First ISCCP Regional Experiment (FIRE) Cirrus 1 Surface Radiation Budget (SRB) Longwave (LW) and Shortwave (SW) Langley DAAC Data Set Document

Summary:

The First ISCCP Regional Experiments (FIRE) 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 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 system.

This document provides information for the following data sets.

- FIRE_CI1_SRB_LW
- FIRE_CI1_SRB_SW

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1. Data Set Overview:

Data Set Identification:

FIRE_CI1_SRB_LW: First ISCCP Regional Experiment (FIRE) Cirrus 1 Surface Radiation

FIRE_CI1_SRB_SW:

Budget (SRB) Longwave (LW) Data (FIRE_CI1_SRB_LW)
First ISCCP Regional Experiment (FIRE) Cirrus 1 Surface Radiation
Budget (SRB) Shortwave (SW) Data (FIRE_CI1_SRB_SW)

Data Set Introduction:

Project FIRE (First ISCCP Regional Experiment) is a U.S. cloud climatology research program to validate and improve ISCCP (International Satellite Cloud Climatology Project) data products and cloud/radiation parameterizations used in general circulation models (GCMs).

The primary emphasis of FIRE is the study of marine stratocumulus and cirrus cloud systems. These two cloud types were selected because of their recognized importance for global climate and their scientific appeal for many members of the scientific community.

Objective/Purpose:

The objective of FIRE is to investigate the cloud properties and physical processes of the cloud systems using combined and coordinated satellite, airborne, and surface observations with modeling studies.

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.

Summary of Parameters:

FIRE_CI1_SRB_LW : Longwave Radiation
FIRE_CI1_SRB_SW : Shortwave Radiation

Discussion:

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Related Data Sets:

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2. Investigator(s):

Investigator(s) Name and Title:

Charles H. Whitlock
Atmospheric Sciences Division
NASA Langley Research Center
21 Langley Boulevard
Hampton, VA 23681
USA

Title of Investigation:

First ISCCP Regional Experiments (FIRE)

3. Theory of Measurements:

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4. Equipment:

Sensor/Instrument Description:

FIRE_CI1_SRB_LW: The pyrgeometers at sites 1 thru 5 (RAD1 to RAD5) are Eppley's precision infrared radiometers operated by the NASA Langley Research Center. The pyrgeometers measure the total hemispherical radiation received at a point on the Earth's surface in the 4 to 50 micron range. The pyrgeometers and the related data reduction software have been designed to correct for dome and body temperature differences. Nonlinearity of the battery circuit, and battery voltage uncertainties. The instruments were correctly mounted on a horizontal plane at approximately 10 meters above the ground and free of any influence from nearby structures.

FIRE_CI1_SRB_SW: The pyranometers at sites 1 thru 5 (RAD1 to RAD5) are Eppley's precision spectral pyranometers operated by the NASA Langley Research Center. The pyranometer at site 6 (RAD6) is Eppley's prcision spectral pyranometer operated by Columbia University. The pyranometers at sites 7 thru 17 (RAD7 to RAD17) are Kipp and Zonen pyranometers operated by the Unviersity of British Columbia. The pyranometers measure the total hemispherical radiation received at a point on the Earth's surface in teh 0.28 to 2.8 micron range. The instruments were correctly mounted on a horizontal plane at approximately 10 meters above the ground and free of any influence from nearby structures.

Collection Environment:

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Source/Platform:

FIRE_CI1_SRB_LW : Ground Station
FIRE_CI1_SRB_SW : Ground Station

Source/Platform Mission Objectives:

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Key Variables:

FIRE_CI1_SRB_LW : Longwave Radiation
FIRE_CI1_SRB_SW : Shortwave Radiation

Principles of Operation:

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Sensor/Instrument Measurement Geometry:

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Manufacturer of Sensor/Instrument:

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Sensor/Instrument:

FIRE_CI1_SRB_LW : Pyrgeometer
FIRE_CI1_SRB_SW : Pyranometer

Calibration:

Specifications:

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Tolerance:

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Frequency of Calibration:

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Other Calibration Information:

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5. Data Acquisition Methods:

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6. Observations:

Data Notes:

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Field Notes:

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7. Data Description:

Spatial Characteristics:

Spatial Coverage:

Data Set Name	Min Lat	Max Lat	Min Lon	Max Lon
FIRE_CI1_SRB_LW	43.52	44.55	-90.76	-89.30
FIRE_CI1_SRB_SW	42.99	44.92	-90.76	-89.30

Spatial Coverage Map:

There are no maps available for this data set.

Spatial Resolution:

FIRE_CI1_SRB_LW : Point Measurements
FIRE_CI1_SRB_SW : Point Measurements

Projection:

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Grid Description:

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Temporal Characteristics:

FIRE_CI1_SRB_LW: The radiance data were obtained at minute intervals from 0000 GMT to 2400 GMT every day from October 12 to November 2, 1986.

FIRE_CI1_SRB_SW: The radiance data were obtained at minute intervals from 1200 GMT to 2400 GMT every day from October 12 to November 2, 1986.

Temporal Coverage:

Data Set Name	Begin Date	End Date
FIRE_CI1_SRB_LW	10-12-1986	11-02-1986
FIRE_CI1_SRB_SW	10-12-1986	11-02-1986

Temporal Coverage Map:

There are no maps available for this data set.

Temporal Resolution:

FIRE_CI1_SRB_LW : 1 Minute
FIRE_CI1_SRB_SW : 1 Minute

Data Characteristics:

Parameter/Variable:

Each of the observation data files in FIRE Cirrus I SRB contains 24 variables. Each variable has been defined as a one byte unsigned integer. Two variables (Lat/Lon) are stored in each ancillary data files each in INTEGER*2 format. In order to scale the data so they are 1-byte, 2-byte, or 4-bytes positive integers the following equation is used:

$$Q = (R - A) * (2^{**}(b - N))$$

where R is the actual (real) data value, b-7 for 1 byte integers, b=15 for 2 byte integers, and b=31 for 4 byte integers and Q is rounded to a positive integer. All records and parameters within each record have been defined including their minimum and maximum values in the header file filename.001.

Variable Description/Definition:

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Unit of Measurement:

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Data Source:

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Data Range:

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Sample Data Record:

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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 written in Modified Standard Data Format.

9. Data Manipulations:

Formulae:

Derivation Techniques and Algorithms:

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Data Processing Sequence:

Processing Steps:

...

Processing Changes:

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Calculations:

Special Corrections/Adjustments:

...

Calculated Variables:

...

Graphs and Plots:

Images are not available for this data set.

10. Errors:

Sources of Error:

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Quality Assessment:

Data Validation by Source:

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Confidence Level/Accuracy Judgement:

...

Measurement Error for Parameters:

...

Additional Quality Assessments:

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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:

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Known Problems with the Data:

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Usage Guidance:

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Any Other Relevant Information about the Study:

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12. Application of the Data Set:

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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.

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:

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USA
Telephone: (757) 864-8656
FAX: (757) 864-8807
E-mail: support-asdc@earthdata.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 this data. There are no plans to reprocess.

16. Output Products and Availability:

There are no output products available at this time for this data set.

17. References:

Sorlie, Susan E. (Editor). Langley DAAC Handbook. NASA/Langley Research Center, Hampton, Virginia, June 27, 1994.

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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