# First ISCCP Reginal Experiment (FIRE) Atlantic Stratocumulus Transition Experiment (ASTEX) Radiosonde 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.
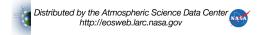
This document concentrates on the radiosonde rawinsonde data collected for this FIRE ASTEX experiment (eight data sets).

- FIRE_AX_MALBAL_SONDE
- FIRE_AX_OCEANS_SONDE
- FIRE_AX_PORSAN_SONDE
- FIRE_AX_RWSONDE_LVL1
- FIRE_AX_RWSONDE_LVL2
- FIRE_AX_SANMAR_SONDE
- FIRE_AX_SUROIT_SONDE
- FIRE_AX_VALDIV_SONDE

## Table of Contents:

## 1. Data Set Overview:

## Data Set Identification:

There are six data sets:

FIRE_AX_MALBAL_SONDE :                      First ISCCP Reginal Experiment (FIRE) Atlantic
                                            Stratocumulus Transition Experiment (ASTEX) Malcolm
                                            Baldridge Radiosonde Data
                                            (FIRE_AX_MALBAL_SONDE)

FIRE_AX_OCEANS_SONDE :                      First ISCCP Reginal Experiment (FIRE) Atlantic
                                            Stratocumulus Transition Experiment (ASTEX)
                                            Oceanus Radiosonde Data
                                            (FIRE_AX_OCEANS_SONDE)

FIRE_AX_PORSAN_SONDE :                      First ISCCP Reginal Experiment (FIRE) Atlantic
                                            Stratocumulus Transition Experiment (ASTEX) Porto
                                            Santo Radiosonde Data (FIRE_AX_PORSAN_SONDE)

FIRE_AX_RWSONDE_LVL1 :                      First ISCCP Reginal Experiment (FIRE) Atlantic
                                            Stratocumulus Transition Experiment (ASTEX)
                                            Rawinsonde Level 1 Data
                                            (FIRE_AX_RWSONDE_LVL1)

FIRE_AX_RWSONDE_LVL2 :                      First ISCCP Reginal Experiment (FIRE) Atlantic
                                            Stratocumulus Transition Experiment (ASTEX)
                                            Rawinsonde Level 2 Data
                                            (FIRE_AX_RWSONDE_LVL2)

FIRE_AX_SANMAR_SONDE :                      First ISCCP Reginal Experiment (FIRE) Atlantic
                                            Stratocumulus Transition Experiment (ASTEX) Santa
                                            Maria Radiosonde Data (FIRE_AX_SANMAR_SONDE)

FIRE_AX_SUROIT_SONDE :                      First ISCCP Reginal Experiment (FIRE) Atlantic
                                            Stratocumulus Transition Experiment (ASTEX) Le
                                            Suroit Radiosonde Data (FIRE_AX_SUROIT_SONDE)

FIRE_AX_VALDIV_SONDE :                      First ISCCP Reginal Experiment (FIRE) Atlantic
                                            Stratocumulus Transition Experiment (ASTEX) Valdivia
                                            Radiosonde Data (FIRE_AX_VALDIV_SONDE)

## Data Set Introduction:

**FIRE_AX_MALBAL_SONDE**
Radiosonde data were collected during the FIRE ASTEX for time period June 7, 1992 through June 28, 1992 from the Malcolm Baldridge (ship). There are 3 sets of interpolated sounding data. They are 5-second, 20-meter, and 2-millibar.

Each file contains a 5-line header. The first line is the site name (up to 16 characters), the next line is the latitude and longitude at the time of launch, the third contains the date-time group at launch in YYMMDDHHMM format. Lines 4 and 5 describe the data to follow, which comprise no more that 1500 additional lines. The data are: minutes, seconds past launch, ascent rate, height, pressure, temperature, relative humidity, dew point, mixing ratio and wind speed and direction.

**FIRE_AX_OCEANS_SONDE**
Radiosonde data were collected during the FIRE ASTEX for time period June 3, 1992 through June 23, 1992 from the Oceanus (ship). There are 3 sets of interpolated sounding data. They are 5-second, 20-meter, and 2-millibar.

