

ISCCP Regional Experiment (FIRE) Atlantic Stratocumulus Transition Experiment (ASTEX) European Centre for Medium-range Weather Forecasting (ECMWF) Langley DAAC Data Set Document



Summary:

A special set of analysis products for the Atlantic Stratocumulus Transition Experiment (ASTEX) region during June 1-28, 1992 was prepared by Ernst Klinker and Tony Hollingsworth of the European Centre for Medium-range Forecasting (ECMWF), and reformatted by Chris Bretherton of the University of Washington. These analyses, or more correctly initializations and very short range forecasts using the ECMWF T213L30 operational model, incorporate routine observations from the global network and special soundings from ASTEX that were sent to ECMWF during ASTEX via the GTS telecommunication system. About 650 special soundings were incorporated, including nearly all soundings from Santa Maria, Porto Santo, and the French ship Le Suroit, most of the soundings taken on the Valdivia and Malcolm Baldrige, and almost none of the soundings from the Oceanus. Surface reports from the research ships were also incorporated into the analyses after the first week of the experiment. Aircraft soundings were not included in the analyses. ECMWF has requested that anyone making use of this data set acknowledge them, and that those investigators publishing research that makes more than casual use of this data set contact Ernst Klinker or Tony Hollingsworth.

The data have been decoded by Chris Bretherton into ASCII files, one for each horizontal field at a given level and base time. All data have the same horizontal resolution of 1.25 degrees in latitude and longitude and correspond to base (initialization) times of 00, 06, 12, or 18Z. Different fields have different lat/lon ranges and sets of available vertical levels. Also, some fields are instantaneous (I) while others are accumulated (A) over the first 6 hours of a forecast initialized at the base time. This is tabulated in the "time range" column in Section 7.0. Instantaneous fields are best compared with data at the base time, while accumulated fields are best compared with data three hours after the base time.

All data sets discussed in this document were produced by European Centre for Medium-range Weather Forecasting (ECMWF). These data sets are:

- FIRE_AX_ECMWF_SFDIAG
- FIRE_AX_ECMWF_MEANW
- FIRE_AX_ECMWF_BASIC
- FIRE_AX_ECMWF_CLOUDS
- FIRE_AX_ECMWF_DIAG
- FIRE_AX_ECMWF_SURFCE

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1. Data Set Overview:

Data Set Identification:

FIRE_AX_ECMWF_SFDIAG	First ISCCP Regional Experiment (FIRE) Atlantic Stratocumulus Transition Experiment (ASTEX) European Centre for Medium-range Weather Forecasting (ECMWF) Surface Diagnostics (FIRE_AX_ECMWF_SFDIAG)
FIRE_AX_ECMWF_MEANW	First ISCCP Regional Experiment (FIRE) Atlantic Stratocumulus Transition Experiment (ASTEX) European Centre for Medium-range Weather Forecasting (ECMWF) Mean Velocity Data (FIRE_AX_ECMWF_MEANW)
FIRE_AX_ECMWF_BASIC	First ISCCP Regional Experiment (FIRE) Atlantic Stratocumulus Transition Experiment (ASTEX) European Centre for Medium-range Weather Forecasting (ECMWF) Basic Fields Data (FIRE_AX_ECMWF_BASIC)
FIRE_AX_ECMWF_CLOUDS	First ISCCP Regional Experiment (FIRE) Atlantic Stratocumulus Transition Experiment (ASTEX) European Centre for Medium-range Weather Forecasting (ECMWF) Cloud Data (FIRE_AX_ECMWF_CLOUDS)
FIRE_AX_ECMWF_DIAG	First ISCCP Regional Experiment (FIRE) Atlantic Stratocumulus Transition Experiment (ASTEX) European Centre for Medium-range Weather Forecasting (ECMWF) Diagnostics (FIRE_AX_ECMWF_DIAG)
FIRE_AX_ECMWF_SURFCE	First ISCCP Regional Experiment (FIRE) Atlantic Stratocumulus Transition Experiment (ASTEX) European Centre for Medium-range Weather Forecasting (ECMWF) Surface Data (FIRE_AX_ECMWF_SURFCE)

Data Set Introduction:

See Summary above.

