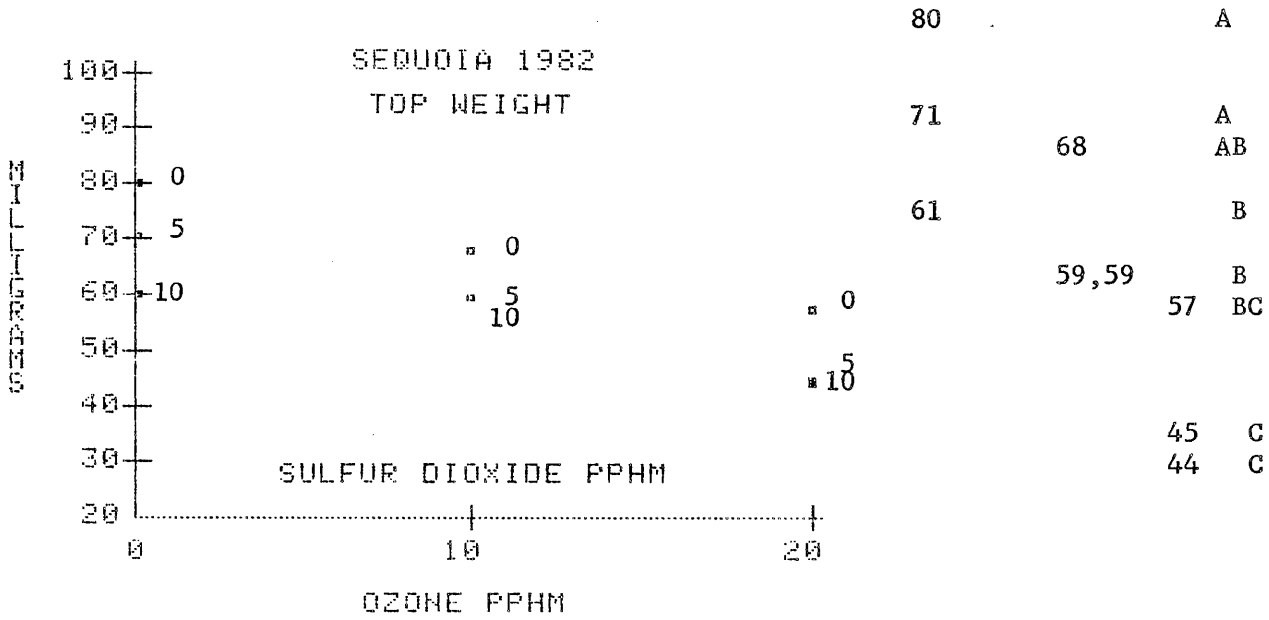


Figure VI-1b. Preliminary single and mixed ozone and sulfur dioxide fumigation of recently germinated conifer seedlings extending from February 18, 1982 to May 26, 1982 to determine concentration ranges where effects on top and root growth may be expected to occur.



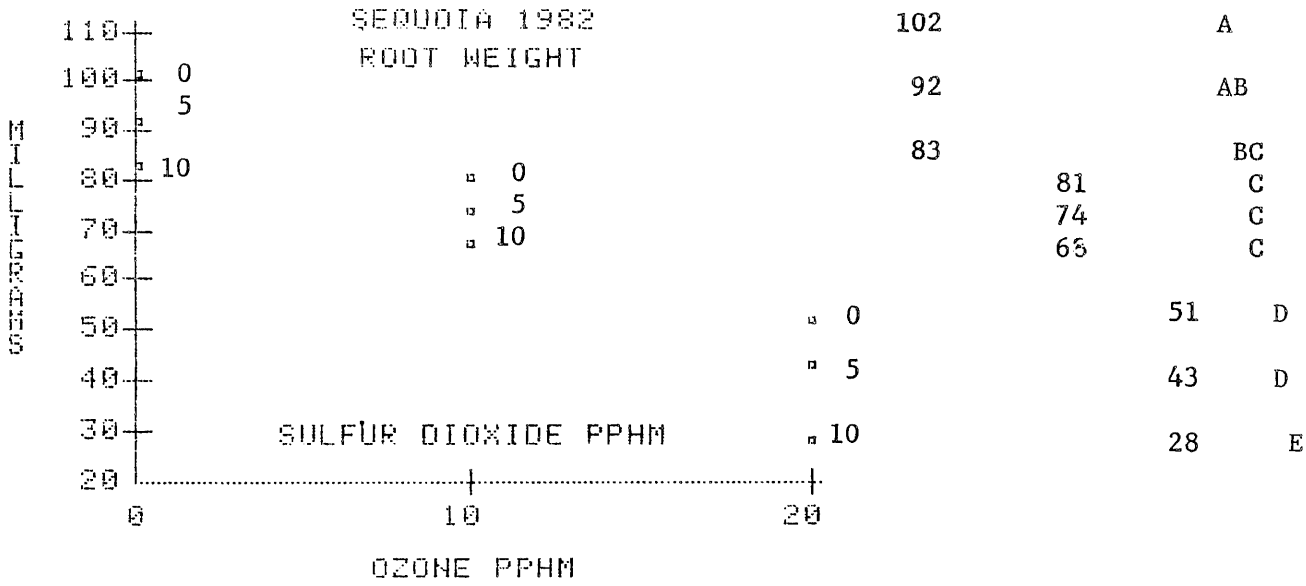


Figure VI-1c. Preliminary single and mixed ozone and sulfur dioxide fumigation of recently germinated conifer seedlings extending from February 18, 1982 to May 26, 1982 to determine concentration ranges where effects on top and root growth may be expected to occur.

Ozone and Sulfur Dioxide Effects on Recently Germinated Ponderosa, Jeffrey, and Digger Pines Fumigated from November 16, 1982 to April 11, 1983

Conditions During Fumigation

The planned seven-hour daily duration of fumigation was achievable only during periods of fair weather. The daily fumigation duration for each day of the November through April period was recorded along with the daily maximum air temperature (Appendix 4). In November only four of 14 days permitted a full day of fumigation; the remaining days were either very cloudy and cool or rainy. On November 30 a violent wind ripped the Teflon film from the upper section of almost all chambers. The seedlings were protected from any physical damage by the remaining Teflon film. The period December 1 to 19 was required to rebuild the chambers. During this period the seedlings were protected in several chambers that received the least damage and were provided with carbon-filtered air during daylight hours. The seedlings were placed back in their original chambers and fumigation resumed on December 20.

The remainder of the fumigation period was characterized by fair weather during the first three weeks of January, the 9th to the 24th of February and the 8th to the 16th of March. The intervening rainy periods produced more rain than the long-term average for that period. The rain amounts and the pH for some rain events are shown in Appendix 4. The unweighted mean pH was 5.1; this level of acidity has not been associated with plant injury.

The pattern of dose resulting from intermittent fumigations, determined by the frequency of rainy and fair weather days, was analogous to typical pollution episodes in the summer. The fair weather periods were similar to the irregularly spaced incidents of high pollution in the

summer and the rainy periods may correspond to summer weather with low air pollution. This dose pattern may be a more realistic exposure because it is similar to fluctuating pollutant concentrations under natural conditions (Wallner and Fong, 1982).

Evaluation of Visible Injury and Growth of Tops and Roots

The visible injury symptoms on recently germinated pines at the end of the experiment (April 11, 1983) are summarized in Table VI-3. Digger pine showed very slight chlorotic mottle at 20 pphm ozone with heavier chlorotic mottle and occasional necrosis from gas mixtures involving 5 or 10 pphm sulfur dioxide with 20 pphm ozone. Necrosis symptoms were common on ponderosa pine at 5 and 10 pphm SO_2 with 10 and 20 pphm O_3, singly and in combination. Jeffrey pine was more resistant to visible injury; obvious injury appeared as a chlorotic mottle with some necrosis at concentrations of 20 pphm O_3 with and without 5 and 10 pphm SO_2. Jeffrey pines exposed to filtered air showed slight tip necrosis. There is reason to suspect that the cool, generally moist conditions during the fumigation may have induced a slight iron deficiency. Foliar applications of chelated iron during the last one-third of the fumigation seemed to correct a lemon-yellow chlorosis of the new primary needles.

TDW and RDW results are examined in order to address the following questions: (1) How much variation was due to chambers and how much due to plants (Table VI-4)? (2) Was there a pattern of interaction among treatment means for either single gases or gas mixtures for pines (Figure VI-2a and VI-2b) and giant sequoia seedlings (one bulk seed lot and six groves) from the Sequoia-Kings Canyon National Park (Figure VI-3a and VI-3g)?

Table VI-3. Visible Injury to Ponderosa, Jeffrey and Digger Pines Exposed to Ozone and Sulfur Dioxide Singly and in Combination from November 16, 1982 to April 11, 1983

Species	Injury Symptoms[a,b]	Concentrations [SO_2 - O_3]								
		0-0	5-0	10-0	0-10	5-10	10-10	0-20	5-20	10-20
		Percent of the Population Exhibiting a Particular Symptom								
Digger pine	NVI				100		100			
	SN			2.5						
	WLC	1.3	7.5			2.5				
	CM							2.5		20.0
	CM-CB								17.5	
Jeffrey pine	SN	42.5								
	SNTN		15	22.5					42.5	
	DN				26.5					
	CM							25.0		25.0
	TN					20.0	17.5			
Ponderosa pine	SN	7.5								
	DN		12.5	42.5						
	TN				20	17.5				
	CM						25.0	30.0		40.0
	SNTN								50.0	

[a]Most common symptom on primary needles.

[b]WLC = whole leaf chlorosis, SN = spotty necrosis, DN = distal necrosis, TN = tip necrosis, NVI = no visible injury, CM = chlorotic mottle, CB = chlorotic banding.

Table VI-4. Comparison of Amounts of Variation Due to Chamber and Plant Replications

Species	Sources of Variation			
	TDW		RDW	
	Chambers (%)	Plants (%)	Chambers (%)	Plants (%)
Digger	37.3	62.7	57.7	42.3
Ponderosa	64.5	35.5	60.6	39.4
Jeffrey	43.3	56.7	25.3	74.7
Mean	48.4	51.6	47.8	52.1

The relative amounts of variation in treatment means ($\bar{X}$) due to chambers and plants were calculated from the mean error sum of squares and chamber sum of squares in the ANOVA tables. Let S^2 denote the variance of the within-chamber random component and S_c^2 denote the variance of the between-chamber component.

Then:

$$S_c^2 = \left(\frac{\text{chamber SS}-S^2}{\text{chamber DF}}\right)/n$$, from the expected value of the chamber SS, and:

$$V(\bar{X}) = S_c^2/c + S^2/n_c$$

= variance due to between-chamber variation + variance due to plant variation within chambers

In this experiment the number of chambers (c) is 2, and the number of plants per chamber (n) is 20. Chamber and plant variation were summed and the sum was divided into both sources of variation to obtain percents attributable to each (Table VI-4). The mean values suggest that the amounts of variation due to chambers and plants are approximately equal, however, there is some inconsistency because TDW for Ponderosa Pine and RDW for Jeffrey Pine do not follow the same pattern as the others.

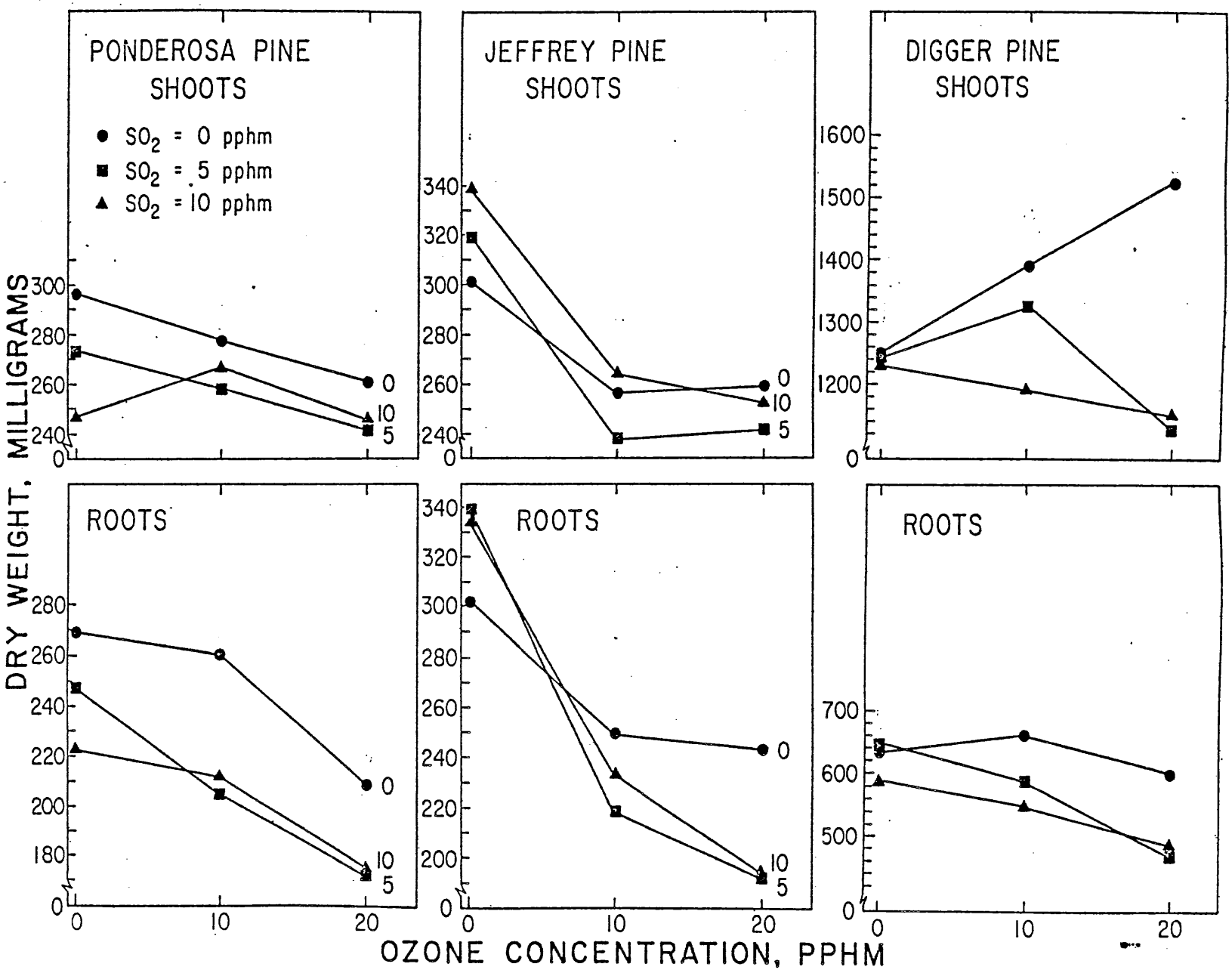


Figure VI-2a. Effects of single and mixed ozone and sulfur dioxide fumigation on recently germinated ponderosa, jeffrey and digger pine seedlings exposed from November 16, 1982 to April 11, 1983.

296			A
	277		A
276			A
	266		A
[illegible] 6		261	A
	258		A
246			A
		245	A
		242	A

339			A
319			A
301			A
	264		A
		259	A
	256		
		252	A
		243	A
	239		A

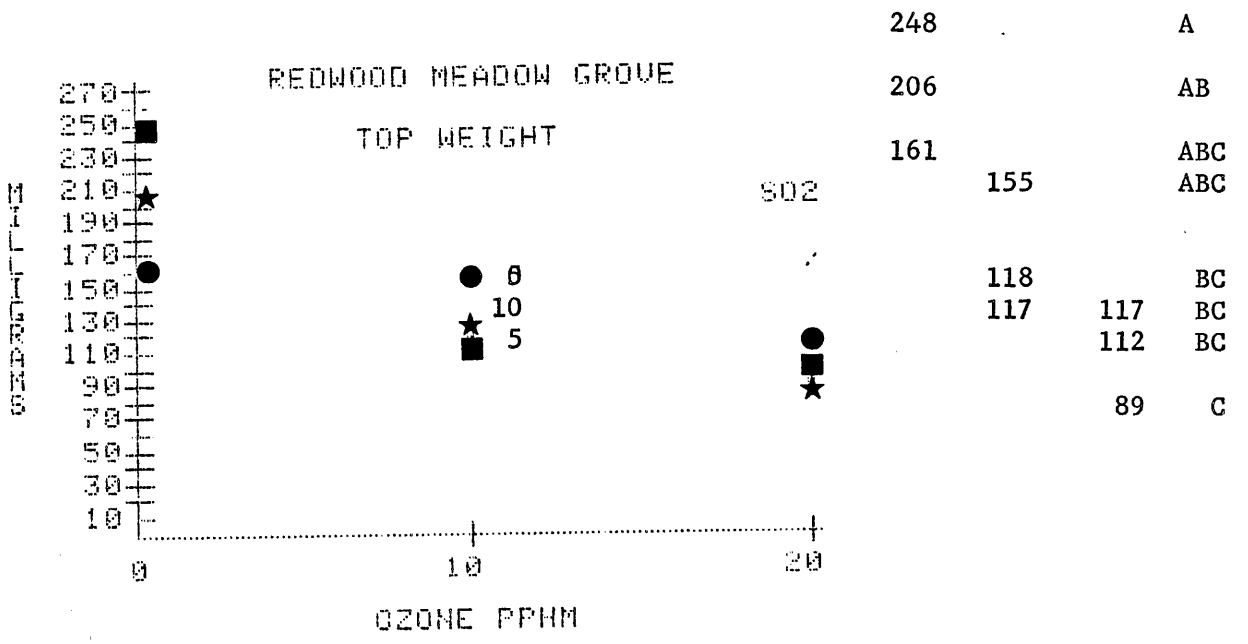
		1541	A
	1390		A
	1323		A
1251			A
1248			A
1229			A
	1188		A
		1152	A
		1124	A

269			A
	261		AB
247			AB
221			AB
	211		AB
		208	AB
	205		AB
		175	B
		174	B

339			A
334			AB
302			ABC
	250		ABCD
		244	BCD
	234		CD
	219		CD
		193	D
		193	D

644			A
	663		AB
635			AB
		602	ABC
588			ABC
	587		ABC
	548		ABC
		489	BC
		465	C

Figure VI-2b. Mean separation, data indicated in Figure VI-2a.



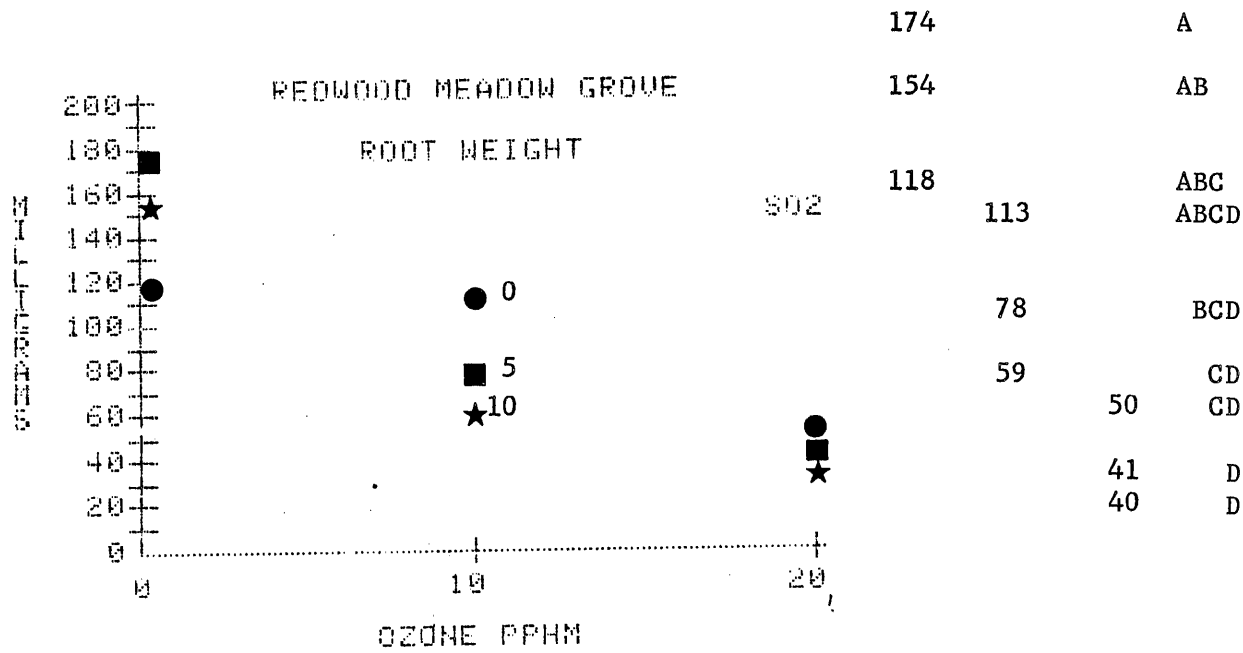
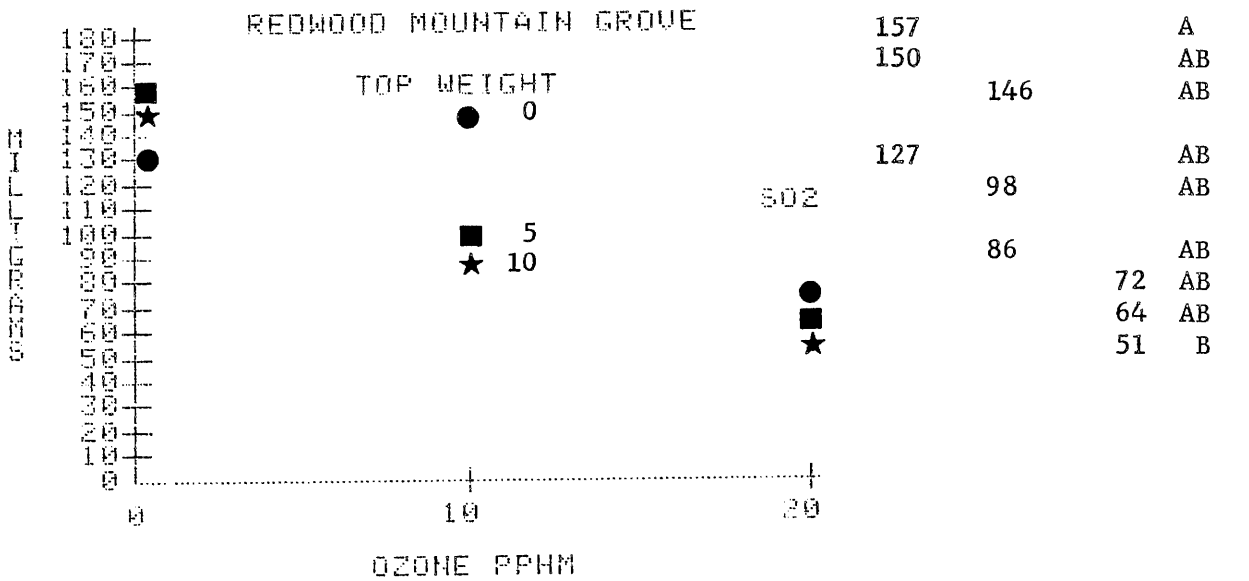


Figure VI-3a. Top and root weights of giant sequoia seedlings from different seed sources following exposure to ozone and sulfur dioxide singly and in combination from November 16, 1982 to April 11, 1983.



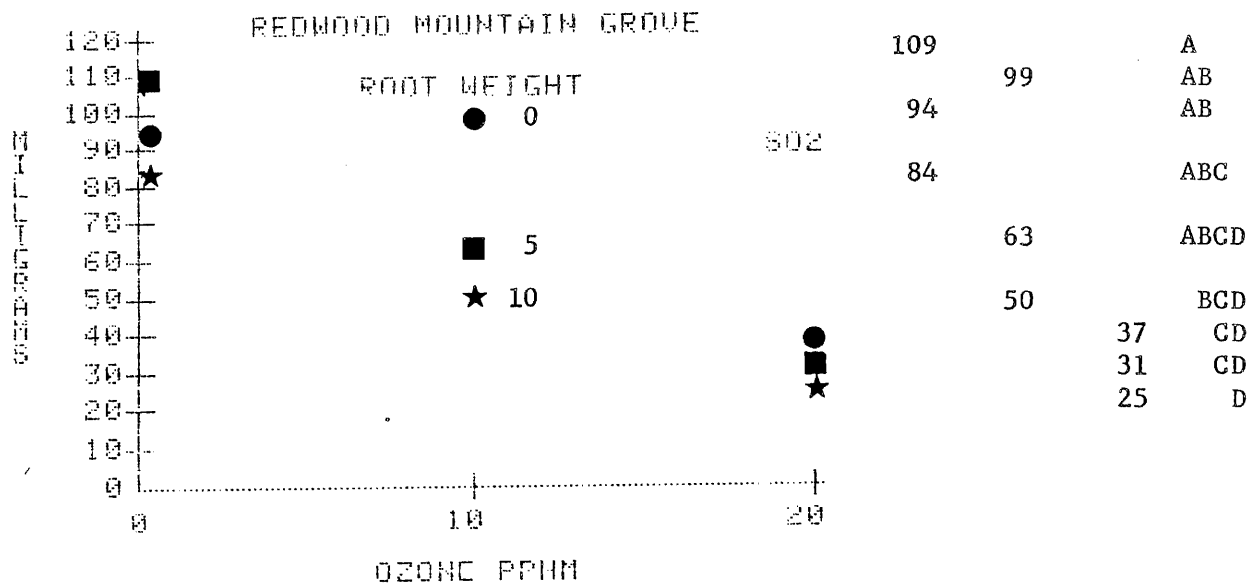
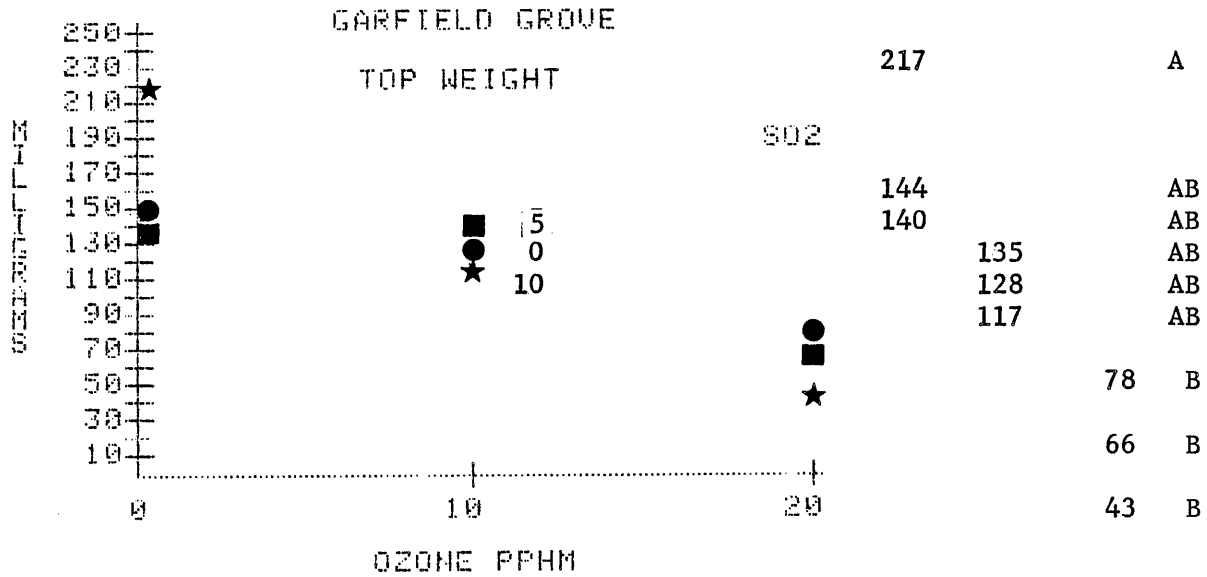


Figure VI-3b. Top and root weights of giant sequoia seedlings from different seed sources following exposure to ozone and sulfur dioxide singly and in combination from November 16, 1982 to April 11, 1983.



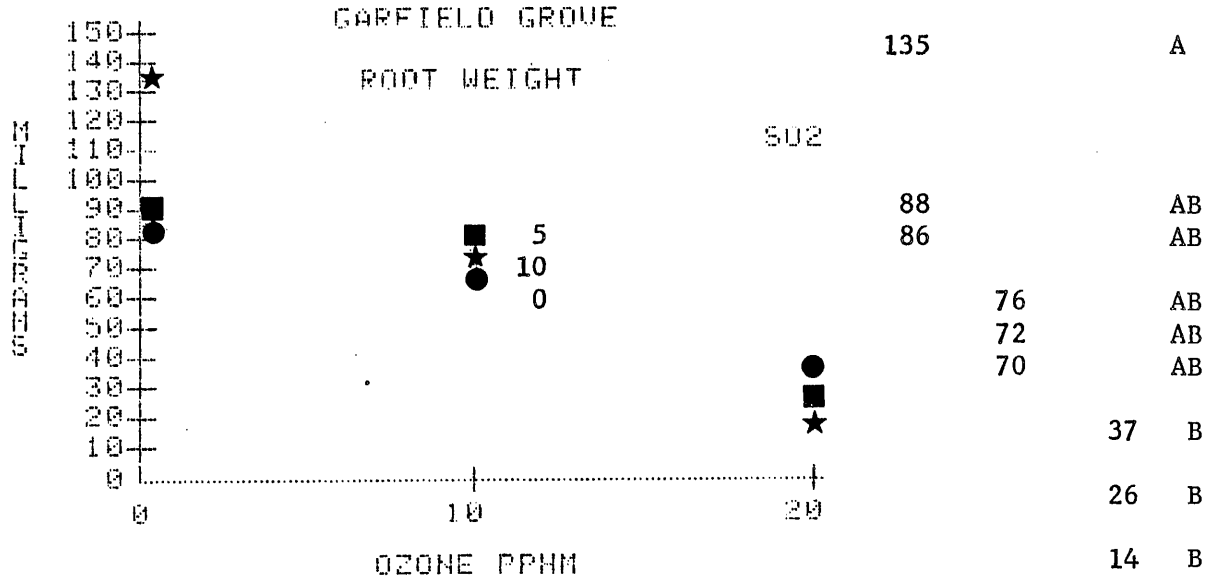
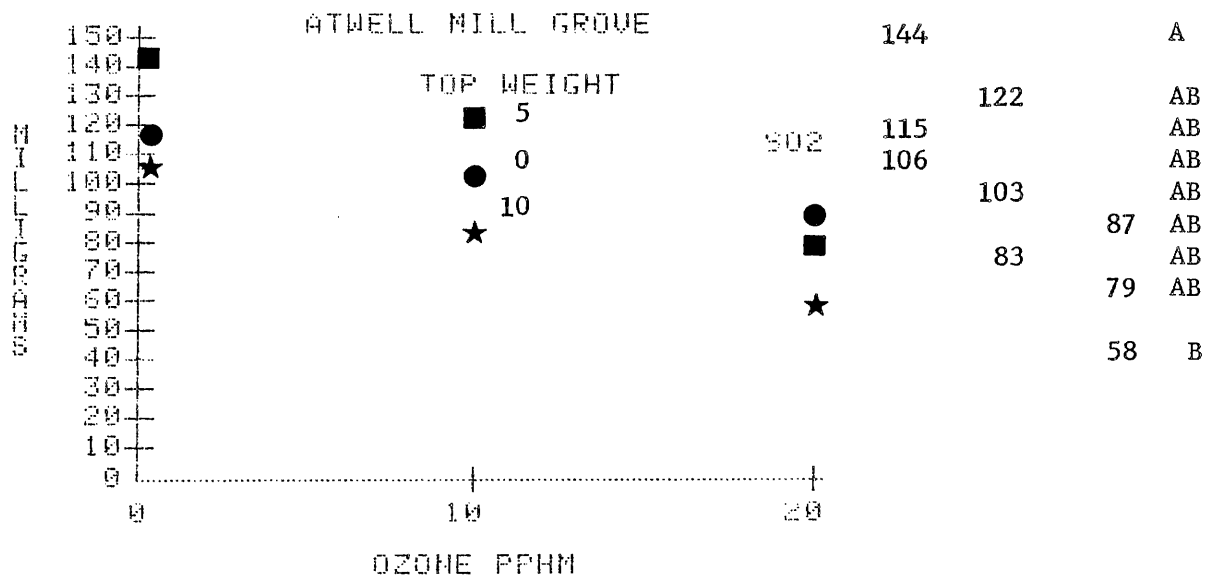


Figure VI-3c. Top and root weights of giant sequoia seedlings from different seed sources following exposure to ozone and sulfur dioxide singly and in combination from November 16, 1982 to April 11, 1983.



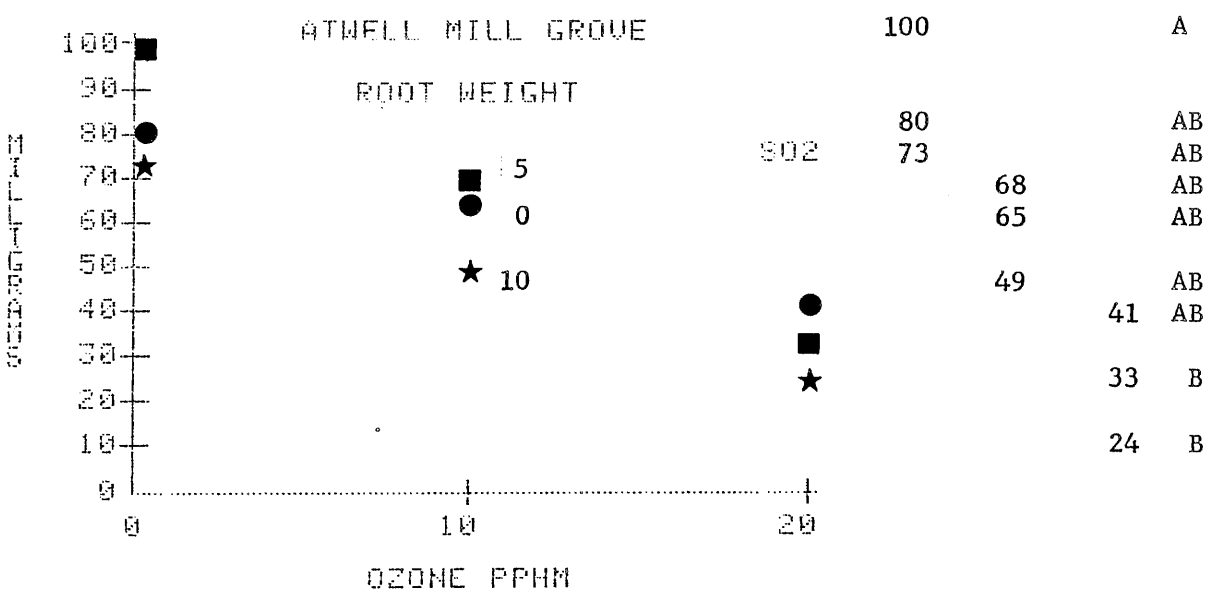
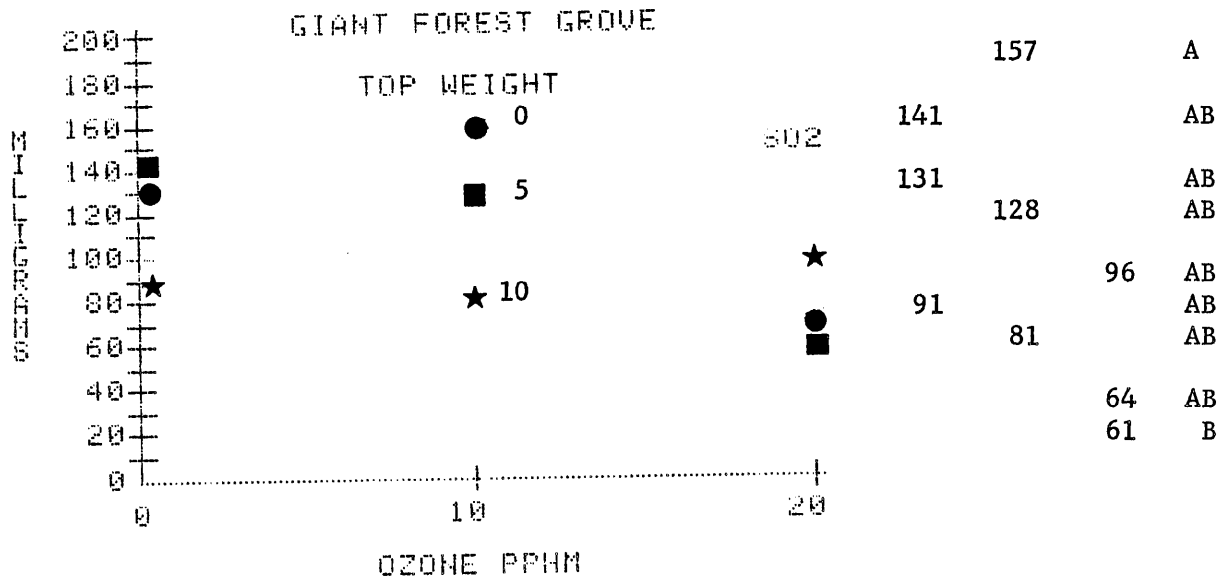


Figure VI-3d. Top and root weights of giant sequoia seedlings from different seed sources following exposure to ozone and sulfur dioxide singly and in combination from November 16, 1982 to April 11, 1983.



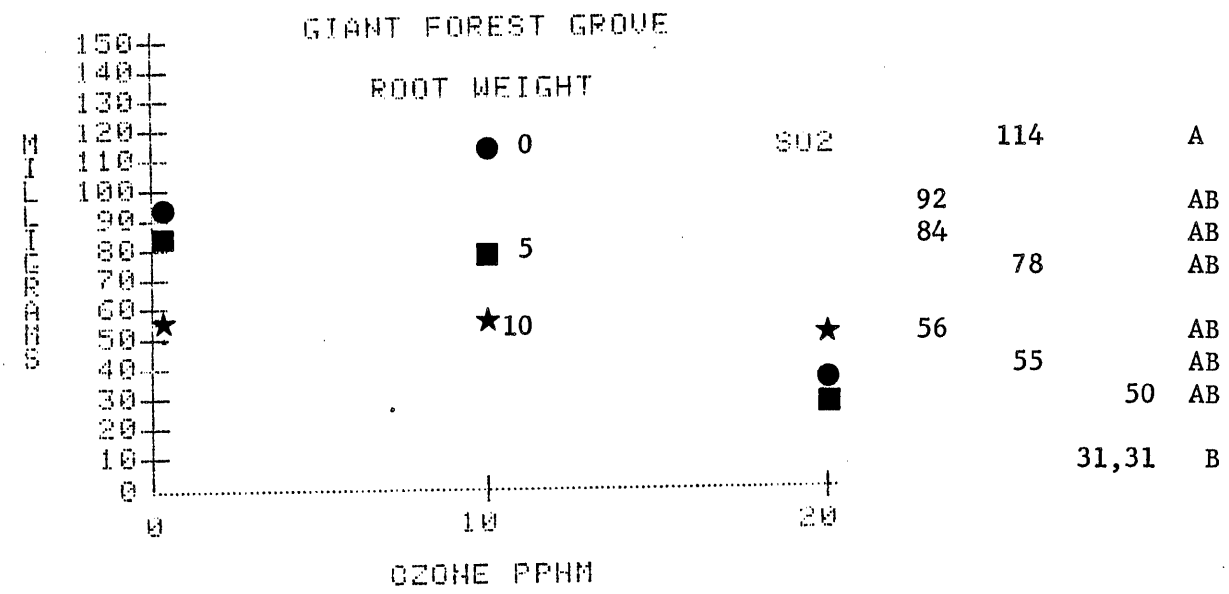
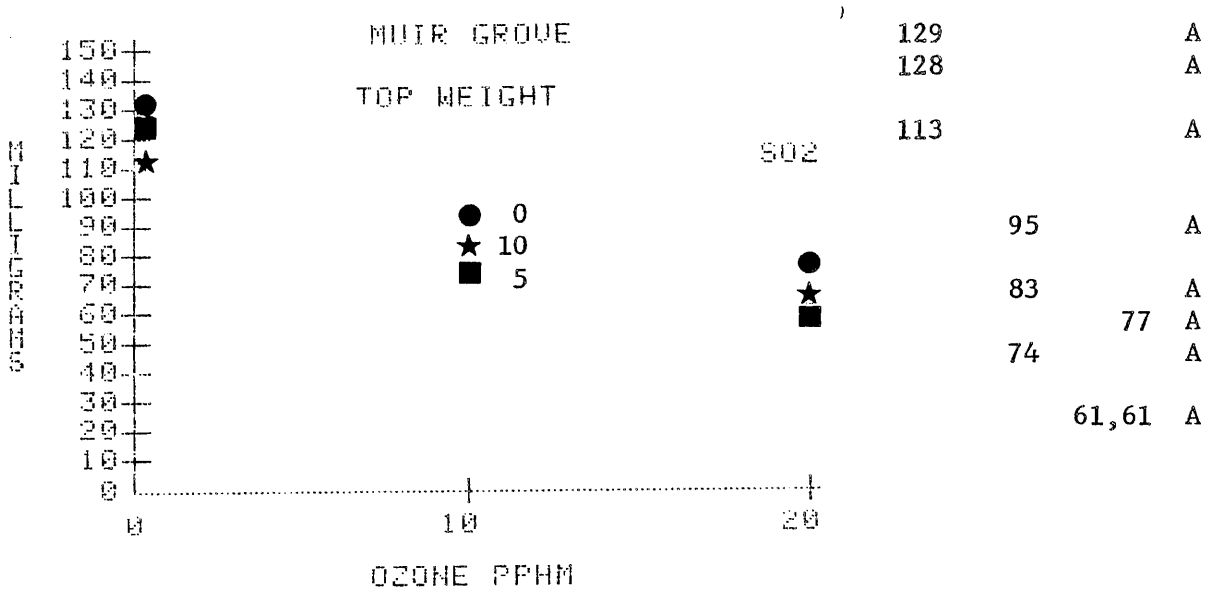


Figure VI-3e. Top and root weights of giant sequoia seedlings from different seed sources following exposure to ozone and sulfur dioxide singly and in combination from November 16, 1982 to April 11, 1983.



