Technical & Business Systems

859 Second Street · Santa Rosa CA 95404 · 707-526-2775

SCAQS METEOROLOGICAL SUPPORT PROGRAM

FINAL REPORT

Contract Number : A6-097-32
Prepared for the California Air Resources Board

October 1988

Technical & Business Systems

859 Second Street · Santa Rosa CA 95404 · 707-526-2775

SCAQS METEOROLOGICAL SUPPORT PROGRAM

FINAL REPORT

by

Technical & Business Systems

D. Lehrman
W. Knuth
N. Alexander
H. Giroux
L. Lehrman

Prepared for the California Air Resources Board

October 1988

ABSTRACT

During the summer and fall of 1987, the Southern California Air Quality Study (SCAQS) was conducted to develop a comprehensive air quality and meteorological database for the South Coast Air Basin (SCAB). Extensive measurements of gaseous and particulate pollutants, atmospheric tracers, and meteorological conditions were made on seventeen select days. Technical & Business Systems (T & B Systems) established a network consisting of upper-air and surface sites designed to augment the existing meteorological resources in the SCAB.

The network was comprised of six upper-air sites and three surface sites during the summer study and five upper-air and two surface sites during the fall study. The upper-air measurements consisted of temperature, humidity, wind speed and direction as a function of height to 10,000 feet or more. Typically soundings were taken six times daily at 0500, 0800, 1100, 1400, 1700, and 2200 local time. A total of 386 atmospheric soundings were made during the summer and 212 during the fall study. Plots and tabular listings of the upper-air data are contained under separate covers from this report in two appendices.

Although existing surface meteorological coverage is unusually complete in the SCAB, T & B Systems installed and operated weather stations in the few areas where coverage was inadequate. Three sites were established in the summer study and two sites in the fall study. Hourly averaged temperature and wind speed and direction from these sites are tabulated herein.

Both the surface and the upper-air data are available as computer files on MS-DOS formatted diskettes.

ACKNOWLEDGMENTS

We wish to acknowledge the many persons and groups whose cooperation and help enabled us to implement and operate this measuring network. Some, but by no means all, of those we wish to acknowledge are FAA personnel Mr. Chris Stoeckert, Mr. Roger Osgood, Mr. Sam Fabello, Mr. Lan Mobley, Mr. Jim McCord, Mr. Fred Berry; Mr. Mickey Harris at Loyola Marymount University; and Mr. John Kowalski and Mr. Pat Harrington at the Environmental Lab in El Monte. All the data presented herein is the product of hard work and long hours by our site operators, Mr. Robert Bergeron, Ms. Cathy Armbruster, Mr. Larry George, Mr. David Giroux, Ms. Jennifer Mulvihill, Mr. Terry Keating, Mr. Richard Sweeney, Ms. Teresa Brand, Ms. Vanetta Peters, and Mr. George Madison. We would also like to express our appreciation to Mr. Michael Spitt of the FAA Western Pacific Region, Chief John Englund of the L.A.C.F.D., and Mr. William Stewart of the County of Los Angeles for permission to use their facilities as our mechanical weather station sites. Most notably, we extend our gratitude to Mr. Charles Unger and Mr. Charles Bennett, of the California Air Resources Board, who coordinated our communication with other agencies, and helped secure many of the sites.

DISCLAIMER

The statements and conclusions in this report are those of the contractor and not necessarily those of the California Air Resources Board. The mention of commercial products, their source or their use in connection with material reported herein is not to be construed as either an actual or implied endorsement of such products.

TABLE OF CONTENTS

SECTION

1.0 INTRODUCTION

The Southern California Air Quality Study (SCAQS) was undertaken to develop a comprehensive air quality and meteorological data base for the South Coast Air Basin (SCAB). Extensive measurements of gaseous and particulate pollutants, atmospheric tracers and meteorological conditions were made during seventeen sampling days. The combined data base resulting from this effort will be used to evaluate and possibly provide solutions to regional air quality problems within the South Coast Air Basin.

SCAQS was a cooperative project involving a diversity of organizations which included private industry, university groups, local, state, and federal agencies. A major contributor to SCAQS was the California Air Resources Board (CARB). As part of their contribution, the CARB contracted with Technical & Business Systems (T & B Systems) to augment existing meteorological measurements.

SCAQS consisted of two distinct study periods in 1987 - the summer study and the fall study. The summer study was conducted from 18 June to 3 September and consisted of eleven sampling days. The fall study commenced 9 November and continued until 11 December, with six sampling days.

The existing SCAB data resources includes an unusually dense surface monitoring network which measures wind speed, wind direction and ambient temperature. However, three areas void of surface meteorological data were identified in the planning phase of SCAQS as critical to the understanding of regional pollutant transport. T & B Systems was contracted to install and maintain mechanical weather stations in these remote locations during SCAQS.

T & B Systems established six RAWINSONDES sites to augment the upper-air meteorological measurements that are routinely collected twice a day at only one location within the SCAB. These sites, in conjunction with other SCAQS activities, defined an upper-air measurement network adequate to describe regional winds and transport conditions aloft. All six of the T & B sites were operated for the summer study, with the number of T & B sites reduced to five for the fall study. Temperature, humidity, and wind soundings were made six times daily at each of the RAWINSONDE sites on sampling days. The elements of the supplemental meteorological measurements made by T & B Systems are described herein, along with tabulated and plotted data.

Descriptions of T & B Systems operations and procedures are given in Section 2 of this report, along with a summary of RAWINSONDE observations. Section 3 describes data reduction and quality

assurance procedures, and in Section 4 comparisons between the types of equipment used in upper-air measurements are discussed.

Formats of the meteorology data base are discussed in Section 5. This section describes the format of the data available on computer compatible media, as well as a description of the tables and plots included in the data volume.

In Section 5.2 tabulated listings of the surface hourly wind speed, wind direction, and temperature are given. Due to the extremely large quantity of upper-air data, these measurements are contained under separate covers. Appendix A contains data collected during the summer study, and Appendix B contains data from the fall study. Both Appendices contain plots of temperature, dew point temperature, wind speed and wind direction shown as functions of height. Tabulated listings of temperature, relative humidity, dew point temperature, wind speed and wind direction, as functions of both height and pressure, are also included.

2.0 FIELD OPERATIONS

A major effort during the planning of this task was devoted to identifying potential operational difficulties likely to be encountered due to the density and timing of observations. Several groups would be releasing radiosondes on intensive sampling days to measure, in detail, the boundary layer meteorology in the SCAB. Optimally, all the soundings would occur simultaneously providing a "snapshot" of the prevailing wind and temperature structure.

As an example, during the summer study T & B Systems released RAWINSONDEs from six locations, and Southern California Edison (SCE) released Airsondes from two additional locations. The Desert Research Institute (DRI) released Airsondes from one location, and the Navy (as a part of the FIRE experiment) expected to release RAWINSONDEs from two offshore locations.

Since most of the radiosondes operate in the same frequency range (399 to 407 MHz), a great deal of coordination and training were required to successfully operate the network. The Airsondes operated by SCE and DRI transmit in a narrow, fixed bandwidth at low power thus T & B Systems felt that the distance between these sites was sufficient to preclude any interference from these transmitters. However RAWINSONDE transmitters (although adjustable) operate at far greater power levels over a broader bandwidth.

To avoid interference several steps were taken. T & B Systems purchased special transmitters designed to operate in a narrower bandwidth (+/- .5 MHz). T & B Systems then modified some RAWINSONDES to cease transmitting at a predetermined altitude. Scheduled release times at the SCAQS RAWINSONDE sites were staggered so that three sites would release about twenty minutes before the hour and three sites would release on the hour. Twenty minutes was the estimated time for a sounding to reach 700 mb (or about 10,000 feet). Above this altitude modified sondes cease transmission. Transmitter frequencies were offset so that sondes would not be transmitting on the same frequency concurrently. When a sonde reached the altitude where transmission ceased, a sonde from another site (assigned the same frequency) was released. This required our site operators to adhere to a strict schedule, and to report any problems or delays to the field coordinator promptly so that timely adjustments to other affected sites' schedules could be made.

2.1 Equipment Description

2.1.1 Surface Measurements

Surface meteorological data consisted of air temperature, wind speed and wind direction measured at 10 meters above ground level at three sites.

All surface data appearing in this volume were measured with Mechanical Weather Stations (MWS) manufactured by Meteorology Research, Inc. (MRI). The MWS is a self-contained system which measures various parameters mechanically. It requires no external power source, as the clock mechanism runs off batteries.

The temperature sensor consists of a bimetallic strip which engages a coil spring/stylus to produce a continuous trace on a pressure-sensitive strip chart. Temperature resolution is approximately 0.2 degrees C. Wind directions are detected by a wind vane (oriented to true north) connected through a series of gears to a stylus which also produces a continuous trace on the strip chart. Wind speeds are measured as wind run via a tri-cup anemometer connected to a stylus through a reducing gear system, and records the total miles of air passage per hour, recorded on the strip chart. One roll of strip chart paper is sufficient to record up to one month's worth of data. Hourly data was extracted from the chart for the specific sampling days appearing in this volume.

2.1.2 Upper-Air Measurements

In this project T & B Systems utilized Beukers W-8000RP+ Upper-Air Measuring Systems manufactured by VIZ Manufacturing Company of Philadelphia, PA. The radiosondes used were supplied by the same manufacturer. As a backup to the Beukers W-8000RP+ Upper-Air Measuring Systems, optical theodolites were used to track balloons.

The radiosonde units used were the VIZ "LO-CATE" 1500 series LORAN-C Microsondes modified with a special two-stage transmitter allowing them to operate in a narrow bandwidth. These radiosondes measured and telemetered temperature, humidity and pressure information to the receiving station via radio signal (capable of operating in the range from 399 to 406 MHz). A rod thermistor measured the temperature with a manufacturer's listed accuracy of 0.2 degrees C, within a range of -90 to +60 degrees Celsius. Relative humidity was measured using a carbon hygristor with an listed accuracy of 2% RH. Pressure was determined using an aneroid cell-commutator bar system with an accuracy within 1 mb. Balloon position (hence winds) were determined using a LORAN-C Navaid system operating within each sonde. The radiosonde units locked onto and tracked the signals from the

LORAN-C secondary stations and one master station of the west coast chain. This information was then transmitted to the ground-based receiving station which uses the phase differences between stations to determine the radiosonde's position. The radiosondes were carried aloft with standard 100 gram helium-filled weather balloons. Balloons were inflated to a predetermined lift in order to maintain a consistent ascension rate from launch to launch.

Each ground-based receiving and data acquisition systems station consisted of two VIZ telemetry antennas, a 403 MHz bucket receiver, a LORAN-C signal converter microprocessor unit, and either an Apple IIe or Apple GS microcomputer system. The telemetry/receiver unit operated in the 395 to 410 MHz range and received radiosonde signals on a monopole antenna. The receiver incorporated automatic and manual frequency control. The radiosonde signal data was processed within the receiver and passed to the microcomputer for data storage and computation. The LORAN-C microprocessor in each base station was either a Texas Instruments (T.I.) or a VIZ signal converter system which processed the incoming LORAN-C stations data from the radiosonde into balloon position which was passed to the microcomputer for storage and reduction to winds. One to three Apple IIe systems operated during the program and were interfaced to the T.I. LORAN-C microprocessor. The five Apple GS systems used in this study always operated with the VIZ LORAN-C microprocessor. Software used in the Apple systems processed the temperature and relative humidity data, (both received in units of resistance) along with pressure-height and radiosonde position data to engineering units. The raw and reduced data were stored on diskettes.

