

# First ISCCP Regional Experiment (FIRE) Atlantic Stratocumulus Transition Experiment (ASTEX) Marine Aerosol Gas Exchange (MAGE) Langley DAAC Data Set Document



## Summary:

The First ISCCP Regional Experiments have 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 the 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.

- FIRE\_AX\_MAGE\_ELECTRA
- FIRE\_AX\_MAGE\_OCN\_AIR
- FIRE\_AX\_MAGE\_OCN\_MET
- FIRE\_AX\_MAGE\_OCN\_SEA
- FIRE\_AX\_MAGE\_TETROON

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## 1. Data Set Overview:

### Data Set Identification:



FIRE_AX_MAGE_ELECTRA	First ISCCP Regional Experiment (FIRE) Atlantic Stratocumulus Transition Experiment (ASTEX) Marine Aerosol Gas Exchange (MAGE) NCAR Electra Data (FIRE_AX_MAGE_ELECTRA)
FIRE_AX_MAGE_OCN_AIR	First ISCCP Regional Experiment (FIRE) Atlantic Stratocumulus Transition Experiment (ASTEX) Marine Aerosol Gas Exchange (MAGE) Oceanus Sulfur in the Air Data (FIRE_AX_MAGE_OCN_AIR)
FIRE_AX_MAGE_OCN_MET	First ISCCP Regional Experiment (FIRE) Atlantic Stratocumulus Transition Experiment (ASTEX) Marine Aerosol Gas Exchange (MAGE) Oceanus Meteorological Data (FIRE_AX_MAGE_OCN_MET)
FIRE_AX_MAGE_OCN_SEA	First ISCCP Regional Experiment (FIRE) Atlantic Stratocumulus Transition Experiment (ASTEX) Marine Aerosol Gas Exchange (MAGE) Oceanus Sulfur in the Ocean Data (FIRE_AX_MAGE_OCN_SEA)
FIRE_AX_MAGE_TETROON	First ISCCP Regional Experiment (FIRE) Atlantic Stratocumulus Transition Experiment (ASTEX) Marine Aerosol Gas Exchange (MAGE) Tetron Data (FIRE_AX_MAGE_TETROON)

## Data Set Introduction:

The ASTEX/MAGE experiment is a multinational effort to improve our capability for studying cloud-chemistry interactions and the air/sea fluxes that affect them. The primary purpose of ASTEX (with which MAGE collaborated) was to study the factors influencing the formation and dissipation of marine clouds. The specific goals of the MAGE atmospheric chemistry experiment in ASTEX included:

- Develop and test a Lagrangian strategy for studying chemical and meteorological evolution in a tagged airmass, using ships, balloons, and aircraft.
- Develop and test new techniques for estimating trace-gas and aerosol fluxes across the air/sea interface by comparison with traditional approaches.
- Evaluate the impact of marine and continental aerosols on the formation and dissipation of stratocumulus clouds.
- Compare the impacts of natural and anthropogenic sulphur, halogens, and hydrocarbons on marine aerosol chemistry.
- Gain experience with multi-national and multi-agency field experiments as a means for addressing global tropospheric chemistry issues.

### FIRE\_AX\_MAGE\_ELECTRA

### FIRE\_AX\_MAGE\_OCN\_AIR

Data were derived directly from ion chromatograms recorded from samples collected on the ship and stored in liquid nitrogen for later analysis. Concentrations were calculated from the standard concentration and the peak height ratio of the standard and ambient isotopomers in the ion chromatograms. Uncertainties were estimated from a propagation of errors calculation which considers estimated error in the standard concentration and signal-to-noise derived error.

### FIRE\_AX\_MAGE\_OCN\_MET

### FIRE\_AX\_MAGE\_OCN\_SEA

Data were derived directly from ion chromatograms recorded from the ship and stored in liquid nitrogen for later analysis. Concentrations were calculated from the standard concentrations and the peak height ratio of the standard and ambient isotopomers in the ion chromatograms.

### FIRE\_AX\_MAGE\_TETROON

The North Carolina State University tetrons were launched from the ship Oceanus in support of the FIRE-ASTEX observational program, conducted in the eastern North Atlantic during the month of June 1992. Special constant density balloons were launched and then tracked for 48 hours - with the idea that they were tracking a single parcel of air. The parameter #sats gives the number of GPS satellites available for positioning. Four satellites are necessary to determine altitude, otherwise the last available altitude from four satellites is assumed to remain constant, so that the horizontal location can be triangulated from three satellites. An altitude is always given in the file, so care should be taken as to its use.

