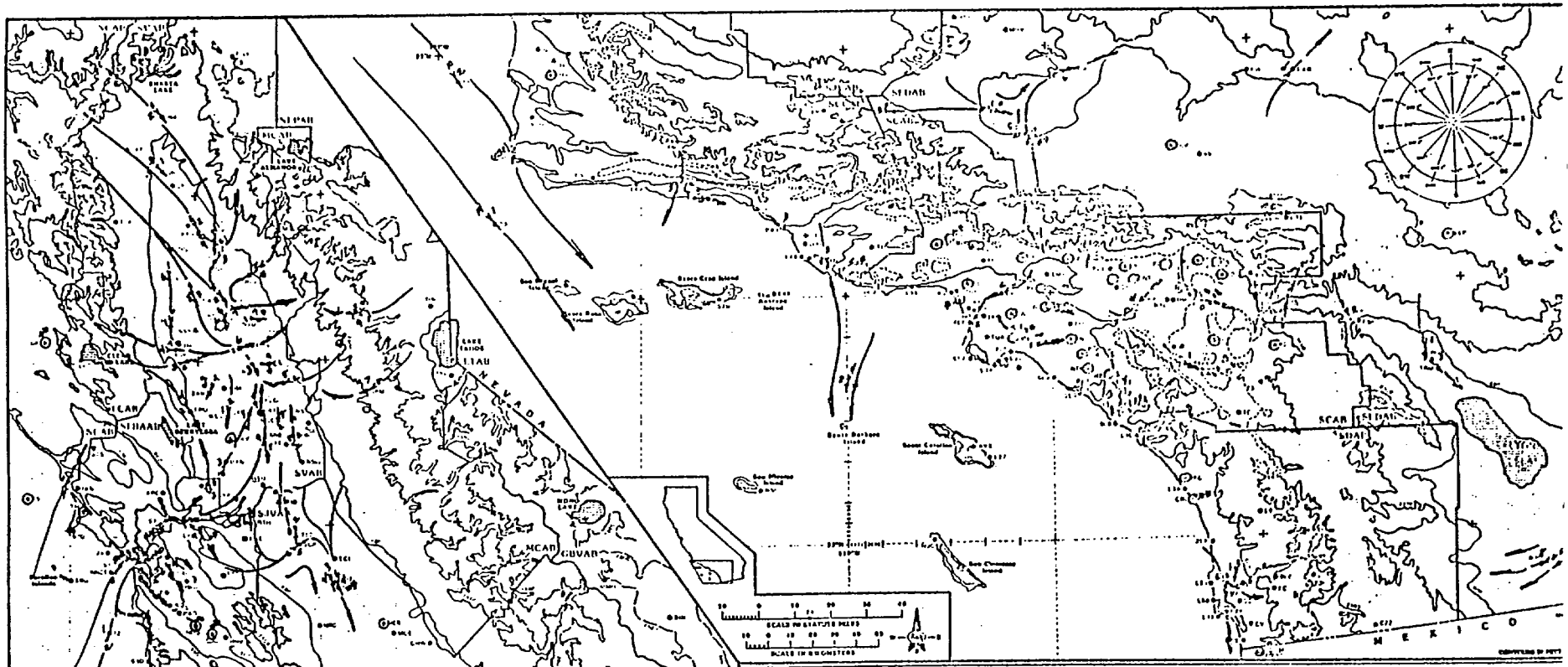
APPENDIX A

ARB AIR FLOW CHARTS
FOR JULY 10-13, 1990 AND AUGUST 10-12, 1990



TEMPERATURE and WIND ALOFT
(Preliminary Data - AQL)

DATA VALID - 1 HOUR EARLIER
DATA VALID - 1 HOUR LATER

DATA SOURCE: ▲ Telemetry; ■ California Irrigation Management Information System; ○ AMOS/Meteorology Stations; ● WNL Library, at others

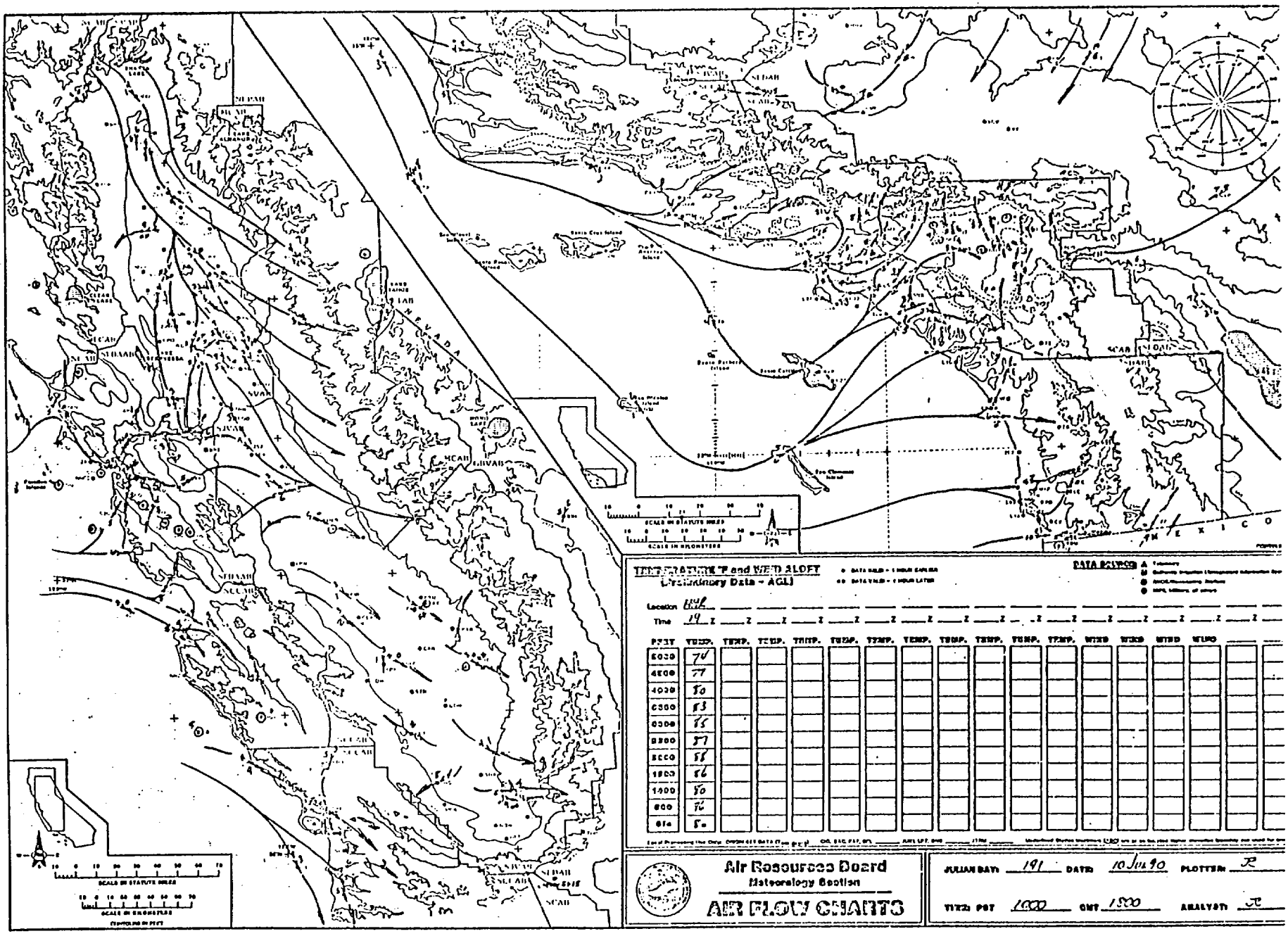
Location	RBL	SAC	CAT	BFL	TRM	LMU	EDT	DWS				LMU	EKU
Time	13 z	13 z	13 z	13 z	13 z	13 z	13 z	17 z	z	z	z	1400z	1257z

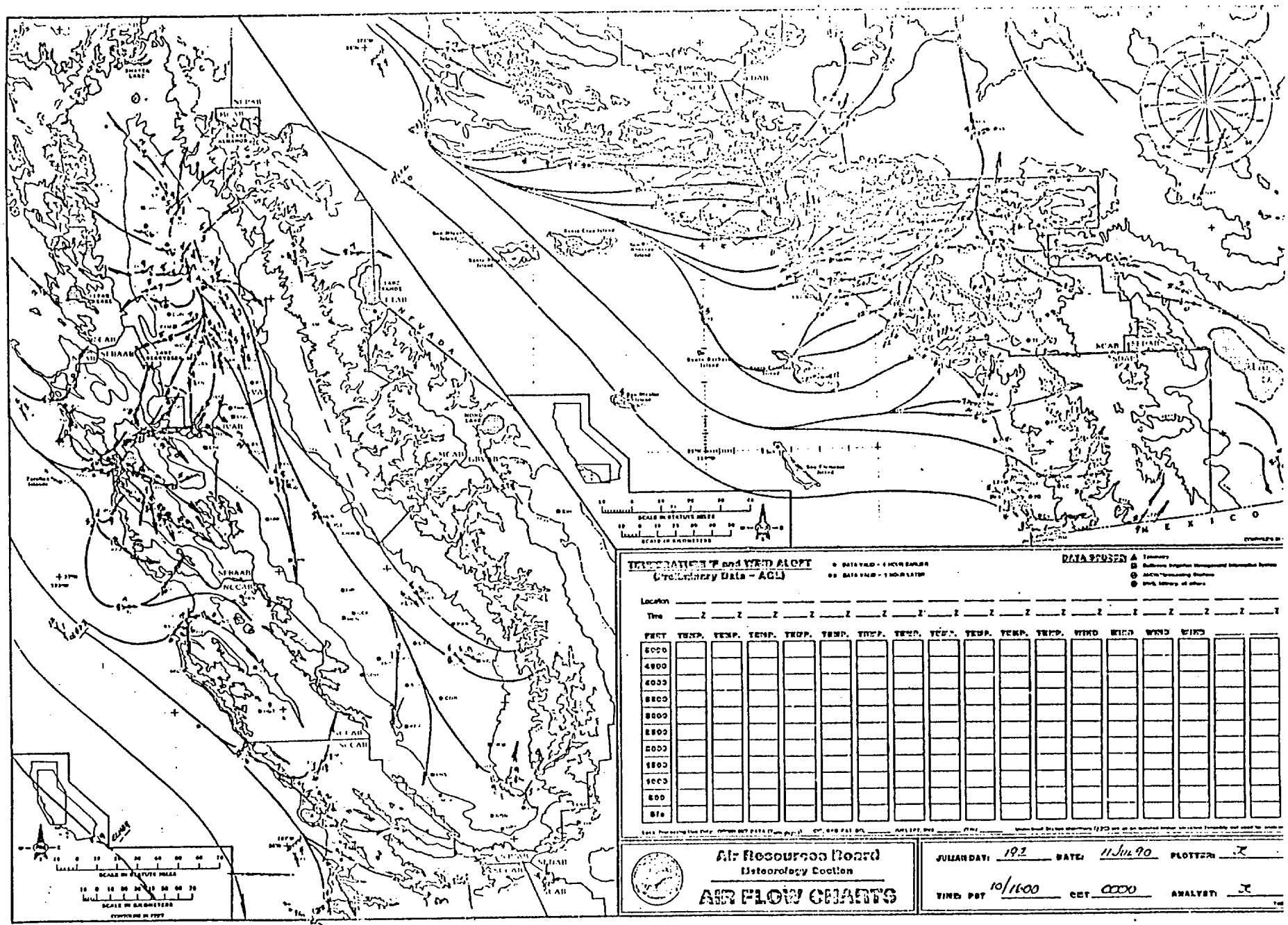
FEET	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	WIND	WIND	WIND	WIND		
8000	72	74	70	72	71	67	64	73					0401				
4000	74	76	72 71	70	73	69	65	75 75					0462				
4500	77	78	73 75	70	75	72	68	76 73					0101				
5000	78	79	75 73	73	77	72	70	75 77				0109	3402				
6000	78	80	76 72	75	79	74	71	80 79				3004	3302				
7000	80	82	78 77	77	80	73	72	82 81				3407	3503				
8000	82	83	79 75	78	82	70	74	83 85				3408	0904				
9000	82	85	78 75	78	84	64	74	79 82				3507	1410				
10000	77	85	76 77	79	85	61	72	66 80				3406	1317				
800	72	77	73 72	78	86	59	70	67 65				0402	1310				
510	69	63	65 65	71	77	58	56	70 65				0101	0000				

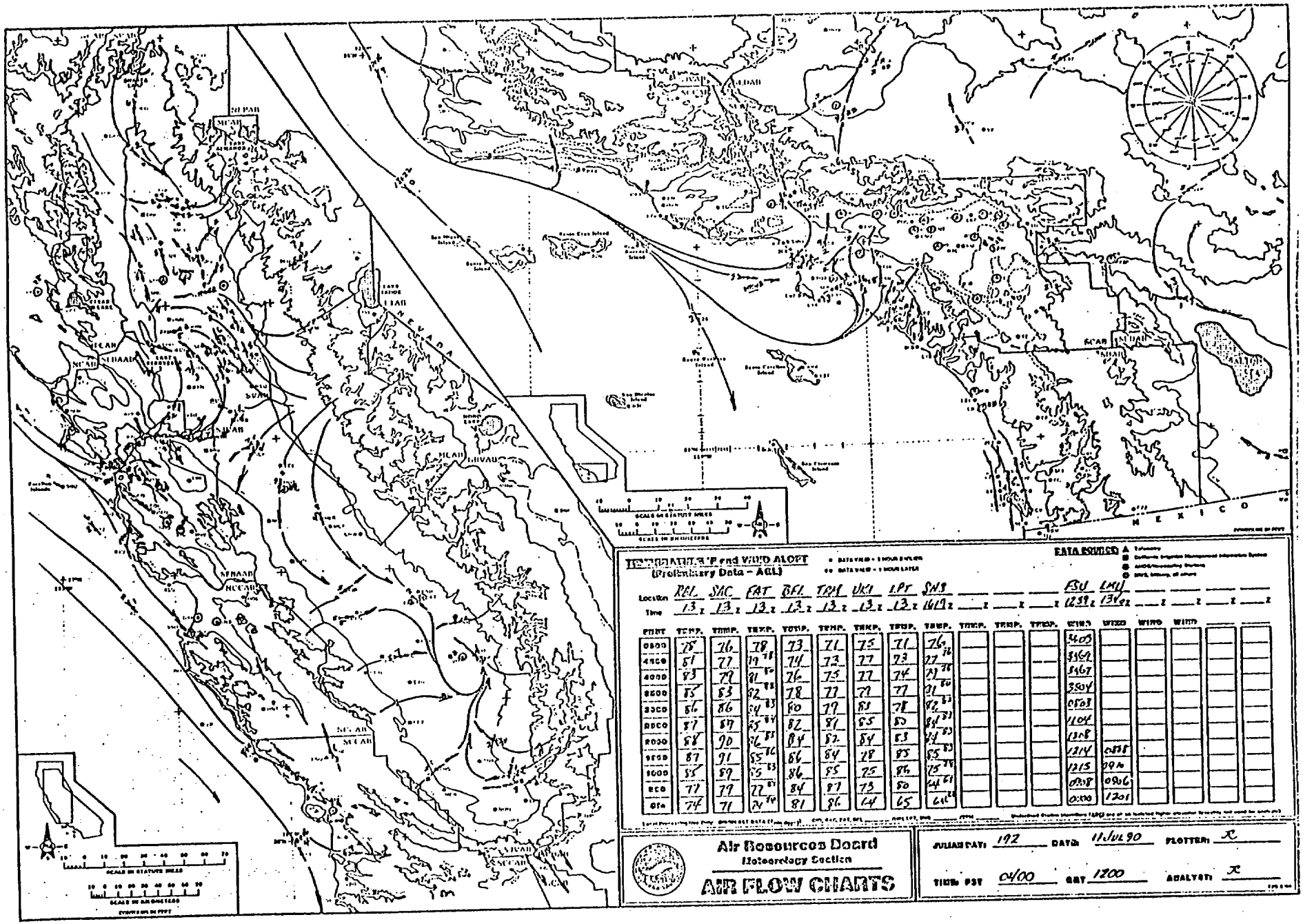
Air Resources Board
Meteorology Section
AIR FLOW CHARTS

JULIAN DATE: 191 DATE: 10 JUL 90 PLOTTER: JP

TIME: PST 0400 GMT 1200 ANALYST: X


NEVADA
MEXICO
SCALE IN STATUTE MILES
SCALE IN KILOMETERS
TEMPERATURE °F and WIND ALOFT
(Preliminary Data - AGL)
DATA SOURCES
Location
Time
PEST
TEMP.
WIND
Air Resources Board
Meteorology Section
AIR FLOW CHARTS
JULIAN DAY: 191
DATE: 10 Jul 90
PLOTTER:
TIME: PST 1000
GMT 1800
ANALYST:


TEMPERATURE °F and WIND ALOFT
(Preliminary Data - ACI)
DATA SOURCES
Location
Time
FEET
TEMP.
WIND
5000
4000
3000
2500
2000
1500
1000
500
Sfc
Air Resources Board
Meteorology Section
AIR FLOW CHARTS
JULIAN DAY: 193
DATE: 11 Jul 90
PLOTTER:
TIME: PST 10/1600
CST 0000
ANALYST:
SCALE IN STATUTE MILES
SCALE IN KILOMETERS
NEVADA
MEXICO



TEMPERATURE °F and WIND ALOFT
(Preliminary Data – AGL)

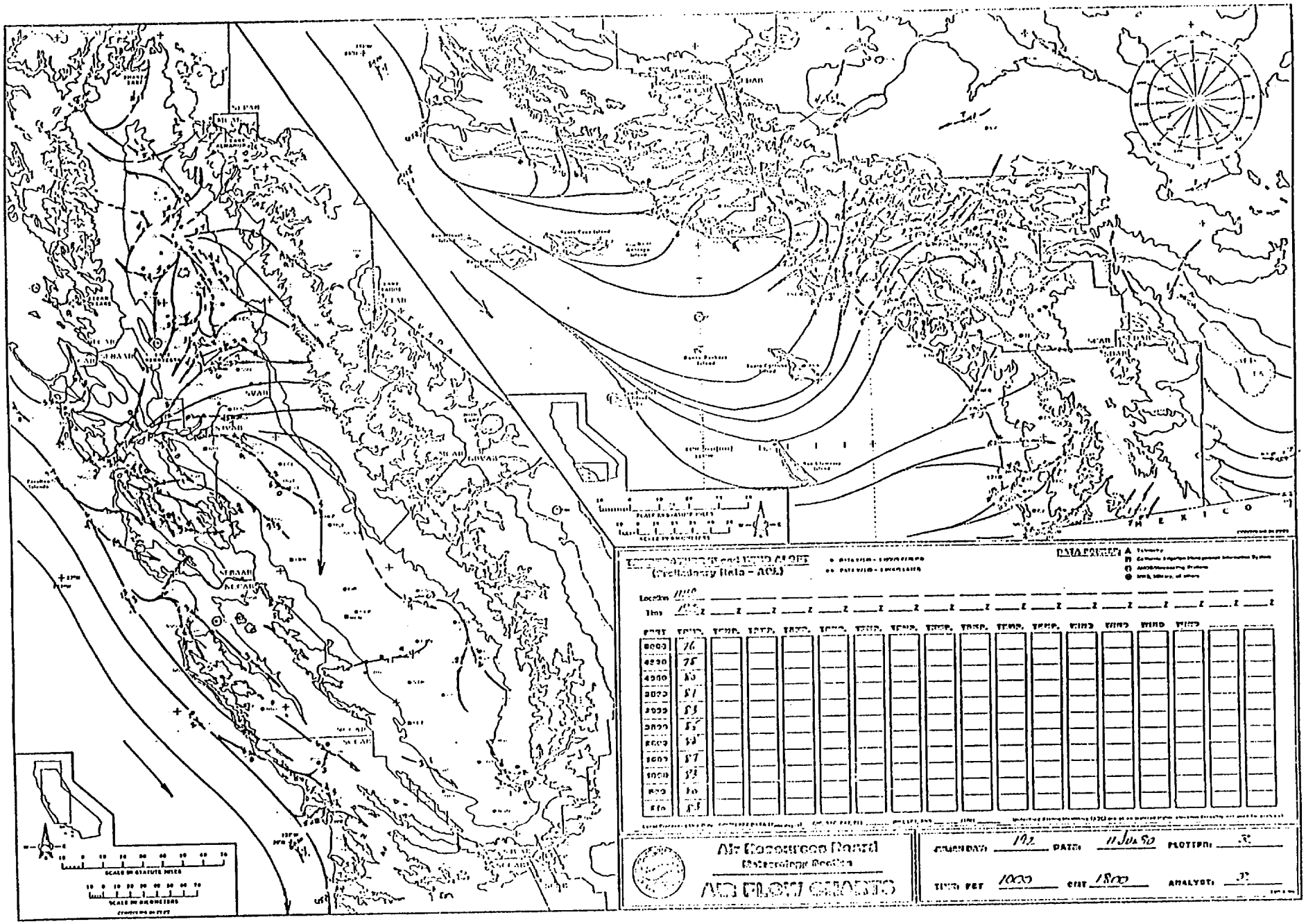
DATA SOURCE: ▲ Telemetry; ■ Defense Irrigation Management Information System; ● AMOS/Meteorology Stations; ○ MWS, Military, all others

Location	RBL	SAC	FAT	BFL	TRM	UKI	LPT	SNS				FSU	LMU				
Time	13 z	13 z	13 z	13 z	13 z	13 z	13 z	1619 z	z	z	z	1239 z	1340 z	z	z	z	z
FEET	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	WIND	WIND	WIND	WIND		
0500	78	76	78	73	71	75	71	76				3403					
4500	81	77	79 78	74	73	77	73	77 76				3469					
4000	83	79	81 80	76	75	77	74	79 78				3467					
3500	85	83	82 82	78	77	79	77	81 80				3504					
3000	86	86	84 83	80	79	83	78	82 83				0803					
2500	87	87	85 84	82	81	85	80	84 83				1104					
2000	88	90	86 85	84	82	84	83	84 83				1308					
1500	87	91	85 86	86	84	78	85	85 83				1214	0838				
1000	85	89	85 83	86	85	75	86	75 78				1215	0910				
500	77	79	77 81	84	87	73	80	64 61				0308	0906				
Gfs	74	71	74 74	81	86	64	65	64 62				0000	1201				

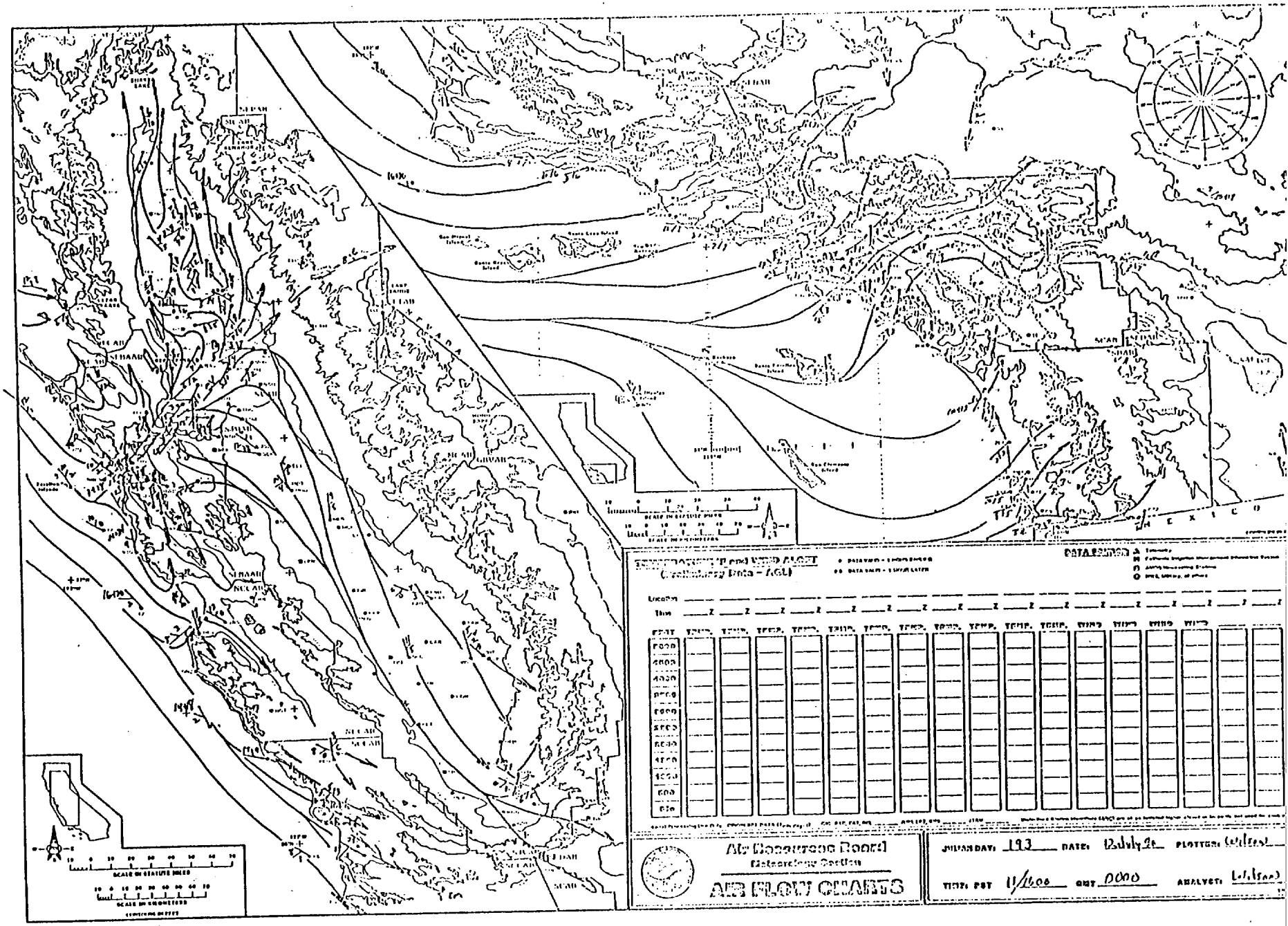
Air Resources Board
Meteorology Section
AIR FLOW CHARTS

