

First ISCCP Regional Experiment (FIRE) Cirrus 2 University of North Dakota Citation Aircraft 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 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.

All data sets discussed in this document were produced by University of North Dakota. These data sets are:

- FIRE_C12_CITATN_1HZ
- FIRE_C12_CITATN_PMS
- FIRE_C12_CITATN_5SEC
- FIRE_C12_CITATN_IWC
- FIRE_C12_CITATN_24HZ

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1. Data Set Overview:

Data Set Identification:



FIRE_CI2_CITATN_1HZ:	First ISCCP Regional Experiment (FIRE) Cirrus 2 University of North Dakota Citation Aircraft 1 Hertz Data (FIRE_CI2_CITATN_1HZ)
FIRE_CI2_CITATN_PMS:	First ISCCP Regional Experiment (FIRE) Cirrus 2 University of North Dakota Citation Aircraft Particle Measuring System Probe Data (FIRE_CI2_CITATN_PMS)
FIRE_CI2_CITATN_5SEC:	First ISCCP Regional Experiment (FIRE) Cirrus 2 University of North Dakota Citation Aircraft 5-Second Data (FIRE_CI2_CITATN_5SEC)
FIRE_CI2_CITATN_IWC:	First ISCCP Regional Experiment (FIRE) Cirrus 2 University of North Dakota Citation Aircraft Ice Water Content Data (FIRE_CI2_CITATN_IWC)
FIRE_CI2_CITATN_24HZ:	First ISCCP Regional Experiment (FIRE) Cirrus 2 University of North Dakota Citation Aircraft 24 Hertz Data (FIRE_CI2_CITATN_24HZ)

Data Set Introduction:

The University of North Dakota owns and operates a Cessna Citation II aircraft (N77ND) for the purpose of atmospheric research. This aircraft type has a number of design and performance characteristics which make it an ideal platform for a wide range of atmospheric studies. A series of structural modifications have been made to the basic airplane. These include the following: pylons under the wing tips for a variety of probes in the undisturbed air flow away from the fuselage; a nose boom for wind measurement; a heated radome to prevent ice accumulation on the nose area; special mounts for upward and downward looking radiometers; side-facing camera mounts for time-lapse cameras; optically-flat glass windows for photography; and an air inlet port for air sampling inside the pressurized cabin. The research instrumentation available on the Citation for the second Cirrus IFO is described below.

The basic instrumentation package measured temperature, dew point temperature, pressure, wind and cloud microphysical characteristics along with aircraft position, altitude and performance parameters. The three-dimensional wind field is derived from measurements of acceleration, pitch, roll and yaw combined with angles of attack and sideslip and indicated airspeed. The aircraft parameters were supplied by an LTN-76 inertial navigation system and a Global Positioning System (GPS). Turbulence intensity can be derived from differential pressure transducers and INS accelerometer outputs.

Cloud microphysics were sampled with PMS 1D-P, 2D-C, 1D-C and FSSP probes, and a continuous formvar replicator from DRI. A number of gas and aerosol sampling instruments were available. These included fast response O3 and NO2 monitors and a condensation nuclei counter.

A forward-looking video camera was used to provide a visual record of flight conditions. The data were sampled at various rates from 1 to 24 sec-1. The sampling is controlled by the on-board computer system which also displayed the data in real time in graphic and alphanumeric formats while recording them on magnetic tape.

Objective/Purpose:

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Summary of Parameters:

FIRE_CI2_CITATN_1HZ	Air Flow Angle Condensation Nuclei Dew/Front Point Temperature Liquid Water Content Nitrogen Dioxide Ozone Pressure Supercooled Liq. Water Content Temperature Wind Direction Wind Speed
FIRE_CI2_CITATN_PMS	Clouds
FIRE_CI2_CITATN_5SEC	Barometric Altitude Cloud Ice Cloud Particles Condensation Nuclei Condensation Nuclei Flow Rate Condensation Nuclei Temp



FIRE_CI2_CITATN_IWC

Dew/Frost Point Temperature
Ice Water Content
Liquid Water Content
Mixing Ratio
Nitrogen Dioxide
Ozone
Potential Temperature
Relative Humidity
Reverse Flow Temperature
Static Pressure
Temperature
Vapor Pressure
Vertical Velocity
Vertical Wind Acceleration
Vertical Wind Angle
Vertical Wind Speed
Virtual Temperature
Wind Direction
Wind Speed

FIRE_CI2_CITATN_24HZ

Ambient Temperature
Barometric Altitude
Dew/Frost Point Temperature
Diffusional Growth Rate
Ice Water Content
Particle Diameter
Particle Number Concentration
Precipitation Rate
Radar Reflectivity
Relative Humidity
Static Pressure
Vertical Velocity
Water Vapor Density
Static Pressure
Temperature
Vertical Wind Acceleration
Vertical Wind Speed
Wind Direction
Wind Speed

Discussion:

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Related Data Sets:

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2. Investigator(s):

Investigator(s) Name and Title:

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Title of Investigation:

First ISCCP Regional Experiment (FIRE)



Contact Information:

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E-mail: poellot@aero.und.nodak.edu

3. Theory of Measurements:

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4. Equipment:

Sensor/Instrument Description:

Collection Environment:

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Source/Platform:

UND CITATION

Source/Platform Mission Objectives:

...