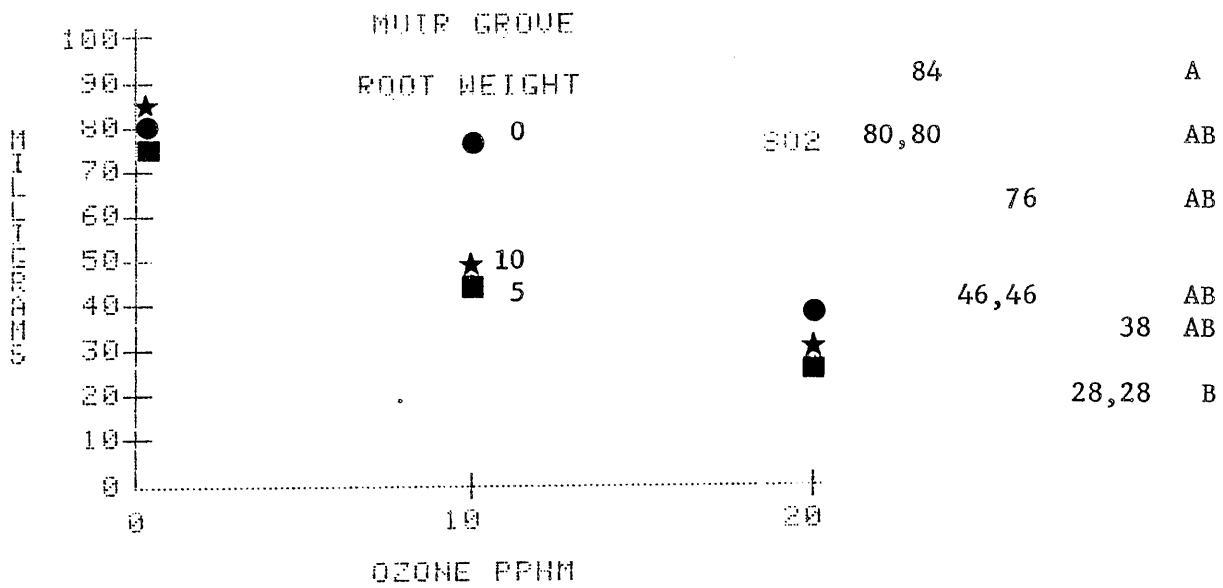
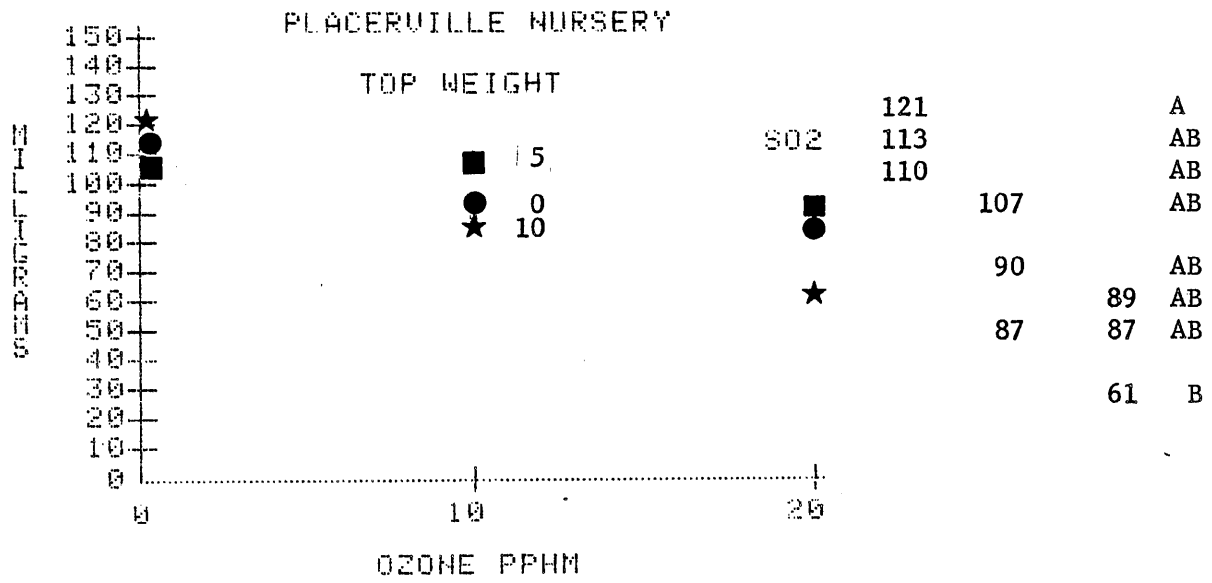


Figure VI-3f. Top and root weights of giant sequoia seedlings from different seed sources following exposure to ozone and sulfur dioxide singly and in combination from November 16, 1982 to April 11, 1983.



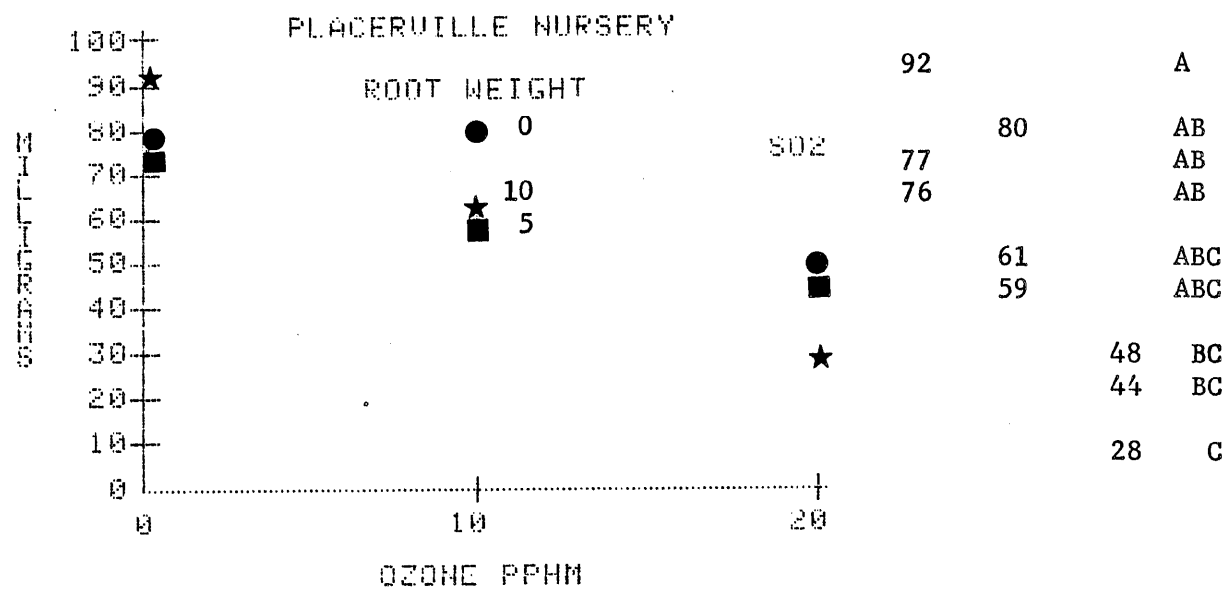


Figure VI-3g. Top and root weights of giant sequoia seedlings from different seed sources following exposure to ozone and sulfur dioxide singly and in combination from November 16, 1982 to April 11, 1983.

The single and mixed gas treatment means for the 3 pine species (Figure VI-2a and VI-2b) show that the TDW is not significantly ($p > 0.05$) different for any species. Even in the absence of significance, the TDW trends suggest that pollutant mixtures depress TDW more than single pollutants. The RDW for both ponderosa and jeffrey pine mirrored the TDW trend and several of the pollutant mixtures produced significant differences ($p < 0.05$) between the 5 pphm SO_2 treatment and the 5-20 mixture. The F value (Table VI-5) for the SO_2*O_3 interaction were not significant except for Jeffrey Pine RDW.

An apparent stimulation of the TDW of digger pines exposed to 20 pphm ozone was an unexpected result. The stimulation of TDW was not paralleled by the RDW response at 20 pphm ozone. This result suggests a compensating

Table VI-5 Tests for the Interaction of Sulfur Dioxide and Ozone (SO_2*O_3) in TDW and RDW Changes

F Values and Probability of Significance	Species		
	Digger Pine	Ponderosa Pine	Jeffrey Pine
		TDW	
F	1.99	0.45	0.60
PR>F	NS[a]	NS	NS
		RDW	
F	1.78	0.36	2.82
PR>F	NS	NS	0.10

[a]Not significant

response in TDW that may not have been sustainable if exposure time was increased. The single gas treatments with 5 or 10 pphm SO_2 suggested stimulation of TDW for jeffrey pine and of RDW for jeffrey pine and digger pine, but these responses were not significant ($p > 0.05$).

Ozone and Sulfur Dioxide Effects on Recently Germinated Giant Sequoia Fumigated from November 16, 1982 to April 11, 1983

Evaluation of Visible Injury on Sequoia Seedlings

At the start of the fumigation (November 17, 1983), sequoia seedlings were two to three weeks old and free from any visible injury symptoms. A final visual evaluation was made on March 21, 1983, approximately 30 days after the termination of weekly visual inspections. This evaluation, on a plant-to-plant basis for each grove, recorded the percent foliar injury for each grove (Table VI-6). Standard deviations of the mean percent visible injury were high in all treatments due to the extreme variation in plant-to-plant response. Typically, larger plants showed more visible injury than did smaller plants. On the basis of percent foliar injury, the greatest injury occurred at 0-20, 5-20 and 10-20 pphm sulfur dioxide-ozone (Table VI-6). Generally the addition of 5 and 10 pphm sulfur dioxide with 20 pphm ozone appeared to increase mean visible injury to plants from Giant Forest, Atwell Mill, Redwood Meadow, Placerville, Garfield Grove and Muir Grove (Table VI-6). Percent visible injury at pollutant concentrations below 10 pphm sulfur dioxide-10 pphm ozone was generally low and usually confined to several individual plants of apparently higher pollutant sensitivity. Most seedlings were not visibly injured unless ozone was present. However, a few seedlings from Garfield Grove, Atwell Mill, Muir Grove and Redwood Mountain were visibly injured by sulfur dioxide alone (Table VI-6).

Table VI-6. Foliar Injury on Five-Month-Old Giant Sequoias from Different Seed Sources.

Seed Source	Pollutant Concentrations (SO_2-O_3) pphm								
	0-0	5-0	10-0	0-10	5-10	10-10	0-20	5-20	10-20
	Percent Visible Injury[a]								
Placerville	0.0	0.0	0.0	2.3	0.2	2.2	8.6	11.0	20.3
Atwell Mill	0.0	0.0	3.7	0.6	2.5	0.7	12.9	21.8	21.8
Redwood Meadow	0.0	0.0	0.0	0.2	0.7	1.2	14.0	26.2	20.7
Garfield Grove	0.0	0.5	0.9	1.6	0.6	5.5	12.9	20.5	15.4
Redwood Mountain	0.0	1.0	1.2	2.1	0.7	1.4	12.2	12.6	18.1
Giant Forest	0.0	0.0	0.0	0.03	0.5	0.9	5.9	15.2	14.7
Muir Grove	0.0	0.1	0.0	0.9	1.3	4.4	14.0	17.2	19.1
Grand Mean	0.0	0.2	0.8	1.1	0.9	2.3	11.5	17.8	18.6
SD (±)		0.4	1.4	0.9	0.8	1.9	3.0	5.4	2.7

[a]Exposed to Sulfur Dioxide and Ozone in Open-Top Chambers from November 16, 1982 to March 21, 1983.
[b]Percentage of Total Leaf Area with Visible Injury Symptoms was Evaluated on a Per Plant Basis.

Seedlings from Garfield Grove and Redwood Mountain were sensitive to visible injury from a wider range of pollutant concentrations (Table VI-6), but the greatest amount of injury, at 10 pphm sulfur dioxide-20 pphm ozone, was not more than observed in other groves. Seedlings from Giant Forest were the least sensitive to visible injury.

Injury symptoms to plants from all seed sources did not appear until more than two weeks after the beginning of the experiment, and injury at concentrations below 20 pphm ozone were not observed until 12 weeks after the fumigation began. Additionally, percent foliar injury in treatments

with 20 pphm ozone was generally lower in progeny from Giant Forest compared to other groves (Table VI-6).

By far the most common injury symptom observed in seedlings from all groves was a purple-red discoloration of older secondary, primary and cotyledonary needles. Necrotic symptoms were also common but accounted for only a small percentage of the total foliar injury.

Analysis of Top and Root Dry Weights of Sequoia Seedlings

Following analysis of variance, significant differences in mean top dry weight (TDW) and root dry weight (RDW) for each treatment were investigated using the Bonferroni t-test. This method is appropriate for an unbalanced analysis of variance and is more conservative than Duncan's multiple range test. Therefore, the results in Figures VI-3a to VI-3g may represent biologically significant differences (i.e., substantial differences) in many cases where there was not statistically significant ($p < 0.05$) differences. For example, the TDW for Placerville seedlings was reduced by 50% when the 10-0 (10 pphm sulfur dioxide-0 pphm ozone) and 10-20 treatments are compared, but this difference was not significant.

This indicates a large range of variability of response to pollutants within each population.

Both TDW and RDW of seedlings receiving 5 and 10 pphm sulfur dioxide alone tended to be as high or higher than the filtered air control for all but one grove (Giant Forest), but the differences were not significant ($p < 0.05$). However, when 5 and 10 pphm sulfur dioxide were combined with 10 or 20 pphm ozone, substantial or significant reductions in TDW and RDW often occurred (Figures VI-3a to VI-3g).

For all groves, the largest decreases in RDW were found in one of the treatments with 20 pphm ozone; the order of increasing effect was usually

0-20, 5-20 and 10-20 pphm. The differences between these treatments were never statistically significant ($p < 0.05$), but the trend suggests a possible minor synergism between pollutants resulting in greater-than-additive decrease of RDW, e.g., Redwood Mountain, Garfield Grove, Atwell Mill, and Placerville (Figures VI-3b, VI-3c, VI-3d, and VI-3g, respectively).

For TDW the 20 pphm ozone treatments, with and without 5 and 10 pphm SO_2, generally resulted in the most weight decrease for three seed sources (Garfield, Placerville and Redwood Mountain), but for the four remaining seed sources (Atwell Mill, Redwood Meadow, Giant Forest and Muir), the 10-10 treatment caused more growth loss than one of the 0-20, 5-20 or 10-20 treatments. As with RDW, there was no significant difference between the three or four treatments causing the most reductions in growth, but a small greater-than-additive interaction is clearly present, since the combination of 10 and 20 pphm ozone with 5 or 10 pphm sulfur dioxide usually caused a greater reduction in growth than 10 or 20 pphm ozone alone. This is especially evident for Redwood Meadow and Redwood Mountain (Figures VI-3a and VI-3b). Statistically significant reductions in TDW occurred mainly between the 5 and 10 pphm sulfur dioxide treatments and the combination of 20 pphm ozone with 5 and 10 pphm sulfur dioxide. The progeny from Redwood Mountain and Giant Forest had a substantially, but not significantly, larger mean TDW and RDW in the 0-10 treatment than the 0-0 treatment. It is feasible that some growth stimulus may result from slight ozone injury or some effect of the chamber itself may have been responsible.

The means of all treatments combined at each grove showed that the overall TDW ranged from 96 to 140 mg, while RDW ranged from 58 to 88 mg (Table VI-7). Seedlings from Redwood Meadow were the most vigorous in

Table VI-7. The Mean Top Dry Weight (TDW) and Root Dry Weight (RDW) and Root-Shoot Ratios of All Seedlings in All Treatments for Each Giant Sequoia Seed Source

Seed Source	Mean TDW (mg)	Mean RDW (mg)	Root-Shoot Ratio	TDW Reduction (% Reduction)[a]	RDW Reduction
Placerville	96.3	62.0	0.64	45.9	64.0
Atwell Mill	99.4	58.5	0.59	49.5	70.5
Redwood Meadow	140.2	88.1	0.63	44.9	66.2
Garfield Grove	118.4	66.3	0.56	69.5	80.3
Redwood Mountain	113.0	71.3	0.63	60.4	73.6
Grant Forest	114.1	71.0	0.62	53.1	63.1
Muir Grove	94.2	58.0	0.62	53.0	65.0
Mean	110.8	67.9	0.61	53.8	69.0
SD (±)	16.1	10.4	0.03	8.7	6.3

[a]Maximum percentage reduction of dry weight comparing 0-0 (control) with the lowest treatment mean (20-5 or 20-10 pphm O_3-SO_2).

both top and root growth. Seedlings from Placerville, Atwell Mill and Muir Grove were the least vigorous, while seedlings from Garfield, Redwood Mountain and Giant Forest Groves exhibited an intermediate growth response (Table VI-7). TDW and RDW differed from grove to grove, but the root-shoot ratio was similar for all groves. For all seed sources, the means of the maximum reductions in TDW and RDW were 53.8 ± 8.7 and 69.0 ± 6.3% relative to the respective controls (0-0). Consequently, root growth was affected the most. It is not likely that site characteristics at the different groves are in any way related to seedling response. The vigor of seedling growth, regardless of pollutant treatment, may have been influenced by the age of cones collected from the forest floor and the temperature and moisture conditions prior to collection.

Fumigation of Conifers with Secondary Foliage

Visible Injury to Secondary Needles of Two- to Three-Year-Old Pines and Four-Month-Old Giant Sequoia for the Fumigation Ending June 2, 1982

The visible injury response of each species, expressed as percentage of leaf area (Table VI-8), indicated that the greatest injury to ponderosa and jeffrey pines resulted from 20 pphm ozone + 20 pphm sulfur dioxide and from 40 pphm ozone. For sequoia, the 40 pphm ozone caused the most injury followed by mixtures of 10 and 20 pphm O_3 with 20 pphm SO_2. The highest sulfur dioxide concentration of 0.25 ppm caused only slight injury to all

Table VI-8. Percent Foliar Injury Response of Two- to Three-Year-Old Ponderosa Pine and Jeffrey Pine and Four-Month-Old Giant Sequoia Seedlings Exposed to Sulfur Dioxide and Ozone Singly and in Combinations from April 1, 1982 to June 2, 1982

Ponderosa Pine			Jeffrey Pine			Giant Sequoia		
O_3 (pphm)	SO_2 (pphm)	Average Injury (%)	O_3 (pphm)	SO_2 (pphm)	Average Injury (%)	O_3 (pphm)	SO_2 (pphm)	Average Injury (%)
20	20	57.40a	20	20	52.45a	40	0	91.60a
40	0	52.60ab	40	0	42.90a	20	10	79.80ab
20	10	48.60ab	20	10	40.40a	30	0	76.00abc
20	5	47.30ab	30	0	32.90ab	20	20	74.15abc
30	0	35.10 bc	20	5	31.00ab	20	5	61.60abcd
10	20	21.20 cd	10	20	16.00 bc	10	20	63.20 bcde
20	0	16.55 cd	20	0	7.65 c	20	0	35.30 bcde
0	25	15.80 cd	10	10	6.40 c	0	20	35.10 bcde
10	10	8.40 d	10	5	5.10 c	10	5	32.30 cde
0	20	6.55 d	0	25	3.70 c	10	10	23.20 de
10	5	6.00 d	0	20	0.00 c	0	25	13.70 e
0	15	2.70 d	0	15	0.00 c	10	0	9.20 e
10	0	1.60 d	0	10	0.00 c	0	10	7.00 e
0	10	0.20 d	0	5	0.00 c	0	15	6.60 e
0	5	0.00 d	10	0	0.00 c	0	0	3.55 e
0	0	0.00 d	0	0	0.00 c	0	5	0.10 e

Upper bounds for pairwise comparison at 5%, based on Tukey's multiple comparison method were: ponderosa 22.09, jeffrey 22.07, giant sequoia 46.13.

species. The mean injury from two chambers is shown for the 0-0, 0-20, 20-0, and 20-20 treatments; other treatments were not replicated.

For all three species in Table VI-9, the injury from all mixtures tested was consistently greater than the sum of injury from each gas alone (more-than-additive). The mixture of the lowest SO_2 concentration, 5 pphm, in combination with 20 or 10 pphm ozone resulted in a substantial increase of injury. This is notable because the 5-10 combination can occur under ambient conditions (Chapter II).

Examples of visible injury symptoms caused by both single and mixed gases were photographed. At 20 and 25 pphm SO_2, the injury was a combination of tip and mid-needle necrosis on pines. The highest concentrations of ozone (30 and 40 pphm) caused intense chlorotic mottle and mid-needle necrosis on pines. The mixtures of SO_2 (> 5 pphm) and

Table VI-9. Percent Foliage Injury to Ponderosa Pine, Jeffrey Pine and Giant Sequoia from Exposure to Mixtures of Ozone and Sulfur Dioxide Compared to Percent Foliar Injury from the Same Concentrations of Single Gas Exposures

Treatment		Ponderosa Pine		Jeffrey Pine		Giant Sequoia	
O_3 (pphm)	SO_2 (pphm)	Injury from Gas Mixture (%)	Sum of Injury from Single Gases (%)	Injury from Gas Mixture (%)	Sum of Injury from Single Gases (%)	Injury from Gas Mixture (%)	Sum of Injury from Single Gases (%)
20	20	57.4	23.3	52.5	7.7	74.2	52.8
20	10	48.6	16.8	40.4	7.9	79.8	42.3
20	5	47.3	16.6	31.0	7.7	61.6	35.3
10	20	21.2	8.3	16.0	0	36.2	26.7
10	10	8.4	1.8	6.4	0	23.2	16.2
10	5	6.0	1.6	5.1	0	32.3	9.3

(> 20 pphm) ozone caused an intensification of the chlorotic mottle so that it had a brassy, necrotic appearance plus tip and mid-needle necrosis (Figure VI-4). Four-month-old sequoia seedlings responded to higher concentrations of ozone and mixtures with a yellowing and subsequent necrosis of the oldest leaves located near the bottom of the plant and on the inside near the main stem (Figure VI-4).

This new information on symptoms from mixed gas fumigations will provide information needed to identify foliar injury symptoms during field surveys.

DISCUSSION

The latest revision of the Air Quality Criteria for Ozone and Other Photochemical Oxidants (U.S. EPA, in press) proposes some general concepts about the joint action of ozone and sulfur dioxide. These concepts are paraphrased as follows:

(1) Synergistic joint action occurs frequently at concentrations below or at the threshold for visible injury. (2) Yield loss may be additive as concentrations increase in the mixture above the visible injury threshold. (3) Antagonistic joint action may occur if one pollutant concentration exceeds the other or if both are high. These concepts are based mainly on research with herbaceous plants. The results of exposure to mixed gases depend also on species, cultivar, environmental conditions, duration and frequency of exposure.

The visible injury observed in the fumigations of recently germinated seedlings did conform to concept #1 in the case of digger pine, but ponderosa and jeffrey pines had slight visible injury from exposure to the lowest concentrations of single gases; visible injury increased from

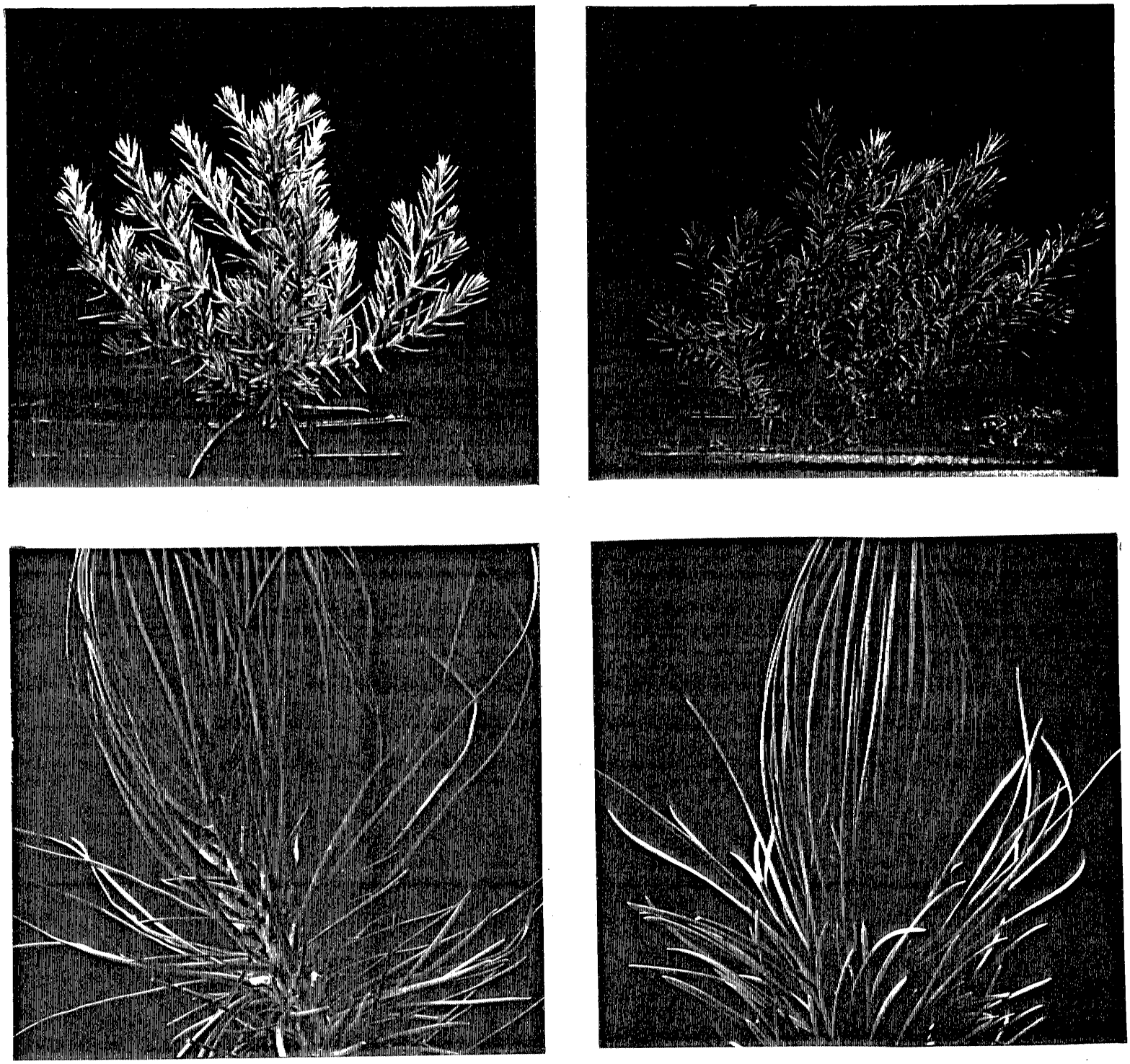


Figure VI-4. Appearance of ozone injury on giant sequoia (upper right) and injury from a combination of ozone and sulfur dioxide on ponderosa pine (lower right). Concentration of both pollutants was 20 pphm. Control plants are on the left.

exposure to mixed gases at higher concentrations. Recently germinated giant sequoia seedlings did not conform clearly to concept #1; substantial injury appeared first with 20 pphm ozone, considerably more injury resulted from the 5-20 pphm mixture, but the 10-20 pphm mixture caused the same or slightly less injury than the 5-20 mixture. The response to the 10-20 pphm mixture may conform to concept #3 regarding antagonistic joint action.

Visible injury to three-year-old ponderosa and jeffrey pines and four-month-old giant sequoia did conform to the concept #1 model. Injury from gas mixtures at the lowest concentrations (5 pphm SO_2, 10 pphm O_3) showed joint action that was greater than additive, particularly for jeffrey pine. There was no suggestion of antagonistic joint action in mixtures with the highest concentrations.

Both experiments which evaluated effects on TDW and RDW of recently germinated pine seedlings show no significant differences among treatments for TDW of ponderosa and jeffrey pines. There were significant differences in RDW of jeffrey pine in one experiment. RDW losses increased in higher concentration mixtures, and the type of response suggested joint action that was additive (concept #2). In the same experiments, the TDW of giant sequoia sometimes showed significant reductions, while RDW routinely showed significant reductions. Sometimes these reductions were not significantly different from the control but rather from the single gas treatments of 5 or 10 pphm SO_2. These low levels of SO_2 frequently stimulated both TDW and RDW of giant sequoia and both TDW and RDW of pines in both experiments, but the differences were not statistically significant ($p = 0.05$) when compared with controls. One case of TDW stimulation by ozone was present with digger pine; however, the RDW did not show stimulation. In general, RDW of all species was more

affected by pollutant mixtures than TDW. No effort was made to correlate visible injury with TDW or RDW.

The visible injury observed on two- to three-year-old pines and four-month-old giant sequoia was more severe than observed on newly germinated seedlings that had received a longer duration of exposure. The older plants were exposed during late April, May and early June, when temperatures were consistently warmer than the December through May period when recently germinated seedlings were exposed. The younger plants may have shown greater depression of TDW and RDW if fumigated in spring and summer. During the course of these experiments, the chambers were not available for use in the summer and fall. In future experiments, we will avoid exposures during the winter months in outdoor open-top chambers.

Few studies to date have analyzed the effects of mixtures of ozone and sulfur dioxide on stem, leaf and root growth of newly established conifer seedlings. Usually only visible injury is measured. Dochinger et al. (1970) reported that mixtures of ozone and sulfur dioxide caused greater than additive amounts of visible leaf injury and abscission in *Pinus strobus*. Yang et al. (1982) observes that six clones of this species showed mixed responses to pollutant mixtures and that additive effects of 10 pphm each of an ozone and sulfur dioxide mixture was indicated on only one clone. Needle dry weight (mg mm^{-1}) was the best indicator of injury. Sensitive and resistant clones were exposed to 10 pphm sulfur dioxide and 10 pphm ozone for eight hours per day, five days per week for four to eight weeks. Similarly, Kress et al. (1982) reported that ozone sensitive and resistant strains of *Pinus taeda* seedlings exhibited reductions in shoot growth when exposed to low concentration mixtures of sulfur dioxide and ozone. Mixtures of ozone (20 pphm) and

sulfur dioxide (150 pphm) acted synergistically in causing damage to *Pinus nigra* (Brennan et al. 1981).

The usual caveats must be observed when comparing the results of chamber experiments to field conditions where environmental conditions and exposure regimes are quite variable. It appears that additive or synergistic joint action of ozone and sulfur dioxide could occur at concentrations easily attained in the ambient atmosphere, namely 5 or 10 pphm SO_2 with 10 or 20 pphm O_3. Injury increases larger than those caused by ozone alone might be detected most easily by a change from a chlorotic to necrotic mottle of secondary pine needles or by more frequent failure of seedling establishment due to the suppression of root growth during the critical early summer period before soil moisture is depleted.

VII. HEALTH OF FOREST VEGETATION IN THE SOUTHERN DISTRICTS OF THE SEQUOIA NATIONAL FOREST

INTRODUCTION

The determination of the present status of air pollution injury to montane vegetation in the mountains generally east of Bakersfield-Oildale was an important objective. The main focus was on species known to be sensitive to ozone, namely ponderosa and jeffrey pines in forest stands above 4500 ft elevation. Grasslands and oak woodlands at lower elevations were observed but in a less systematic manner. We were aided in the observation of pines by preliminary surveys done by the Forest Pest Management staff of the USDA, Forest Service, Regional Office, San Francisco.

A survey of chronic ozone damage to ponderosa and jeffrey pines was completed in the summer of 1977 for the area including the Greenhorn Mountains, Breckenridge Mountain and the Piute Mountains. The amount of damage at 60 semi-permanent plots was mainly slight with only a few plots having moderate injury (Figure VII-1). At least 21 plots were marked by spray painting numbers on the bark of selected trees. Our objective was to select a representative number of plots to serve as sample locations for soil and leaf sulfur content. We wanted to measure any changes in chronic injury that may have occurred between 1977 and 1981, and to be vigilant for foliage symptoms that may be caused by a combination of ozone and sulfur dioxide.

PROCEDURE

After considerable searching with the aid of John Pronos and John Wenz of the U. S. Forest Service, Region 5, Forest Pest Management staff, we located only five of the subset of 21 plots. The 1977 paint did not persist because of weathering and shedding of bark platelets. The relocated plots designated Pronos 6-4, 6-6, 6-11, 7-1 and 7-10 are shown in Figure III-1.

The method of rating the amount of chronic ozone injury to pines was the same as that developed in the San Bernardino Mountains (Miller 1973). Scores are derived by summing ordinal scale numbers representing the number of annual needle whorls retained, the condition of each needle whorl (4 = uninjured, 2 = ozone needle mottle and 0 = necrotic), the needle length (0 or 1) and lower branch mortality (0 or 1). Higher scores represent less injury. In the San Bernardino Mountains, the following labels were appropriate for the indicated score range: 0-8 = very severe, 9-14 = severe, 15-21 = moderate, 22-28 = slight, 29-35 = very slight and 36 or higher = no visible injury.

RESULTS AND DISCUSSION

Pines at three of the five relocated plots showed substantial increases in defoliation and needle injury symptoms attributed to ozone. These plots (6-4, 6-6 and 6-1) located on Breckenridge Mountain and the Greenhorn Ridge (Figure III-1) are closer to Bakersfield than the two Piute Mountain plots (7-1 and 7-10) which showed little change (Table VII-1). In 1977 all plot trees had scores ranging between 47.5 and 51.5, but the three plots with declining scores ranged from 36-37.1 in 1981. The lower scores mean decreased needle retention and increased intensity

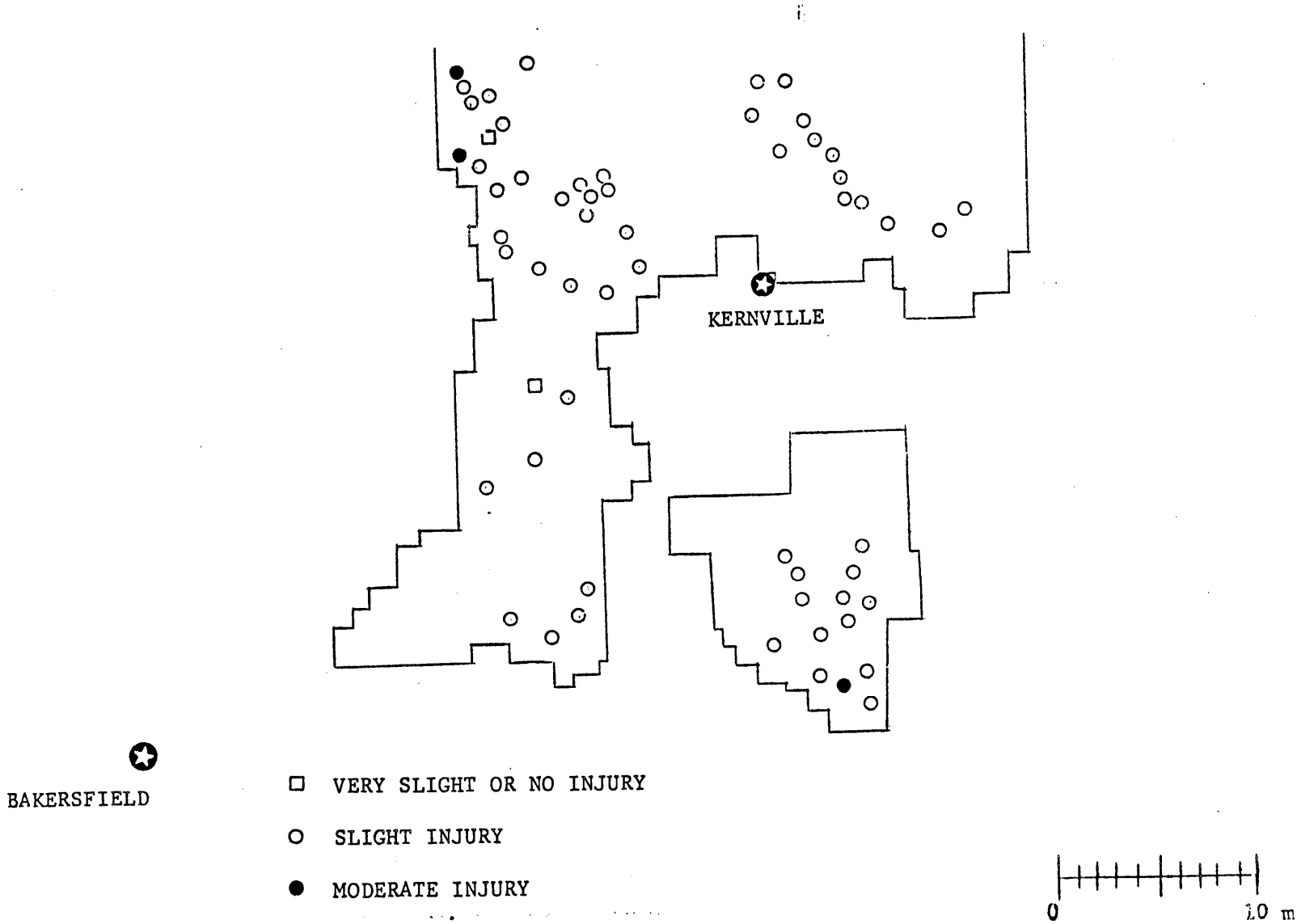


Figure VII-1. Chronic ozone injury to *Pinus pondersoa* and *P. jeffreyi* determined at 10-tree observation plots established in 1977 in the southern Sequoia National Forest by the U. S. Forest Service, Forest Pest Management staff, San Francisco, CA.

Table VII-1. Comparison of 1977 and 1981 Oxidant Injury Scores of Ponderosa and Jeffrey Pines at 5-10 Tree Plots in the Southern Sequoia National Forest

Region	Plot Number	dbh[a] Mean S.O.	Oxidant Injury Score[b] 1977 Mean S.O.	1982 Mean S.O.
Breckenridge Mountain	6-4	18.3 ± 5.5	51.5 ± 4.1	37.1 ± 9.9
Greenhorn Mountain	6-6	14.1 ± 4.6	50.3 ± 4.2	36.6 ± 7.5
	6-11	14.0 ± 3.4	50.4 ± 8.6	36.0 ± 8.9
Piute Mountains	7-1	12.6 ± 4.7	47.5 ± 12.2	47.8 ± 14.4
	7-10	17.9 ± 6.5	48.5 ± 11.5	47.0 ± 10.2

[a]dbh = diameter at breast height (inches).

[b]Higher scores indicate less injury; the score of 36 and higher indicates no visible injury based on the San Bernardino Mountain criteria, but the obvious decline of scores from about 50 in 1977 to about 37 in 1981 at several plots suggest a need for re-evaluating the terminology applied to score values.

of ozone-caused chlorotic mottle symptoms on needles. Variation of the chlorotic mottle symptom (Figure VI-5) or sulfur dioxide symptoms were not detected at any plot.

The similarity of scores between 1977 and 1981 at the Piute Mountain plots (7-1 and 7-10) suggests a minimal influence of ozone at distances ranging from 30-35 miles east of Bakersfield. One plot in the vicinity of 7-10 was indicated on Figure VII-1 as having moderate injury in 1977. This defoliation appeared to be due to biotic pests in 1981 and not ozone.

Digger pines growing at elevations between about 2000 and 4500 ft in the Greenhorn and Breckenridge Mountain areas were observed repeatedly during the process of sampling foliage for sulfur analysis. It was common

for digger pines to retain only two annual needle whorls at many sites. Other trees with three or more annual whorls present were also observed at the same sites. Defoliation seemed to be caused mainly by insects that were no longer present at the time we were collecting foliage. The chlorotic mottle symptom associated with ozone injury was rarely observed on digger pine. The most common symptom was tip dieback of needles in all whorls. The cause of the tip dieback was not determined.

The foliage of California sycamore (Plantanus racemosa) had severe necrotic stippling on the upper leaf surface at two of three sites on the banks of the Kern River. This is a typical ozone symptom. However, at sites designated as SYC1 and possibly SYC2 and SYC3 (Figure III-2), there is more probability that sulfur dioxide and ozone may interact to cause injury than at any other location in the study area because of the nearness to Bakersfield. This species requires further study to determine if it could be developed as a bioindicator of injury due to the combined effects of ozone and sulfur dioxide.

In summary, ozone injury to ponderosa and jeffrey pines in the study area (Figure VII-1) has increased since 1977 at locations selected for observation. Forested areas above 4500 ft elevation appear to have higher average ozone concentrations than the Bakersfield-Oildale area (Table II-1), and injury from this single pollutant is expected to continue. Fumigation studies (Section VI) suggest that sulfur dioxide may interact with ozone to cause additional injury, but not until sulfur dioxide hourly averages exceed 5-10 pphm (50-100 ppb).

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IX. APPENDICES

1. Vertical Mixing and Mass Flux Between Bakersfield and the Kern River Drainage During Summer Synoptic Forcing--A Case Study.
   Contriuted by:
   Michal A. Fosberg
   USDA, Forest Service
   Fire Laboratory
   Riverside, CA

2. Hourly Ozone, Sulfur Dioxide, Temperatures, Relative Humidities, Wind Speed, Wind Direction and Monthly Wind Roses and Wind Run for Democrat Springs (2400 ft) and Shirley Meadow (6400 ft) During July Through October 1982.

3. Stable Sulfur Isotope Determinations for Soils and Plant Tissue Based on Total Sulfur in Samples Collected in 1981 and 1982.

4. Record of Daily Fumigation Duration and Weather Conditions from November 16, 1983 to April 11,1983.

APPENDIX 1

VERTICAL MIXING AND MASS FLUX BETWEEN BAKERSFIELD AND THE KERN RIVER DRAINAGE DURING SUMMER SYNOPTIC FORCING -- A CASE STUDY.

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Abstract --A brief intensive field experiment was conducted to determine pollutant transport mechanisms from the southern end of the San Joaquin Valley of California into the southern Sierra Nevada Mountains. Six surface wind stations were located in the Kern River Canyon, Lake Isabella and upper portions of the drainage to determine mass flux. These measurements indicated that the lower gorge of the Kern River showed mass flux, an order of magnitude below that observed in the mid and upper canyon.