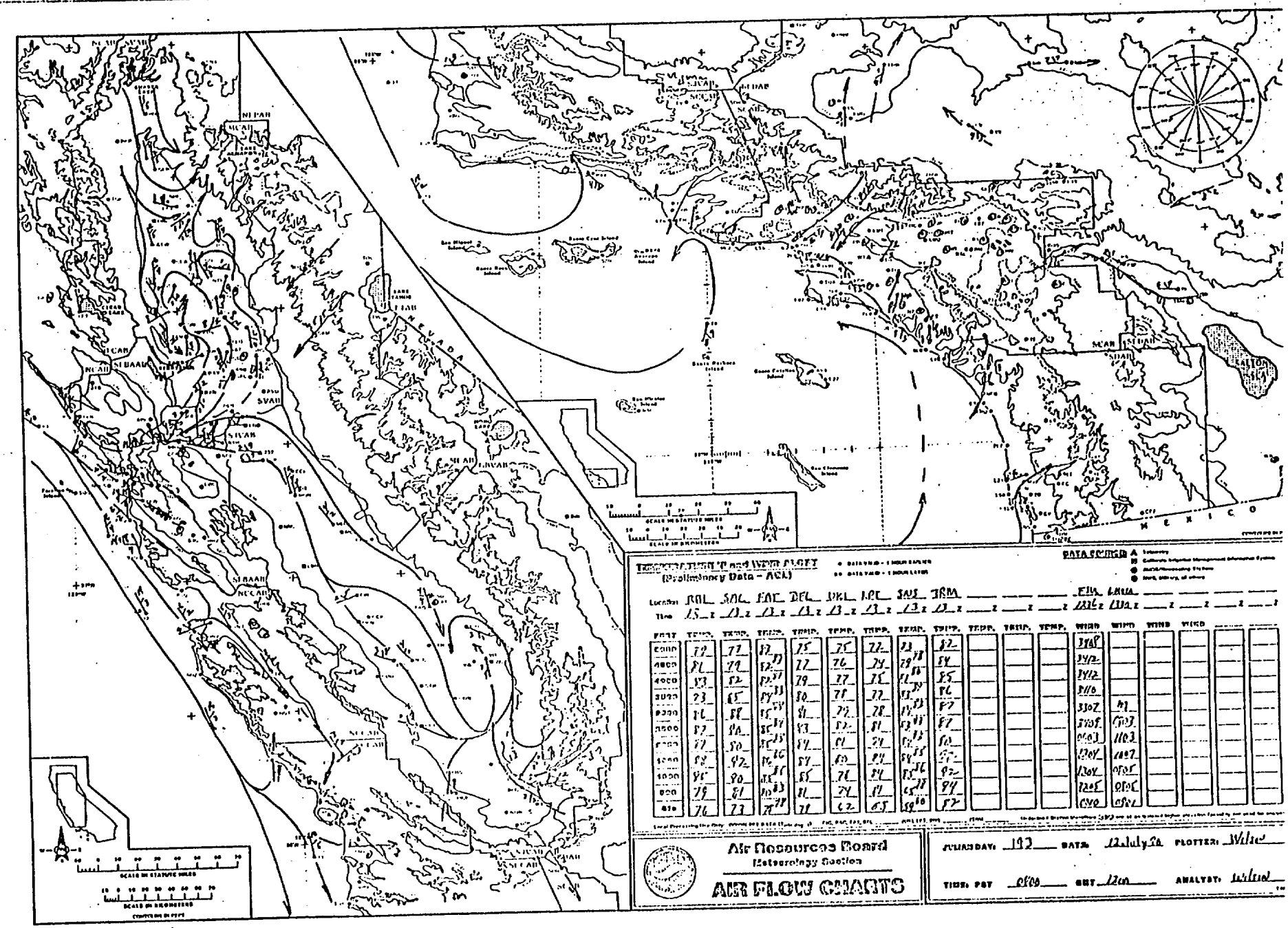
JULIAN DAY: 192 DATE: 11 JUL 90 PLOTTER: X

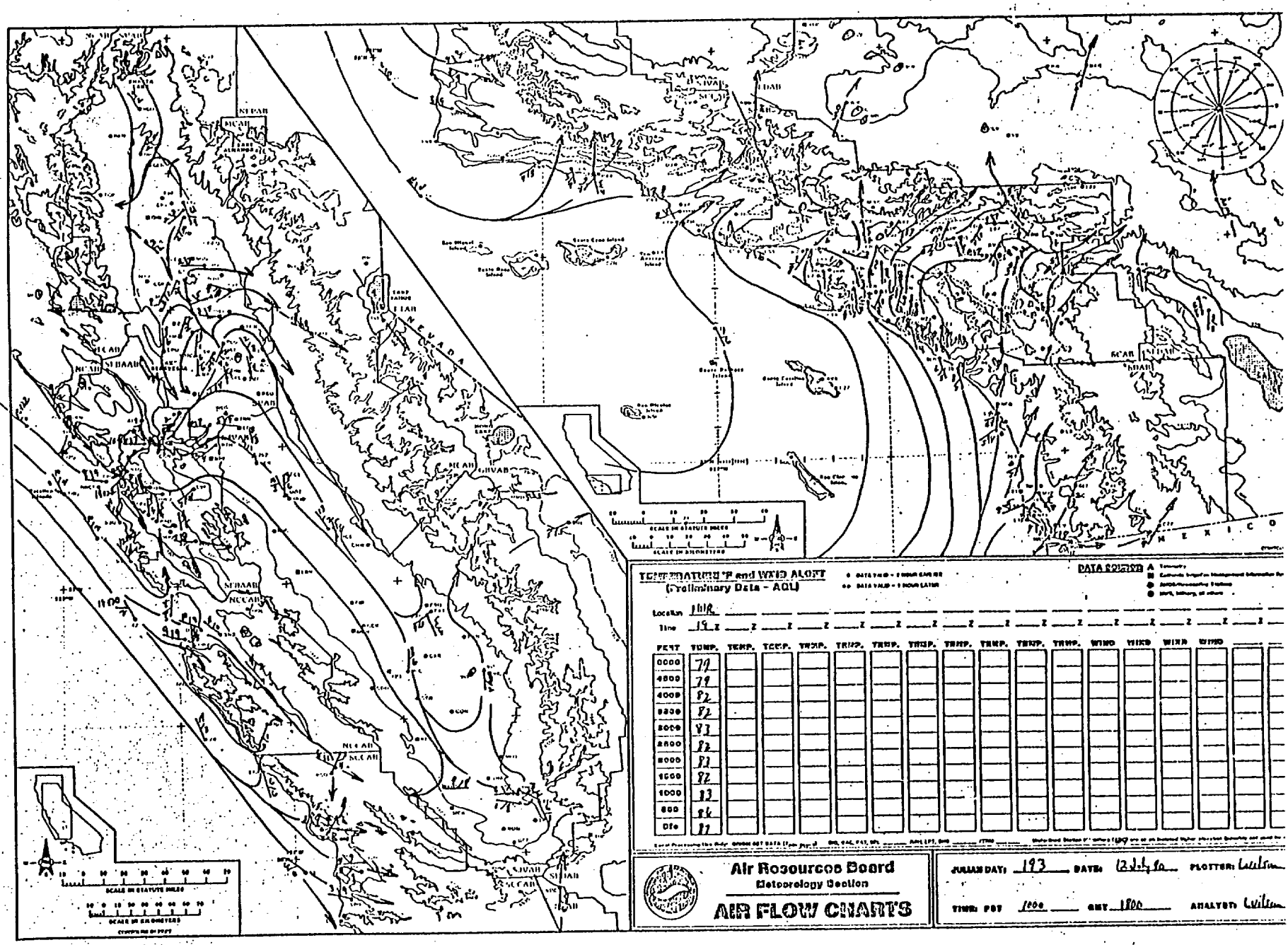
TIME: PST 0400 GMT 1200 ANALYST: X

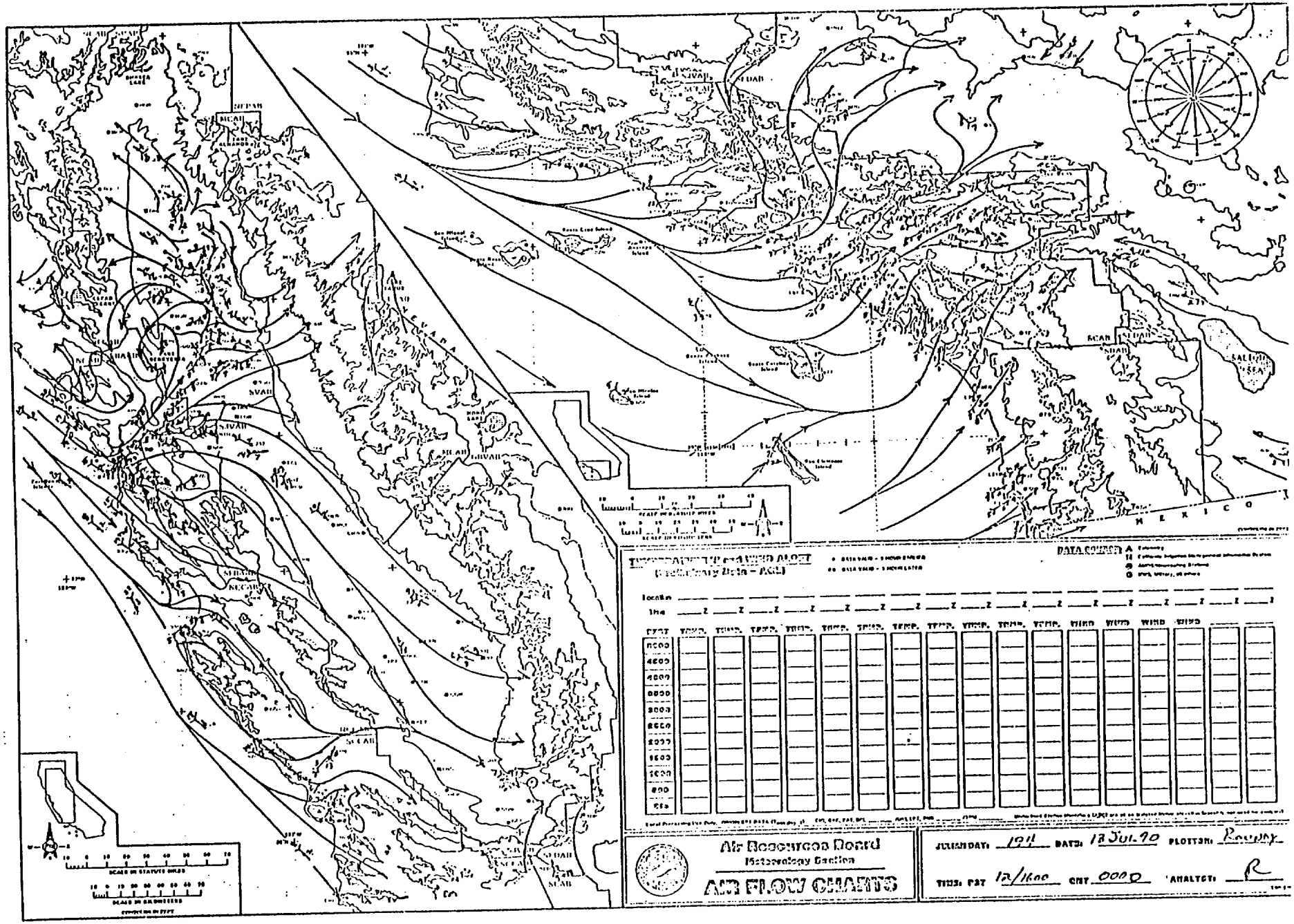


SCALE IN STATUTE MILES
SCALE IN KILOMETERS
MEXICO
DATA SOURCE
Location
Time
FEET
TEMP.
WIND
Air Resources Board
Meteorology Section
AIR FLOW CHARTS
DATE: 11 Jul 80
PLOTTER:
TIME: FST 1000
GMT 1800
ANALYST:

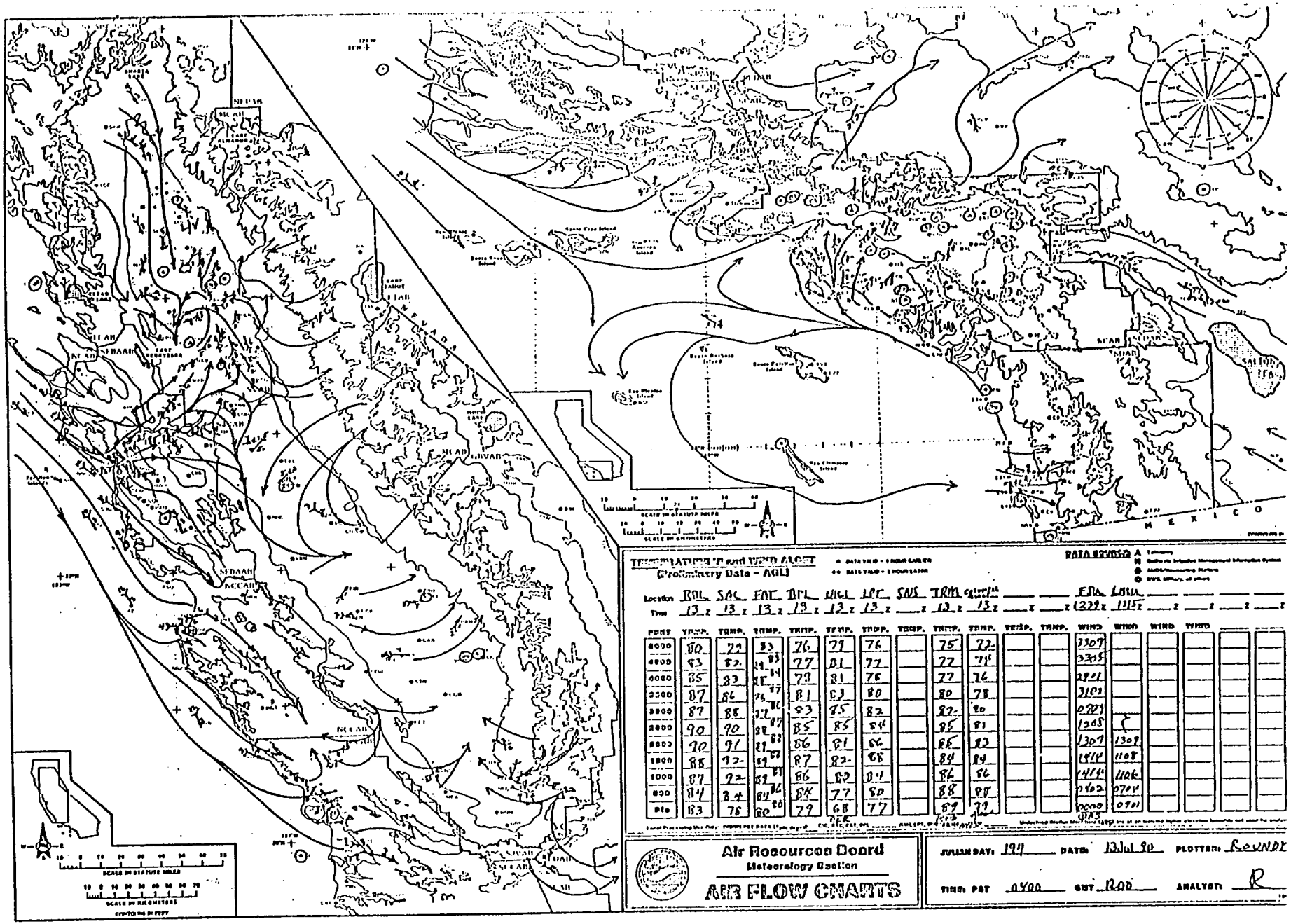

Air Resources Board
Meteorology Section
AIR FLOW CHARTS
JULIAN DAY: 193
DATE:
PLOTTER:
TIME: PST
GMT
ANALYST:
SCALE IN STATUTE MILES
SCALE IN KILOMETERS


NEVADA
MEXICO
SCALE IN STATUTE MILES
SCALE IN KILOMETERS
DATA SOURCES
Location
Time
Air Resources Board
Meteorology Section
AIR FLOW CHARTS
JULIAN DAY: 193
DATE: 12 July 90
PLOTTER: Wilson
TIME: PST 0800
GMT 12 00
ANALYST: Wilson


NEVADA
MEXICO
SCALE IN STATUTE MILES
SCALE IN KILOMETERS
TEMPERATURE °F and WIND ALOFT
(Preliminary Data - ACL)
DATA SOURCE
Location
Time
FEET
TEMP.
WIND
Air Resources Board
Meteorology Section
AIR FLOW CHARTS
JULIAN DAY:
DATE:
PLOTTER:
TIME: PST
GMT
ANALYST:



NEVADA
MEXICO
SALTON SEA
SCAB
SVAB
NCAB
SEDAB
SCALE IN STATUTE MILES
SCALE IN KILOMETERS
DATA SOURCE
Location
Time
DEPT
TEMP.
WIND
Air Resources Board
Meteorology Section
AIR FLOW CHARTS
JULIAN DAY: 1911
DATE: 13 JUL 90
PLOTTER: Rowley
TIME: PST 12/1600
CNT 0000
ANALYST: R



TEMPERATURE and WIND ALOFT
(Preliminary Data - AGL)

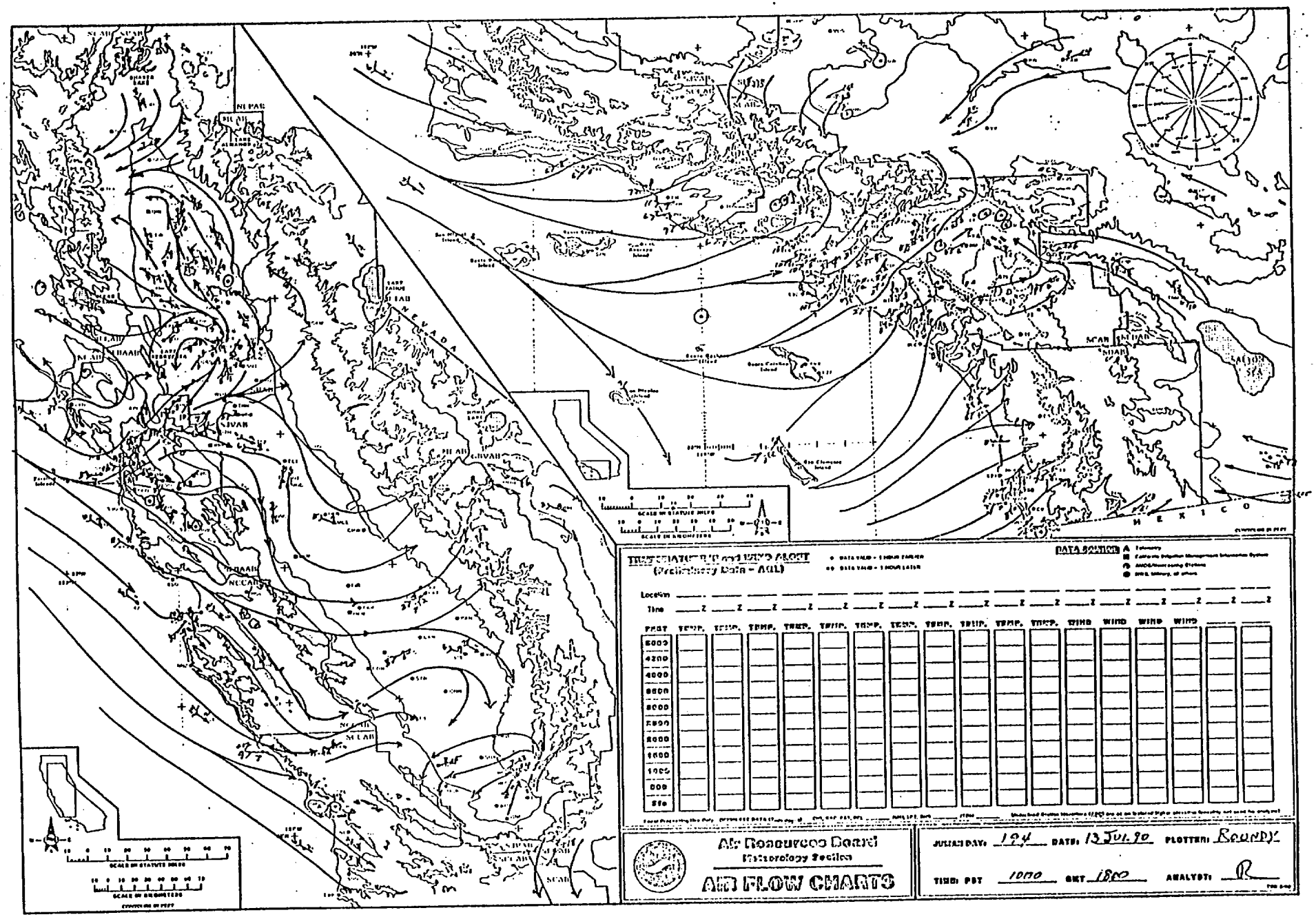
DATA REVIEWED

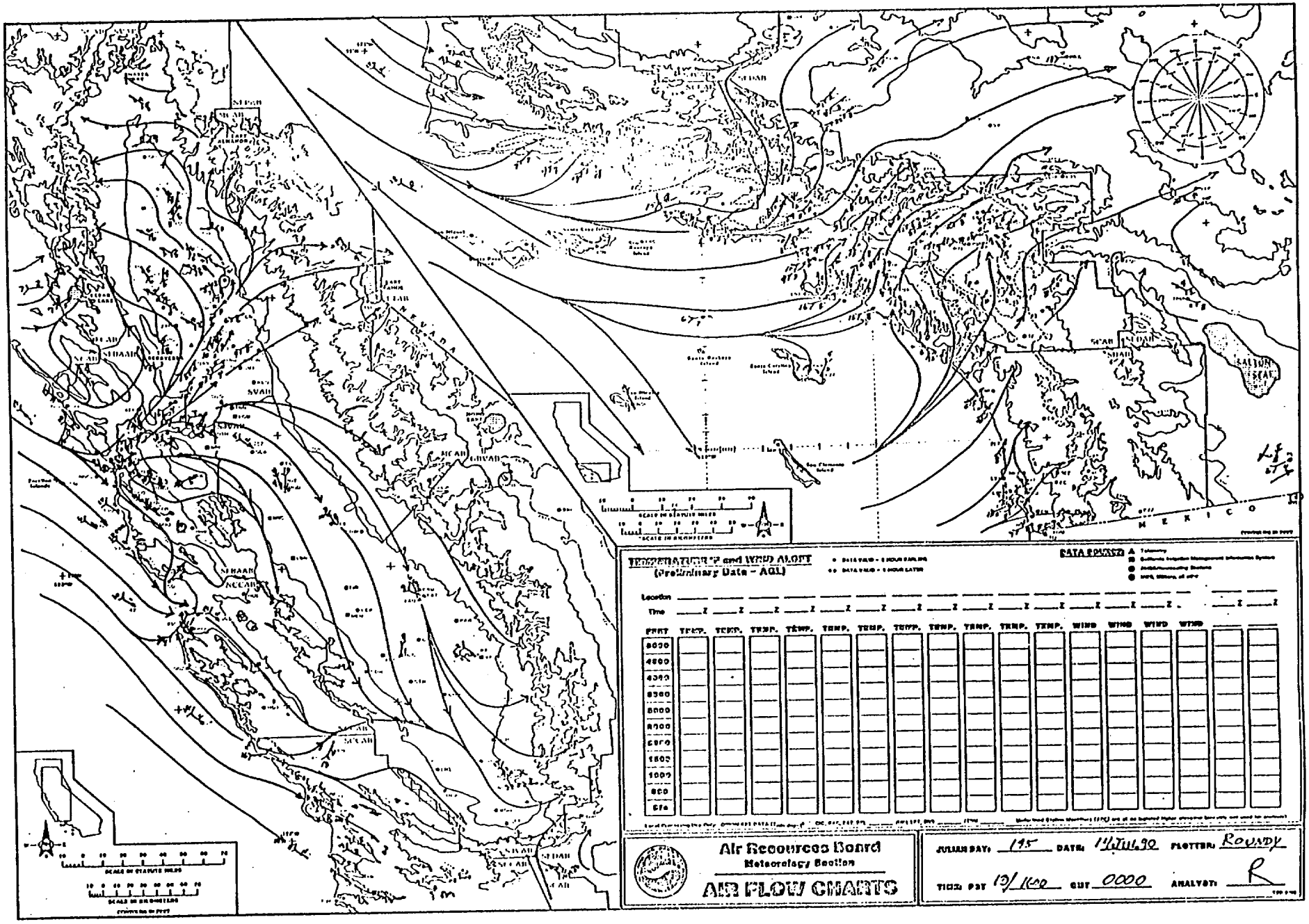
Location	BOL	SAC	FAT	BFL	VCL	LPC	SAN	TRM					ESA	LAXA				
Time	13 z	13 z	13 z	13 z	13 z	13 z	z	13 z	13 z	z	z	z	1222 z	1115 z	z	z	z	z
POINT	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	WIND	WIND	WIND	WIND		
5000	80	72	83	76	77	76		75	72			3307					
4500	83	82	84 83	77	81	77		77	71			3305					
4000	85	83	87 84	79	81	78		77	76			2921					
3500	87	86	76 87	81	83	80		80	78			3103					
3000	87	88	77 86	83	85	82		82	80			0203					
2500	90	90	88 87	85	85	84		85	81			1208					
2000	90	91	89 88	86	81	86		86	83			1307	1309				
1500	86	92	89 88	87	82	88		84	84			1414	1108				
1000	87	92	89 87	86	89	84		86	86			1414	1106				
500	84	84	84 86	88	77	80		88	88			0402	0704				
Site	83	76	80 80	79	68	77		89	79			0000	0701				

Air Resources Board
Meteorology Section
AIR FLOW CHARTS

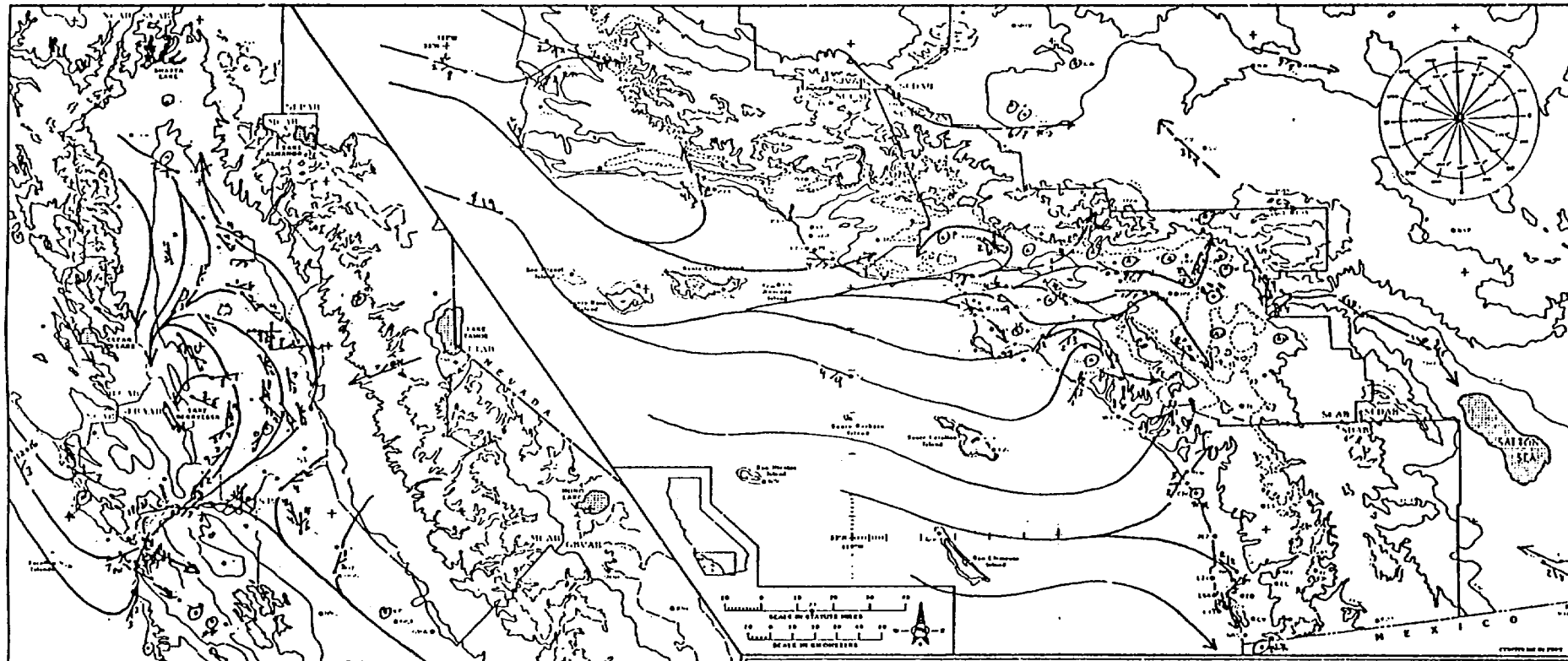
JULIAN DAY: 194 DATE: 13 Jul 90 PLOTTER: ROUNDY

TIME: PST 0400 GMT 1200 ANALYST: R


NEVADA
MEXICO
SCALE IN STATUTE MILES
SCALE IN KILOMETERS
DATA SOURCE
Location
Time
PRST
TEMP.
WIND
5000
4200
4000
3500
3000
2500
2000
1500
1000
500
Sfc
Air Resources Board
Meteorology Section
AIR FLOW CHARTS
JULIAN DAY: 194
DATE: 13 JUL 90
PLOTTER: ROUNDY
TIME: PST 1000
GMT 1800
ANALYST: R