As a backup to the LORAN-C Navaid system wind measurements, we used balloon theodolites. At the start of SCAQS (19 June, 24 June, 25 June) when we were experiencing problems with the LORAN-C Navaid systems, theodolites were used at some sites to track the radiosondes. Winds that were determined by theodolite are noted in Table 2.3.

2.2 Locations and Schedules of Observations

2.2.1 Surface Measurements

Surface weather measurements were made with MWS's at Henninger Flats (summer study only), Kellogg Hill and on the Palos Verdes peninsula (Figure 2.1).

The Henninger Flats site (latitude 34 deg 12' N, longitude 118 deg 05' W) was located in the San Gabriel Mountains above Pasadena on Los Angeles County property (3300 ft. elevation). This site is in an ideal location to characterize the slope flows and has been used by the California Institute of Technology as a key pollution monitoring location in a number of projects.

The Kellogg Hill equipment was sited at the San Dimas Microwave facility in San Dimas (latitude 34 deg 05′ N, longitude 117 deg 49′ W, at 1250 ft. elevation). Winds from this site may be useful in defining the air flow split between the Pomona/Walnut and San Gabriel Valleys.

The Palos Verdes mechanical weather station was located adjacent to the radar facility on top of San Pedro Hill (latitude 33 deg 45′ N, longitude 118 deg 20′ W, at an elevation of 1480 ft.) near the southern tip of the Palos Verde peninsula. Winds from this site are intended to provide coastal wind flow data near an area where a number of mesoscale circulations develop.

The mechanical weather stations continuously recorded temperature, wind run and wind direction on sampling days. The only exceptions to this are that the Kellogg Hill and Henninger Flats sites were not operational on the first sampling day (19 June), and the Henninger Flats site was not utilized during the six fall sampling days.

2.2.2 Upper-Air Measurements

T & B Systems established RAWINSONDE sites at six locations for the summer SCAQS field study, with the number of sites reduced to five during the fall study. A list of the upper-air measuring sites with their addresses and pertinent information is given below. A map showing their location within the SCAB is given in Figure 2.1.

BURBANK AIRPORT (BA) [Summer and Fall Site]
Martin Aviation
3000 North Clybourn Avenue
Hanger # 28
Burbank, CA 91505
Latitude : 34 deg 12′ 00"
Longitude : 118 deg 21′ 30"
Elevation : 732′
This site was located at the east end of the San Fernando Valley, approximately 13 miles northwest of the Los Angeles Civic Center.

EL MONTE AIR RESOURCES BOARD (EM) [Summer and Fall Site]
9528 Telestar
El Monte, CA 91731
Latitude : 34 deg 04′ 04"
Longitude : 118 deg 03′ 39"
Elevation : 250′
This site was located in the San Gabriel Valley approximately 10 miles east of the Los Angeles Civic Center.

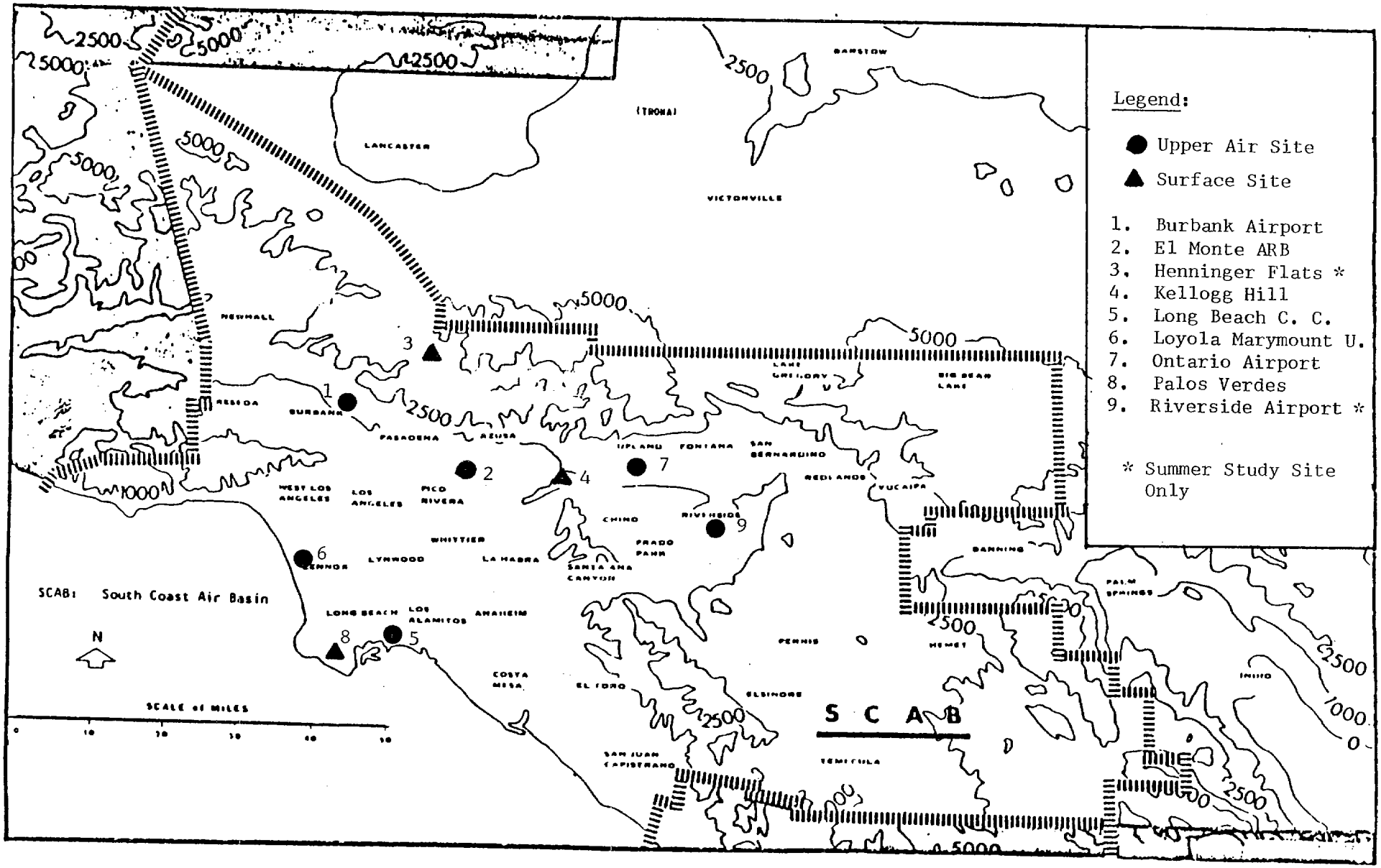

Figure 2.1 Locations of T & B Systems Surface and Upper Air Sites.

LONG BEACH CITY COLLEGE (LB) [Summer and Fall Site]
Faculty Avenue between Carson St. & Conant St.
Long Beach, CA
Latitude : 33 deg 49' 50"
Longitude : 118 deg 08' 03"
Elevation : 45'
These observations were taken at the SCAQS 'A' monitoring site, approximately 17 miles south of the Los Angeles Civic Center.

LOYOLA MARYMOUNT UNIVERSITY (LM) [Summer and Fall Site]
Engineering Building, Room 64
Loyola Blvd. @ West 80th Street
Los Angeles, CA 90045
Latitude : 33 deg 58' 40"
Longitude : 118 deg 24' 48"
Elevation : 146'
LMU is located in the coastal plain about 1.5 miles north of the Los Angeles International Airport, approximately 11 miles southwest of the Los Angeles Civic Center.

ONTARIO AIRPORT (NT) [Summer and Fall Site]
Beechcraft West
2161 East Avion Street
Ontario, CA 91761
Latitude : 34 deg 03' 22"
Longitude : 117 deg 36' 11"
Elevation : 952'
The Ontario Airport is located in the Pomona Valley approximately 37 miles east of the Los Angeles Civic Center.

RIVERSIDE AIRPORT (RV) [Summer Site Only]
6651 Flight Road
Riverside, CA 92504
Latitude : 33 deg 57' 06"
Longitude : 117d deg 26' 42"
Elevation : 816'
The Riverside Airport is located approximately 47 miles east of the Los Angeles Civic Center, near the eastern boundary of the SCAB.

T & B Systems personnel typically released six radiosondes per sampling day. Release times were centered on the hour at 0500, 0800, 1100, 1400, 1700, and 2200 PDT (summer) and PST (fall). Radiosondes were released 20-30 minutes early at three sites and transmission frequencies were varied from site to site to eliminate radio interference between sondes. Table 2.1 and Table 2.2 lists the launch times and frequency assignments for each release site.

Table 2.1. SCAQS RAWINSONDE Release Times and Frequency Assignments - Summer Study

Frequency	Released 20 - 30 minutes before hour	Released on the hour
399.5 MHz	Riverside	El Monte
402.5 MHz	Burbank	Loyola Marymount
405.5 MHz	Long Beach	Ontario

Table 2.2. SCAQS RAWINSONDE Release Times and Frequency Assignments - Fall Study

Frequency	Released 20 - 30 minutes before hour	Released on the hour
399.5 MHz	Burbank	El Monte
402.5 MHz		Loyola Marymount
405.5 MHz	Long Beach	Ontario

Exceptions to the above release times were at the start of an intensive sampling period. The sites scheduled to release on the hour utilized unmodified radiosondes at midnight at the commencement of the first sampling day of an intensive sampling period. For sampling periods continuing on successive days standard release times were in effect. On the last day of an intensive sampling period the sites operating at midnight did not release a radiosonde at 2200.

When equipment problems at a site caused a delayed launch, launch times were switched between the site experiencing difficulties and the site at the same frequency.

The program was designed to track radiosondes to 700 mb, however at the request of the SCAQS Management Advisory Group we tracked radiosondes to a pressure of 500 mb at selected sites when possible. Generally, radiosondes released on the hour were tracked to a pressure of 500 mb, while those released 20-30 minutes earlier were tracked to 700 mb. During the fall study, only the Loyola Marymount sounding was routinely tracked to 500 mb.

2.3 Operational Procedures

2.3.1 Surface Measurements

The Mechanical Weather Stations were checked by T & B personnel prior to the start of each intensive sampling period. At this time, proper operation was confirmed, the chart paper and batteries were replaced if necessary, and the date and time were marked on the chart paper.

2.3.2 Upper-Air Measurements

Radiosonde site operators were required to phone the T & B Systems field manager daily during the SCAQS field study to obtain the latest operational forecast and/or operational status report. When an sampling day was forecast, all personnel were to remain accessible, and be prepared to begin observations at the scheduled times. Before an intensive sampling period was to begin, the T & B Systems project manager notified the Hawthorne and Riverside FAA Flight Services of the impending radiosonde launches.

Each site operator, upon arriving at their site on sampling days, called the T & B Systems field manager to check in and to receive the most current operational status report. If a morning check-in call was not received, the T & B Systems field manager would either contact the assigned operator or reach another operator to insure that each site was manned.

Typical pre-launch preparations consisted of the following tasks. The checklist shown in Figure 2.2 was used during each launch.

> Water-activated batteries were made ready and connected to the radiosonde for a period of time adequate to insure operational voltages were reached.

> A balloon train was assembled that consisted of a 100-gram balloon, a parachute, and a nylon cord. The balloon was carefully weighed during inflation with helium to insure a standard ascension rate.

> The radiosonde and LORAN-C receivers were turned on and the radiosonde signal was checked for proper operation. The LORAN-C Navaid receiver was locked-in (one master and at least two secondary stations).

> The sensor calibration data (thermistor, hygristor and pressure) were entered into the microprocessor via bar code reader.