Radar traced tetroon released from Oildale showed deep mixing of the San Joaquin Valley. This case study indicated that pollutants in the San Joaquin Valley would have been mixed through a deep layer and that transport into the Kern River Drainage would have been at ridge top level rather than through the lower Kern River Canyon.

Key Words: pollutant transport, tetroons

1. INTRODUCTION

Pollutant concentration in the San Joaquin Valley of California is sufficient to cause vegetation damage (Millecan, 1971). Transport of these pollutants into the forested areas of the Sierra Nevada Mountains and subsequent chronic exposure of the forests to pollutants, particularly oxidents and sulphur oxides can range in results from individual plant damage to major perturbations in the ecosystem (Skelly, 1980; Legge, 1980).

Major regional scale experiments (Smith et al., 1981) have documented the flow within the San Joaquin Valley and transport across the Tehachapi Mountains onto the Mojave Desert. Detailed fine scale flow features such as the Bakersfield eddy and the nocturnal low level jet contribute to well mixed aerosol (Smith et al., 1981). Specific studies of pollutants transport from the San Joaquin Valley into the Sierra Nevada Mountains showed that oxidants were transported into the mountains during periods of good ventilation rather than stagnation periods, and that significant transport took place above the ground (Miller et al., 1972; Carroll and Baskett, 1979). These latter two papers served as the model for determining the specific transport processes into the Kern River drainage.

A short, intensive exploratory study was carried out on September 15 and 16, 1982, to provide meteorological information on transport of oxidants and sulfur oxides into the Greenhorn and Breckenridge Mountain areas of the southern Sierra Nevada Mountains. The specific objectives of this study were to determine the mass balance in the lower and midregions of the drainage, to determine the transport patterns from Oildale, and to make a preliminary estimate of the mixing and dispersion processes at the valley-mountain interface.

2. METHODS

2.1 Experimental Methods

The experimental area consisted of the Oildale-Bakersfield urban area, the Kern River Canyon, Lake Isabella, Kernville, south fork of the Kern River towards Walker Pass, and the surrounding Greenhorn and Breckenridge Mountains (Fig. 1). Six Climatronix[1] surface weather stations were set out for the experiment. Wind speed and direction were obtained at hourly intervals from 0400 PDT on September 15 to 1600 PDT on September 16 at the Shirley Peak Ski area, the Kernville Airport, an open field in Weldon, the dam on Lake Isabella, Democrat Springs Fire Station and the hydroelectric plant in the lower Kern River gorge (Fig. 1). Particular care was taken to locate these surface wind stations at well exposed sites near the valley center. For example, the wind station at the lower canyon power station was on a well exposed rock outcrop in the center of the canyon. Similarly, the Isabella Dam station was on the dam, the Kernville station was on a peninsula juting out into the lake, and the Shirley Peak station was in the center of the ski slope.

A tracking radar system (Fosberg and Lanham, 1983) was set up on the bluff overlooking the Kern River within the City of Bakersfield. The radar is an S band marine radar and equipped with a collision avoidance computer capable of tracking 20 targets simultaneously. The radar was used to track constant volume tetroons released from Oildale. Each tetroon was equipped with a transponder. The radar transmitted a 3.05 GHz signal and the transponder returned a 2.95 GHz signal. This 100 MHz shift eliminated ground clutter in

[1]Trade names, commercial products, and enterprises are mentioned solely for information. No endorsement by the U.S. Department of Agriculture is implied.

the radar processed data. Tetroons were equipped for temperature and pressure and these data were telemetered to the radar trailer. The temperature and pressure data were used to calculate tetroon elevation. Radar and telemetered data were logged at 1 minute intervals. Tetroon volume was 1 cubic meter. Tetroons were flown at three altitudes; 600, 1000, and 1500 meters msl. These altitudes were chosen in order to measure transport patterns in the boundary layer in the valley, transport patterns at the level at which maximum concentrations of pollutants have been found in the mountains and at the 850 mb level in order to relate the local observations to the larger scale flow features.

2.2 Mass Flux Calculations

Mass flux within the Kern River Canyon was calculated at five of the six surface wind stations. The vertical cross sectional area of the canyon was measured perpendicular to the local orientation of the canyon axis at the lower canyon power station, Democrat Springs Fire Station, the dam at Lake Isabella, Kernville and at Weldon. Because the mixing depth was not known, the top of the cross section was set at the ridge line on each side of the valley. The wind speed perpendicular to these cross sections was then used to calculate the volumetric flux of air moving past the weather station. No correction was made for variations in wind profiles at any of the stations. The surface winds were used directly. Also, this calculation of volumetric flux does not include variations in density. This latter factor is least important.

3. RESULTS

Large scale weather features during the experiment were as somewhat anomalous. A weak, short wave disturbance moved through the experimental area on September 15. This resulted in a high thin cloud cover, and weakened extended sea breeze and local flows.

Surface wind patterns within the study area during the passage of the short wave disturbance showed strong up canyon from Democrat Springs past Lake Isabella and up both forks of the upper Kern River drainage (Fig. 2). Winds at Shirley Peak reflected the large scale southwesterly flow throughout the entire study and were particularly strong during the passage of the disturbance (Fig. 2). Surface winds at the lower canyon power station were down canyon in the afternoon (Fig. 2) and continued to flow down canyon until sunset.

The volumetric flux past the five canyon weather stations showed a large flux at four of the stations from 0800 PDT to 1800 PDT on September 15. These fluxes were considerably greater than observed on September 16 (Fig. 3). The lower canyon power station flux did not show any response to the passage of the disturbance (Fig. 3). Also, the volumetric flux at the lower canyon power station was significantly smaller than that observed at the other stations. The cross sectional area of the canyon at the power station is about one-eighth that of the cross section at Democrat Springs. The canyon at the power station is best characterized as a narrow, steep walled gorge.

Radar tracked tetroons released from Oildale showed northerly flow in the lowest levels and westerly flow at the highest elevations. The tetroon released at 1400 PDT and ballasted for 1500 m msl drifted towards the southeast until it was caught in an updraft and lifted to approximately 2000 m msl. The tetroon then drifted towards the northeast. When the tetroon

escaped the updraft and returned to the ballast elevation, it again drifted towards the southeast (Figs. 4, 5). The two tetroons flown at lower levels, 1520 PDT, ballast altitute 600 m msl and 1616 PDT, ballast altitude 1000 m msl, showed definite northerly flow towards the Tehachapi Mountains (Fig. 4). These tetroon tracks showed strong northerly flow in the lowest levels, with northerly flow decreasing with elevation and the transition from low level northerly flow to the large scale southwesterly flow occurring between 1500 m and 2000 m msl. The lower two tetroons were tracked south-southeastward across Bakersfield towards the Tehachapi Mountains. Average transport speed of the 600 m msl tetroon was 8.2 m s^{-1}. The average transport speed of the 1000 m msl tetroon was 5.1 m s^{-1}. The highest tetroon (1500 m msl) had an average transport speed of 1.4 m s^{-1} towards the east-southeast. This tetroon stayed north of Bakersfield during the entire track. All three tetroons flown on September 15 showed large vertical movement. The tetroon released 1400 PDT with a ballast altitute of 1500 m msl (850 mb) was caught in an updraft and displaced about 500 m above the ballast altitutde for approximately 20 minutes (Fig. 5). The tetroon released at 1520 PDT with a ballast altitude of 600 m (950 mb) also showed vertical displacements as great as 500 m (Fig. 5). The limited record from the telemetry package on the tetroon released at 1616 PDT, ballast altitude 1000 m msl (900 mb) also suggest several hundred meter fluctuations (Fig. 5). These three flights showed deep mixing from the lowest levels up to the transition to the large scale flow.

FIGURE CAPTIONS

Figure 1. Map of study area with location of weather stations and tetroon launch site. Tetroons were released from Oildale. Weather stations were located at Shirley Peak, Kernville, Weldon, the Lake Isabella dam, Democrat Springs Fire Station, and the lower canyon power station.

Figure 2. Surface winds during the passage of the short wave disturbance on September 15, 1982, (a) 1500 PDT, (b) 1700 PDT. Wind direction is shown by the arrow. Wind speed is in m s^{-1}.

Figure 3. Volumetric flux of air past five canyon weather stations.

Figure 4. Horizontal tracts of tetroon on September 15. Launch site is 331 degrees and 3.9 nautical miles from the radar. Each dot represents the tetroon position at 1 minute intervals. ~~Solid dots~~ open circles are 1400 PDT, ballast altitude 1500 m msl, ~~open circles~~ solid dots (X's) are 1520 PDT, ballast altitude 600 m msl, ~~(x's)~~ solid dots are 1616 PDT, ballast altitude 1000 m msl. Range circles are in nautical miles. Direction is in true north bearing from radar.

Figure 5. Vertical position of the tetroons shown in Figure 4. Vertical axis is in millibars. Horizontal axis is in minutes from time of release.

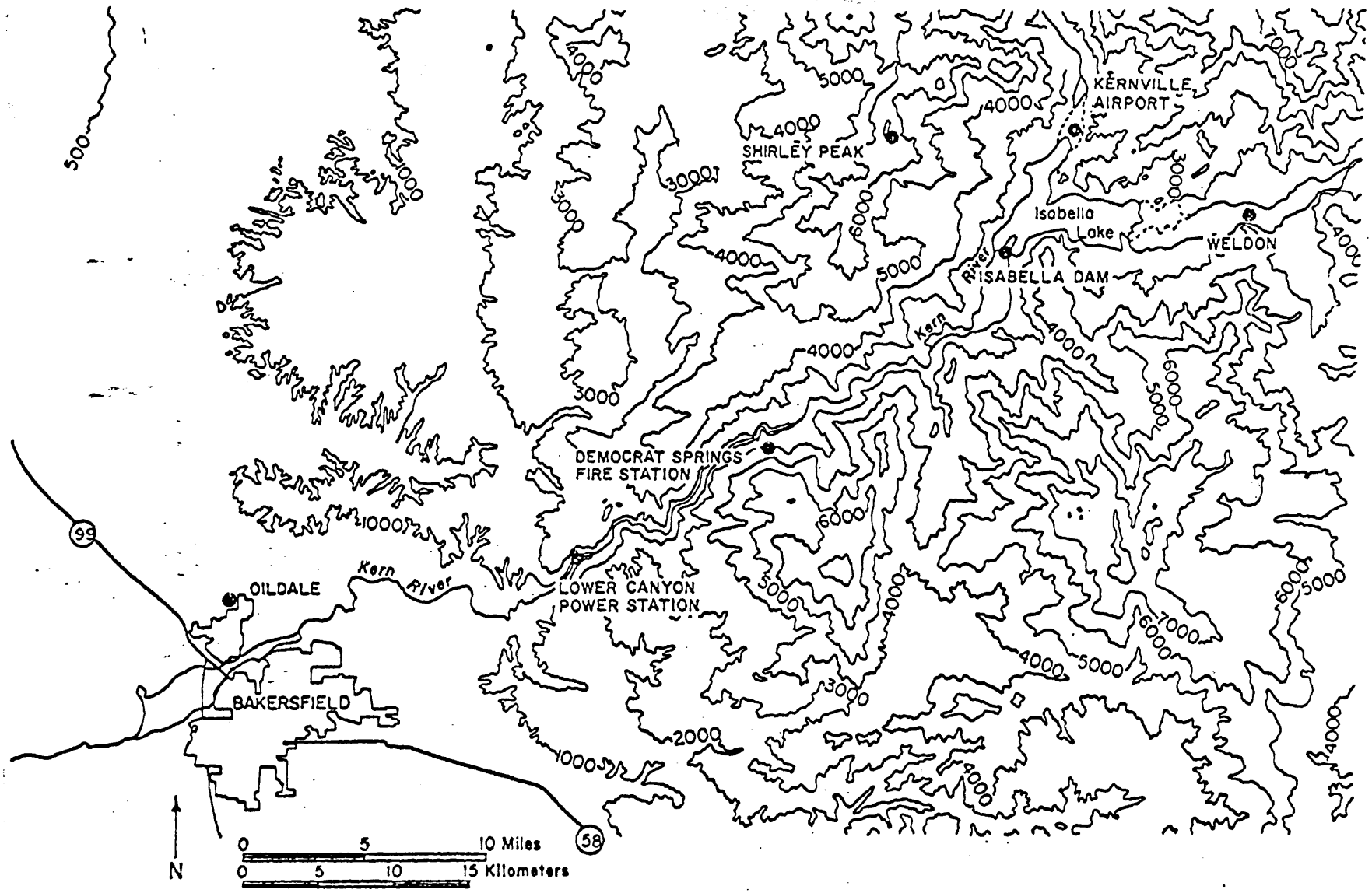
KERNVILLE AIRPORT
SHIRLEY PEAK
Isabella Lake
WELDON
ISABELLA DAM
Kern River
DEMOCRAT SPRINGS FIRE STATION
LOWER CANYON POWER STATION
OILDALE
Kern River
BAKERSFIELD
99
58
N
0 5 10 Miles
0 5 10 15 Kilometers

Figure 1

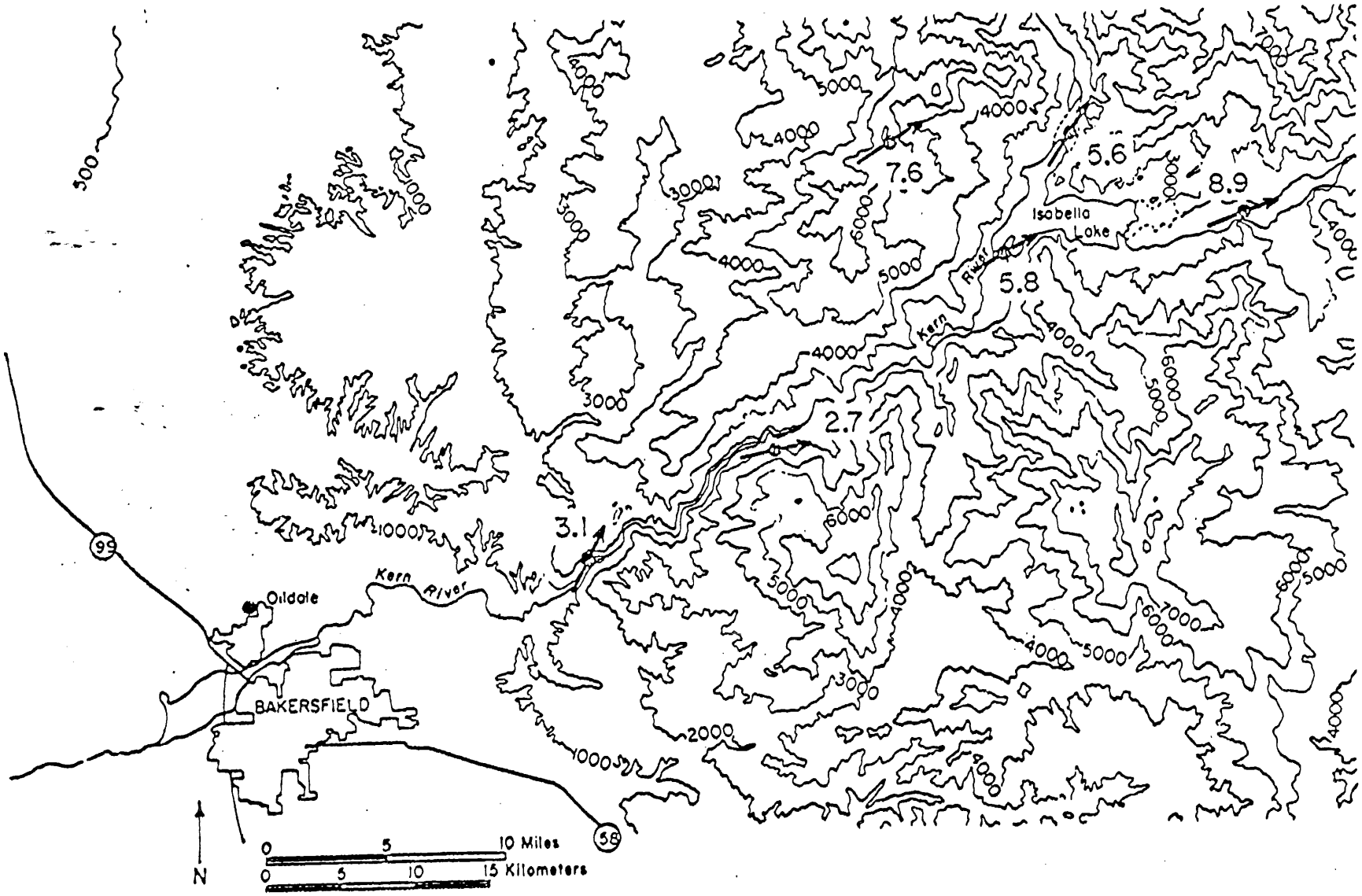
Isabella Lake
Kern River
Kern River
Oildale
BAKERSFIELD
99
58
7.6
5.6
8.9
5.8
2.7
3.1
N
0 5 10 Miles
0 5 10 15 Kilometers

Figure 2A

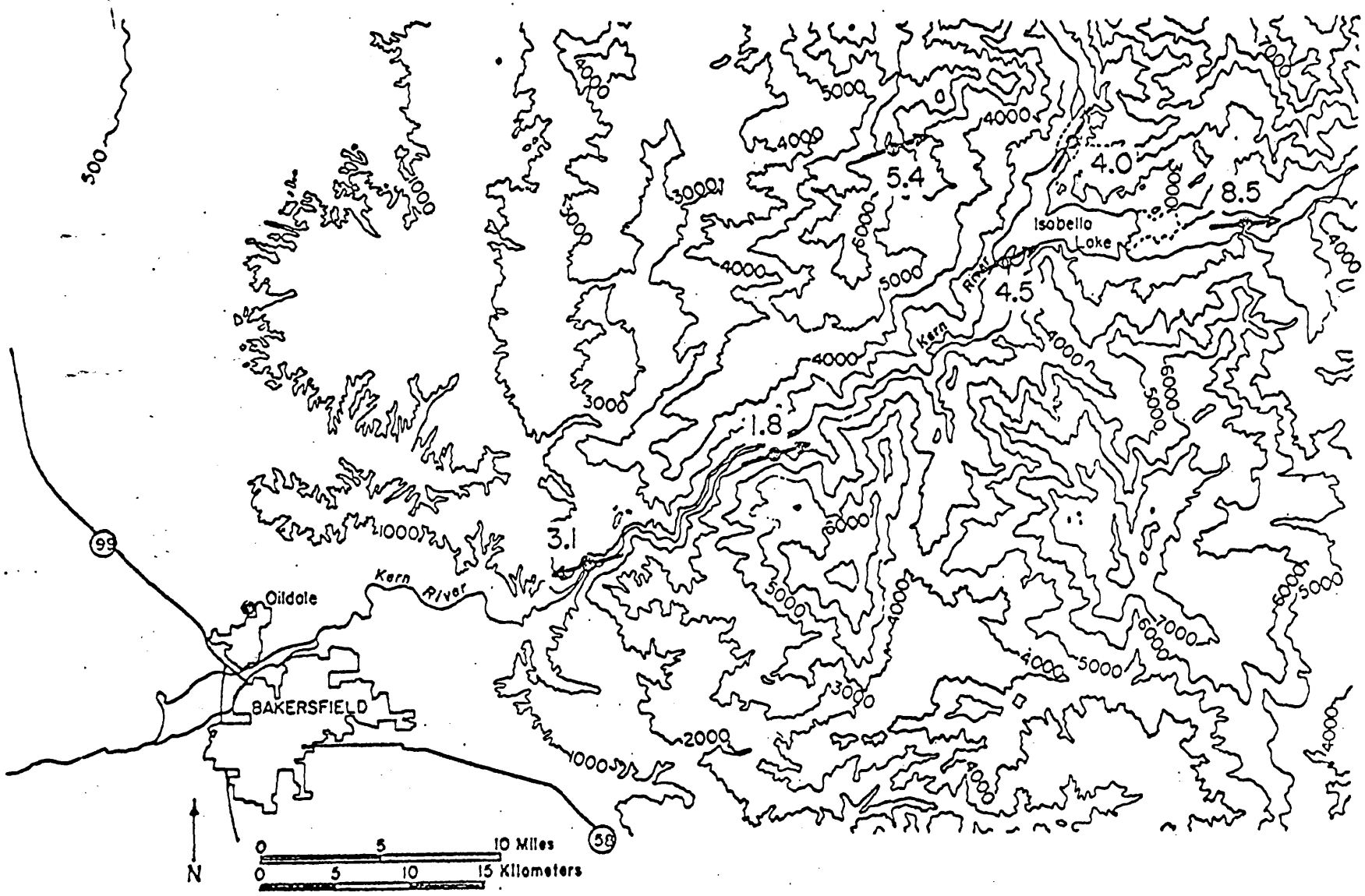
Isobello Lake
Kern River
Oildale
BAKERSFIELD
99
58
N
0 5 10 Miles
0 5 10 15 Kilometers
5.4
4.0
8.5
4.5
1.8
3.1

Figure 2B

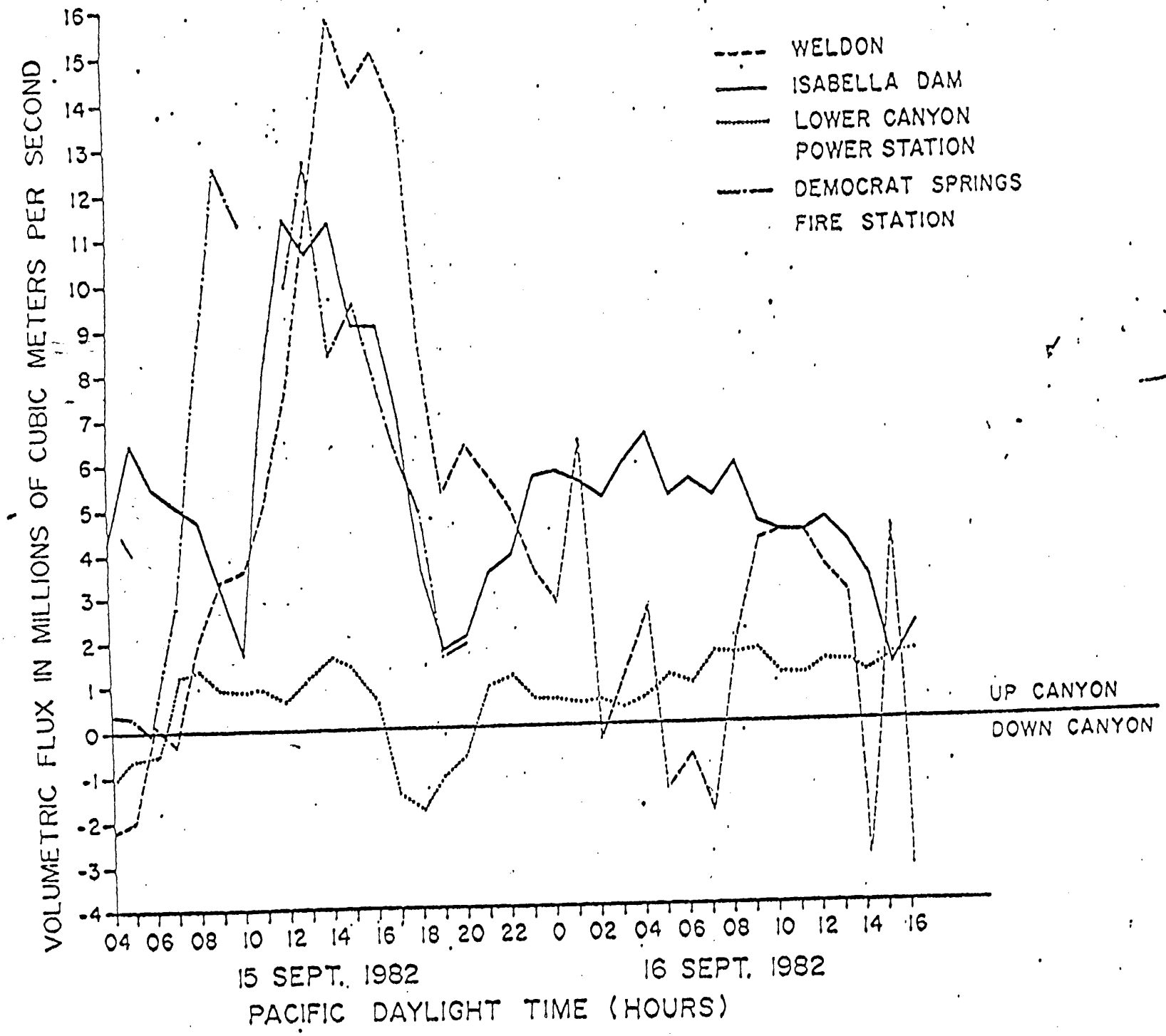
WELDON
ISABELLA DAM
LOWER CANYON POWER STATION
DEMOCRAT SPRINGS FIRE STATION
UP CANYON
DOWN CANYON
VOLUMETRIC FLUX IN MILLIONS OF CUBIC METERS PER SECOND
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
-1
-2
-3
-4
04 06 08 10 12 14 16 18 20 22 0 02 04 06 08 10 12 14 16
15 SEPT. 1982
16 SEPT. 1982
PACIFIC DAYLIGHT TIME (HOURS)

Figure 3

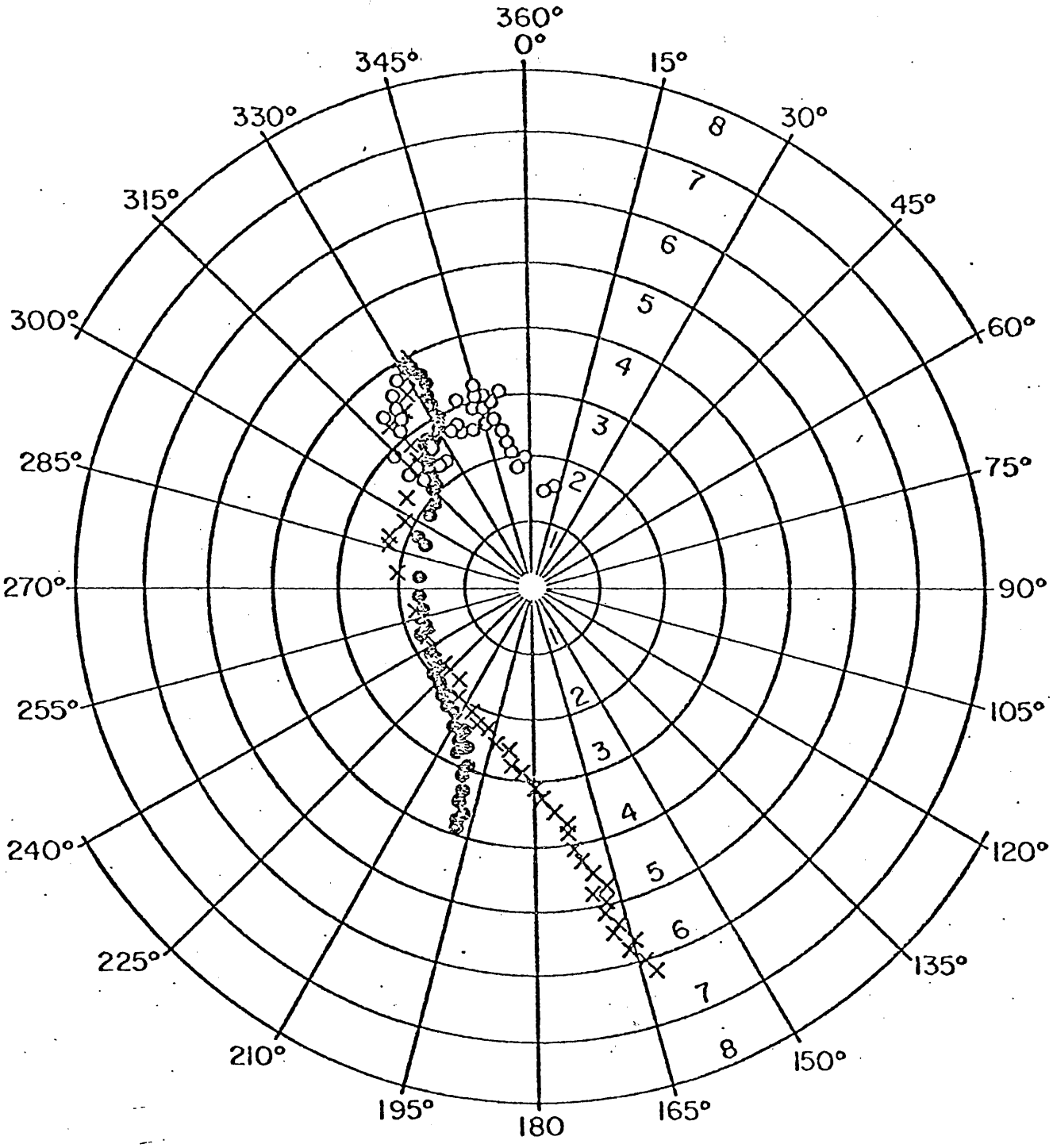
360°
0°
15°
30°
45°
60°
75°
90°
105°
120°
135°
150°
165°
180
195°
210°
225°
240°
255°
270°
285°
300°
315°
330°
345°
1
2
3
4
5
6
7
8

Figure 4

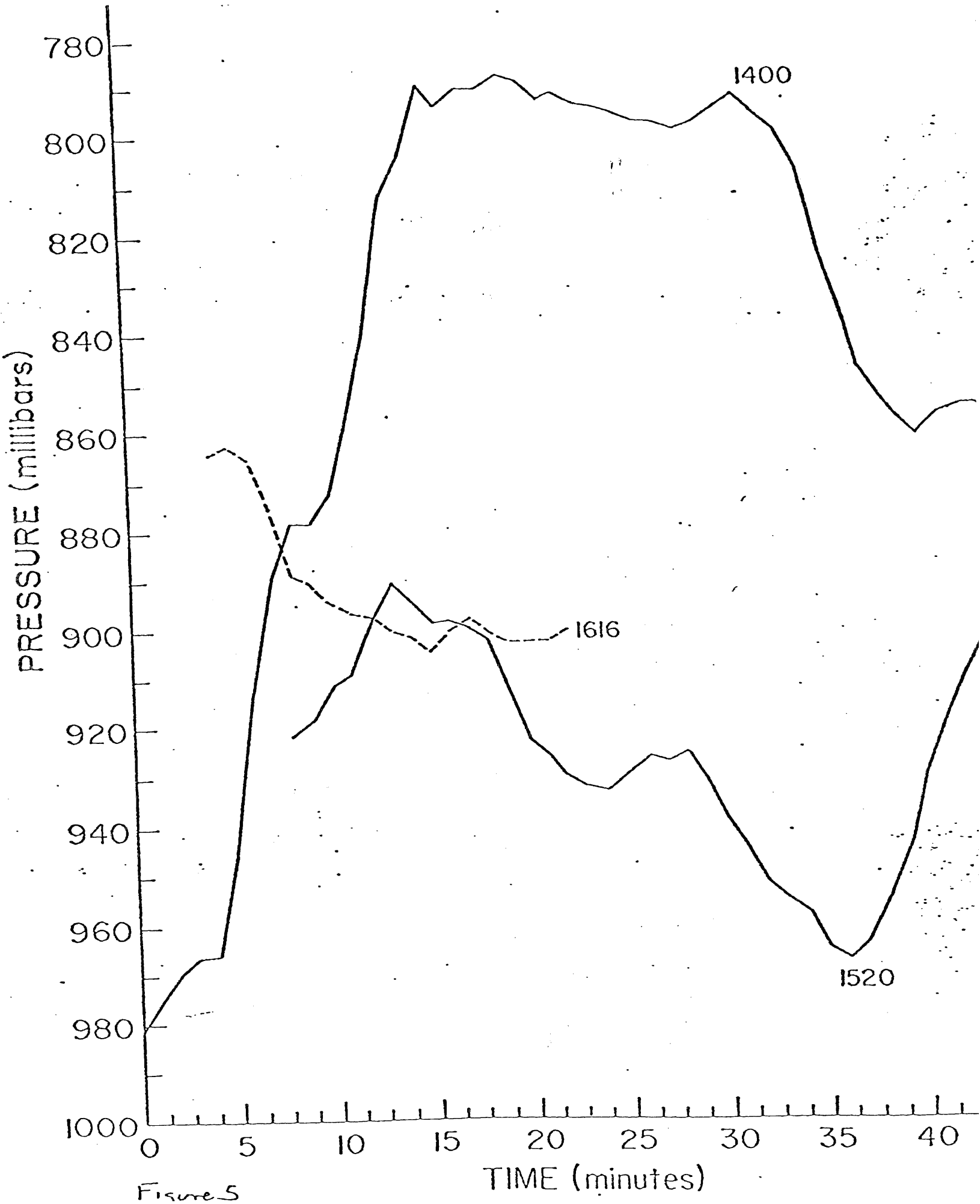
PRESSURE (millibars)
780
800
820
840
860
880
900
920
940
960
980
1000
0
5
10
15
20
25
30
35
40
TIME (minutes)
1400
1616
1520

Figure 5

APPENDIX 2

Hourly Ozone, Sulfur Dioxide, Temperatures, Relative Humidities, Wind Speed, Wind Direction and Monthly Wind Roses and Wind Run for Democrat Springs (2400 ft) and Shirley Meadow (6400 ft) During July Through October 1982.

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

OZONE BY DASIBI/AT HOUR OR HRLY AVE/ IN PPHM

SHIRLEY PEAK

JULY, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1																												
2																												
3																												
4																												
5																												
6																												
7																												
8																		6	6	6	6	6	6	7	6.1	7	7	6
9	7	6	6	6	6	6	6	6	6	5	5	5	5	5	6	6	6	6	6	6	6	7	7	7	6.0	24	7	5
10	7	7	7	7	7	7	7	6	6	6	5	5	6	6	7	7	6	6	7	7	7	7	7	7	6.5	24	7	5
11	7	7	7	7	5	5	4	4	5	5	4	4	5	6	6	6	6	6	6	6	6	6	6	6	5.6	24	7	4
12	6	7	6	6	7	6	6	5	5	4	5	5	5	6	6	9	8	7	7	7	7	7	7	8	6.3	24	9	4
13	8	8	8	8	7	7	7	6	6	6	6	6	6	6	6	6	6	6	7	7	7	7	7	7	6.7	24	8	6
14	7	7	7	7	6	6	6	6	6	6	6	6	6	6	6	6	5	5	6	6	6	5	6	6	6.0	24	7	5
15	6	7	5	5	5	6	6	6	5	5	5	5	5	6	5	5	5	5	6	7	6	6	6	6	5.6	24	7	5
16	5	5	5	5	5	5	5	5	5	5		7	7	7	7	7	7	8	8	8	7	8	8	8	6.4	23	8	5
17	8	8	8	7	6	6	6	5	5	5	5	5	6	6	7	7	8	9	9	9	8	7	7	9	6.9	24	9	5
18	8	7	6	6	6	6	5	5	5	5	4	4	6	6	7	10	12	12	11	10	9	5	6	9	7.1	24	12	4
19	10	5	5	5	5	8	5	4	4	5	5	7	8	8	11	10	9	8	9	8	9	9	7	8	7.2	24	11	4
20	8	6	6	7	9	8	8	8	8	8	7	7	8	9	9	10	9	9	8	8	8	6	6	8	7.8	24	10	6
21	9	9	9	9	9	9	9	8	7	7	7	7	7	8	9	9	8	8	8	8	8	8	9	9	8.3	24	9	7
22	9	9	9	9	9	9	9	9	7	7															8.6	10	9	7
23																												
24																												
25																												
26																												
27																												
28																												
29																9	9	8	8	9	10	7	8	9	8.6	9	10	7
30	9	6	7	8	7	8	8	5	5	5		7	8	9	10	10	9	9	9	9	10	10	10	10	8.2	23	10	5
31	11	11	12	13	13	13	12	10	5	7	7	7	8	9	7	7	8	8	8	9	10	10	10	10	9.4	24	13	5
AVE	8	7	7	7	7	7	7	6	6	6	5	6	6	7	7	8	8	7	8	8	8	7	7	8	7.0		9	5
N	16	16	16	16	16	16	16	16	16	16	13	15	15	15	15	16	16	17	17	17	17	17	17	17		384	17	
MAX	11	11	12	13	13	13	12	10	8	8	7	7	8	9	11	10	12	12	11	10	10	10	10	10	9.4		13	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

OZONE BY DASIBI/AT HOUR OR HRLY AVE/ IN PPHM

SHIRLEY PEAK
AUGUST, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	10	11	12	11	11	8	9	9	8	7	7	8	8	7	6	6	7	7	8	7	7	7	8	8	8.2	24	12	6
2	5	7										3	5	6	7	6	6	7	7	7	7	7	7	4	6.1	15	7	3
3	6												6	7	7	7	7	7	7	7	7	7	5	7	6.7	13	7	5
4											4	7	6	7	8				8	9	9	6	6	6	6.9	11	9	4
5	7	5	5	4	4	4	5	5	5	5	5	5	6	8	9	10	12	13	11	11	8	7	7	8	7.0	24	13	4
6	7	7	8	7	7	6	6	6	6	6	7	7	8	7	7	7	7	7	6	6	7	7	6	6	6.7	24	8	6
7	6	6	6	6	6	6	6	6	6	5	5	6	6	7	10	9	8	8	8	7	7	7	7	7	6.7	24	10	5
8	7	7	7	7	7	7	7	7	7	7	7	7	7	8	9	9	7	7	8	7	8	8	8	8	7.4	24	9	7
9	8	8	8	8	7	7	7	7	6	5	5	5	6	9	12	11	10	10	10	11	10	10	11	12	8.5	24	12	5
10	12	12	11	11	9	9	6	5	5	5	6	7	8	8	9	9	9	8	8	9	9	9	9	9	8.4	24	12	5
11	10	10	10	11	11	11	10	8	8	7	7	7	8	8	9	9	8	7	7	7	6	6	6	6	8.2	24	11	6
12	7	7	6	6	5	6	6	6	6	5			6	6	7	8	11	12	11	10	9	10	10	10	7.7	22	12	5
13	9	9	7	5	6	7	7	7	9	9	7	7	8	9	9	10	10	10	10	10	10	8	8	9	8.3	24	10	5
14	8	8	6	6	7	7	7	6	6	5	5	6	7	8	9	9	9	9	9	10	9	9	9	8	7.6	24	10	5
15	8	8	7	6	5	5	5	5	5	5	5	5	5	8	9	10	13	13	12	11	8	7	8	7	7.5	24	13	5
16	8	8	8	7	8	7	7	7	6	6	6	6	5	8	9	11	13	12	11	10	9	9	9	9	8.3	24	13	5
17	8	8	9	9	9	9	8	8	7	7	7	8	8	8	10	10	11	11	11	11	10	10	9	9	9.0	24	11	7
18	10	10	10	10	9	9	9	8	8	8	8	8	8	7	10	12	12	12	11	10	9	9	10	10	9.5	24	12	7
19	10	10	9	9	10	9	8	8	7		6	6	6	6	9	9	11	13	12	11	11	8	7	8	8.8	23	13	6
20	8	8	7	7	7	7	7	6	6	6	7	8	8	7	13	16	16	16	15	13	9	9	8	6	9.2	24	16	6
21	6	6	6	6	6	5	5	5	6	6	6	6	6	10	11	12	12	13	12	11	10	8	9	11	8.1	24	13	5
22	8	8	8	8	8	7	8	7	7	7	7	7	9	10	13	15	12	10	7	10	10	10	10	10	9.0	24	15	7
23	10	10	10	10	11	11	12	10	9	9	9	9	8	8	7	8	8	8	8	9	10	10	10	10	9.3	24	12	7
24	9	8	9	10	8	7	7	7	7	7	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7.3	24	10	6
25	7	7	7	7	8	7	7	8	7	6	6	7	8	10	11	11	11		10	10	10	10	10	10	8.5	23	11	6
26	8	9	9	9	10	9	9	9	8	8	8	8	8	9	11	12	11	11	11	10	11	11	12	11	9.7	24	12	8
27	10	8	6	7	8	9	9	9	9	10	10	10	8	9	10	13	15	13	12	11	11	11	9	11	9.9	24	15	6
28	11	10	10	10	10	10	9	10	9	8	7	7	6	6	8	10	11	10	10	9	9	9	9	10	9.1	24	11	6
29	10	10	9	9	8	8	10	9	9	9	9	9	9	9	10	9	9	9	9	9	8	8	9	9	9.0	24	10	8
30	9	9	8	8	8	8	8	7	8	7	6	6	7	7	7	8	9	7	7	7	7	7	7	7	7.5	24	9	6
31	8	8	5	6	6	7	5	5	5	5	5	5	5	6	7	8	8	10	12	5	5	5	5	5	6.3	24	12	5
AVE	8	8	8	8	8	8	7	7	7	7	7	7	7	8	9	10	10	10	10	9	9	8	8	8	8.1		11	6
N	30	29	28	28	28	28	28	28	28	27	28	29	31	31	31	30	30	29	31	31	31	31	31	31		707	31	
MAX	12	12	12	11	11	11	12	10	9	10	10	10	9	10	13	16	16	16	15	13	11	11	12	12	9.9		16	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

OZONE BY DASIBI/AT HOUR OR HRLY AVE/ IN PPHM

SHIRLEY PEAK
OCTOBER, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	7	7	7	7	6	7	7	7	7	6.3	24	7	6
2	7	7	6	6	6	6	6	6	6	5	5	5	5	5	5	6	8	8	7	7	7	7	7	6	6.2	24	8	5
3	6	6	6	6	6	6	6	6	7	7	6	6	7	7	8	9	9	9	9	7	6	6	6	7	6.8	24	9	6
4	8	7	8	7	6	8	9	9	9	9	9	9	9	10	10	10	9	10	10	11	10	9	9	8	8.9	24	11	6
5	8	7	7	7	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6.2	24	8	6
6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	6	7	7	7	7	7	7	7	8	9	6.2	24	9	5
7	9	8	8	7	7	5	5	3	3	3	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5.1	24	9	3
8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0	24	5	5
9	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	6	6	5	5	5	5	5.1	24	6	5
10	5	5	5	5	5	5	5	5	5	5	5	5	5	6	6	6	6	7	7	6	6	6	6	6	5.5	24	7	5
11	6	6	6	6	6	6	6	6	6	6	6	6	5	5	6	6	6	7	7	7	6	6	7	7	6.1	24	7	5
12	6	6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.1	24	6	5
13	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	6	7	7	7	7	6	6	6	6	5.5	24	7	5
14	5	5	6	6	5	5	5	5	5	5	5	5	5	6	6	6	5	5	7	6	7	6	6	7	5.6	24	7	5
15	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	6	6	5	5	5	5	5	5.7	24	6	5
16	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	6	7	9	9	7	7	5	7	7	5.8	24	9	5
17	7	8	9	7	7	9	9	9	7	7	6	6	7	8	8	8	8	8	8	7	7	7	7	7	7.5	24	9	6
18	7	7	6	5	5	4	4	4	4	4	4	4	4	5	5	6	6	7	8	5	4	4	4	5	5.0	24	8	4
19	6	6	6	6	6	5	5	5	5	5	4	4	4	4	5	7	8	8	8	9	8	7	6	6	6.0	24	9	4
20	5	5	5	6	6	5	5	6	5	5	4	5	6	6	6	6	6	6	6	6	5	5	5	5	5.4	24	6	4
21	5	6	5	4	4	4	4	4	4	5	5	5	4	4	6	7	7	8	5	5	4	5	4	3	4.9	24	8	3
22	4	5	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	3	3	3.3	24	5	3
23	2	3	3	3	3	3	3	4	5	6	6	4	3	3	3	3	3	3	4	3	3	3	3	3	3.4	24	6	2
24	3	3	3	3	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.0	24	4	3
25	3	3	3	3	3	3	3	3	3	2	2	2	2	2	3	3	3	3	3	2	2	2	2	2	2.6	24	3	2
26	2	2	3	3	3	2	3	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	4.0	24	5	2
27	5	5	5	5	5	5	5	5	5	5	4														4.9	11	5	4
AVE	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	6	6	6	6	6	6	5	5	6	5.4		7	4
N	27	27	27	27	27	27	27	27	27	27	27	26	26	26	26	26	26	26	26	26	26	26	26	26		635	27	
MAX	9	8	9	7	7	9	9	9	9	9	9	9	9	10	10	10	9	10	10	11	10	9	9	9	8.9		11	

OK, LO

FIRELB (user 6) logged out Wednesday, 29 Jun 83 11:55:56.
Time used: 00h 03m connect, 00m 06s CPU, 00m 03s I/O.