NEVADA
MEXICO
SALTON SEA
SCALE IN STATUTE MILES
SCALE IN KILOMETERS
TEMPERATURE °F and WIND ALOFT
(Preliminary Data - AGL)
DATA SOURCE
Location
Time
FEET
TEMP.
WIND
Air Resources Board
Meteorology Section
AIR FLOW CHARTS
JULIAN DAY: 195
DATE: 14/JUL/90
PLOTTER: ROUNDY
TIME: PST 13/1600
GMT 0000
ANALYST: R



TEMPERATURE °F and WIND ALOFT
(Preliminary Data - AGL)

DATA 92/2/93

Location	RBL	SAC	FAT	BFL	TRM	UKI	LPT	SNS				FSU	LMU				
Time	13 z	13 z	13 z	13 z	z	13 z	13 z	z	z	z	z	1345 z	1330 z	z	z	z	z
FEET	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	WIND	WIND	WIND	WIND		
5000	77	77	81	76		74	69					3208					
4500	79	81	83 81	78		73	73					3107					
4000	80	84	85 84	80		75	76					0103					
3500	82	86	87 86	81		77	77					0605					
3000	83	88	88 87	82		78	78					1107					
2500	84	89	89 88	83		79	79					1210					
2000	84	91	90 89	84		79	81					1218					
1500	85	92	90 90	87		80	84					1220					
1000	84	93	91 91	88		76	85					1216					
500	76	77	89 91	89		71	84					1904	2703				
Sfc	71	56	28 87	80		60	63					0000	2501				

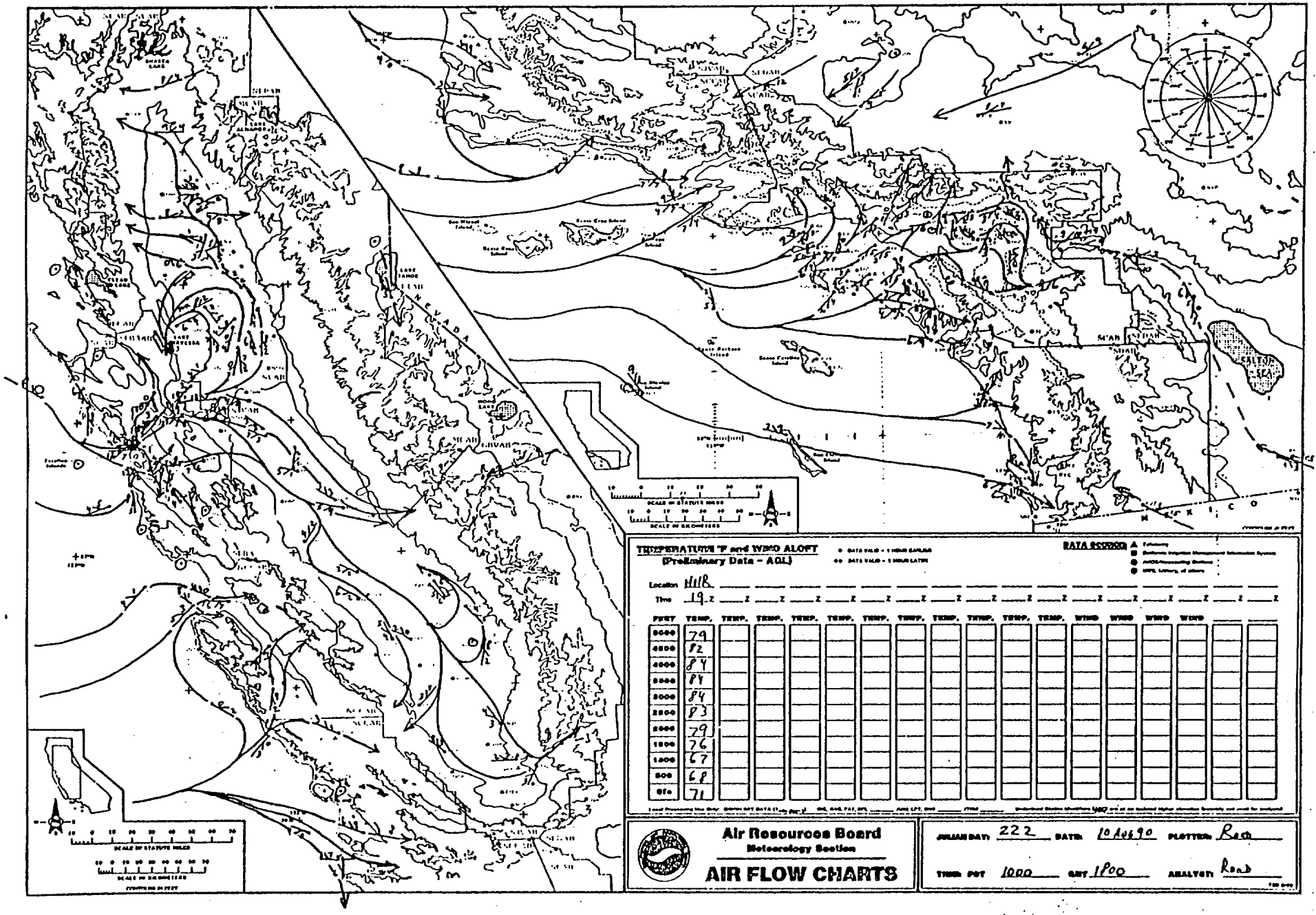
Local Processing Use Only. DATA 92 DATA 17 ... OCL SAC FAT BFL ... JUL LPT SNS ... TIME ... Unauthorized Station Identifiers (USD) are at an isolated higher elevation (possibly not used for analysis)

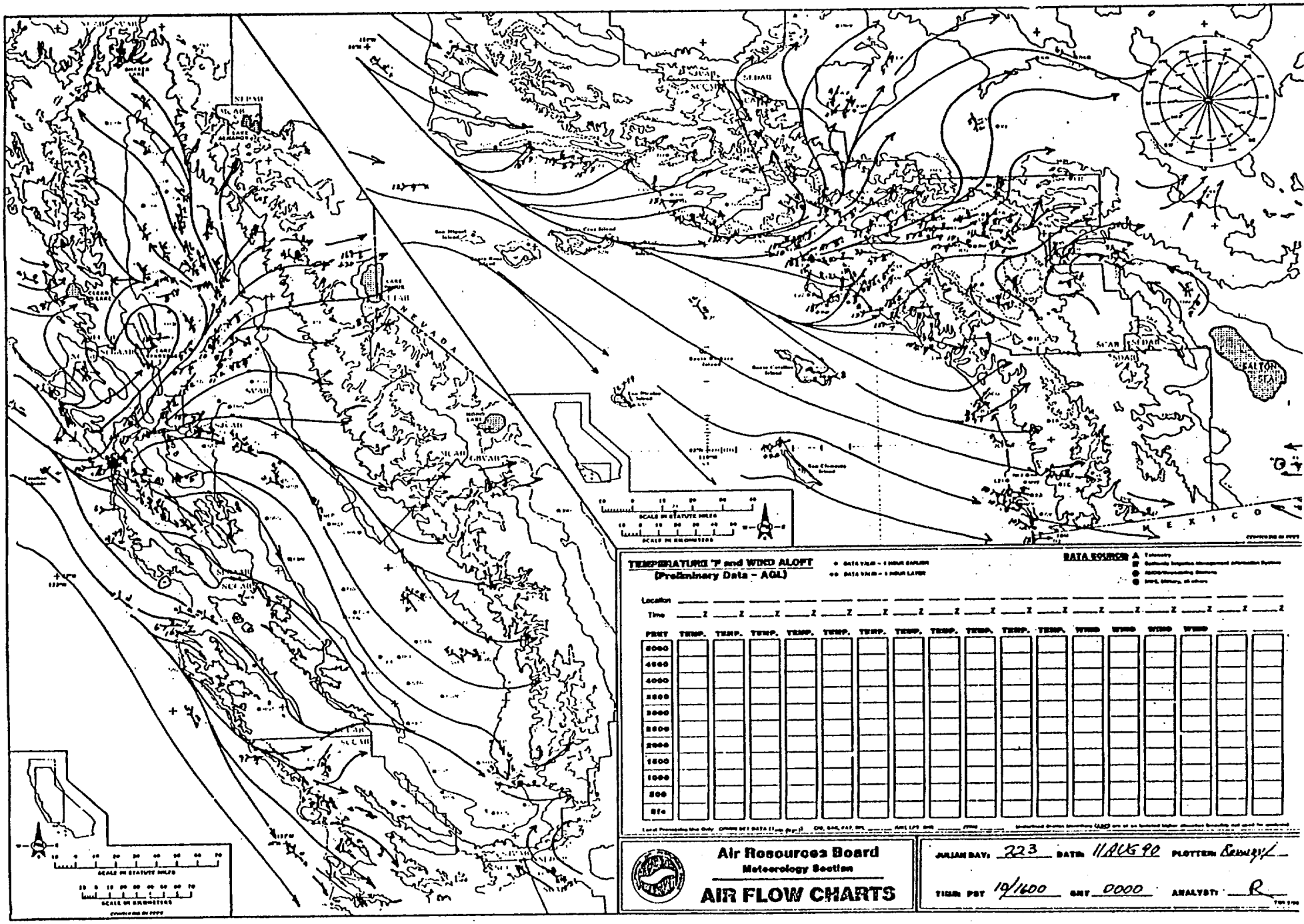
Air Resources Board
Meteorology Section

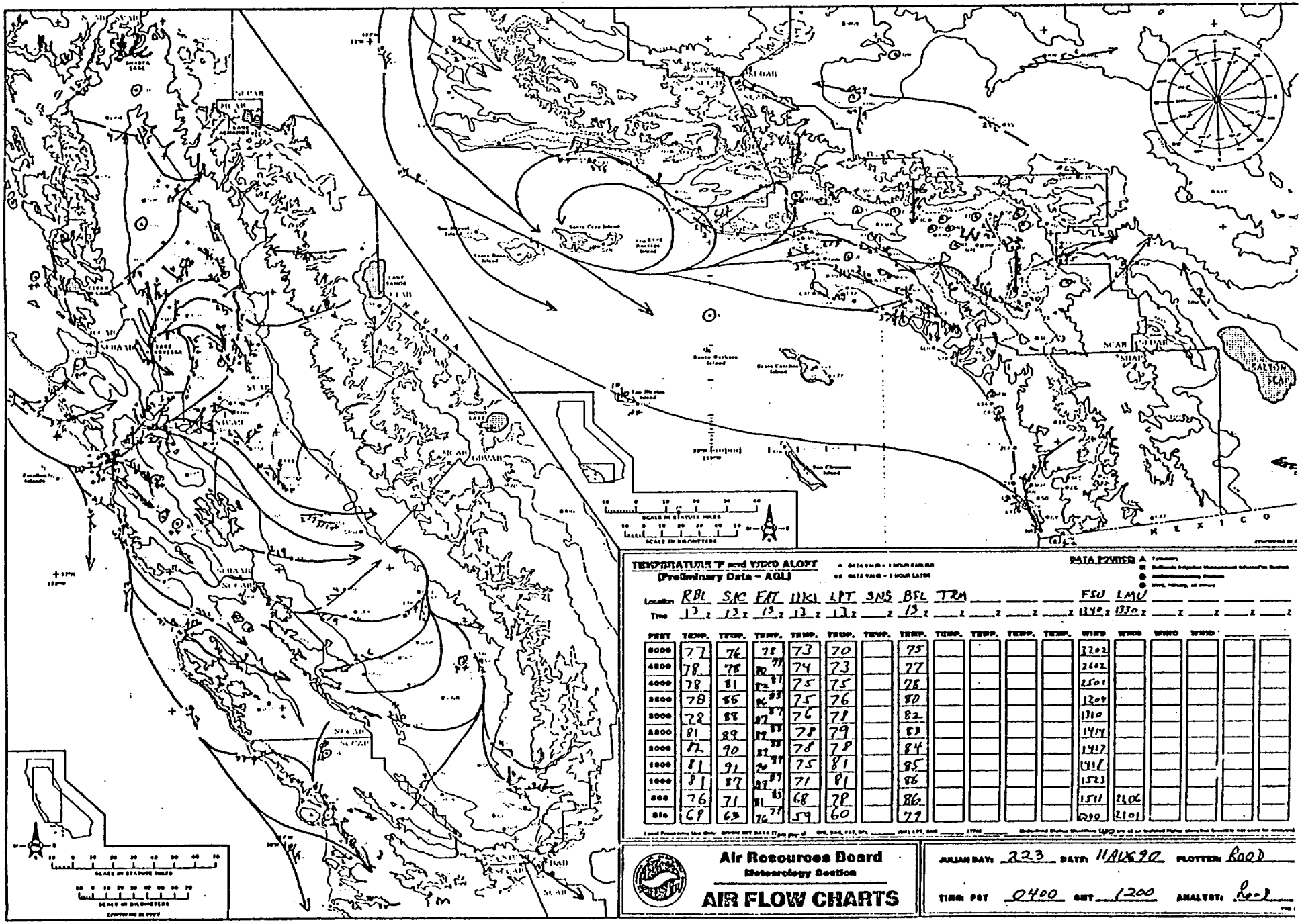
AIR FLOW CHARTS

JULIAN DAY: 222 DATE: 10 AUG 90 PLOTTER: ROOD

TIME: PST 0400 GMT 1200 ANALYST: ROOD


NEVADA
SALTON SEA
MEXICO
SCALE IN STATUTE MILES
SCALE IN KILOMETERS
TEMPERATURE °F and WIND ALOFT
(Preliminary Data - AQL)
DATA SOURCE
Location HILR
Time 19 Z
FEET TEMP. TEMP. TEMP. TEMP. TEMP. TEMP. TEMP. TEMP. TEMP. TEMP. TEMP. WIND WIND WIND WIND
5000 79
4500 82
4000 84
3500 84
3000 84
2500 83
2000 79
1500 76
1000 67
500 68
Sfc 71
Air Resources Board
Meteorology Section
AIR FLOW CHARTS
JULIAN DATE 222 DATE 10 Aug 90 PLOTTER Ross
TIME PST 1000 GMT 1800 ANALYST Ross


NEVADA
MEXICO
SALTON SEA
SCALE IN STATUTE MILES
SCALE IN KILOMETERS
TEMPERATURES °F and WIND ALOFT
(Preliminary Data - AGL)
DATA SOURCES
Location
Time
PRESS
TEMP.
WIND
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
Sfc
Air Resources Board
Meteorology Section
AIR FLOW CHARTS
JULIAN DAY: 223
DATE: 11 AUG 90
PLOTTER:
TIME: PST 10/1600
GMT 0000
ANALYST: R



TEMPERATURE °F and WIND ALOFT
(Preliminary Data – AQL)

DATA POINTER

Location	RBL	SAC	FAT	UKI	LPT	SNS	BFL	TRA					FSU	LMU				
Time	13z	13z	13z	13z	13z	z	13z	z	z	z	z	z	1340z	1330z	z	z	z	z
FEET	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	WIND	WIND	WIND	WIND		
5000	77	76	78	73	70		75						2202					
4500	78	78	80 77	74	73		77						2602					
4000	78	81	82 81	75	75		78						2501					
3500	78	86	84 83	75	76		80						1209					
3000	78	88	87 87	76	78		82						1310					
2500	81	89	87 88	78	79		83						1414					
2000	82	90	87 88	78	78		84						1417					
1500	81	91	86 87	75	81		85						1416					
1000	81	87	82 87	71	81		86						1523					
500	76	71	81 83	68	78		86						1511	2106				
Sfc	68	63	76 77	59	60		79						0200	2101				

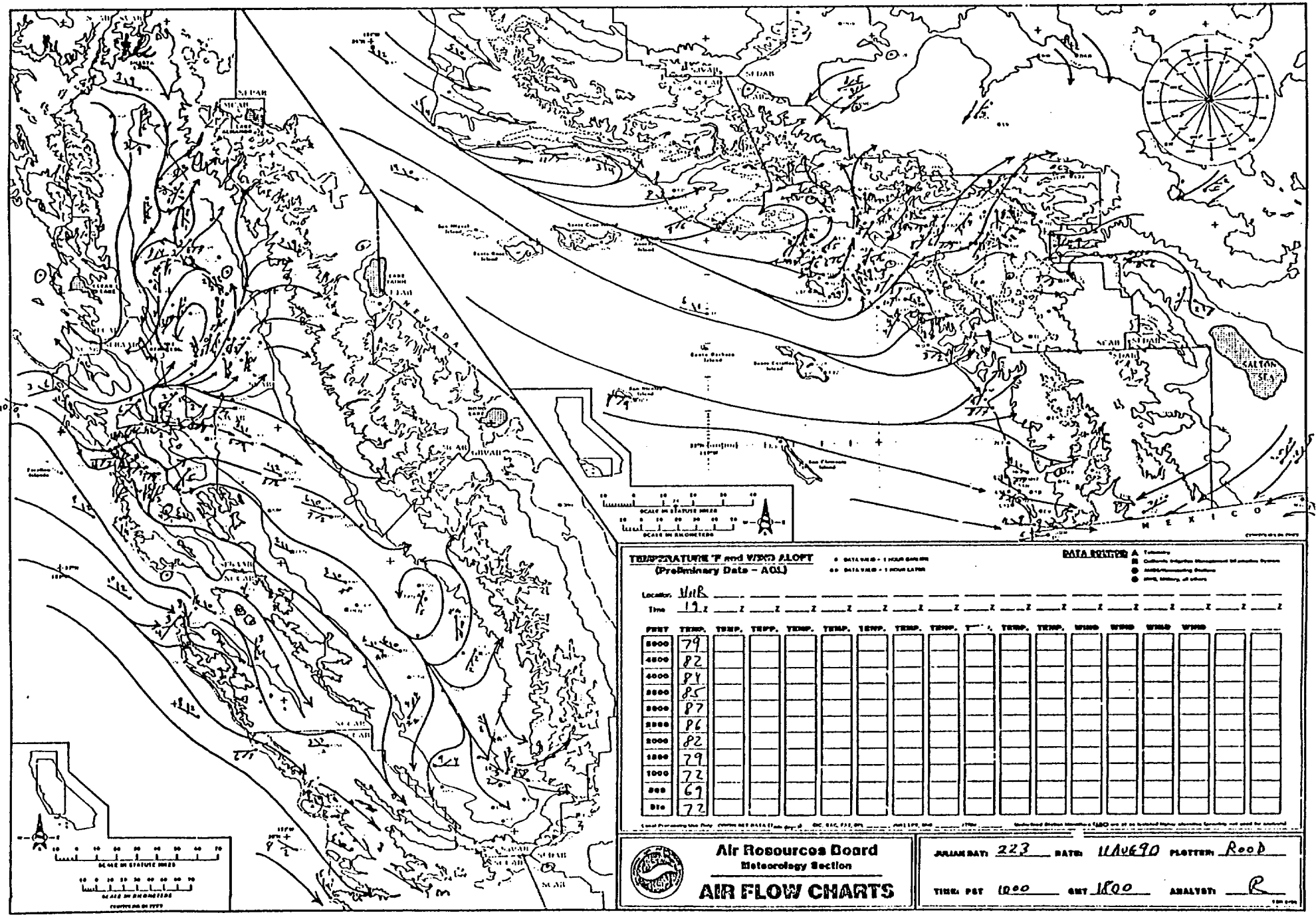
Local Processing Use Only: Winds not data if [illegible] per [illegible] SAC, SNS, FAT, BFL ____ AQL, LPT, UKI ____ TRA ____ Unofficial Status Weather Data are all on Unofficial Status where this Scientific not used for [illegible]

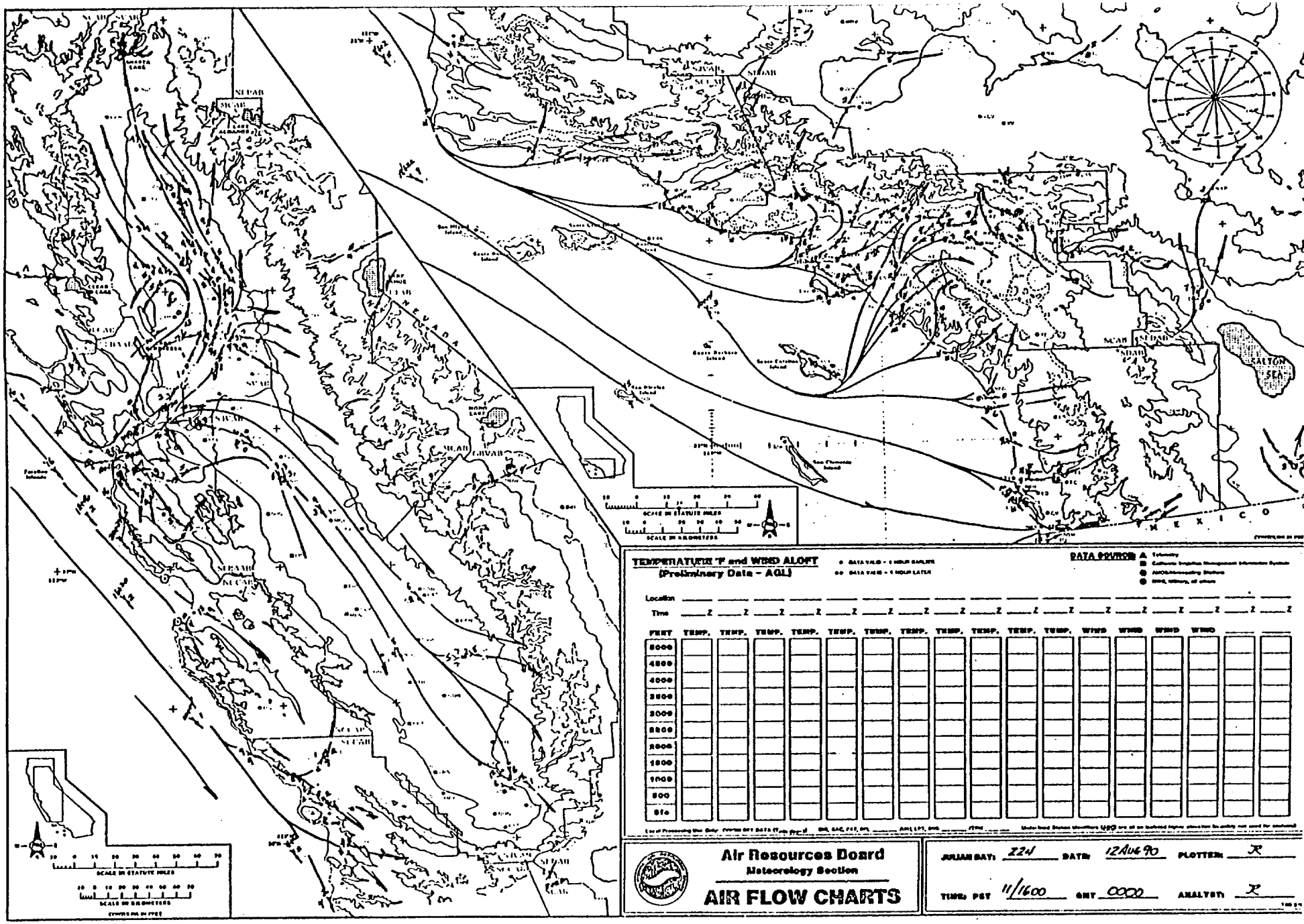
Air Resources Board
Meteorology Section

AIR FLOW CHARTS

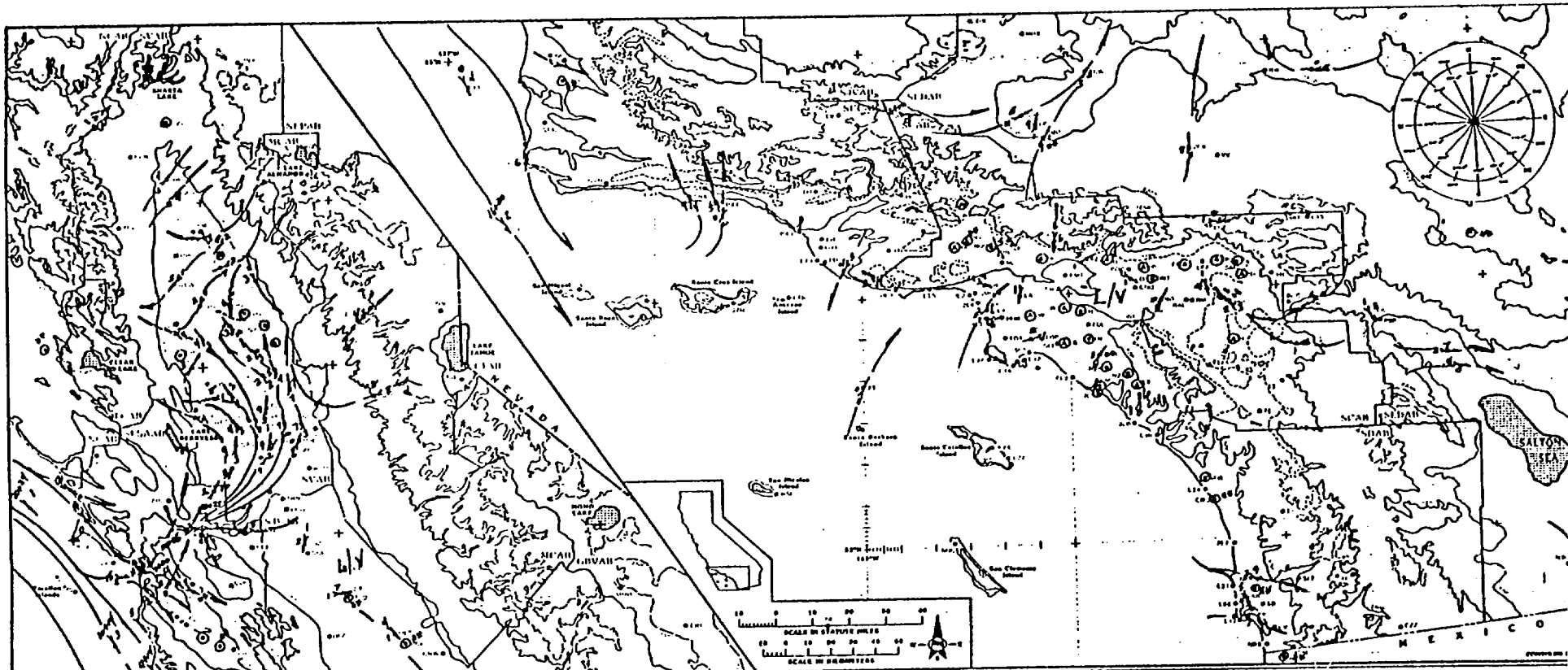
JULIAN DAY: 223 DATE: 11 AUG 90 PLOTTER: Rood

TIME: PST 0400 GMT 1200 ANALYST: Rood


NEVADA
SALTON SEA
MEXICO
SCALE IN STATUTE MILES
SCALE IN KILOMETERS
TEMPERATURE °F and WIND ALOFT
(Preliminary Data - AGL)
DATA SOURCE
Location: NHR
Time: 19 Z
FEET TEMP. TEMP. TEMP. TEMP. TEMP. TEMP. TEMP. TEMP. TEMP. TEMP. TEMP. WIND WIND WIND WIND
5000 79
4500 82
4000 84
3500 85
3000 87
2500 86
2000 82
1500 79
1000 72
500 69
Sfc 72
Air Resources Board
Meteorology Section
AIR FLOW CHARTS
JULIAN DAT: 223 DATE: 11AUG90 PLOTTER: RooD
TIME: PST 1000 GMT 1800 ANALYST: R



NEVADA
SALTON SEA
MEXICO
SCALE IN STATUTE MILES
SCALE IN KILOMETERS
TEMPERATURE °F and WIND ALOFT
(Preliminary Data - AGL)
DATA SOURCE
Location
Time
FEET
TEMP.
WIND
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
Sfc
Air Resources Board
Meteorology Section
AIR FLOW CHARTS
JULIAN DAY: 224
DATE: 12 AUG 90
PLOTTER: R
TIME: PST 11/1600
GMT 0000
ANALYST: R