Each file contains a 5-line header. The first line is the site name (up to 16 characters), the next line is the latitude and longitude at the time of launch, the third contains the date-time group at launch in YYMMDDHHMM format. Lines 4 and 5 describe the data to follow, which comprise no more that 1500 additional lines. The data are: minutes, seconds past launch, ascent rate, height, pressure, temperature, relative humidity, dewpoint, mixing ratio and wind speed and direction.

**FIRE_AX_PORSAN_SONDE**
Radiosonde data were collected during the FIRE ASTEX for time period June 1, 1992 through June 29, 1992 from Porto Santo. There are 3 sets of interpolated sounding data. They are 5-second, 20-meter, and 2-millibar.

Each file contains a 5-line header. The first line is the site name (up to 16 characters), the next line is the latitude and longitude at the time of launch, the third contains the date-time group at launch in YYMMDDHHMM format. Lines 4 and 5 describe the data to follow, which comprise no more that 1500 additional lines. The data are: minutes, seconds past launch, ascent rate, height, pressure, temperature, relative humidity, dew point, mixing ratio and wind speed and direction.

### FIRE_AX_RWSONDE_LVL1 and FIRE_AX_RWSONDE_LVL2

During the period from June 1 to June 29, 1992, 203 soundings were obtained. At present two forms of data exist - Level I and Level II. Level I are the raw data produced in real time by the software of the Atmospheric Instrumentation Research (AIR) radiosonde system. These data are at irregular pressure and height levels. Level II data consist of processed thermodynamic and wind data at a uniform resolution of 10m, which essentially retains the highest possible vertical resolution in the original data. The Level II thermodynamic data seem to be reasonably free of errors; however, as mentioned in Schubert et. al., (1992) the wind data requires additional filtering before use.

### FIRE_AX_SANMAR_SONDE

Radiosonde data were collected during the FIRE ASTEX for time period June 1, 1992 through June 28, 1992 from the Santa Maria. There are 3 sets of interpolated sounding data. They are 5-second, 20-meter, and 2-millibar.

Each file contains a 5-line header. The first line is the site name (up to 16 characters), the next line is the latitude and longitude at the time of launch, the third contains the date-time group at launch in YYMMDDHHMM format. Lines 4 and 5 describe the data to follow, which comprise no more that 1500 additional lines. The data are: minutes, seconds past launch, ascent rate, height, pressure, temperature, relative humidity, dew point, mixing ratio and wind speed and direction.

### FIRE_AX_SUROIT_SONDE

Radiosonde data were collected during the FIRE ASTEX for time period June 1, 1992 through June 20, 1992 from the Le Suroit (ship). There are 3 sets of interpolated sounding data. They are 5-second, 20-meter, and 2-millibar.

Each file contains a 5-line header. The first line is the site name (up to 16 characters), the next line is the latitude and longitude at the time of launch, the third contains the date-time group at launch in YYMMDDHHMM format. Lines 4 and 5 describe the data to follow, which comprise no more that 1500 additional lines. The data are: minutes, seconds past launch, ascent rate, height, pressure, temperature, relative humidity, dew point, mixing ratio and wind speed and direction.

### FIRE_AX_VALDIV_SONDE

Radiosonde data were collected during the FIRE ASTEX for time period May 28, 1992 through June 22, 1992 from the Valdivia (ship). There are 3 sets of interpolated sounding data. They are 5-second, 20-meter, and 2-millibar.

Each file contains a 5-line header. The first line is the site name (up to 16 characters), the next line is the latitude and longitude at the time of launch, the third contains the date-time group at launch in YYMMDDHHMM format. Lines 4 and 5 describe the data to follow, which comprise no more that 1500 additional lines. The data are: minutes, seconds past launch, ascent rate, height, pressure, temperature, relative humidity, dew point, mixing ratio and wind speed and direction.
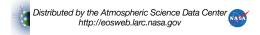
## Objective/Purpose:

...

## Summary of Parameters:

These parameters apply for all of the data sets listed in this document.

- Dew/Frost Point Temperature
- Humidity
- Mixing Ratio
- Pressure

- Temperature
- Wind Direction
- Wind Speed

## Discussion:

...

## Related Data Sets:

...