	Prime time	Non-prime time
Connect time:	3	0 Minutes.
CPU Time :	7	0 Seconds.
Batch CPU :	0	Seconds.

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

OZONE BY DASIBI/AT HOUR OR HRLY AVE/ IN PPHM

SHIRLEY PEAK
SEPTEMBER, 1982

DAY	HOUR PST																											
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	5	5	6	6	7	7	7	6	5	5	4	4	6	7	9	10	10	10	9	5	4	4	4	4	6.2	24	10	4
2	4	4	4	4	4	5	5	5	5	5	5	5	5	8		10	11	13	11	8	6	5	5	5	6.2	23	13	4
3	5	5	5	5	5	5	5	5	5	6	9	10	10	10	11	12	15	15	12	12	11	11	12	12	8.9	24	15	5
4	12	12	12	12	12	11	8	6	9	10	10	10	10	9	9	10	10	10	10	8	6	6	7	7	9.4	24	12	6
5	8	8	7	6	6	6	6	6	6	6	6	6	7	7	7	9	11	12	10	12	9	8	9	9	7.8	24	12	6
6	9	9	9	9	8	8	7	8	8	7	7	7	8	9	10	9	10	11	10	10	10	10	10	8	8.8	24	11	7
7	8	8	7	7	7	7	7	7	7	7	7	6	6	6	6	6	6	7	6	7	7	7	6	6	6.7	24	8	6
8	6	6	6	6	6	6	8	7	6	6	6	6	6	6	6	6		8	9	10	9	10	10	9	7.1	23	10	6
9	8	8	8	8	8	7	6	7	7	7	7	7	8	8	8	8	8	8	9	8	8	8	8	8	7.7	24	9	6
10	8	8	8	7	8	8	8	7	7	7	7	7	8	8	8	8	7	7	7	7	7	7	6	7	7.4	24	8	6
11	6	7	6	6	7	6	6	6	6	6	6	7	7	6	6	6	6	6	6	6	6	6	7	7	6.3	24	7	6
12	7	7	7	7	7	7	7	7	7	7	7	7	7	8	9	9	9	9	9	9	9	9	9	9	7.9	24	9	7
13	9	9	8	8	7	7	7	7	6	6	6	6	7	7	7	7	7	7	7	7	7	7	7	7	7.1	24	9	6
14	7	8	8	8	7	7	7	8	9	9	9	8	8	8	8	8	8	8	8	9	9	9	9	9	8.2	24	9	7
15	9	9	9	9	8	8	7	6	6	6	7	6	6	7	7	6	6	6	6	6	6	6	6	6	6.8	24	9	6
16	6	6	6	6	5	4	4	5	5	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	4.8	24	6	4
17	5	5	5	5	5	4	4	4	4	4	4	4	5	5	5	6	6	8	8	6	6	6	5	5	5.2	24	8	4
18	5	5	5	5	4	3	3	3	3	3	3	3	3	3	4	5	6	5	5	4	4	4	4	4	4.0	24	6	3
19	4	4	4	4	4	3	3	3	3	3	3	3	4	4	5	6	6	6	6	6	4	4	4	4	4.2	24	6	3
20	4	5	6	6	6	6	6	5	5	5	5	5	6	6	6	7	8	9	8	7	7	7	6	7	6.2	24	9	4
21	6	7	8	8	7	7	7	6	6	6	6	6	6	5	5	5	5	5	7	7	7	7	7	7	6.4	24	8	5
22	7	7	6	6	6	6	6	6	6	7	7	6	6	7	7	7	8	8	8	8	6	7	7	7	6.8	24	8	6
23	8	8	6	4	3	4	4	4	4	4	4	4	4	5	7	12	12	10	13	12	10	9	7	7	6.9	24	13	3
24	7	6	6	8	7	5	4	4	4	4	3	3	3	3	3	3	2	3	3	3	3	3	3	3	4.0	24	8	2
25	3	3	3	3	4	3	3	3	3	3	3	4	4	4	4	3	4	4	4	4	3	3	3	3	3.4	24	4	3
26	3	3	4	4	6	4	3	3	3	3	3	3	4	4	4	4	5	5	5	5	5	5	5	5	4.1	24	6	3
27	5	5	5	5	5	5	5	5	4	4	4	4	4	5	4	5	5	5	5	5	5	5	5	5	4.8	24	5	4
28	5	5	5	5	5	5	5	5	5	5	5	5	5	5	6	6	6	6	7	7	6	6	6	6	5.5	24	7	5
29	7	7	7	6	6	6	5	5	6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.4	24	7	5
30	5	5	5	5	5	4	5	5	5	5	5	5	5	5	6	6	6	6	6	5	5	5	5	6	5.2	24	6	4
AVE	6	6	6	6	6	6	6	5	6	6	6	6	6	6	6	7	7	8	7	7	7	6	6	6	6.3		9	5
N	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	29	30	30	30	30	30	30	30		718	30	
MAX	12	12	12	12	12	11	8	8	9	10	10	10	10	10	11	12	15	15	13	12	11	11	12	12	9.4		15	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

OZONE BY DASIBI/AT HOUR OR HRLY AVE/ IN PPHM

DEMOCRAT

JULY, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1																												
2																												
3																												
4																												
5																												
6																												
7																												
8												7	7	7	7	7	7	7	7	8	8	8	7	7	7.2	13	8	7
9	7	7	7	7	6	6	5	6	5	6	7	7	8	9	9	11	10	9	9	9	9	8	8	8	7.6	24	11	5
10	8	8	8	8	8	7	7	7	7	8	8	8	8	8	9	11	10	9	9	10	11	10	9	9	8.5	24	11	7
11	8	7	7	6	6	5	5	5	5	6	7	8	8	9	10	15	12	11	10	10	10	9	8	8	8.1	24	15	5
12	8	7	7	7	7	7	7	7	7	7	9	9	9	10	9	13	13	10	10	10	9	9	9	9	8.7	24	13	7
13	9	9	8	8	8	7	7	6	6	7	8	9	9	10	10	10	10	10	11	10	9	7	7	7	8.4	24	11	6
14	7	8	8	8	8	8	8	7	8	8	9	9	10	11	11	9	8	7	8	8	7	7	6	6	8.1	24	11	6
15	7	7	7	8	8	8	7	7	6	7	8	8	7	8	9	8	7	7	8	9	10	9	8	7	7.7	24	10	6
16	7	6	6	6	6	5	5	5	5	7	9	8	9	8	8	8	8	9	9	8	8	7	6	6	7.0	24	9	5
17	6	6	6	6	5	5	5	5	5	6	7	7	7	8	8	8	10	10	10	10	9	7	7	7	7.1	24	10	5
18	8	9	7	7	7	7	7	7	6	7	8	8	9	9	10	10	14	15	14	12	11	9	9	9	9.1	24	15	6
19	8	8	8	8	8	8	7	7	8	8	9	10	10	11	11	13	15	12	8	8	8	7	6	6	8.8	24	15	6
20	6	7	7	7	7	8	8	7	5	8	9	10	10	10	11	13	11	9	9	10	9	8	7	7	8.5	24	13	5
21	8	8	8	9	9	9	8	7	7	8	9	10	10	10	11		9	9	10	9	9	9	8	8	8.8	23	11	7
22	8	8	9	8	9	9	8	7	8	8	9	9	10	10	11	12	16	14	12	11	9	9	8	7	9.5	24	16	7
23	6	6	6	6	6	6	6	5	5	5	6	7	7	8	8	10	12	10	9	9	9	8	8	7	7.3	24	12	5
24	6	6	6	6	6	6	5	5	5	6	7	8	8	9	10	12	11	11	11	11	9	9	7	7	7.8	24	12	5
25	6	6	6	6	6	6	6	5	6	6	7	7	7	8	9	12	13	11	11	10	9	9	8	7	7.8	24	13	5
26	7	6	6	6	6	6	6	6	5	6	6	7	9	9	10	11	10	11	14	14	12	10	9	9	8.4	24	14	5
27	8	7	7	7	7	7	7	7	6	8	9	10	10	11	12	16	15	11	10	10	10	9	8	8	9.2	24	16	6
28	7	7	7	7	7	7	7	6	7	7	8	9	10	11	11	11	10	10	10	10	9	9	9	8	8.5	24	11	6
29	8	8	9	9	8	8	8	8	8	9	10	9	10	11	12	12	11	11	11	11	9	8	8	8	9.3	24	12	8
30	8	8	8	8	9	9	9	8	8	7	10	10	11	12		15	12	10	9	10	10	9	8	8	9.4	23	15	7
31	8	9	9	10	10	10	9	7	8	9	9	9	10	11	11	11	10	9	9	9	9	8	8	8	9.2	24	11	7
AVE	7	7	7	7	7	7	7	6	6	7	8	8	9	10	10	11	11	10	10	10	9	8	8	8	8.4		12	6
N	23	23	23	23	23	23	23	23	23	23	23	24	24	24	23	23	24	24	24	24	24	24	24	24		563	24	
MAX	9	9	9	10	10	10	9	8	8	9	10	10	11	12	12	16	16	15	14	14	12	10	9	9	9.5		16	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

OZONE BY DASIBI/AT HOUR OR HRLY AVE/ IN PPHM

DEMOCRAT

SEPTEMBER, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	7	7	7	7	7	7	7	7	7	6	7	6	6	6	9	9	12	18	17	13	11	9	8	8	8.7	24	18	6
2	8	8	7	7	6	7	7	7	7	6	7	6	9	10	11	12	17	16	14	11	10	10	9	9	9.2	24	17	6
3	8	8	8	8	7	7	7	7	7	8	9	9	10	11	12	12	12	14	17	12	10	9	9	8	9.5	24	17	7
4	8	8	8	7	7	7	7	7	6	7	7	7	7	8	8	9	10	12	11	9	8	8	8	7	8.0	24	12	6
5	7	7	7	6	6	7	6	6	6	6	7	7	7	9	10	12	14	14	13	13	12	10	10	10	8.8	24	14	6
6	9	9	9	9	8	8	7	7	6	7	7	7	7	11	12	13	13	13	12	11	9	9	9	8	9.2	24	13	6
7	8	8	7	7	7	7	7	6	6	6	6	6	7	7	9	11	11	11	12	11	9	9	8	7	8.0	24	12	6
8	6	5	5	5	5	5	5	5	5	5	6	6	6	9	10	10	11	10	8	8	7	7	7	7	6.8	24	11	5
9	7	7	6	6	5	5	5	5	5		7	7	7	7	8	8	8	9	9	9	8	8	7	7	7.0	23	9	5
10	7	7	6	6	5	5	5	5	5	6	7	8	8	9	9	7	6	5	5	6	5	6	6	6	6.3	24	9	5
11	6	5	5	5	4	4	4	4	4	5	6	6	6	6	6	5	5	6	6	5	5	5	5	5	5.1	24	6	4
12	5	5	5	5	5	5	5	5	5	5	6	6	7	7	9	10	8	8	7	7	6	6	6	6	6.2	24	10	5
13	7	7	6	6	6	5	5	5	4	6	6	6	7	7	7	7	7	6	6	6	6	6	6	5	6.0	24	7	4
14	5	5	5	5	5	5	5	5	4	5	6	7	7	8	9	8	8	8	8	8	8	7	7	7	6.5	24	9	4
15	7	7	6	6	5	4	4	4	5	5	5	5	5	6	6	6	6	6	6	6	6	5	5	5	5.5	24	7	4
16	4	4	4	3	3	3	2	2	2	2	2	3	3	3	3	3	4	5	6	5	5	4	4	4	3.5	24	6	2
17	4	3	3	3	3	3	3	3	3	4	4	4	5	6	7	8	8	7	7	6	5	4	4	4	4.6	24	8	3
18	3	3	3	3	3	3	2	2	2	3	3	4	4	4	4	6	6	6	5	5	4	4	4	4	3.8	24	6	2
19	4	3	3	3	2	2	2	1	2	3	4	4	4	5	5	6	7	7	7	6	5	5	5	4	4.1	24	7	1
20	5	5	4	4	4	4	3	3	3	3	4	4	6	7	7	7	7	8	8	7	6	6	6	6	5.3	24	8	3
21	6	5	5	5	5	4	4	4	4	4	5	5	6	6	8	10	13	15	16	14	11	9	9	8	7.5	24	16	4
22	8	7	7	6	6	5	5	5	5	5	5	5	6	6	6	9	13	14	14	13	11	10	9	9	7.9	24	14	5
23	8	7	7	7	7	6	6	5	5	5	5	7	10	10	12	15	13	12	12	11					8.5	20	15	5
24																	5	5	5	4	3	3	3	2	3.8	8	5	2
25	2	3	2	1	1	1	1	1	2	2	2	2	2	3	2	2	2	2	2	3	4	3	3	3	2.1	24	4	1
26	3	3	3	4	3	3	3	2	3	2	2	2	3	4	4	4	4	4	5	5	5	5	5	5	3.6	24	5	2
27	5	5	5	5	4	4	4	4	4	3															4.3	10	5	3
28																												
29																												
30																												
AVE	6	6	6	5	5	5	5	5	5	5	5	6	6	7	8	8	9	9	9	8	7	7	6	6	6.4		10	4
N	26	26	26	26	26	26	26	26	26	25	25	25	25	25	25	25	26	26	26	26	25	25	25	25		613	26	
MAX	9	9	9	9	8	8	7	7	7	8	9	9	10	11	12	15	17	18	17	14	12	10	10	10	9.5		18	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

OZONE BY DASIBI/AT HOUR OR HRLY AVE/ IN PPHM

DEMOCRAT

AUGUST, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	8	8	8	9	9	8	7	7	7	8	8	8	8	10	9	7	7	7	7	7	7	7	6	6	7.6	24	10	6
2	6	6	6	6	6	5	5	5	4	5	6	6	7	8	9	9	7	7	7	7	7	7	7	6	6.4	24	9	4
3	6	6	6	6	6	5	5	5	5	6	6	6	7	7	8	8	7	7	7	7	8	7	7	7	6.5	24	8	5
4	7	7	6	6	6	6	6	5	5	6	6			8	8	10	11	9	9	9	9	7	7	7	7.3	22	11	5
5	7	6	7	7	6	6	6	6	6	6	6	6	7	9	10	11	14	14	13	11	10	9	8	8	8.3	24	14	6
6	7	7	7	7	6	6	6	6	7	7	7	7	8	9	10	10	7	7	7	6	6	7	6	6	7.0	24	10	6
7	6	6	5	6	6																				5.8	5	6	5
8																												
9																												
10																												
11																												
12																												
13												9	9	9	9	9	9	10	10	9	9	9	8	8	9.0	13	10	8
14	7	7	7	7	6	6	6	5	5	6	7	7	7	8	9	10	10	10	10	10	9	8	8	7	7.6	24	10	5
15	7	7	7	6	6	6	6	6	7	7	7	7	8	9	9	13	14	14	12	11	9	8	8	8	8.4	24	14	6
16	8	8	7	7	7	7	7	6	7	7	8	8	9	9	10	13	13	13	11	10	9	8	8	8	8.7	24	13	6
17	8	7	7	7	7	7	7	6	6	7	7	8	8	9	10	13	14	13	12	11	9	8	8	8	8.6	24	14	6
18	8	8	8	8	7	8	8	7	7	7	8	8	8			12	16	12	12	11	10	8	8	7	8.9	22	16	7
19	7	7	7	7	7	7	7	6	6	7	7	7	9	10	10	12	14	13	12	10	8	7	7	7	8.4	24	14	6
20	7	6	7	7	6	6	5	5	5	5	6	7	8	11	11	12	17	18	15	14	13	11	10	9	9.2	24	18	5
21	10	9	8	8	8	7	8	8	8	8	8	8	10	12	13	13	16	16	15	15	13	11	10	10	10.5	24	16	7
22	10	10	9	9	9	9	9	8	8	9	10	10	11	12	12	15	15	12	11	10	10	9	9	9	10.2	24	15	8
23	8	8	7	7	7	7	7	7	7	8	10	9	9	9	9	8	8	8	8	7	7	7	7	7	7.8	24	10	7
24	7	8	8	9	8	7	7	6	6	7	7	7	8	8	8	9	13	10	10	9	9	8	8	8	8.1	24	13	6
25	7	7	7	7	7	7	7	7	7	8	8	8	9	11	13	12	11	11	10	10	10	9	8	8	8.7	24	13	7
26	7	7	7	6	6	6	6	6	6	7	8	8	9	10	11	12	14	12	11	10	9	9	9	8	8.5	24	14	6
27	7	7	7	8	7	7	7	7	7	7	8	8	9	9	10	12	14	13	12	12	13	11	10	9	9.2	24	14	7
28	9	8	8	8	8	8	7	7	7	7	7	8	8	7	11	13	14	13	11	12	11	10	9	9	9.2	24	14	7
29	9	8	8	7	7	7	7	6	6	7	7	8	8	9	10	11	9	8	8	8	9	9	8	7	8.0	24	11	6
30	8	7	7	7	7	6	6	5	5	4	5	5	6	6	6	7	8	9	10	7	7	6	6	6	6.5	24	10	4
31	6	6	6	6	5	5	5	5	5	5	5	5	5	6	7	9	9	9	12	13	12	10	8	7	7.1	24	13	5
AVE	7	7	7	7	7	7	7	6	6	7	7	7	8	9	10	11	12	11	10	10	9	8	8	8	8.2		12	6
N	25	25	25	25	25	24	24	24	24	24	24	24	24	24	24	25	25	25	25	25	25	25	25	25		590	25	
MAX	10	10	9	9	9	9	9	8	8	9	10	10	11	12	13	15	17	18	15	15	13	11	10	10	10.5		18	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

OZONE BY DASIBI/AT HOUR OR HRLY AVE/ IN PPHM

DEMOCRAT
OCTOBER, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1																												
2																												
3																												
4																												
5																												
6													4	3	4	4	4	5	5	5	5	4	3	3	4.1	12	5	3
7													4	4	6	7	7	7	6	5	5	5	4	4	4.0	24	7	2
8	3	3	3	3	2	2	2	2	2	3	4	4	4	4	4	4	5	5	5	5	4	5	4	4	3.8	24	5	3
9	3	3	3	3	3	3	3	3	3	3	4	4	4	5	5	6	6	5	5	5	5	4	4	4	4.0	24	6	3
10	3	3	3	3	3	3	3	3	3	3	4	4	4	5	5	5	6	6	6	6	6	5	5	5	4.4	24	6	3
11	4	4	4	4	3	3	3	3	3	3	4	4	4	4	4	5	6	5	4	3	3	3	3	3	3.8	24	6	3
12	5	4	4	4	4	4	3	3	3	3	4	4	4	4	5	5	5	6	6	6	5	5	4	4	4.0	24	6	3
13	3	3	3	3	3	3	3	3	3	3	3	3	4	5	6	7	9	9	8		6	6	5	5	4.9	23	9	3
14	4	4	4	4	4	3	3	3	3	3	3	4	5	5	5	5	6	6	6	5	5	4	4	4	4.4	24	6	3
15	4	4	4	4	4	4	3	3	3	4	4	4	5	5	7	9	11	10	9	7	6	7	7	7	5.5	24	11	3
16	4	4	4	4	3	3	3	3	3	4	4	4	7	7	7	8	9	9	8	8	7	6	6	6	6.8	24	9	5
17	7	7	7	6	6	6	6	6	6	5	7	7	6	6	7	8	9	10	10	7	6	6	5	5	6.1	24	10	4
18	6	6	6	6	5	5	5	4	4	5	5	5	8	8	7	7	7	8	8	7	6	5	5	5	5.9	24	8	4
19	5	5	5	5	5	5	5	4	5	5	5	6		8	6	6	6	6	6	5	5	4	4	4	4.6	21	8	3
20	5	5	5	4	3	3	3	3	3	3																		
21	4	4	4	4	4	4	4	3	3	4	4	4	5	5	5	7	7	8	7	5	5	4	4	3	4.6	24	8	3
22	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	3	3	4	3	3	3	3	2	2	2.9	24	4	2
23	2	2	2	2	2	2	2	2	4	3	4	4	3	3	3	4	4	4	2	2	2	2	2	2	2.7	24	4	2
24	2	2	2	2	3	3	3	2	1	2	3	2	3	3	3	3	3	4	2	2	2	2	2	2	2.4	24	4	1
25	2	2	1	2	3	3	2	2	2	2	2	2	2	2	3	3	3	3	3	2	2	2	2	2	2.3	24	3	1
26	1	1	1	1	1	1	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	3	3	3.0	24	4	1
27	3	3	2	2	2	2	2	1	2	2	3	4	4	4	4	5	4								2.9	17	5	1
AVE	4	4	4	3	3	3	3	3	3	3	4	4	4	5	5	5	6	6	6	5	5	4	4	4	4.2		6	3
N	20	20	20	20	20	20	20	20	20	20	19	19	20	21	21	21	21	20	20	19	20	20	20	20		481	21	
MAX	7	7	7	6	4	6	6	6	6	5	7	7	8	8	7	9	11	10	10	8	7	7	7	7	6.8		11	

OK,

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

SULFUR DIOXIDE/ HOURLY AVERAGE/ IN PPB

DEMOCRAT

JULY, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1																												
2																												
3																												
4																												
5																												
6																												
7												0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	13	0	0
8																10	5	5	0	0	0	0	0	0	1.1	19	10	0
9	0	0	0	0	0	0	0	0	0	0																		
10	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0	24	5	5
11	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	10	10	5	5	5	5	5	5	5	5.4	24	10	5
12	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	10	10	5	5	5	5	5	5	5	5.4	24	10	5
13	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0	5	5	4.8	24	5	0
14	5	5	5	5	5	5	5	5	10	5	5	5	5	5	10	5	5	5	5	5	5	5	5	5	5.4	24	10	5
15	5	5	5	5	5	5	5	5	5	10	5	5	5	5		0	0	0	0	0	0	0	0	0	3.3	23	10	0
16	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	24	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	5	20	20	5	5	0	0	0	0	0	0	2.3	24	20	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	10	10	5	5	5	5	5	5	2.3	24	10	0
19	5	0	0	0	0	0	0	0	0	5	5	0	0	0	0	10	10	5	0	0	0	0	0	0	1.7	24	10	0
20	0	0	0	0	0	0	0	0	0	5	5	5	5	0	0	10	0	0	0	0	0	0	0	0	4.3	24	10	0
21	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0		0	0	0	0	0	0	0	0	0.2	23	5	0
22	0	0	0	0	0	0	0	0	0	5	5	5	5	5	5	5	10	10	5	5	5	5	0	0	3.1	24	10	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	0	0	0	0	0.8	24	5	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	5	15	5	5	5	5	0	0	0	0	0	1.7	24	15	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	5	15	15	10	5	0	0	0	0	0	0	2.1	24	15	0
26	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	5	5	5	5	5	0	5	1.5	24	5	0
27	0	5	5	5	5	5	0	0	5	5	5	5	5	5	5	15	10	5	0	0	0	0	0	0	3.8	24	15	0
28	0	0	0	0	0	0	0	0	0	5	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0.6	24	5	0
29	0	0	0	0	0	0	0	0	0	5	5	5	5		0	5	5	5	0	5	5	5	0	5	2.4	23	5	0
30	0	0	0	0	0	0	0	0	0	0	5	0	0	5	10	5	5	0	0	0	0	0	0	0	1.3	24	10	0
31	0	0	0	0	0	5	0	0	5	5	0	0	5	5	5	5	5	0	0	0	0	0	0	0	1.7	24	5	0
AVE	2	2	2	2	2	2	1	1	2	3	3	2	2	3	5	7	5	4	2	2	2	2	1	2	2.4		9	1
N	23	23	23	23	23	23	23	23	23	23	22	23	23	22	22	23	24	24	24	24	24	24	24	24		557	24	
MAX	5	5	5	5	5	5	5	5	10	10	5	5	5	5	20	20	10	10	5	5	5	5	5	5	5.4		20	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

SULFUR DIOXIDE/ HOURLY AVERAGE/ IN PPB

DEMOCRAT

SEPTEMBER, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	5	20	15	5	5	5	0	0	0	2.7	24	20	0
2	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	15	10	5	0	0	0	0	0	1.3	23	15	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0.2	24	5	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	10	5	5	0	0	0	1.0	24	10	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	5	5	0	0	0	0	1.0	24	5	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	0	0	0	0	0	0.8	24	5	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5	0	5	0.6	24	5	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	0	0	0	0	0	0	0	0	0.6	24	5	0
9	0	0	0	0	0	0	0	0	0	0								0	0	0	0	0	0	0	0.0	17	0	0
10	5	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0.4	24	5	0
11	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	24	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	0	0	0	0	0	0	0	0	0.8	24	10	0
13	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	24	0	0
14	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	24	0	0
15	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	24	0	0
16	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	23	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	5	3	0	0	0	0	0	0	0.7	24	5	0
18	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	24	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	5	0	0	0	0	0	0.8	24	8	0
20	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	24	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	14	16	9	5	5	3	3	0	2.5	24	16	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	5	5	3	3	0	0	0	1.5	24	10	0
23	0	0	0	0	0	0	0	0	0	0	0	0		0	3	13	3	0	0	0					1.0	19	13	0
24																	0	0	0	0	0	0	0	0	0.0	8	0	0
25	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	24	0	0
26	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	24	0	0
27	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	24	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0	0	0	0	0	0	0	0.4	24	3	0
29	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	24	3	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	8	5	5	5	3	1.2	24	8	0
AVE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	2	2	1	1	0	0	0	0.6		5	0
N	29	29	29	29	29	29	29	29	29	29	28	28	26	28	28	28	29	29	30	30	29	29	29	29		690	30	
MAX	5	5	0	0	0	0	0	0	0	3	3	0	0	5	10	13	20	16	10	8	5	5	5	5	2.7		20	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

SULFUR DIOXIDE/ HOURLY AVERAGE/ IN PPB

DEMOCRAT

AUGUST, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	0	0	0	0	0	0	0	0	5	5	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0.8	24	5	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0.4	24	5	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0.4	24	5	0
4	0	0	0	0	0	0	0	0	0	0			0	0	5	10	5	5	0	0	0	0	0	0	1.1	22	10	0
5	0	0	0	0	0	0	0	0	0	0	0	0		0	0	5	10	10	5	5	5	5	5	0	2.2	23	10	0
6	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	0	0	0	0	0	0	5	1.0	24	5	0
7	5	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	0	0	0	0	0	0	0	0	0.8	24	5	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0.4	24	5	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	5	10	5	0	0	0	0	0	0	0	0	0.8	24	10	0
10	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5	5	5	5	0	0	0	0	0	1.0	24	5	0
11	0	0	0	0	0	0	0	0	5	5	0	0	5	10	10	10	5	0	0	0	0	0	0	0	2.1	24	10	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0.4	24	5	0
13	0	0	0	0	0	0	0	0	0	0		0	0	0	5	0	0	0	0	0	0	0	0	0	0.2	23	5	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0.2	24	5	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0.4	24	5	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	0	0	0	0	0	0	0.6	24	5	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0.4	24	5	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	5	0	0	0	0	0	0	0	0.2	23	5	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5	5	0	0	0	0.6	24	5	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	5	5	5	5	0	0	0	1.5	24	15	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	0	0	0	0.8	24	5	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0.2	24	5	0
23	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	24	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0.2	24	5	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0		15	5	0	0	0	0	0	0	0	0	0.9	23	15	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	10	5	0	0	0	0	0	0	0.8	24	10	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	10	5	5	5	0	0	0	0	1.3	24	10	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	15	5	5	0	0	5	0	0	0	1.7	24	15	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0.4	24	5	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0.4	24	5	0
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	10	10	5	5	5	5	1.9	24	10	0
AVE	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	4	3	2	1	1	1	0	0	0	0.8		7	0
N	31	31	31	31	31	31	31	31	31	31	29	30	30	29	31	31	31	31	31	31	31	31	31	31		738	31	
MAX	5	0	0	0	0	0	0	0	5	5	0	0	5	10	15	15	15	10	10	10	5	5	5	5	2.2		15	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

SULFUR DIOXIDE/ HOURLY AVERAGE/ IN PPB

DEMOCRAT

OCTOBER, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	5	5	5	5	5	3	3	3	1.7	24	5	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	15	15	10	5	5	3	3	3	3	3.0	24	15	0
3	0	0	0	3	3	3	0	0	3	3	3	3	3	5	5	8	15	12	10	3	0	0	0	0	3.4	24	15	0
4	0	0	0	0	0	0	0	0	0	3	3	3	3	3	3	6	5	0	0	0	0	0	0	0	1.2	24	6	0
5	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	3	3	4	8	3	3	3	3	3	1.6	24	8	0
6	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	3	3	3	0	3	5	3	1.4	24	5	0
7	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0.5	24	3	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0.1	24	3	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	8	5	5	0	0	0	0	0.9	24	8	0
10	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	24	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	10	10	10	5	5	5	2.7	24	10	0
12	5	5	5	5	5	5	0	0	0	0	0	0	0	0	0	5	10	10	5	5	0	0	0	0	2.7	24	10	0
13	0	0	0	0	0	0	0	0	0	0	0	0	5	10	10	10	10	10	5	5	3	5	5	3	3.4	24	10	0
14	5	3	3	3	3	3	3	0	0	0	0	0	0	0	10	15	13	10	10		5	5	5	3	4.3	23	15	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	13	10	10	5	5	5	3	2.8	24	15	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	15	10	10	5	0	5	5	5	2.7	24	15	0
17	5	5	5	5	5	5	0	0	0	5	5	5	5	5	3	5	5	10	5	10	5	3	0	0	4.2	24	10	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	10	15	15	13	10	5	5	5	3.6	24	15	0
19	5	5	5	5	5	5	5	3	0	3	5	10	10	10	5	5	5	5	10	8	3	0	0	0	4.9	24	10	0
20	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0	0	0	0	0	0	0.0	21	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	8	0	0	0	0	0	0	0.5	24	8	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0.4	24	10	0
23	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	24	0	0
24	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	24	0	0
25	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	24	0	0
26	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	24	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							0.0	18	0	0
28																												
29																												
30																												
31																												
AVE	1	1	1	1	1	1	0	0	0	1	1	1	1	1	2	3	6	5	5	4	2	2	2	1	1.7		7	0
N	27	27	27	27	27	27	27	27	27	27	26	26	26	27	27	27	27	27	26	25	26	26	26	26		638	27	
MAX	5	5	5	5	5	5	5	3	3	5	5	10	10	10	10	15	15	15	15	13	10	5	5	5	4.9		15	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

SULFUR DIOXIDE/ HOURLY AVERAGE/ IN PPB

SHIRLEY PEAK

JULY, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1																												
2																												
3																												
4																												
5																												
6																												
7																												
8																		3	0	0	0	0	0	0	0.4	7	3	0
9	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	24	0	0
10	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	24	0	0
11	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	24	0	0
12	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	24	0	0
13	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	24	0	0
14	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	24	0	0
15	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	24	0	0
16	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	23	0	0
17	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	24	0	0
18	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	24	0	0
19	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	24	0	0
20	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	24	0	0
21	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	24	0	0
22	0	0	0	0	0	0	0	0	0	0	0														0.0	11	0	0
23																												
24																												
25																												
26																												
27																												
28																												
29																3	3		0	0	0	0	0	0	0.8	8	3	0
30	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	24	0	0
31	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	24	0	0
AVE	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		0	0
N	16	16	16	16	16	16	16	16	16	16	16	14	15	15	15	16	16	16	17	17	17	17	17	17		385	17	
MAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0	0	0	0	0	0	0.8		3	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

SULFUR DIOXIDE/ HOURLY AVERAGE/ IN PPB

SHIRLEY PEAK

SEPTEMBER, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	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	24	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	5	5	5	0	0	0	0	0	0.7	23	5	0
3	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5	5	10	10	0	0	0	0	0	0	1.5	24	10	0
4	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	24	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	5	5	0	0	0	0	1.0	24	5	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0.2	24	5	0
7	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	24	0	0
8	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	24	0	0
9	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	24	0	0
10	0	0	0	0	0	0	0	0	0	0	0	5	5	5	0	0	0	0	0	0	0	0	0	0	0.6	24	5	0
11	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	24	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0.4	24	5	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0.2	24	5	0
14	0	5	0	0	5	0	0	5	0	5	5	5	5	5	5	0	0	0	0	0	0	5	0	0	2.1	24	5	0
15	0	0	0	5	0	0	0	0	0	5	0	0	5	5	0	0	5	0	5	0	0	0	5	0	1.5	24	5	0
16	0	5	5	0	5	5	0	5	5	5	0	0	5	0	0	5	5	0	0	0	5	0	5	5	2.7	24	5	0
17	5	5	5	5	5	5	5	5	5	5	0	0	0	0	3	3	3	5	5	3	3	0	0	0	3.1	24	5	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0.1	24	3	0
19	0	0	0	0	0	0	0	0	3	3	3	3	3	0	0	3	3	3	0	0	0	0	0	0	1.0	24	3	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0.3	24	3	0
21	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	24	0	0
22	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	24	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	8	5	5	5	3	5	3	3	0	1.7	24	8	0
24	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	23	0	0
25	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	24	0	0
26	0	0	0	0	0	0	0	0	0	3	3	3	3	3	3	3	3	3	3	3	3	0	0	0	1.5	24	3	0
27	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	3	0	0	0	0	0	0	0.8	24	3	0
28	0	0	0	0	0	0	3	3	3	3	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0.6	24	3	0
29	0	0	0	0	0	0	0	0	0	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0.4	24	3	0
30	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	24	0	0
AVE	0	1	0	0	1	0	0	1	1	1	0	1	1	1	1	1	2	2	1	0	1	0	0	0	0.7		3	0
N	30	30	30	30	30	30	30	30	30	30	30	29	30	30	29	30	30	30	30	30	30	30	30	30		718	30	
MAX	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	8	10	10	5	5	5	5	5	5	3.1		10	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

SULFUR DIOXIDE/ HOURLY AVERAGE/ IN PPB

SHIRLEY PEAK

AUGUST, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	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	24	0	0
2	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	24	0	0
3	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	24	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0				3			0	0	0	0	0	0.2	19	3	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	5	5	0	0	0	0	1.0	24	5	0
6	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	24	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0.4	24	5	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	5	10	5	0	0	0	0	0	0	0	0	0.8	24	10	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	5	15	5	5	0	0	0	0	0	0	0	1.3	24	15	0
10	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	24	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	0	0	0	0	0	0	0	0	0.6	24	5	0
12	0	0	0	0	0	0	0	0	0	0	0														0.0	11	0	0
13																												
14																												
15																												
16																												
17																												
18											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	14	0	0
19											0	0	0	0	5	5	5	5	5	5	0	0	0	0	1.3	24	5	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	0	0	0	0	0	0.8	24	5	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	0	0	0	0	0	0	0	0.6	24	5	0
22	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	24	0	0
23	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	24	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0		0	0	0	0	0	0	0.2	23	5	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	0	0	0	0	0	0	0	0.6	24	5	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	0	0	0	0	0	0	0.6	24	5	0
27	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	24	0	0
28	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	24	0	0
29	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	24	0	0
30	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	24	0	0
31	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	24	0	0
AVE	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	2	2	1	0	0	0	0	0	0	0.4		3	0
N	24	24	24	24	24	24	24	24	24	24	25	24	24	23	23	23	24	22	23	24	24	24	24	24		571	25	
MAX	0	0	0	0	0	0	0	0	0	0	0	0	0	5	15	5	5	5	5	5	0	0	0	0	1.3		15	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

SULFUR DIOXIDE/ HOURLY AVERAGE/ IN PPB

SHIRLEY PEAK
OCTOBER, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	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	24	0	0
2	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	24	0	0
3	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	24	0	0
4	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	24	0	0
5	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	24	0	0
6	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	24	0	0
7	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	24	0	0
8	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	24	0	0
9	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	24	0	0
10	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	24	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0.3	24	3	0
12	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	24	0	0
13	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	24	0	0
14	0	0																							0.0	2	0	0
15														0	0	0	0	0	3	3	3	0	0	0	0.8	11	3	0
16	3	3	0	0	3	0	0	0	3	0	3	0	0	0	3	0	5	3	3	0	0	0	0	0	1.2	24	5	0
17	0	3	0	0	3	0	0	0	0	0	0	0	3	3	3	3	0	0	0	0	0	0	0	0	0.8	24	3	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0.3	24	3	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	5	5	3	3	3	0	1.2	24	5	0
20	0	0	0	0	0	0	0	0	0	0	3	3	0	3	0	0	0	3	0	3	0	0	0	0	0.6	24	3	0
21	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	24	0	0
22	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	24	0	0
23	0	0	0	0	0	0	0	0	5	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	24	5	0
24	0	0	0	0	3	3	0	0	0	0	3	3	3	3	0	0	3	0	0	3	3	3	0	0	1.3	24	3	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	5	3	3	0.7	24	5	0
26	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	24	0	0
27	0	0	0	0	0	0	0	0	0	0	0														0.0	11	0	0
28																												
29																												
30																												
31																												
AVE	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0.3		1	0
N	26	26	25	25	25	25	25	25	25	25	25	24	24	25	25	25	25	25	25	25	25	25	25	25		600	26	
MAX	3	3	0	0	3	3	0	0	5	5	5	3	3	3	3	3	5	3	5	5	3	5	3	3	1.3		5	

OK,

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

PERCENT RELATIVE HUMIDITY, AMBIENT AIR

SHIRLEY PEAK

JULY, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1																												
2																												
3																												
4																												
5																												
6																												
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23																												
24																												
25																												
26																												
27																												
28																		33	35	40	44	36	38	46	38.9	7	46	33
29																		31	32	36	42	44	45	47	37.9	24	47	25
30	44	38	41	41	40	45	40	25	28	32	34	44	43	38	35	32	32	27	29	32	40	43	42	42	40.6	24	62	26
31	48	50	55	59	60	62	56	44	38	33	34	34	34	32	28	26	27	27	32	36	42	41	42	45	39.2		52	28
AVE	46	44	48	50	50	54	48	35	33	33	34	39	39	35	32	29	30	30	3	3	3	3	3	3		55	3	
N	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	35	40	44	44	45	47	40.6		62	
MAX	48	50	55	59	60	62	56	44	38	33	34	44	43	38	35	32	32	33										