> The nearest FAA air traffic control tower was contacted to advise tower personnel of the impending radiosonde launch and to obtain current weather information (when available).

> The radiosonde was fastened to the balloon train and launched only after being secured on the ground in a flight configuration with the LORAN-C antenna extended and the transmitting signals checked.

In flight, a data scan (temperature, humidity, pressure and balloon position) was received every fifteen seconds. Data acquisition continued until terminated by the operator. This was done when the calibration data indicated that the scheduled pressure-height was reached. Depending on the location, the scheduled height was 500 or 700 mb (approximately 18,000 and 10,000 ft. respectively).

After each flight the data in the microprocessor memory was output to two diskettes. One diskette was used for processing purposes, while the other served as a backup of all the raw data collected in one day.

Figure 2.2. RAWINSONDE CHECKLIST.

GENERAL PREPARATION

Date : ____/____/1987 Radiosonde Serial # : _____
Site Abbreviation : _____
Scheduled Release Time : _____ PDT
Flight Name : _____
Radiosonde Frequency : _____
Automatic Cutoff Radiosonde ? : _____
Operator Initials : _____

MICROSONDE PREPARATION

_____ Activate battery, inflate balloon, attach parachute to balloon
_____ Attach bar code information below

_____ Check that bar code humidity element # matches humidity element lock-in value on foil wrapper. Wrapper lock-in value _____
_____ Install humidity element & plastic cap
_____ Connect battery & tape in place 20 min. before FLIGHT PREP.
_____ Assemble & mount antenna on radiosonde
_____ Adjust thermistor harness to be perpendicular to radiosonde

FLIGHT PREPARATION FOR APPLE GS UNITS

_____ Read in bar code information
_____ Set AFC switch OFF, METER switch to FREQUENCY, & Telemetry Receiver switch to LOCAL
_____ Rotate TUNE knob until radiosonde audio tone is clear
_____ Set FREQUENCY-TUNE switch to TUNE & balance
_____ Set METER switch to FREQUENCY
_____ Verify proper transmission monitored (adjust sonde freq.)

Figure 2.2 (cont.) **RAWINSONDE CHECKLIST.**

_____ Set radiosonde to desired frequency
_____ Conduct test to assure system is receiving data
(CNTRL B returns you to prelaunch mode)

PREPARE TO LAUNCH
_____ Assemble balloon train with loran antenna extended
_____ Tether balloon
_____ Call for permission to release, get the following info
Surface Pressure : _____ in _____ mb
Air Temperature : _____
Relative Humidity (Dew Point) : _____
Wind Speed : _____
Wind Direction : _____
Altimeter Setting : _____
_____ Set Telemetry Receiver switch to TELEMETRY

LAUNCH
_____ Press carriage return on computer
_____ Quickly check that the 1st 15 secs of met & loran data are valid
_____ Press flap door closed, remove it, & release the radiosonde
Actual Release Time _____ PDT
_____ Re-tune signal to insure receiver locked on YOUR radiosonde
_____ Set AFC switch to ON

AFTER LAUNCH
_____ Enter CNTRL E to end data collection
_____ Print collected raw data to printer
_____ Make back-up of the three collected raw data files
_____ Label data floppies and store properly
_____ If radiosonde defective fill out Warranty Card

2.4 Summary of Upper-Air Operations

Surface measurements and upper-air soundings were made during a total of seventeen 24-hour periods (eleven in the summer and six in the fall study). A total of 598 RAWINSONDE releases were made on sampling days. A list of the release dates, times, and data recovery are given in Table 2.3.

Table 2.3 Summary of SCAQS RAWINSONDE Operations on 6/19/87

Release Time	Site**	Met*	Wind*	Comments
0440	BA	4084	0	Weak LORAN signal
0740	BA	1913	1849	Faulty radiosonde
1040	BA	3906	3838	
1340	BA	3789	3722	
1635	BA	3753	3694	
2135	BA	3845	3769	
0035	EM	5215	5156	Theodolite winds to 567/LORAN above
0500	EM	5938	5844	Theodolite wind to 1684/LORAN above
0801	EM	5981	5484	Theodolite wind to 1243/LORAN above
1100	EM	0	0	Operator error
1406	EM	6262	3158	Inop LORAN/Theodolite winds
1700	EM	6533	3152	Inop LORAN/Theodolite winds
0500	LB	0	0	Operator error
0739	LB	3792	3733	
1100	LB	0	0	Equipment malfunction
1345	LB	2478	2442	Slow ascension rate
1635	LB	3179	3111	
2158	LB	3705	0	Weak LORAN signal
0015	LM	5573	283	Inop LORAN/Theodolite winds/Stratus
0520	LM	6095	1466	Inop LORAN/Theodolite winds
0800	LM	6605	2295	Lost LORAN signal
1110	LM	6454	3321	Inop LORAN/Theodolite winds
1410	LM	7160	3477	Inop LORAN/Theodolite winds
1700	LM	5799	3391	Inop LORAN/Theodolite winds
0027	NT	5799	0	Inop LORAN
0527	NT	3822	0	Inop LORAN
0803	NT	5218	2314	Inop LORAN/Theodolite winds
1100	NT	3025	2178	Inop LORAN/Theodolite winds
1359	NT	3596	126	Inop LORAN/Theodolite winds - Poor sky contrast
1745	NT	3342	3313	Inop LORAN/Theodolite winds
0440	RV	2405	0	Inop LORAN
0740	RV	3004	0	Inop LORAN
1040	RV	575	0	Inop LORAN/Faulty radiosonde
1340	RV	3839	0	Inop LORAN
1725	RV	3739	0	Inop LORAN
2140	RV	3501	0	Inop LORAN

* Top of measurement (m-agl)
** BA - Burbank, EM - El Monte, LB - Long Beach,
LM - Loyola Marymount, NT - Ontario, RV - Riverside

Table 2.3 (cont.) Summary of SCAQS RAWINSONDE Operations on 6/24/87

Release Time	Site**	Met*	Wind*	Comments
0435	BA	3367	3312	
0745	BA	3185	3118	
1035	BA	3007	2506	Lost LORAN signal
1335	BA	3209	0	Inop LORAN
1635	BA	3416	0	Inop LORAN
2135	BA	3006	2869	
0035	EM	4425	449	Inop LORAN/Theodolite winds/Stratus
0540	EM	5844	390	Inop LORAN/Theodolite winds/Stratus
0759	EM	6359	381	Inop LORAN/Theodolite winds/Stratus
1100	EM	6219	3182	Inop LORAN/Theodolite winds
1400	EM	6740	3223	Inop LORAN/Theodolite winds
1700	EM	6305	3176	Inop LORAN/Theodolite winds
2212	EM	5996	686	Inop LORAN/Theodolite winds/Stratus
0450	LB	3687	286	Inop LORAN/Theodolite winds
0730	LB	3770	3665	Theodolite to 290 m, LORAN above
1035	LB	3704	3633	
1330	LB	3723	3252	Inop LORAN/Theodolite winds
1630	LB	3590	3288	Inop LORAN/Theodolite winds
2200	LB	3521	3430	
0020	LM	6641	6557	
0524	LM	5957	5879	
0820	LM	6252	6171	
1125	LM	5966	5893	
1400	LM	6097	6019	
1700	LM	6017	5944	
2200	LM	5969	3380	Winds missing 489-829 m
0002	NT	5767	5694	
0503	NT	3680	3680	
0840	NT	2829	2744	
1109	NT	5962	5884	
1415	NT	5621	5550	
1700	NT	6230	6145	
2258	NT	5536	5443	
0500	RV	0	0	Equipment malfunction
0905	RV	3880	2028	Inop LORAN/Theodolite winds
1030	RV	4051	0	Inop LORAN/Theodolite wind no good
1340	RV	3146	1624	Inop LORAN/Theodolite winds
1640	RV	2845	2766	
2131	RV	3263	3197	

* Top of measurement (m-agl)
** BA - Burbank, EM - El Monte, LB - Long Beach,
LM - Loyola Marymount, NT - Ontario, RV - Riverside

Table 2.3 (cont.) Summary of SCAQS RAWINSONDE Operations on 6/25/87

Release Time	Site**	Met*	Wind*	Comments
0435	BA	3173	3110	
0741	BA	3013	2912	
1035	BA	3240	0	Inop LORAN
1335	BA	3153	0	Inop LORAN
1640	BA	3392	934	Lost LORAN signal
2135	BA	3196	2944	
0503	EM	6090	242	Inop LORAN/Theodolite winds/Stratus
0800	EM	6068	293	Inop LORAN/Theodolite winds/Stratus
1101	EM	6311	3104	Inop LORAN/Theodolite winds
1400	EM	6011	3181	Inop LORAN/Theodolite winds
1700	EM	3142	3071	Inop LORAN/Theodolite winds
0500	LB	3649	3578	
0745	LB	3588	395	Inop LORAN/Theodolite winds/Stratus
1100	LB	0	0	Equipment malfunction
1400	LB	0	0	Equipment malfunction
1700	LB	4449	4339	
2140	LB	3470	3375	
0504	LM	6011	5928	
0806	LM	5846	5770	
1114	LM	6029	5943	
1454	LM	6100	6019	
1700	LM	5932	3358	
0500	NT	6236	6145	Humidity above 673 m in error
0800	NT	5726	5641	
1100	NT	6051	5964	
1400	NT	5855	3307	
1731	NT	5769	5669	
0449	RV	3105	3033	
0735	RV	3203	3122	
1035	RV	2830	2804	
1400	RV	2909	2872	Inop LORAN/Theodolite winds
1635	RV	2839	2764	
2139	RV	3200	1742	Inop LORAN/Theodolite winds
6/26				
0440	RV	2976	2899	
0740	RV	3507	3480	

* Top of measurement (m-agl)
** BA - Burbank, EM - El Monte, LB - Long Beach,
LM - Loyola Marymount, NT - Ontario, RV - Riverside

Table 2.3 (cont.) Summary of SCAQS RAWINSONDE Operations on 7/13/87

Release Time	Site**	Met*	Wind*	Comments
0435	BA	2925	2849	
0815	BA	2175	2097	Lost signal due to interference from another radiosonde
1050	BA	3245	3166	
1330	BA	3086	3000	
1630	BA	2960	2847	
2130	BA	2973	2893	
0003	EM	2910	2844	Faulty radiosonde
0526	EM	6144	6065	Humidity above 614 m in error
0800	EM	2520	2440	Weak transmission
1100	EM	6087	5997	
1405	EM	2118	0	Incorrect LORAN lock
1701	EM	6146	6069	
2212	EM	5810	3218	
0430	LB	3298	3218	
0755	LB	3298	3200	
1031	LB	3413	3366	
1400	LB	0	0	Faulty radiosonde
1705	LB	3339	3268	
2131	LB	1686	1617	Weak LORAN signal
0002	LM	5736	5664	
0511	LM	5784	5696	
0746	LM	6040	5926	
1109	LM	5855	5766	
1403	LM	5998	5902	
1700	LM	5623	0	Incorrect LORAN lock
2212	LM	5793	5710	
0005	NT	5615	5518	
0503	NT	5960	5855	
0812	NT	5701	5594	
1103	NT	5876	5781	
1401	NT	5761	5668	
1700	NT	5770	5690	
2202	NT	5897	5796	Winds missing 3385-3848 m
0437	RV	3335	3250	
0740	RV	3152	3056	
1045	RV	3089	2996	
1335	RV	2963	2900	
1700	RV	0	0	Equipment malfunction
2130	RV	2771	2667	