TEMPERATURES °F and WIND ALOFT
(Preliminary Data – AQL)

DATA VALID – 1 HOUR EARLIER
DATA VALID – 1 HOUR LATER

DATA SOURCE

Location	RBL	SAC	FAT	BFL	UKI	LPT	SNS	TRM			FSU	LMU
Time	13 z	13 z	13 z	13 z	13 z	13 z	z	z	z	z	1248z	1350z

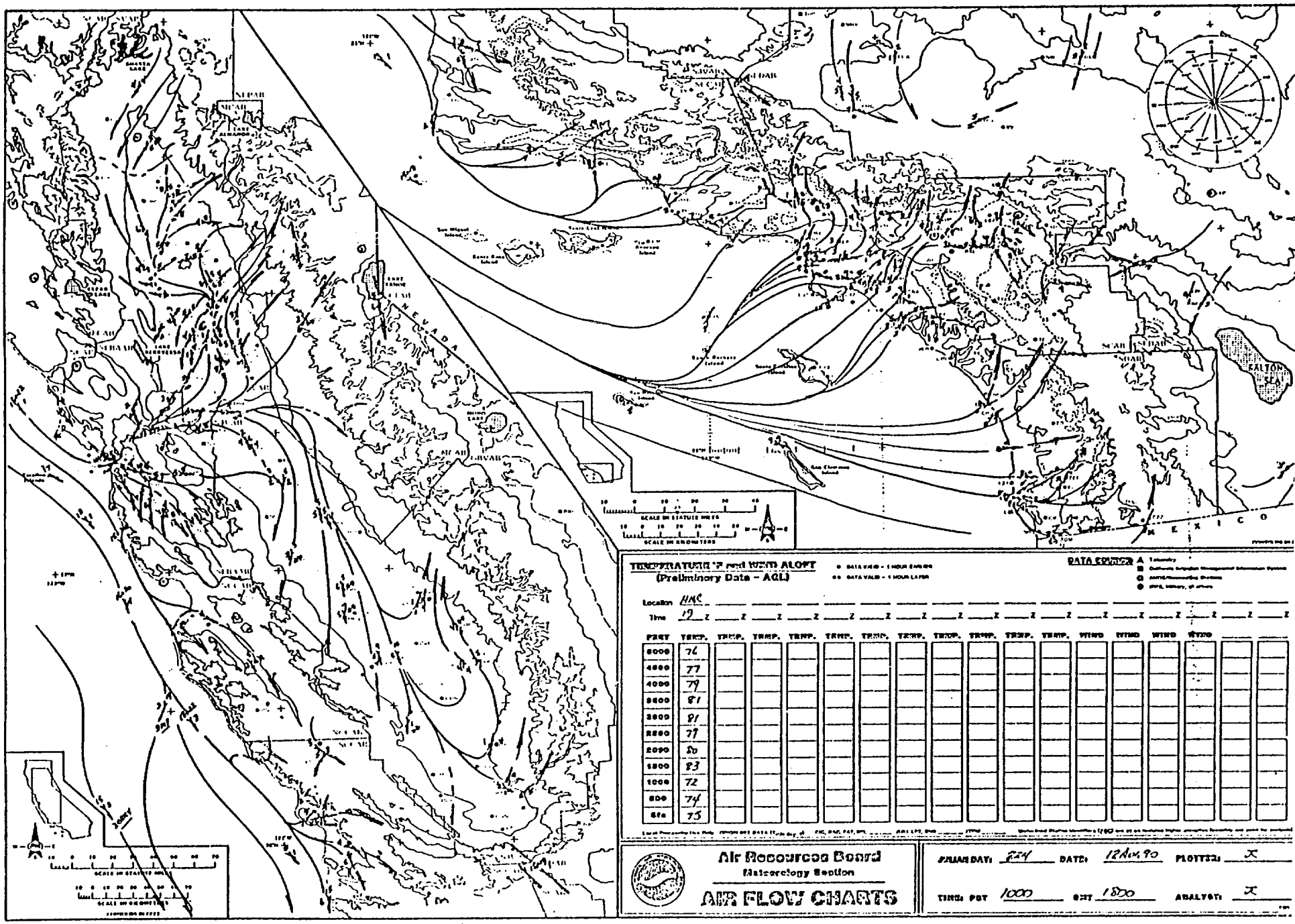
FEET	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	TEMP.	WIND	WIND	WIND	WIND
5000	73	75	76	74	72	67					3519			
4000	76	77	78	75	74	70					3424			
3000	77	79	80	77	75	73					3/22			
2500	79	82	82	79	76	75					3426			
2000	81	83	84	81	76	77					3521			
1500	82	82	86	81	75	78					3617			
1000	82	82	86	81	75	80					0806			
1500	80	80	85	81	74	80					1311			
1000	77	77	85	83	73	77					1414	2-4		
500	70	63	82	80	69	75					0803	2-4		
SFC	67	61	69	73	63	M					0000	2-4		

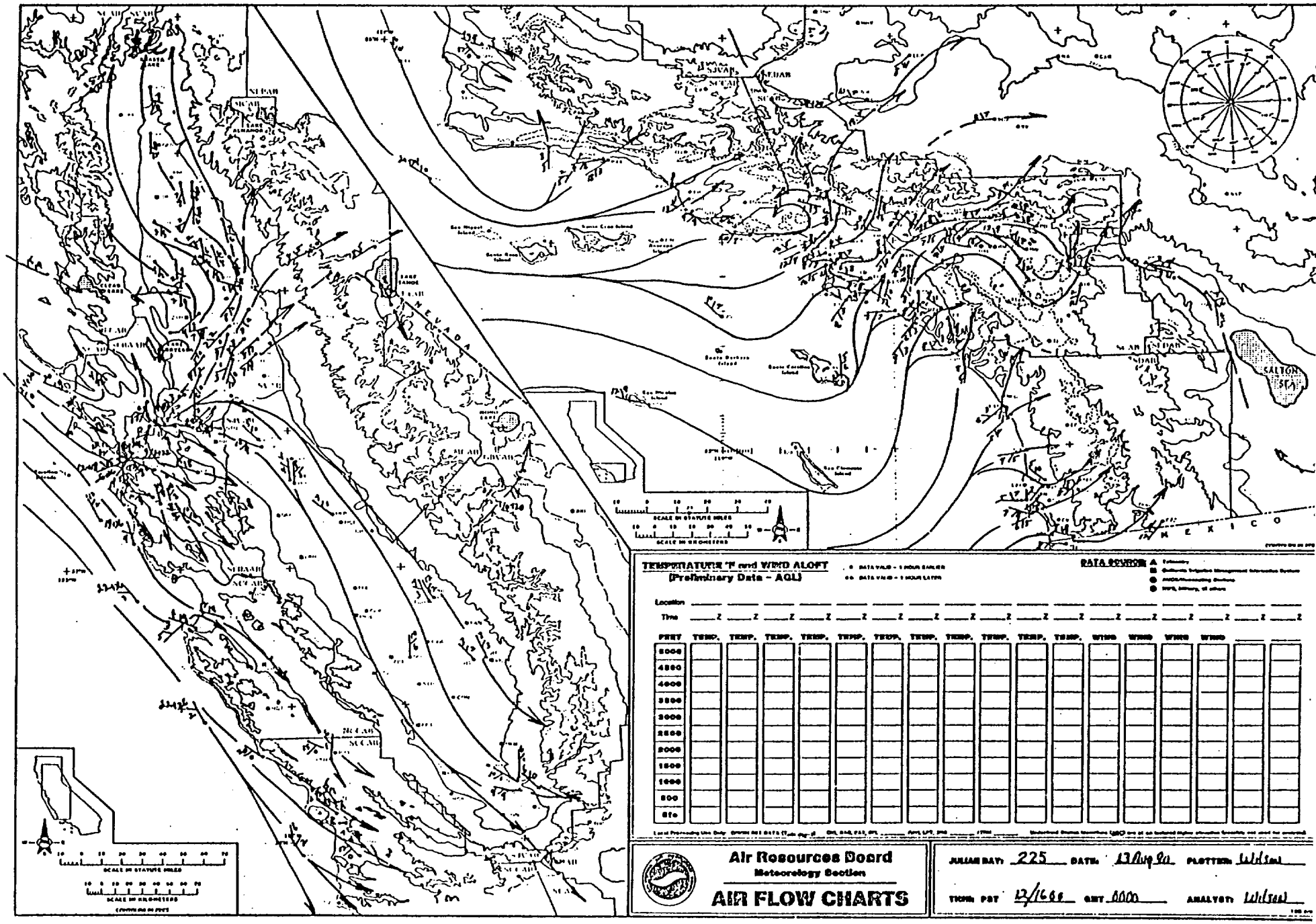
Air Resources Board
Meteorology Section

AIR FLOW CHARTS

JULIAN DATE 224 DATE 12 AUG 90 PLOTTER R

TIME: PST 0400 GMT 1200 ANALYST: R


NEVADA
MEXICO
SALTON SEA
SCALE IN STATUTE MILES
SCALE IN KILOMETERS
TEMPERATURE °F and WIND ALOFT
(Preliminary Data - AGL)
DATA VALID - 1 HOUR EARLIER
DATA VALID - 1 HOUR LATER
DATA SOURCE
Location HMC
Time 19 Z
FEET TEMP. TEMP. TEMP. TEMP. TEMP. TEMP. TEMP. TEMP. TEMP. TEMP. TEMP. WIND WIND WIND WIND
5000 76
4500 77
4000 79
3500 81
3000 81
2500 77
2000 80
1500 83
1000 72
500 74
Sfc 75
Air Resources Board
Meteorology Section
AIR FLOW CHARTS
JULIAN DAY: 224
DATE: 12 Aug 90
PLOTTER: X
TIME: PST 1000
GMT 1800
ANALYST: X


NEVADA
MEXICO
SALTON SEA
SCALE IN STATUTE MILES
SCALE IN KILOMETERS
TEMPERATURE °F and WIND ALOFT
(Preliminary Data - AGL)
DATA VALID - 1 HOUR EARLIER
DATA VALID - 1 HOUR LATER
DATA SOURCE
Location
Time
Z
FEET
TEMP.
WIND
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
Air Resources Board
Meteorology Section
AIR FLOW CHARTS
JULIAN DAY: 225
DATE: 13 Aug 90
PLOTTER: Wilson
TIME: PST 12/1600
GMT 0000
ANALYST: Wilson

APPENDIX B

SURFACE METEOROLOGICAL MEASUREMENT LOCATIONS USED FOR UPPER SACRAMENTO VALLEY TRAJECTORIES

Table B-1. Wind sites for Upper Sacramento Valley trajectories, including site number (See Figure 6-1) and UTM coordinates.

No.	UTM-E	UTM-N	Name
1	612061.	4526857.	Burney
2	550000.	4495000.	Redding airport
3	551955.	4492859.	Redding-1615 Continental
4	559296.	4485710.	Redding (NOAA)
5	563861.	4446895.	Red Bluff (NOAA)
6	571278.	4409554.	CAPAY
7	598685.	4401311.	Chico Manzinita
8	601422.	4395130.	CHICO ST. FARM
9	600170.	4385900.	DURHAM
10	623180.	4375131.	OROVILLE
11	568075.	4374895.	Willows
12	578900.	4367117.	CODORA
13	522973.	4366750.	BIGGS
14	614894.	4354023.	Gridley
15	606393.	4345245.	SUTTER BUTTES
16	625800.	4341600.	NORTH YUBA
17	584963.	4339765.	Colusa
18	620727.	4331258.	Yuba City-Ag Building
19	620763.	4331245.	Yuba City
20	676012.	4329823.	Colfax
21	572063.	4324542.	ARBUCKLE
22	637015.	4321631.	WHEATLAND
23	506423.	4320223.	Lakeport-Lakeport Blvd
24	663948.	4311558.	Auburn-Dewitt Center
25	606894.	4308289.	Kirkville
25a	621500.	4308200.	West Nicolas (SACOG)
26	644590.	4305114.	LINCOLN
27	602500.	4304200.	Tyndall Mound (SACOG)
28	629863.	4298420.	Pleasant Grove
29	655626.	4295168.	Rocklin-Sierra College
30	629096.	4291958.	Pleasant Grove-4SW
31	607500.	4252800.	DIXON
32	640852.	4286115.	North Highlands-Blackfoot
33	627568.	4284508.	NATOMAS
34	657823.	4282299.	Folsom
35	605432.	4281187.	Woodland
36	652685.	4281175.	Citrus Hts - Sunrise
37	642193.	4275199.	Sacramento-Del Paso Manor
38	629263.	4272436.	Broderick
39	606260.	4271320.	Davis Golf Course
40	631180.	4271135.	Sacramento 1131 S St.
41	624700.	4268800.	West Sacramento (SACOG)
42	630764.	4264579.	Sacra. Exec. Airport (NOAA)
43	633160.	4260225.	Sacramento-Meadowview Rd
44	525474.	4255283.	Santa Rosa-837 Fifth St
45	588385.	4245491.	Vacaville-Merchant

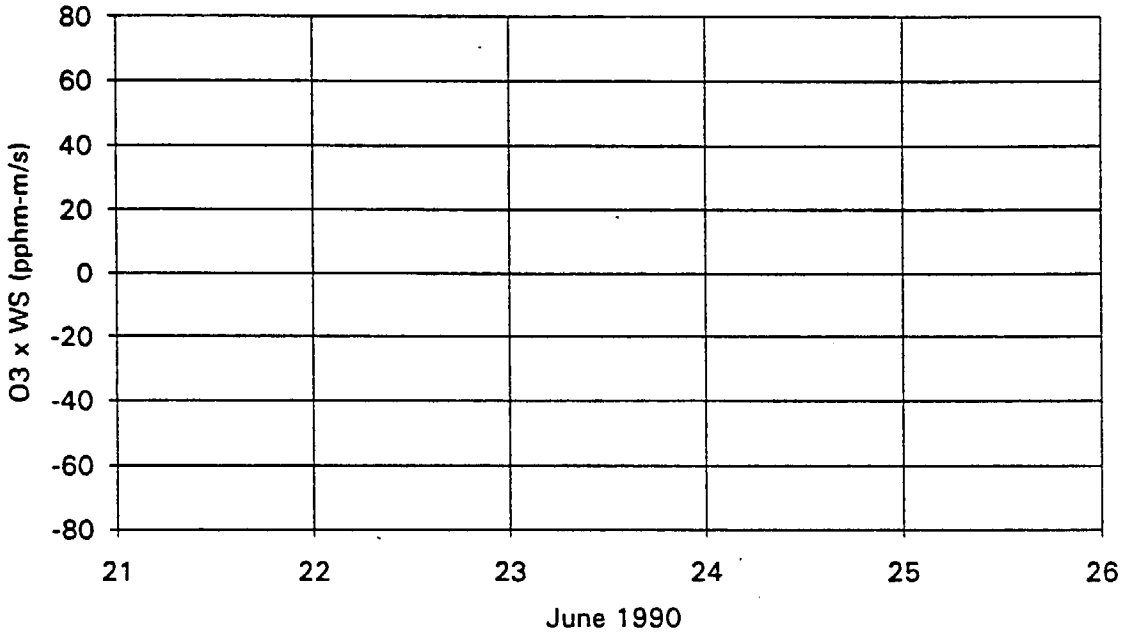
Table B-1. Wind sites for Upper Sacramento Valley trajectories, including site number (see Figure 6-1) and UTM coordinates.

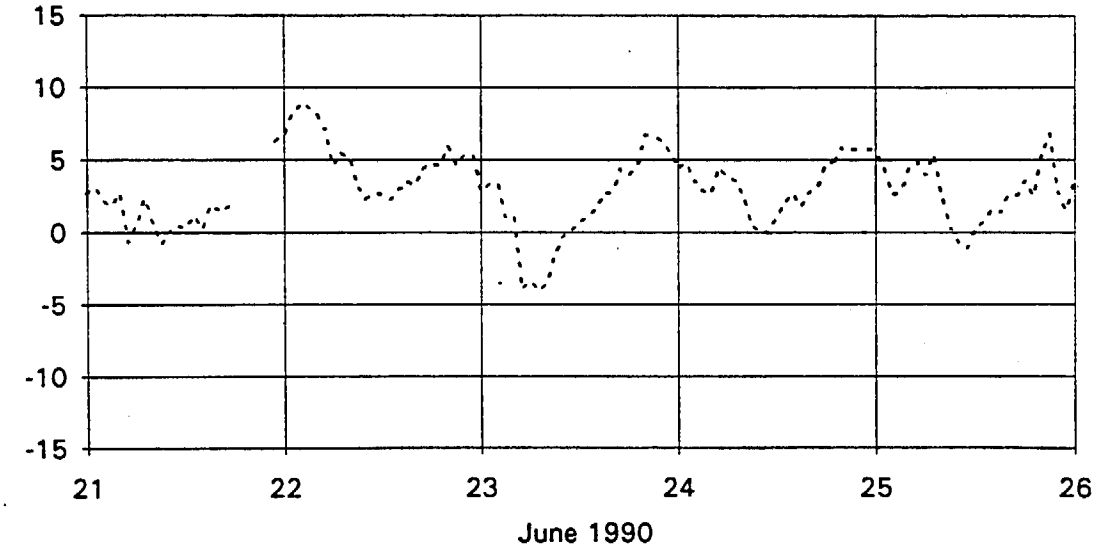
No.	UTM-E	UTM-N	Name
46	561637.	4240601.	Napa-Jefferson Street
47	654100.	4239700.	Herald (SACOG)
48	547521.	4238789.	Sonoma-First Street
49	534100.	4234500.	PETALUMA
50	582548.	4233539.	Fairfield-Bay Area APCD
51	590500.	4230500.	Scalley Road (SACOG)
52	601000.	4230500.	Lambie Road (SACOG)
53	470000.	4225000.	MMS BOUY 46013
54	567087.	4217629.	Vallejo-Tuolumne
55	597225.	4209667.	Pittsburg
56	619302.	4207907.	Bethel Island
57	619400.	4207400.	Bethel Island-ARB TELEMETRY
58	542246.	4202841.	San Rafael
59	652101.	4201793.	Stockton-Hazelton Street
60	556606.	4200448.	Richmond-13th Street
61	585715.	4199430.	Concord-2975 Treat Blvd
62	653860.	4196164.	Stockton (NOAA)
63	564539.	4183786.	Oakland-Alice
64	559881.	4181624.	Alameda NAS (NOAA)
65	553012.	4180017.	San Francisco-10 Arkansas
66	573801.	4174900.	San Leandro
67	608793.	4171599.	Livermore-Old First St
68	676983.	4167988.	Modesto
69	585185.	4167953.	Hayward-La Mesa
70	677002.	4167945.	Modesto-814 14th Street
71	554715.	4163835.	San Francisco Airport (NOAA)
72	581900.	4160900.	UNION CITY
73	689977.	4155765.	Turlock-Monte Vista
74	591851.	4154800.	Fremont-Chapel Way
75	570489.	4148552.	Redwood City
76	584061.	4141889.	Moffet Field (NOAA)
77	665518.	4140888.	Crows Landing (NOAA)
78	525000.	4140000.	MMS BOUY 46012
79	602475.	4138966.	San Jose-Piedmont Road
80	581700.	4136703.	Mountain View-Cuesta
81	666061.	4133311.	Crows Landing-Davis Road
82	598501.	4133171.	San Jose - 4th St.
83	594000.	4128000.	PG&E SUBSTATION IN CAMPBELL
84	590601.	4120520.	Los Gatos
85	625000.	4104400.	SAN MARTIN

APPENDIX C

ESTIMATED RELATIVE OZONE FLUX, OZONE CONCENTRATION, AND RESULTANT WIND SPEED AT SUTTER BUTTES AND LAMBIE ROAD, JUNE 21 - AUGUST 19, 1990

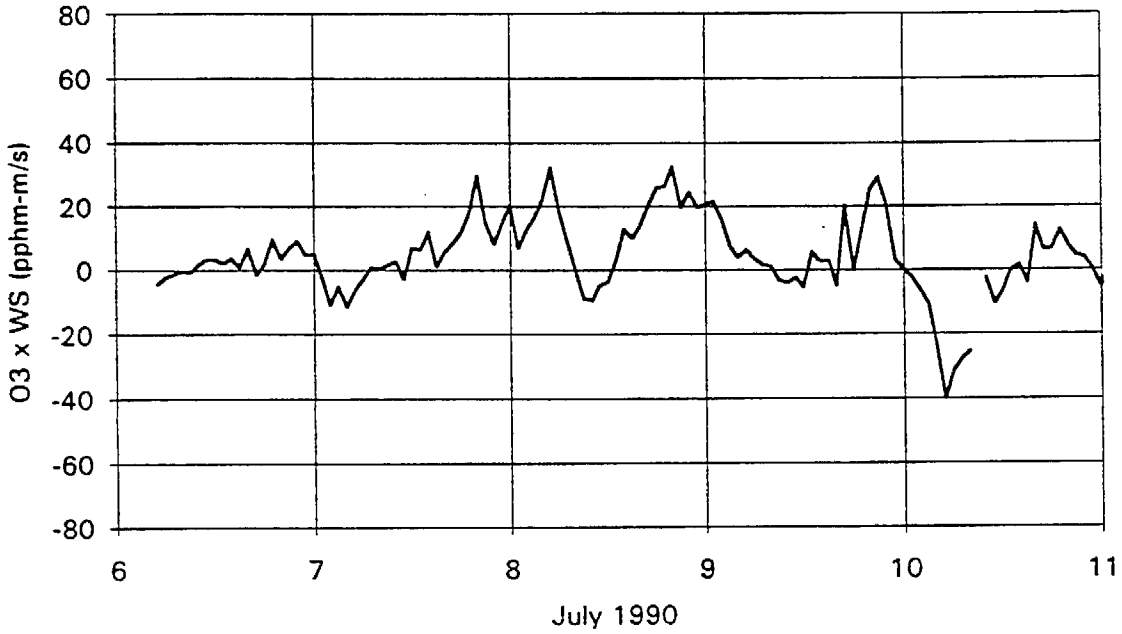
Sutter Buttes
O3 Flux Parallel to 180°

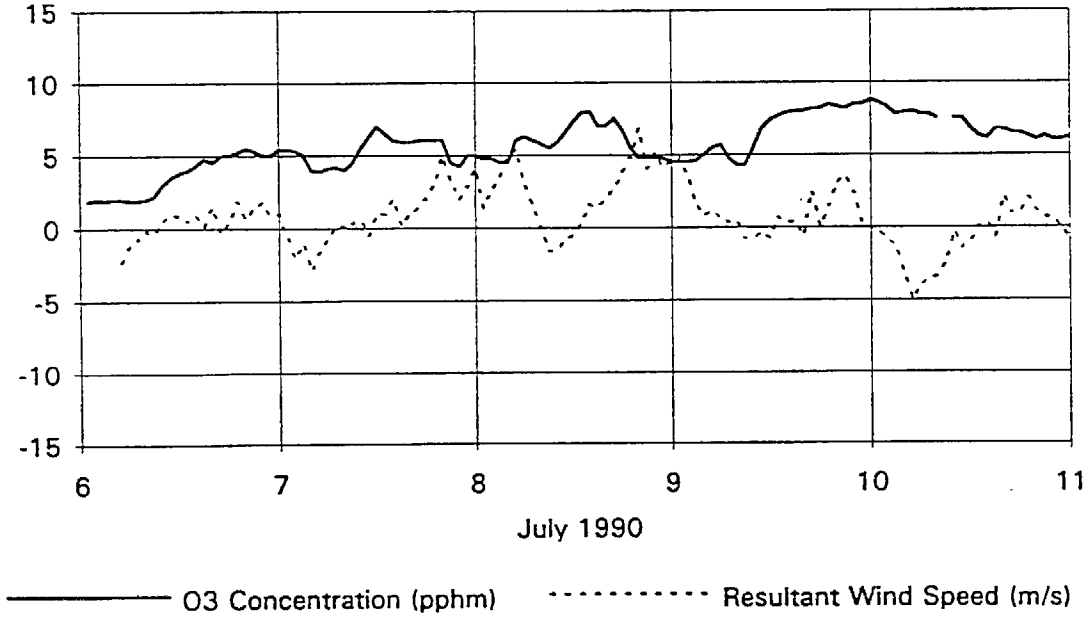




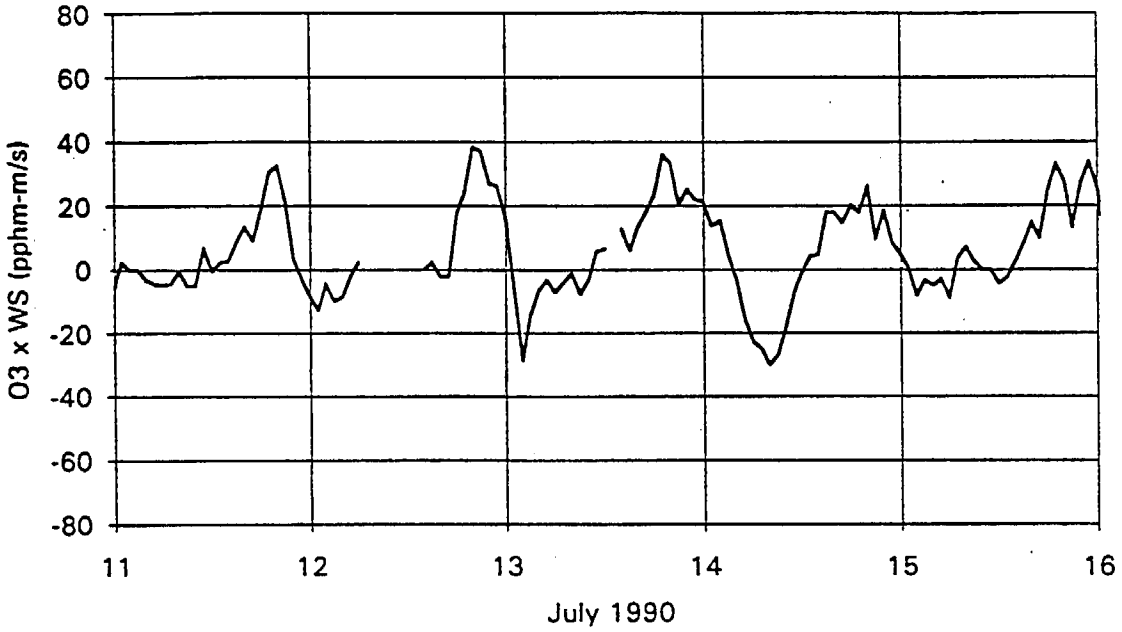
O3 Concentration (pphm) Resultant Wind Speed (m/s)