Key Variables:

FIRE_CI2_CITATN_1HZ

Air Flow Angle
Condensation Nuclei
Dew/Front Point Temperature
Liquid Water Content
Nitrogen Dioxide
Ozone
Pressure
Supercooled Liq. Water Content
Temperature
Wind Direction
Wind Speed

FIRE_CI2_CITATN_PMS

FIRE_CI2_CITATN_5SEC

Clouds
Barometric Altitude
Cloud Ice
Cloud Particles
Condensation Nuclei
Condensation Nuclei Flow Rate
Condensation Nuclei Temp
Dew/Frost Point Temperature
Ice Water Content
Liquid Water Content
Mixing Ratio
Nitrogen Dioxide
Ozone
Potential Temperature
Relative Humidity
Reverse Flow Temperature
Static Pressure
Temperature
Vapor Pressure
Vertical Velocity
Vertical Wind Acceleration
Vertical Wind Angle



FIRE_CI2_CITATN_IWC

Vertical Wind Speed
Virtual Temperature
Wind Direction
Wind Speed
Ambient Temperature
Barometric Altitude
Dew/Frost Point Temperature
Diffusional Growth Rate
Ice Water Content
Particle Diameter
Particle Number Concentration
Precipitation Rate
Radar Reflectivity
Relative Humidity
Static Pressure
Vertical Velocity
Water Vapor Density

FIRE_CI2_CITATN_24HZ

Static Pressure
Temperature
Vertical Wind Acceleration
Vertical Wind Speed
Wind Direction
Wind Speed

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_CI2_CITATN_1HZ

ALCOHOL CONDENSING
CHEMILUMINESCENT
CHILLED MIRROR
FLOW ANGLE SENSORS
HOT-WIRE
ICING RATE DETECTOR
PRESSURE TRANSDUCER
REVERSE FLOW
TEMPERATURE PROBES

FIRE_CI2_CITATN_PMS

FSSP
PMS 1D-C PROBE
PMS 1D-P PROBE

FIRE_CI2_CITATN_5SEC

ALCOHOL CONDENSING
CHEMILUMINESCENT
CHILLED MIRROR
FLOW ANGLE SENSORS
FSSP
ICING RATE DETECTOR
JW PROBE
PLATINUM RESISTANCE
PMS 1D-C PROBE
PMS 1D-P PROBE
PMS 2D-C PROBE
PRESSURE TRANSDUCER
REVERSE FLOW
THERMOMETER
VARIABLE CAPACITANCE



FIRE_CI2_CITATN_IWC
FIRE_CI2_CITATN_24HZ

PMS 2D-C PROBE
PMS 2D-P PROBE
FLOW ANGLE SENSORS
THERMOMETER
VARIABLE CAPACITANCE

Calibration:

Specifications:

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Tolerance:

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Frequency of Calibration:

...

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:

<u>Data Set Name</u>	<u>Min Lat</u>	<u>Max Lat</u>	<u>Min Lon</u>	<u>Max Lon</u>
FIRE_CI2_CITAT N_1HZ	33.37	38.82	-96.41	-92.76
FIRE_CI2_CITAT N_PMS	33.37	38.82	-96.41	-92.76
FIRE_CI2_CITAT N_5SEC	37.05	38.82	-96.41	-93.71
FIRE_CI2_CITAT N_IWC	33.37	38.82	-96.41	-92.76
FIRE_CI2_CITAT N_24HZ	33.37	38.82	-96.41	-92.76

Spatial Coverage Map:

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Spatial Resolution:

Not applicable.

Projection:

...

Grid Description:

...

Temporal Characteristics:**Temporal Coverage:**

Data Set Name	Begin Date	End Date
FIRE_CI2_CITATN_1HZ	11-14-1991	12-07-1991
FIRE_CI2_CITATN_PM S	11-14-1991	12-07-1991
FIRE_CI2_CITATN_5SE C	11-22-1991	11-22-1991
FIRE_CI2_CITATN_IWC	11-14-1991	12-07-1991
FIRE_CI2_CITATN_24H Z	11-14-1991	12-07-1991

Temporal Coverage Map:

...

Temporal Resolution:

FIRE_CI2_CITATN_1HZ : 1 Hertz
 FIRE_CI2_CITATN_PMS : Daily
 FIRE_CI2_CITATN_5SEC : 5 seconds
 FIRE_CI2_CITATN_IWC : 5 seconds
 FIRE_CI2_CITATN_24HZ : 24 Hertz

Data Characteristics:**Parameter/Variable:**

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Variable Description/Definition:

...

Unit of Measurement:

...

Data Source:

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Data Range:

...

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:

Native 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:

...

10. Errors:

Sources of Error:

...

Quality Assessment:

Data Validation by Source:

...

Confidence Level/Accuracy Judgement:

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Measurement Error for Parameters:

...

Additional Quality Assessments:

...



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:

There are sample read software available for these 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

Data Center Identification:

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NASA Langley Research Center
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Hampton, Virginia 23681-2199
USA
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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) which allows users 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 (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:

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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:

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Document ID:

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Citation:

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Document Curator:

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