* Top of measurement (m-agl)
** BA - Burbank, EM - El Monte, LB - Long Beach,
LM - Loyola Marymount, NT - Ontario, RV - Riverside

Table 2.3 (cont.) Summary of SCAQS RAWINSONDE Operations on 7/14/87

Release Time	Site**	Met*	Wind*	Comments
0500	BA	3977	3899	
0730	BA	3533	3451	
1030	BA	3267	3196	
1335	BA	2939	2849	
1635	BA	3205	3132	
2135	BA	3343	3255	
0542	EM	6074	0	Incorrect LORAN lock
0801	EM	6114	6036	
1101	EM	5863	5764	
1404	EM	6472	6405	
1700	EM	6203	6141	
2202	EM	6065	5995	
0540	LB	3683	3611	
0730	LB	3316	3225	
1048	LB	3434	3371	
1336	LB	3289	3214	
1637	LB	3370	3300	
2140	LB	2632	2543	Lost signal due to interference from another radiosonde
0515	LM	6430	6346	
0845	LM	6048	0	Incorrect LORAN lock
1100	LM	5885	5809	
1400	LM	5898	5814	
1702	LM	6180	0	Incorrect LORAN lock
2200	LM	5701	0	Incorrect LORAN lock/humidity above 798 m in error
0512	NT	5927	5818	
0800	NT	5730	5636	
1105	NT	5790	5708	
1400	NT	5773	5675	
1702	NT	5976	5869	
2200	NT	5583	5497	Winds missing 1756-2860 m
0437	RV	3180	0	Incorrect LORAN lock
0750	RV	2389	2298	
1035	RV	3080	2998	
1335	RV	3391	3312	
1715	RV	3230	2613	Lost LORAN signal
2130	RV	3292	1603	Lost LORAN signal

* Top of measurement (m-agl)
** BA - Burbank, EM - El Monte, LB - Long Beach,
LM - Loyola Marymount, NT - Ontario, RV - Riverside

Table 2.3 (cont.) Summary of SCAQS RAWINSONDE Operations on 7/15/87

Release Time	Site**	Met*	Wind*	Comments
0442	BA	3533	3447	
0735	BA	3469	3379	
1035	BA	3590	3534	
1455	BA	3036	2966	
1635	BA	3395	3322	
2210	BA	3213	3038	
0504	EM	5903	3042	Lost LORAN signal
0800	EM	4236	4147	
1112	EM	4724	4637	
1400	EM	3556	0	Incorrect LORAN lock
1739	EM	3796	3408	
0545	LB	3425	3346	
0733	LB	3038	2948	
1033	LB	3148	3063	
1339	LB	3389	3318	
1633	LB	3305	3236	
2132	LB	3299	0	Incorrect LORAN lock
0505	LM	5374	5292	
0800	LM	6004	0	Incorrect LORAN lock
1100	LM	5411	5319	
1400	LM	5264	5165	
1705	LM	3540	3500	Faulty radiosonde
0500	NT	3484	3391	
0800	NT	5889	5794	
1100	NT	4625	4520	
1413	NT	5682	5582	
1659	NT	6036	5927	
0435	RV	3058	0	Lost LORAN signal
0735	RV	3277	3193	
1055	RV	2883	2813	
1335	RV	3141	0	Incorrect LORAN lock
1645	RV	3120	3027	
2135	RV	3263	3161	

* Top of measurement (m-agl)
** BA - Burbank, EM - El Monte, LB - Long Beach,
LM - Loyola Marymount, NT - Ontario, RV - Riverside

Table 2.3 (cont.) Summary of SCAQS RAWINSONDE Operations on 8/27/87

Release Time	Site**	Met*	Wind*	Comments
0435	BA	2948	2863	
0735	BA	3215	3125	
1035	BA	3289	3186	
1335	BA	3344	3235	
1635	BA	3088	3014	
2300	BA	3009	2929	
0000	EM	2124	2059	
0500	EM	5782	5703	
0801	EM	5379	5292	Winds missing below 3298 m
1102	EM	5744	5651	
1459	EM	3407	2359	
1755	EM	5916	3431	
2210	EM	6005	5888	
0430	LB	3686	3562	
0730	LB	2694	2615	
1035	LB	3678	3596	
1335	LB	3440	3365	
1635	LB	3470	2817	
2130	LB	3812	0	Incorrect LORAN lock
0004	LM	5863	0	Incorrect LORAN lock
0500	LM	5853	0	Incorrect LORAN lock
0800	LM	5956	5878	
1101	LM	6282	6144	
1400	LM	5865	5791	
1700	LM	6012	0	Weak LORAN signal
2159	LM	2850	2771	Signal interference
0040	NT	5857	5769	
0502	NT	6089	0	Incorrect LORAN lock
0835	NT	5634	0	Incorrect LORAN lock
1109	NT	2717	2633	
1400	NT	6026	5926	Winds missing 1526-2227 m
1715	NT	5505	5413	
2200	NT	5685	5604	
0437	RV	3216	3132	
0737	RV	3181	3103	
1032	RV	3184	3119	
1423	RV	2941	2858	
1634	RV	3078	2999	
2131	RV	2726	0	Incorrect LORAN lock

* Top of measurement (m-agl)
** BA - Burbank, EM - El Monte, LB - Long Beach,
LM - Loyola Marymount, NT - Ontario, RV - Riverside

Table 2.3 (cont.) Summary of SCAQS RAWINSONDE Operations on 8/28/87

Release Time	Site**	Met*	Wind*	Comments
0435	BA	3202	3122	
0735	BA	3031	2935	
1035	BA	3067	2978	
1335	BA	2857	2778	
1635	BA	3058	2964	
2135	BA	3315	3236	
0500	EM	3932	3855	
0800	EM	5873	5801	
1100	EM	0	0	Equipment down for repair
1350	EM	5924	5855	
1700	EM	5557	5487	
2200	EM	5767	5675	
0438	LB	3516	0	Weak LORAN signal
0737	LB	3859	3768	
1036	LB	3408	3341	
1435	LB	1761	1673	Equipment malfunction
1635	LB	3248	3178	Faulty temperature element
2136	LB	3719	3632	
0500	LM	6047	5292	
0815	LM	6791	6696	RH missing above 500 m
1055	LM	6363	6279	
1355	LM	6090	6013	
1703	LM	6129	5946	
2200	LM	5840	5707	
0540	NT	4814	4718	
0800	NT	6016	5930	Wind missing 1690-3454 m
1100	NT	5736	5631	
1400	NT	5876	5801	
1700	NT	5733	5626	
2200	NT	5665	5573	Wind missing 787-1854 m
0443	RV	2452	2386	
0735	RV	3079	3010	
1033	RV	3038	2975	Significant portions of data msg
1400	RV	0	0	Site power outage
1700	RV	3275	3188	
2133	RV	1226	1172	Weak transmission

* Top of measurement (m-agl)
** BA - Burbank, EM - El Monte, LB - Long Beach,
LM - Loyola Marymount, NT - Ontario, RV - Riverside

Table 2.3 (cont.) Summary of SCAQS RAWINSONDE Operations on 8/29/87

Release Time	Site**	Met*	Wind*	Comments
0435	BA	3343	0	Lost LORAN signal
0735	BA	3265	3050	
1035	BA	3358	3272	
1335	BA	3240	2192	Lost LORAN signal
1642	BA	2994	2913	
2135	BA	3084	2967	
0522	EM	6116	6049	Significant portions of data msg
0802	EM	5916	5816	Winds missing 636-1515 m
1123	EM	5610	5516	Winds missing 635-1493 m
1400	EM	5871	5779	
1701	EM	5664	5569	
0443	LB	3714	3636	
0800	LB	3317	3232	
1054	LB	3130	0	Incorrect LORAN lock
1337	LB	2706	2626	
1641	LB	3942	3869	
2138	LB	0	3960	Unusable met/Winds msg 2304-2760 m
0501	LM	5761	0	Incorrect LORAN lock
0735	LM	6442	6352	
1100	LM	6060	5979	
1400	LM	0	0	Operator error
1707	LM	5312	5234	
0530	NT	5718	0	Incorrect LORAN lock
0800	NT	5558	5478	
1120	NT	6028	5951	
1408	NT	5740	5647	
1708	NT	5716	5620	
0446	RV	3380	3299	
0732	RV	3196	3099	
1058	RV	3032	2962	
1330	RV	3029	2964	
1630	RV	3183	3078	
2130	RV	1471	1402	Equipment malfunction

* Top of measurement (m-agl)
** BA - Burbank, EM - El Monte, LB - Long Beach,
LM - Loyola Marymount, NT - Ontario, RV - Riverside

Table 2.3 (cont.) Summary of SCAQS RAWINSONDE Operations on 9/2/87

Release Time	Site**	Met*	Wind*	Comments
0436	BA	3193	3104	
0735	BA	3386	3304	
1035	BA	3166	3070	
1335	BA	3168	3093	
1755	BA	3444	3333	
2135	BA	3220	3135	
0000	EM	5981	5892	
0515	EM	6056	5901	
0800	EM	6531	0	Weak LORAN signal
1105	EM	5903	5811	
1403	EM	5547	5471	
1753	EM	5806	5650	
2200	EM	5771	5664	
0435	LB	3239	0	Weak LORAN signal
0742	LB	3390	3313	
1035	LB	3371	3292	
1337	LB	3455	3366	
1635	LB	3469	3390	
2301	LB	7029	7029	
0003	LM	6117	6018	
0502	LM	6188	6087	
0800	LM	5627	5561	
1100	LM	5805	5719	
1400	LM	6158	6071	
1730	LM	6133	6047	
2203	LM	6011	5930	
0007	NT	5919	5826	
0500	NT	6025	6025	
0805	NT	4909	3362	Lost LORAN signal
1100	NT	5741	5679	
1400	NT	5594	5499	
1700	NT	5919	5843	
2200	NT	5978	5894	
0433	RV	3284	3194	
0736	RV	3209	3124	
1035	RV	3318	3256	Noisy signal. Some msg met data
1330	RV	3328	3264	Noisy signal. Some msg met data
1633	RV	3195	3079	
2134	RV	3130	3028	

* Top of measurement (m-agl)
** BA - Burbank, EM - El Monte, LB - Long Beach,
LM - Loyola Marymount, NT - Ontario, RV - Riverside

Table 2.3 (cont.) Summary of SCAQS RAWINSONDE Operations on 9/3/87

Release Time	Site**	Met*	Wind*	Comments
0435	BA	3159	3074	
0735	BA	3005	2909	
1035	BA	3182	3082	
1335	BA	3246	3179	
1635	BA	3370	3289	
2135	BA	2905	2905	
0500	EM	0	0	Equipment malfunction
0828	EM	6078	5979	
1131	EM	5654	5580	
1357	EM	5715	5631	
1700	EM	5559	5445	
0443	LB	3444	3341	
0735	LB	3476	3394	
1038	LB	3413	3333	
1335	LB	3528	3453	
1637	LB	3307	3227	
2142	LB	4148	4060	
0500	LM	6011	4942	
0800	LM	5767	5691	
1100	LM	6199	6113	
1400	LM	6015	5939	
1700	LM	5698	5616	
0500	NT	5720	5622	Portions of data missing
0800	NT	5846	5771	
1100	NT	6397	6323	
1400	NT	4747	0	Equipment malfunction
1700	NT	5208	5116	
2200	NT	5895	5814	
0434	RV	940	3423	Met data missing above 940 m
0731	RV	3258	3177	
1035	RV	3159	3100	
1335	RV	3210	3145	
1635	RV	3219	0	Weak LORAN signal
2130	RV	3295	3217	