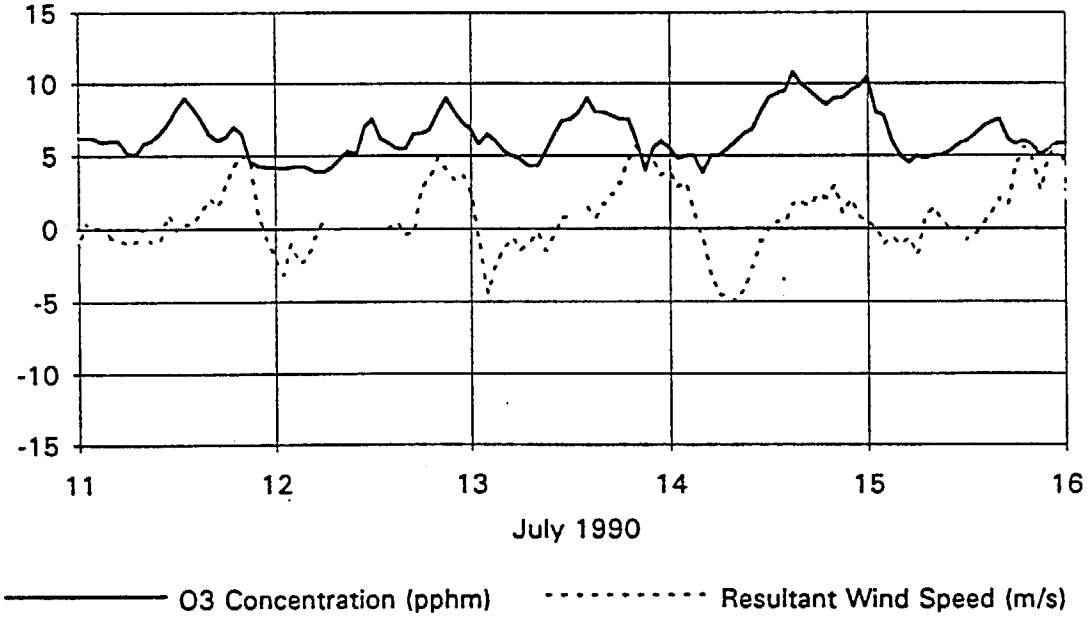
Sutter Buttes
O3 Flux Parallel to 180°



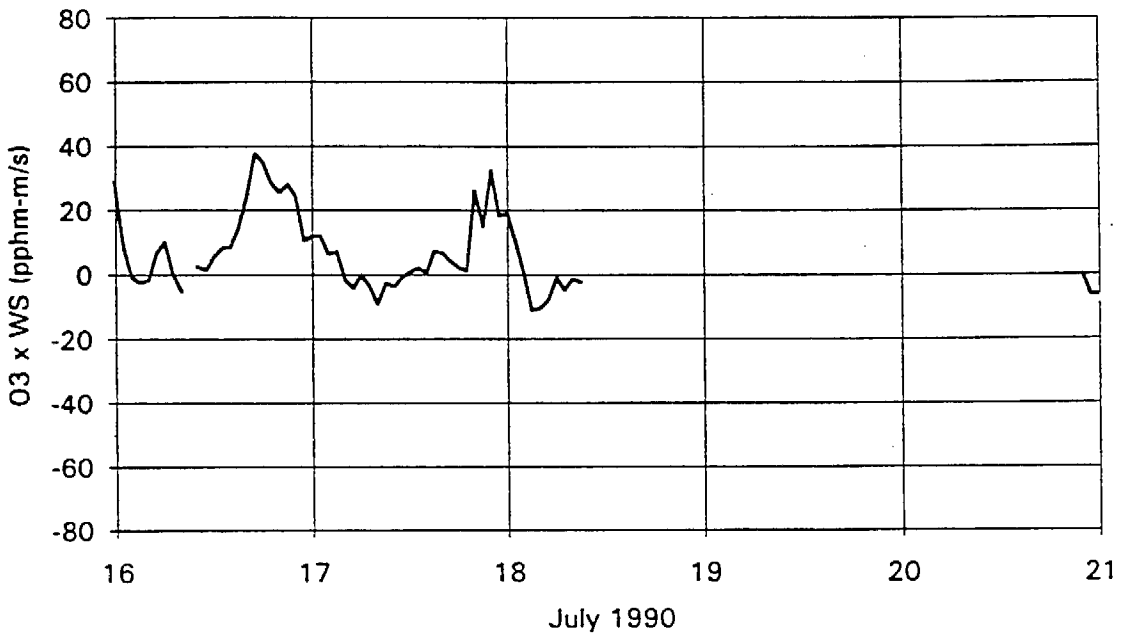


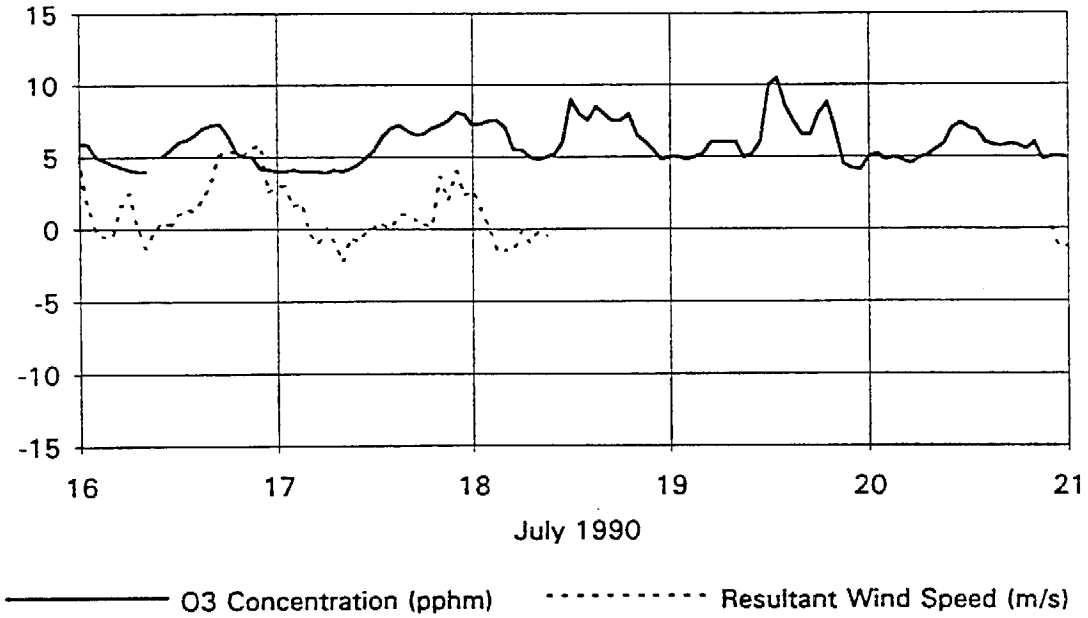
Sutter Buttes
O3 Flux Parallel to 180°



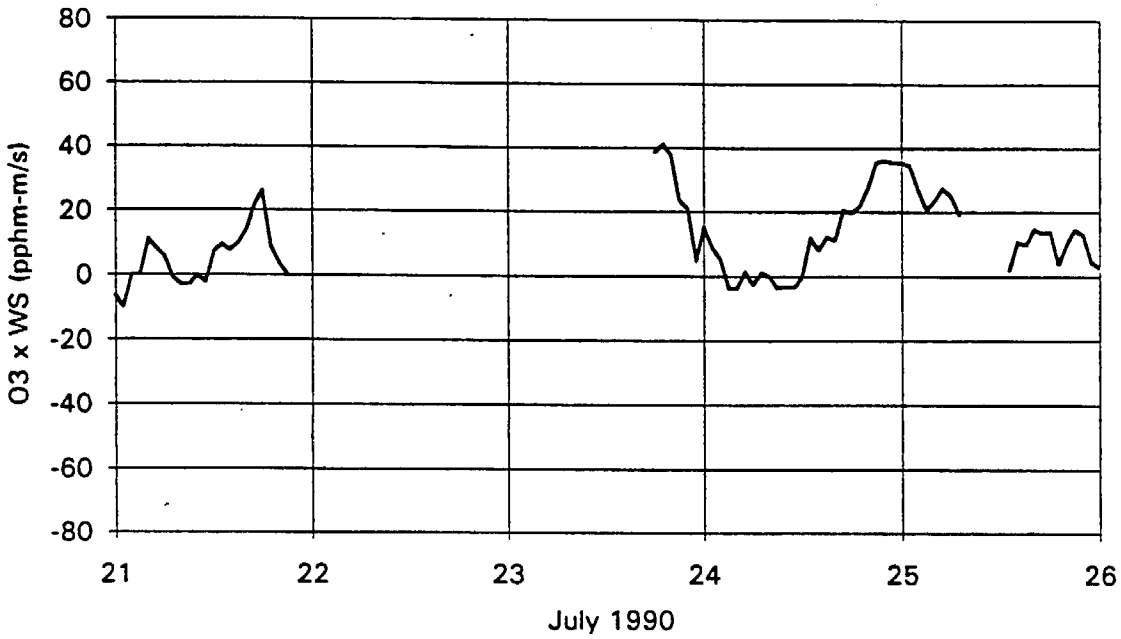


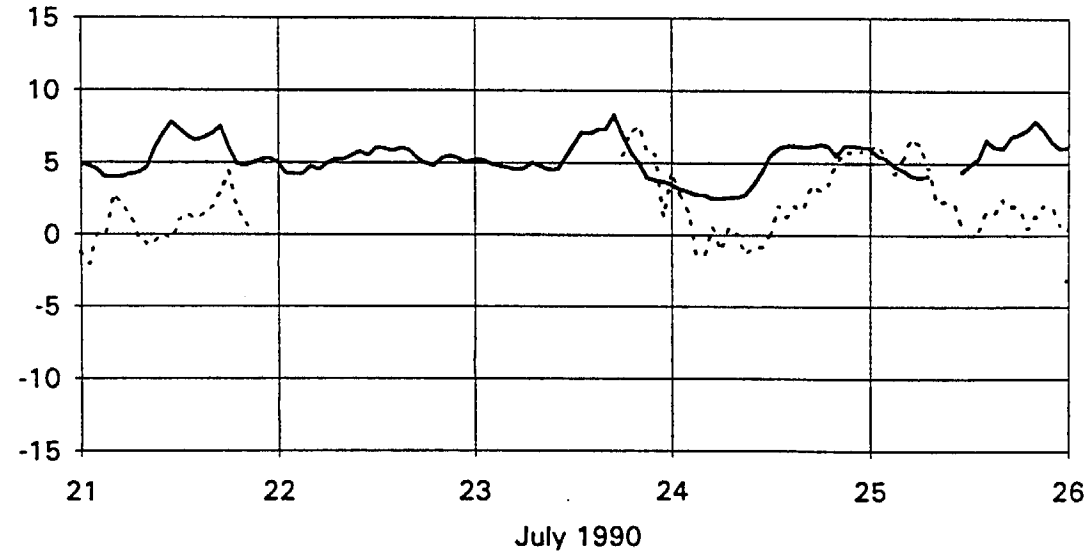
Sutter Buttes
O3 Flux Parallel to 180°



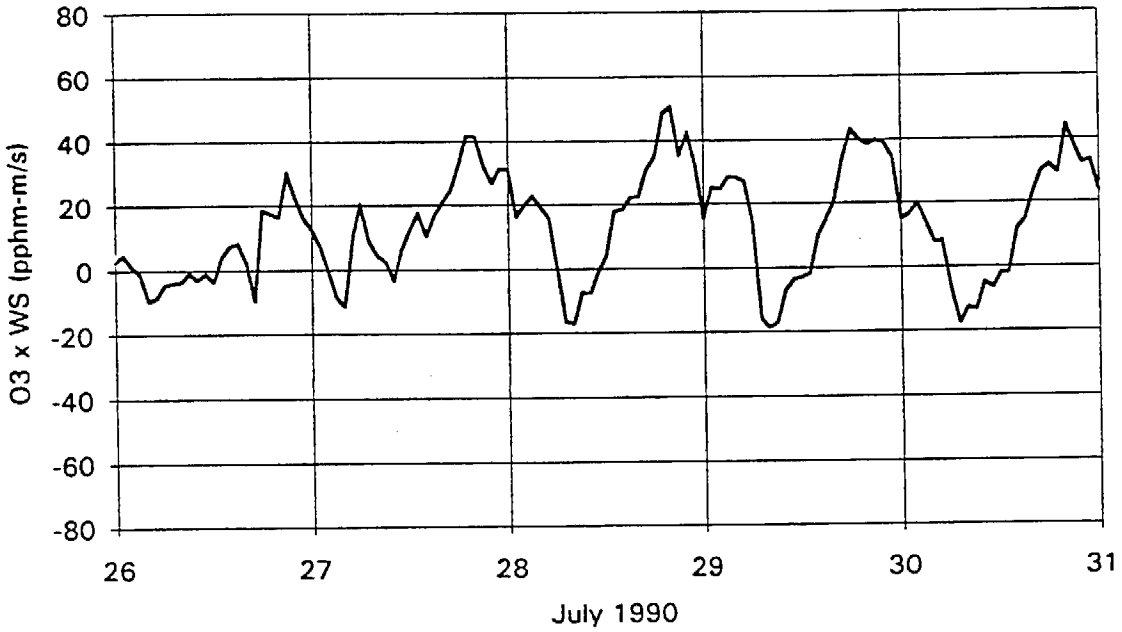


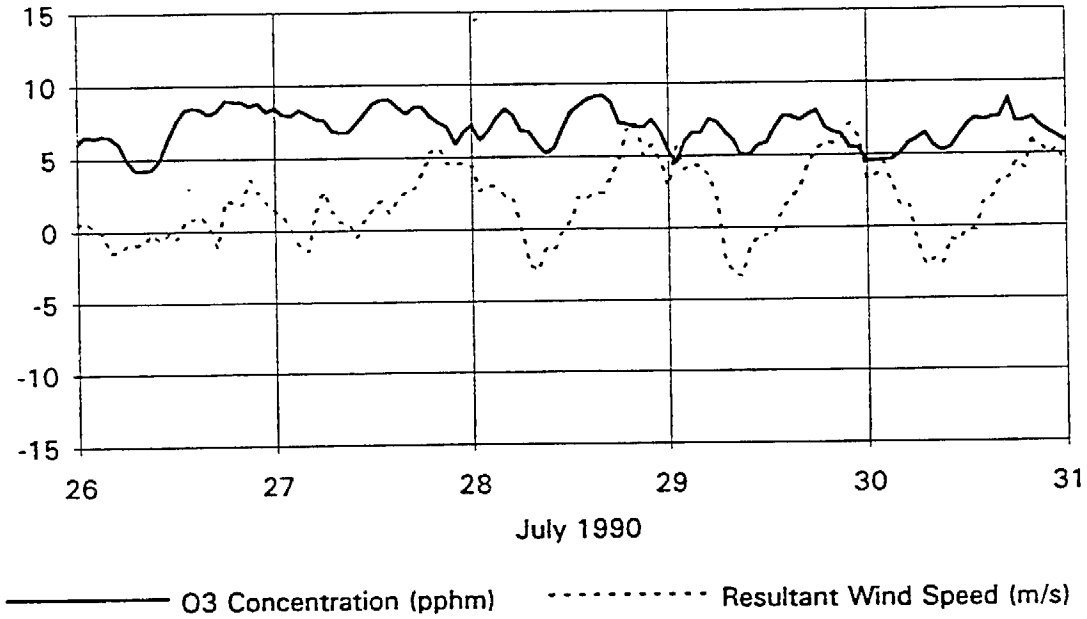
Sutter Buttes
O3 Flux Parallel to 180°



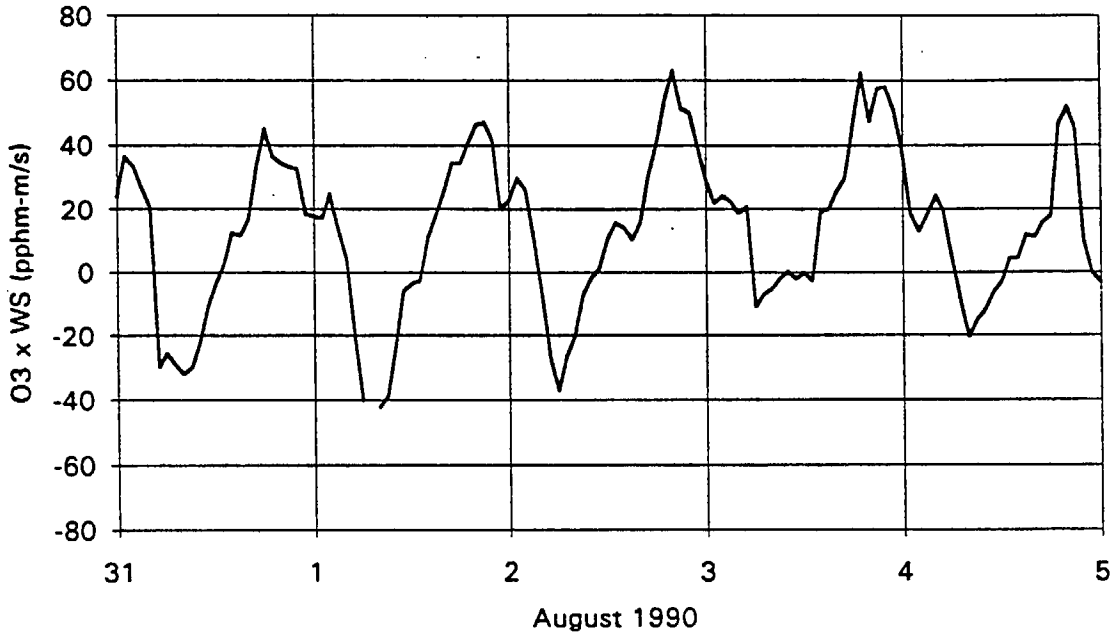


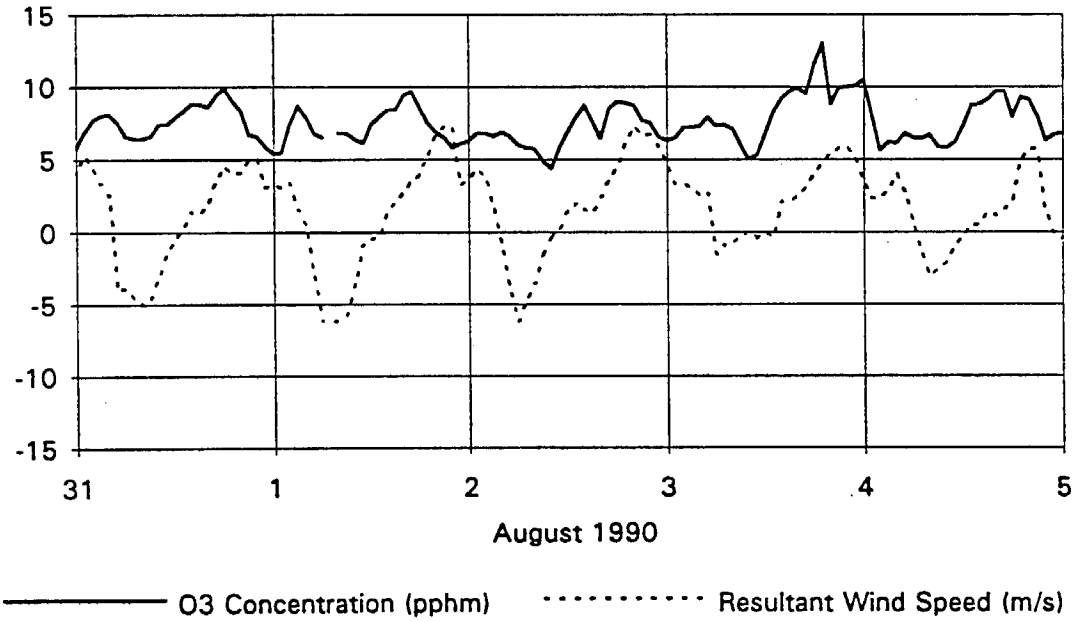
Sutter Buttes
O3 Flux Parallel to 180°



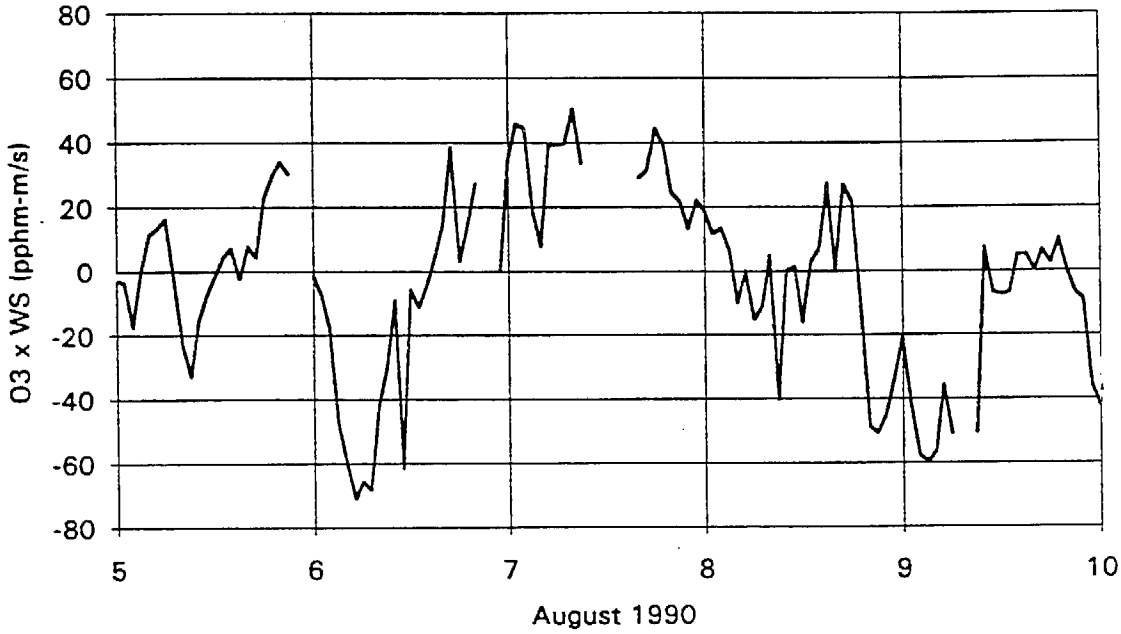


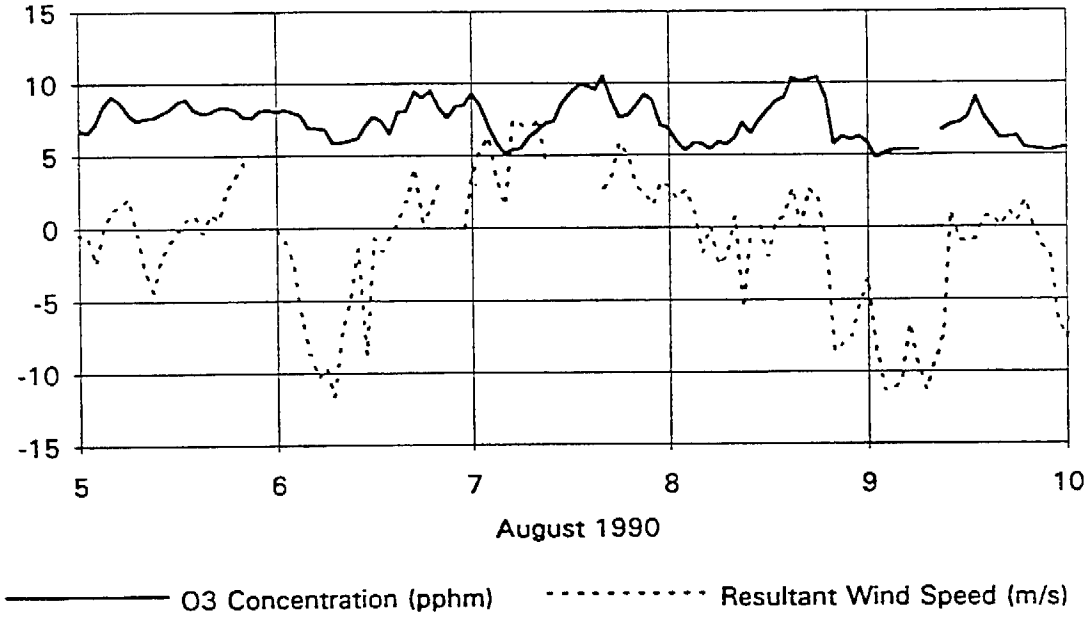
