

First ISCCP Regional Experiment (FIRE) Atlantic Stratocumulus Transition Experiment (ASTEX) NASA ER-2 MODIS Airborne Simulator (MAS) (FIRE_AX_ER2_MAS) Langley DAAC Data Set Document



Summary:

The First ISCCP Regional Experiment has been designed to improve data products and cloud/radiation parameterizations used in general circulation models (GCMs). Specifically, the goals of FIRE are (1) to improve basic understanding of the interaction of physical processes in determining life cycles of cirrus and marine stratocumulus systems and the radiative properties of these clouds during their life cycles and (2) to investigate the interrelationships between the ISCCP data, GCM parameterizations, and higher space and time resolution cloud data.

To-date, four intensive field-observation periods were planned and executed: a cirrus IFO (October 13 - November 2, 1986); a marine stratocumulus IFO off the southwestern coast of California (June 29 - July 20, 1987); a second cirrus IFO in southeastern Kansas (November 13 - December 7, 1991); and a second marine stratocumulus IFO in the eastern North Atlantic Ocean (June 1 - June 28, 1992). Each mission combined coordinated satellite, airborne, and surface observations with modeling studies to investigate the cloud properties and physical processes of the cloud systems.

This document provides information on the FIRE_AX_ER2_MAS data set.

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1. Data Set Overview:

Data Set Identification:



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)

Data Set Introduction:

The MODIS Airbourne Simulator (MAS) is a modified Daedalus Wildfire scanning spectrometer which flies on the 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).

In January 1992, the modified Wildfire instrument was converted to MAS configuration. In June 1992 the MAS was flown over portions of the Atlantic Ocean in the region of the Azores during the ASTEX experiment. Although the MAS instrument is a 50 band spectrometer, the data system used in this experiment could only record 12 channels (at 8-bit resolution).

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:

Not available at this time.

Summary of Parameters:

Radiance

Discussion:

Not available at this time.

Related Data Sets:

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)

SCAR_A_ER2_MAS

Sulfates, Clouds and Radiation America (SCAR A) NASA ER-2 Moderate Resolution Imaging Spectroradiometer (MODIS) Airborne Simulator (MAS) Data (SCAR_A_ER2_MAS)

SCAR_B_ER2_MAS

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

2. Investigator(s):

Investigator(s) Name and Title:

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NASA Goddard Space Flight Center

Paul Menzel, Ph. D.
NOAA/NESDIS



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Title of Investigation:

First ISCCP Regional Experiment (FIRE) ASTEX

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3. Theory of Measurements:

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:

Not available at this time.

6. Observations:

Data Notes:

Not available at this time.

Field Notes:

Not available at this time.

7. Data Description:

Spatial Characteristics:

Spatial Coverage:

Data Set Name	Min Lat.	Max Lat.	Min Lon.	Max Lon.
FIRE_AX_ER2_MA S	32.28	41.02	-122.01	-15.31



Spatial Coverage Map:

None available.

Spatial Resolution:

50 meters (at 20 kilometers altitude)

Projection:

Information not available at this time.

Grid Description:

Information not available at this time.

Temporal Characteristics:**Temporal Coverage:**

Data Set Name	Begin Date	End Date
FIRE_AX_ER2_MAS	05-29-1992	06-23-1992

Temporal Coverage Map:

None available.

Temporal Resolution:

Each granule contains data from one flight track.

Data Characteristics:

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

Sample Data Record:

Sample data from the ax_mas_920529.001 file:

This is the report file for the ax_mas_920529.001 file

Left50ResponseWavelength

units = microns

0 , 0.529 , 0.688 , 0.81 , 0.852 , 0.926 , 3.659 , 12.539 , 9.452 , 10.259 ,
10.791 , 11.799 ;

Central100ResponseWavelength

units = microns

0 , 0.547 , 0.707 , 0.834 , 0.875 , 0.945 , 3.725 , 12.775 , 9.642 ,
10.438 , 11.002 , 12.032 ;

Right50ResponseWavelength

units = microns

0 , 0.572 , 0.729 , 0.852 , 0.893 , 0.969 , 3.81 , 12.986 , 9.877 ,
10.725 , 11.239 , 12.245 ;

SolarSpectralIrradiance

units = watts/meter2/micron

title = Sensor Weighted and Orbit Corrected Solar Spectral
Irradiance

0 , 1813.973 , 1353.598 , 1028.991 , 939.2146 , 769.5214 , 11.60004 ,
0.08751081 , 0.2722558 , 0.1944685 , 0.1555748 , 0.1166811 ;



AnchorPointIndex

1, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160,
170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, 300,
310, 320, 330, 340, 350, 360, 370, 380, 390, 400, 410, 420, 430, 440,
450, 460, 470, 480, 490, 500, 510, 520, 530, 540, 550, 560, 570, 580,
590, 600, 610, 620, 630, 640, 650, 660, 670, 680, 690, 700, 710, 716 ;

8. Data Organization:

Data Granularity:

A general description of data granularity as it applies to the IMS appears in the [EOSDIS Glossary](#). There are no terms.

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:

Information not available at this time.

11. Notes:

Limitations of the Data:

Information not available at this time.

Known Problems with the Data:

Information not available at this time.

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 for future modifications of this data set.

14. Software:

Software Description:

Sample read software are available for these data sets. The codes are written in C. A makefile and readme file are also available. These files allow users to compile and output the data.

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
NASA Langley Research Center
Mail Stop 157D
Hampton, Virginia 23681-2199
USA
Telephone: (757) 864-8656
FAX: (757) 864-8807
E-mail: support-asdc@earthdata.nasa.gov

Data Center Identification:



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FAX: (757) 864-8807
E-mail: support-asdc@earthdata.nasa.gov
URL: <http://eosweb.larc.nasa.gov>

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. Brownsn 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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