# 2. Investigator(s):

## Investigator(s) Name and Title:

Mr. William J. Syrett

## Title of Investigation:

First ISCCP Regional Experiment (FIRE)

## Contact Information:

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University Park, PA 16802
USA
Phone: (814) 863-2473
FAX: (814) 865-3663
E-Mail: syrett@essc.psu.edu

**For the Rawinsonde Data**
John Davis
Department of Atmospheric Science
Colorado State University
Fort Collins, CO 80523
USA
Phone: (970) 491-8583
E-mail: jdavis@trueno.atmos.colostate.edu

# 3. Theory of Measurements:

...

# 4. Equipment:

## Sensor/Instrument Description:

### Collection Environment:

...

### Source/Platform:

Ground Station
Ship

### Source/Platform Mission Objectives:

...

### Key Variables:

...

### Principles of Operation:

...

**Sensor/Instrument Measurement Geometry:**

...

**Manufacturer of Sensor/Instrument:**

...

**Sensor/Instrument:**

Radiosonde
Rawinsonde

## 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_MALBA L_SONDE | 27.31 | 37.29 | -27.88 | -21.92 |
| FIRE_AX_OCEAN S_SONDE | 32.70 | 41.17 | -25.89 | -21.09 |
| FIRE_AX_PORSA N_SONDE | 33.08 | 33.08 | -16.35 | -16.35 |
| FIRE_AX_RWSO NDE_LVL1 | 33.08 | 33.08 | -16.35 | -16.35 |
| FIRE_AX_RWSO NDE_LVL2 | 33.08 | 33.08 | -16.35 | -16.35 |
| FIRE_AX_SANMA | 36.99 | 36.99 | -25.17 | -25.17 |

R_SONDE

| | | | | |
|---|---|---|---|---|
| FIRE_AX_SUROIT _SONDE | 34.50 | 37.70 | -26.36 | -23.08 |
| FIRE_AX_VALDIV _SONDE | 27.10 | 46.01 | -24.07 | -11.92 |

**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_MALBAL_SOND E | 06-07-1992 | 06-28-1992 |
| FIRE_AX_OCEANS_SON DE | 06-03-1992 | 06-23-1992 |
| FIRE_AX_PORSAN_SON DE | 06-01-1992 | 06-29-1992 |
| FIRE_AX_RWSONDE_LV L1 | 06-01-1992 | 06-28-1992 |
| FIRE_AX_RWSONDE_LV L2 | 06-01-1992 | 06-28-1992 |
| FIRE_AX_SANMAR_SON DE | 06-01-1992 | 06-28-1992 |
| FIRE_AX_SUROIT_SOND E | 06-01-1992 | 06-20-1992 |
| FIRE_AX_VALDIV_SOND E | 05-28-1992 | 06-22-1992 |

**Temporal Coverage Map:**

There are no maps available for these data sets.

**Temporal Resolution:**

All granules consist of one day of data.

# Data Characteristics:

**Parameter/Variable:**

**FIRE_AX_MALBAL_SONDE**

| Parameter | Units | Minimum Value | Maximum Value | Fill Value |
|-----------|-------|---------------|---------------|------------|
| Time | minutes | 0 | 120 | |
| Second | seconds | 0 | 60 | |
| AscRate | m/s | 0.0 | 20.0 | |
| Height | m | 0 | 30000 | |
| Pressure | hPa | 10.0 | 1050.0 | |
| Temperature | degC | -80.0 | 35.0 | |
| Relative Humidity | | | | |
| Dewpoint | degC | -99.9 | 30.0 | -99.9 |
| Mixing Ratio | g/kg | 0.0 | 20.0 | -9.999 |
| Wind Direction | deg | 0 | 360 | -99 |
| Wind Speed | m/s | 0.0 | 100.0 | -99.9 |

**FIRE_AX_OCEANS_SONDE**

| Parameter | Units | Minimum Value | Maximum Value | Fill Value |
|-----------|-------|---------------|---------------|------------|
| Time | minutes | 0 | 120 | |
| Second | seconds | 0 | 59 | |
| AscRate | m/s | 0.0 | 20.0 | |
| Height | m | 0 | 30000 | |
| Pressure | hPa | 10.0 | 1050.0 | |
| Temperature | degC | -80.0 | 35.0 | |
| Relative Humidity | | | | |
| Dewpoint | degC | -99.9 | 30.0 | -99.9 |
| Mixing Ratio | g/kg | 0.0 | 20.0 | -9.999 |
| Wind Direction | deg | 0 | 360 | -99 |
| Wind Speed | m/s | 0.0 | 100.0 | -99.9 |