Sutter Buttes
O3 Flux Parallel to 180°



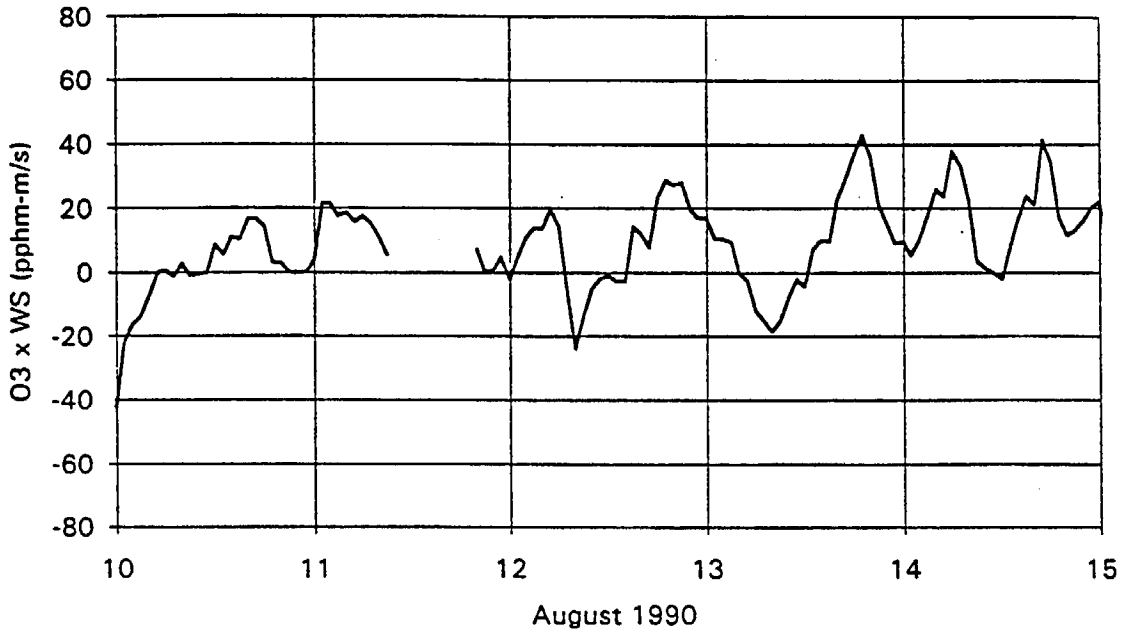


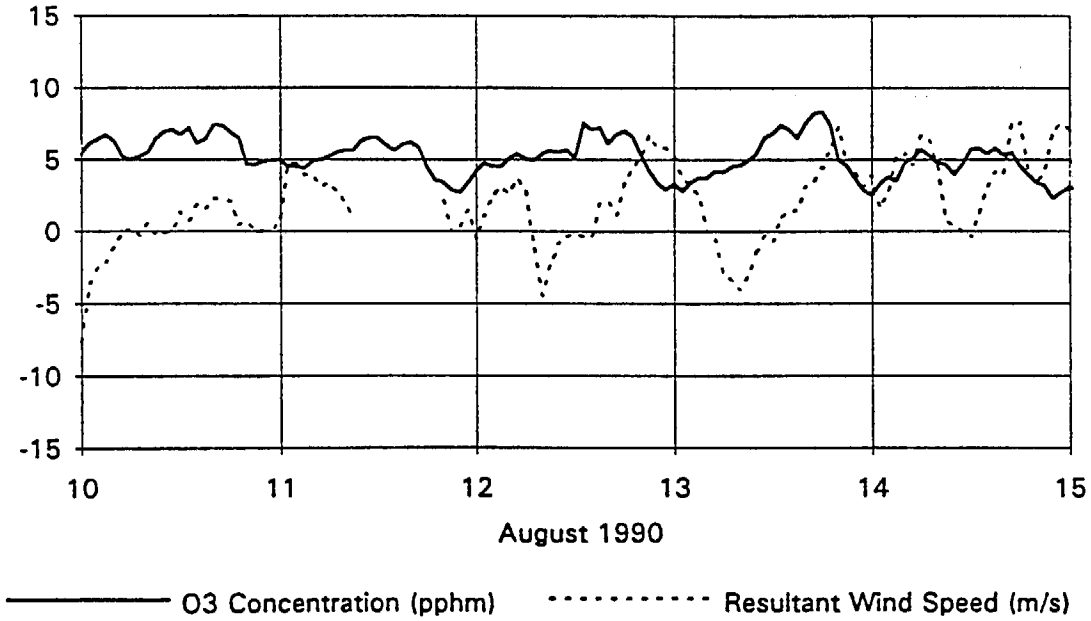
Sutter Buttes
O3 Flux Parallel to 180°



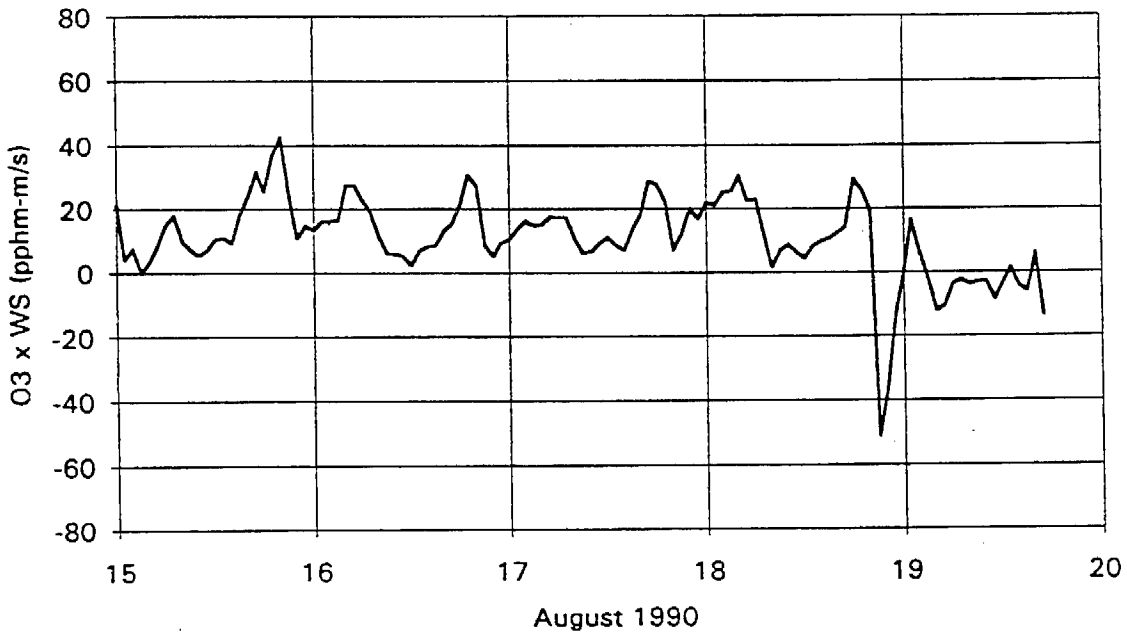


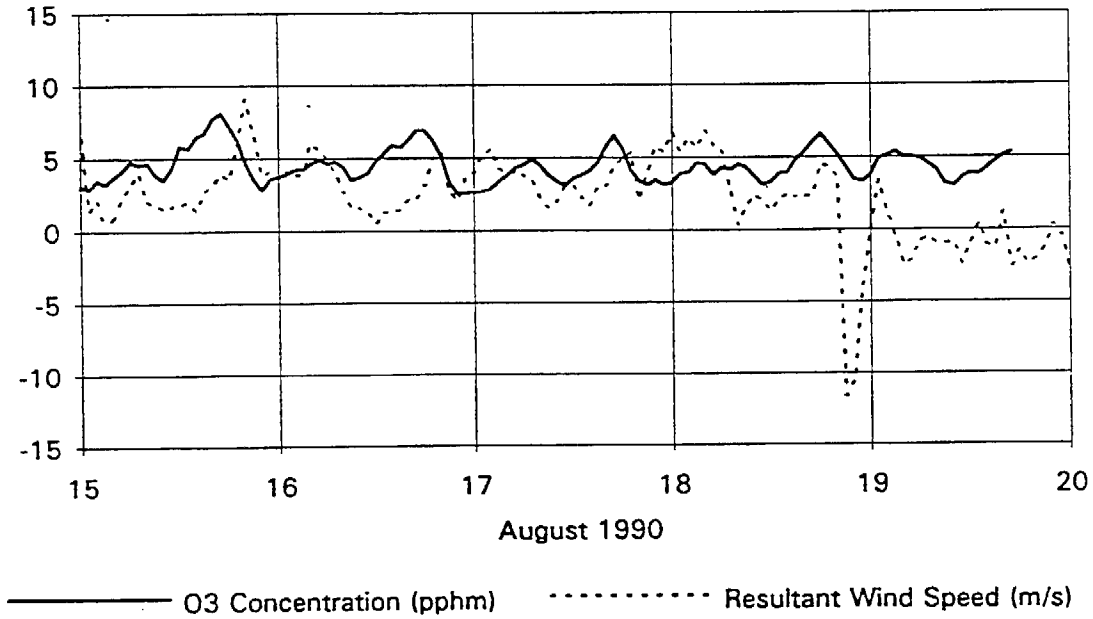
Sutter Buttes
O3 Flux Parallel to 180°



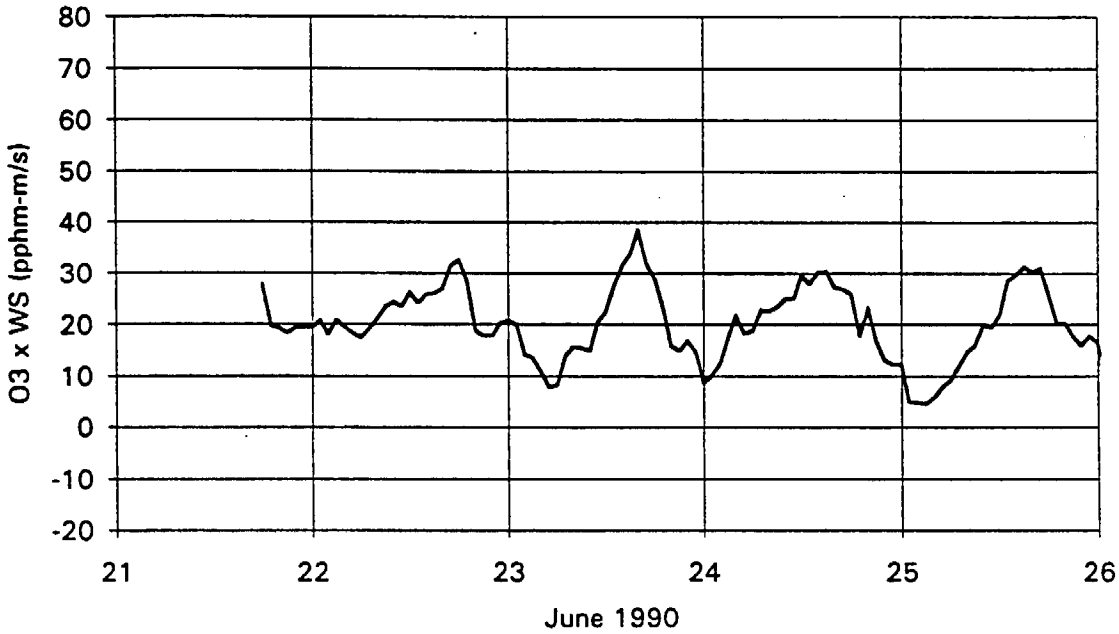


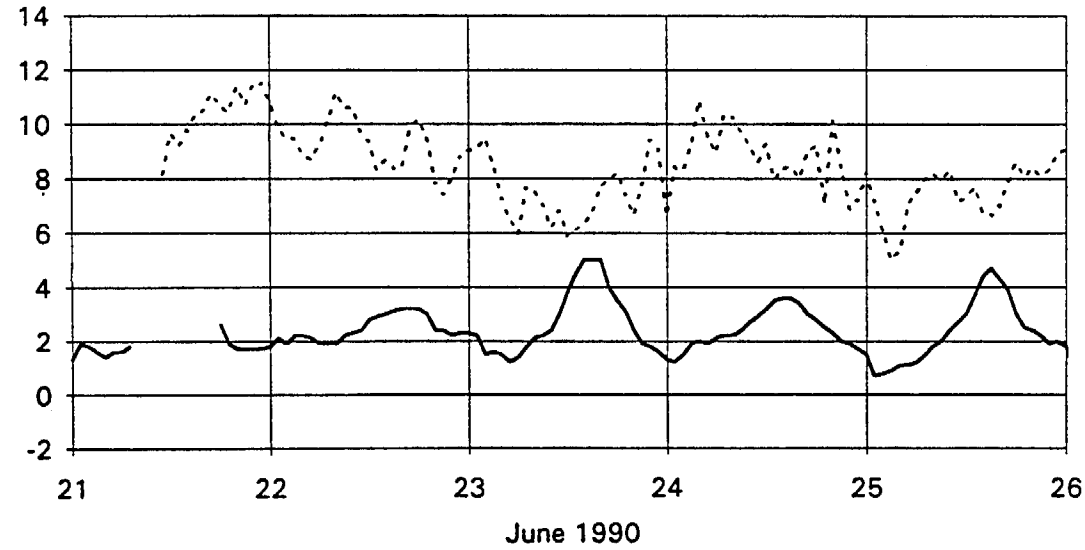
Sutter Buttes
O3 Flux Parallel to 180°





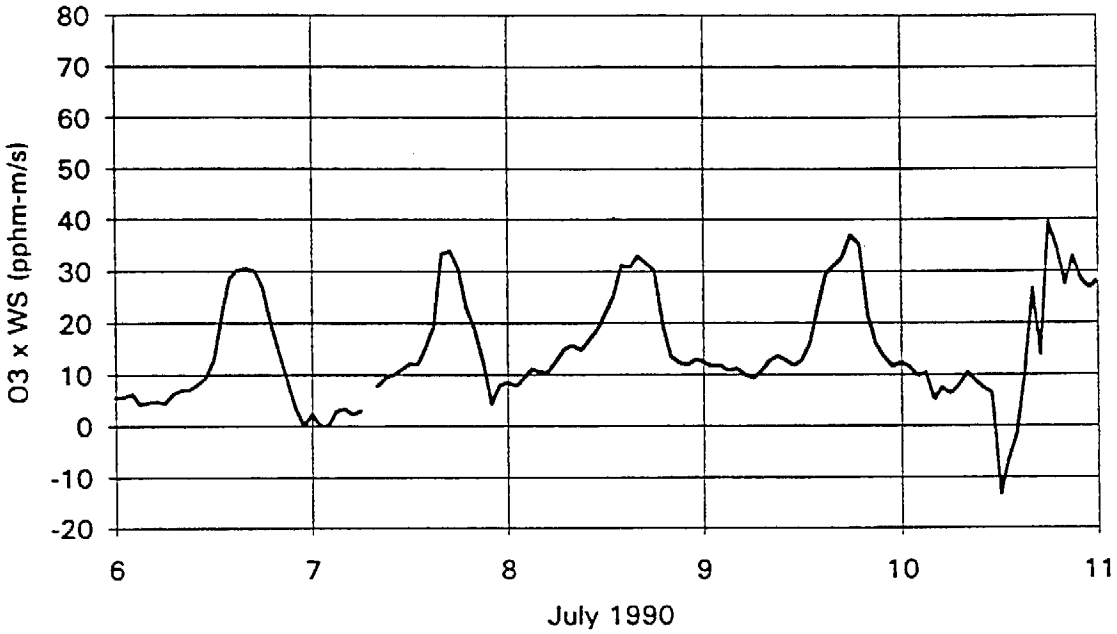
Lambie Road
O3 Flux Parallel to 230°

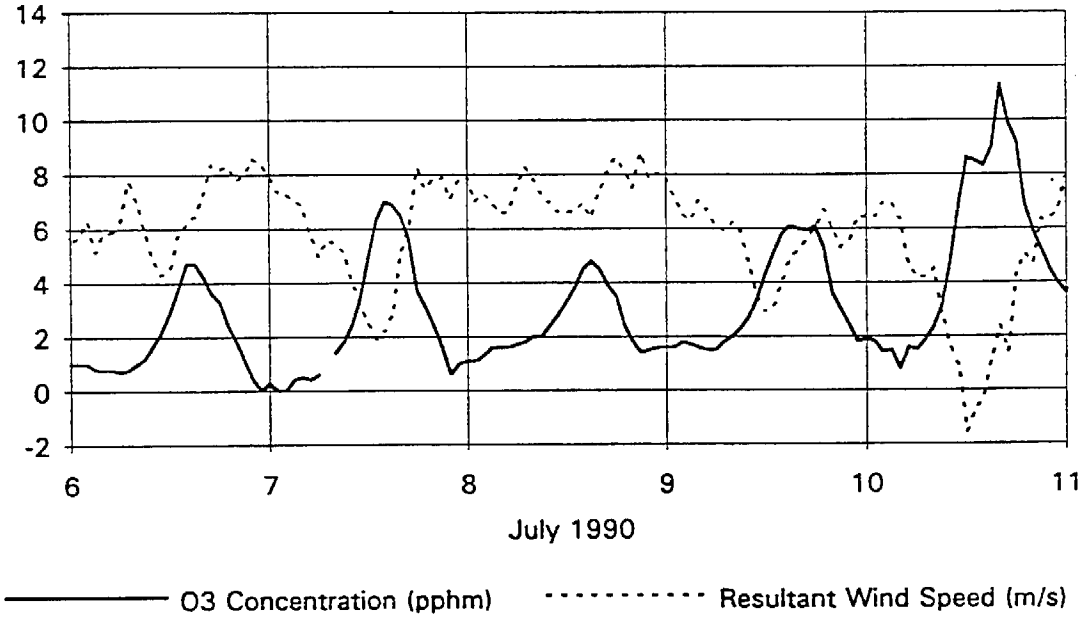




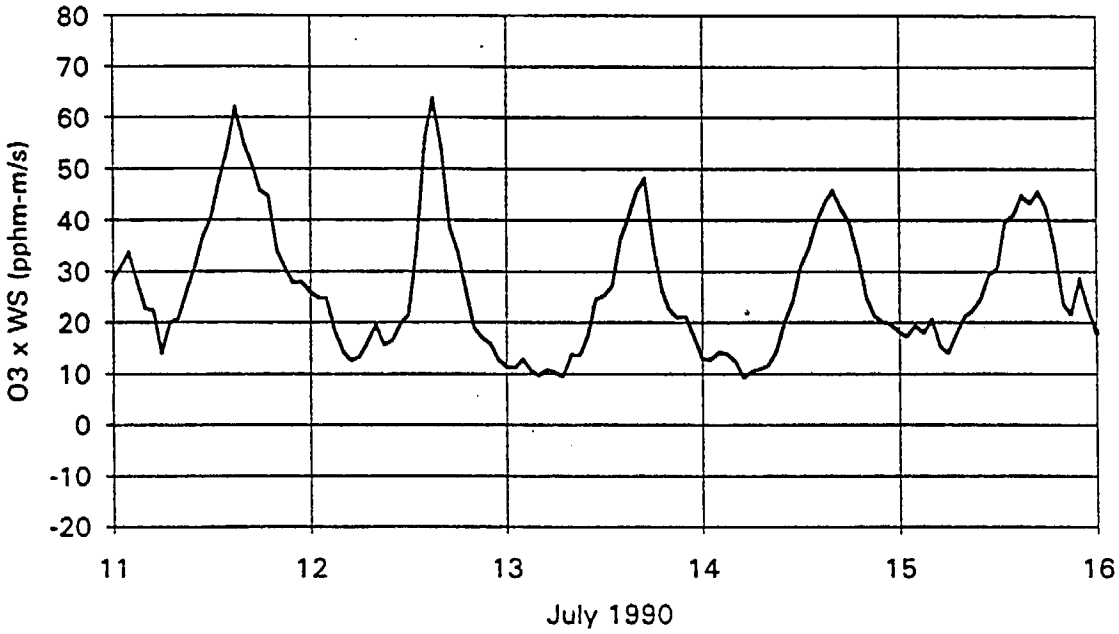
O3 Concentration (pphm) ---------- Resultant Wind Speed (m/s)