* Top of measurement (m-agl)
** BA - Burbank, EM - El Monte, LB - Long Beach,
LM - Loyola Marymount, NT - Ontario, RV - Riverside

Table 2.3 (cont.) Summary of SCAQS RAWINSONDE Operations on 11/11/87

Release Time	Site**	Met*	Wind*	Comments
0432	BA	3210	3135	
0730	BA	3107	3042	
0927	BA	3346	3274	
1030	BA	3032	2964	
1330	BA	3596	0	Weak LORAN signal
1703	BA	3056	2978	
2128	BA	3072	3005	
0525	EM	2993	2924	RH appears 10% too low
0800	EM	3201	3176	
1116	EM	3164	3096	
1400	EM	3249	3181	
1730	EM	3040	2956	
2200	EM	3023	2955	
0435	LB	3869	482	Lost LORAN signal
0730	LB	3801	3728	
1032	LB	3238	3164	
1329	LB	3269	3193	
1635	LB	3070	2983	
2130	LB	3591	3510	Winds missing 891 - 3230 m
0000	LM	5930	5839	
0500	LM	6090	6003	
0800	LM	6194	6100	
1100	LM	5944	5858	
1400	LM	5765	5669	
1700	LM	6218	6131	Winds missing 2590 - 3753 m
2200	LM	5703	5513	
0100	NT	2872	2788	
0500	NT	3226	3145	
0800	NT	4292	4207	
1100	NT	2801	2725	
1400	NT	2765	2683	
1700	NT	2541	2466	
2245	NT	2718	2645	

* Top of measurement (m-agl)
** BA - Burbank, EM - El Monte, LB - Long Beach,
LM - Loyola Marymount, NT - Ontario

Table 2.3 (cont.) Summary of SCAQS RAWINSONDE Operations on 11/12/87

Release Time	Site**	Met*	Wind*	Comments
0429	BA	2950	2139	Lost LORAN signal
0801	BA	3099	3028	
1030	BA	3214	3149	
1330	BA	3103	3034	
1630	BA	3030	2955	
2130	BA	3165	3093	
0620	EM	3131	3059	
0730	EM	3025	2953	
1100	EM	3307	3239	
1400	EM	3206	3139	
1700	EM	3054	2993	
2200	EM	3084	2995	
0433	LB	3619	182	Weak LORAN signal
0730	LB	3745	3652	
1038	LB	3467	3392	
1332	LB	3424	3338	
1631	LB	3617	3524	
2131	LB	3624	3549	
0505	LM	5807	5714	
0845	LM	5928	5809	
1100	LM	5965	5870	
1400	LM	6107	6005	
1700	LM	6380	6281	
2200	LM	5131	5055	
0510	NT	2725	2642	
0915	NT	3107	3030	
1100	NT	3297	3216	
1402	NT	3485	3408	
1700	NT	3566	0	Weak LORAN signal
2200	NT	3183	3107	

* Top of measurement (m-agl)
** BA - Burbank, EM - El Monte, LB - Long Beach,
LM - Loyola Marymount, NT - Ontario

Table 2.3 (cont.) Summary of SCAQS RAWINSONDE Operations on 11/13/87

Release Time	Site**	Met*	Wind*	Comments
0430	BA	3299	3237	
0730	BA	3170	3105	
1030	BA	3023	2953	
1330	BA	3189	3096	
1750	BA	3125	3039	
2130	BA	3068	3007	No RH, Winds missing 1137 - 2117 m
0630	EM	3103	0	Equipment malfunction
0800	EM	3040	362	Theodolite winds/Stratus
1100	EM	3174	404	Equipment malfunction/Theodolite winds, Temp. missing above 963 m
1400	EM	3025	2947	
1700	EM	3197	3144	
2153	EM	1264	1214	
0431	LB	3521	3433	
0730	LB	3294	3152	
1031	LB	3454	3369	
1330	LB	3479	3405	
1630	LB	3229	3186	
2226	LB	3082	2960	
0500	LM	1817	1783	Faulty sonde
0800	LM	6052	0	Winds missing/Operator error
1100	LM	5955	5850	
1400	LM	5983	5861	
1700	LM	5407	0	Winds missing/Operator error
0504	NT	2633	2552	
0835	NT	3649	3581	
1100	NT	2594	2515	
1400	NT	2834	2762	
1700	NT	2623	2524	Winds missing 1086 - 2096 m

* Top of measurement (m-agl)
** BA - Burbank, EM - El Monte, LB - Long Beach,
LM - Loyola Marymount, NT - Ontario

Table 2.3 (cont.) Summary of SCAQS RAWINSONDE Operations on 12/03/87

Release Time	Site**	Met*	Wind*	Comments
0432	BA	3138	3074	
0730	BA	3054	2989	
1030	BA	3203	0	No RH, Weak LORAN signal
1330	BA	3167	3097	
1807	BA	3051	2972	
2130	BA	3116	3051	
0510	EM	3127	3059	
0800	EM	3366	3293	
1130	EM	3125	3056	
1335	EM	3218	3156	
1700	EM	2929	2855	
2200	EM	4190	4126	
0500	LB	0	0	Equipment malfunction
0737	LB	3651	0	Weak LORAN signal
1032	LB	3564	3489	
1337	LB	3531	2868	
1630	LB	3534	3431	
2132	LB	3232	3156	
0000	LM	6053	0	Winds missing/Operator error
0500	LM	3908	0	Winds missing/Operator error
0800	LM	5891	0	Winds missing/Operator error
1100	LM	5867	5755	
1400	LM	6078	5959	
1700	LM	6201	6090	
2200	LM	5982	5885	
0030	NT	4479	4386	
0500	NT	3208	2619	Lost LORAN signal
0800	NT	3140	3052	
1100	NT	3705	3623	
1400	NT	3551	3460	
1730	NT	3517	3434	

* Top of measurement (m-agl)
** BA - Burbank, EM - El Monte, LB - Long Beach,
LM - Loyola Marymount, NT - Ontario

Table 2.3 (cont.) Summary of SCAQS RAWINSONDE Operations on 12/10/87

Release Time	Site**	Met*	Wind*	Comments
0430	BA	3036	2954	
0730	BA	3129	3070	
1033	BA	3041	2971	RH appears 10-15% too low
1330	BA	3174	3106	
1630	BA	3067	2992	
2130	BA	3038	2967	
0500	EM	3245	3181	
0800	EM	3134	3068	
1100	EM	2980	2916	
1430	EM	3324	3260	
1700	EM	3325	2765	Winds < 600 m appear questionable
2200	EM	3199	368	Weak LORAN signal
0430	LB	3231	3140	
0733	LB	3556	3453	
1031	LB	3540	3463	
1337	LB	3561	3479	
1632	LB	3682	3573	
2131	LB	3426	3318	
0000	LM	5512	4974	
0600	LM	5616	5468	
0800	LM	4977	4861	
1100	LM	5907	5800	
1400	LM	5114	5002	
1715	LM	4751	4643	
2200	LM	5744	5610	
0115	NT	1106	1010	Faulty sonde
0505	NT	3747	0	Weak LORAN signal
0815	NT	3436	3356	
1110	NT	3559	3477	
1410	NT	3028	2944	
1700	NT	3543	3446	
2205	NT	4994	4905	

* Top of measurement (m-agl)
** BA - Burbank, EM - El Monte, LB - Long Beach,
LM - Loyola Marymount, NT - Ontario

Table 2.3 (cont.) Summary of SCAQS RAWINSONDE Operations on 12/11/87

Release Time	Site**	Met*	Wind*	Comments
0432	BA	3214	3130	
0730	BA	3173	3112	
1028	BA	2970	2899	
1330	BA	3205	3140	
1630	BA	3087	3020	
2130	BA	3048	2978	
0601	EM	3035	2959	
0800	EM	3383	3324	
1100	EM	3310	3234	
1400	EM	3347	3222	
1700	EM	3357	3279	
2231	EM	3199	3106	
0430	LB	3716	3610	
0731	LB	3817	3724	
1030	LB	3354	3271	
1331	LB	3520	3444	
1739	LB	3527	3432	
2130	LB	3638	3551	
0500	LM	5988	5899	
0800	LM	5752	5662	
1100	LM	5949	5857	
1400	LM	5755	5662	
1700	LM	5851	5756	
0440	NT	3081	2982	
0830	NT	3799	3708	
1103	NT	3305	3220	
1400	NT	2956	2862	
1715	NT	3268	3184	

* Top of measurement (m-agl)
** BA - Burbank, EM - El Monte, LB - Long Beach,
LM - Loyola Marymount, NT - Ontario

3.0 DATA REDUCTION AND QUALITY ASSURANCE

3.1.1 Surface Measurements

Hourly averaged values of wind speed and wind direction and instantaneous temperature readings were manually extracted from the MWS strip charts. The wind data are averaged centered on the hour. Temperatures were read on the hour. The data was reviewed by a meteorologist experienced with the equipment.

3.1.2 Upper-Air Measurements

Site operators attempted to reduce all the data in a preliminary manner in the field, when possible. Thus the first step in our post-field data reduction procedures was to process, plot, and list all the field data. The data were next subjected to two-levels of quality assurance (QA) checks. After each QA check, the raw data was corrected and reduced again if needed.

All RAWINSONDE data presented in this report were carefully reviewed by meteorologists familiar with the inherent problems and operational pitfalls typically experienced in field operations. The first level of QA checks required consistency within each sounding and with sequential soundings made at that site. A second level of QA checks consisted of comparing soundings from all the sites taken at the same observation time.

Quality assurance checks included the comparison of 850 mb and 700 mb level data at corresponding times, with prior and successive soundings. Inversion bases, wind speed profiles, and temperature maxima were compared in a similar manner.

When questionable reduced data were encountered, the raw field data was reviewed in detail to determine possible sources of error. In many instances, questionable data were resolved, and corrections applied. Some data were interpolated, and are flagged as such in the database. Data considered in error and not recoverable were deleted and are flagged as missing in the data base. In some instances, data were suspect but could not be discounted with any certainty and were therefore retained in the data base.

4.0 COMPARISON OF UPPER AIR MEASUREMENT EQUIPMENT

The complete SCAQS database will consist of upper-air measurements made by several types of equipment. The measurements include winds aloft as determined by theodolites, radiotheodolites, LORAN-C Navaids and Doppler radar; and temperature and humidity aloft as measured with Airsonde systems, a variety of radiosonde systems and aircraft. Users of the SCAQS database will be integrating these measurements for their specific purposes and, thus, should have knowledge of the comparability of the different data sources. In some instances, we have simultaneous or near simultaneous measurements with different equipment. Comparative analyses of these data are briefly discussed in this section.

Tables 4.1 to 4.3 summarize four comparisons; a winds only comparison, two comparisons of temperature and humidity, and one comparison of winds and temperature-humidity data. These comparisons are between theodolite and LORAN-C Navaid derived winds; the two types of Beukers W-8000RP+ Upper-Air Measuring Systems which were used in SCAQS by T & B Systems; and airplane soundings made by Sonoma Technology, Inc. (STI) vs. VIZ radiosonde data.

Early in the field program some RAWINSONDES were simultaneously tracked with theodolites. A flight which exhibited typical basin flows aloft was chosen to compare these two wind measuring methods. This comparison was based on the projected balloon position on a horizontal plane since wind is a vector quantity (as opposed to the scaler quantities wind speed and wind direction). The X and Y coordinates of the balloon position at 10,000 feet (approx. 700 mb) was calculated for both methods. With the theodolite data, the position was determined directly from the measured angles and with the balloon height. Balloon height was calculated from the radiosonde data. The LORAN-C system required that the balloon position be computed by summing the incremental X and Y coordinates as determined from the N-S and E-W component winds at 15-second intervals. In Table 4.1, the results of the theodolite vs. LORAN-C winds are shown.