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

PERCENT RELATIVE HUMIDITY, AMBIENT AIR

SHIRLEY PEAK

SEPTEMBER, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	30	18	20	18	19	24	27	24	20	22	21	24	25	31	34	38	35	38	42	32	20	22	22	21	26.1	24	42	18
2	22	24	23	21	24	29	30	30	32	27	20	19	18	30	35		32	38	32	30	22	18	16	15	25.5	23	38	15
3	18	18	18	18	17	18	21	22	24	25	38	45	43	42	40	38	37	38	40	46	48	46	48	52	33.3	24	52	17
4	56	61	64	65	66	68	46	40	44	50	47	45	44	40	37	34	33	34	37	26	12	14	18	19	41.7	24	68	12
5	20	22	22	20	19	21	22	25	26	20	16	14	16	20	17	30	32	37	28	50	32	26	20	24	24.1	24	50	14
6	30	30	20	22	20	16	15	16	17	16	12	14	24	30	30	24	27	31	33	42	40	40	45	20	25.6	24	45	12
7	24	28	16	19	19	18	18	20	23	24	21	19	21	23	18	20	20	18	20	22	23	48	57	62	25.0	24	62	16
8	64	63	66	67	60	56	52	54	55	46	36	34	32	30	30	36	46								48.6	17	67	30
9																			70	78	78	84	88	86	80.7	6	88	70
10	87	88	96	100	100	100	96	100	100	100	94	74	66	61	59	60	62	64	78	86	88	96	100	100	85.6	24	100	59
11	92	95	87	89	88	81	82	83	81	60	50	66	60	46	38	37	38	40	43	52					65.4	20	95	37
12										52	52	49	46	47											49.2	5	52	46
13										58	52	50	50	50	50	49	49	52	57	70	79	74	74	78	59.5	15	79	49
14	80	88	90	88	89	92	97	98	96	80	63	70	64	58	57	54	54	59	66	81	93	96	98	100	79.6	24	100	54
15	100	99	100	100	100	100	100	100	100	100	100	100	100	100	88	74	80	88	92	96	100	100	100	100	96.5	24	100	74
16	100	100	100	100	100	100	100	100	100	100	100	100	100	100	95	74	76	53							94.3	18	100	53
17											86	62	49	40	38	46	68	62	66	72	80	90	94	90	67.4	14	94	38
18	90	90	94	95	98	100	100	100	100	100	100	100	96	92	90	86	85	80	94	100	100	95	100	100	95.2	24	100	80
19	100	100	100	100	100	100	100	96	84	88	60	75	71	70	62	78	70	66	79	98	66	63	60	57	81.0	24	100	57
20	56	50	38	40	32	28	26	26	28	22	20	16	17	40	45	47	51	56	56	44	50	40	39	38	37.7	24	56	16
21	36	44	47	46	46	45	44	42	39	33	30	28	24	22	18	19	20	24	30	32	34	35	37	38	33.9	24	47	18
22	40	37	34	33	34	35	37																		35.7	7	40	33
23																40	48	46	56	70	55	48	45	46	50.4	9	70	40
24	47	48	50	58	88	78	80	76	74	78	80	84	80	83	85	80	86	83	74	73	72	72	73	77	74.1	24	88	47
25	90	96	92	94	96	95	98	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	98.4	24	100	90
26	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100.0	24	100	100
27	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100.0	24	100	100
28	100	100	100	100	100	100	100	100	100	100	100	100	100	100	99	100	100	100	100	100	100	100	100	100	100.0	24	100	99
29	100	100	100	100									100	100	100	100	100	100	100	100	100	100	100	100	100.0	16	100	100
30	100	80	66	72	78	92	77	72	60	52	56	60	59	56	62	60	62	61	76	62	36	27	26	43	62.3	24	100	26
AVE	67	67	66	67	66	67	65	66	65	62	60	60	59	60	59	59	60	60	64	68	65	65	66	67	63.7		78	47
N	25	25	25	25	24	24	24	23	23	25	26	26	27	27	26	26	27	26	26	26	25	25	25	25		606	27	
MAX	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100.0		100	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

PERCENT RELATIVE HUMIDITY, AMBIENT AIR

SHIRLEY PEAK
AUGUST, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	46	52	52	52	50	38	40	40	34	35	40	40	37	29	22	24	25	28	31	29	32	36	38	40	37.1	24	52	22
2	41	40	41	43	40	37	36	32	30	28	32	31	31	32	29	25	23	23	26	30	34	41	37	33	33.1	24	43	23
3	33	37	41	44	44	46	43	44	40	40	42	41	38	35	34	32	30	29	32	37	44	48	50	50	39.8	24	50	29
4	50	51	50	44	52	56	50	39	36	37	36	44	43	46	46	42	42	44	46	52	60	46	44	36	45.5	24	60	36
5	29	20	20	20	19	19	20	21	18	16	16	16	24	34	37	38	37	36	40	42	46	32	27	26	27.2	24	46	16
6	26	28	28	26	24	24	26	27	28	25	22	22	22	24	30	31	32	32	34	30	30	35	37	38	28.4	24	38	22
7	38	38	39	40	42	46	48	51	49	48	43	39	38	35	35	36	35	34	35	38	42	47	46	42	41.0	24	51	34
8	44	46	44	46	48	46	44	45	48	44	40	41	42	40	38	34	34	33	33	32	32	39	42	37	40.5	24	48	32
9	36	52	52	49	48	44	41	42	41	38	34	30	34	36	39	40	42	43	46	54	60	70	74	76	46.7	24	76	30
10	74	74	72	70	69	61	60	20	16	12	12	36	41	42	41	40	38	36	37	43	50	54	58	60	46.5	24	74	12
11	66	68	72	75	72	72	74	68	58	52	44	46	48	50	48	43	43	42	43	45	54	36	34	28	53.4	24	75	28
12	15	12	11	13	18	16	13	15	17	20	20	20	14	13	33	31	36	40	42	46	55	54	47	40	26.7	24	55	11
13	38	36	20	12	13	19	28	30	31	28	18	30	40	42	38	39	42	46	52	60	72	44	42	48	36.2	24	72	12
14	40	36	29	27	31	29	29	30	29	27	24	30	39	38	36	35	38	40	44	52	46	40	35	34	34.9	24	52	24
15	37	40	30	24	16	17	16	17	22	18	19	15	13	32	42	42	44	46	48	52	49	47	44	20	31.3	24	52	13
16	32	36	37	36	38	33	30	30	26	21	20	19	20	38	39	40	40	42	44	50	40	32	36	36	34.0	24	50	19
17	28	30	38	34	35	37	36	38	40	32	23	22	21	20	36	40	40	41	40	46	48	48	36	36	35.2	24	48	20
18	39	44	48	53	54	54	52	52	44	36	32	32	30	34	30	34	36	39	40						41.2	19	54	30
19											32	28	26	24	32	28	40	37	39	44	48	46	41	44	36.4	14	48	24
20	46	46	47	50	50	46	45	45	45	41	33	30	29	26	26	38	36	38	42	49	56	46	44	36	41.3	24	56	26
21	28	26	26	26	27	28	28	27	26	30	27	26	26	28	40	46	42	42	42	46	48	52	39	40	34.0	24	52	26
22	49	46	40	40	42	42	40	42	43	42	43	34	32	40	42	42	41	40	36	39	42	48	54	56	42.3	24	56	32
23	54	58	59	59	61	63	60	66	66	56	52	46	46	42	37	32	28	32	34	35	37	52	62	52	49.5	24	66	28
24	56	60	48	46	62	54	39	42	38	38	38	32	36	40	42	35	34	40	42	39	42	49	54	52	44.1	24	62	32
25	54	46	49	47	47	48	44	43	42	48	42	38	34	36	34	34	35	39	41	46	51	52	51	50	43.8	24	54	34
26	44	46	48	50	54	48	54	55	48	40	36	37	40	42	45	44	44	45	50	56	60	62	65	64	49.0	24	65	36
27	56	56	30	35	50	62	57	57	56	42	36	37	42	46	44	43	48	56	61	62	66				49.6	21	66	30
28													34	35	46	54	50	56	56	60	64	66	69	72	55.2	12	72	34
29	75	78	82	88	78	69	93	97	96	84	77	72	65	62	58	54	54	54	55	62	75	73	80	81	73.4	24	97	54
30	84	85	85	86	84	87	87	65	65	68	48	56	54	54	50	46	43	43	45	51	60	50	46	46	62.0	24	87	43
31	40	62	11	9	13	30	18	13	10	11	12	11	12	11	33	34	32	34	38	44	17	17	18	21	23.0	24	62	9
AVE	45	47	43	43	44	44	43	41	39	36	33	33	34	36	38	38	38	40	42	46	49	47	47	45	41.2		59	26
N	29	29	29	29	29	29	29	29	29	29	30	30	31	31	31	31	31	31	31	30	30	29	29	29		714	31	
MAX	84	85	85	88	84	87	93	97	96	84	77	72	65	62	58	54	54	56	61	62	75	73	80	81	73.4		97	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

PERCENT RELATIVE HUMIDITY, AMBIENT AIR

SHIRLEY PEAK
OCTOBER, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	59	58	61	57	56	51	49	36	37	40	34	29	30	46	46	54	54	66	62	61	53	56	58	55	50.3	24	66	29
2	57	55	49	47	46																				50.8	5	57	46
3																												
4																												
5																												
6															100	100	100	100	100	100	100	100	100	100	100.0	10	100	100
7														30	28	25	28	30	29	31	32	34	34	34	46.9	16	90	25
8	76	88	90	80	82								26	25	23	22	23	27	46	57	38	40	36	39	33.8	24	57	22
9	35	35	35	35	35	36	36	37	36	31	29	28	24	31	35	30	36	42	49	48	48	47	46	38	40.3	24	49	24
10	40	42	45	49	48	48	48	47	44	31	27	24	22	20	28	30	32	34	42	36	36	36	39	39	32.0	24	42	20
11	36	32	32	37	31	30	30	29	33	28	26	30	26	24	22	21	27	29	37	39	39	37	36	36	31.8	24	40	21
12	40	40	35	33	31	30	32	34	34	29	27	26	24	22	30	33	33	34	43	40	38	37	36	36	34.8	24	43	22
13	35	36	37	37	37	39	40	42	40	32	29	26	22	21	20	20	24	24	40	36	36	35	35	39	31.3	24	40	20
14	34	34	34	36	35	36	38	37	37	28	26	24	21	24	22	23	26	32	38	30	28	29	28	27	28.9	24	38	21
15	33	32	33	33	33	33	32	31	30	29	24	22	19	17	29	32	37	43	39	45	33	36	40	45	30.0	24	45	17
16	27	29	26	27	26	24	26	28	28	24	21	20	46	58	65	64	74	80	85	65	70	68	56	90	57.6	24	90	25
17	40	70	32	36	66	70	73	32	40	25	38	39	26	36	45	52	63	68	80	11	8	5	18	42	36.1	24	92	5
18	76	92	21	50	22	17	20	26	28	25	19	17	24	20	28	42	43	44	45	61	67	62	64	70	40.5	24	70	20
19	42	36	35	35	34	33	34	35	34	32	30	22	78	74	75	83	90	93	95	100	92	91	92	93	85.8	24	100	72
20	72	74	76	82	84	89	88	89	92	86	86	85	36	40	48	52	59	59	68	25	21	24	30	27	47.4	24	93	21
21	88	93	73	61	56	44	40	74	38	52	41	38	40	39	39	39	36	40	45	43	42	54	52	44	41.3	24	54	29
22	32	30	29	38	48	46	43	44	43	42	41	41	56	54	52	54	55	58	64	72	72	72	73	74	58.2	24	74	41
23	41	44	46	43	44	48	57	57	66	67	65	62	100	100	100	100	100	100	100	100	100	100	100	100	94.6	24	100	74
24	74	78	79	80	80	82	98	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100.0	24	100	100
25	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100.0	24	100	100
26	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	99.6	11	100	96
27	100	100	100	100	100	100	100	100	100	100	96																	
AVE	56	59	53	54	54	53	54	51	53	50	48	44	43	44	49	51	54	57	62	57	55	55	56	58	53.2	498	71	41
N	22	22	22	22	22	20	20	20	20	20	20	19	19	20	21	21	21	21	21	21	21	21	21	21			22	
MAX	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100.0		100	

OK,

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

TEMPERATURE/FARHENHIET/HOURLY AVERAGE

SHIRLEY PEAK

JULY, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1																												
2																												
3																												
4																												
5																												
6																												
7																												
8																												
9																												
10																												
11																												
12																												
13																												
14																												
15																												
16																												
17																												
18																												
19																												
20																												
21																												
22																												
23																												
24																												
25																												
26																												
27																												
28																		76	74	71	67	70	68	65	70.1	7	76	65
29																		76	73	70	66	66	64	64	70.5	24	76	64
30	66	68	66	66	68	65	66	71	74	76	76	75	75	75	76	75	76	73	71	69	64	62	63	62	66.9	24	75	61
31	64	62	62	62	62	61	61	63	64	68	70	71	72	74	75	75	75	73	71	69	64	62	63	62	66.9	24	75	61
AVE	65	65	64	64	65	63	64	67	69	72	73	73	74	75	76	75	76	75	73	70	66	66	65	64	68.9		76	63
N	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3		55	3	
MAX	66	68	66	66	68	65	66	71	74	76	76	75	75	75	76	75	76	76	74	71	67	70	68	65	70.5		76	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

TEMPERATURE/FARHENHIET/HOURLY AVERAGE

SHIRLEY PEAK
SEPTEMBER, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	64	63	62	64	64	63	61	62	65	69	71	74	74	74	72	71	73	70	66	67	68	67	68	68	67.5	24	74	61
2	67	67	68	67	66	65	65	66	68	75	80	83	83	80	76		75	72	70	68	69	68	70	70	71.2	23	83	65
3	69	70	68	69	70	69	68	67	66	70	64	63	66	68	68	69	68	66	64	60	58	59	58	57	65.6	24	70	57
4	56	56	55	55	56	54	58	58	58	60	64	67	68	68	70	70	69	68	65	63	62	64	64	64	62.2	24	70	54
5	64	65	65	65	65	64	62	60	64	70	76	78	79	76	78	74	73	71	73	66	64	65	66	66	68.7	24	79	60
6	63	64	63	65	65	66	66	66	68	70	76	77	75	73	74	74	73	72	70	66	64	64	62	63	68.3	24	77	62
7	64	63	65	65	66	65	66	64	64	65	71	74	72	70	77	75	74	75	70	68	67	62	61	60	67.6	24	77	60
8	59	59	58	57	58	59	60	60	61	66	71	73	73	74	72	70	64								64.4	17	74	57
9																			56	55	55	54	53	52	54.2	6	56	52
10	52	52	50	51	50	49	49	50	50	51	52	56	57	58	59	58	58	56	55	52	50	49	48	48	52.5	24	59	48
11	49	48	49	47	48	48	48	49	49	55	58	57	57	58	58	60	59	58	56	52	50	50	50	50	52.6	24	60	47
12	49	49	51	49	50	49	49	48	51	54	55	57	58	59	58	58	58	57	55	51	49	49	49	49	52.5	24	59	48
13	48	48	48	48	48	47	47	46	47	51	54	56	56	57	58	58	58	57	55	55	48	49	48	48	51.5	24	58	46
14	47	46	46	46	46	45	45	45	46	50	52	54	56	57	57	57	56	54	52	47	46	45	44	44	49.3	24	57	44
15	44	44	44	44	44	44	42	43	44	44	46	46	46	46	48	50	48	46	46	45	44	44	44	44	45.0	24	50	42
16	44	44	44	43	42	42	41	40	41	42	42	42	44	44	45	48	50	52							43.9	18	52	40
17											49	55	57	60	59	52	55	54	53	49	46	45	44	45	51.6	14	60	44
18	45	46	46	46	47	46	48	48	48	49	50	51	52	54	53	53	54	53	51	50	49	48	47	47	49.2	24	54	45
19	47	47	46	45	46	45	46	46	47	50	53	53	54	54	54	52	53	52	50	47	45	45	46	46	48.7	24	54	45
20	46	48	46	48	49	48	50	50	53	60	64	66	65	62	62	62	60	60	60	52	54	54	53	52	55.2	24	66	46
21	54	53	54	54	53	53	53	56	60	65	67	70	71	74	75	74	70	69	63	63	61	60	59	57	62.0	24	75	53
22	56	56	59	58	58	57	58																		57.4	7	59	56
23																70	66	63	58	55	58	60	62	62	61.6	9	70	55
24	61	61	61	55	50	54	55	55	57	58	59	59	60	59	58	60	59	59	57	58	58	58	57	57	57.7	24	61	50
25	55	54	54	54	55	55	54	54	54	55	55	56	56	56	55	55	55	55	55	55	55	55	55	55	54.9	24	56	54
26	55	55	55	54	54	53	52	51	50	48	45	46	45	44	42	42	40	39	38	38	37	37	38	38	45.7	24	55	37
27	37	37	37	36	36	36	36	36	33	34	35	36	36	36	36	37	37	36	37	38	36	36	37	37	36.2	24	38	33
28	37	36	36	36	36	36	36	37	38	39	39	42	42	42	42	40	40	40	39	39	39	39	38	38	38.6	24	42	36
29	37	37	37	37									35	35	34	33	33	34	34	32	32	32	31	32	34.1	16	37	31
30	33	34	33	32	31	31	32	33	38	40	42	42	43	44	44	44	42	41	37	36	37	38	40	37	37.7	24	44	31
AVE	52	52	52	51	52	52	52	52	53	56	57	59	59	59	59	58	58	57	55	53	52	52	52	51	54.2		61	49
N	27	27	27	27	26	26	26	25	25	25	26	26	27	27	27	27	28	27	27	27	27	27	27	27		638	28	
MAX	69	70	68	69	70	69	68	67	68	75	80	83	83	80	78	75	75	75	73	68	69	68	70	70	71.2		83	

STATEWIDE AIR POLLUTION RESEARCH CENTER -- RIVERSIDE, CALIFORNIA

TEMPERATURE/FARHENHIET/HOURLY AVERAGE

SHIRLEY PEAK

AUGUST, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	62	60	60	60	59	59	59	60	62	64	64	64	65	67	68	68	67	64	63	62	57	56	56	55	61.7	24	68	55
2	54	54	54	52	52	52	52	53	55	58	58	61	63	64	64	65	64	63	62	60	56	53	54	54	57.4	24	65	52
3	54	52	52	52	52	52	52	52	53	55	56	57	59	60	61	62	62	61	60	58	54	52	50	50	55.3	24	62	50
4	50	50	50	50	50	49	50	52	54	56	60	59	60	60	61	62	63	63	62	59	54	53	54	55	55.7	24	63	49
5	57	60	58	58	58	59	58	59	63	68	72	73	73	72	71	70	71	71	70	68	64	62	63	64	65.1	24	73	57
6	65	63	64	64	66	66	65	65	66	72	75	76	78	75	70	67	67	67	66	69	66	63	62	62	67.5	24	78	62
7	63	63	62	63	60	59	60	59	60	62	66	68	68	71	72	72	72	72	71	68	66	61	62	62	65.1	24	72	59
8	61	61	62	61	60	60	60	60	61	63	67	68	69	71	72	73	72	72	71	69	66	62	61	62	65.2	24	73	60
9	61	58	58	58	58	58	58	59	59	62	65	68	68	69	70	70	70	69	67	64	61	56	56	56	62.4	24	70	56
10	56	56	56	56	56	55	57	63	65	69	72	68	66	67	69	68	68	67	65	62	60	57	56	56	62.1	24	72	55
11	54	54	54	53	52	52	52	53	54	57	62	61	62	63	64	65	65	66	64	62	58	56	56	57	58.2	24	66	52
12	60	61	61	62	62	60	60	60	62	66	72	72	74	74	70	70	70	68	66	62	58	59	59	60	64.5	24	74	58
13	58	58	58	59	58	59	58	60	64	68	70	68	67	68	69	69	68	67	64	60	55	56	56	55	62.2	24	70	55
14	55	55	56	57	57	56	55	57	61	64	67	67	67	68	69	69	68	66	64	60	56	57	58	58	61.1	24	69	55
15	57	57	58	59	58	56	56	60	62	70	71	73	73	70	68	68	67	66	65	60	57	58	58	59	62.8	24	73	56
16	58	58	57	56	56	56	56	56	62	70	73	75	74	70	71	70	70	69	66	62	60	60	59	59	63.5	24	75	56
17	60	59	60	62	60	60	61	61	64	71	76	78	78	77	72	70	70	69	70	65	61	60	62	62	66.2	24	78	59
18	60	60	58	58	57	57	57	58	64	70	72	75	76	76	74	74	74	71	68						66.3	19	76	57
19											74	79	80	80	74	72	73	73	72	69	63	65	66	65	71.8	14	80	63
20	63	62	62	61	62	63	63	64	65	72	76	79	80	82	78	76	77	76	72	69	65	65	66	67	69.4	24	82	61
21	68	69	69	69	67	67	67	68	69	71	77	76	78	78	74	72	74	75	72	70	70	66	67	67	70.8	24	78	66
22	64	65	67	66	65	66	67	66	66	68	71	78	77	75	74	74	75	75	76	74	71	66	63	64	69.7	24	78	63
23	65	63	62	62	61	62	62	60	60	62	64	66	68	69	71	72	72	72	70	69	67	63	60	62	65.2	24	72	60
24	61	61	62	62	60	60	61	60	62	62	63	64	68	70	67	70	70	66	67	68	66	64	65	63	64.3	24	70	60
25	63	63	63	63	62	61	63	62	61	62	68	70	72	70	70	71	71	70	67	62	60	60	60	59	64.7	24	72	59
26	58	60	59	58	58	57	58	58	60	66	69	69	69	70	68	69	66	66	62	59	57	57	56	56	61.9	24	70	56
27	57	57	59	59	58	56	58	60	63	70	74	75	72	70	70	70	68	63	61	59					63.9	20	75	56
28													68	70	64	63	67	68	63	61	59	57	58	56	62.8	12	70	56
29	55	54	53	52	53	54	52	51	54	56	58	60	62	62	63	63	63	62	61	58	54	53	52	52	56.5	24	63	51
30	51	50	50	50	49	49	49	52	53	54	61	62	62	63	64	64	65	64	63	60	54	54	54	54	56.3	24	65	49
31	53	51	57	57	55	53	54	55	58	63	68	71	70	72	71	70	72	71	68	62	63	64	64	64	62.8	24	72	51
AVE	59	58	59	59	58	58	58	59	61	65	68	69	70	70	69	69	69	68	66	64	61	59	59	59	63.2		72	57
N	29	29	29	29	29	29	29	29	29	29	30	30	31	31	31	31	31	31	31	30	29	29	29	29		713	31	
MAX	68	69	69	69	67	67	67	68	69	72	77	79	80	82	78	76	77	76	76	74	71	66	67	67	71.8		82	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

TEMPERATURE/FARHENHIET/HOURLY AVERAGE

SHIRLEY PEAK
OCTOBER, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	37	38	38	39	40	40	40	45	49	49	52	52	53	52	52	49	49	44	44	43	45	44	44	43	45.0	24	53	37
2	43	43	42	43	43																				42.8	5	43	42
3																												
4																												
5																												
6															38	38	38	38	38	37	38	38	38	39	38.0	10	39	37
7															54	56	54	49	48	46	45	44	44	43	44.8	24	56	37
8	40	37	37	39	38	40	39	38	40	45	46	49	51	52	58	59	57	52	50	47	47	46	45	44	47.7	24	59	41
9	43	43	43	42	42	41	41	41	42	48	50	52	55	56	53	54	52	50	46	44	44	44	44	45	46.0	24	54	40
10	43	42	42	40	40	40	40	40	42	50	52	52	52	53														
11	45	44	44	44	43	43	44	45	46	53	52	53	55	57	56	55	54	53	48	49	49	48	46	46	48.8	24	57	43
12	44	44	44	44	44	44	44	45	47	52	55	57	58	59	60	59	55	53	47	46	46	46	45	45	49.3	24	60	44
13	46	46	46	47	47	46	45	45	48	54	57	59	60	60	58	56	56	53	48	49	50	50	50	50	51.1	24	60	45
14	50	51	50	50	49	48	47	47	50	56	59	60	61	62	62	61	56	54	50	48	49	48	48	47	52.6	24	62	47
15	48	49	48	47	47	47	47	48	50	54	60	60	62	60	61	59	56	54	51	50	51	52	51	52	52.7	24	62	47
16	52	51	51	50	51	50	50	50	50	59	58	60	61	60	59	58	56	55	53	50	49	48	48	47	53.2	24	61	47
17	48	45	50	46	44	43	44	48	48	52	52	53	52	51	50	50	48	47	45	45	43	44	45	42	47.3	24	53	42
18	42	40	49	44	48	50	49	47	46	50	54	57	58	56	55	54	52	50	48	50	50	51	50	48	49.9	24	58	40
19	49	50	50	50	49	49	48	48	49	50	56	60	59	59	56	54	53	52	49	45	43	44	43	43	50.3	24	60	43
20	44	44	43	42	41	41	41	41	41	43	43	45	46	47	48	47	46	45	44	42	42	42	42	41	43.4	24	48	41
21	42	42	42	42	45	46	47	47	46	53	55	56	56	58	55	54	53	52	50	51	53	50	50	52	49.9	24	58	42
22	53	49	49	51	51	51	53	53	53	54	55	56	57	58	57	57	58	56	54	54	52	50	50	53	53.5	24	58	49
23	54	51	52	53	52	50	47	48	46	48	48	50	52	54	54	55	53	52	50	48	48	49	49	49	50.5	24	55	46
24	49	48	47	47	46	46	46	46	46	45	47	48	47	48	48	47	47	47	47	47	46	45	46	45	46.7	24	49	45
25	46	46	46	46	46	46	45	44	44	43	44	44	45	46	47	46	46	45	44	44	44	44	44	44	45.0	24	47	43
26	44	44	44	44	43	43	43	40	38	38	39	40	36	34	35	34	33	32	32	31	32	32	31	30	37.2	24	44	30
27	30	29	28	27	27	27	26	26	27	30	40														28.8	11	40	26
AVE	45	44	45	44	44	44	44	44	45	49	51	53	54	54	53	52	51	49	47	46	46	46	45	45	47.6		54	41
N	22	22	22	22	22	21	21	21	21	21	21	20	20	20	21	21	21	21	21	21	21	21	21	21		506	22	
MAX	54	51	52	53	52	51	53	53	53	59	60	60	62	62	62	61	58	56	54	54	53	52	51	53	53.5		62	

OK,

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

TEMPERATURE/CENTIGRADE/HOURLY AVERAGE

DEMOCRAT

JULY, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1																												
2																												
3																												
4																												
5																												
6																												
7																												
8																												
9																												
10																												
11																												
12																												
13																												
14																												
15																	34	34	33	31	30	28	26	23	29.9	8	34	23
16	21	20	20	19	18	18	19	18	23	25	27	29	28	31	32	32	33	31	29	29	27	26	23	21	25.0	24	33	18
17	18	19	18	16	15	14	14	15	20	24	25	28	30	31	31	31	30	30	29	29	26	22	21	20	23.2	24	31	14
18	19	19	18	17	15	15	15	17	20	24	25	27	29	30	31	31	31	32	30	29	26	23	22	21	23.6	24	32	15
19	21	19	18	18	17	17	16	17	22	24	26	30	30	30	31	33	33	32	32	31	26	25	21	20	24.5	24	33	16
20	19	20	19	18	19	18	16	18	22	24	28	29	30	30	32	32	32	32	32	31	28	25	22	23	25.0	24	32	16
21	20	20	19	20	19	20	19	19	23	24	28	30	30	31	31	31	33	33	32	30	29	26	23	21	25.5	24	33	19
22	21	20	20	19	20	19	18	18	22	26	29	30	33	32	32	34	34	33	32	31	27	25	22	22	25.8	24	34	18
23	21	20	20	20	18	18	18	19	23	26	30	31	34	35	34	35	35	35	34	31	30	26	26	23	26.8	24	35	18
24	22	20	20	19	19	18	18	20	24	28	30	32	34	33	34	35	35	35	33	32	30	29	25	23	27.0	24	35	18
25	23	22	21	20	19	18	18	20	24	28	29	32	33	34	34	34	34	33	33	31	29	26	25	23	26.8	24	34	18
26	22	23	21	21	20	19	20	20	24	24	28	31	33	34	33	34	35	35	33	32	30	26	25	26	27.0	24	35	19
27	24	23	24	22	22	21	20	21	25	27	29	31	32	34	33	34	34	34	33	31	30	28	24	23	27.5	24	34	20
28	23	23	22	21	22	20	20	20	24	27	28	31	31	31	33	34	34	34	33	31	29	27	25	23	26.9	24	34	20
29	22	22	22	21	21	20	20	21	26	29	30	32	34	35	35	36	38	37	35	32	29	26	25	24	28.0	24	38	20
30	24	22	22	22	21	21	20	21	27	29	31	34	35	35	36	37	38	37	36	34	31	28	26	25	28.8	24	38	20
31	25	24	23	22	22	21	20	22	28	31	33	34	34	35	35	36	36	37	35	33	30	27	26	25	28.9	24	37	20
AVE	22	21	20	20	19	19	18	19	24	26	29	31	32	33	33	34	34	34	33	31	29	26	24	23	26.3		34	18
N	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	17	17	17	17	17	17	17	17		392	17	
MAX	25	24	24	22	22	21	20	22	28	31	33	34	35	35	36	37	38	37	36	34	31	29	26	26	29.9		38	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

TEMPERATURE/CENTIGRADE/HOURLY AVERAGE

DEMOCRAT

SEPTEMBER, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1																												
2																												
3																												
4																												
5																												
6																												
7																												
8																												
9										24	26	25	25	25	26	26	26	26	25	24	23	23	22	21	24.5	15	26	21
10	20	19	18	18	18	17	16	16	21	23	25	26	27	27	27	27	28	26	26	23	22	22	20	18	22.1	24	28	16
11	17	17	15	15	14	14	13	14	18	21	23	24	25	26	26	27	27	26	26	22	20	17	16	16	20.0	24	27	13
12	16	14	14	13	13	12	12	12	17	20	23	26	26	26	27	27	27	26	26	22	19	18	17	16	19.5	24	27	12
13	15	15	14	14	14	13	13	13	17	21	24	25	25	26	26	27	26	26	25	21	20	18	17	16	19.6	24	27	13
14	16	14	14	14	13	12	12	12	17	20	23	24	24	25	26	25	25	25	23	21	19	17	15	16	18.8	24	26	12
15	14	14	13	13	12	12	13	14	16	17	18	19	20	22	22	23	22	21	20	19	18	17	17	17	17.2	24	23	12
16	16	15	15	14	15	13	12	13	14	15	15	16	18	18	18	18	19	20	18	16	14	13	13	11	15.4	24	20	11
17	10	10	11	10	9	9	8	9	14	19	21	24	26	23	24	25	25	24	22	19	17	16	16	15	16.9	24	26	8
18	14	14	15	15	14	14	14	15	14	15	18	19	21	23	25	26	25	24	23	20	18	17	17	15	18.1	24	26	14
19	15	15	14	14	12	12	12	14	15	17	18	20	21	24	23	23	23	23	21	19	17	16	16	14	17.4	24	24	12
20	14	13	12	12	11	10	9	9	14	16	19	21	22	24	26	25	25	24	22	18	17	16	16	13	17.0	24	26	9
21	12	12	11	11	11	11	11	11	15	21	23	26	29	30	32	30	28	27	25	21	19	19	16	16	19.5	24	32	11
22	15	14	15	15	14	15	13	13	19	23	25	29	31	34	34	33	32	31	29	23	22	21	20	18	22.4	24	34	13
23	17	16	15	15	16	16	15	16	19	24	26	29	30	33	30	27	26	26	25						22.2	19	33	15
24																21	22	21	21	20	20	19	19	19	20.2	9	22	19
25	19	19	19	18	18	18	18	18	19	20	21	20	22	22	21	19	20	21	20	19	19	19	19	19	19.5	24	22	18
26	19	18	18	18	18	18	18	17	16	14	14	14	15	16	18	16	15	16	15	14	14	14	14	14	16.0	24	19	14
27	13	13	13	13	13	12	12	12	11	9	10	10	12	13	13	14	15	16	16	14	12	11	9	8	12.3	24	16	8
28	8	9	10	9	8	8	7	7	9	12	16	17	18	18	18	19	19	18	18	16	14	11	11	10	12.9	24	19	7
29	10	11	11	10	11	10	10	8	10	13	14	14	14	14	14	14	15	15	14	13	10	9	7	7	11.6	24	15	7
30	6	6	6	5	4	4	4	3	5	10	12	14	16	18	18	19	19	18	17	14	11	10	9	7	10.6	24	19	3
AVE	14	14	14	13	13	13	12	12	15	18	20	21	22	23	24	23	23	23	22	19	17	16	16	15	17.7		24	12
N	20	20	20	20	20	20	20	20	20	21	21	21	21	21	21	22	22	22	22	21	21	21	21	21		499	22	
MAX	20	19	19	18	18	18	18	18	21	24	26	29	31	34	34	33	32	31	29	24	23	23	22	21	24.5		34	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

TEMPERATURE/CENTIGRADE/HOURLY AVERAGE

DEMOCRAT

AUGUST, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	24	22	22	21	21	20	19	20	26	27	29	30	31	31	32	32	33	32	31	30	27	23	21	20	26.0	24	33	19
2	18	18	18	17	16	15	15	15	23	26	28	29	30	32	31	32	33	32	30	29	26	24	20	18	24.0	24	33	15
3	19	17	16	16	16	15	15	16	22	23	26	28	27	29	29	31	32	31	29	27	24	21	20	18	22.8	24	32	15
4	16	17	16	16	15	15	14	15	20	23			27	27	28	29	29	29	29	26	24	22	20	19	21.6	22	29	14
5	18	17	16	16	15	14	14	14	22	23	26	28	30	32	32	33	33	33	31	28	25	22	21	20	23.5	24	33	14
6	20	19	17	16	16	16	16	17	25	26	29	31	30	30	28	30	32	32	30	29	25	25	22	22	24.3	24	32	16
7	22	21	21	22	22	22	24	25	27	29	30	32	34	35	34	35	36	36	34	32	29	25	24	22	28.0	24	36	21
8	22	22	20	20	19	18	18	19	27	28	31	33	33	34	35	35	36	34	34	32	28	27	24	22	27.1	24	36	18
9	23	20	19	18	18	17	16	18	26	27	29	31	32	33	33	32	33	34	31	29	26	24	22	20	25.5	24	34	16
10	20	20	20	19	19	18	16	17	24	25	28	29	29	30	31	31	32	31	29	27	23	22	21	19	24.2	24	32	16
11	19	18	18	17	16	16	16	17	23	23	25	27	27	28	28	28	31	30	29	26	24	21	20	19	22.8	24	31	16
12	17	17	16	15	14	14	14	14	22	23	26	29	31	32	31	33	32	32	32	29	26	22	21	20	23.4	24	33	14
13	19	18	18	17	16	15	15	16	22	24	27	29	30	32	32	32	33	32	30	28	26	24	22	20	24.0	24	33	15
14	19	19	18	16	16	15	14	15	23	23	25	27	30	29	30	31	31	30	30	27	24	21	20	20	23.0	24	31	14
15	18	17	18	16	15	13	13	14	21	24	27	27	29	30	30	29	29	31	29	27	24	21	20	19	22.5	24	31	13
16	18	18	17	16	15	14	15	15	32	24	26	30	32	31	31	31	32	32	30	27	25	22	21	20	23.9	24	32	14
17	20	18	18	17	16	15	15	16	20	23	27	29	33	34	34	33	34	34	33	29	26	24	22	23	24.7	24	34	15
18	22	21	20	19	18	18	18	18	23	28	30	32	34	34	35	34	35	35	33	31	29	26	23	23	26.6	24	35	18
19	22	21	19	19	18	18	19	21	24	28	32	34	33	34	33	34	35	35	33	29	25	23	22	21	26.3	24	35	18
20	21	21	20	19	19	19	20	20	25	29	31	33	34	35	36	35	34	34	28	29	26	24	23	23	26.6	24	36	19
21	22	22	20	20	19	19	19	19	24	28	31	33	34	32	34	34	34	34	33	30	26	25	24	24	26.7	24	34	19
22	23	22	22	21	20	20	20	20	25	28	30	34	34	34	35	36	35	35	34	31	30	27	26	25	27.8	24	36	20
23	25	25	24	22	23	22	22	22	28	29	32	33	33	34	34	36	34	34	33	31	29	25	25	23	28.3	24	36	22
24	23	22	23	22	22	22	22	24	25	29	30	30	33	33	33	33	31	31	30	29	27	26	26	25	27.1	24	33	22
25	25	25	24	24	22	22	20	20	24	29	31	32	33	34	34	34	33	33	33	30	28	25	23	23	27.5	24	34	20
26	22	22	21	19	19	20	18	18	23	26	29	31	30	31	31	32	32	32	29	27	24	22	21	21	25.0	24	32	18
27	20	20	18	17	17	16	16	17	22	25	28	29	31	32	31	31	30	27	26	25	24	23	22	21	23.7	24	32	16
28	20	19	19	18	18	17	17	17	23	25	25	28	31	31	30										22.5	15	31	17
29																												
30																												
31																												
AVE	21	20	19	18	18	17	17	18	24	26	28	30	31	32	32	32	33	32	31	29	26	24	22	21	25.0		33	17
N	28	28	28	28	28	28	28	28	28	28	27	27	28	28	28	27	27	27	27	27	27	27	27	27		661	28	
MAX	25	25	24	24	23	22	24	25	32	29	32	34	34	35	36	36	36	36	34	32	30	27	26	25	28.3		36	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

TEMPERATURE/CENTIGRADE/HOURLY AVERAGE

DEMOCRAT

OCTOBER, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	6	5	5	4	4	4	4	4	5	11	13	16	18	21	23	22	22	21	19	15	14	12	12	11	12.1	24	23	4
2	9	8	7	8	7	7	8	7	9	13	18	20	24	26	26	25	24	23	22	17	15	14	13	13	15.1	24	26	7
3	11	11	7	9	8	8	7	7	9	14	16	20	22	24	25	24	24	24	22	18	16	14	13	11	15.2	24	25	7
4	14	10	10	9	9	8	8	8	10	16	19	20	20	21	22	21	21	20	19	18	17	17	15	11	15.1	24	22	8
5	11	8	8	7	7	6	7	6	6	13	15	17	19	20	22	23	22	22	20	14	13	12	11	10	13.3	24	23	6
6	9	11	9	8	9	9	9	8	9	14	19	21	23	25	27	27	26	24	22	17	16	13	13	14	15.9	24	27	8
7	12	14	12	11	12	12	12	11	10	12	14	15	16	16	14	17	15	15	14	13	12	10	8	9	12.8	24	17	8
8	7	8	8	7	6	5	5	4	6	10	14	16	18	21	21	20	21	21	17	14	13	11	9	8	12.1	24	21	4
9	7	8	10	9	9	9	8	8	11	14	20	22	24	25	26	26	26	25	21	19	16	14	12	11	15.8	24	26	7
10	11	10	10	11	13	11	9	8	8	14	19	21	23	24	24	24	24	23	20	17	16		11	11	15.7	23	24	8
11	10	9	9	7	7	6	7	6	7	13	16	19	21	24	25	25	25	25	20	17	15	12	12	11	14.5	24	25	6
12	10	10	9	9	8	7	7	7	8	14	17	22	25	27	27	27	26	24	21	18	15	15	15	14	15.9	24	27	7
13	14	13	13	10	11	10	10	9	8	13	18	22	24	27	26	28	26	25	23	20	18	14	13	13	17.0	24	28	8
14	11	11	11	10	9	9	9	8	9	13	18	21	24	27	28	28	27	26	21	19	18	15	14	12	16.6	24	28	8
15	11	12	11	10	8	10	10	9	9	15	18	21	22	23	27	27	26	25	21	19	16	15	14	13	16.3	24	27	8
16	12	12	11	11	9	9	8	9	9	13	18	21	23	28	27	26	26	23	21	17	16	15	15	14	16.4	24	28	8
17	12	11	11	10	9	10	10	9	9	14	15	18	20	22	22	22	20	19	18	16	14	11	10	10	14.3	24	22	9
18	10	9	8	9	8	7	7	8	7	12	14	18	20	23	23	22	21	20	19	16	13	14	12	10	13.8	24	23	7
19	10	10	11	12	14	13	14	13	13	16	18	20	22	23	24	24	24	23	19	16	16	14	14	14	16.5	24	24	10
20	12	12	12	13	10	10	10	9	9	14				20	21	20	21	20	17	15	13	12	12	10	13.9	21	21	9
21	10	10	9	9	8	8	8	8	8	12	15	17	20	22	24	23	23	22	20	17	17	15	13	14	14.7	24	24	8
22	12	13	12	12	12	11	13	13	14	15	17	20	23	27	27	27	26	24	22	19	17	17	17	17	17.8	24	27	11
23	16	15	15	14	13	12	13	12	15	17	19	22	24	25	26	26	26	23	22	20	19	17	16	16	18.5	24	26	12
24	15	15	15	15	15	15	15	15	14	14	14	16	16	19	20	21	22	21	19	16	15	14	14	15	16.3	24	22	14
25	14	14	13	14	15	16	15	14	15	17	17	18	20	21	22	20	20	19	18	17	16	16	16	16	16.8	24	22	13
26	14	13	14	13	13	13	13	11	11	11	11	12	10	10	12	11	12	11	11	10	9	9	9	7	11.3	24	14	7
27	5	5	4	4	3	3	2	2	2	5	9	11	12	14	15	15	15	15							7.8	18	15	2
AVE	11	11	10	10	9	9	9	9	9	13	16	19	21	22	23	23	23	22	20	17	15	14	13	12	14.9		24	8
N	27	27	27	27	27	27	27	27	27	27	26	26	26	27	27	27	27	27	26	26	26	25	26	26		638	27	
MAX	16	15	15	15	15	16	15	15	15	17	20	22	25	28	28	28	27	26	23	20	19	17	17	17	18.5		28	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND ROSE FOR NUMBER OF HOURS

SHIRLEY PEAK

WIND POINTS

JULY, 1982

DAY	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	SUM(1)
1																									
2																									
3																									
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									
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29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5	0	0	0	0	0	0	0	7
30	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	12	6	1	0	0	0	0	0	1	24
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	24
TOT(2)	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	38	11	1	0	0	0	0	0	1	55
DAYS	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	3	2	1	0	0	0	0	0	1	

225 (POINT 16) HAD 38 HOURS

(1) NUMBER OF HOURLY OBSERVATIONS PER DAY
(2) NUMBER OF HOURLY OBSERVATIONS AT EACH POINT ALL MONTH

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND SPEED / HOURLY AVERAGE OR AT HOUR/ IN MPH

SHIRLEY PEAK

JULY, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1																												
2																												
3																												
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27																												
28																		8	8	10	9	9	9	8	8.8	8	10	8
72	9																											
30	6	6	5	3	4	4	2	2	3	3	4	5	7	8	11	12	12	11	12	12	11	10	11	11	7.3	24	12	2
31	10	10	11	10	10	9	8	8	9	9	8	8	11	12	13	14	14	14	14	13	12	11	12	12	10.9	24	14	8
AVE	8	8	8	7	7	7	5	5	6	6	6	7	9	10	12	13	13	11	11	12	11	10	11	10	9.1		12	6
N	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3		56	3	
MAX	10	10	11	10	10	9	8	8	9	9	8	8	11	12	13	14	14	14	14	13	12	11	12	12	10.9		14	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND DIRECTION - DISTANCE