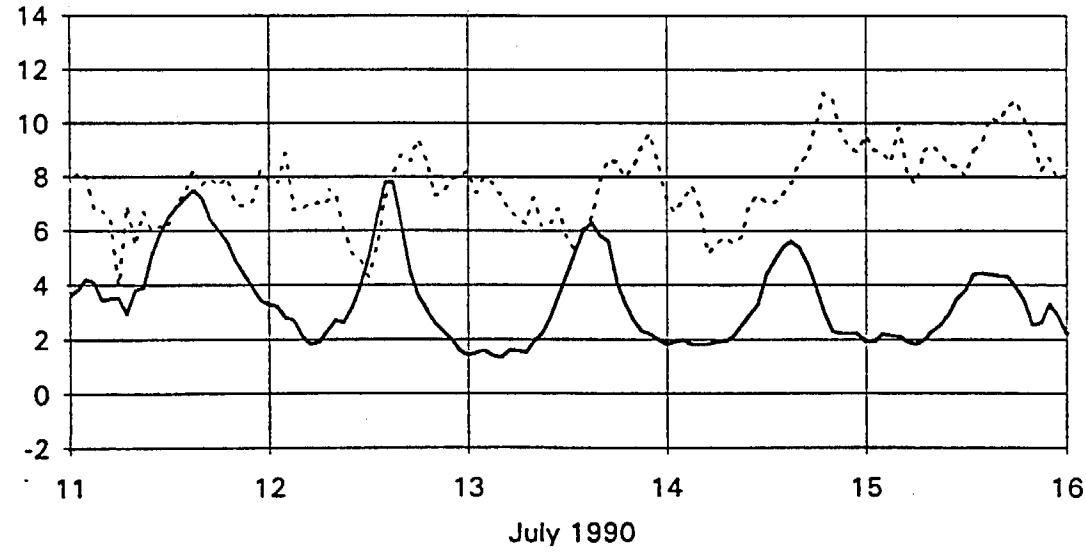
Lambie Road
O3 Flux Parallel to 230°



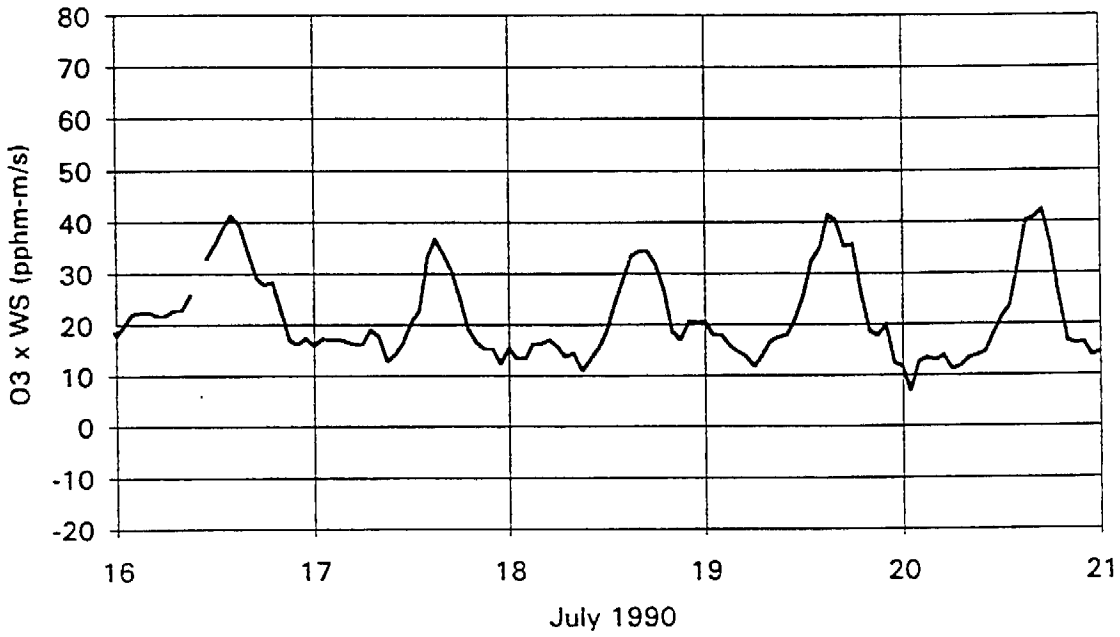


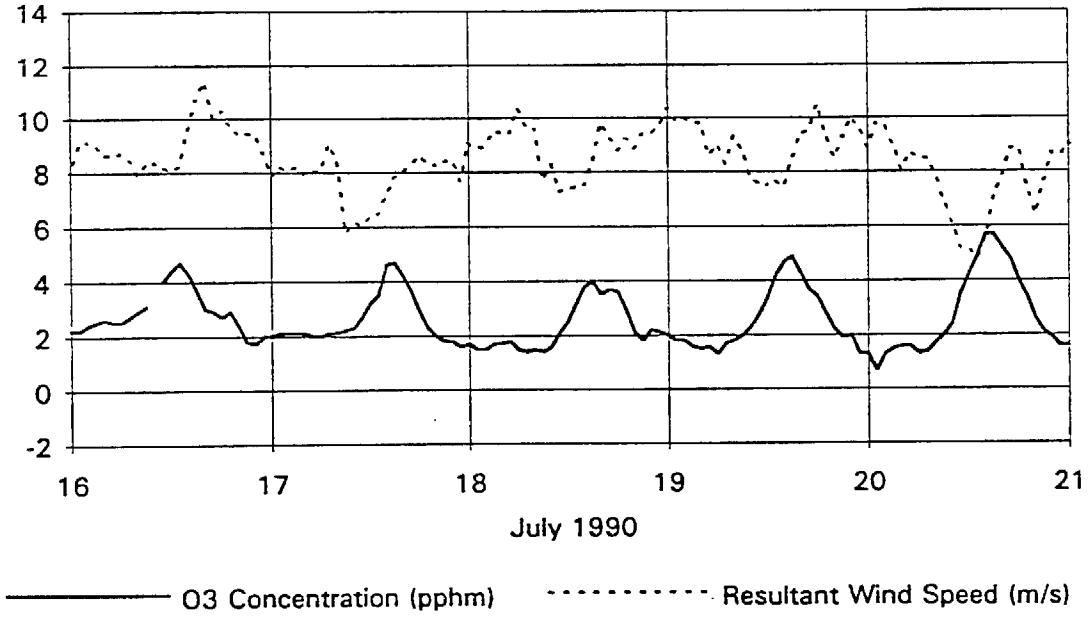
Lambie Road
O3 Flux Parallel to 230°



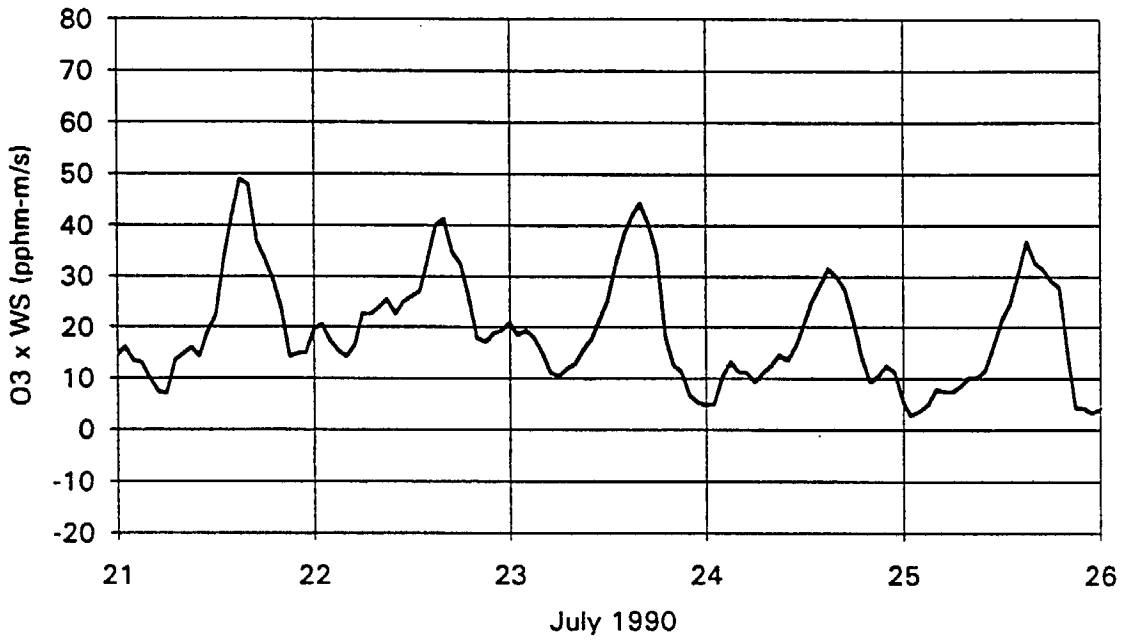


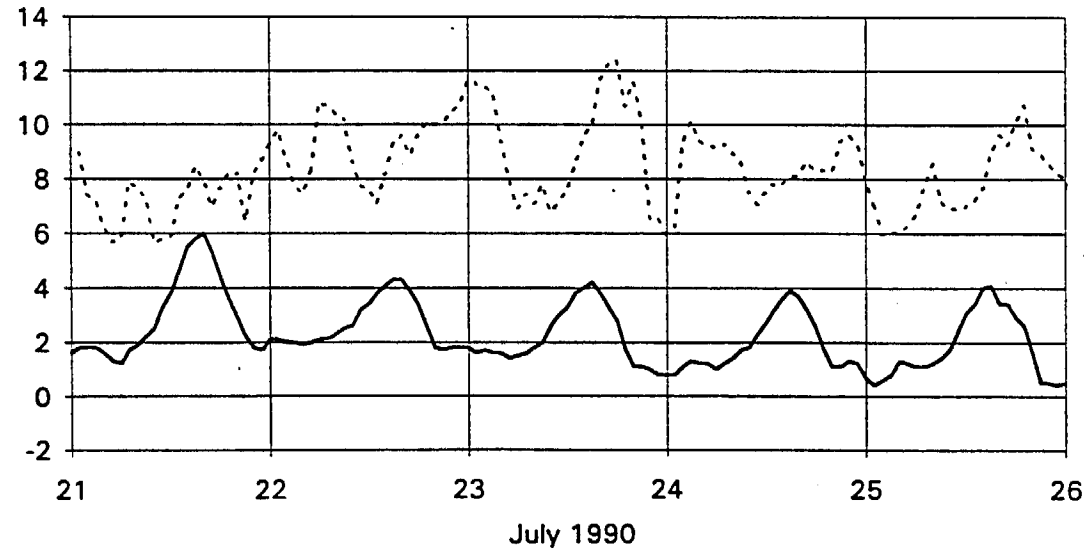
Lambie Road
O3 Flux Parallel to 230°





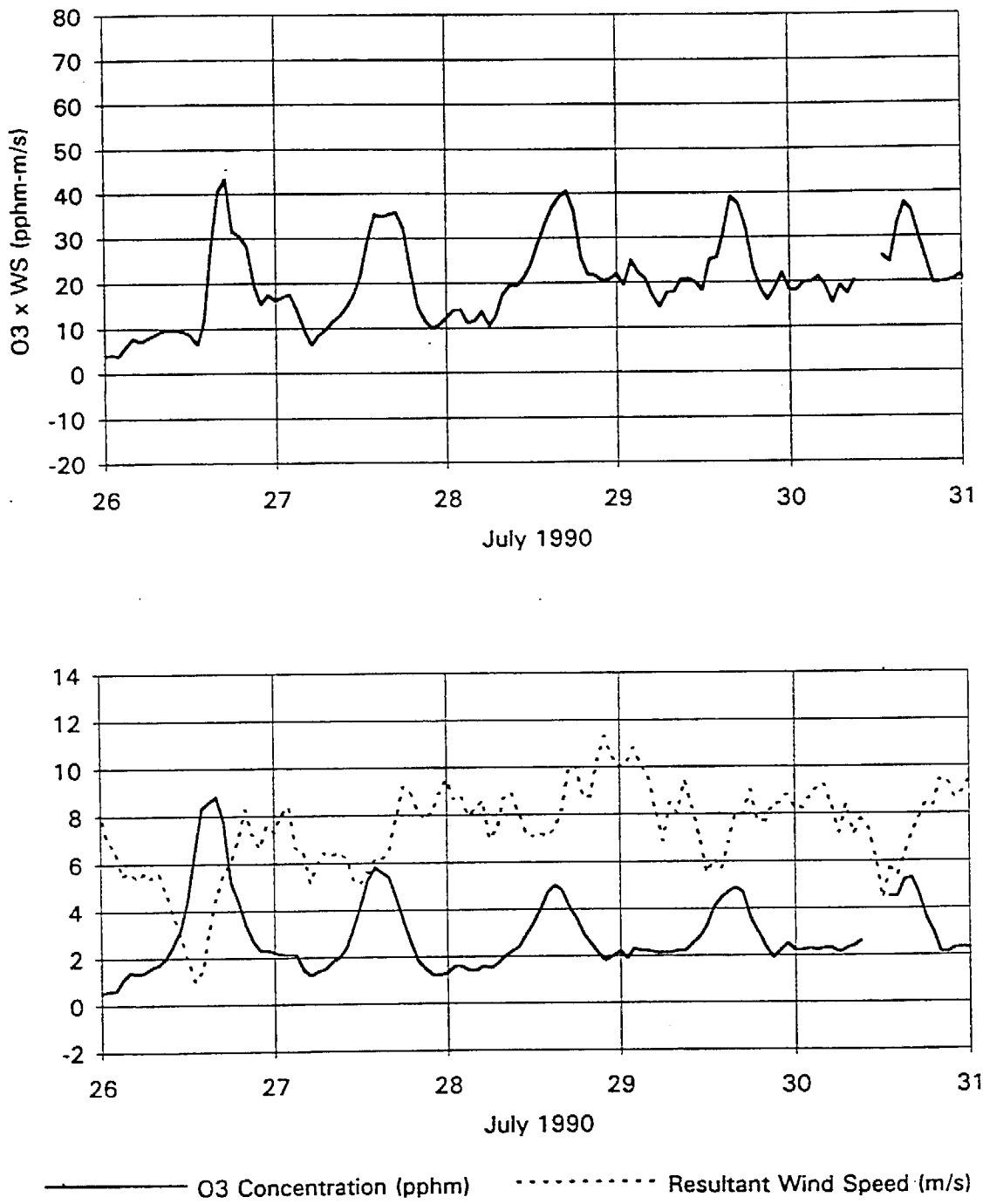
Lambie Road
O3 Flux Parallel to 230°



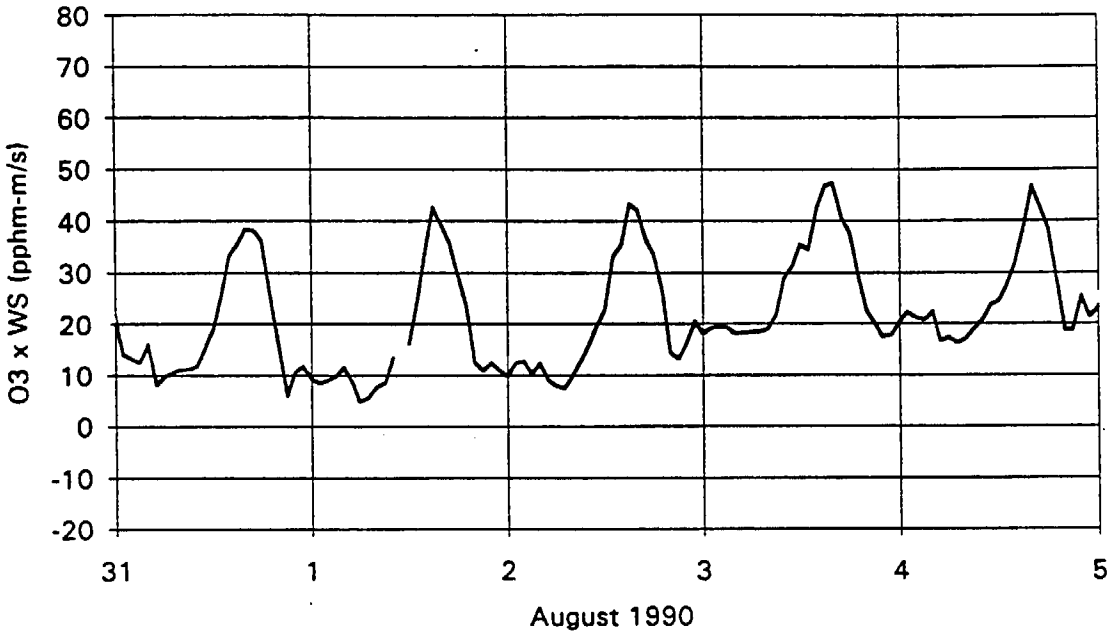


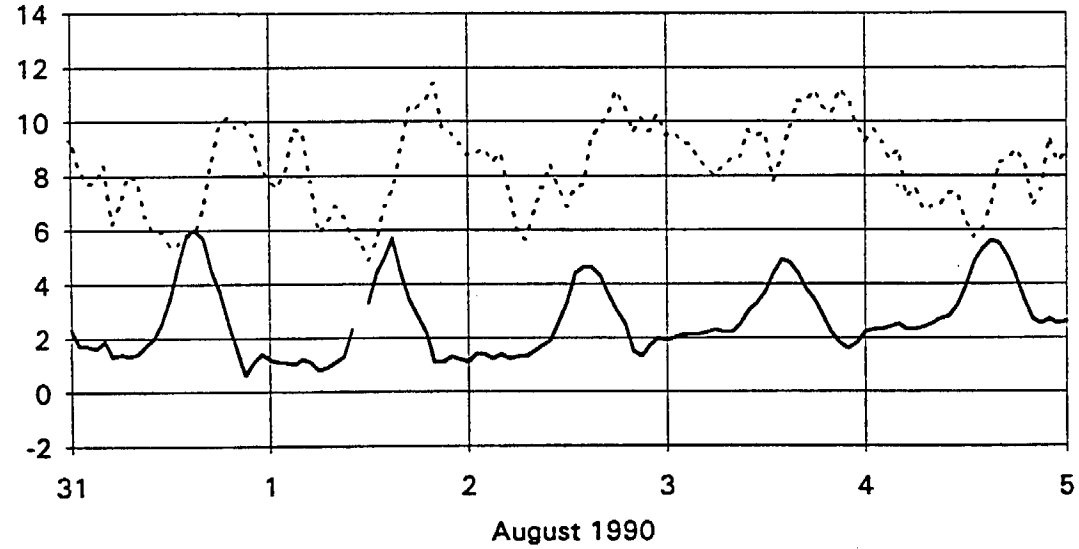
O3 Concentration (pphm) Resultant Wind Speed (m/s)

Lambie Road
O3 Flux Parallel to 230°



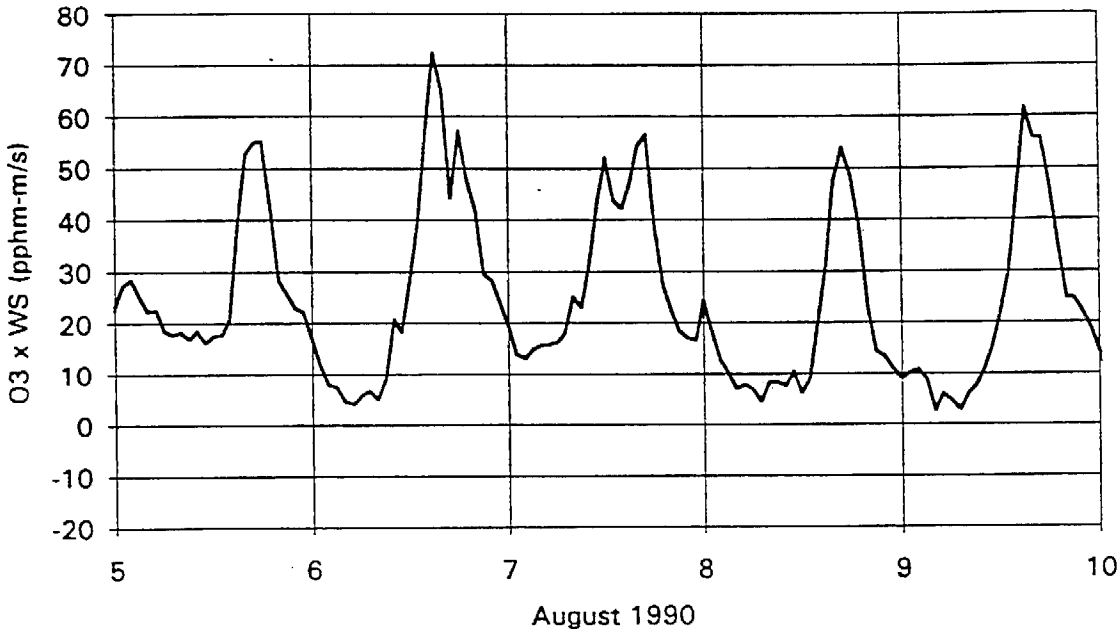
Lambie Road
O3 Flux Parallel to 230°

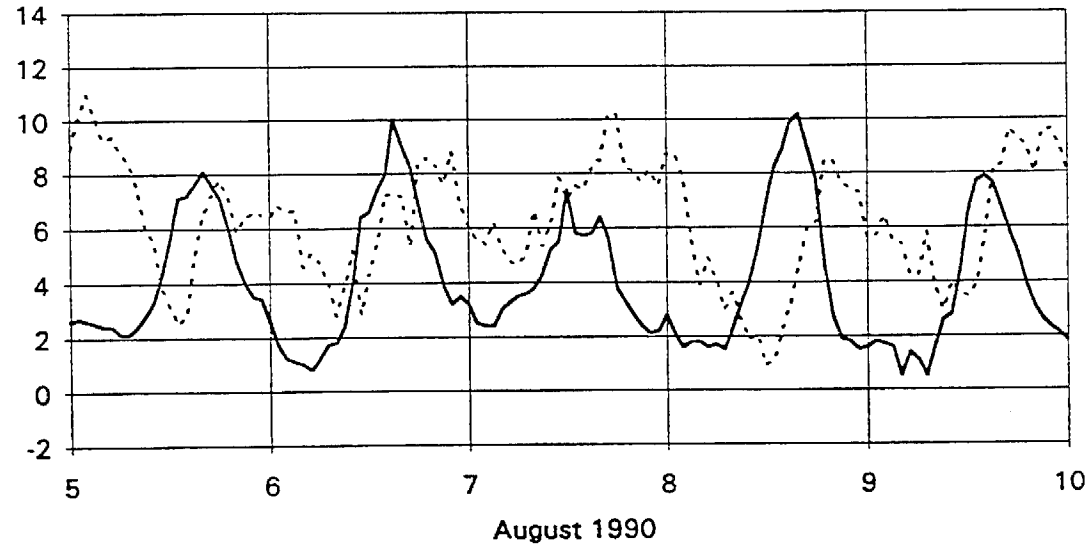




O3 Concentration (pphm) Resultant Wind Speed (m/s)

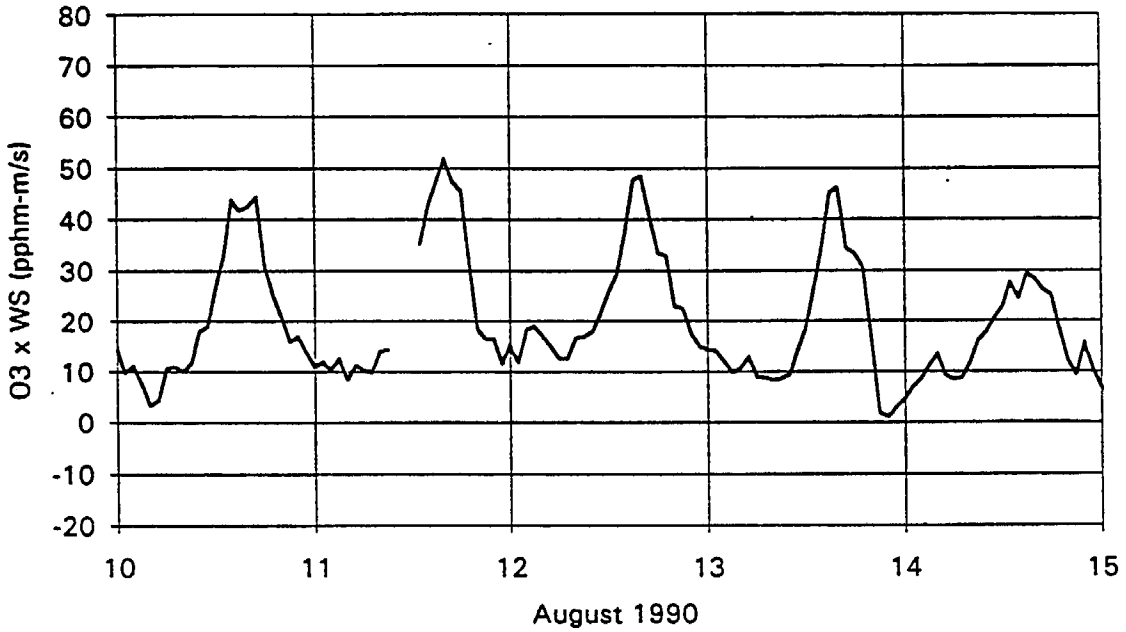
Lambie Road
O3 Flux Parallel to 230°

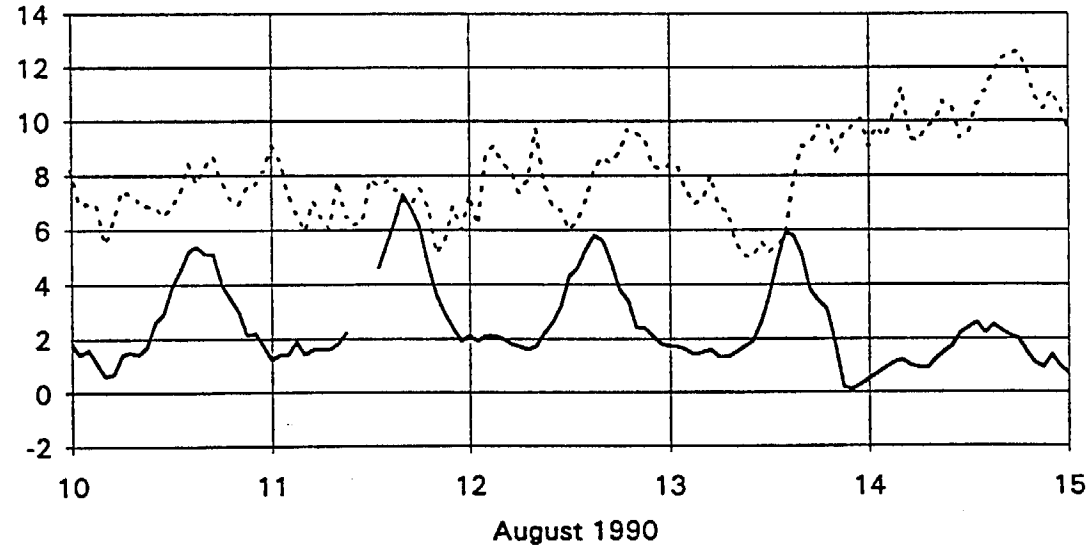




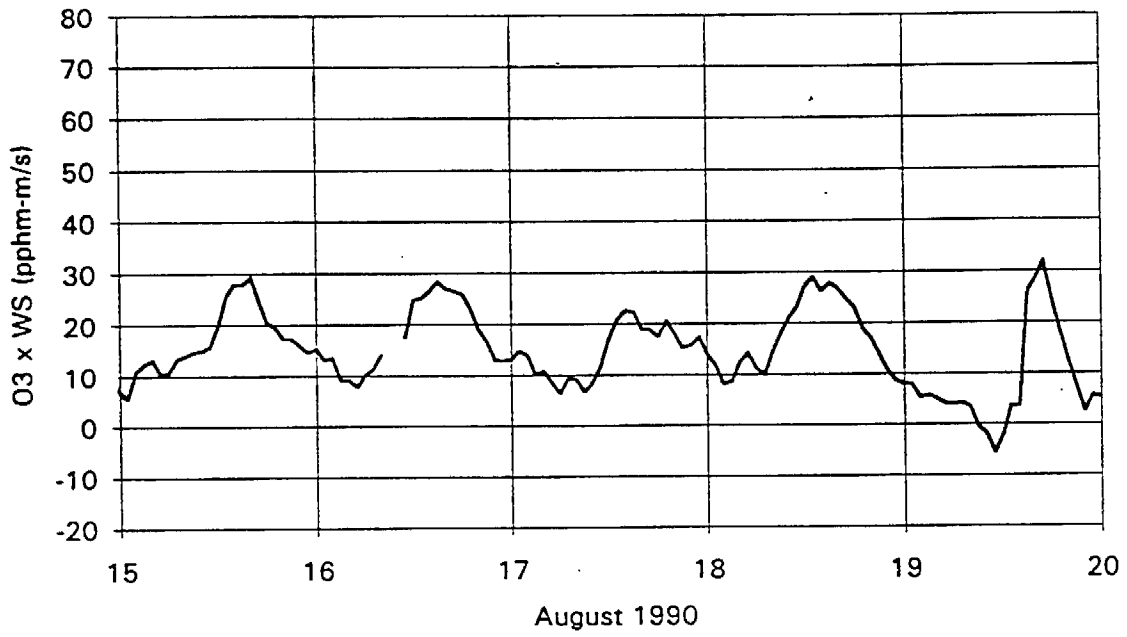
O3 Concentration (pphm) Resultant Wind Speed (m/s)

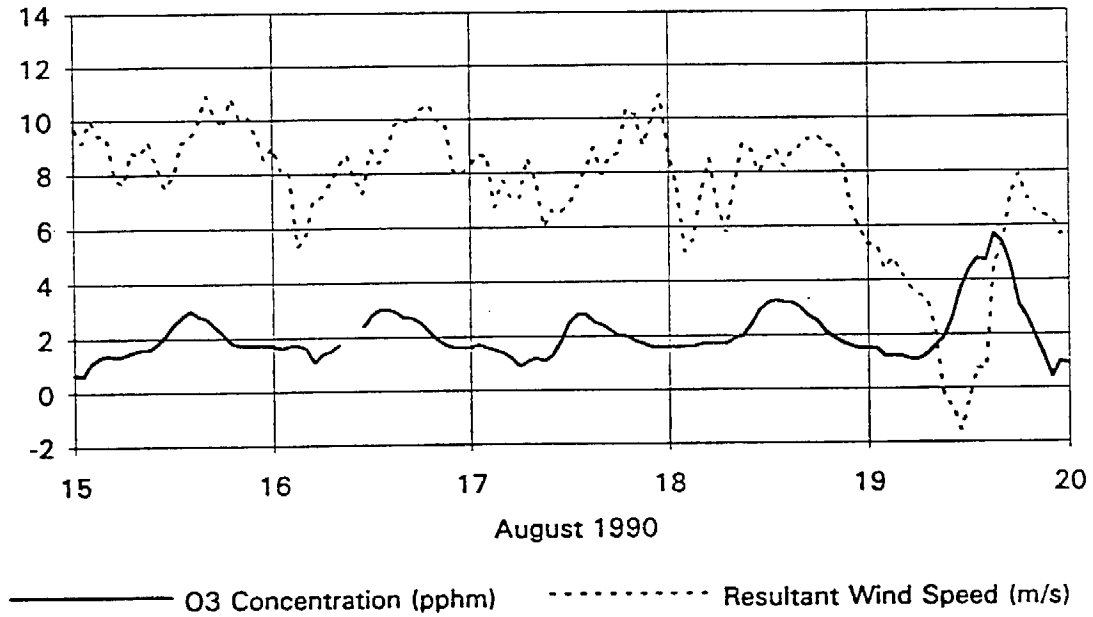
Lambie Road
O3 Flux Parallel to 230°





Lambie Road
O3 Flux Parallel to 230°





APPENDIX D

VOC AND EXOTICS DATA SUMMARY FROM THE UPPER SACRAMENTO VALLEY TRANSPORT STUDY

The following pages list the volatile organic compound (VOC) and exotic species (chlorofluorocarbons - CFCs) data collected during the Upper Sacramento Valley field measurement portion of the Methods Development for Quantification of Ozone Transport for California Study (Upper Sacramento Valley Transport study). Table D-1 lists the location, date, time, average altitude, and major hydrocarbon group concentrations including identified species, paraffins, olefins, aromatic and unidentified hydrocarbons, and total nonmethane hydrocarbon (NMHC) for each sample. Also included is a validation code assigned by STI during data validation and analyses. These codes are defined in Table D-2. Samples were flagged as having unusually high fractions or concentrations of species based on scatter plots, box-whisker plots, species composition profiles, or other analyses. The complete listing of hydrocarbon data is provided by Rasmussen (1991).

Table D-3 lists the location, date, time, average altitude, and exotics species concentrations for each sample collected in the Upper Sacramento Valley Transport study. Also included are six samples collected during the Sacramento Area Ozone Study.

Table D-4 lists the location, date, time, and exotics species concentrations for each sample collected at Point Reyes and Richmond during the San Joaquin Valley/AUSPEX study. These data were part of a working data base provided by the Air Resources Board (ARB) (K. Magliano, 1992).

Table D-1. Major VOC species groups concentrations for each sample collected during the Upper Sacramento Valley Transport study.

Location	YRMODY	Time (PDT)	Average Altitude (m msl)	Identif'd	Paraffins	Olefins	Aromatics	Unident'd	NMHC	Valid Code
Auburn	900713	1554	914	43.3	21.8	9.0	12.5	41.6	84.9	-1
Davis	900730	1029	609	13.7	6.0	1.8	5.9	18.0	31.7	-1
Davis/Sun	900730	1041	455	14.7	7.5	1.5	5.7	4.9	19.6	-1
Folsom	900711	1442	609	84.1	49.2	10.6	24.3	58.2	142.3	-1
Haigh	900811	734	630	22.9	11.6	5.3	6.0	16.7	39.6	-1
Haigh	900812	740	616	211.3	140.2	63.1	8.0	14.9	226.2	3,11,12,13
Haigh	900913	809	608	23.6	13.6	3.9	6.1	32.4	56.0	-1
Haigh	900912	812	635	21.1	11.5	2.4	7.2	57.4	78.5	-1
Haigh	900713	819	611	21.5	9.0	2.7	9.8	33.0	54.5	-1
Haigh	900712	828	615	325.0	9.2	303.7	12.1	37.3	362.3	2
Haigh	900712	1427	479	17.2	5.7	1.7	9.8	11.4	28.6	-1
Haigh	900912	1434	458	17.3	9.3	3.2	4.8	12.0	29.3	-1
Haigh	900811	1453	462	10.6	4.5	1.7	4.4	6.2	16.8	-1
Haigh	900713	1459	452	26.1	11.1	2.6	12.4	54.5	80.6	-1
Haigh	900913	1506	458	18.8	10.5	3.6	4.7	14.2	33.0	-1
Haigh	900812	1527	463	11.6	5.3	1.5	4.8	10.7	22.3	-1
Maxwell	900811	623	633	14.4	6.7	2.4	5.3	29.5	43.9	-1
Maxwell	900812	627	604	15.1	7.2	2.8	5.1	13.8	28.9	-1
Maxwell	900913	651	608	17.6	10.7	1.9	5.0	13.5	31.1	-1
Maxwell	900912	653	632	17.9	10.6	1.7	5.6	14.9	32.8	-1
Maxwell	900713	710	597	13.0	4.7	1.7	6.6	9.0	22.0	-1
Maxwell	900712	716	605	894.9	26.9	836.3	31.7	55.0	949.9	7,4,10
Maxwell	900711	1405	481	290.1	138.2	141.0	10.9	80.9	371.0	8,12
Maxwell	900810	1454	478	13.6	5.4	1.0	7.2	9.0	22.6	-1
Maxwell	900711	1510	473	53.2	27.8	13.4	12.0	12.8	66.0	-1
Maxwell	900811	1519	450	10.7	5.1	1.6	4.0	2.2	12.9	-1
Maxwell	900712	1521	476	66.2	28.2	27.2	10.8	21.2	87.4	-1
Maxwell	900713	1525	466	21.4	10.1	2.5	8.8	34.9	56.3	-1
Maxwell	900911	1526	472	19.1	10.7	2.6	5.8	9.1	28.2	-1
Maxwell	900912	1531	458	31.5	13.8	9.6	8.1	17.1	48.6	-1
Maxwell	900913	1536	458	21.1	13.7	2.5	4.9	24.0	45.1	-1
Maxwell	900812	1554	466	20.6	11.0	3.4	6.2	19.8	40.4	-1
Maxwell	900810	1608	437	14.8	6.7	2.1	6.0	12.0	26.8	-1
N. Yuba	900811	541	618	11.1	6.0	1.9	3.2	12.6	23.7	-1
N. Yuba	900812	543	602	20.6	11.1	2.7	6.8	23.3	43.9	-1
N. Yuba	900913	604	608	15.0	6.4	3.3	5.3	13.4	28.4	-1
N. Yuba	900912	605	633	29.2	14.7	8.4	6.1	7.2	36.4	-1
N. Yuba	900713	626	616	22.1	10.1	5.2	6.8	13.6	35.7	-1
N. Yuba	900712	634	599	202.3	153.9	37.8	10.6	24.0	226.3	3
N. Yuba	900711	1318	508	15.2	8.3	2.3	4.6	16.3	31.5	-1
N. Yuba	900810	1355	442	18.7	10.3	2.4	6.0	10.6	29.3	-1
N. Yuba	900911	1423	577	32.9	18.1	6.4	8.4	35.7	68.6	-1
N. Yuba	900711	1555	480	24.3	9.5	1.3	13.5	25.1	49.4	-1
N. Yuba	900811	1601	467	13.5	6.3	2.0	5.2	9.9	23.4	-1
N. Yuba	900712	1606	473	23.4	8.8	2.1	12.5	11.0	34.4	-1
N. Yuba	900713	1610	471	35.5	18.5	5.0	12.0	34.2	69.7	-1

Table D-1. Major VOC species groups concentrations for each sample collected during the Upper Sacramento Valley Transport study.

Location	YRMODY	Time (PDT)	Average Altitude (m msl)	Identif'd	Paraffins	Olefins	Aromatics	Unident'd	NMHC	Valid Code
N. Yuba	900912	1619	458	24.3	13.6	3.7	7.0	27.8	52.1	-1
N. Yuba	900913	1622	458	17.1	9.3	3.6	4.2	17.3	34.4	-1
N. Yuba	900812	1639	457	9.3	3.8	1.0	4.5	10.0	19.3	-1
N. Yuba	900810	1702	485	17.7	9.7	3.1	4.9	23.4	41.1	-1
N. Yuba	900911	1723	469	19.9	10.4	3.9	5.6	13.1	33.0	-1
Chico	900811	711	627	22.5	12.9	2.1	7.5	14.3	36.8	-1
Chico	900812	718	618	52.2	24.4	13.6	14.2	36.0	88.2	9
Chico	900913	744	608	814.8	50.3	707.8	56.7	70.2	885.0	7,4
Chico	900912	746	637	17.0	8.9	2.6	5.5	19.7	36.7	-1
Chico	900713	754	613	87.5	52.1	10.2	25.2	22.8	110.3	11,13,14
Chico	900712	805	616	78.6	40.9	25.7	12.0	37.3	115.9	12
Chico	900811	1430	457	111.7	5.3	100.5	5.9	9.5	121.2	2
Chico	900713	1435	471	1039.6	784.4	244.0	11.2	47.6	1087.2	6,8
Chico	900913	1441	458	13.6	5.4	4.1	4.1	22.6	36.2	-1
Chico	900712	1453	477	23.3	7.9	4.1	11.3	29.6	52.9	-1
Chico	900912	1459	458	28.1	17.1	3.6	7.4	47.9	76.0	-1
Chico	900812	1503	444	14.8	7.2	2.1	5.5	39.4	54.2	-1
Red Bluff	900811	801	607	30.5	15.0	6.7	8.8	8.9	39.4	-1
Red Bluff	900812	805	624	30.6	13.9	4.2	12.5	2.6	33.2	-1
Red Bluff	900913	838	608	26.1	16.8	2.9	6.4	38.0	64.1	-1
Red Bluff	900912	841	622	6.1	2.3	0.4	3.4	6.3	12.4	-1
Red Bluff	900713	846	611	20.4	6.5	3.1	10.8	8.9	29.3	-1
Red Bluff	900712	856	603	161.3	60.0	90.8	10.5	31.8	193.1	12,4
Red Bluff	900811	1358	440	21.7	11.2	5.8	4.7	14.3	36.0	-1
Red Bluff	900713	1402	454	21.2	11.4	2.3	7.5	13.7	34.9	-1
Red Bluff	900912	1405	458	11.7	6.1	2.1	3.5	12.8	24.5	-1
Red Bluff	900913	1406	458	13.9	8.5	2.2	3.2	14.6	28.5	-1
Red Bluff	900812	1431	436	26.6	15.8	3.5	7.3	6.6	33.2	-1
Redding	900811	826	636	28.9	13.3	7.4	8.2	16.6	45.5	9
Redding	900812	829	626	33.4	13.6	11.3	8.5	24.3	57.7	9
Redding	900913	903	608	25.2	13.5	5.4	6.3	21.0	46.2	-1
Redding	900912	904	632	15.2	7.4	2.9	4.9	29.0	44.2	-1
Redding	900713	910	599	724.9	11.9	698.2	14.8	32.0	756.9	4
Redding	900712	920	600	37.0	14.8	9.7	12.5	46.2	83.2	-1
Redding	900712	1327	484	753.7	649.9	91.3	12.5	58.0	811.7	6
Redding	900811	1334	450	47.1	25.9	10.3	10.9	17.7	64.8	9
Redding	900713	1336	461	28.9	12.7	8.5	7.7	12.5	41.4	-1
Redding	900913	1340	458	25.2	14.8	4.9	5.5	15.7	40.9	-1
Redding	900912	1342	428	9.8	4.8	1.8	3.2	6.9	16.7	-1
Redding	900712	1358	477	73.4	25.9	36.5	11.0	24.4	97.8	-1
Redding	900812	1405	454	54.8	26.2	17.2	11.4	36.7	91.5	9
Davis	900730	1013	1525	8.7	2.8	1.5	4.4	26.4	35.1	-1
Travis	900713	1453	457	16.2	6.9	2.6	6.7	27.5	43.7	14

Table D-2. Definition of validation codes used to flag Upper Sacramento Valley VOC and exotics samples.