Each tetron attempted to fix its location once every 5 minutes of operation. Each tetron was given an offset in transmission time during the 5 minute period in which to transmit its location in order to allow all tetrons to broadcast on the same frequency. The time at which a position fix was made and the relevant location information is provided for each tetron. In the event no fix was possible due to the satellite

constellation configuration, number or signal strength, no position was transmitted. Each position was retransmitted at 1/2 hour increments for seven hours to attempt to obtain the maximum amount of data, even for periods when aircraft were not in the area of transmission.

### **Objective/Purpose:**

...

### **Summary of Parameters:**

FIRE_AX_MAGE_ELECTRA	
FIRE_AX_MAGE_OCN_AIR	GC-MS
FIRE_AX_MAGE_OCN_MET	ANEMOMETER
	BAROMETER
	CTD RECORDER
	PYRANOMETER
	PYRGEOMETER
	RAIN GUAGE
	THERMISTER
	THERMOMETER
FIRE_AX_MAGE_OCN_SEA	GC-MS
FIRE_AX_MAGE_TETROON	RADIO TRANSMITTER

### **Discussion:**

...

### **Related Data Sets:**

...

## **2. Investigator(s):**

### **Investigator(s) Name and Title:**

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Dept. of Chemistry  
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Philadelphia, PA 19104  
USA  
Phone: (215) 895-2640  
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E-mail: arb@ac1.chemistry.drexel.edu

### **Title of Investigation:**

First ISCCP Regional Experiment (FIRE)

### **Contact Information:**

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North Carolina State University  
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Raleigh, NC 27695-8208  
USA  
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FAX: (919) 515-7802  
E-mail: chiz@measun.nrrc.ncsu.edu

## **3. Theory of Measurements:**



...

## 4. Equipment:

### Sensor/Instrument Description:

#### Collection Environment:

...

#### Source/Platform:

FIRE_AX_MAGE_ELECTRA	
FIRE_AX_MAGE_OCN_AIR	SHIP
FIRE_AX_MAGE_OCN_MET	SHIP
FIRE_AX_MAGE_OCN_SEA	SHIP
FIRE_AX_MAGE_TETROON	CON. DENSITY BALLOON

#### Source/Platform Mission Objectives:

...

#### Key Variables:

FIRE_AX_MAGE_ELECTRA	
FIRE_AX_MAGE_OCN_AIR	GC-MS
FIRE_AX_MAGE_OCN_MET	ANEMOMETER BAROMETER CTD RECORDER PYRANOMETER PYRGEOMETER RAIN GUAGE THERMISTER THERMOMETER
FIRE_AX_MAGE_OCN_SEA	GC-MS
FIRE_AX_MAGE_TETROON	RADIO TRANSMITTER

#### Principles of Operation:

...

#### Sensor/Instrument Measurement Geometry:

...

#### Manufacturer of Sensor/Instrument:

...

#### Sensor/Instrument:

FIRE_AX_MAGE_ELECTRA	
FIRE_AX_MAGE_OCN_AIR	Sulfur Dioxide Concentration
FIRE_AX_MAGE_OCN_MET	Irradiance Precipitation Pressure Sea Surface Temperature Sea Water Surface Conductivity



	Temperature
	Wind Direction
	Wind Speed
FIRE_AX_MAGE_OCN_SEA	Dimethylsulfide Concentration
FIRE_AX_MAGE_TETROON	Altitude

**Calibration:**

**Specifications:**

...

**Tolerance:**

...

**Frequency of Calibration:**

...

**Other Calibration Information:**

...

**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
FIRE_AX_MAGE_EL ECTRA				
FIRE_AX_MAGE_OC 30.00 N_AIR		39.00	-25.00	-21.00
FIRE_AX_MAGE_OC 00.00 N_MET		41.25	-25.73	00.00
FIRE_AX_MAGE_OC 30.00 N_SEA		39.00	-25.00	-21.00
FIRE_AX_MAGE_TE 30.73 TROON		41.02	-24.02	-22.00

**Spatial Coverage Map:**

There are no maps available for these data sets.



**Spatial Resolution:**

...

**Projection:**

...

**Grid Description:**

...

**Temporal Characteristics:**

**Temporal Coverage:**

Data Set	Begin Date	End Date
FIRE_AX_MAGE_ELECTR A		
FIRE_AX_MAGE_OCN_AI R	06-03-1992	06-18-1992
FIRE_AX_MAGE_OCN_M ET	05-26-1992	06-23-1992
FIRE_AX_MAGE_OCN_S EA	05-31-1992	06-20-1992
FIRE_AX_MAGE_TETRO ON	06-12-1992	06-19-1992

**Temporal Coverage Map:**

There are no maps available for these data sets.