Table 4.1. **Comparison of Theodolite vs. LORAN-C Derived Winds at the Long Beach Site on 25 June 1987 at 1700 PDT**

	Theodolite	LORAN-C	Difference
Resultant Distance	2486 m	2449 m	2%
Resultant Azimuth Angle	335 deg	340 deg	1.5%

On 16 September 1987, both types of Beukers W-8000RP+ Upper-Air Measuring Systems (Apple IIe and the Apple GS) Acquisition systems which were used in the SCAQS field study were run side-by-side, and simultaneously tracked the same radiosonde. This provided an opportunity to compare the two data acquisition systems and reduction software for temperature, relative humidity, height and winds. Root-mean-squares (rms) of the differences between the X and Y coordinates of the radiosonde position every 15 seconds to an altitude of 10,000 ft. or 700 mb were calculated. Radiosonde position was determined from the calculated wind speed and direction, a method that seemed appropriate since we are comparing identical methods of wind determination. The rms for the X and Y coordinates were used to compute a resultant vector. The results are shown below in Table 4.2. Temperature and relative humidity were also compared using the rms of the differences.

Table 4.2. **Comparison Between W-8000RP+ Apple GS vs. Apple IIe Systems at Monterey Bay on 16 September 1987 at 1300 PDT**

Temperature (rms)	0.3 deg C
Relative Humidity (rms)	1.1 %
Wind (rms)	1.2 m/sec

The STI airplane flew spiral soundings (from the surface to approx. 1500 m-msl) in close proximity to two of T & B Systems RAWINSONDE airport sites. Two airplane soundings taking place within half an hour of RAWINSONDE observations were compared and the results shown below in Table 4.3. Comparisons were made for August 27, 1987, 1700 PDT at the Burbank Airport and for November 11, 1987, 0500 PST at the Ontario Airport (from the fall SCAQS study). A portion of the sounding at the Burbank Airport was not included in the comparisons. Air traffic patterns had dictated that the airplane fly over foothill terrain, at some distance away from the radio-sounding, to make a low approach to the runway. Therefore, below 350 m. the aircraft and radiosonde were sampling different air masses.

Radiosonde dewpoint temperature was calculated from the measured temperature and relative humidity, whereas dewpoint was measured directly in the airplane sounding. Rms differences in temperature and dewpoint temperature were computed for the combined data set. Considering that humidity is a difficult parameter to measure accurately, and that two distinctly different techniques were used obtain dewpoint, a noteworthy feature of Table 4.3 is the closeness of the dewpoint temperature.

Table 4.3. **Comparison of STI Airplane vs. VIZ Microsonde at the Burbank Airport on 27 August 1987 at 1700 PDT and at the Ontario Airport on 11 November 1987 at 0500 PST**

Temperature	1.07 deg-C (rms)
Dewpoint	0.96 deg-C (rms)

5.0 DATA

5.1 Data Format

5.1.1 Surface Measurements

The surface meteorology data have been prepared in two formats: tables and computer file.

The tabulated data are organized by site and date and consist of wind direction, wind speed and air temperature as a function of time.

The computer file containing surface meteorology data is available on 5 1/4 inch floppy diskette in an ASCII, MS-DOS format. The format of the file is described below.

Record #	Variable	Column	Form	Values Indicating Missing Data
1 - 3	Header Info	1 - 80	Alphanumeric	
4 - n*	Site Abbreviation	1 - 2	Alpha	
	Julian Date	4 - 6	###	
	Hour (Local Time)	8 - 9	##	
	Wind Speed (m/s)	11 - 15	###.#	999.9
	Wind Direction	18 - 20	###	999
	Temperature (deg C)	22 - 24	###	999

* n equals the number of hourly observations

Site names and abbreviations are as follows:

Henninger Flats	HF
Kellogg Hill	KH
Palos Verdes	PV

5.1.2 Upper-Air Measurements

The radiosonde data have been prepared in three formats: tables, plots, and computer files.

The tabulated listings of radiosonde data are of pressure, temperature, relative humidity, dew point temperature, wind speed and wind direction as a function of height.

The second data form is plots of temperature, dew point temperature, wind direction and wind speed as a function of height. Each plot appears on the page opposite the first page of the corresponding tabulated listing in the data base presentation. An example of plotted upper-air data is shown in Figure 5.1. Temperature is shown as a solid heavy line and dew point temperature as a heavy broken line. For reference, the dry adiabatic lapse rate is depicted as a series of thin broken lines. This special lapse rate of temperature is defined as the rate at which the temperature of a dry air parcel decreases while being lifted adiabatically through the atmosphere in hydrostatic equilibrium. Temperature lapse rates greater than adiabatic are buoyantly unstable, those near the dry adiabatic lapse rate charaterize a well-mixed layer, and less than the adiabatic lapse rate indicate stable layers. Wind speed and direction are shown on the right side of the graph and are plotted approximately every 90 meters. More frequent measurements may be available and would be included in the tabular listing, but are not plotted for readability. Wind direction is shown as arrows pointing the direction the wind is blowing to, with the corresponding numbers representing the wind speed (mps) at that level.

Tabulated listings and plots are presented under separate covers. Appendix A contains the summer measurements, and correspondingly the fall measurements are contained in Appendix B. The order in which the data are arranged is by date, site, and time, corresponding to Table 2.3.

For portability to other computers, the data base has been made available on 5 1/4 inch floppy diskettes in an ASCII, MS-DOS format. Each sounding comprises a single file, whose length is determined by the number of fifteen-second readings. The format of the computer files is fully described below.

File names are modeled on the following form:

NNMMDDHH.DAT

where NN is a two letter site abbreviation unique to each site, MM is the month, DD the day, and HH the scheduled sounding time.

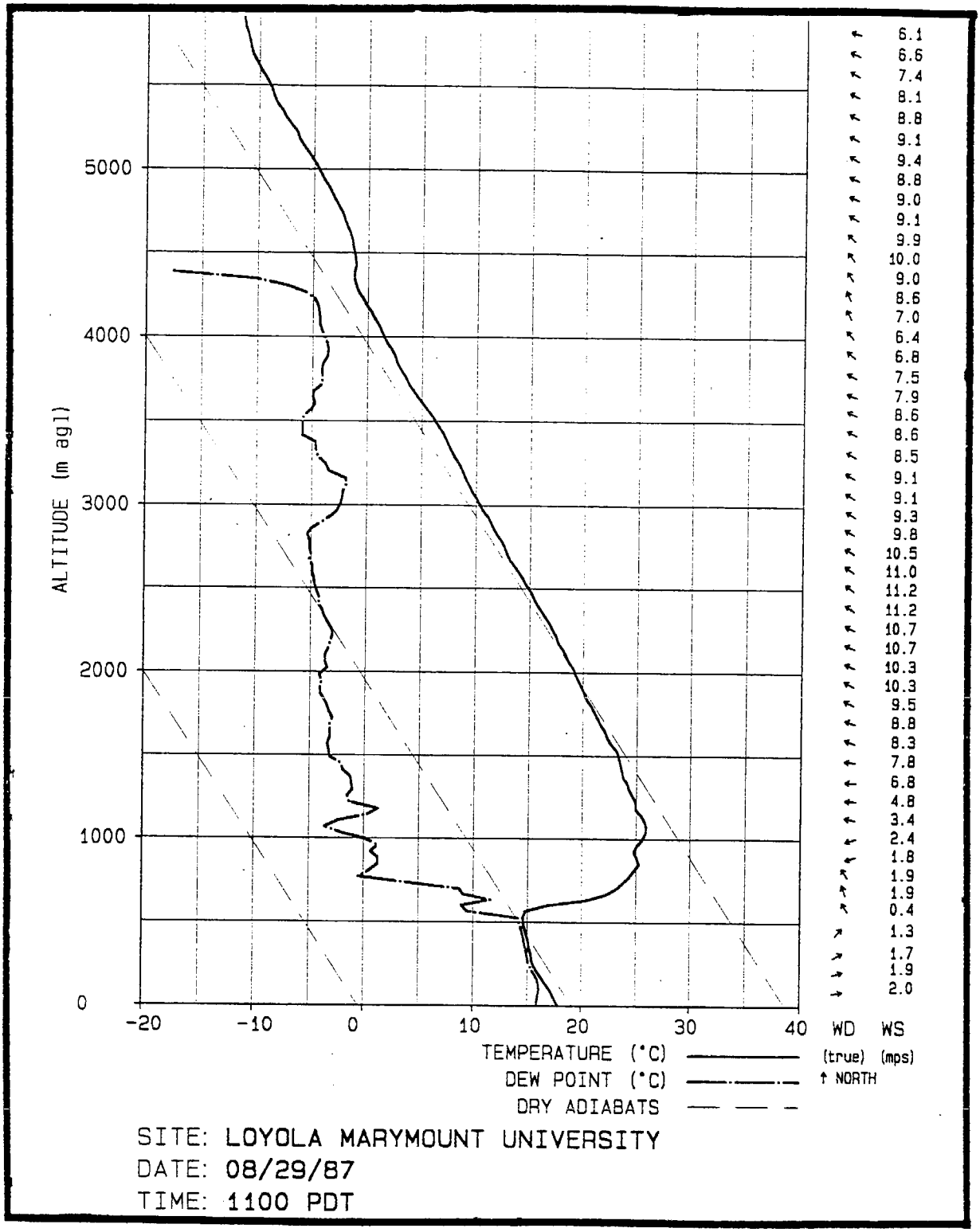

Figure 5.1 Sample of Plotted Upper-Air Data. Temperature, Dew Point Temperature, Wind Speed and Direction as Functions of Height.

The site abbreviations are as follows:

Burbank Airport	BA
El Monte Air Resources Board	EM
Long Beach Community College	LB
Loyola Marymount University	LM
Ontario Airport	NT
Riverside Airport	RV

Each file is comprised of three distinct record formats.

Record #		Column	Form	Values Indicating Missing Data
1	Site Name	1 - 30	Alpha-numeric	
2	Date	1 - 8	MM/DD/YY	
	Time (Local)	15 - 18	HHMM	
	Time Zone	20 - 22	PDT or PST	
	Latitude	26 - 32	DD.MMSS	
	Longitude	35 - 42	DDD.MMSS	
3 to n*	Height (m-agl)	1 - 5	####.	
	Pressure (mb)	7 - 12	####.#	9999.9
	Temperature (deg C)	14 - 18	###.#	99.9
	* indicates interpolated	20	* or blank	
	Relative Humidity (%)	22 - 25	###.	999.
	* indicates interpolated	27	* or blank	
	Dew Point Temp. (deg C)	29 - 33	###.#	99.9
	* indicates interpolated	35	* or blank	
	Height (m-agl)	37 - 41	####.	
	Wind Direction (True)	43 - 47	###.#	999.9
	* indicates interpolated	49	* or blank	
	Wind Speed (meters/sec)	51 - 55	###.#	999.9
	* indicates interpolated	57	* or blank	

* n equals the number of fifteen-second readings

5.2 Tabulated Listings - Surface Measurements

Tabulated listings of the surface measurements are provided on pages 5-5 thru 5-12. A sample listing and explanation is provided below:

Sample Listing

Hour	08/27/87
1	18/03/62

Explanation of Sample Listing:

CODED VALUE	INTERPRETATION OF CODE
18	The hourly average wind direction for 0100 PDT on August 27, 1987 is 180 degrees (direction from which wind is blowing).
03	The hourly average wind speed for 0100 PDT on August 27, 1987 is 3 miles per hour.
62	The hourly average temperature for 0100 PDT on August 27, 1987 is 62 degrees Fahrenheit.

