

Sulfates, Clouds and Radiation Brazil (SCAR-B) NASA ER-2 Moderate Resolution Imaging Spectrometer (MODIS) Airborne Simulator (MAS) Langley DAAC Data Set Document

Summary:

The primary objective of the SCAR-A experiment was to help scientists characterize the the relationship between sulfate particles and clouds' reflective properties. Sulfate aerosols are believed to provide condensation nuclei, resulting in smaller, more numerous droplets within a cloud.

SCAR-A (America) was the first in a series of experiments. It was followed by the SCAR-C experiment conducted over California in 1994. A third experiment, SCAR-B (Smoke, Clouds and Radiation-Brazil), was conducted in Brazil during August and September 1995.

This document provides information for the SCAR_B_ER2_MAS data set.

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1. Data Set Overview:

Data Set Identification:

SCAR_B_ER2_MAS:

Sulfates, Clouds and Radiation Brazil (SCAR-B) NASA ER-2
Moderate Resolution Imaging Spectroradiometer (MODIS) Airborne
Simulator (MAS) Data (SCAR_B_ER2_MAS)

Data Set Introduction:

The MODIS Airborne Simulator (MAS) is a modified Daedalus Wildfire scanning spectrometer which flies on a NASA ER-2 and provides spectral information similar to that which will be provided by the Moderate Resolution Imaging Spectroradiometer (MODIS), scheduled to be launched on the EOS-AM platform in 1998 (King et al. 1992). The principal investigators for the MAS are Dr. Michael King (NASA/GSFC,



Greenbelt MD), and Dr. Paul Menzel (NOAA/NESDIS, Madison WI).

The MAS spectrometer acquires high spatial resolution imagery in the wavelength range of 0.55 to 14.3 microns. A total of 50 spectral bands are available in this range, and the digitizer can be configured to collect data from any 12 of these bands. The digitizer was configured with four 10-bit channels and seven 8-bit channels. The MAS spectrometer was mated to a scanner subassembly which collected image data with an IFOV of 2.5 mrad, giving a ground resolution of 50 meters from 20000 meters altitude, and a cross track scan width of 85.92 degrees. The data granules were written using the self documenting file storage format provided through the netCDF interface routines included in the HDF libraries.

Objective/Purpose:

Information not available at this time.

Summary of Parameters:

Radiance

Discussion:

Information not available at this time.

Related Data Sets:

FIRE_AX_ER2_MAS:

First ISCCP Regional Experiment (FIRE) Atlantic Stratocumulus Transition Experiment (ASTEX) NASA ER-2 Moderate Resolution Imaging Spectroradiometer (MODIS) Airborne Simulator (MAS) Data (FIRE_AX_ER2_MAS)

FIRE_CI2_ER2_MAS:

First ISCCP Regional Experiment (FIRE) Cirrus 2 NASA ER-2 Moderate Resolution Imaging Spectroradiometer (MODIS) Airborne Simulator (MAS) Data (FIRE_CI2_ER2_MAS)

2. Investigator(s):

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Title of Investigation:

Sulfates, Clouds and Radiation Brazil (SCAR-B)

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3. Theory of Measurements:

Information not available at this time.

4. Equipment:

Sensor/Instrument Description:

See [MAS User's Guide](#).

Calibration:

See [MAS User's Guide](#).

5. Data Acquisition Methods:

Information not available at this time.

6. Observations:

Data Notes:

Information not available at this time.

Field Notes:

Information not available at this time.

7. Data Description:

Spatial Characteristics:

Spatial Coverage:

Data Set	Min Lat	Max Lat	Min Lon	Max Lon
SCAR_B_ER2_	-19.20	34.96	-116.36	-45.94
MAS				

Spatial Coverage Map:

None available.

Spatial Resolution:

Variable

Projection:

Information not available at this time.

Grid Description:

Information not available at this time.

Temporal Characteristics:

Temporal Coverage:

Data Set Begin Date

End Date



Distributed by the Atmospheric Science Data Center
<http://eosweb.larc.nasa.gov>



Temporal Coverage Map:

None available.

Temporal Resolution:

Each granule contains one flight track.

Data Characteristics:

See [MAS User's Guide](#).

8. Data Organization:**Data Granularity:**

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

Each granule contains one flight track.

Data Format:

The data are in NCSA'S HDF/netCDF format.

9. Data Manipulations:**Formulae:****Derivation Techniques and Algorithms:**

Information not available at this time.

Data Processing Sequence:**Processing Steps:**

Information not available at this time.

Processing Changes:

Information not available at this time.

Calculations:**Special Corrections/Adjustments:**

Information not available at this time.

Calculated Variables:

Information not available at this time.

Graphs and Plots:

There are two browse images, infrared and visible, per granule.

10. Errors:**Sources of Error:**

Information not available at this time.



Quality Assessment:

Data Validation by Source:

Information not available at this time.

Confidence Level/Accuracy Judgement:

Information not available at this time.

Measurement Error for Parameters:

Information not available at this time.

Additional Quality Assessments:

Information not available at this time.

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:

Information not available at this time.