SHIRLEY PEAK

WIND POINTS JULY, 1982

DAY	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	SUM(1)
1																									
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27																									
28																									
72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	43	0	0	0	0	0	0	0	7
30	0	0	0	0	0	0	0	0	0	0	0	0	2	0	11	117	39	4	0	0	0	0	0	2	24
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	262	0	0	0	0	0	0	0	0	24
TOT(2)	0	0	0	0	0	0	0	0	0	0	0	0	2	0	11	397	82	4	0	0	0	0	0	2	498
DAYS	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	3	2	1	0	0	0	0	0	1	

225 (POINT 16) HAD 397 MILES

(1) NUMBER OF HOURLY OBSERVATIONS PER DAY
(2) TOTAL MILES AT EACH POINT ALL MONTH

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND DIRECTION/HOURLY AVERAGE OR AT HOUR/IN PTS

SHIRLEY PEAK

JULY, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1																												
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27																												
28																		240	240	240	235	235	240	240	238.6	7	240	235
29																												
30	240	250	230	210	220	215	190	350	230	240	260	250	240	230	230	230	230	230	230	240	230	225	225	225	235.4	24	350	190
31	225	225	225	225	225	225	225	225	230	230	225	230	230	230	230	230	230	230	230	230	235	225	225	225	227.7	24	235	225
AVE	233	238	228	218	223	220	208	288	230	235	243	240	235	230	230	230	230	233	233	237	233	228	230	230	232.5		275	217
N	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3		55	3	
MAX	240	250	230	225	225	225	225	350	230	240	260	250	240	230	230	230	230	240	240	240	235	235	240	240	238.6		350	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND SPEED / HOURLY AVERAGE OR AT HOUR/ IN MPH

SHIRLEY PEAK

AUGUST, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	11	10	11	12	13	12	11	9	10	11	12	14	15	16	15	17	17	19	19	19	16	12	11	12	13.5	24	19	9
2	12	14	13	13	14	15	15	14	9	6	7	7	6	13	13	14	17	18	20	17	15	14	14	14	13.1	24	20	6
3	15	15	16	17	19	18	15	13	10	9	8	11	14	15	15	15	16	16	15	15	13	11	9	8	13.7	24	19	8
4	9	11	8	12	12	10	8	7	6	7	4	4	7	12	12	13	13	13	11	11	8	7	6	5	9.0	24	13	4
5	4	1	1	1	2	3	2	2	2	2	2	2	2	3	4	8	8	9	8	9	7	5	3	2	3.8	24	9	1
6	1	2	2	2	1	1	1	1	2	2	3	3	3	2	3	3	2	3	2	2	1	2	2	2	2.0	24	3	1
7	1	1	1	2	3	3	3	4	3	3	2	2	4	7	8	10	11	12	13	11	9	6	5	4	5.3	24	13	1
8	2	3	3	5	4	2	5	6	5	4	4	5	7	8	10	9	8	10	11	11	12	11	8	10	6.8	24	12	2
9	11	9	8	9	11	12	12	10	9	6	4	4	7	9	10	11	12	12	15	17	16	12	7	7	10.0	24	17	4
10	8	10	10	11	11	8	9	1	2	3	3	3	5	6	7	9	9	11	12	13	11	7	9	11	7.9	24	13	1
11	8	8	8	10	12	11	9	10	7	5	3	4	5	8	9	9	10	11	12	11	9	7	8	4	8.3	24	12	3
12	5	3	2	2	2	2	2	2	1	2	3	4	3	3	7	8	10	10	11	10	5	4	2	1	4.3	24	11	1
13	2	2	1	1	1	2	1	1	1	2	3	3	5	8	10	11	10	11	12	12	8	5	6	5	5.1	24	12	1
14	4	3	2	1	1	2	2	2	3	4	4	4	7	7	7	8	10	12	11	9	6	4	2	2	4.9	24	12	1
15	2	2	1	1	1	2	2	0	2	2	3	3	3	3	8	10	10	10	10	7	3	2	3	1	3.8	24	10	0
16	1	1	1	1	2	1	1	2	4	3	3	3	4	4	7	7	8	9	9	7	4	4	4	3	3.9	24	9	1
17	2	1	1	2	1	1	3	3	3	4	4	4	3	3	5	8	8	8	8	7	4	4	3	2	3.8	24	8	1
18	1	1	2	3	3	3	4	4	5	4	4	4	3	4	5	8	8	10	10						4.5	19	10	1
19											4	4	4	4	3	7	6	7	9	9	7	2	2	1	4.9	14	9	1
20	1	1	2	1	1	1	2	1	1	2	3	3	4	3	4	8	9	11	11	10	8	5	4	2	4.1	24	11	1
21	1	1	1	2	2	2	2	2	2	1	2	3	3	4	6	6	8	8	10	8	9	9	8	8	4.5	24	10	1
22	6	4	2	3	3	2	1	1	2	1	2	3	3	5	8	10	7	8	6	7	8	10	8	10	5.0	24	10	1
23	10	11	7	5	4	8	8	8	7	9	9	10	11	12	13	14	15	18	16	16	15	12	5	10	10.5	24	18	4
24	9	9	8	9	9	8	9	8	8	7	7	8	4	6	5	6	5	4	1	2	2	2	2	2	5.8	24	9	1
25	1	2	2	2	4	4	4	3	2	1	2	3	4	6	8	10	13	13	10	9	5	4	5	3	5.0	24	13	1
26	4	1	2	3	2	2	3	1	2	2	3	3	4	8	10	11	12	13	12	11	10	9	7	5	5.8	24	13	1
27	5	4	2	1	1	1	2	3	4	4	4	4	3	9	10	11	11	12	7	11					5.4	20	12	1
28													3	3	9	8	6	4	6	5	5	5	4	3	5.1	12	9	3
29	2	4	6	5	4	3	3	3	3	5	6	7	10	11	13	14	14	15	15	11	7	9	8	9	7.8	24	15	2
30	7	5	5	7	7	5	5	2	2	4	3	4	5	7	10	10	13	14	15	14	10	11	10	6	7.5	24	15	2
31	6	4	2	2	2	4	5	5	4	3	2	4	4	7	7	8	8	7	6	5	3	2	2	3	4.4	24	8	2
AVE	5	5	4	5	5	5	5	4	4	4	4	5	5	7	8	10	10	11	11	10	8	7	6	5	6.5		12	2
N	29	29	29	29	29	29	29	29	29	29	30	30	31	31	31	31	31	31	31	30	29	29	29	29		713	31	
MAX	15	15	16	17	19	18	15	14	10	11	12	14	15	16	15	17	17	19	20	19	16	14	14	14	13.7		20	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND ROSE FOR NUMBER OF HOURS

SHIRLEY PEAK

WIND POINTS AUGUST, 1982

DAY	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	SUM(1)
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	24
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	1	0	0	0	0	0	0	0	24
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	18	3	0	0	0	0	0	0	0	24
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	16	5	0	0	0	0	0	0	0	24
5	0	0	0	0	3	0	0	1	0	0	2	0	1	0	3	7	6	0	1	0	0	0	0	0	24
6	0	0	0	0	14	2	2	1	2	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	24
7	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	3	8	1	0	0	0	0	0	0	24
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	14	5	1	0	0	0	0	0	24
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	18	0	0	0	0	0	0	0	24
10	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	11	10	0	0	0	0	0	0	0	24
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	13	10	0	0	0	0	0	0	0	24
12	0	0	0	1	3	0	0	0	0	0	1	1	1	3	7	1	5	0	0	0	1	0	0	0	24
13	0	2	0	0	0	1	0	1	0	0	1	3	2	0	2	4	6	0	1	0	0	0	1	0	24
14	0	0	0	0	0	0	1	0	0	0	0	0	1	2	9	3	7	1	0	0	0	0	0	0	24
15	0	0	2	3	0	2	2	0	1	1	2	0	0	1	2	2	4	1	0	0	0	0	1	0	24
16	0	0	2	3	7	0	0	0	0	0	0	0	0	0	2	3	6	0	0	0	0	1	0	0	24
17	0	0	2	3	6	2	0	0	0	0	0	0	0	0	3	2	6	0	0	0	0	0	0	0	24
18	0	0	1	4	9	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0	19
19	0	0	1	2	1	1	0	0	0	0	1	0	0	0	1	1	5	0	1	0	0	0	0	0	14
20	0	0	0	7	5	1	1	0	0	0	0	0	0	0	3	1	5	0	0	0	0	0	0	1	24
21	0	0	0	0	0	0	1	0	1	0	2	0	0	0	4	2	13	1	0	0	0	0	0	0	24
22	0	1	0	1	0	1	0	1	1	0	2	0	0	0	2	1	9	3	0	0	2	0	0	0	24
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	18	3	1	0	0	0	0	0	24
24	0	0	0	0	4	0	0	0	0	0	0	0	0	0	2	1	17	0	0	0	0	0	0	0	24
25	0	0	1	2	0	0	0	0	1	0	0	0	0	0	4	8	8	0	0	0	0	0	0	0	24
26	0	0	2	1	1	0	2	0	0	0	0	0	0	0	2	7	8	1	0	0	0	0	0	0	24
27	0	0	1	3	3	1	1	1	0	0	0	0	0	0	2	1	5	2	0	1	0	0	0	0	21
28	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	5	3	1	0	0	0	1	0	0	12
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	8	12	0	0	0	0	0	0	0	24
30	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	6	15	1	0	0	0	0	0	0	24
31	0	0	0	0	0	0	0	0	0	0	0	2	0	1	2	10	8	1	0	0	0	0	0	0	24
TOT(2)	0	3	13	30	70	11	11	5	4	3	11	6	6	7	64	195	238	21	5	1	3	2	2	1	714
DAYS	0	2	9	11	13	8	8	5	5	2	7	3	5	4	23	30	29	12	5	1	2	2	2	1	

240 (POINT 17) HAD 238 HOURS.

(1) NUMBER OF HOURLY OBSERVATIONS PER DAY
(2) NUMBER OF HOURLY OBSERVATIONS AT EACH POINT ALL MONTH

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND DIRECTION/HOURLY AVERAGE OR AT HOUR/IN PTS

SHIRLEY PEAK

AUGUST, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	225	225	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	225	225	230	229.2	24	230	225
2	225	225	225	225	230	230	240	230	225	235	230	230	230	230	230	230	230	225	225	225	225	230	235	235	229.2	24	240	225
3	235	230	235	235	235	235	240	235	240	240	235	230	230	225	225	230	230	225	225	225	220	220	220	230	230.4	24	240	220
4	235	235	230	235	235	230	240	240	240	235	220	230	230	225	225	225	235	240	235	240	225	225	220	220	231.3	24	240	220
5	215	110	150	150	220	230	220	230	230	225	70	60	70	270	250	250	250	245	245	240	235	230	230	190	200.6	24	270	60
6	120	80	80	115	100	140	180	130	100	65	65	60	60	60	60	60	140	65	65	60	60	65	65	65	85.8	24	180	60
7	65	65	65	65	65	65	65	65	65	65	65	65	250	250	250	240	230	235	240	235	240	250	250	255	154.4	24	255	65
8	255	235	260	255	240	270	260	260	245	240	230	250	240	245	240	245	245	240	240	235	235	245	245	240	245.6	24	270	230
9	245	235	245	245	235	245	245	235	240	240	240	240	240	235	240	240	235	235	240	240	240	240	245	250	240.4	24	250	235
10	240	240	235	235	235	230	220	65	65	235	240	240	235	240	240	240	235	240	240	240	235	230	235	235	221.9	24	240	65
11	225	225	230	235	240	240	235	240	230	230	240	240	245	240	235	235	230	240	240	240	235	225	230	220	234.4	24	245	220
12	220	220	210	170	180	200	210	200	220	60	60	60	45	310	240	240	240	240	240	235	220	220	200	160	191.7	24	310	45
13	180	170	180	170	165	85	150	115	20	25	340	270	250	240	240	240	240	235	240	235	220	215	230	230	195.2	24	340	20
14	220	205	210	210	210	205	220	220	220	235	260	250	240	250	240	240	235	240	240	235	220	220	180	100	221.0	24	260	100
15	80	80	90	120	135	155	160	55	40	50	40	45	340	255	250	240	245	240	235	230	220	220	200	90	159.0	24	340	40
16	70	65	65	65	70	70	65	40	50	50	50	30	320	240	250	250	240	240	240	230	230	225	220	210	149.4	24	320	30
17	210	70	75	80	70	60	60	60	60	55	55	50	40	40	245	240	240	240	240	240	225	225	220	210	137.9	24	245	40
18	60	70	60	60	55	60	60	60	60	60	55	55	55	30	250	250	240	230	235						105.5	19	250	30
19											60	50	55	40	270	240	250	250	250	240	230	210	150	80	169.6	14	270	40
20	70	45	70	60	60	70	85	90	50	50	50	50	45	45	350	250	250	240	230	240	240	220	220	210	137.1	24	350	45
21	160	130	150	90	210	210	210	220	230	240	250	250	260	250	250	240	250	245	240	240	230	240	250	250	220.6	24	260	90
22	240	240	260	220	210	160	110	120	80	160	310	50	20	260	240	250	240	240	300	260	240	240	240	235	205.2	24	310	20
23	240	240	250	250	260	250	240	240	240	250	250	240	250	240	240	240	230	240	240	235	240	260	270	260	245.6	24	270	230
24	250	240	240	240	240	240	245	250	250	250	245	240	240	240	240	250	240	230	220	60	70	70	60	210	210.8	24	250	60
25	120	220	210	210	225	230	240	250	230	50	50	250	30	250	240	240	235	230	240	240	225	230	230	220	204.0	24	250	30
26	230	100	220	230	240	230	100	60	30	40	45	240	260	250	250	240	240	240	240	235	230	230	225	220	192.7	24	260	30
27	220	220	110	100	75	70	60	60	55	50	45	40	290	260	260	250	245	240	230	240	240				160.0	21	290	40
28													30	320	230	240	255	250	240	230	235	230	230	220	225.8	12	320	30
29	210	220	235	230	220	225	220	225	225	240	240	240	240	240	240	245	240	240	250	250	230	230	235	240	233.8	24	250	210
30	230	220	250	240	240	230	225	90	230	235	245	250	255	240	250	240	240	245	245	250	240	240	240	225	233.1	24	255	90
31	225	220	230	225	220	225	230	235	225	240	235	240	255	245	240	240	240	250	245	230	225	200	175	170	227.7	24	255	170
AVE	190	175	183	179	184	183	182	164	159	158	165	166	186	216	240	235	236	233	234	226	220	218	213	204	198.4		268	104
N	29	29	29	29	29	29	29	29	29	29	30	30	31	31	31	31	31	31	31	30	30	29	29	29		714	31	
MAX	255	240	260	255	260	270	260	260	250	250	340	270	340	320	350	250	255	250	300	260	240	260	270	260	245.6		350	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND DIRECTION - DISTANCE

SHIRLEY PEAK

WIND POINTS AUGUST, 1982

DAY	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	SUM(1)
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	324	0	0	0	0	0	0	0	0	24
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	299	15	0	0	0	0	0	0	0	24
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	261	34	0	0	0	0	0	0	0	24
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	154	45	0	0	0	0	0	0	0	24
5	0	0	0	0	6	0	0	1	0	0	2	0	2	0	8	24	46	0	3	0	0	0	0	0	24
6	0	0	0	0	33	4	3	2	2	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	24
7	0	0	0	0	28	0	0	0	0	0	0	0	0	0	0	34	62	4	0	0	0	0	0	0	24
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	110	21	2	0	0	0	0	0	24
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63	177	0	0	0	0	0	0	0	24
10	0	0	0	0	3	0	0	0	0	0	0	0	0	0	9	95	82	0	0	0	0	0	0	0	24
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	107	87	0	0	0	0	0	0	0	24
12	0	0	0	3	9	0	0	0	0	0	1	2	2	4	22	10	46	0	0	0	3	0	0	0	24
13	0	3	0	0	0	2	0	1	0	0	1	4	3	0	13	34	56	0	3	0	0	0	3	0	24
14	0	0	0	0	0	0	2	0	0	0	0	0	2	5	25	23	56	4	0	0	0	0	0	0	24
15	0	0	5	5	0	4	2	0	1	1	4	0	0	3	5	17	38	3	0	0	0	0	3	0	24
16	0	0	5	10	8	0	0	0	0	0	0	0	0	0	7	15	44	0	0	0	0	4	0	0	24
17	0	0	6	12	12	3	0	0	0	0	0	0	0	0	7	8	44	0	0	0	0	0	0	0	24
18	0	0	4	14	27	0	0	0	0	0	0	0	0	0	0	20	21	0	0	0	0	0	0	0	19
19	0	0	4	8	4	1	0	0	0	0	2	0	0	0	2	7	38	0	3	0	0	0	0	0	14
20	0	0	0	17	6	2	1	0	0	0	0	0	0	0	11	11	46	0	0	0	0	0	0	4	24
21	0	0	0	0	0	0	2	0	1	0	2	0	0	0	8	11	81	3	0	0	0	0	0	0	24
22	0	3	0	3	0	2	0	1	1	0	3	0	0	0	6	10	69	14	0	0	8	0	0	0	24
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	191	26	5	0	0	0	0	0	24
24	0	0	0	0	8	0	0	0	0	0	0	0	0	0	3	4	125	0	0	0	0	0	0	0	24
25	0	0	4	3	0	0	0	0	1	0	0	0	0	0	9	50	53	0	0	0	0	0	0	0	24
26	0	0	4	3	1	0	4	0	0	0	0	0	0	0	7	46	71	4	0	0	0	0	0	0	24
27	0	0	4	12	6	1	1	2	0	0	0	0	0	0	9	7	45	19	0	3	0	0	0	0	20
28	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3	28	18	6	0	0	0	3	0	0	12
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	44	130	0	0	0	0	0	0	0	24
30	0	0	0	0	0	0	2	0	0	0	0	0	0	0	5	29	140	5	0	0	0	0	0	0	24
31	0	0	0	0	0	0	0	0	0	0	0	5	0	2	6	38	50	4	0	0	0	0	0	0	24
TOT(2)	0	6	39	90	151	19	17	7	4	4	15	11	10	16	230	1836	2020	113	16	3	11	7	6	4	4637
DAYS	0	2	9	11	13	8	8	5	5	2	7	3	5	4	23	30	29	12	5	1	2	2	2	1	

240 (POINT 17) HAD 2020 MILES

(1) NUMBER OF HOURLY OBSERVATIONS PER DAY
(2) TOTAL MILES AT EACH POINT ALL MONTH

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND SPEED / HOURLY AVERAGE OR AT HOUR/ IN MPH

SHIRLEY PEAK
SEPTEMBER, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	1	1	1	1	1	1	2	2	3	3	3	4	7	9	9	10	12	12	11	8	3	3	2	1	4.6	24	12	1
2	1	2	1	1	1	1	1	2	3	3	3	3	3	4	8		10	10	8	9	7	3	3	2	3.9	23	10	1
3	1	1	2	2	1	2	2	2	3	3	9	10	10	15	13	12	14	16	16	13	9	8	7	9	7.5	24	16	1
4	9	10	10	8	8	4	1	2	4	4	3	3	6	5	6	8	9	8	10	4	3	2	1	2	5.4	24	10	1
5	1	2	2	2	2	2	1	1	3	4	4	4	4	3	3	5	8	9	6	10	4	4	2	1	3.6	24	10	1
6	2	7	3	2	1	1	2	1	2	2	2	2	7	8	9	12	13	11	8	5	4	4	5	3	4.8	24	13	1
7	4	3	2	2	1	1	1	1	2	2	4	4	4	4	5	4	3	2	3	3	4	4	4	4	3.0	24	5	1
8	3	3	4	3	2	1	1	2	3	4	4	4	5	4	3	2	2								2.9	17	5	1
9																			16	15	19	19	20	20	18.2	6	20	15
10	21	18	16	18	15	14	16	14	15	13	15	14	16	18	20	22	19	18	21	19	20	17	15	13	17.0	24	22	13
11	9	7	4	5	4	1	1	1	2	2	3	5	7	11	13	13	13	12	13	10					6.8	20	13	1
12										5	5	10	13	13											9.2	5	13	5
13										7	7	9	10	11	12	10	12	12	12	11	6	7	7	8	9.4	15	12	6
14	8	5	4	4	6	5	6	6	6	4	5	9	10	11	12	12	14	16	15	14	11	11	8	8	8.8	24	16	4
15	9	11	11	11	12	11	10	9	8	7	4	5	7	7	13	17	16	12	9	7	6	6	7	7	9.3	24	17	4
16	8	6	7	8	6	7	7	3	4	3	2	2	3	1	2	2	2	6							4.4	18	8	1
17											5	6	6	4	3	3	3	3	3	2	3	3	3	4	3.6	14	6	2
18	5	4	5	4	4	4	4	3	3	2	2	3	2	2	3	5	7	7	8	5	4	3	4	4	4.0	24	8	2
19	2	3	3	2	2	2	3	2	2	2	4	2	8	8	12	14	14	15	15	9	7	6	5	4	6.1	24	15	2
20	3	2	2	3	3	1	2	3	2	2	3	3	4	3	3	4	5	4	2	1	3	4	4	4	2.9	24	5	1
21	3	4	4	3	3	3	3	4	5	4	5	5	5	4	3	2	2	1	2	2	2	1	2	3	3.1	24	5	1
22	3	3	2	2	2	2	1																		2.1	7	3	1
23																4	5	8	9	6	2	2	1	2	4.3	9	9	1
24	0	3	3	5	6	2	1	1	2	2	4	1	2	2	2	1	1	1	1	2	1	1	1	1	1.9	24	6	0
25	2	4	2	2	2	2	3	3	4	5	5	4	5	4	3	4	3	3	4	3	2	4	4	5	3.4	24	5	2
26	6	7	8	9	13	13	15	14	14	16	15	17	17	18	18	18	21	21	20	19	17	21	21	18	15.7	24	21	6
27	18	18	20	21	19	20	16	15	15	10	14	19	17	15	9	10	9	12	9	13	5	11	12	11	14.1	24	21	5
28	13	10	10	4	7	11	12	13	14	15	18	20	21	18	21	18	17	17	17	17	16	18	19	19	15.2	24	21	4
29	20	20	17	17									18	19	19	21	19	17	19	11	6	2	9	13	15.4	16	21	2
30	8	6	2	2	3	2	3	1	1	4	3	5	7	9	11	11	10	10	7	6	4	2	2	2	5.0	24	11	1
AVE	6	6	6	6	5	5	5	5	5	5	6	7	8	9	9	9	10	10	10	9	7	7	7	7	7.0		12	3
N	25	25	25	25	24	24	24	23	23	25	26	26	27	27	26	26	27	26	26	26	25	25	25	25		606	27	
MAX	21	20	20	21	19	20	16	15	15	16	18	20	21	19	21	22	21	21	21	19	20	21	21	20	18.2		22	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND ROSE FOR NUMBER OF HOURS

SHIRLEY PEAK

WIND POINTS

SEPTEMBER, 1982

DAY	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	SUM(1)
1	0	0	0	0	1	1	3	0	1	0	0	0	0	0	4	3	11	0	0	0	0	0	0	0	24
2	0	0	0	5	3	0	2	0	2	1	0	0	0	1	0	3	5	1	0	0	0	0	0	0	23
3	1	0	0	0	1	0	2	1	0	0	1	1	0	0	1	4	11	1	0	0	0	0	0	0	24
4	0	0	0	0	1	0	1	0	0	1	0	0	1	0	2	6	12	0	0	0	0	0	0	0	24
5	0	0	1	6	3	1	5	0	0	1	0	0	0	0	1	1	5	0	0	0	0	0	0	0	24
6	1	1	0	0	2	1	2	0	0	0	0	0	0	0	2	2	9	2	1	0	0	0	0	1	24
7	0	0	1	3	12	0	2	0	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	24
8	0	0	0	5	9	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	17
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0	0	0	0	0	0	6
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	19	1	0	0	0	0	0	0	24
11	1	0	0	0	0	0	0	5	0	1	0	0	1	0	1	2	12	0	0	0	0	0	1	0	24
12	0	0	0	0	0	0	7	10	2	0	0	0	0	0	0	1	4	0	0	0	0	0	0	0	24
13	0	0	0	0	0	0	0	2	7	0	1	0	0	0	0	2	12	0	0	0	0	0	0	0	24
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6	15	1	0	0	0	0	0	0	24
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	19	0	0	0	0	0	0	0	24
16	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6	3	0	0	3	0	2	1	18
17	1	1	1	2	4	0	0	0	0	0	0	0	0	0	0	0	1	2	0	1	0	0	0	1	14
18	0	0	0	2	12	0	0	0	0	0	0	0	0	0	0	2	7	1	0	0	0	0	0	0	24
19	1	2	1	1	0	0	2	2	0	0	0	0	0	0	1	4	8	1	1	0	0	0	0	0	24
20	0	0	1	3	5	2	2	0	0	1	1	1	0	1	1	0	4	2	0	0	0	0	0	0	24
21	0	0	0	2	17	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	24
22	0	0	0	0	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
23	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	9
24	1	2	1	3	3	0	1	0	0	0	0	0	0	0	1	4	4	0	1	0	1	1	1	0	24
25	0	1	2	4	12	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	1	0	0	24
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	15	3	0	0	0	0	0	0	24
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	14	8	1	0	0	0	0	24
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	9	7	0	0	0	0	0	24
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	10	0	0	0	0	0	0	0	16
30	0	0	0	0	0	0	1	2	0	0	0	0	2	1	5	8	4	0	1	0	0	0	0	0	24
TOT(2)	8	7	9	37	92	9	31	22	14	7	4	2	6	4	24	72	212	43	19	2	4	2	5	3	638
DAYS	7	5	8	12	16	7	13	6	6	7	4	2	5	4	14	20	26	14	6	2	2	2	4	3	

240 (POINT 17) HAD 212 HOURS

(1) NUMBER OF HOURLY OBSERVATIONS PER DAY
(2) NUMBER OF HOURLY OBSERVATIONS AT EACH POINT ALL MONTH

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND DIRECTION/HOURLY AVERAGE OR AT HOUR/IN PTS

SHIRLEY PEAK
SEPTEMBER, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	125	75	70	90	220	220	225	210	220	230	240	240	250	250	240	240	240	240	245	250	250	225	90	100	199.4	24	250	70
2	120	125	135	200	90	70	70	70	55	50	55	45	45	240	250		240	240	230	240	260	230	230	90	147.0	23	260	45
3	10	100	230	220	70	110	100	170	160	230	230	240	240	240	240	230	240	240	240	240	250	260	250	240	199.2	24	260	10
4	230	240	240	230	240	230	60	230	235	240	250	250	240	240	240	240	240	240	230	220	210	180	140	90	216.0	24	250	60
5	70	90	100	100	100	80	70	60	45	50	50	50	45	45	40	240	250	240	250	240	230	220	140	100	121.0	24	250	40
6	70	210	90	80	70	100	230	20	350	10	240	260	240	240	250	240	240	240	250	230	260	270	240	210	193.3	24	350	10
7	200	220	190	120	140	100	90	70	60	60	50	50	60	60	60	60	70	160	40	50	70	70	70	70	91.3	24	220	40
8	70	80	70	70	70	70	80	70	50	60	60	50	60	55	50	50	220								72.6	17	220	50
9																			240	250	250	260	260	250	251.7	6	260	240
10	250	250	260	250	250	240	250	240	250	240	240	230	230	240	240	230	240	235	240	250	245	250	250	250	243.8	24	260	230
11	250	250	220	230	225	180	110	140	240	340	10	240	250	240	240	245	240	240	250	250	115	115	115	115	202.1	24	340	10
12	110	100	110	100	100	100	100	100	100	240	240	240	230	240	115	115	115	115	115	120	120	115	115	115	136.3	24	240	100
13	120	120	120	120	120	120	120	110	110	240	240	250	250	240	240	150	240	240	240	240	225	230	240	240	190.2	24	250	110
14	240	230	220	220	240	230	230	240	240	245	250	240	240	260	250	240	240	240	240	240	240	235	230	230	237.9	24	260	220
15	230	230	240	240	240	240	250	240	240	250	250	250	250	245	240	240	240	235	240	240	240	235	235	240	240.8	24	250	230
16	240	250	260	260	250	250	260	240	230	250	300	340	310	330	300	350	10	0							246.1	18	350	0
17											70	55	65	60	45	250	295	260	260	350	25	35	0	70	131.4	14	350	0
18	70	70	65	70	65	65	70	70	65	45	55	60	65	70	250	240	245	245	245	240	250	260	235	235	139.6	24	260	45
19	240	35	25	45	270	90	115	110	100	20	260	0	250	250	240	245	235	245	245	245	235	225	225	220	173.8	24	270	0
20	210	205	90	90	170	160	135	80	70	55	55	45	40	260	250	250	250	250	260	60	70	70	75	70	136.3	24	260	40
21	70	70	70	70	70	70	70	70	65	65	70	65	65	65	55	70	125	135	180	340	45	100	70	70	89.4	24	340	45
22	70	65	70	70	80	70	70																		70.7	7	80	65
23																245	245	235	235	225	65	35	85	45	157.2	9	245	35
24	35	70	15	235	235	250	340	245	230	225	245	250	20	325	270	305	55	55	215	0	45	90	70	60	161.9	24	340	0
25	70	70	60	60	45	65	70	70	65	65	65	65	65	50	45	25	35	45	30	325	250	245	250	240	99.0	24	325	25
26	240	245	245	245	245	245	240	240	235	240	240	235	235	240	235	245	235	245	250	250	260	220	265	260	243.1	24	265	220
27	260	255	255	260	265	250	260	270	265	270	275	270	265	265	270	280	270	275	285	265	260	260	255	255	265.0	24	285	250
28	260	250	250	275	270	255	260	265	270	270	270	265	270	270	265	255	255	260	250	245	250	245	245	245	259.0	24	275	245
29	245	245	240	245									235	235	230	235	235	230	240	250	245	250	245	240	240.3	16	250	230
30	250	250	270	180	215	220	225	110	190	205	215	245	235	235	235	240	235	235	235	225	220	215	110	90	211.9	24	270	90
AVE	161	163	156	162	168	157	158	150	166	163	174	174	176	203	199	213	206	208	221	225	192	191	175	164	180.8		270	92
N	27	27	27	27	26	26	26	25	25	25	26	26	27	27	27	27	28	27	27	27	27	27	27	27		638	28	
MAX	260	255	270	275	270	255	340	270	350	340	300	340	310	330	300	350	295	275	285	350	260	270	265	260	265.0		350	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND DIRECTION - DISTANCE

SHIRLEY PEAK

WIND POINTS SEPTEMBER, 1982

DAY	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	SUM(1)
1	0	0	0	0	1	1	4	0	1	0	0	0	0	0	7	8	88	0	0	0	0	0	0	0	24
2	0	0	0	15	4	0	3	0	3	1	0	0	0	1	0	14	41	7	0	0	0	0	0	0	23
3	1	0	0	0	1	0	3	2	0	0	3	2	0	0	2	26	132	8	0	0	0	0	0	0	24
4	0	0	0	0	1	0	2	0	0	1	0	0	2	0	7	37	80	0	0	0	0	0	0	0	24
5	0	0	3	22	3	2	9	0	0	2	0	0	0	0	4	4	38	0	0	0	0	0	0	0	24
6	2	1	0	0	3	2	4	0	0	0	0	0	0	0	10	7	75	6	4	0	0	0	0	2	24
7	0	0	3	11	41	0	2	0	2	1	2	0	2	4	3	0	0	0	0	0	0	0	0	0	24
8	0	0	0	16	28	4	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	17
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	39	0	0	0	0	0	0	6
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	321	16	0	0	0	0	0	0	24
11	3	0	0	0	0	0	0	1	0	1	0	0	1	0	4	9	115	0	0	0	0	0	2	0	20
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	33	0	0	0	0	0	0	0	5
13	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	13	118	0	0	0	0	0	0	0	15
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	43	148	11	0	0	0	0	0	0	24
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	177	0	0	0	0	0	0	0	24
16	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	33	22	0	0	7	0	3	2	18
17	3	3	3	9	19	0	0	0	0	0	0	0	0	0	0	0	3	6	0	3	0	0	0	2	14
18	0	0	0	4	43	0	0	0	0	0	0	0	0	0	0	8	39	3	0	0	0	0	0	0	24
19	2	5	3	2	0	0	4	5	0	0	0	0	0	0	4	32	83	4	2	0	0	0	0	0	24
20	0	0	4	8	14	7	5	0	0	2	1	3	0	2	3	0	16	5	0	0	0	0	0	0	24
21	0	0	0	5	62	0	1	0	2	1	0	0	2	0	0	0	0	0	0	0	0	0	2	0	24
22	0	0	0	0	13	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
23	0	0	2	2	2	1	0	0	0	0	0	0	0	0	0	23	9	0	0	0	0	0	0	0	9
24	2	5	0	3	5	0	1	0	0	0	0	0	0	0	1	15	8	0	2	0	1	2	1	0	24
25	0	4	7	12	41	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	3	0	0	24
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	87	212	56	0	0	0	0	0	0	24
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	211	98	0	0	0	0	0	24
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	126	142	97	0	0	0	0	0	24
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	113	134	0	0	0	0	0	0	0	16
30	0	0	0	0	0	0	2	3	0	0	0	0	3	4	14	63	30	0	2	0	0	0	0	0	24
TOT(2)	21	18	25	109	281	19	40	11	8	9	16	5	10	11	90	634	2164	586	205	12	8	5	8	6	4251
DAYS	7	5	7	12	16	7	12	4	4	7	4	2	5	4	14	20	26	14	6	2	2	2	4	3	

240 (POINT 17) HAD 2164 MILES

(1) NUMBER OF HOURLY OBSERVATIONS PER DAY
(2) TOTAL MILES AT EACH POINT ALL MONTH

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND SPEED / HOURLY AVERAGE OR AT HOUR/ IN MPH

SHIRLEY PEAK
OCTOBER, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	2	2	1	2	2	3	2	1	2	4	3	3	3	6	5	6	5	3	2	1	1	1	2	2	2.7	24	6	1
2	3	3	3	3	3																				3.0	5	3	3
3																												
4																												
5																												
6																												
7															14	15	16	20	17	13	10	8	7	5	12.5	10	20	5
8	4	7	3	2	3	2								4	3	2	2	2	2	2	2	3	3	3	2.9	17	7	2
9	3	4	3	3	4	3	3	3	3	4	5	5	4	4	3	3	3	2	1	2	2	1	2	3	3.0	24	5	1
10	3	2	3	2	2	2	2	1	2	2	3	3	3	5	5	3	6	8	5	2	1	1	2	2	2.9	24	8	1
11	1	2	2	1	3	2	3	1	1	2	3	3	3	2	6	8	8	9	3	2	2	2	1	2	3.0	24	9	1
12	3	3	3	3	3	4	4	5	5	5	5	5	5	4	3	2	2	1	2	3	3	3	4	4	3.5	24	5	1
13	3	4	4	4	4	4	3	3	3	4	4	3	4	3	6	10	10	10	4	2	1	1	1	2	4.0	24	10	1
14	1	1	1	2	1	1	2	3	3	4	4	4	4	4	4	3	2	1	1	1	1	1	2	2	2.2	24	4	1
15	2	1	2	2	3	2	2	2	2	3	3	4	3	2	3	2	1	2	1	3	3	2	1	1	2.2	24	4	1
16	1	1	1	2	1	1	1	2	1	2	3	3	4	3	7	9	11	10	10	9	8	9	11	12	5.1	24	12	1
17	10	9	9	9	11	9	6	7	7	7	6	8	8	10	13	14	12	16	11	12	10	9	10	11	9.8	24	16	6
18	10	9	7	6	6	5	5	4	6	6	4	3	4	5	6	7	8	8	9	7	5	2	2	3	5.7	24	10	2
19	3	4	4	5	5	3	3	2	2	2	2	2	3	3	4	8	10	11	12	10	2	4	5	3	4.7	24	12	2
20	1	2	3	6	7	5	5	4	6	6	7	7	8	11	13	12	14	12	10	9	9	8	8	5	7.4	24	14	1
21	6	6	2	3	2	1	2	1	2	1	2	3	3	6	6	9	8	9	5	2	2	3	6	7	4.0	24	9	1
22	8	6	7	10	11	10	13	17	13	13	12	13	17	16	18	15	16	13	7	9	7	6	7	9	11.4	24	18	6
23	9	4	5	5	6	6	3	10	13	14	13	16	18	17	20	19	16	14	12	10	10	12	11	10	11.4	24	20	3
24	6	6	5	7	5	8	9	12	5	5	1	3	7	7	9	10	9	11	8	10	11	10	7	11	7.6	24	12	1
25	13	10	10	9	12	13	16	15	15	14	13	13	8	9	12	14	14	12	11	9	10	11	11	11	11.9	24	16	8
26	13	16	12	13	14	16	15	17	23	19	17	21	14	15	16	20	19	16	15	16	14	13	11		15.9	23	23	11
27											2														2.0	1	2	2
AVE	5	5	4	5	5	5	5	6	6	6	6	6	6	7	8	9	9	9	7	6	5	5	5	5	6.2		11	3
N	21	21	21	21	21	20	19	19	19	19	20	19	19	20	21	21	21	21	21	21	21	21	21	20		488	21	
MAX	13	16	12	13	14	16	16	17	23	19	17	21	18	17	20	20	19	20	17	16	14	13	11	12	15.9		23	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND ROSE FOR NUMBER OF HOURS

SHIRLEY PEAK

WIND POINTS OCTOBER, 1982

DAY	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	SUM(1)
1	1	1	1	1	4	2	3	2	1	0	0	0	0	2	0	1	2	2	1	0	0	0	0	0	24
2	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
3																									
4																									
5																									
6																									
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	1	0	0	0	0	0	1	10
8	0	0	5	6	6	1	1	0	0	0	0	2	0	0	1	2	0	0	0	0	0	0	0	0	24
9	0	0	0	4	17	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	24
10	1	1	0	1	6	3	0	1	0	1	1	0	2	0	0	1	4	0	1	0	0	0	1	0	24
11	1	1	0	1	2	2	0	2	0	3	4	0	0	0	0	2	1	3	1	0	0	0	0	1	24
12	0	2	3	8	10	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
13	0	1	5	3	3	0	1	1	0	0	1	1	2	0	2	1	3	0	0	0	0	0	0	0	24
14	0	2	0	7	5	1	2	1	2	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	24
15	0	0	1	7	9	0	0	0	3	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	24
16	0	0	0	0	0	0	1	9	1	1	0	1	0	0	0	2	8	0	0	0	0	0	1	0	24
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	18	3	0	0	0	0	0	0	24
18	0	0	0	0	1	0	1	0	0	0	0	0	1	0	2	7	10	2	0	0	0	0	0	0	24
19	0	0	1	4	9	0	0	0	0	0	0	0	0	0	1	2	5	1	0	1	0	0	0	0	24
20	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	6	15	1	0	0	0	0	0	0	24
21	0	0	0	1	1	0	1	1	0	2	0	1	0	1	1	3	11	1	0	0	0	0	0	0	24
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	20	1	0	0	0	0	0	0	24
23	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	17	4	0	0	0	0	0	0	24
24	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	16	3	1	0	0	0	0	0	24
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	20	2	0	0	0	0	0	0	24
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	13	5	4	0	0	0	0	0	24
27	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1	3	0	0	0	0	0	8
TOT(2)	3	8	16	43	81	9	11	17	7	8	9	6	9	6	10	42	172	30	11	1	0	0	2	2	503
DAYS	3	6	6	11	15	5	8	7	4	5	6	5	6	5	8	17	17	14	6	1	0	0	2	2	

240 (POINT 17) HAD 172 HOURS

(1) NUMBER OF HOURLY OBSERVATIONS PER DAY
(2) NUMBER OF HOURLY OBSERVATIONS AT EACH POINT ALL MONTH

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND DIRECTION/HOURLY AVERAGE OR AT HOUR/IN PTS

SHIRLEY PEAK
OCTOBER, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	70	75	80	90	115	125	110	205	45	25	35	0	260	245	280	250	260	225	205	90	90	70	70	70	128.8	24	280	0
2	65	65	65	70	65																				66.0	5	70	65
3																												
4																												
5																												
6															245	245	245	250	250	250	260	250	245	350	259.0	10	350	245
7																												
8	225	235	70	215	100	65	45	45	40	40	35	170	170	55	55	30	45	35	45	70	75	70	70	70	86.5	24	235	30
9	70	70	70	65	65	70	70	70	60	55	60	60	65	70	45	50	50	65	155	245	190	70	70	65	79.0	24	215	45
10	70	70	65	60	75	65	80	75	60	55	25	10	335	245	250	270	250	245	225	180	135	115	180	160	137.5	24	335	10
11	150	110	145	160	150	80	110	0	70	55	235	245	25	350	260	270	260	265	225	135	145	160	80	65	156.3	24	350	0
12	100	25	25	45	35	35	55	55	45	55	65	65	65	55	45	35	50	65	60	65	70	70	70	65	55.0	24	100	25
13	70	35	35	35	100	105	45	55	35	25	60	60	45	40	245	240	245	235	220	190	190	160	215	170	119.0	24	245	25
14	180	125	195	90	90	80	70	70	70	20	45	55	50	50	45	55	55	190	170	125	115	70	65	25	87.7	24	195	20
15	40	60	65	60	55	60	65	65	65	65	55	55	55	45	60	55	55	215	200	160	145	125	130	130	86.9	24	215	40
16	115	110	115	115	110	170	110	90	110	135	115	125	115	340	240	245	245	245	245	240	240	235	235	240	178.5	24	340	90
17	240	245	250	250	240	250	260	255	245	245	240	235	235	230	245	240	240	245	245	250	250	250	260	250	245.6	24	260	230
18	255	250	260	245	245	245	250	245	240	230	225	210	215	230	235	240	240	235	235	250	225	180	90	65	222.5	24	260	65
19	65	60	60	65	65	65	55	55	65	65	70	45	45	30	290	245	240	250	240	235	245	260	225	215	135.6	24	290	30
20	180	160	230	240	245	235	240	245	255	250	245	240	235	235	240	240	240	245	245	245	240	240	235	230	234.8	24	255	160
21	235	240	215	135	100	205	110	170	135	65	225	45	225	245	240	240	245	245	245	250	260	245	245	250	200.6	24	260	45
22	255	235	235	245	245	250	245	245	250	250	245	245	250	250	245	245	240	245	250	250	250	235	245	245	245.6	24	255	235
23	245	225	250	245	245	240	205	240	245	250	250	240	235	240	240	245	250	245	245	245	260	255	260	260	244.2	24	260	205
24	265	260	250	250	235	245	250	260	230	245	65	60	270	250	240	240	245	240	245	250	245	245	245	245	232.3	24	270	60
25	245	245	240	240	240	240	240	245	250	250	260	250	255	250	245	240	240	245	240	235	245	235	240	245	244.2	24	260	235
26	240	245	240	245	240	245	240	235	245	245	240	245	235	250	260	270	255	260	255	250	270	270	265	270	250.6	24	270	235
27	270	270	265	275	240	235				215	70														230.0	8	275	70
AVE	166	155	156	156	150	158	143	146	138	135	136	133	169	185	202	200	200	214	212	199	197	181	178	175	170.3		254	94
N	22	22	22	22	22	21	20	20	20	21	21	20	20	20	21	21	21	21	21	21	21	21	21	21		503	22	
MAX	270	270	265	275	245	250	260	260	255	250	260	250	335	350	290	270	260	265	255	250	270	270	265	350	259.0		350	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND DIRECTION - DISTANCE