**FIRE_AX_PORSAN_SONDE**

| Parameter | Units | Minimum Value | Maximum Value | Fill Value |
|-----------|-------|---------------|---------------|------------|
| Time | minutes | 0 | 120 | |
| Second | seconds | 0 | 60 | |
| AscRate | m/s | 0.0 | 20.0 | |
| Height | m | 0 | 30000 | |
| Pressure | hPa | 10.0 | 1050.0 | |
| Temperature | degC | -80.0 | 35.0 | |
| Relative Humidity | | | | |
| Dewpoint | degC | -99.9 | 30.0 | -99.9 |
| Mixing Ratio | g/kg | 0.0 | 20.0 | -9.999 |
| Wind Direction | deg | 0 | 360 | -99 |
| Wind Speed | m/s | 0.0 | 100.0 | -99.9 |

**FIRE_AX_SANMAR_SONDE**

| Parameter | Units | Minimum Value | Maximum Value | Fill Value |
|---|---|---|---|---|
| Time | minutes | 0 | 120 | |
| Second | seconds | 0 | 59 | |
| AscRate | m/s | 0.0 | 20.0 | |
| Height | m | 0 | 30000 | |
| Pressure | hPa | 10.0 | 1050.0 | |
| Temperature | degC | -80.0 | 35.0 | |
| Relative Humidity | | | | |
| Dewpoint | degC | -99.9 | 30.0 | -99.9 |
| Mixing Ratio | g/kg | 0.0 | 20.0 | -9.999 |
| Wind Direction | deg | 0 | 360 | -99 |
| Wind Speed | m/s | 0.0 | 100.0 | -99.9 |

**FIRE_AX_SUROIT_SONDE**

| Parameter | Units | Minimum Value | Maximum Value | Fill Value |
|---|---|---|---|---|
| Time | minutes | 0 | 120 | |
| Second | seconds | 0 | 59 | |
| AscRate | m/s | 0.0 | 20.0 | |
| Height | m | 0 | 30000 | |
| Pressure | hPa | 10.0 | 1050.0 | |
| Temperature | degC | -80.0 | 35.0 | |
| Relative Humidity | | | | |
| Dewpoint | degC | -99.9 | 30.0 | -99.9 |
| Mixing Ratio | g/kg | 0.0 | 20.0 | -9.999 |
| Wind Direction | deg | 0 | 360 | -99 |
| Wind Speed | m/s | 0.0 | 100.0 | -99.9 |

**FIRE_AX_VALDIV_SONDE**

| Parameter | Units | Minimum Value | Maximum Value | Fill Value |
|---|---|---|---|---|
| Time | minutes | 0 | 120 | |
| Second | seconds | 0 | 60 | |
| AscRate | m/s | 0.0 | 20.0 | |
| Height | m | 0 | 30000 | |

| | | | |
|---|---|---|---|
| Pressure | hPa | 10.0 | 1050.0 | |
| Temperature | degC | -80.0 | 35.0 | |
| Relative Humidity | | | | |
| Dewpoint | degC | -99.9 | 30.0 | -99.9 |
| Mixing Ratio | g/kg | 0.0 | 20.0 | -9.999 |
| Wind Direction | deg | 0 | 360 | -99 |
| Wind Speed | m/s | 0.0 | 100.0 | -99.9 |

**Variable Description/Definition:**

See table above.

**Unit of Measurement:**

See table above.

**Data Source:**

See table above.

**Data Range:**

See table above.