SCAQS Surface Wind Monitoring Data Site: Henninger Flats

Hour:	06/19/87	06/24/87	06/25/87	07/13/87	07/14/87	07/15/87
1	XX/XX/XX	18/01/56	28/01/56	16/01/64	12/02/68	21/02/66
2	XX/XX/XX	18/01/57	05/01/62	12/00/66	01/02/68	08/02/63
3	XX/XX/XX	17/01/59	36/01/62	14/01/64	35/02/69	18/02/61
4	XX/XX/XX	18/02/58	21/02/65	15/01/65	01/02/67	20/02/64
5	XX/XX/XX	28/01/59	01/03/63	18/01/63	18/02/68	18/02/63
6	XX/XX/XX	10/02/58	12/02/64	15/01/61	15/00/64	17/03/69
7	XX/XX/XX	13/01/64	34/01/65	18/01/64	34/01/67	17/03/70
8	XX/XX/XX	35/02/67	05/01/66	16/01/62	35/02/69	20/02/69
9	XX/XX/XX	27/01/71	18/01/70	03/01/70	17/02/73	36/02/72
10	XX/XX/XX	21/03/76	22/03/74	21/03/73	17/03/71	33/02/73
11	XX/XX/XX	19/04/78	22/03/75	20/05/73	20/05/73	20/04/70
12	XX/XX/XX	21/05/73	21/05/74	20/05/72	20/04/73	20/04/67
13	XX/XX/XX	21/05/73	21/06/74	21/06/73	21/04/77	20/04/68
14	XX/XX/XX	21/06/75	19/07/76	21/06/75	22/06/78	20/06/74
15	XX/XX/XX	21/06/76	22/07/74	21/07/76	21/05/79	20/05/73
16	XX/XX/XX	19/06/77	21/06/77	21/06/77	20/06/81	21/05/73
17	XX/XX/XX	22/04/78	21/06/76	22/06/77	22/04/82	20/05/76
18	XX/XX/XX	22/04/79	20/04/76	21/05/76	21/04/86	21/03/78
19	XX/XX/XX	28/02/77	19/02/76	22/03/74	33/03/80	29/02/75
20	XX/XX/XX	34/02/71	02/03/71	34/01/73	04/02/78	03/03/68
21	XX/XX/XX	30/01/73	03/02/73	36/01/70	18/02/71	31/02/72
22	XX/XX/XX	01/03/72	35/02/70	05/02/71	33/02/65	18/02/70
23	XX/XX/XX	34/02/69	19/03/67	36/02/70	17/02/61	18/02/68
24	XX/XX/XX	15/02/62	32/02/63	03/03/67	15/01/61	18/03/66

Key: WD ÷ 10 / WS (mph) / Temp (deg F)

SCAQS Surface Wind Monitoring Data Site: Henninger Flats

Hour:	08/27/87	08/28/87	08/29/87	09/02/87	09/03/87
1	18/03/62	07/02/72	04/01/65	01/02/63	01/03/65
2	18/01/62	03/01/74	17/02/65	36/02/62	02/02/65
3	03/03/64	21/01/75	33/03/65	20/01/63	03/02/64
4	02/02/71	32/02/74	06/01/64	18/01/65	03/02/64
5	18/02/67	05/02/74	21/01/61	18/02/63	02/03/63
6	19/02/67	05/06/78	03/01/63	03/01/61	18/02/61
7	06/02/67	19/03/81	20/03/64	17/01/61	19/02/62
8	27/02/69	18/03/80	34/02/67	36/01/63	03/01/65
9	33/02/77	21/04/82	21/03/73	16/03/69	20/03/72
10	23/03/83	21/06/84	20/04/77	20/04/73	21/04/73
11	21/05/82	21/11/85	20/07/78	21/06/72	22/05/74
12	21/05/83	23/08/86	20/07/77	21/06/77	22/05/74
13	21/07/84	21/08/85	22/07/78	20/06/78	22/06/75
14	22/06/87	22/08/85	22/08/79	21/08/80	21/06/74
15	21/05/87	21/09/85	21/09/80	21/08/80	21/06/74
16	30/03/87	20/08/85	18/07/80	22/06/79	22/05/75
17	21/02/86	22/07/84	21/07/79	21/07/81	22/04/76
18	02/03/83	22/04/86	22/05/77	21/04/79	35/02/74
19	30/02/78	05/04/83	20/02/75	03/02/76	27/02/70
20	01/02/77	04/03/78	35/02/70	36/02/70	32/01/65
21	03/02/77	18/03/75	01/02/68	35/03/68	18/03/64
22	04/04/74	20/02/72	33/02/66	35/03/64	04/02/62
23	04/08/76	21/02/70	16/02/65	18/04/62	36/03/60
24	06/02/75	17/03/68	22/02/65	16/02/62	21/01/61

Key: WD ÷ 10 / WS (mph) / Temp (deg F)

SCAQS Surface Wind Monitoring Data Site: Kellogg Hill

Hour:	06/19/87	06/24/87	06/25/87	07/13/87	07/14/87	07/15/87
1	XX/XX/XX	32/03/56	30/05/58	23/04/59	24/04/66	21/04/59
2	XX/XX/XX	31/04/56	20/02/57	22/05/58	28/03/65	20/04/59
3	XX/XX/XX	31/05/56	35/03/57	24/04/59	32/03/65	22/04/60
4	XX/XX/XX	32/05/57	32/04/57	32/03/60	23/03/65	20/06/60
5	XX/XX/XX	32/04/57	35/06/57	31/04/60	23/03/65	20/05/60
6	XX/XX/XX	30/04/57	29/03/57	29/03/60	22/03/65	XX/XX/XX
7	XX/XX/XX	31/04/57	34/03/58	35/02/60	23/02/67	XX/XX/XX
8	XX/XX/XX	33/02/58	32/02/60	19/02/60	20/02/70	XX/XX/XX
9	XX/XX/XX	27/04/62	18/03/67	20/03/61	23/03/74	XX/XX/XX
10	XX/XX/XX	29/05/65	26/03/75	20/05/64	30/07/78	XX/XX/XX
11	XX/XX/XX	30/07/70	30/08/75	24/06/71	27/08/83	XX/XX/XX
12	XX/XX/XX	29/08/72	29/08/79	30/08/75	26/09/84	XX/XX/XX
13	XX/XX/XX	29/08/77	30/09/83	28/08/79	26/09/86	XX/XX/XX
14	XX/XX/XX	28/10/79	30/10/88	28/09/80	29/09/89	XX/XX/XX
15	XX/XX/XX	26/09/82	27/09/89	23/09/84	28/09/92	XX/XX/XX
16	XX/XX/XX	23/10/84	30/10/90	26/08/87	23/09/91	XX/XX/XX
17	XX/XX/XX	26/09/84	28/09/89	29/09/88	21/09/90	XX/XX/XX
18	XX/XX/XX	20/11/84	28/12/87	24/09/85	20/14/88	XX/XX/XX
19	XX/XX/XX	20/14/80	23/12/80	26/06/80	20/13/85	XX/XX/XX
20	XX/XX/XX	20/12/71	22/11/73	24/08/72	21/13/74	XX/XX/XX
21	XX/XX/XX	20/11/63	20/09/67	24/06/65	21/08/65	XX/XX/XX
22	XX/XX/XX	20/07/60	32/08/63	21/06/64	21/06/62	XX/XX/XX
23	XX/XX/XX	27/05/60	29/07/62	22/04/64	20/05/61	XX/XX/XX
24	XX/XX/XX	29/05/59	24/03/61	21/04/65	20/05/59	XX/XX/XX

Key: WD ÷ 10 / WS (mph) / Temp (deg F)

SCAQS Surface Wind Monitoring Data Site: Kellogg Hill

Hour:	08/27/87	08/28/87	08/29/87	09/02/87	09/03/87
1	XX/XX/XX	XX/XX/XX	XX/XX/XX	05/07/68	24/04/66
2	XX/XX/XX	XX/XX/XX	XX/XX/XX	11/10/67	25/03/64
3	XX/XX/XX	XX/XX/XX	XX/XX/XX	07/11/66	34/06/63
4	XX/XX/XX	XX/XX/XX	XX/XX/XX	10/07/66	36/04/63
5	XX/XX/XX	XX/XX/XX	XX/XX/XX	04/08/66	36/03/63
6	XX/XX/XX	XX/XX/XX	XX/XX/XX	05/08/70	13/02/66
7	XX/XX/XX	XX/XX/XX	XX/XX/XX	12/07/74	04/03/65
8	XX/XX/XX	XX/XX/XX	XX/XX/XX	12/07/75	06/02/70
9	XX/XX/XX	XX/XX/XX	XX/XX/XX	11/08/78	29/02/74
10	XX/XX/XX	XX/XX/XX	XX/XX/XX	20/07/82	30/05/76
11	XX/XX/XX	XX/XX/XX	XX/XX/XX	14/08/86	30/06/80
12	XX/XX/XX	XX/XX/XX	XX/XX/XX	07/04/90	30/06/84
13	XX/XX/XX	XX/XX/XX	XX/XX/XX	20/08/95	27/08/88
14	XX/XX/XX	XX/XX/XX	XX/XX/XX	21/07/98	20/16/86
15	XX/XX/XX	XX/XX/XX	XX/XX/XX	21/12/94	20/14/84
16	XX/XX/XX	XX/XX/XX	XX/XX/XX	20/12/91	26/11/83
17	XX/XX/XX	XX/XX/XX	XX/XX/XX	29/11/84	21/10/79
18	XX/XX/XX	XX/XX/XX	XX/XX/XX	20/08/88	20/12/78
19	XX/XX/XX	XX/XX/XX	XX/XX/XX	20/08/81	20/11/70
20	XX/XX/XX	XX/XX/XX	XX/XX/XX	21/09/77	20/09/67
21	XX/XX/XX	XX/XX/XX	XX/XX/XX	25/06/74	20/09/63
22	XX/XX/XX	XX/XX/XX	XX/XX/XX	29/09/71	20/07/61
23	XX/XX/XX	XX/XX/XX	XX/XX/XX	19/03/68	21/07/62
24	XX/XX/XX	XX/XX/XX	XX/XX/XX	26/04/68	29/03/63

Key: WD ÷ 10 / WS (mph) / Temp (deg F)