Objective/Purpose:

Information not available at this time.

Summary of Parameters:

Information not available at this time.

Discussion:

Information not available at this time.

Related Data Sets:

Information not available at this time.



2. Investigator(s):

Investigator(s) Name and Title:

Christopher Bretherton, Ph. D.

Title of Investigation:

First ISCCP Regional Experiment (FIRE) ASTEX

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3. Theory of Measurements:

Information not available at this time.

4. Equipment:

Sensor/Instrument Description:

ECMWF Model.

Collection Environment:

Not applicable.

Source/Platform:

ECMWF Model.

Source/Platform Mission Objectives:

Information not available at this time.

Key Variables:

FIRE_AX_ECMWF_SFDIAG	Boundary Layer Dissipation Clouds Dew/Front Point Temperature Evaporation Precipitation Solar Radiation Surface Latent Heat Flux Surface Sensible Heat Flux Surface Stress Temperature Thermal Radiation Wind Speed
FIRE_AX_ECMWF_MEANW	Vertical Velocity
FIRE_AX_ECMWF_BASIC	Geopotential Specific Humidity Temperature Vertical Velocity Wind Speed
FIRE_AX_ECMWF_CLOUDS	Cloud Liquid Water



	Clouds
	Geopotential
	Specific Humidity
	Temperature
	Vertical Velocity
	Wind Speed
FIRE_AX_ECMWF_DIAG	Adiabatic Tendency
	Cloud Liquid Water
	Clouds
	Convective Tendency
	Diabatic Heating
	Geopotential
	Gravity Wave
	Humidity Tendency
	Specific Humidity
	Temperature
	Vertical Diffusion
	Vertical Velocity
	Wind Speed
FIRE_AX_ECMWF_SURFCE	Adiabatic Tendency
	Cloud Liquid Water
	Clouds
	Convective Tendency
	Diabatic Heating
	Geopotential
	Gravity Wave
	Humidity Tendency
	Sea Surface Temperature
	Specific Humidity
	Surface Pressure
	Temperature
	Vertical Diffusion
	Vertical Velocity
	Wind Speed

Principles of Operation:

Information not available at this time.

Sensor/Instrument Measurement Geometry:

Information not available at this time.

Manufacturer of Sensor/Instrument:

Information not available at this time.

Sensor/Instrument:

ECMWF Model.

Calibration:

Specifications:

Information not available at this time.

Tolerance:

Information not available at this time.

Frequency of Calibration:

Information not available at this time.

Other Calibration Information:



Information not available at this time.

5. Data Acquisition Methods:

Information not available at this time.

6. Observations:

Data Notes:

Information not available at this time.

Field Notes:

Information not available at this time.

7. Data Description:

Spatial Characteristics:

Spatial Coverage:

Data Set	Min Lat	Max Lat	Min Lon	Max Lon
FIRE_AX_ECMWF_B ASIC	10.00	70.00	-85.00	15.00
FIRE_AX_ECMWF_ CLOUDS	20.00	45.00	-35.00	-5.00
FIRE_AX_ECMWF_ DIAG	20.00	45.00	-35.00	-5.00
FIRE_AX_ECMWF_ MEANW	10.00	70.00	-85.00	15.00
FIRE_AX_ECMWF_S FDIAG	20.00	45.00	-35.00	-5.00
FIRE_AX_ECMWF_S URFCE	10.00	70.00	-85.00	15.00

Spatial Coverage Map:

Not available.

Spatial Resolution:

Information not available at this time.

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_ECMWF_BASIC	06-01-1992	06-28-1992
FIRE_AX_ECMWF_CLOU	06-01-1992	06-28-1992



DS
 FIRE_AX_ECMWF_DIAG 06-01-1992 06-28-1992
 FIRE_AX_ECMWF_MEAN 06-01-1992 06-28-1992
 W
 FIRE_AX_ECMWF_SFDDIA 06-01-1992 06-28-1992
 G
 FIRE_AX_ECMWF_SURF 06-01-1992 06-28-1992
 CE

Temporal Coverage Map:

Not available.

