EXECUTIVE SUMMARY TO THE CALIFORNIA AIR RESOURCES BOARD

UNDER AGREEMENT NO. A4-143-32

("Cloud and Precipitation Scavenging Processes in the South Coast Air Basin")

by

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EXECUTIVE SUMMARY

"CLOUD AND PRECIPITATION SCAVENGING PROCESSES IN THE SOUTH COAST AIR BASIN"

(CARB CONTRACT A4-143-32)

The responsibilities of the University of Washington's Cloud and Aerosol Research Group under Contract A4-143-32 with the California Air Resources Board (CARB) consisted of providing an aircraft from which to obtain airborne measurements of particles and trace gases during the 1987 Southern California Air Quality Study (SCAQS). These measurements included concentrations of SO_2, $SO_4^=$, SO_3^-, PAN, carbonyls, elemental carbon and HNO_3 by means of filter sampling. Canister samples for hydrocarbon speciation were also obtained. Analysis of these measurements is being undertaken by other CARB contractors. In addition, ancillary meteorological and selected continuous trace chemical measurements were obtained. The ancillary measurements have been screened for errors, calibrated and read onto computer tapes. These tapes have been sent to ERT for archiving.

An additional task under this contract was the provision of atmospheric particle size distributions measured aboard the aircraft during SCAQS. These average particle size distributions are presented and discussed in this Final Report.

Nine research flights were conducted during the SCAQS program. Five of these were morning flights during which sampling orbits were flown at two offshore sample points in the Catalina Channel, over Long Beach, and northeast of Los Angeles International Airport (LAX). During the four afternoon flights, sampling orbits were flow at the Long Beach and LAX sites and, additionally, near Pomona and Riverside.

The filter measurements taken during the above flights are summarized in Table 1. The continuous measurements available on computer tape are summarized in Table 2.

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TABLE 1. Filter measurements taken during the SCAQS project aboard the C-131A.

Filter	Species Measured	Numerical Flow	Analysis Organization
Nylon Denuder (Denuder difference)	HNO_3	35 lpm	EMSI/ARB
Quartz	Carbon	50 lpm	ERT
Zefluor	Particulate	25 lpm	EMSI
K_2CO_3 Whatman	SO_2	25 lpm	EMSI
Nuclepore	Particulate mass	14 lpm	EMSI
Alkaline Whatman	PAN	25 lpm	Grojean & Assoc.
Teflo	Particulate Chemistry	35 lpm	EMSI
Oxalic Acid Whatman	NH_3	35 lpm	EMSI
Steel Canisters	Hydrocarbons	---	Oregon Graduate Center
DNPH Canisters	Carbonyls	2 lpm	EMSI

TABLE 2. PARAMETERS INCLUDED ON SCAQS DATA TAPES

Parameter	Units	Time Resolution
Time	hours, minutes, seconds	1 second
Dewpoint	° C	1 second
Total Temperature	° C	1 second
Static Temperature	° C	1 second
Static Pressure	mb	1 second
Liquid Water Content	g m^{-3}	1 second
Drop Rate	cm^{-3} s^{-1}	1 second
CN Concentration	cm^{-3}	1 second
b_{scat} = total light scattering	m^{-1}	1 second
b_{sp} = light scattering due to dried particles	m^{-1}	1 second
NO	ppb	1 second
NO_x	ppb	1 second
O_3	ppb	1 second
SO_2	ppb	1 second
Wind Direction	° magnetic	1 second
Wind Speed	m s^{-1}	1 second
Ultraviolet Light Intensity	millicalories cm^{-3} min^{-1}	1 second
True Air Speed	m s^{-1}	1 second
Latitude	° N	1 second
Longitude	° E	1 second
Ground Speed	m s^{-1}	1 second
LOR	° magnetic	1 second
DME 1	nautical miles	1 second
DME 2	nautical miles	1 second