SCAQS Surface Wind Monitoring Data Site: Kellogg Hill

Hour:	11/11/87	11/12/87	11/13/87	12/03/87	12/10/87	12/11/87
1	14/11/62	11/07/62	12/05/55	11/06/49	13/09/60	11/06/58
2	14/10/62	12/08/61	13/04/55	15/06/48	12/09/60	11/06/57
3	13/08/62	11/08/60	18/03/55	13/06/46	15/07/63	12/07/57
4	09/07/61	11/07/60	04/02/55	13/06/46	14/08/60	15/08/58
5	12/08/61	12/10/59	32/04/53	15/05/47	12/10/55	13/08/55
6	11/08/61	12/11/59	21/03/53	07/05/50	12/08/56	12/06/53
7	13/08/62	12/10/60	16/02/54	15/06/52	11/07/58	13/06/54
8	15/07/64	14/06/63	03/02/57	11/05/57	12/06/60	16/05/58
9	16/10/67	19/06/64	35/02/59	18/04/61	15/06/62	20/04/60
10	18/08/70	18/06/69	25/05/62	20/07/68	18/05/65	19/06/67
11	18/06/76	18/07/73	31/04/57	21/07/72	20/05/69	18/07/74
12	35/03/79	20/05/78	23/04/61	21/08/75	22/03/73	21/06/74
13	33/04/78	21/06/79	30/06/57	21/09/73	32/05/74	19/06/74
14	30/04/79	21/07/79	26/05/60	21/11/70	30/05/75	32/04/74
15	26/04/79	21/06/79	27/06/60	20/07/64	30/03/74	33/04/74
16	25/03/79	21/07/75	24/06/60	21/06/57	36/03/70	30/04/70
17	27/04/76	21/07/68	21/08/56	32/03/56	09/06/70	35/03/68
18	31/06/73	21/05/63	21/10/55	02/04/57	14/07/69	12/05/63
19	33/07/70	31/05/62	21/07/54	10/04/56	12/08/64	13/08/61
20	33/05/69	32/06/60	22/05/55	11/04/54	12/07/63	15/08/61
21	36/05/68	29/04/59	22/05/55	12/05/53	10/06/63	16/06/66
22	13/07/65	23/03/58	23/07/56	12/05/53	15/06/60	16/07/63
23	09/06/63	12/02/57	24/06/58	11/05/52	16/05/58	13/08/61
24	06/04/62	12/05/56	30/05/59	11/06/51	12/05/58	15/06/60

Key: WD ÷ 10 / WS (mph) / Temp (deg F)

SCAQS Surface Wind Monitoring Data Site: Palos Verdes

Hour:	06/19/87	06/24/87	06/25/87	07/13/87	07/14/87	07/15/87
1	16/02/53	11/03/51	05/07/53	26/04/59	28/03/63	15/03/59
2	21/02/52	06/03/51	11/05/53	28/02/57	18/03/60	12/04/59
3	06/05/51	02/05/51	06/02/53	34/05/59	24/03/58	11/03/59
4	08/05/51	02/04/51	04/03/53	26/06/56	26/05/57	10/04/58
5	20/03/50	07/02/51	06/02/52	30/02/57	06/02/57	10/04/58
6	22/03/50	01/03/51	02/03/52	09/02/58	12/03/57	12/04/58
7	30/01/50	03/04/51	02/03/52	10/04/58	09/02/57	16/03/57
8	35/02/53	08/03/52	04/06/53	10/03/59	36/02/57	13/04/57
9	06/03/58	34/02/53	04/04/53	06/03/64	18/02/57	12/06/58
10	23/03/61	18/02/56	02/03/60	04/03/66	27/02/59	16/07/58
11	20/03/62	24/03/58	24/06/61	03/05/67	02/05/62	16/07/59
12	22/07/60	24/06/60	23/05/66	03/04/67	03/05/66	17/07/60
13	22/08/60	24/05/63	25/05/68	26/04/67	02/07/68	15/06/68
14	23/08/60	01/04/69	28/03/70	24/04/68	04/02/68	15/04/68
15	24/08/60	01/05/70	04/03/73	25/04/68	27/04/68	14/04/68
16	24/07/64	08/04/70	09/03/73	28/02/68	08/03/69	18/05/68
17	24/06/61	11/03/72	24/02/72	27/03/68	28/03/69	20/06/68
18	24/07/58	08/03/70	08/04/70	29/03/68	28/03/69	18/05/68
19	24/05/57	08/02/69	08/03/69	27/04/68	28/02/68	21/04/67
20	24/03/59	24/03/58	12/05/62	30/05/67	26/06/59	20/04/68
21	24/02/54	10/04/56	11/05/60	29/08/66	25/07/58	18/03/64
22	27/03/52	08/06/56	12/05/57	28/11/60	24/05/57	22/02/59
23	12/02/51	06/08/55	12/05/55	28/10/60	24/04/57	14/03/59
24	24/03/50	06/06/54	14/04/53	29/07/62	18/02/58	11/04/59

Key: WD ÷ 10 / WS (mph) / Temp (deg F)

SCAQS Surface Wind Monitoring Data Site: Palos Verdes

Hour:	08/27/87	08/28/87	08/29/87	09/02/87	09/03/87
1	21/03/54	06/04/56	07/06/57	27/07/57	27/10/56
2	09/03/54	09/04/56	07/05/57	33/05/57	27/08/56
3	12/02/55	05/04/56	02/06/57	25/06/57	26/07/56
4	29/04/56	03/07/56	03/06/56	26/04/56	28/07/56
5	26/03/58	03/07/58	03/06/55	24/03/56	27/05/56
6	25/02/56	02/06/59	36/03/55	28/06/55	27/06/56
7	03/03/58	23/03/58	01/04/55	27/06/55	27/06/56
8	01/04/57	06/05/61	24/01/56	28/04/56	36/02/59
9	03/03/60	08/04/61	36/02/57	04/04/59	03/02/62
10	26/03/63	03/03/62	24/03/58	06/05/62	01/03/63
11	07/04/66	01/06/62	24/02/60	24/07/64	25/04/65
12	02/04/68	01/05/66	23/04/61	25/06/63	24/06/66
13	24/03/69	05/04/69	26/05/62	24/07/66	24/08/64
14	25/05/69	07/03/70	03/05/69	24/07/69	24/12/64
15	27/06/69	06/02/70	04/05/68	24/08/67	23/11/64
16	25/03/70	06/02/70	03/05/69	24/08/66	24/13/63
17	26/05/69	09/02/70	04/05/67	24/08/66	25/13/62
18	10/07/66	07/03/69	04/04/66	26/08/65	26/12/61
19	09/02/68	13/03/68	06/04/60	26/07/62	27/08/58
20	23/02/63	12/07/61	08/04/58	27/09/60	26/07/57
21	16/05/60	05/05/58	07/04/57	27/13/57	26/09/57
22	12/07/57	04/05/56	12/05/56	27/12/57	27/10/56
23	09/05/56	05/06/56	21/03/55	27/11/57	27/11/56
24	07/06/55	09/05/56	26/03/55	27/10/57	27/12/56

Key: WD ÷ 10 / WS (mph) / Temp (deg F)

SCAQS Surface Wind Monitoring Data Site: Palos Verdes

Hour:	11/11/87	11/12/87	11/13/87	12/03/87	12/10/87	12/11/87
1	12/07/67	04/04/68	20/03/56	14/04/51	12/06/61	08/15/66
2	11/06/66	08/04/68	15/01/53	13/04/51	11/04/62	08/11/65
3	11/05/67	08/04/67	29/03/52	12/05/52	09/02/61	08/09/64
4	10/06/67	13/03/67	35/04/52	11/05/53	07/01/60	06/08/63
5	10/07/67	23/02/65	26/04/52	13/06/53	09/04/61	08/05/62
6	08/05/67	31/04/64	20/06/52	08/06/53	11/03/63	11/11/60
7	11/06/67	34/02/64	13/05/52	07/06/53	07/04/63	11/14/60
8	11/06/70	35/03/68	16/04/53	18/05/54	11/06/64	11/13/60
9	11/07/70	21/03/72	18/03/53	10/05/56	11/06/66	13/08/61
10	11/06/70	16/02/75	20/05/54	09/05/57	04/02/70	12/10/63
11	13/05/73	16/03/73	20/05/54	09/07/57	36/02/74	13/10/65
12	12/04/76	32/03/76	20/03/58	14/03/63	08/03/74	12/09/67
13	08/02/79	33/04/72	31/04/60	34/04/63	10/02/73	08/06/69
14	30/03/79	34/04/74	30/04/57	32/04/63	08/04/73	08/04/68
15	32/05/78	34/05/70	32/05/55	18/03/62	01/10/70	05/03/67
16	35/04/75	35/07/66	34/04/54	26/02/63	36/07/71	08/04/67
17	35/06/71	36/08/66	33/05/54	33/02/59	36/11/70	10/04/67
18	35/07/70	01/08/65	31/04/54	18/04/57	04/08/71	11/05/67
19	35/08/70	01/07/64	31/05/54	18/04/55	05/10/71	09/06/64
20	36/08/70	02/06/65	32/06/54	19/03/53	07/14/70	10/07/62
21	35/06/70	36/04/63	34/08/55	19/04/52	08/16/68	12/10/61
22	03/06/70	36/03/62	01/12/55	19/03/52	08/15/67	13/11/61
23	04/06/67	15/02/60	35/12/55	26/03/52	11/13/65	06/09/60
24	04/05/68	14/03/57	36/15/53	15/04/51	10/14/66	10/07/61

Key: WD ÷ 10 / WS (mph) / Temp (deg F)

6.0 GLOSSARY OF TERMS

Airsonde - a radiosonde which is tracked with a theodolite to obtain data on upper-air winds

Microsondes - a brand name for a RAWINSONDE manufactured by VIZ

Radiosonde - a weather instrument fitted with a radio transmitter and carried aloft by a balloon

RAWINSONDE - a radiosonde that is tracked by radio-location devices in order to obtain data on upper-air winds

Sampling day - Twenty-four hour period of data collection

Intensive sampling period - a period of data collection whose length is determined by the number of consecutive sampling days

Sonde - abbreviation for radiosonde

Summer study - 18 June to 3 September 1987, includes 11 sampling days

Fall study - 9 November to 11 December 1987, includes 6 sampling days

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. ARB/R-88/374	2.	3. Recipient's Accession No. PB 89145403
4. Title and Subtitle SCAQS Meteorological Support Program			5. Report Date October 1988 6.
7. Author(s) Don Lehrman, William Knuth, Hans Giroux, Nancy Alexander			8. Performing Organization Rept. No.
9. Performing Organization Name and Address Technical & Business Systems 859 Second Street Santa Rosa, CA 95404			10. Project/Task/Work Unit No. 11. Contract(C) or Grant(G) No. (C) A6-097-32 (G)
12. Sponsoring Organization Name and Address AIR RESOURCES BOARD STATE OF CALIFORNIA P.O. BOX 2815 SACRAMENTO, CA 95812			13. Type of Report & Period Covered Final 6/87 - 12/87 14.

15. Supplementary Notes

ARB Project Officer: Mr. Charles L. Bennett

16. Abstract (Limit: 200 words)

During the summer and fall of 1987, the Southern California Air Quality Study (SCAQS) was conducted to develop a comprehensive air quality and meteorological database for the South Coast Air Basin (SCAB). Extensive measurement of gaseous and particulate pollutants, atmospheric tracers, and meteorological conditions were made on seventeen select days. A network consisting of upper-air and surface sites was designed to augment the existing meteorological resources in the SCAB. This network consisted of six upper-air sites and three surface sites during the summer study and five upper-air and two surface sites during the fall study. The upper-air measurements consisted of temperature, humidity, wind speed and direction as a function of height to 10,000 feet or more. Typically soundings were taken six times daily at 0500, 0800, 1100, 1400, 1700, and 2200 local time. A total of 386 atmospheric soundings were made during the summer and 212 during the fall study. Three surface sites were established in the summer study and two sites in the fall study. Hourly averaged temperature and wind speed and direction from these sites are tabulated in the report.

17. Document Analysis a. Descriptors

Upper Air Meteorological Measurements
Surface Meteorological Measurements

b. Identifiers/Open-Ended Terms

Southern California Air Quality Study (SCAQS)
South Coast Air Basin (SCAB)

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
Release Unlimited. Available from National Technical Information Service 5285 Port Royal Rd. Springfield, VA 22161		49
	20. Security Class (This Page)	22. Price $15.95

(See ANSI-Z39.18) See Instructions on Reverse OPTIONAL FORM 272 (4-77) (Formerly NTIS-35) Department of Commerce