Code	Problem
-1	None
2	High acetylene
3	High ethane
4	High ethene
6	High C2-C3 hydrocarbons
7	High CO
8	High 1-butene
9	In or near smoke plume from forest fire
10	High CO_2
11	High Freon 11 and Freon 113
12	High $CHCl_3$
13	High CH_3CCl_3
14	High C_2HCl_3

Table D-3. Exotic species concentrations for each sample collected during the Upper Sacramento Valley Transport study.

Location	YRMODY	Time (PDT)	Average Altitude (m msl)	Methane ppb	CO ppb	NMHC ppbC	Valid Code	CO2 ppm	N2O ppt	F-12 ppt	F-11 ppt	F-113 ppt	CHCl3 ppt	CH3CCl3 ppt	CCl4 ppt	C2HCl3 ppt	C2Cl4 ppt
Auburn	900713	1554	914	1806	292	84.9	-1	363	340	674	295	63	21	379	108		104
Davis	900730	1029	609	1771	134	31.7	-1	349	339	356	292	54	11	192	106		25
Davis	900730	1013	1525	1757	89	35.1	-1	348	342	517	290	57	10	179	106		10
Davis/Sunset	900730	1041	455	1778	132	19.6	-1	351	340	514	292	55	13	196	104		21
Folsom	900711	1442	609	1826	197	142.3	-1	360	341	789	321	83	34	585	106	9	189
Haigh	900712	828	615	1746	245	362.3	2	370	338	504	296	55	26	198	110		40
Haigh	900712	1427	479	1775	146	28.6	-1	356	339	500	290	54	8	194	106	8	47
Haigh	900713	819	611	1760	134	54.5	-1	365	335	510	288	55	13	194	108		45
Haigh	900713	1459	452	1916	175	80.6	-1	359	339	546	302	60	13	223	112		44
Haigh	900811	734	630	1788	188	39.6	-1	358	339	531	289	57	10	188	109	9	17
Haigh	900811	1453	462	1806	133	16.8	-1	352	338	529	288	52	14	185	109		10
Haigh	900812	740	616	1983	237	226.2	3,11,12,13	340	339	536	797	365	103	372	109		50
Haigh	900812	1527	463	1783	134	22.3	-1	353	340	537	291	57	15	194	110		10
Haigh	900912	812	635	1794	118	78.5	-1	353	339	526	285	58	16	213	108		10
Haigh	900912	1434	458	1818	169	29.3	-1	354	338	518	292	60	8	221	111	7	15
Haigh	900913	809	608	1810	163	56.0	-1	358	337	551	288	59	14	228	110		32
Haigh	900913	1506	458	1827	185	33.0	-1	352	337	534	287	58	16	207	109		23
Maxwell	900711	1405	481	1950	171	371.0	8,12	354	336	557	298	70	366	205	119	13	69
Maxwell	900711	1510	473	1790	137	66.0	-1	351	337	520	304	57	12	215	111	15	57
Maxwell	900712	716	605	1777	1783	949.9	7,4,10	408	335	543	302	63	22	220	112		33
Maxwell	900712	1521	476	1782	127	87.4	-1	347	336	564	297	55	64	213	100		58
Maxwell	900713	710	597	1755	116	22.0	-1	364	335	538	290	54	21	193	111		
Maxwell	900713	1525	466	1823	169	56.3	-1	360	338	525	297	60	26	213	109		44
Maxwell	900810	1454	478	1804	128	22.6	-1	353	339	522	289	56		222	108	8	20
Maxwell	900810	1608	437	1762	117	26.8	-1	353	339	515	291	55	7	204	111	9	25
Maxwell	900811	623	633	1728	64	43.9	-1	354	341	528	312	55	11	173	104		12
Maxwell	900811	1519	450	1782	116	12.9	-1	354	338	535	288	56	5	176	107		10
Maxwell	900812	627	604	1759	148	28.9	-1	351	341	534	288	57	20	194	107		16
Maxwell	900812	1554	466	1889	197	40.4	-1	354	339	539	290	59	22	191	108		12
Maxwell	900911	1528	472	1869	186	28.2	-1	355	339	548	296	59		227	109		32
Maxwell	900912	653	632	1799	134	32.8	-1	353	339	536	290	58	20	222	110		20
Maxwell	900912	1531	458	1856	400	48.6	-1	357	339	530	298	58	9	238	112	4	20
Maxwell	900913	651	608	1805	130	31.1	-1	352	341	539	291	58	9	204	110	6	20
Maxwell	900913	1536	458	1879	165	45.1	-1	350	338	537	292	58	22	222	113	9	32
N. Yuba	900711	1318	508	1776	123	31.5	-1	350	338	524	309	59	13	210	108		20
N. Yuba	900711	1555	480	1773	136	49.4	-1	350	340	559	307	56	11	210	105		52
N. Yuba	900712	634	599	1798	186	226.3	3	358	338	573	298	58	9	241	106		36
N. Yuba	900712	1606	473	1902	175	34.4	-1	360	337	529	295	60	11	206	101		48
N. Yuba	900713	626	616	1782	143	35.7	-1	364	339	560	288	56	9	211	109		20
N. Yuba	900713	1610	471	1802	207	69.7	-1	360	334	580	301	61	13	232	107		49
N. Yuba	900810	1355	442	1607	157	29.3	-1	352	338	549	292	56	12	219	110		30
N. Yuba	900810	1702	485	1600	133	41.1	-1	349	340	514	284	55	9	211	105	7	20

Table D-3. Exotic species concentrations for each sample collected during the Upper Sacramento Valley Transport study.

Location	YRMODY	Time (PDT)	Average Altitude (m msl)	Methane ppb	CO ppb	NMHC ppbC	Valid Code	CO2 ppm	N2O ppt	F-12 ppt	F-11 ppt	F-113 ppt	CHCl3 ppt	CH3CCl3 ppt	CCl4 ppt	C2HCl3 ppt	C2Cl4 ppt
N. Yuba	900811	541	618	1738	105	23.7	-1	356	338	540	286	53	7	181	106		10
N. Yuba	900811	1601	467	1779	111	23.4	-1	350	337	536	289	52	7	247	107		23
N. Yuba	900812	543	602	1756	138	43.9	-1	361	339	524	289	58	6	203	109		24
N. Yuba	900812	1639	457	1756	124	19.3	-1	352	338	511	283	52	13	181	105		6
N. Yuba	900911	1423	577	1842	269	68.6	-1	354	338	545	295	59	11	257	109		38
N. Yuba	900911	1723	469	1843	202	33.0	-1	351	339	555	295	61	10	240	107		44
N. Yuba	900912	605	633	1802	167	36.4	-1	355	338	535	292	62	16	240	112		39
N. Yuba	900912	1619	458	1877	210	52.1	-1	354	337	528	309	59	17	234	110	10	20
N. Yuba	900913	604	608	1783	107	28.4	-1	349	342	541	289	56	15	196	113	4	16
N. Yuba	900913	1622	458	1836	161	34.4	-1	349	341	540	292	57	6	213	110		23
Chico	900712	805	616	1837	181	115.9	12	348	339	523	296	57	220	205	118		47
Chico	900712	1453	477	1783	204	52.9	-1	354	338	504	292	55	9	197	106		52
Chico	900713	754	613	1813	326	110.3	11,13,14	374	341	551	353	200	76	551	101	61	69
Chico	900713	1435	471	2048	178	1087.2	6,8	341	340	515	293	57		205	107		39
Chico	900811	711	627	1763	140	36.8	-1	360	336	545	290	57	18	206	109		28
Chico	900811	1430	457	1725	192	121.2	2	353	340	526	287	54	13	171	109		16
Chico	900812	718	618	1814	446	88.2	9	361	338	542	288	58	12	210	107		8
Chico	900812	1503	444	1805	157	54.2	-1	356	338	543	290	59	19	197	110		15
Chico	900912	746	637	1801	146	36.7	-1	355	338	534	286	57	24	220	111	11	15
Chico	900912	1459	458	1848	242	76.0	-1	358	339	569	305	64	31	261	112	9	47
Chico	900913	744	608	1816	5164	885.0	7,4	373	342	533	291	64	16	235	109	4	30
Chico	900913	1441	458	1801	149	36.2	-1	349	342	534	286	58	11	196	111		5
Red Bluff	900712	856	603	1816	305	193.1	12,4	362	342	527	300	59	388	205	115	14	41
Red Bluff	900713	846	611	1766	135	29.3	-1	368	336	528	298	58	17	202	110	10	36
Red Bluff	900713	1402	454	1812	164	34.9	-1	368	336	535	294	52	8	202	108		38
Red Bluff	900811	801	607	1795	301	39.4	-1	364	338	532	288	55	30	195	109	11	14
Red Bluff	900811	1358	440	1766	144	36.0	-1	357	340	536	288	53	6	186	107		18
Red Bluff	900812	805	624	1798	474	33.2	-1	363	342	524	290	56	14	189	108		10
Red Bluff	900812	1431	436	1818	290	33.2	-1	359	339	547	293	61	13	204	110		15
Red Bluff	900912	841	622	1772	76	12.4	-1	350	337	516	282	56	14	172	106		5
Red Bluff	900912	1405	458	1789	120	24.5	-1	352	341	527	292	57	28	190	111	12	17
Red Bluff	900913	838	608	1808	151	64.1	-1	355	338	559	290	62	8	226	111		26
Red Bluff	900913	1406	458	1808	132	28.5	-1	352	341	547	288	61	9	206	109		12
Redding	900712	920	600	1747	142	83.2	-1	359	336	525	291	63	47	195	110	10	38
Redding	900712	1327	484	1983	173	811.7	6	343	339	512	313	57	17	199	104		37
Redding	900712	1358	477	1834	173	97.8	-1	344	337	516	294	56	21	204	107		75
Redding	900713	910	599	1749	568	756.9	4	376	339	517	295	61		232	108		
Redding	900713	1336	461	1758	176	41.4	-1	363	338	538	295	58	38	212	110	8	23
Redding	900811	826	636	1791	235	45.5	9	359	338	533	285	55	12	187	108		15
Redding	900811	1334	450	1801	500	64.8	9	368	340	557	286	55	73	197	109	8	12
Redding	900812	829	626	1800	427	57.7	9	366	338	521	288	55	10	189	107		10
Redding	900812	1405	454	1807	479	91.5	9	360	338	536	289	58	11	189	108	10	8

Table D-3. Exotic species concentrations for each sample collected during the Upper Sacramento Valley Transport study.

Location	YRMODY	Time (PDT)	Average Altitude (m msl)	Methane ppb	CO ppb	NMHC ppbC	Valid Code	CO2 ppm	N2O ppt	F-12 ppt	F-11 ppt	F-113 ppt	CHCl3 ppt	CH3CCl3 ppt	CCl4 ppt	C2HCl3 ppt	C2Cl4 ppt
Redding	900912	904	632	1778	109	44.2	-1	356	338	513	284	56	10	160	108		5
Redding	900912	1342	428	1783	116	16.7	-1	352	340	532	289	55	15	188	112	11	15
Redding	900913	903	608	1820	154	46.2	-1	357	338	539	292	62	10	219	110		27
Redding	900913	1340	456			40.9	-1		338	543	290	60	19	217	110		40
Travis	900713	1453	457	1730	108	43.7	14	356	338	515	286	55	15	203	110		60

Table D-4. Exotic species concentrations of samples collected at Point Reyes and Richmond during the San Joaquin Valley/AUSPEX study.

Location	YRMODY	Time (PDT)	Average Altitude (m msl)	Methane ppb	CO ppb	NMHC ppbC	Valid Code	CO2 ppm	N20 ppt	F-12 ppt	F-11 ppt	F-113 ppt	CHCl3 ppt	CH3CCl3 ppt	CCl4 ppt	C2HCl3 ppt	C2Cl4 ppt
Pt. Reyes	900803	01-08	Surface	1743	127	43			338.0	541	482	300	13	217	108		46
Pt. Reyes	900803	08-15	Surface	1751	201	37			337.0	528	290	179	10	198	108		24
Pt. Reyes	900803	16-24	Surface	1751	316	69			340.0	523	289	234	15	188	108		32
Pt. Reyes	900806	10-16	Surface	1743	274	39			338.0	516	290	171	7	190	110		19
Pt. Reyes	900806	16-24	Surface	1734	205	23			337.0	512	286	151	35	183	109		19
Richmond	900727	08-10	Surface						339.5	967	368	58	13	296	105	10	204
Richmond	900727	12-14	Surface						341.3	725	370	78	14	1384	99	378	127
Richmond	900728	08-10	Surface						339.6	580	296	59	14	944	100		25
Richmond	900728	12-14	Surface						339.8	551	317	57	8	699	99	108	31
Richmond	900729	08-10	Surface						335.3	542	302	59	64	311	104	7	20
Richmond	900729	12-14	Surface						339.0	546	300	57	25	270	106	8	48
Richmond	900803	08-10	Surface	1747	861	224			338.8	543	298	100	40	465	106	17	20
Richmond	900803	12-14	Surface	1891	682	309			340.0	587	364	81	25	1578	98	316	20
Richmond	900804	12-14	Surface	1768	640	247			339.6	559	298	62	56	309	107	8	120
Richmond	900805	08-10	Surface	1814	567	187			337.1	586	303	68		261	110	10	59
Richmond	900805	12-14	Surface	1860	676	256			340.3	680	330	63	34	292	108		60
Richmond	900806	08-10	Surface	1842	882	309			338.1	729	304	60	13	365	108	70	60
Richmond	900806	12-14	Surface	1718	366	223			341.0	814	316	70	16	444	110	36	215
Richmond	900822	08-10	Surface						341.9	648	308	78	17	484	105	83	240
Richmond	900822	12-14	Surface						338.2	878	389	116	100	1687	95	280	294
Richmond	900823	08-10	Surface						337.2	839	297	76	22	405	104	9	296
Richmond	900823	12-14	Surface						336.4	562	306	63	20	352	106	26	77
Richmond	900824	08-10	Surface						338.2	594	306	60	36	547	104	12	101
Richmond	900824	12-14	Surface						340.5	747	309	64	32	255	107	13	164

Notes: Methane, CO, and NMHC data were not yet available form the Air Resources Board for the July and late August episodes. CO_2 data were not reported. Validation codes were not yet assigned to these data. Freon 113 data at Point Reyes are suspect.

APPENDIX E

CORRECTED OZONE CONCENTRATIONS FOR RED BLUFF FOR AUGUST 5 - AUGUST 15, 1990

Sonoma Technology Inc.

5510 Skylane Blvd., Suite 101
Santa Rosa, CA 95403-1083
707 / 527-9372

October 14, 1992

Mr. Charles Bennett
Research Division
Air Resources Board
2020 L Street (P.O. Box 2815)
Sacramento, CA 95812

STI No. 90150

Subject: Review of Red Bluff Ozone Strip Charts for August 1990.

Dear Chuck:

Attached is a copy of a letter to Vic Williams of the Tehama Air Pollution Control District. As discussed in the letter, Vic provided us the opportunity to review the Red Bluff - Walnut St. ozone strip charts for August 1990. One of the episodes we are studying to assess transport into the upper-Sacramento Valley occurred during the August 1990 time period. To improve our study we need to have access to as much valid ozone exceedance data during this time period as possible. With this goal in mind, it is important to make the ozone data collected at the Red Bluff - Walnut St. monitor as complete as possible.

As we told you a year ago, we believe these data to be suspect. Our review of the data was initiated because the data for the Red Bluff station, as reported, shows peak ozone values greater than 10 pphm occurring at midnight for a period of about one week in August; a very unusual temporal pattern for high ozone concentrations. As of about one month ago, we contacted Barry Reisman, in the ARB Quality Assurance Section of MLD, regarding the status of this ozone data and were told that the data was valid "as-is". However, as a result of our review we believe that the data should be adjusted as described in the attached letter. We have also attached a computer printout of the hourly ozone data that we believe best represents the ozone measurements for the Red Bluff station for the time period in question.

90150CB.PTR/SRB

We plan to use the adjusted data in our study. Please call if you have any questions regarding our review of the ozone strip charts and use of the adjusted data.

Sincerely,

Paul

Paul T. Roberts
Vice President, Regional Studies

PTR/szh

cc: Steve Gouze, TSD

Attach.: Letter to Vic Williams, Tehama County
Corrected Red Bluff Ozone Data for 8/5/90 - 8/15/90

Sonoma Technology Inc.

5510 Skylane Blvd., Suite 101
Santa Rosa, CA 95403-1083
707 / 527-9372

October 14, 1992

Mr. Vic Williams
Tehama County
Department of Agriculture
1750 Walnut (P.O. Box 38)
Red Bluff, CA 96080

STI No. 90105

Subject: Review of Ozone Strip Charts for August 1990.

Dear Vic:

Thank you very much for providing us the opportunity to review the Red Bluff - Walnut St. ozone strip charts for August 1990. As you know, we are conducting a study to assess ozone transport in the Sacramento Valley for the Air Resources Board. As part of the project, special studies of ozone transport were performed involving additional meteorological and air quality monitoring as well as tracer releases. One of the episodes to be studied occurred during the August 1990 time period. To improve our study, we need to have access to as much valid ozone exceedance data during this time period as possible. With this goal in mind, it is important to make the ozone data collected at the Red Bluff - Walnut St. monitor as complete as possible.

Our review of the data was initiated because the data for the Red Bluff station, as reported, shows peak ozone values greater than 10 pphm occurring at midnight for a period of about one week in August; a very unusual temporal pattern for high ozone concentrations. Prior to reviewing the strip charts, we contacted the ARB regarding the status of the ozone data and were told that the data was valid "as-is". However, as a result of our review we believe that the data should be adjusted as described below.

The first step in our review of the ozone strip charts was to reconstruct a continuous record from the various portions of strip charts provided. Once "taped" together, it became clear that a segment of ozone measurements had been "omitted" from the reported ozone data for the station. The inclusion of this "missing" data and the resulting shift in the data as reported results in the ozone peaks occurring during the more normal time period of early afternoon. Below we outline the corrected ozone data based on our review. We have also attached a computer printout of the hourly ozone data that we believe best represents the ozone measurements for the Red Bluff station for the time period in question.

DATE	TIME (PST)	COMMENTS
8/6/90	<1300	Reported to ARB correctly
	1300	Reported to ARB correctly
	1400	On-chart; not reported
	1500	On-chart; not reported
	1600	On-chart; not reported
	1700	Air Conditioning malfunction, no data until next morning at 0944
8/7/90	1000	On-chart; not reported; correctly time-stamped
	.	" " "
	.	" " "
	2300	On-chart; not reported; correctly time-stamped
8/8/90	0000	On-chart; correctly time-stamped; incorrectly reported as 8/7/90
	.	" " "
	.	
	.	
	1300	On-chart; correctly time-stamped; incorrectly reported as 8/7/90
	1329	Malfunction of time-stamp jumped ahead by 10 hours 30 min, but ozone data measurement continues.
	1400	On-chart; incorrectly reported as 0000 8/8/90
	.	
	.	On-chart; incorrectly reported through 8/15/90 1100
	.	
8/15/90	1100	On-chart; incorrectly reported until 8/15/90
	1200	Strip-chart missing
	1300	Strip-chart missing
	1400	Strip-chart missing
	1430-1500	Strip-chart manually adjusted to correct date and time stamp
	1500	On-chart; correctly time-stamped and reported
	>1500	On-chart; correctly time-stamped and reported

During our review, we noticed that there were two sets of hand-written dates and times along the chart edge. One of these (in black ink) matches the data as reported to the ARB. The other hand-written dates and times are consistent with our analysis. We did not make any written marks on the original strip charts. We did however, add a blank section corresponding to the missing three hours on 8/15/90.

Once again, thank you for providing us the opportunity to review the ozone strip charts. We plan to use the adjusted data in our study as described above. Please call if you have any questions regarding our review of the ozone strip charts.

Sincerely,

Lyle R. Chinkin

Lyle R. Chinkin
Manager, Emissions Assessment

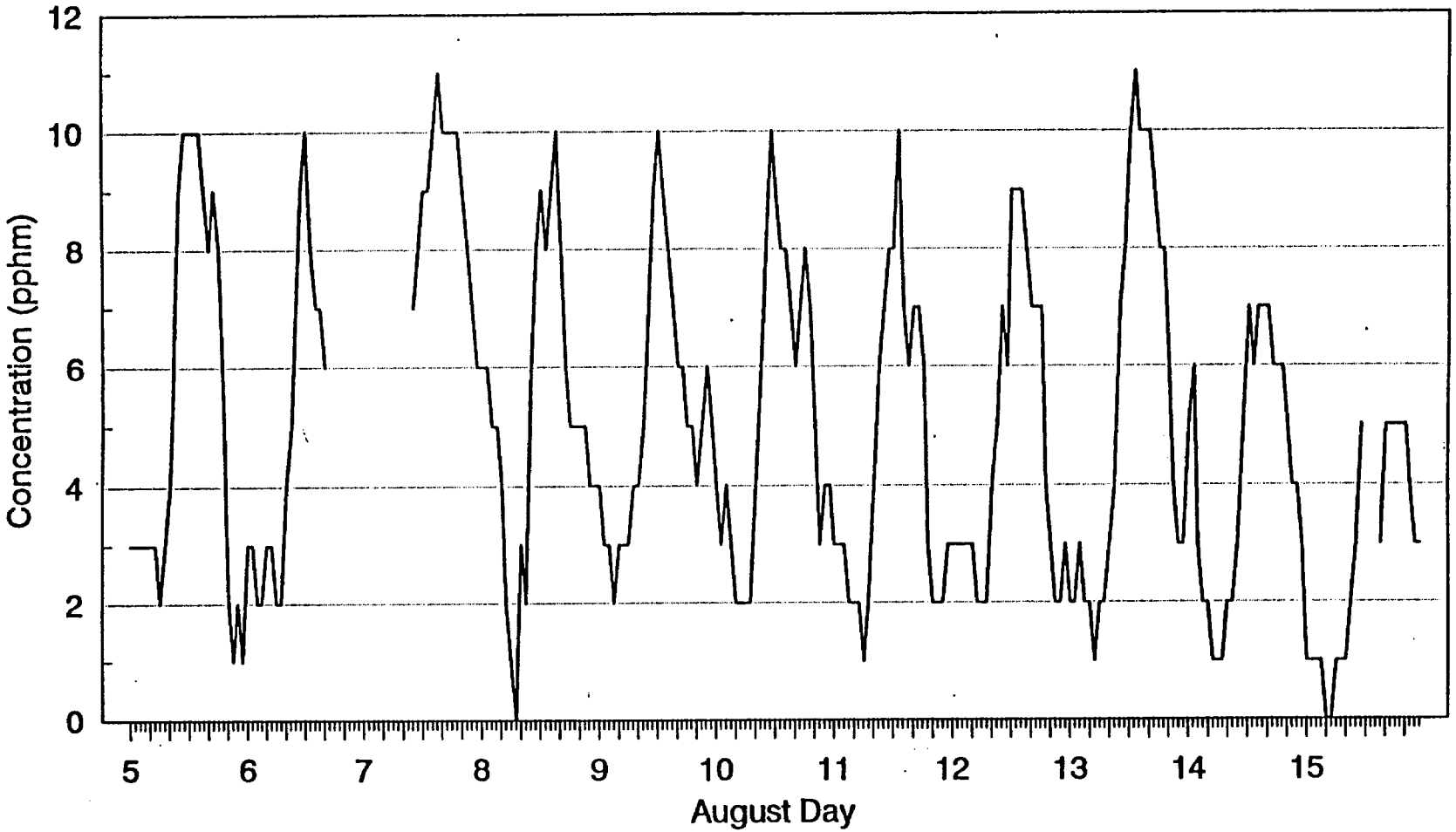
LRC/szh

Attach.: Corrected Red Bluff Ozone Data 8/5/90 -8/15/90

STI-Corrected Ozone Concentrations for Red Bluff August 1990

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
5	3	3	3	3	3	3	2	3	4	7	9	10	10	10	10	9	8	9	8	5	2	1	2	1
6	3	3	2	2	3	3	2	2	4	5	7	9	10	8	7	7	6							
7											7	8	9	9	10	11	10	10	10	10	9	8	7	6
8	6	6	5	5	4	2	1	0	3	2	6	8	9	8	9	10	8	6	5	5	5	5	4	4
9	4	3	3	2	3	3	3	4	4	5	7	9	10	9	8	7	6	6	5	5	4	5	6	5
10	4	3	4	3	2	2	2	2	4	6	8	10	9	8	8	7	6	7	8	7	5	3	4	4
11	3	3	3	2	2	2	1	2	4	6	7	8	8	10	7	6	7	7	6	3	2	2	2	3
12	3	3	3	3	3	2	2	2	4	5	7	6	9	9	9	8	7	7	7	4	3	2	2	3
13	2	2	3	2	2	1	2	2	3	4	7	8	10	11	10	10	10	9	8	8	6	4	3	3
14	5	6	3	2	2	1	1	1	2	2	3	5	7	6	7	7	7	6	6	6	5	4	4	3
15	1	1	1	1	0	0	1	1	1	2	3	5				3	5	5	5	5	5	4	3	3

STI-CORRECTED RED BLUFF OZONE CONCENTRATIONS
AUGUST 5 - 15, 1990



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13. ABSTRACT *(Maximum 200 Words)*

This report addresses the California Clean Air Act requirement to assess the relative contribution of upwind pollutants to violations of the state ozone standard in downwind areas. The objectives of the project were to develop data analysis methods to quantify the contribution of upwind emissions to downwind ozone concentrations; to apply those methods to the transport of pollutants from the San Francisco Bay Area, the San Joaquin Valley, and the Lower Sacramento Valley, to receptor sites in the Upper Sacramento Valley; and to recommend the best methods to use for the Upper Sacramento Valley.

This report discusses the data analysis methods used in this project, presents the results of applying the various methods, compares and evaluates the results, and discusses project conclusions and recommendations for future applications. The data analysis methods which could be applied in future applications for the study area include transport paths and precursor contribution estimates using surface and aloft trajectories, 2-D pollutant flux estimates, ozone/tracer regressions, and analyses of unique signatures of VOC species and tracers of opportunity. In addition, air flow patterns should be characterized as a basis for all of the methods.

14. SUBJECT TERMS

Ozone transport, air pollutant transport, ozone precursors, pollutant flux, volatile organic compounds, VOC, tracers of opportunity.

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