SHIRLEY PEAK

WIND POINTS

OCTOBER, 1982

DAY	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	SUM(1)
1	3	4	3	2	7	3	4	4	3	0	0	0	0	3	0	3	12	8	5	0	0	0	0	0	24
2	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
3																									
4																									
5																									
6																									
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	110	10	0	0	0	0	0	5	10
8	0	0	4	11	16	2	3	0	0	0	0	0	0	0	2	11	0	0	0	0	0	0	0	0	17
9	0	0	0	13	55	0	0	0	0	0	1	0	2	0	2	0	0	0	0	0	0	0	0	0	24
10	3	3	0	2	14	5	0	1	0	1	2	0	4	0	0	5	24	0	3	0	0	0	3	0	24
11	1	3	0	2	3	3	0	5	0	4	7	0	0	0	0	6	3	23	8	0	0	0	0	2	24
12	0	6	9	31	35	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
13	0	4	18	10	10	0	4	4	0	0	1	2	3	0	5	10	26	0	0	0	0	0	0	0	24
14	0	6	0	25	11	1	3	1	2	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	24
15	0	0	2	18	19	0	0	0	4	3	3	0	0	1	2	0	0	0	0	0	0	0	0	0	24
16	0	0	0	0	0	0	2	15	3	2	0	1	0	0	0	20	76	0	0	0	0	0	3	0	24
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	185	23	0	0	0	0	0	0	24
18	0	0	0	0	3	0	2	0	0	0	0	0	2	0	7	43	63	17	0	0	0	0	0	0	24
19	0	0	3	10	30	0	0	0	0	0	0	0	0	0	3	15	43	4	0	4	0	0	0	0	24
20	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	40	129	6	0	0	0	0	0	0	24
21	0	0	0	3	1	0	2	2	0	5	0	1	0	1	2	11	67	2	0	0	0	0	0	0	24
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	246	8	0	0	0	0	0	0	24
23	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	22	205	43	0	0	0	0	0	0	24
24	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	10	137	24	7	0	0	0	0	0	24
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	244	21	0	0	0	0	0	0	24
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	210	77	47	0	0	0	0	0	23
27	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
TOT(2)	7	26	39	127	225	14	23	32	12	17	16	5	14	7	23	292	1780	266	70	4	0	0	6	7	3014
DAYS	3	6	6	11	15	5	8	7	4	5	6	4	6	5	7	16	16	13	5	1	0	0	2	2	

240 (POINT 17) HAD 1780 MILES

(1) NUMBER OF HOURLY OBSERVATIONS PER DAY
(2) TOTAL MILES AT EACH POINT ALL MONTH

OK,

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND SPEED / HOURLY AVERAGE OR AT HOUR/ IN MPH

DEMOCRAT

JULY, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1																												
2																												
3																												
4																												
5																												
6																												
7																												
8												5	5	6	6	7	7	6	5	3	2	2	3	2	4.5	13	7	2
9	2	3	3	3	3	3	1	1	2	5	7	8	7	8	10	6	6	6	6	4	3	2	3	3	4.4	24	10	1
10	3	3	3	3	3	3	3	1	1	2	3	6	7	8	7	6	6	6	6	5	3	3	2	3	4.0	24	8	1
11	3	3	3	3	3	3	2	1	1	2	3	6	8	7	7	7	7	6	6	5	3	2	3	3	4.0	24	8	1
12	3	3	3	3	3	3	3	1	1	2	2	4	7	8	6	7	6	5	6	4	3	3	2	3	3.8	24	8	1
13	3	4	3	3	3	3	3	1	1	1	4	5	5	5	5	6	6	6	6	4	3	3	3	3	3.7	24	6	1
14	3	2	3	3	3	3	4	2	1	2	4	7	6	5	5	5	6	7	5	3	4	3	3	3	3.8	24	7	1
15	2	2	3	2	3	3	3	1	1	1	4	5	5	6	6	6	7	6	7	6	6	4	3	2	3.9	24	7	1
16	3	2	3	3	3	4	2	0	1	2	6	6	5	5	6	7	6	6	7	5	4	3	3	3	4.0	24	7	0
17	3	3	3	3	3	3	3	2	2	2	2	6	7	8	8	8	6	6	5	5	3	3	4	3	4.2	24	8	2
18	3	3	3	3	3	3	3	1	1	2	3	5	7	8	7	7	5	6	5	4	2	3	3	3	3.9	24	8	1
19	3	4	3	3	3	3	2	1	1	1	3	5	7	7	6	6	5	5	5	4	3	4	4	4	3.8	24	7	1
20	4	3	3	3	3	3	2	1	2	2	4	5	6	5	7	5	6	6	6	4	3	4	4	4	4.0	24	7	1
21	3	3	3	3	3	3	4	2	1	2	5	6	7	8	6	6	6	6	5	4	3	3	3	3	4.1	24	8	1
22	3	3	3	3	3	3	3	1	1	2	5	6	6	7	6	7	6	6	5	3	3	3	4	4	4.0	24	7	1
23	4	3	3	3	3	3	3	1	1	2	3	4	9	9	8	6	6	6	6	3	3	3	3	4	4.1	24	9	1
24	4	3	3	3	3	3	2	2	2	2	3	7	8	8	7	8	7	6	6	4	4	3	3	3	4.3	24	8	2
25	4	3	3	3	3	3	2	1	1	2	5	6	8	9	9	11	9	6	4	3	2	2	3	3	4.4	24	11	1
26	3	3	2	3	3	3	2	1	2	2	4	7	6	5	7	4	5	8	6	4	2	3	2	2	3.7	24	8	1
27	2	3	3	3	3	3	2	0	2	2	4	5	6	6	6	6	6	6	6	4	3	2	4	4	3.8	24	6	0
28	4	3	3	3	3	3	3	1	1	2	5	7	7	7	6	7	5	5	6	3	2	3	3	3	4.0	24	7	1
29	3	3	3	3	3	3	2	1	1	2	4	7	7	8	5	5	9	7	5	2	3	3	3	3	4.0	24	9	1
30	3	3	3	3	3	3	2	1	1	1	3	6	7	7	6	6	6	5	8	5	3	4	3	3	4.0	24	8	1
31	4	3	3	3	3	3	3	2	1	3	5	6	6	5	6	6	5	5	6	4	3	4	4	3	4.0	24	6	1
AVE	3	3	3	3	3	3	3	1	1	2	4	6	7	7	7	6	6	6	6	4	3	3	3	3	4.0		8	1
N	23	23	23	23	23	23	23	23	23	23	23	24	24	24	24	24	24	24	24	24	24	24	24	24		565	24	
MAX	4	4	3	3	3	4	4	2	2	5	7	8	9	9	10	11	9	8	8	6	6	4	4	4	4.5		11	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND ROSE FOR NUMBER OF HOURS

DEMOCRAT

WIND POINTS

JULY, 1982

DAY	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	SUM(1)
1																									
2																									
3																									
4																									
5																									
6																									
7																									
8	0	0	0	0	0	0	0	0	0	0	2	2	1	0	0	0	3	2	3	0	0	0	0	0	13
9	0	0	0	0	0	0	0	0	0	1	8	1	1	0	0	0	4	4	5	0	0	0	0	0	24
10	0	0	0	0	0	0	0	1	0	1	7	2	0	1	0	0	2	6	4	0	0	0	0	0	24
11	0	0	0	0	0	0	0	1	0	1	9	0	1	0	0	1	4	5	1	1	0	0	0	0	24
12	0	0	0	0	0	1	0	0	1	4	5	2	0	0	1	0	2	7	1	0	0	0	0	0	24
13	0	0	0	0	0	0	0	0	0	0	7	4	1	0	0	1	4	4	3	0	0	0	0	0	24
14	0	0	0	0	0	0	0	0	0	0	11	2	0	0	0	3	2	5	1	0	0	0	0	0	24
15	0	0	0	0	0	0	0	0	0	0	6	3	2	1	1	0	2	4	5	0	0	0	0	0	24
16	0	0	0	0	0	0	0	0	0	1	8	0	2	1	0	0	4	3	5	0	0	0	0	0	24
17	1	0	1	0	0	0	0	0	2	0	10	0	0	0	1	0	3	5	1	0	0	0	0	0	24
18	0	0	0	0	0	0	0	0	1	1	9	0	0	1	1	1	4	3	3	0	0	0	0	0	24
19	0	0	0	0	0	0	1	0	0	1	11	0	0	0	0	1	3	5	2	0	0	0	0	0	24
20	1	1	0	0	0	0	1	0	0	1	5	5	0	0	0	1	4	4	1	0	0	0	0	0	24
21	0	0	0	0	0	0	0	0	0	0	11	1	0	0	1	0	0	5	5	1	0	0	0	0	24
22	0	0	0	0	0	0	0	1	0	0	5	6	1	0	0	0	3	6	2	0	0	0	0	0	24
23	0	0	0	0	0	0	0	0	2	3	7	0	2	1	0	0	1	4	2	1	0	1	0	0	24
24	0	0	0	0	0	0	0	1	0	3	6	0	3	0	1	0	1	7	2	0	0	0	0	0	24
25	0	0	0	0	0	0	0	0	0	2	9	0	1	0	2	2	0	6	2	0	0	0	0	0	24
26	1	0	0	0	0	0	0	0	2	3	8	0	0	0	0	1	2	4	3	0	0	0	0	0	24
27	0	0	0	0	0	0	0	0	0	0	6	3	2	0	0	0	4	4	4	1	0	0	0	0	24
28	0	0	0	0	0	0	0	1	0	0	8	3	0	1	1	0	3	5	2	0	0	0	0	0	24
29	0	0	0	0	0	0	0	1	0	1	7	2	0	0	0	0	3	4	5	0	1	0	0	0	24
30	0	0	0	0	0	0	1	0	1	2	5	4	0	0	0	2	3	5	1	0	0	0	0	0	24
31	0	0	0	0	0	0	0	0	0	0	6	6	0	0	0	3	3	6	0	0	0	0	0	0	24
TOT(2)	3	1	1	0	0	1	3	6	9	25	176	46	17	6	9	16	64	113	63	4	1	1	0	0	565
DAYS	3	1	1	0	0	1	3	6	6	14	24	15	11	6	8	10	22	24	23	4	1	1	0	0	

150 (POINT 11) HAD 176 HOURS

(1) NUMBER OF HOURLY OBSERVATIONS PER DAY
(2) NUMBER OF HOURLY OBSERVATIONS AT EACH POINT ALL MONTH

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND DIRECTION/HOURLY AVERAGE OR AT HOUR/IN PTS

DEMOCRAT

JULY, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1																												
2																												
3																												
4																												
5																												
6																												
7												260	250	270	260	270	250	270	240	180	165	150	160	165	222.3	13	270	150
8													250	250	260	255	250	270	270	240	190	160	165	160	212.9	24	270	135
9	150	135	150	160	160	160	150	270	270	270	260	255	260	255	255	240	255	255	270	250	195	170	150	165	207.1	24	270	110
10	150	150	160	160	160	150	140	110	270	270	270	260	250	240	250	255	260	240	255	230	180	150	160	160	203.8	24	290	110
11	150	160	150	155	160	155	140	110	255	280	290	255	260	260	255	255	250	255	260	210	170	160	165	160	194.2	24	270	75
12	155	150	150	145	140	140	140	120	75	250	270	265	240	255	255	270	280	265	255	240	165	165	165	155	207.9	24	280	150
13	155	160	165	160	160	150	160	180	240	280	240	230	260	225	240	230	240	260	255	225	155	150	160	155	198.8	24	270	150
14	150	160	160	160	165	165	160	155	150	260	260	270	250	255	260	270	280	280	280	270	195	185	170	150	212.5	24	280	150
15	150	150	160	165	165	160	150	190	210	260	255	240	240	240	270	280	280	270	260	240	190	195	155	160	211.7	24	280	140
16	150	160	150	155	160	160	140	190	255	270	260	250	260	260	255	255	250	250	245	265	210	150	150	160	181.3	24	270	0
17	160	150	160	155	155	160	150	130	30	0	120	270	270	260	255	240	230	250	220	240	200	155	150	150	202.3	24	270	130
18	155	160	160	150	150	150	140	130	260	240	270	270	265	255	250	255	235	255	260	240	160	160	155	155	197.5	24	280	100
19	155	150	155	150	150	150	145	100	150	240	280	270	240	230	240	245	255	265	270	255	165	165	165	160	182.3	24	270	5
20	155	160	160	155	165	165	140	90	20	5	250	255	260	255	260	265	255	270	270	210	175	160	155	160	210.0	24	285	150
21	155	155	155	160	155	160	160	150	285	270	270	270	255	255	255	255	255	260	250	190	165	165	160	160	204.8	24	280	110
22	150	160	165	165	165	165	160	110	270	280	250	250	260	270	275	260	255	265	245	200	180	155	155	160	198.3	24	320	120
23	155	155	150	150	145	145	140	130	170	180	320	290	250	270	255	260	260	265	270	210	190	180	160	150	201.5	24	270	110
24	160	155	160	150	145	145	140	110	255	180	260	255	265	255	255	270	265	255	235	210	190	135	155	155	200.8	24	270	135
25	150	160	160	155	150	150	150	135	225	210	260	270	280	280	255	150	0	265	260	235	160	160	130	130	188.1	24	280	0
26	155	160	145	155	150	150	145	140	245	255	240	270	255	250	255	250	255	270	275	240	175	165	180	185	217.1	24	290	155
27	155	160	155	165	160	160	160	240	290	280	270	260	255	255	250	260	240	250	255	220	200	150	160	150	201.3	24	280	105
28	150	165	160	160	160	165	165	105	150	280	270	255	255	260	265	240	250	270	270	270	250	165	150	160	211.9	24	300	110
29	150	150	155	160	165	160	135	110	300	270	270	255	250	255	230	240	260	225	260	255	165	160	155	165	195.4	24	270	90
30	165	160	165	160	145	145	150	90	240	120	270	260	255	240	240	230	225	230	255	240	160	165	165	160	203.5	24	260	155
31	160	160	165	165	160	165	165	155	255	260	255	255	256	254	254	250	243	259	258	232	181	161	158	158	202.4		278	110
AVE	154	156	157	157	156	155	149	141	210	227	259	260	24	24	24	24	24	24	24	24	24	24	24	24		565	24	
N	23	23	23	23	23	23	23	24	23	23	23	24	280	280	275	280	280	280	280	270	250	195	180	185	222.3		320	
MAX	165	165	165	165	165	165	165	270	300	280	320	290																

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND DIRECTION DISTANCE

DEMOCRAT

JULY, 1982

WIND POINTS

DAY	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	SUM(1)
1																									
2																									
3																									
4																									
5																									
6																									
7																									
8	0	0	0	0	0	0	0	0	0	0	5	4	3	0	0	0	17	11	19	0	0	0	0	0	13
9	0	0	0	0	0	0	0	0	0	3	20	3	3	0	0	0	25	31	20	0	0	0	0	0	24
10	0	0	0	0	0	0	0	1	0	3	20	6	0	3	0	0	11	40	12	0	0	0	0	0	24
11	0	0	0	0	0	0	0	1	0	2	26	0	3	0	0	5	28	27	2	3	0	0	0	0	24
12	0	0	0	0	0	1	0	0	1	12	15	5	0	0	4	0	8	43	2	0	0	0	0	0	24
13	0	0	0	0	0	0	0	0	0	0	22	12	1	0	0	5	14	22	13	0	0	0	0	0	24
14	0	0	0	0	0	0	0	0	0	0	31	6	0	0	0	13	11	24	7	0	0	0	0	0	24
15	0	0	0	0	0	0	0	0	0	0	15	8	5	6	1	0	10	17	32	0	0	0	0	0	24
16	0	0	0	0	0	0	0	0	0	2	24	0	4	3	0	0	21	14	27	0	0	0	0	0	24
17	2	0	2	0	0	0	0	0	4	0	31	0	0	0	3	0	17	34	6	0	0	0	0	0	24
18	0	0	0	0	0	0	0	0	1	3	27	0	0	2	5	5	19	16	15	0	0	0	0	0	24
19	0	0	0	0	0	0	1	0	0	2	35	0	0	0	0	5	11	30	8	0	0	0	0	0	24
20	2	2	0	0	0	0	1	0	0	2	17	17	0	0	0	5	22	21	6	0	0	0	0	0	24
21	0	0	0	0	0	0	0	0	0	0	33	3	0	0	4	0	0	33	24	1	0	0	0	0	24
22	0	0	0	0	0	0	0	1	0	0	17	18	3	0	0	0	16	38	3	0	0	0	0	0	24
23	0	0	0	0	0	0	0	0	2	2	23	0	5	3	0	0	6	27	17	4	0	3	0	0	24
24	0	0	0	0	0	0	0	2	0	8	19	0	9	0	4	0	8	40	14	0	0	0	0	0	24
25	0	0	0	0	0	0	0	0	0	3	27	0	2	0	5	5	0	46	17	0	0	0	0	0	24
26	5	0	0	0	0	0	0	0	4	5	24	0	0	0	0	4	6	23	18	0	0	0	0	0	24
27	0	0	0	0	0	0	0	0	0	0	16	8	8	0	0	0	16	23	18	2	0	0	0	0	24
28	0	0	0	0	0	0	0	1	0	0	23	9	0	2	3	0	16	34	7	0	0	0	0	0	24
29	0	0	0	0	0	0	0	1	0	2	21	6	0	0	0	0	17	27	20	0	1	0	0	0	24
30	0	0	0	0	0	0	1	0	1	4	15	12	0	0	0	11	14	32	3	0	0	0	0	0	24
31	0	0	0	0	0	0	0	0	0	0	18	20	0	0	0	16	15	27	0	0	0	0	0	0	24
TOT(2)	7	2	2	0	0	1	3	7	13	44	524	137	44	17	29	74	328	682	310	10	1	3	0	0	2262
DAYS	3	1	1	0	0	1	3	4	6	14	24	15	11	6	8	10	22	24	23	4	1	1	0	0	

255 (POINT 18) HAD 682 MILES

(1) NUMBER OF HOURLY OBSERVATIONS PER DAY
(2) TOTAL MILES AT EACH POINT ALL MONTH

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND SPEED / HOURLY AVERAGE OR AT HOUR/ IN MPH

DEMOCRAT

AUGUST, 1982

DAY	HOUR PST 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	3	4	3	3	4	4	3	2	1	6	7	7	7	6											4.3	14	7	1
2																												
3																												
4											7	7	7	8	9	9	7	7	5	3	3	3	3	4	5.9	14	9	3
5	3	3	3	3	3	3	2	1	2	2	2	4	7	8	7	7	6	6	6	3	2	3	3	3	3.8	24	8	1
6	3	3	3	3	3	3	2	1	1	2	2	4	4	3	1	2	4	3	2	3	3	3	3	3	2.7	24	4	1
7	3	2	2	3	2	2	3	2	3	3	4	3	5	6	5	6	7	6	6	3	3	4	3	3	3.7	24	7	2
8	3	3	3	3	3	3	3	1	1	2	2	7	7	7	6	7	6	7	5	3	3	3	3	3	3.9	24	7	1
9	3	4	4	3	4	3	3	1	1	2	5	7	7	7	7	7	7	6	5	3	3	3	3	3	4.2	24	7	1
10	3	4	3	4	3	4	3	1	1	2	6	6	7	8	8	7	8	7	6	3	3	3	4	4	4.5	24	8	1
11	4	3	3	3	3	3	4	2	2	5	7	8	8	8	8	8	7	6	7	5	2	3	4	3	4.8	24	8	2
12	4	3	3	3	3	3	2	1	2	3	2	4	8	9	8	9	7	5	5	3	2	3	3	3	4.1	24	9	1
13	3	3	3	3	3	3	3	1	1	2		7	11	10	8	6	6	7	5	3	2	3	4	3	4.3	23	11	1
14	3	3	3	3	3	3	2	0	1	2	3	6	8	7	7	7	8	6	4	3	2	3	3	4	3.9	24	8	0
15	3	3	3	3	3	3	3	1	1	2	2	6	6	9	10	8	6	6	4	3	2	3	4	3	4.0	24	10	1
16	3	3	3	3	2	3	2	2	1	2	3	4													2.6	12	4	1
17							3	2	1	1	2	3	6	9	12	11	9	6	6	3	2	3	3	3	4.7	18	12	1
18	3	3	3	3	3	3	3	3	2	3	5	5		8	8	7	7	5	4	3	2	2	3	3	4.0	23	8	2
19	3	2	2	3	3	3	3	2	2	2	4	6	5	10	9	7	7	6	4	1	2	2	3	3	3.9	24	10	1
20	3	2	3	2	2	3	3	2	2	3	3	5	7	8	8	7	6	5	3	1	2	3	3	3	3.7	24	8	1
21	3	2	2	3	2	2	2	2	1	2	2	5	7	6	7	5	4	3	3	2	3	3	3	3	3.2	24	7	1
22	3	3	2	2	2	2	2	1	1	2	2	6	6	6	6	5	5	5	4	3	3	3	3	3	3.3	24	6	1
23	3	2	3	2	3	2	3	1	1	2	5	5	6	6	5	6	5	6	5	2	3	3	2	3	3.5	24	6	1
24	3	3	3	3	2	3	2	0	0	5	6	5	5	6	5	5	4	7	5	2	2	3	2	2	3.5	24	7	0
25	3	3	2	2	3	3	6	2	1	1	4	7	6	6		5	5	6	3	3	2	4	4	3	3.7	23	7	1
26	4	3	2	3	3	2	2	2	1	2	2	5	9	11	9	8	7	5	5	3	2	3	3	4	4.2	24	11	1
27	3	4	2	3	3	2	3	1	2	2	3	6	8	10	9	7	5	3	4	6	1	2	3	2	3.9	24	10	1
28	3	3	3	2	2	3	3	2	1	1	2	2	4	8	6	4	4	6	3	1	3	3	2	1	3.0	24	8	1
29	3	3	3	3	3	3	3	2	1	3	5	7	7	7	5	6	6	6	5	3	3	3	3	3	4.0	24	7	1
30	3	4	3	3	3	4	3	1	1	2	4	6	8	7	8	7	6	5	3	2	4	4	3	4	4.1	24	8	1
31	3	3	3	3	3	2	3	2	2	3	2	3	4	6	7	6	7	6	4	2	3	3	3	2	3.5	24	7	2
AVE	3	3	3	3	3	3	3	1	1	2	4	5	7	8	7	7	6	6	4	3	2	3	3	3	3.9		8	1
N	27	27	27	27	27	27	28	28	28	28	28	29	27	28	26	27	27	27	27	27	27	27	27	27		655	29	
MAX	4	4	4	4	4	4	6	3	3	6	7	8	11	11	12	11	9	7	7	6	4	4	4	4	5.9		12	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND ROSE FOR NUMBER OF HOURS

DEMOCRAT

WIND POINTS AUGUST, 1982

DAY	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	SUM(1)
1	0	0	0	0	0	0	0	0	0	0	6	2	0	0	0	0	0	4	1	1	0	0	0	0	14
2																									
3																									
4	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	4	4	1	0	0	0	0	0	13
5	2	0	0	0	0	0	0	0	1	1	9	1	0	1	1	1	2	3	0	2	0	0	0	0	24
6	2	0	0	0	0	0	1	0	1	4	8	2	0	0	0	1	1	1	3	0	0	0	0	0	24
7	4	0	0	0	0	0	0	0	2	4	1	4	1	0	1	0	3	1	2	0	1	0	0	0	24
8	2	0	0	0	0	0	0	0	0	1	10	1	1	0	0	0	3	3	2	1	0	0	0	0	24
9	0	0	0	0	0	0	0	0	0	2	7	3	0	0	0	0	2	8	2	0	0	0	0	0	24
10	0	0	0	0	0	0	0	0	0	1	7	4	0	0	1	0	1	6	3	0	1	0	0	0	24
11	0	0	0	0	0	0	0	0	0	0	8	3	0	0	0	1	2	6	4	0	0	0	0	0	24
12	4	0	0	0	0	0	0	0	1	2	5	3	1	1	2	0	0	1	4	0	0	0	0	0	24
13	2	0	0	0	0	0	0	0	0	3	6	2	1	1	0	1	2	1	5	0	0	0	0	0	24
14	0	0	0	0	0	0	0	0	0	0	7	3	1	0	4	0	4	1	4	0	0	0	0	0	24
15	0	0	0	0	0	0	0	0	0	2	10	0	0	1	2	0	1	0	8	0	0	0	0	0	24
16	2	0	1	0	0	0	0	0	0	2	6	0	0	0	0	1	0	0	1	0	0	0	0	0	13
17	1	0	0	0	0	0	0	0	1	0	5	0	2	0	2	0	1	2	3	0	0	1	0	0	18
18	4	0	0	0	0	0	0	0	0	1	11	1	0	1	0	0	1	2	3	0	0	0	0	0	24
19	2	0	0	0	0	0	0	0	1	2	9	1	0	0	0	1	1	2	3	1	1	0	0	0	24
20	2	0	0	0	0	0	0	0	1	5	6	1	0	0	2	0	4	1	2	0	0	0	0	0	24
21	3	0	0	0	0	0	0	0	0	4	6	2	1	0	0	2	3	1	2	0	0	0	0	0	24
22	2	0	0	0	0	0	1	0	1	1	8	2	0	0	2	0	4	1	2	0	0	0	0	0	24
23	0	0	0	0	0	0	0	0	0	0	9	3	1	0	1	1	2	4	2	0	0	0	1	0	24
24	0	0	0	0	0	0	0	0	0	0	9	2	1	1	1	1	0	6	2	1	0	0	0	0	24
25	2	0	0	0	0	0	1	0	1	0	9	1	1	1	0	0	2	5	1	0	0	0	0	0	24
26	0	0	0	0	0	0	0	0	1	1	7	3	0	0	1	1	3	5	1	0	0	0	1	0	24
27	0	0	0	0	0	0	1	0	0	2	7	1	0	0	1	1	6	4	1	0	0	0	0	0	24
28	0	0	0	0	0	0	0	0	2	3	6	1	1	0	3	0	4	1	0	0	2	0	1	0	24
29	0	0	0	0	0	0	0	0	0	0	9	3	2	0	0	0	4	4	2	0	0	0	0	0	24
30	0	0	0	0	0	0	0	0	0	0	6	6	1	0	1	1	4	2	3	0	0	0	0	0	24
31	1	0	0	0	0	0	0	0	0	3	8	3	0	0	0	0	1	4	3	0	1	0	0	0	24
TOT(2)	35	0	1	0	0	0	4	0	13	44	205	60	17	7	25	13	65	83	70	6	6	1	3	0	658
DAYS	15	0	1	0	0	0	4	0	11	19	28	26	14	7	15	12	25	27	27	5	5	1	3	0	

150 (POINT 11) HAD 205 HOURS

(1) NUMBER OF HOURLY OBSERVATIONS PER DAY
(2) NUMBER OF HOURLY OBSERVATIONS AT EACH POINT ALL MONTH

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND DIRECTION/HOURLY AVERAGE OR AT HOUR/IN PTS

DEMOCRAT

AUGUST, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	160	160	165	160	160	160	165	160	285	270	260	260	260	260											206.1	14	285	160
2																												
3												270	240	255	250	250	240	255	260	260	180	180	165	170	228.8	13	270	165
4																												
5	165	155	155	150	150	150	150	145	0	0	295	225	290	260	260	240	265	240	195	210	120	155	150	150	178.1	24	295	0
6	150	150	150	150	150	140	135	140	260	225	0	280	270	270	245	120	90	0	150	135	165	160	165	150	160.4	24	280	0
7	165	150	140	145	120	120	145	140	0	0	0	0	250	260	240	210	270	300	270	250	180	165	165	165	160.4	24	300	0
8	155	160	150	150	140	150	150	150	180	0	0	250	255	255	255	240	270	240	290	270	150	160	150	170	180.8	24	290	0
9	155	160	155	170	150	150	140	140	240	270	260	270	255	255	250	255	255	260	260	265	160	165	165	160	206.9	24	270	140
10	160	150	170	165	170	150	150	150	260	300	280	260	255	260	270	220	260	270	260	240	160	170	160	140	209.6	24	300	140
11	150	160	160	165	160	170	165	155	270	270	270	260	255	260	265	250	250	255	265	270	230	150	155	150	212.9	24	270	150
12	155	155	165	165	145	160	140	130	0	0	0	0	270	270	260	270	270	210	210	200	180	170	160	160	160.2	24	270	0
13	140	165	150	155	160	140	150	135	270	0	0	270	270	270	260	230	240	270	240	200	180	150	160	165	182.1	24	270	0
14	165	155	165	160	160	165	160	190	210	270	270	270	270	260	240	220	240	250	240	220	210	150	150	160	206.3	24	270	150
15	160	150	150	155	150	150	150	140	140	275	270	270	270	270	270	270	250	270	220	215	195	150	160	150	202.1	24	275	140
16	160	150	160	150	145	150	150	145	30	275	0	0	270												133.5	13	270	0
17							150	155	125	0	315	180	270	240	270	270	265	220	260	210	180	150	160	150	198.3	18	315	0
18	160	170	150	150	155	140	160	155	150	0	0	0	0	270	270	270	265	265	240	150	195	150	155	155	157.3	24	270	0
19	150	120	150	150	150	150	150	140	165	0	0	300	270	270	270	225	255	240	265	285	150	135	150	155	179.0	24	300	0
20	135	135	140	135	150	140	150	150	130	0	0	240	270	270	265	240	240	240	210	210	175	150	150	150	169.8	24	270	0
21	150	145	165	145	150	150	140	140	0	0	0	270	270	240	260	240	240	230	225	180	165	150	150	150	164.8	24	270	0
22	160	165	150	150	130	145	150	150	90	0	0	270	240	250	265	210	270	250	240	210	165	155	150	150	171.5	24	270	0
23	150	165	160	170	150	155	150	165	180	330	240	270	210	265	240	260	225	255	255	270	150	155	155	155	203.3	24	330	150
24	155	165	165	160	150	150	155	180	210	265	260	285	270	270	255	255	230	260	260	200	160	150	150	155	204.8	24	285	150
25	150	165	100	150	160	160	150	150	130	0	0	265	260	240	260	265	255	270	240	200	180	155	155	160	175.8	24	270	0
26	170	165	160	170	160	150	140	130	250	330	270	255	265	265	265	265	240	240	230	220	160	150	155	160	206.5	24	330	130
27	160	155	150	150	150	140	135	90	240	240	265	265	260	245	240	265	225	240	240	270	210	165	160	150	200.4	24	270	90
28	150	150	155	140	130	140	140	150	210	180	330	300	240	250	260	300	240	240	210	210	150	165	155	130	196.9	24	330	130
29	155	160	165	155	170	160	155	150	180	280	245	260	265	240	245	260	265	270	250	185	165	160	160	155	202.3	24	280	150
30	165	165	160	160	170	170	165	150	180	270	270	270	250	245	250	265	265	240	225	210	160	155	165	160	203.5	24	270	150
31	160	160	150	150	150	135	150	135	135	0	300	270	270	280	265	265	240	255	260	150	165	170	165	160	189.2	24	300	0
AVE	156	156	154	155	151	150	150	147	161	143	157	227	251	259	257	245	245	242	240	218	172	157	157	155	187.8		285	69
N	27	27	27	27	27	27	28	28	28	28	28	29	29	28	27	27	27	27	27	27	27	27	27	27		658	29	
MAX	170	170	170	170	170	170	165	190	285	330	330	300	290	280	270	300	270	300	290	285	230	180	165	170	228.8		330	

STATEWIDE AIR POLLUTION RESEARCH CENTER RIVERSIDE, CALIFORNIA

WIND DIRECTION - DISTANCE

DEMOCRAT

WIND POINTS AUGUST, 1982

DAY	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	SUM(1)
1	0	0	0	0	0	0	0	0	0	0	20	6	0	0	0	0	0	27	6	1	0	0	0	0	14
2																									
3																									
4	0	0	0	0	0	0	0	0	0	0	0	7	6	0	0	0	32	23	7	0	0	0	0	0	13
5	4	0	0	0	0	0	0	0	2	1	26	3	0	6	3	4	13	21	0	9	0	0	0	0	24
6	5	0	0	0	0	0	4	0	2	9	23	6	0	0	0	2	1	1	11	0	0	0	0	0	24
7	13	0	0	0	0	0	0	0	4	10	2	13	3	0	6	0	13	6	13	0	6	0	0	0	24
8	4	0	0	0	0	0	0	0	0	3	28	3	1	0	0	0	21	20	9	5	0	0	0	0	24
9	0	0	0	0	0	0	0	0	0	4	24	9	0	0	0	0	8	47	9	0	0	0	0	0	24
10	0	0	0	0	0	0	0	0	0	4	22	13	0	0	7	0	3	36	21	0	2	0	0	0	24
11	0	0	0	0	0	0	0	0	0	0	25	10	0	0	0	2	15	45	19	0	0	0	0	0	24
12	11	0	0	0	0	0	0	0	1	5	16	9	2	3	10	0	0	8	33	0	0	0	0	0	24
13	2	0	0	0	0	0	0	0	0	7	19	6	2	3	0	6	11	8	36	0	0	0	0	0	23
14	0	0	0	0	0	0	0	0	0	0	21	9	0	0	13	0	25	7	19	0	0	0	0	0	24
15	0	0	0	0	0	0	0	0	0	2	31	0	0	2	7	0	6	0	49	0	0	0	0	0	24
16	7	0	1	0	0	0	0	0	0	4	17	0	0	0	0	2	0	0	0	0	0	0	0	0	12
17	1	0	0	0	0	0	0	0	1	0	14	0	5	0	9	0	9	15	29	0	0	2	0	0	18
18	13	0	0	0	0	0	0	0	0	3	31	3	0	2	0	0	4	12	23	0	0	0	0	0	23
19	6	0	0	0	0	0	0	0	2	4	25	2	0	0	0	7	6	11	24	1	6	0	0	0	24
20	6	0	0	0	0	0	0	0	2	13	16	2	0	0	4	0	23	8	15	0	0	0	0	0	24
21	5	0	0	0	0	0	0	0	0	9	16	5	2	0	0	6	15	7	12	0	0	0	0	0	24
22	4	0	0	0	0	0	1	0	2	2	19	6	0	0	8	0	21	6	11	0	0	0	0	0	24
23	0	0	0	0	0	0	0	0	0	0	25	5	1	0	6	5	10	23	7	0	0	0	2	0	24
24	0	0	0	0	0	0	0	0	0	0	22	6	0	2	0	4	0	33	11	5	0	0	0	0	24
25	5	0	0	0	0	0	2	0	1	0	30	3	2	3	0	0	9	23	6	0	0	0	0	0	23
26	0	0	0	0	0	0	0	0	2	2	19	10	0	0	3	5	13	42	2	0	0	0	2	0	24
27	0	0	0	0	0	0	1	0	0	5	20	2	0	0	1	5	30	24	6	0	0	0	0	0	24
28	0	0	0	0	0	0	0	0	3	8	16	3	1	0	5	0	22	6	0	0	6	0	2	0	24
29	0	0	0	0	0	0	0	0	0	0	26	9	4	0	0	0	22	26	9	0	0	0	0	0	24
30	0	0	0	0	0	0	0	0	0	0	19	20	1	0	2	3	28	13	12	0	0	0	0	0	24
31	3	0	0	0	0	0	0	0	0	6	22	9	0	0	0	0	7	23	13	0	2	0	0	0	24
TOT(2)	89	0	1	0	0	0	8	0	22	101	594	179	30	21	84	51	367	521	412	21	22	2	6	0	2531
DAYS	15	0	1	0	0	0	4	0	11	19	28	26	12	7	14	12	25	27	26	5	5	1	3	0	

150 (POINT 11) HAD 594 MILES

(1) NUMBER OF HOURLY OBSERVATIONS PER DAY
(2) TOTAL MILES AT EACH POINT ALL MONTH

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND SPEED / HOURLY AVERAGE OR AT HOUR/ IN MPH

DEMOCRAT

SEPTEMBER, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
													6	7	7	7	8	7	3	2	3	3	3	3	3.6	24	8	1
1	3	2	3	2	3	2	3	2	2	1	2	3		7	6	9	8	9	8	3	3	4	3	3	3.9	23	9	1
2	3	2	3	2	2	2	2	1	1	2	2	4	7	10	5	6	5	6	3	3	3	3	3	4	4.2	24	10	1
3	3	3	3	3	3	3	3	2	1	4	8	6	8	8	7	7	7	9	5	3	3	3	4	3	4.4	24	9	1
4	3	3	3	3	4	3	3	3	1	1	4	7	5	4	5	7	7	5	6	3	3	3	3	3	3.7	24	7	2
5	3	3	2	3	2	3	4	3	2	3	3	4	5	7	7	7	5	4	2	3	3	4	3	3	3.6	24	7	1
6	3	3	2	3	4	4	4	3	1	2	2	3	5	5	6	3	1	4	1	3	3	3	2	2	2.5	24	6	1
7	3	3	1	2	3	3	3	2	1	1	2	2	5	6	7	6	5	7	5	2	2	3	1	1	3.9	24	7	1
8	3	4	2	3	4	3	4	2	3	5	5	6	5	4	4	4	5	4	2	1	2	1	1		2.6	23	5	0
9	2	2	3	2	1	2	2	1	0	3	4	5	5	5	6	8	6	6	5	4	5	3	3	2	4.7	15	8	2
10										3	4	5	6															
11	3	3	3	3	3	3	3	1	1	2	5	9	9	7	6	5	5	4	4	3	3	4	4	3	4.0	24	9	1
12	3	3	3	3	3	3	3	2	1	2	2	6	5	6	5	7	7	5	4	3	4	3	2	4	3.7	24	7	1
13	3	3	3	3	3	3	3	2	1	2	5	6	7	6	6	5	6	5	3	3	3	3	3	3	3.8	24	7	1
14	3	3	3				2	1	1	2	5	6	8	6	6	5				3	3	3	3	2	3.6	18	8	1
15	3	3	3	3	3	2	0	2	6	8	8		7	9	6	6	5	4	3	2	3				4.3	20	9	0
16															4	3	4	7	4	2	3	3	2	2	3.4	10	7	2
17	2	2	2	2	2	3	2	2	2	.6		6	6	7	9	8	7	5	2	3	2	3	2	3	3.8	23	9	2
18	2	1	1	1	1	1	1	1	1	2	4	4	3	2	6	6	6	4	3	2	3	3	2	3	2.6	24	6	1
19	2	3	2	3	3	.3	1	2	5	4	6	6	8	5	5	6	3	3	2	3	2	2	1	2	3.4	24	8	1
20	3	3	3	3	3	3	2	1	3	2	7	7	8	7	6	5	5	2	3	3	4	3	3	.3	3.8	24	8	1
21	3	3	2	4	4	5	3	3	4	6	5	5	7	7	10	7	5	3	3	3	4	3	3	4	4.4	24	10	2
22	4	4	5	4	4	4	4	2	2	2	3	2	6	5	6	5	3	3	3	4	3	4	3	3	3.7	24	6	2
23	3	3	4	4	4	4	3	1	2	4															3.2	10	4	1
24																												
25																												
26																												
27																												
28																												
29											2	3	6	10	7	5	5	3	3	2	3	3	2	3	4.1	14	10	2
30																												
AVE	3	3	3	3	3	3	3	2	2	3	4	5	6	6	6	6	5	5	4	3	3	3	3	3	3.7		8	1
N	21	21	21	20	20	20	21	21	21	22	21	21	21	22	23	23	22	22	22	23	23	22	22	21		516	23	
MAX	4	4	5	4	4	5	4	3	6	8	8	9	9	10	10	9	8	9	8	4	5	4	4	4	4.7		10	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND ROSE FOR NUMBER OF HOURS