Temporal Resolution:

One granule of FIRE ASTEX ECMWF data contains data for a 6 hour period for the following 3 data sets:

FIRE_AX_ECMWF_BASIC
 FIRE_AX_ECMWF_CLOUDS
 FIRE_AX_ECMWF_DIAG

One granule of FIRE ASTEX ECMWF data contains one day of data for the following 3 data sets:

FIRE_AX_ECMWF_MEANW
 FIRE_AX_ECMWF_SFDDIA
 FIRE_AX_ECMWF_SURFCE

Data Characteristics:

Parameter/Variable:

FIRE_AX_ECMWF_BASIC

The data have been decoded by Chris Bretherton into ASCII files, one for each horizontal field at a given level and base time. All data have the same horizontal resolution of 1.25 degrees in latitude and longitude and correspond to base (initialization) times of 00, 06, 12, or 18Z. Different fields have different lat/lon ranges and sets of available vertical levels, as tabulated below. Also, some fields are instantaneous (I) while others are accumulated (A) over the first 6 hours of a forecast initialized at the base time. This is tabulated in the "time range" column below. Instantaneous fields are best compared with data at the base time, while accumulated fields are best compared with data three hours after the base time.

Data Set Name	ECMWF Field Abbrev.	ECMWF ID#	Time Range	Field Description	Units
BASIC	Z	129	I	Geopotential	m ² /s ²
	T	130	I	Temperature	K
	Q	133	I	Specific humidity	kg/kg
	U	131	I	U [eastward]-velocity	m/s
	V	132	I	V [northward]-velocity	m/s
	W	135	I	Vertical velocity	Pa/s

lat/lon range: 85W to 15E, 70N to 10N

levels: 1010,1000,975,950,925,900,875,850,825,800,775,750,700, 650,600,550,500,400,300,200,100 hPa

The ECMWF field abbreviation, ID#, field description and units are taken directly from ECMWF Code Table 2, in case you ever need to consult with ECMWF about this data set.

FIRE_AX_ECMWF_CLOUDS

The data have been decoded by Chris Bretherton into ASCII files, one for each horizontal field at a given level and base time. All data have the same horizontal resolution of 1.25 degrees in latitude and longitude and correspond to base (initialization) times of 00, 06, 12, or 18Z. Different fields have different lat/lon ranges and sets of available vertical levels, as tabulated below. Also, some fields are instantaneous (I) while others are accumulated (A) over the first 6 hours of a forecast initialized at the base time. This is tabulated in the "time range" column below. Instantaneous fields are best compared with data at the base time, while accumulated fields are best compared with data three hours after the base time.

Data Set Name	ECMWF Field Abbrev.	ECMWF ID#	Time Range	Field Description	Units
CLOUDS	CLW	212	I	Cloud liquid water	kg/kg
	CF	213	I	Cloud fraction	0-1

lat/lon range: 35W to 05W, 20N to 45N

levels:

1010,1000,975,950,925,900,875,850,825,800,775,750,700,
650,600,550,500,400,300,200,100 HPa

The ECMWF field abbreviation, ID#, field description and units are taken directly from ECMWF Code Table 2, in case you ever need to consult with ECMWF about this data set.

FIRE_AX_ECMWF_DIAG

The data have been decoded by Chris Bretherton into ASCII files, one for each horizontal field at a given level and base time. All data have the same horizontal resolution of 1.25 degrees in latitude and longitude and correspond to base (initialization) times of 00, 06, 12, or 18Z. Different fields have different lat/lon ranges and sets of available vertical levels, as tabulated below. Also, some fields are instantaneous (I) while others are accumulated (A) over the first 6 hours of a forecast initialized at the base time. This is tabulated in the "time range" column below. Instantaneous fields are best compared with data at the base time, while accumulated fields are best compared with data three hours after the base time.