## Sample Data Record:

**FIRE_AX_MALBAL_SONDE**

```
MALCOLM BALDRIGE
 28.83N   27.40W
 9206071035
 Time    AscRate Hgt/MSL Pressure  Temp    RH     Dewp  Mix R.  Dir Speed
min  s     m/s       m      hPa    degC      0egC   g/kg    deg   m/s
   0  0    0.0        7   1024.2   21.0   84.0   18.2  12.945    20   7.0
```

**FIRE_AX_OCEANS_SONDE**

```
 OCEANUS
37.65N   25.17W
9206031945
 Time    AscRate Hgt/MSL Pressure  Temp    RH     Dewp  Mix R.  Dir Speed
min  s     m/s       m      hPa    degC      0egC   g/kg    deg   m/s
   0  0    0.0        5   1031.2   18.0   64.0   11.2   8.066   270   2.6
```

**FIRE_AX_PORSAN_SONDE**

```
 PORTO SANTO
 33.08N   16.35W
 9206010203
 Time    AscRate Hgt/MSL Pressure  Temp    RH     Dewp  Mix R.  Dir Speed
min  s     m/s       m      hPa    degC      0egC   g/kg    deg   m/s
   0  0    0.0       97   1005.8   16.8   74.0   12.1   8.874   350   1.5
```

**FIRE_AX_RWSONDE_LVL1**

```
   TIME       PMB      TEMP     TDEW     RH 0EOPM  AZDEG    ELDEG    SPEED    DIR    E.TIME
02:03:04.89  1005.80   16.80   12.13   74.00        97  137.52   -0.90    1.5    350    0.00
```

**FIRE_AX_RWSONDE_LVL2**

```
 z(m)    p(mb)      t(c)     td(c)     wind        wind
                                                             speed      direction
```

```
                                                   (m/s)          (deg)
      1      97.      1005.80    16.80   12.13      1.50          350.00
```

**FIRE_AX_SANMAR_SONDE**

```
STA MARIA

 36.99N    25.17W

 9206011039

  Time     AscRate Hgt/MSL Pressure   Temp     RH     Dewp  Mix R.  Dir Speed

 min  s    m/s      m        hPa      degC      0egC   g/kg   deg   m/s

   0  0    0.0       50     1020.6    17.2    61.0    9.6   7.377   350    4.0
```

**FIRE_AX_SUROIT_SONDE**

```
LE SUROIT
 37.05N    25.00W
 9205312317
  Time     AscRate Hgt/MSL Pressure   Temp     RH     Dewp  Mix R.  Dir Speed
 min  s    m/s      m        hPa      degC      0egC   g/kg   deg   m/s
   0  0    0.0        5     1024.0    16.4    76.0   12.1   8.725    13    8.2
```

**FIRE_AX_VALDIV_SONDE**

```
 VALDIVIA

 39.08N    12.40W

 9205281112

  Time     AscRate Hgt/MSL Pressure   Temp     RH     Dewp  Mix R.  Dir Speed

 min  s    m/s      m        hPa      degC      0egC   g/kg   deg   m/s

   0  0    0.0       15     1007.3    14.4    94.0   13.4   9.663   213    2.3
```

# 8. Data Organization:

## Data Granularity:

A general description of data granularity as it applies to the IMS appears in the EOSDIS Glossary.

## Data Format:

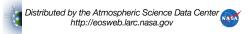All data are in ASCII format.

# 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 to modify these data sets.

## 14. Software:

### Software Description:

There are sample read software available for these data sets. The codes are written in C. A makefile and readme file are also available. These files allow the users to compile and work with the data easily.

### 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

### 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

### 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 dataset 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 (UDS) 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
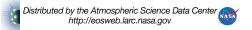Mail Stop 157D
Hampton, Virginia 23681-2199
USA
Telephone: (757) 864-8656
FAX: (757) 864-8807
E-mail: support-asdc@earthdata.nasa.gov
URL: http://eosweb.larc.nasa.gov

### 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:

Schubert, W.S., S.K. Cox, T.B. McKee, D.A. Randall, P.E. Ciesielski, J.D. Kliest and E.L. Stevens, 1992: Analysis of Sounding Data from Porto Santo Island during ASTEX. Colorado State Univeristy Department of Atmospheric Science Paper No.512, 96 pp.

# 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
**Document Review Date:**
     October 07, 1996
**Document ID:**
     ...
**Citation:**
     ...
**Document Curator:**
     Langley DAAC User and Data Services Office
     Telephone: (757) 864-8656
     FAX: (757) 864-8807
     E-mail: support-asdc@earthdata.nasa.gov