Known Problems with the Data:

There were quite a few MAS port 4 (channels 42-50) failures during SCAR-B. This was due to technical (and mechanical) problems with the instrument which occurred throughout the campaign. Data gaps in the port#4 bands (bands 42-50) exist in most of the days during SCAR-B. (Note that when port 4 fails, the calibration coefficients will be missing and the Calibrated Radiance Data will be 0.)

When the plane comes out of a steep roll into a straight and level flight track it sometimes takes several seconds for the MAS instrument to fully stabilize. This could cause some smearing of data at the very beginning of a few straight-line flight tracks. Generally, this only occurs in the first 20 scanlines or so.

In every 3.9, 3.7 and 1.6 micron image, there is a streak in that runs the entire length of the flight line. It is located at pixels 477-478 (note: pixel range is 1-716).

Problems noted during specific flights

August 27, 1995 (Flight #95-): Slice 3 / Track 3: Numerous sections of data are missing in bands #42-#50 due to port 4 failures on the MAS.

Slice 3 / Track 4: Numerous sections of data are missing in bands #42-#50 due to port 4 failures on the MAS.

September 1, 1995 (Flight #95-): Slice 1 / Line 5: Bands below 1.6 and above 1.6 are not co-registered. (There are 2 groups that register differently.)

Slice 4 / Line 1: There are broad areas of light and dark in the 11 and 12 micron bands.

September 4, 1995 (Flight #95-): Slice 2 / Line 5: Broad areas of dark and light in 11 and 12 micron bands.

Slice 3 / Lines 2,3,4: Large areas where data from the 11 and 12 uM bands are missing, also many areas where banding was noted across the image. In slice 2 the 3.7 uM band gives a very different response than 3.9.

In slice 4, sections of 3.9 and 3.7 are missing. 1.6 has a very low response throughout the image.

September 7, 1995 (Flight #95-): Slice 2 / Line 3: A large area of data missing for the 3.7, 3.9, 11 and 12 uM.

Slice 2 / Line 5: Large areas of data missing in the 11 uM band.



Usage Guidance:

Information not available at this time.

Any Other Relevant Information about the Study:

Information not available at this time.

12. Application of the Data Set:

Information not available at this time.

13. Future Modifications and Plans:

There are no plans to modify these data sets.

14. Software:

Software Description:

Software Access:

The software can be obtained through the Langley DAAC User Services Office. Please refer to the contact information in Section 15. The software can also be ordered through the on-line system while ordering these data sets.

15. Data Access:

Contact Information:

Langley DAAC User and Data Services Office
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Mail Stop 157D
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USA
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Data Center Identification:

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Procedures for Obtaining Data:

The data are available from the [Langley Data Center web site](#).

Data Center Status/Plans:

The Langley DAAC will continue to archive these data sets. There are no plans to reprocess.

16. Output Products and Availability:

None available.

17. References:

Arnold, G.T., M. Fitzgerald, P.S. Grant, and M.D. King, 1994a: *MODIS Airborne Simulator Visible and Near-Infrared Calibration - 1991 FIRE-Cirrus Field Experiment*. NASA Goddard Space Flight Center, NASA Technical Memorandum 104600.



Arnold, G.T., M. Fitzgerald, P.S. Grant, and M.D. King, 1994b: *MODIS Airborne Simulator Visible and Near-Infrared Calibration - 1992 ASTEX Field Experiment*. NASA Goddard Space Flight Center, NASA Technical Memorandum 104599.

Gumley, L.E., P.A. Hubanks, E.J. Masuoka, 1994: *MODIS Technical Report Series: Volume 3, MODIS Airborne Simulator Level 1B Data User's Guide*. NASA Goddard Space Flight Center, NASA Technical Memorandum 104594.

Jedlovec, G.J., K.B. Batson, R.J. Atkinson, C.C. Moeller, W.P. Menzel, and M.W. James, 1989: *Improved Capabilities of the Multispectral Atmospheric Mapping Sensor (MAMS)*. NASA Marshall Space Flight Center, NASA Technical Memorandum 100352.

King, M.D., Y.J. Kaufman, W.P. Menzel and D.Tanre, 1992: Remote sensing of cloud, aerosol, and water vapor Properties from the Moderate Resolution Imaging Spectrometer (MODIS). *IEEE Trans. Geosci. Remote Sens.*, 30, 2-27.

King, M.D., W.P. Menzel, P.S. Grant, J.S. Myers, G.T. Arnold, S.E. Platnick, L.E. Gumley, S-C. Tsay, C.C. Moeller, M. Fitzgerald, K.S. Brown and F.G. Osterwisch, 1996: Airborne Scanning Spectrometer for Remote Sensing of Cloud, Aerosol, Water Vapor, and Surface Properties. *Journal of Atmospheric and Oceanic Technology*, 13(4), 777-794.

18. Glossary of Terms:

[EOSDIS Glossary.](#)

19. List of Acronyms:

NASA - National Aeronautics Space Administration

URL - Uniform Resource Locator

[EOSDIS Acronyms.](#)

20. Document Information:

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