Data Set Name	ECMWF Field Abbrev.	ECMWF ID#	Time Range	Field Description	Units
DIAGNOSTIC	DHR	214	A	Diabatic heating by radiation	K/s
	DHVD	215	A	Diab. heat. by vert. diffusion	K/s
	DHCC	216	A	Diab. heat. by cu. convection	K/s
	DHLC	217	A	Diab. heat. by lg-scale condens.	K/s
	VDZW	218	A	Vert. diffusion of zonal wind	m ² /s ³
	VDMW	219	A	Vert. diffusion of meri. wind	m ² /s ³
	EWGD	220	A	E-W gravity wave drag	m ² /s ³
	NSGD	221	A	N-S gravity wave drag	m ² /s ³
	CTZW	222	A	Convective tend. of zonal wind	m ² /s ³
	CTMW	223	A	Convective tend. of meri. wind	m ² /s ³
	VDH	224	A	Vertical diffusion	kg/(kg s)



				of humidity
HTCC	225	A		Humid. tend. by kg/(kg s) cu. convection
HTLC	226	A		Humid. tend. by lg-kg/(kg s) scale cond.
ATT	228	A		Adiabatic tend. of K/s temperature
ATH	229	A		Adiabatic tend. of kg/(kg s) humidity
ATZW	230	A		Adiabatic tend. of m/s ² zonal wind
ATMW	231	A		Adiabatic tend. of m/s ² meri. wind
	232	A		

lat/lon range: 35W to 05W, 20N to 45N

levels:

1010,1000,975,950,925,900,875,850,825,800,775,750,700

The ECMWF field abbreviation, ID#, field description and units are taken directly from ECMWF Code Table 2, in case you ever need to consult with ECMWF about this data set.

FIRE_AX_ECMWF_MEANW

The data have been decoded by Chris Bretherton into ASCII files, one for each horizontal field at a given level and base time. All data have the same horizontal resolution of 1.25 degrees in latitude and longitude and correspond to base (initialization) times of 00, 06, 12, or 18Z. Different fields have different lat/lon ranges and sets of available vertical levels, as tabulated below. Also, some fields are instantaneous (I) while others are accumulated (A) over the first 6 hours of a forecast initialized at the base time. This is tabulated in the "time range" column below. Instantaneous fields are best compared with data at the base time, while accumulated fields are best compared with data three hours after the base time.

Data Set Name	ECMWF Field Abbrev.	ECMWF ID#	Time Range	Field Description	Units
MEANW	MVV	232	A	Mean vertical velocity	Pa/s

lat/lon range: 85W to 15E, 70N to 10N

levels:

1010,1000,975,950,925,900,875,850,825,800,775,750,700,
650,600,550,500,400,300,200,100 hPa

The ECMWF field abbreviation, ID#, field description and units are taken directly from ECMWF Code Table 2, in case you ever need to consult with ECMWF about this data set.

FIRE_AX_ECMWF_SFDIAG

The data have been decoded by Chris Bretherton into ASCII files, one for each horizontal field at a given level and base time. All data have the same horizontal resolution of 1.25 degrees in latitude and longitude and correspond to base (initialization) times of 00, 06, 12, or 18Z. Different fields have different lat/lon ranges and sets of available vertical levels, as tabulated below. Also, some fields are instantaneous (I) while others are accumulated (A) over the first 6 hours of a forecast initialized at the base time. This is tabulated in the "time range" column below. Instantaneous fields are best compared with data at the base time, while accumulated fields are best compared with data three hours after the base time.