DEMOCRAT

WIND POINTS SEPTEMBER, 1982

DAY	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	SUM(1)
1	1	0	0	0	0	0	0	0	1	4	8	1	0	0	0	0	2	3	3	0	1	0	0	0	24
2	0	0	0	0	0	0	0	0	1	3	9	0	1	0	0	0	3	4	3	0	0	0	0	0	24
3	0	0	0	0	0	0	0	0	0	5	7	1	0	0	1	1	6	3	0	0	0	0	0	0	24
4	0	0	0	0	0	0	0	0	0	0	12	0	0	0	1	2	2	5	2	0	0	0	0	0	24
5	0	0	0	0	0	0	0	0	2	7	4	0	0	0	1	2	3	3	0	1	0	1	0	0	24
6	1	0	0	0	0	0	0	0	2	6	6	0	1	1	0	2	2	1	2	0	0	0	0	0	24
7	1	0	0	0	0	0	0	0	2	4	9	0	1	0	2	0	0	4	1	0	0	0	0	0	24
8	4	0	0	0	0	0	0	0	1	2	9	1	0	0	0	0	4	2	1	0	0	0	0	0	24
9	0	0	0	0	0	0	0	0	0	1	4	1	2	2	1	4	6	2	0	0	0	0	0	0	23
10	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	5	2	3	0	1	0	0	0	0	15
11	0	0	0	0	0	0	0	0	0	3	7	3	0	0	1	2	3	4	1	0	0	0	0	0	24
12	0	0	0	0	0	0	0	0	1	2	10	1	0	0	1	0	5	3	1	0	0	0	0	0	24
13	0	0	0	0	0	0	0	0	0	0	9	4	0	0	0	2	6	3	0	0	0	0	0	0	24
14	0	0	0	0	0	0	0	0	0	1	6	3	0	0	0	0	3	5	0	0	0	0	0	0	18
15	0	0	0	0	0	0	0	0	0	0	7	2	0	0	0	0	0	5	6	0	0	0	0	0	20
16	0	0	0	0	0	0	0	0	0	1	3	1	0	0	0	0	0	1	4	0	0	0	0	0	10
17	1	0	1	0	0	0	0	0	1	5	7	1	0	1	0	1	1	2	1	0	0	1	0	0	23
18	3	0	0	0	0	0	1	0	0	0	10	3	2	0	1	2	2	0	0	0	0	0	0	0	24
19	0	0	0	0	0	0	0	0	0	1	10	2	1	0	1	1	2	6	0	0	0	0	0	0	24
20	1	0	0	0	0	0	0	0	0	2	12	1	0	0	0	2	1	3	2	0	0	0	0	0	24
21	5	0	0	0	0	0	0	0	0	1	12	0	0	0	0	1	2	1	2	0	0	0	0	0	24
22	3	0	0	0	0	0	0	0	0	2	13	0	0	0	0	3	1	2	0	0	0	0	0	0	24
23	1	0	0	0	0	0	0	1	1	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	10
24																									
25																									
26																									
27																									
28																									
29																									
30	1	0	0	0	0	0	0	0	0	1	4	1	1	0	0	0	1	2	3	0	0	0	0	0	14
TOT(2)	22	0	1	0	0	0	1	1	12	54	183	26	10	5	11	30	57	67	32	2	1	2	0	0	517
DAYS	11	0	1	0	0	0	1	1	9	19	24	15	8	4	10	14	20	22	14	2	1	2	0	0	

150 (POINT 11) HAD 183 HOURS

(1) NUMBER OF HOURLY OBSERVATIONS PER DAY
(2) NUMBER OF HOURLY OBSERVATIONS AT EACH POINT ALL MONTH

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND DIRECTION/HOURLY AVERAGE OR AT HOUR/IN DEG

DEMOCRAT

SEPTEMBER, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	165	150	155	160	145	135	135	135	130	0	300	270	265	250	260	260	270	270	240	150	155	155	150	155	185.8	24	300	0
2	160	155	150	150	145	135	145	130	150	270	250	270	270	240	240	260	260	260	260	190	150	150	150	155	195.6	24	270	130
3	150	150	150	145	140	140	140	140	250	260	255	250	250	260	240	240	240	230	210	160	160	165	155	160	193.3	24	260	140
4	160	150	160	155	160	155	155	150	230	210	270	270	260	255	240	230	255	260	255	240	150	155	155	150	201.3	24	270	150
5	155	140	130	140	135	140	150	140	120	320	290	250	260	265	260	240	230	240	235	210	160	145	155	140	193.8	24	320	120
6	140	130	135	140	140	140	145	150	120	0	280	270	260	230	230	240	240	200	190	150	150	160	160	160	173.3	24	280	0
7	150	160	130	145	140	140	150	150	160	150	180	0	270	265	265	260	220	260	210	150	150	150	130	140	171.9	24	270	0
8	150	150	150	140	145	150	155	120	0	0	0	0	270	240	260	250	250	255	240	150	160	160	160	165	155.0	24	270	0
9	155	210	230	180	150	150	150	140	260	240	250	230	250	245	240	260	240	230	225	200	200	180	175		208.3	23	260	140
10										230	240	230	225	225	230	255	255	255	250	220	205	190	295	160	231.0	15	295	160
11	160	155	165	150	145	145	155	145	255	270	260	265	260	250	230	230	240	220	240	160	155	165	160	165	197.7	24	270	145
12	160	155	150	150	150	145	145	130	150	255	270	255	240	240	240	240	255	240	210	160	155	160	165	160	190.8	24	270	130
13	160	155	160	160	160	160	150	155	240	240	255	250	235	250	230	240	260	250	260	165	165	160	165	165	199.6	24	260	150
14	160	165	165				150	140	260	255	260	240	255	240	260	240				150	165	150	160	155	198.3	18	260	140
15	150	150	150	155	150	150	160	270	270	260	270		270	270	270	260	260	260	255	175	165				216.0	20	270	150
16															270	270	265	270	270	165	150	145	150	150	210.5	10	270	145
17	160	145	140	140	155	140	150	135	120	40		0	320	230	250	260	260	270	200	170	160	150	160	160	170.2	23	320	0
18	150	160	170	160	150	155	165	180	150	190	0	0	90	0	250	230	250	225	220	170	150	155	160	160	153.8	24	250	0
19	155	160	150	150	160	165	150	260	260	260	260	265	255	245	245	230	210	190	170	160	150	150	140	160	195.8	24	265	140
20	155	160	150	150	150	145	140	150	0	260	270	270	260	260	240	230	225	170	150	160	150	155	150	150	179.2	24	270	0
21	150	150	150	155	160	150	150	0	0	0	0	0	270	270	260	250	240	225	150	155	150	150	145	150	145.0	24	270	0
22	145	150	150	150	155	150	150	150	0	0	0	255	265	230	240	230	230	160	150	160	155	155	150	145	155.2	24	265	0
23	145	150	150	150	150	140	135	130	110	0															126.0	10	150	0
24																												
25																												
26																												
27																												
28																												
29																												
30											0	280	270	270	260	250	260	135	180	150	165	160	160	150	192.1	14	280	0
AVE	154	155	154	151	149	147	149	148	154	169	198	196	253	238	248	246	246	231	217	170	160	158	161	155	184.5		269	77
N	21	21	21	20	20	20	21	21	21	22	21	21	22	22	23	23	22	22	22	23	23	22	22	21		517	23	
MAX	165	210	230	180	160	165	165	270	270	320	300	280	320	270	270	270	270	270	270	240	205	190	295	165	231.0		320	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND DIRECTION - DISTANCE

DEMOCRAT

SEPTEMBER, 1982

WIND POINTS

DAY	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	SUM(1)
1	1	0	0	0	0	0	0	0	2	10	21	3	0	0	0	0	10	20	18	0	2	0	0	0	24
2	0	0	0	0	0	0	0	0	1	6	24	0	3	0	0	0	15	34	6	0	0	0	0	0	23
3	0	0	0	0	0	0	0	0	0	14	22	3	0	0	3	6	30	22	0	0	0	0	0	0	24
4	0	0	0	0	0	0	0	0	0	0	38	0	0	0	1	8	10	37	11	0	0	0	0	0	24
5	0	0	0	0	0	0	0	0	4	20	13	0	0	0	3	13	16	14	0	3	0	3	0	0	24
6	2	0	0	0	0	0	0	0	4	20	19	0	2	4	0	14	12	5	5	0	0	0	0	0	24
7	2	0	0	0	0	0	0	0	3	10	22	0	2	0	2	0	0	18	2	0	0	0	0	0	24
8	19	0	0	0	0	0	0	0	2	7	24	1	0	0	0	0	22	14	5	0	0	0	0	0	24
9	0	0	0	0	0	0	0	0	0	1	7	1	3	3	2	14	25	4	0	0	0	0	0	0	23
10	0	0	0	0	0	0	0	0	0	0	2	0	3	5	4	25	9	20	0	3	0	0	0	0	15
11	0	0	0	0	0	0	0	0	0	7	22	10	0	0	4	11	16	24	2	0	0	0	0	0	24
12	0	0	0	0	0	0	0	0	2	4	30	2	0	0	4	0	28	15	2	0	0	0	0	0	24
13	0	0	0	0	0	0	0	0	0	0	26	12	0	0	0	13	25	14	0	0	0	0	0	0	24
14	0	0	0	0	0	0	0	0	0	1	16	9	0	0	0	0	17	22	0	0	0	0	0	0	18
15	0	0	0	0	0	0	0	0	0	0	17	5	0	0	0	0	0	26	38	0	0	0	0	0	20
16	0	0	0	0	0	0	0	0	0	3	7	2	0	0	0	0	0	4	18	0	0	0	0	0	10
17	6	0	6	0	0	0	0	0	2	11	16	3	0	2	0	7	9	15	5	0	0	6	0	0	23
18	10	0	0	0	0	0	3	0	0	0	18	4	3	0	3	10	12	0	0	0	0	0	0	0	24
19	0	0	0	0	0	0	0	0	0	1	23	5	3	0	3	6	10	31	0	0	0	0	0	0	24
20	3	0	0	0	0	0	0	0	0	5	35	2	0	0	0	10	6	17	14	0	0	0	0	0	24
21	23	0	0	0	0	0	0	0	0	3	41	0	0	0	0	3	12	10	14	0	0	0	0	0	24
22	7	0	0	0	0	0	0	0	0	7	47	0	0	0	0	13	6	8	0	0	0	0	0	0	24
23	4	0	0	0	0	0	0	2	1	10	15	0	0	0	0	0	0	0	0	0	0	0	0	0	10
24																									
25																									
26																									
27																									
28																									
29																									
30	2	0	0	0	0	0	0	0	0	3	10	3	3	0	0	0	5	12	19	0	0	0	0	0	14
TOT(2)	79	0	6	0	0	0	3	2	21	145	515	65	22	14	29	153	295	386	159	6	2	9	0	0	1911
DAYS	11	0	1	0	0	0	1	1	7	17	24	15	8	4	10	14	20	22	14	2	1	2	0	0	

150 (POINT 11) HAD 515 MILES

(1) NUMBER OF HOURLY OBSERVATIONS PER DAY
(2) TOTAL MILES AT EACH POINT ALL MONTH

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND SPEED / HOURLY AVERAGE OR AT HOUR/ IN MPH

DEMOCRAT

OCTOBER, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	3	4	3	3	2	3	3	2	1	2	2	2	3	7	6	7	8	5	3	2	3	3	2	3	3.4	24	8	1
2	3	3	5	3	4	3	4	3	2	3	4	5	4	7	9	10	8	4	3	4	4	3	3	3	4.3	24	10	2
3	3	3	2	3	3	2	3	2	1	1	2	3	6	8	6	6	4	2	3	4	4	4	4	4	3.5	24	8	1
4	3	3	4	3	3	2	2	1	2	2	4	5	4	5	5	4	5	4	4	5	4	3	3	4	3.5	24	5	1
5	4	3	4	3	3	3	2	2	1	2	2	5	5	6	6	5	5	5	3	3	3	3	3	3	3.5	24	6	1
6	4	4	5	4	5	3	5	3	2	1	3	2	2	8	7	4	4	3	3	4	2	3	3	3	3.6	24	8	1
7	4	1	3	4	2	3	4	3	4	5	5		6	4	4	4	3	3	3	3	3	2	3	2	3.4	23	6	1
8	3	2	3	2	2	2	2	2	1	2	2	3	2	7	8	5	3	3	3	3	3	3	3	3	3.0	24	8	1
9	2	3	5	4	5	4	3	2	3	4	5	5	6	6	5	5	3	4	4	2	3	3	3	4	3.9	24	6	2
10	3	3	2	3	4	4	4	3	1	3	3	4	3	4	4	5	4	3	4	3	3	3	4	4	3.4	24	5	1
11	3	4	4	3	3	4	4	3	2	3	3	2	2	5	5	4	3	5	3	3	3	4	4	3	3.4	24	5	2
12	4	3	4	3	4	4	3	4	2	2	3	4	6	5	6	4	4	4	3	3	3	3	2	3	3.6	24	6	2
13	3	3	5	4	4	4	4	3	1	2	2	2	5	6	6	6	4	3	4	2	3	3	4	4	3.6	24	6	1
14	3	4	3	3	4	4	4	3	2	2	2	3	6	4	5	5	3	4		3	3	4	4	4	3.6	23	6	2
15	4	5	4	4	4	4	5	3	3	2	2	2	2	2	4	4	3	3	3	3	3	4	3	4	3.3	24	5	2
16	3	3	4	4	3	4	4	3	2	2	2	2	2	5	5	4	4	3	3	4	4	4	3	3	3.3	24	5	2
17	3	3	3	2	2	3	3	1	1	1	2	4	7	6	7	4	3	3	4	3	2	3	3	2	3.1	24	7	1
18	3	3	2	3	3	3	2	3	1	2	1	2	6	6	5	7	6	4	3	3	3	3	3	3	3.3	24	7	1
19	3	3	2	2	3	2	2	1	0	2	2	4	6	8	8	5	4	4	3	3	3	2	3	3	3.3	24	8	0
20	3	2	2	3	2	3	2	2	0	1	2	4	5	5	4	4	4	3	3	3	4	3	3	2	2.9	24	5	0
21	3	2	3	3	3	3	4	2	2	2	2	2	1	7	6	4	5	3	3	3	3	3	3	3	3.1	24	7	1
22	2	3	1	2	2	2	2	1	1	2	2	2	4	7	4	3	3	1	4	3	3	2	2	2	2.5	24	7	1
23	2	2	3	2	3	2	2	1	2	1	3	3	5	5	5	5	2	3	3	2	3	2	2	3	2.8	24	5	1
24	2	3	1	2	2	1	1	1	1	2	1	2	2	3	3	3	3	2	3	3	3	3	1	1	2.0	24	3	1
25	2	2	1	1	3	1	2	1	2	4	3	4	5	7	6	4	3	3	2	3	1	1	2	1	2.7	24	7	1
26	1	1	2	2	2	5	5	3	2	6	5	5	5	6	7	5	5	3	3	2	3	2	3	2	3.5	24	7	1
27	1	3	3	3	3	2	3	2	2	1	2	2	6	5	5	4	3								2.9	17	6	1
AVE	3	3	3	3	3	3	3	2	2	2	3	3	4	6	6	5	4	3	3	3	3	3	3	3	3.3		6	1
N	27	27	27	27	27	27	27	27	27	27	27	26	27	27	27	27	27	26	25	26	26	26	26	26		639	27	
MAX	4	5	5	4	5	5	5	4	4	6	5	5	7	8	9	10	8	5	4	5	4	4	4	4	4.3		10	

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND ROSE FOR NUMBER OF HOURS

DEMOCRAT

WIND POINTS OCTOBER, 1982

DAY	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	SUM(1)
1	1	0	0	0	0	0	0	0	0	5	9	1	0	0	0	0	0	3	4	0	1	0	0	0	24
2	4	0	0	0	0	0	0	0	0	0	12	3	0	0	1	0	0	0	4	0	0	0	0	0	24
3	0	0	0	0	0	0	1	0	1	4	6	3	2	0	0	1	1	2	3	0	0	0	0	0	24
4	0	0	0	0	0	0	0	0	0	0	4	6	1	3	1	2	5	0	2	0	0	0	0	0	24
5	0	0	0	0	0	0	0	0	0	3	10	1	0	1	0	0	2	2	5	0	0	0	0	0	24
6	2	0	0	0	0	0	0	0	0	2	11	1	3	2	0	0	0	1	2	0	0	0	0	0	24
7	0	0	0	0	0	0	0	0	0	0	3	3	0	5	6	1	3	1	2	0	0	0	0	0	24
8	3	0	0	0	0	0	0	0	0	4	10	2	0	0	0	0	1	1	3	0	0	0	0	0	24
9	5	0	0	0	1	0	0	0	1	2	10	3	0	0	0	0	2	0	0	0	0	0	0	0	24
10	4	0	0	0	0	0	0	0	1	3	10	0	2	0	0	0	2	2	0	0	0	0	0	0	24
11	3	0	0	0	0	0	0	0	0	1	12	3	1	0	0	0	3	0	1	0	0	0	0	0	24
12	4	0	0	0	0	0	0	0	0	7	9	2	0	0	0	1	0	0	1	0	0	0	0	0	24
13	0	0	0	0	0	0	0	0	0	2	13	1	2	0	0	0	0	4	2	0	0	0	0	0	24
14	3	0	0	0	0	0	0	0	0	2	12	1	1	0	0	0	1	1	2	0	0	0	0	0	23
15	4	0	0	0	0	0	0	0	1	0	11	5	1	0	0	0	1	0	1	0	0	0	0	0	24
16	1	0	0	0	0	0	0	0	0	0	11	5	2	0	0	0	2	0	1	1	1	0	0	0	24
17	0	0	1	0	0	0	1	0	0	1	7	4	0	1	3	0	0	2	2	2	0	0	0	0	24
18	0	0	0	0	0	0	0	0	0	2	12	1	0	0	1	1	2	3	2	0	0	0	0	0	24
19	0	0	0	0	0	0	0	0	1	0	7	7	1	0	1	0	1	0	6	0	0	0	0	0	24
20	0	0	0	0	0	0	1	0	0	1	9	3	2	0	0	1	4	1	1	1	0	0	0	0	24
21	1	0	0	0	0	0	1	0	0	1	12	2	0	0	1	0	3	1	1	1	0	0	0	0	24
22	2	0	0	1	0	0	1	1	3	3	2	5	0	0	1	0	2	1	2	0	0	0	0	0	24
23	0	0	0	0	0	0	0	0	0	1	7	5	2	0	0	2	2	2	3	0	0	0	0	0	24
24	0	0	0	0	1	0	0	0	3	0	2	10	2	0	1	1	2	0	2	0	0	0	0	0	24
25	0	0	0	0	0	0	0	0	1	0	5	3	1	1	4	0	1	0	7	1	0	0	0	0	24
26	0	0	0	0	0	0	0	0	0	1	5	2	1	2	7	3	1	1	1	0	0	0	0	0	24
27	0	0	0	0	0	0	0	0	0	1	4	3	1	0	0	0	1	0	3	4	0	0	0	0	17
TOT(2)	37	0	1	1	2	0	5	1	12	46	225	85	25	15	27	13	42	28	63	10	2	0	0	0	640
DAYS	13	0	1	1	2	0	5	1	8	19	27	26	16	7	11	9	21	16	25	6	2	0	0	0	

150 (POINT 11) HAD 225 HOURS

(1) NUMBER OF HOURLY OBSERVATIONS PER DAY
(2) NUMBER OF HOURLY OBSERVATIONS AT EACH POINT ALL MONTH

STATEWIDE AIR POLLUTION RESEARCH CENTER - RIVERSIDE, CALIFORNIA

WIND DIRECTION/HOURLY AVERAGE OR AT HOUR/IN PTS

DEMOCRAT

OCTOBER, 1982

HOUR PST

DAY	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	AVE	N	MAX	MIN
1	160	140	150	150	145	140	140	155	150	0	300	270	270	265	260	270	270	265	150	160	165	160	145	150	184.6	24	300	0
2	150	150	150	160	155	160	150	150	155	0	0	0	0	270	270	270	270	220	165	160	165	165	160	150	151.9	24	270	0
3	150	150	140	145	145	150	145	130	180	90	270	270	275	265	260	250	230	190	165	150	160	160	165	165	183.3	24	275	90
4	160	160	165	160	165	165	170	170	280	270	240	240	230	240	225	220	240	240	200	200	195	180	160	165	201.7	24	280	160
5	160	160	165	160	160	140	140	150	200	280	240	260	270	270	260	270	270	240	160	150	160	150	145	150	196.3	24	280	140
6	150	150	150	150	150	160	150	150	140	135	0	0	270	270	260	200	205	180	150	165	150	190	180	160	161.0	24	270	0
7	210	160	210	200	200	225	220	210	240	270	275	255	245	220	240	215	200	205	195	165	170	150	165	150	208.1	24	275	150
8	150	160	135	155	150	145	145	135	150	270	0	0	0	265	270	250	270	160	165	165	155	155	160	150	156.7	24	270	0
9	150	155	160	165	165	160	140	145	120	60	0	0	0	0	0	250	240	170	155	160	150	150	150	150	124.8	24	250	0
10	145	135	130	145	150	150	150	150	0	0	0	0	180	260	255	250	245	180	150	160	155	150	150	155	143.5	24	260	0
11	150	150	155	150	150	150	150	150	135	0	0	0	240	270	250	250	180	160	165	165	165	150	150	150	151.5	24	270	0
12	145	150	155	150	155	150	155	150	140	140	0	0	0	0	280	235	165	145	145	165	150	150	145	140	133.8	24	280	0
13	145	155	155	160	150	150	150	150	135	180	270	180	255	255	265	270	255	160	150	170	155	150	150	150	181.9	24	270	135
14	150	150	150	150	145	150	150	150	150	270	0	0	0	270	240	255	190	145		165	150	155	155	160	152.2	23	270	0
15	150	155	155	155	150	155	170	165	160	120	0	0	0	180	0	270	240	165	170	175	160	160	155	155	140.2	24	270	0
16	155	150	160	150	150	160	160	160	150	150	0	300	270	285	240	240	190	180	165	160	165	170	165	165	176.7	24	300	0
17	160	170	160	150	160	165	145	100	30	260	285	295	280	270	255	220	210	205	210	165	150	150	160	165	188.3	24	295	30
18	160	150	150	150	155	145	150	145	150	240	225	270	275	260	240	260	260	210	160	160	165	160	155	150	189.4	24	275	145
19	160	165	160	170	160	150	180	150	130	270	280	270	270	270	270	250	210	165	165	165	165	170	160	150	194.0	24	280	130
20	150	160	180	160	160	150	160	140	100	290	280	240	240	240	240	230	260	190	160	170	165	165	160	160	189.6	24	290	100
21	160	150	150	155	145	150	160	155	150	90	0	240	290	270	240	250	260	210	160	165	160	165	160	160	174.8	24	290	0
22	160	140	120	140	120	110	140	130	90	45	0	0	255	270	280	240	250	210	165	170	165	165	160	165	153.8	24	280	0
23	150	160	150	150	155	160	165	135	225	270	270	250	240	260	270	260	225	180	170	180	165	165	160	170	195.2	24	270	135
24	165	170	170	170	160	130	180	160	130	120	210	60	280	280	240	230	240	190	170	165	165	165	170	170	178.8	24	280	60
25	160	150	170	120	210	200	160	210	270	280	290	270	270	270	270	240	270	210	160	165	170	150	210	180	210.6	24	290	120
26	155	140	170	160	180	220	210	210	210	225	225	210	210	255	280	240	230	210	200	200	170	150	150	160	198.8	24	280	140
27	180	165	165	165	160	150	160	160	140	250	280	290	290	290	290	270	280								216.8	17	290	140
AVE	157	154	157	155	157	157	159	154	152	169	146	154	200	241	239	246	235	192	167	167	162	160	159	158	175.1		278	62
N	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26	25	26	26	26	26	26		640	27	
MAX	210	170	210	200	210	225	220	210	280	290	300	300	290	290	290	270	280	265	210	200	195	190	210	180	216.8		300	

STATEWIDE AIR POLLUTION RESEARCH CENTER RIVERSIDE, CALIFORNIA

WIND DIRECTION - DISTANCE

DEMOCRAT

WIND POINTS OCTOBER, 1982

DAY	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	SUM(1)
1	0	0	0	0	0	0	0	0	0	14	23	3	0	0	0	0	0	18	20	0	2	0	0	0	24
2	2	0	0	0	0	0	0	0	0	0	40	10	0	0	4	0	0	0	34	0	0	0	0	0	24
3	16	0	0	0	0	0	1	0	2	11	20	11	3	0	0	4	6	14	11	0	0	0	0	0	24
4	0	0	0	0	0	0	0	0	0	0	12	16	3	13	4	9	23	0	4	0	0	0	0	0	24
5	0	0	0	0	0	0	0	0	0	8	30	4	0	1	0	0	7	11	23	0	0	0	0	0	24
6	5	0	0	0	0	0	0	0	0	3	41	4	9	8	0	0	0	7	10	0	0	0	0	0	24
7	0	0	0	0	0	0	0	0	0	0	5	9	0	15	22	3	14	0	10	0	0	0	0	0	23
8	7	0	0	0	0	0	0	0	0	9	25	6	0	0	0	0	5	7	13	0	0	0	0	0	24
9	27	0	0	0	4	0	0	0	3	5	33	13	0	0	0	0	8	0	0	0	0	0	0	0	24
10	11	0	0	0	0	0	0	0	2	9	36	0	6	0	0	0	9	8	0	0	0	0	0	0	24
11	8	0	0	0	0	0	0	0	0	2	44	9	3	0	0	0	11	0	5	0	0	0	0	0	24
12	18	0	0	0	0	0	0	0	0	20	31	7	0	0	0	4	0	0	6	0	0	0	0	0	24
13	0	0	0	0	0	0	0	0	0	4	48	2	4	0	0	0	0	21	8	0	0	0	0	0	24
14	11	0	0	0	0	0	0	0	0	8	41	3	3	0	0	0	5	5	6	0	0	0	0	0	23
15	10	0	0	0	0	0	0	0	2	0	42	17	2	0	0	0	3	0	4	0	0	0	0	0	24
16	2	0	0	0	0	0	0	0	0	0	36	17	7	0	0	0	9	0	2	5	2	0	0	0	24
17	0	0	1	0	0	0	1	0	0	3	18	11	0	3	11	0	0	8	13	6	0	0	0	0	24
18	0	0	0	0	0	0	0	0	0	6	32	3	0	0	4	1	7	19	8	0	0	0	0	0	24
19	0	0	0	0	0	0	0	0	0	0	17	20	2	0	4	0	5	0	30	0	0	0	0	0	24
20	0	0	0	0	0	0	0	0	0	2	23	10	5	0	0	4	18	4	2	1	0	0	0	0	24
21	2	0	0	0	0	0	2	0	0	3	34	6	0	0	3	0	12	5	7	1	0	0	0	0	24
22	4	0	0	2	0	0	1	2	4	7	4	14	0	0	1	0	6	4	11	0	0	0	0	0	24
23	0	0	0	0	0	0	0	0	0	1	16	13	5	0	0	4	8	10	9	0	0	0	0	0	24
24	0	0	0	0	2	0	0	0	4	0	3	22	3	0	1	3	6	0	5	0	0	0	0	0	24
25	0	0	0	0	0	0	0	0	1	0	9	5	1	1	9	0	4	0	31	3	0	0	0	0	24
26	0	0	0	0	0	0	0	0	0	1	10	5	2	5	28	16	5	6	7	0	0	0	0	0	24
27	0	0	0	0	0	0	0	0	0	2	10	9	1	0	0	0	1	0	9	18	0	0	0	0	17
TOT(2)	123	0	1	2	6	0	5	2	18	118	683	249	59	46	91	48	172	147	288	34	4	0	0	0	2096
DAYS	13	0	1	1	2	0	4	1	7	19	27	26	16	7	11	9	21	15	25	6	2	0	0	0	

150 (POINT 11) HAD 683 MILES

(1) NUMBER OF HOURLY OBSERVATIONS PER DAY
(2) TOTAL MILES AT EACH POINT ALL MONTH

OK.

APPENDIX 3

Stable Sulfur Isotope Determinations for Soils and Plant Tissue Based on Total Sulfur in Samples Collected in 1981 and 1982.

Appendix 3. Stable Sulfur Isotope Determinations for Soils and Plant Tissues Based on Total Sulfur for Samples Collected in July, 1981.

Site and Elevation (Feet)	Miles From Oildale	Soil Depth (cm) $\delta^{34}S$ 0 - 5	5 - 15	15 - 30	Plant Tissue Species	$\delta^{34}S$
Panorama Park (N) 600	1.8	—	—	—	Canary Isle Pine	+1.2 +2.0 +0.9 +1.6
Kern Park 500	5.3	—	—	—	Canary Isle Pine	-0.8 -0.3 +0.6 -2.4
Round Mountain Road #1 700	6.7	-28.3 -26.3 -26.8 -25.5	-27.7 -27.8 -24.5 -27.4	-25.5 — — —	No Trees	— — —
Round Mountain Road #2 700	6.7	-12.0 -8.6 -9.9 -14.0	-12.0 -11.9 -12.7 —	-13.4 — -12.9 —	No Trees	
Syc #1	10.7	—	—	—	Sycamore	-1.4 +1.4
Syc #2	13.7	—	—	—	Sycamore	+0.3
Syc #3	16.7	—	—	—	Sycamore	-0.7 -0.3
Democrat Springs 2000	20.8	+1.8 — +1.5 +0.4	+0.2 -0.9 -0.1 —	— — -2.2 —	Digger Pine	+3.0 +2.0 +2.4
Miracle Hot Springs 2400	27.0	+2.8 +1.4 +0.9 +2.7	+2.9 +0.7 +1.8 +1.8	-2.3 — — —	Digger Pine	+1.5 +2.0 +1.4

Appendix 3 (1981) continued

Site and Elevation (Feet)	Miles From Oildale	Soil Depth (cm) $\delta^{34}S$ 0 - 5	5 - 15	15 - 30	Plant Tissue Species	$\delta^{34}S$
Ant Hill 800	6.2	+0.1	-3.1	-3.2	No Trees	
		-0.4	-3.2	-4.4		
		-0.1	-2.0	—		
		-1.4	-5.8			
Comanche Road 1000	9.2	-0.2	-5.2	-2.8	No Trees	
		-0.7	-3.8	—		
		-1.8	—	-2.0		
		-0.7	-2.6	—		
BR #2 2930	16.0	+7.2	-0.3	+0.6	Digger Pine	+0.1
		+1.4	+0.8	—		+1.0
		+2.7	-1.8	+2.1		+3.4
		+1.7	—	—		
BR #3 3915	18.5	+0.9	+0.7	+0.1	Digger Pine	+1.5
		+1.4	-0.1	—		+0.5
		0.0	+2.2	+0.4		+1.9
		+1.4	+0.8	—		
PRONO 6-4 6040	19.7	+2.3	-0.8	+1.2	Jeffrey Pine	—
		+0.7	+1.8	—		+3.6
		+6.7	+2.0	+1.1		—
		+2.3	+1.5	—		—
BR #5 7544	22.4	—	—	—	Jeffrey Pine	—
		—	—	—		+0.8
		—	—	—		+2.9
		—	—	—		+3.4

Appendix 3 (1981) continued

Site and Elevation (Feet)	Miles From Oildale	Soil Depth (cm) $\delta^{34}S$ 0 - 5	5 - 15	15 - 30	Plant Tissue Species	$\delta^{34}S$
HAV	24.9	—	+2.7	—	Digger	—
3000		+0.6	+2.4	—	Pine	+1.6
		—	+4.5	—		—
		+2.0	—	—		—
PR7-1	32.9	-1.5	-2.5	-1.5	Digger	+3.6
6600		—	+2.1	—	Pine	+3.0
		+2.6	+1.1	-0.7		+1.1
		-0.2	+1.0	—		+1.4
GH #5	7	-1.3	+0.9	-0.2	No Trees	—
2800		-0.2	+0.3	—		—
		+1.7	+0.7	+0.2		—
		+0.4	-0.4	—		—
GH #4	24	—	—	—	Digger	+0.8
4000		—	—	—	Pine	-0.8
		—	—	—		-0.3
GH #3	25	+1.8	-0.2	—	Digger	+1.5
4973		+1.2	+0.7	—	Pine	+0.7
		+0.6	+0.2	—		+1.6
		+3.0	-0.6	-0.5		
PRONOS	29.5	—	—	—	Jeffrey	+4.1
6-6		—	—	—	Pine	+5.9
5968		—	—	—		+13.1
		—	—	—		+4.3
						+4.3

Appendix 3 (1981) continued

Site and Elevation (Feet)	Miles From Oildale	Soil Depth (cm) $\delta^{34}S$ 0 - 5	5 - 15	15 - 30	Plant Tissue Species	$\delta^{34}S$
GH #2 6250	26.1	+4.2	+3.6	—	Jeffrey Pine	+1.0
		+3.4	+2.4	—		+1.8
		+2.8	-4.0	—		+2.6
		+3.4	+4.4	+0.6		+2.6
GH #1 6520	29.9	+3.0	+3.6	+4.4	Jeffrey Pine	+3.3
		+3.0	+3.7	2.5		+2.6
		+3.5	+4.0	—		+3.1
		+3.7	+5.2	+2.5		+3.2
PR 6-11 102	36.0	—		—	Jeffrey Pine	-2.6
		—		—		+5.4
		—		—		+4.5
		—		—		+8.4
						+4.9
						+4.9

Appendix 3. Stable Sulfur Isotope Determinations for Soils and Plant Tissues Based on Total Sulfur for Samples Collected in 1982.

Site and Elevation (Feet)	Miles From Oildale	Soil Depth (cm) $\delta^{34}S$ 0 - 5	5 - 15	15 - 30	Plant Tissue Species	$\delta^{34}S$
Lene Place 850	8.0	-1.5	-2.9	-1.2	—	—
Democrat Springs 2400	20.8	+1.7	+0.3	-1.6	Digger Pine	+2.4
BR 15 1540	10.7	-0.5 -0.6	—	—	—	—
BR 20 2000	12.0	+2.9 +4.2 +3.0	—	—	—	—
BR 25 2500	12.7	+1.4 +1.9 +0.7	—	—	—	—
BR 30 3000	13.7	+1.7 +2.6	—	—	Digger Pine	+1.5
BR 35 3500	16.0	+0.8 +2.5 -1.2	—	—	Digger Pine	+1.8
BR 40 4000	17.7	+1.9 +2.5 +2.3	—	—	—	—
BR 45 4500	18.2	+1.6 +2.0	—	+2.8	Digger Pine	+1.7
BR 50 5000	18.7	+2.2 +2.5 +3.2	—	—		—

Appendix 3 (1982) continued

Site and Elevation (Feet)	Miles From Oildale	Soil Depth (cm) $\delta^{34}S$ 0 - 5	5 - 15	15 - 30	Plant Tissue Species	$\delta^{34}S$
BR 55 5500	19.1	+3.0 +3.0 +3.2	—	—	Ponderosa Pine	+3.2
BR 60	19.7	+2.3	+4.0	+3.0	Ponderosa Pine	+3.2
5920		+2.7	+4.4	+2.3	Letharia Vulpina (LV)	+5.0
(PRONOS 6-4)		+2.4			Hypogymnia Entermorpha (HE)	+4.9
		+4.4				
BR 65 6500	20.4	+1.9 +2.7	—	—	Jeffrey Pine Sugar Pine LV HE	+3.2 +3.9 +3.0 +4.8
BR 70 7000	22.2	+3.0 +2.5 +3.1	—	—	Jeffrey Pine LV HE	+3.7 +4.7 +5.5
GH 6 822	10.5	-6.2	-11.0	-12.0	—	—
GH 15 1520	11.5	+0.4	-4.1	-3.4	—	—
GH 25 2240	14	-1.3	-1.6	-2.2	—	—
GH 27 2700	16.5	—	—	—	—	—
GH 4 3100	17	+3.2	+1.8	-1.5	Digger Pine	+2.2
GH 35 3290	17.4	—	—	—	—	—

Appendix 3 (1982) continued

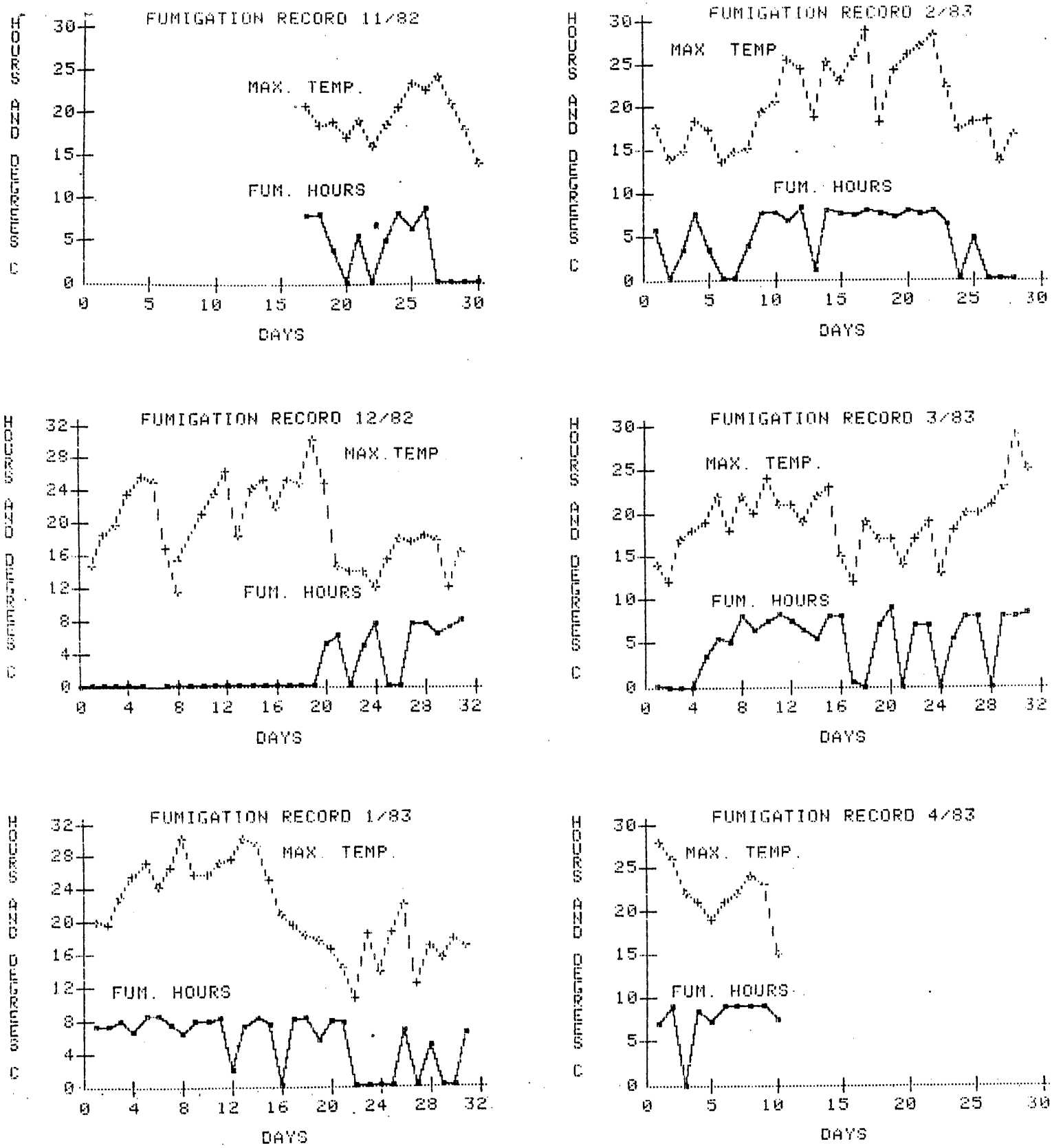
Site and Elevation (Feet)	Miles From Oildale	Soil Depth (cm) $\delta^{34}S$ 0 - 5	5 - 15	15 - 30	Plant Tissue Species	$\delta^{34}S$
GH 3 4466	19.5	+3.6	0	—	Digger Pine LV	+3.4 +3.0
GH 50 4910	25.2	+3.3	—	-1.3	—	—
GH 55 5500	27.0	—	—	—	Jeffrey Pine LV	+3.4 +4.2
PRONOS 6-6 5968	29.5	+0.9 +5.1	—	—	—	—
Shirley PK 7092	33	+5.4	+5.0	+5.5	Jeffrey Pine LV	+5.2 +4.3
Shirley Molw 6400	33.5	+6.0	+5.7	+5.2	Sugar Pine LV	+4.3 +5.4
Greenhorn Summit 6050	35.0	+5.5	+4.1	+6.0	Sugar Pine LV HE	+5.6 +4.4 +3.9
PRONOS 6-11 6102	36.0	+5.4	+4.9	+4.9	Jeffrey Pine LV HE	 +5.0 +4.4
SR 30 3000	36.5	+2.3	+3.2	+2.8	—	—
SR 35 3500	34.8	—	—	—	—	—
SR 40 4000	33.5	+3.0	—	—	—	—

Appendix 3 (1982) continued

Site and Elevation (Feet)	Miles From Oildale	Soil Depth (cm) $\delta^{34}S$ 0 - 5	5 - 15	15 - 30	Plant Tissue Species	$\delta^{34}S$
SR 45 4500	32.5	+3.6	—	—	—	—
SR 50 4890	31.0	+4.6	+4.4	+4.3	—	—
SR 55 5500	30.2	+3.3	+1.8	+7.6	—	—
SR 60 5840	29.5	+3.8	+3.7	-0.7	LV HE	+4.8 +5.4

APPENDIX 4

Record of Daily Fumigation Duration and Weather Conditions from November 16, 1983 to April 11, 1983.



Appendix 4. Daily record of sulfur dioxide-ozone fumigation of conifer seedlings from November 16, 1982 to April 11, 1983, showing the number of hours each day that weather conditions were suitable for fumigation, and the maximum daily air temperature.

Appendix 4. Dates and Amount of Rainfall at the Open-Top Chamber Facility, University of California, Riverside. Rainfall pH is Included for Some Events.

Date	Amount (Hundredths of an Inch)	pH
11/29	25	--[a]
11/30	121	--[a]
12/22	5	--[a]
12/23	45	--[a]
12/29	2	--[a]
1/19	14	--[a]
1/22	3	--[a]
1/23	86	--[a]
1/24	30	--[a]
1/25	2	--[a]
1/27	82	--[a]
1/29	41	--[a]
2/2	43	--[a]
2/3	15	--[a]
2/5	12	--[a]
2/7	11	--[a]
2/8	17	--[a]
2/9	1	--[a]
2/24	85	4.41
2/25	110	4.6
2/28	225	5.6
3/1	15	4.3
3/2	149	5.2
3/3	350	5.3
3/4	24	4.8
3/6	6	5.1
3/13	11	6.1
3/17	9	5.3
3/18	45	5.0
3/21	23	5.7
3/23	8	5.6
3/23	34	5.4
Total	1649	
Mean		5.1

[a]No pH data obtained.