**Temporal Resolution:**

...

**Data Characteristics:**

**Parameter/Variable:**

FIRE_AX_MAGE_ELECTRA	
Variable	Units
Start Time	Julian Date
End Time	Julian Date
SO2	PPTV
SO2 Error	PPTV
DMS	PPTV
DMS Error	PPTV
CS2	PPTV
CS2 Error	PPTV

FIRE_AX_MAGE_OCN_AIR and FIRE_AX_MAGE_OCN_MET and FIRE_AX_MAGE_OCN_SEA	
Variable	Units
Barometric Pressure	mb
Precipitation	millimeters



Short Wave Radiation (UV) Watts/sq meter  
 Wind Direction Degrees  
 Wind Speed m/sec  
 LRN-Lat Deg N  
 LRN-Lon Deg W  
 Ship Speed Knots  
 Sea Water Surface S/m  
 Conductivity  
 Sea Surface Temperature Deg C

**FIRE\_AX\_MAGE\_TETROON**

Variable	Units
Balloon	number
Day	day, month, year
Time	hour/min/sec
LatD (whole degrees)	degree
Latitude	dec/min
LonD (whole degrees)	degree
Longitude (decimal/minute)	dec/min
Altitude	
GPS Satellite	number

**Variable Description/Definition:**

See above.

**Unit of Measurement:**

See above.

**Data Source:**

...

**Data Range:**

...

**Sample Data Record:**

FIRE\_AX\_MAGE\_ELECTRA

START TIME,END TIME,SO2,SO2 ERROR,DMS,DMS ERROR,CS2,CS2 ERROR  
 156.41744,156.41953,-999,-999,-888,12,-888.0,3.2

FIRE\_AX\_MAGE\_OCN\_AIR and FIRE\_AX\_MAGE\_OCN\_MET and FIRE\_AX\_MAGE\_OCN\_SEA

W/m<sup>2</sup>,deg,m/sec,deg N,deg W,Kts,S/m,C

92,05,26,02,35,32, 23432, 37.736, 25.659, 63.6, 16.223, 1011.6, 21.0  
 -1.8, 140.1, 5.2, 37.736, 25.659, .0, 74.5100, 17.0740

FIRE\_AX\_MAGE\_TETROON

balloon # 2^M

balloon	dd-mm-yy	hh:mm:ss	latitude	longitude	altitude	#sats^M
002	12-06-92	20:25:08	39d 37.74'N	023d 32.70'W	000605 M	3^M

**8. Data Organization:**



## Data Granularity:

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

## Data Format:

All data are in ASCII 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:

There are no images available for these data sets.

## 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:

...





## 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:

There are no plans for future modifications of these data sets.

## 14. Software:

### Software Description:

Sample read software are available for the FIRE\_AX\_OCN\_MET and the FIRE\_AX\_MAGE\_TETROON data sets.

### Software Access:

The software can be obtained through the Langley DAAC. Please refer to the contact information below. The software can also be obtained at the same time the user is 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](mailto:support-asdc@earthdata.nasa.gov)

### Data Center Identification:

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](mailto:support-asdc@earthdata.nasa.gov)

### Procedures for Obtaining Data:

The Langley DAAC Information Management System (IMS) is an on-line system that features a graphical user interface (GUI) that allows to query the Langley DAAC data set holdings, to view pre-generated browse products, and to order specific data products. Users may also



request data by letter, telephone, electronic mail (INTERNET), or personal visit.

The Langley DAAC User and Data Services (SUDS) staff provides technical and operational support for users ordering data. The Langley DAAC Handbook is available in a postscript file through the IMS for users who want detailed information about the Langley DAAC holdings. Users may also obtain a copy by contacting:

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](mailto:support-asdc@earthdata.nasa.gov)

URL: <http://eosweb.larc.nasa.gov>

## Data Center Status/Plans:

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

## 16. Output Products and Availability:

There are no output products available at this time.

## 17. References:

...

## 18. Glossary of Terms:

[EOSDIS Glossary.](#)

## 19. List of Acronyms:

**NASA** - National Aeronautics Space Administration

**URL** - Uniform Resource Locator

[EOSDIS Acronyms.](#)

## 20. Document Information:

### Document Revision Date:

October 07, 1996; May 28, 1997; November 24, 1997

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### Document ID:

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### Citation:

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### Document Curator:

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