Data Set Name	ECMWF Field Abbrev.	ECMWF ID#	Time Range	Field Description	Units
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SURFACE DIAG	LSP	142	A	Large scale precipitation	m/(6 hr)
	CP	143	A	Convective precipitation	m/(6 hr)
	BLD	145	A	Boundary layer dissipation	W/m ²
	SSHF	146	A	Surface sensible heat flux	W/m ²
	SLHF	147	A	Surface latent heat flux	W/m ²
	TCC	164	I	Total cloud cover	0-1
	10U	165	I	10 meter u	m/s
	10V	166	I	10 meter v	m/s
	2T	167	I	2 meter temperature	K
	2D	168	I	2 meter dewpoint temperature	K
	SSR	176	A	Surface solar radiation	W/m ²
	STR	177	A	Surface thermal radiation	W/m ²
	TSR	178	A	Top solar radiation	W/m ²
	TTR	179	A	Top thermal radiation	W/m ²
	EWSS	180	A	U-stress	N/m ²
	NSSS	181	A	V-stress	N/m ²
	E	182	A	Evaporation	m (H ₂ O)
	CCC	185	I	Convective cloud cover	0-1
	LCC	186	I	Low cloud cover	0-1
	MCC	187	I	Medium cloud cover	0-1
	HCC	188	I	High cloud cover	0-1
	TSRU	208	I	Top solar radiation upward	W/m ²
	TTRU	209	I	Top thermal radiation upward	W/m ²
	TSUC	210	I	Top solar radiation upward clear sky	

lat/lon range: 35W to 05W, 20N to 45N; at surface pressure

The ECMWF field abbreviation, ID#, field description and units are taken directly from ECMWF Code Table 2, in case you ever need to consult with ECMWF about this data set.

FIRE_AX_ECMWF_SURFACE

The data have been decoded by Chris Bretherton into ASCII files, one for each horizontal field at a given level and base time. All data have the same horizontal resolution of 1.25 degrees in latitude and longitude and correspond to base (initialization) times of 00, 06, 12, or 18Z. Different fields have different lat/lon ranges and sets of available vertical levels, as tabulated below. Also, some fields are instantaneous (I) while others are accumulated (A) over the first 6 hours of a forecast initialized at the base time. This is tabulated in the "time range" column below. Instantaneous fields are best compared with data at the base time, while accumulated fields are best compared with data three hours after the base time.

Data Set Name	ECMWF Field Abbrev.	ECMWF ID#	Time Range	Field Description	Units
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SURFACE	SP	134	I	Surface pressure	Pa
	ST	139	I	[Sea] surface temperature	K

lat/lon range: 85W to 15E, 70N to 10N; at surface pressure

The ECMWF field abbreviation, ID#, field description and units are taken directly from ECMWF Code Table 2, in case you ever need to consult with ECMWF about this data set.

Variable Description/Definition:

See Section 7.3.1.

Unit of Measurement:

See Section 7.3.1.

Data Source:

ECMWF Model.

Data Range:

Information not available at this time.

Sample Data Record:

Information not available at this time.

8. Data Organization:

Data Granularity:

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

One granule of FIRE ASTEX ECMWF data contains data for a 6 hour period for the following 3 data sets:

- FIRE_AX_ECMWF_BASIC
- FIRE_AX_ECMWF_CLOUDS
- FIRE_AX_ECMWF_DIAG

One granule of FIRE ASTEX ECMWF data contains one day of data for the following 3 data sets:

- FIRE_AX_ECMWF_MEANW
- FIRE_AX_ECMWF_SFDIAG
- FIRE_AX_ECMWF_SURFCE

Data Format:

- FIRE_AX_ECMWF_BA ASCII
- SIC
- FIRE_AX_ECMWF_CL ASCII
- LOUDS
- FIRE_AX_ECMWF_DI ASCII
- AG
- FIRE_AX_ECMWF_ME ASCII
- ANW
- FIRE_AX_ECMWF_SF ASCII
- DIAG
- FIRE_AX_ECMWF_SU ASCII
- RFCE



9. Data Manipulations:

Formulae:

Derivation Techniques and Algorithms:

Not available at this time.

Data Processing Sequence:

Processing Steps:

Not available at this time.

Processing Changes:

Not available at this time.

Calculations:

Special Corrections/Adjustments:

Not available at this time.

Calculated Variables:

Not available at this time.

Graphs and Plots:

None available.

10. Errors:

Sources of Error:

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 these data sets.

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:

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 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:

Information not available at this time.

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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Document ID:

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Citation:

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Document Curator:

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