

Sulfates, Clouds and Radiation Brazil (SCAR-B) University of Washington C131A (SCAR_B_UWC131A) Langley DAAC Data Set Document

Summary:

From 17 August to 20 September 1995, the University of Washington's (UW) Cloud and Aerosol Research Group, with its Convair C-131A research aircraft, participated in an intensive field study of smoke emissions from various types of biomass burning over a large area of Brazil.

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1. Data Set Overview:

Data Set Identification:

SCAR_B_UWC131A:

Sulfates, Clouds and Radiation Brazil (SCAR-B) University of
Washington C131A

Data Set Introduction:

An overview of the data collected:

- Twenty-nine research flights (~90 flight hours) in Brazil from 17 August - 20 September 1995.
- Transcriptions of the in-flight voice recordings made on the C-131A.
- Documentation of regional smoke properties from ~16° to 3° S and from ~64° to 48° W. (~67 filter sets.)
- One hundred and ten (110) photographs of fires, smoke, clouds and terrain.
- Aerosol and gas (NO, NO₂, SO₂, CO, CO₂, O₃ and hydrocarbons) measurements on smoke from ~16 cerrado and grass fires and ~16 forest and/or slash fires.
- Twenty-three samples for "true" emission factors for particulate (including CCN), NO, NO₂, SO₂, CO, CO₂ and total volatile organic compounds (VOCs).
- Three thousand nine hundred and seventy measurements of aerosol size distributions in regional haze and plumes.
- One hundred and fifty-six cloud condensation nucleus (CCN) spectra for smoke in individual plumes, in regional haze, and in cloud-processed smoke.



- One hundred and thirty-seven measurements of volatility of aerosols (at $\leq 320^{\circ}\text{C}$).
- Seventy measurements of humidification factor of aerosols from individual fires and in regional haze.
- Extensive black carbon measurements by four techniques (optical extinction cell (OEC), aethelometer, Teflon filters, and thermal-optical). On 26 occasions, simultaneous measurements were obtained using all four techniques.
- One hundred and thirty-five measurements of single-scattering albedo of smoke from individual fires and in regional haze.
- Twenty smoke-cloud interaction studies.
- Seven direct aerosol "closure" experiments over NASA ground-based sun photometers.
- Six coordinated flights with NASA ER-2 (plus three other "crossings").
- Four flights during satellite overpasses (AVHRR and LANDSAT).
- Seven dedicated surface reflectivity and smoke measurements with CAR.
- Intermittent downward-pointing lidar measurements.

Objective/Purpose:

The objectives of the research flights of the University of Washington's (UW) Convair C-131A in the Smoke, Clouds And Radiation-Brazil (SCAR-B) field study in Brazil, which took place between 17 August and 20 September 1995, were to collect data needed to determine the following.

- Emission factors of gases and particles from cerrado and tropical forest fires in various stages of combustion.
- The nature of the gases and particles in smoke plumes from various types of biomass fires in Brazil.
- The optical and radiative properties of smoke from biomass fires in Brazil.
- Direct radiative forcing by smoke (through direct aerosol "closure" measurements).
- The effects of smoke on cloud microstructures, and the effects of cloud scavenging on smoke.
- The evolution of the physical and chemical properties of smoke (from local to regional scales) from biomass burning in Brazil.
- Comparisons of ground-based, airborne, and satellite-borne remote sensing measurements of smoke from biomass fires in Brazil with *in situ* measurements of the smoke.

The extensive measurements obtained aboard the UW Convair C-131A aircraft in SCAR-B provided considerable data relevant to each of the topics listed above.

Summary of Parameters:

Aerosol Backscattering Coefficient
 Aerosol Light Scattering Coefficient
 Carbon Dioxide
 Carbon Monoxide
 Condensation Nuclei
 Droplet Concentration
 Effective Droplet Radius
 Liquid Water Content
 Nitrogen Oxides
 Ozone Mixing Ratio
 Particle Number Concentration
 Sulfur Dioxide Concentration

Discussion:

Related Data Sets:

2. Investigator(s):

Investigator(s) Name and Title:

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Title of Investigation:

Sulfates, Clouds and Radiation Brazil (SCAR-B)

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3. Theory of Measurements:

4. Equipment:

Sensor/Instrument Description:

C2H4 Chemiluminescence
Chemiluminescence
Cloud Chamber
FSSP
Gerber Probe
Integrating Nephelometer
IR Correlation Spectrometer
King Probe
PCASP-100
PMS OAP-200X Probe
Pulsed Fluorescence
TSI 3760

Source/Platform:

University of Washington C131

Calibration:

5. Data Acquisition Methods:

6. Observations:

Data Notes:

Field Notes:

7. Data Description:

Spatial Characteristics:

Spatial Coverage:

Data Set	Min Lat	Max Lat	Min Lon	Max Lon
SCAR_B_UWC1 31A	-16.85	-2.42	-64.75	-47.53

Spatial Coverage Map:

Spatial Resolution:



Projection:

Grid Description:

Temporal Characteristics:

Temporal Coverage:

August 17, 1995 to September 20, 1995

Temporal Coverage Map:

Temporal Resolution:

1 second

Data Characteristics:

8. Data Organization:

Data Granularity:

A general description of data granularity as it applies to the IMS appears in the [EOSDIS Glossary](#).

Data Format:

The data are in native binary format.

9. Data Manipulations:

Formulae:

Derivation Techniques and Algorithms:

Data Processing Sequence:

Processing Steps:

Processing Changes:

Calculations:

Special Corrections/Adjustments:

Calculated Variables:

Graphs and Plots:

10. Errors:

Sources of Error:

Quality Assessment:

Data Validation by Source:

Confidence Level/Accuracy Judgement:

Measurement Error for Parameters:

Additional Quality Assessments:

Data Verification by Data Center:

The Langley DAAC performs an inspection process on this data received by the data producer via ftp. The DAAC checks to see if the transfer of the data completed and were delivered in their entirety. An inspection software was developed by the DAAC to see if the code was able to read every granule. The code also checks to see if every parameter of data falls within the ranges which are included in the granule. This same code extracts the metadata required for ingesting the data into the IMS. If any discrepancies are found, the data producer is contacted. The discrepancies are corrected before the data are archived at the DAAC.

11. Notes:



Limitations of the Data:

Known Problems with the Data:

Usage Guidance:

Any Other Relevant Information about the Study:

12. Application of the Data Set:

13. Future Modifications and Plans:

14. Software:

Software Description:

Software Access:

15. Data Access:

Contact Information:

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Procedures for Obtaining Data:

The Langley DAAC provides multiple interfaces to access its data holdings. The graphical and character user interfaces allow users to search and order data; and web interfaces allow direct access to some data holdings for immediate downloading or placing media orders, for searching the data holdings, and downloading electronically available holdings, and for ordering prepackaged CD-ROMs and videocassettes. All of these methods are easily obtained from the [Langley DAAC web site](#).

Data Center Status/Plans:

The Langley DAAC will continue to archive these data sets.

16. Output Products and Availability:

17. References:

18. Glossary of Terms:

[EOSDIS Glossary](#).

19. List of Acronyms:

[EOSDIS Acronyms](#).



20. Document Information:

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