Sulfates, Clouds and Radiation Brazil (SCAR-B) GOES-8 Fire Langley DAAC Data Set Document

Summary:

The Cooperative Institute for Meteorological Satellite Studies (CIMSS) at the University of Wisconsin-Madison has produced diurnal GOES-8 derived fire products for the 1995 fire season (June--October 1995) with version 5.5 of the GOES-8 Automated Biomass Burning Algorithm (ABBA). The diurnal fire products were produced for 1145, 1445, 1745, and 2045 UTC coinciding with peak burning hours.

The GOES-8 Automated Biomass Burning Algorithm (ABBA) fire products are derived from Geostationary Operational Environmental Satellite (GOES)-8 imager radiances from bands 1 (visible), 2 (3.9 micron), and 4 (11 micron).

Table of Contents:

1. Data Set Overview:

Data Set Identification:

SCAR_B_G8_FIRE:	Sulfates, Clouds and Radiation Brazil (SCAR-B) GOES-8 Fire

Data Set Introduction:

Not available at this time.

Objective/Purpose:

To study the effects of biomass burning on atmospheric processes and aids in the preparation of new techniques for remote sensing of these processes from space.

Summary of Parameters:

FIRE EXTENT

FIRE COUNT
BIOMASS BURNING

Discussion:

Not available at this time.

Related Data Sets:

2. Investigator(s):

Investigator(s) Name and Title:

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3. Theory of Measurements:

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4. Equipment:

Sensor/Instrument Description:

The Advanced Very High Resolution Radiometer (AVHRR) is a broad-band, 4 or 5 channel (depending on the model) scanning radiometer, sensing in the visible, near-infrared, and thermal infrared portions of the electromagnetic spectrum.

Source/Platform:

GOES-8 (Geostationary Operational Environmental Satellite)

Calibration:

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5. Data Acquisition Methods:

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6. Observations:

Data Notes:

Field Notes:

7. Data Description:

Spatial Characteristics:

Spatial Coverage:

Data Set	Min Lat	Max Lat	Min Lon	Max Lon
SCAR_B_G8_FIRE	~40S	~0	~35 W	~75 W

Spatial Coverage Map:

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Spatial Resolution:

The resolution of the GOES-8 imager data and the derived GOES-8 fire product is 4km.

Projection:

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Grid Description:

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Temporal Characteristics:

Temporal Coverage:

June 1, 1995 to October 31, 1995

Temporal Coverage Map:

Temporal Resolution:

3-hourly during the day at 1145, 1445, 1745, and 2045 UTC

NOTE: There are certain time periods/days when the GOES-8 data could not be captured in real time, could not be processed due to calibration errors, or were simply not available due to either ground station or local ingestor difficulties.

Data Characteristics:

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 in ASCII format with GIF and HDF images.

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:

Prior to processing the GOES data with the ABBA software, an automated McIDAS routine is used to adjust the GOES imagery if necessary to maintain navigation to within 4km at nadir. The navigation routine uses a database of landmarks in South America to renavigate the GOES imagery when necessary.

The GOES-8 ABBA software contains checks to screen for blank lines or anamolous data in the GOES imagery. After processing, the GOES ABBA fire data product is plotted and compared with the GOES imagery to assure that the software has successfully screened the satellite data.

Although limited in scope, GOES-8 ABBA results have been compared to ground truth estimates in North and South America which indicate the GOES ABBA can identify fires that are on the order of a few acres in size and that GOES ABBA fire size and temperature estimates are typically in line with ground truth observations.

Confidence Level/Accuracy Judgement:

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:

Known Problems with the Data:

NOTE: On some occasions there will be missing/bad lines in the raw GOES-8 imagery which results in no fires being able to be detected in those geographic regions. The GOES-8 ABBA software checks for missing/bad lines and does not process these values.

Usage Guidance:

Any Other Relevant Information about the Study:

12. Application of the Data Set:

To study the effects of biomass burning on atmospheric processes and to aid in the preparation of new techniques for remote sensing of these processes from space.

13. Future Modifications and Plans:

14. Software:

Software Description:

The GOES-8 ABBA software incorporates the following ancillary data sets

a. NMC (NCEP) Global Tropospheric Analysis Data: Parameter used: Total Precipitable Water (PWAT).

b. Olson World Ecosystem Data Base (Version 1.4D, Olson, 1992): Parameter used: Ecosystem type Although this data base contains 74 ecosystem types (ranging from 0-73), our study area in South America only includes some of these ecosystem types.

The data set consists of ASCII text files for each time period and corresponding daily GIF and HDF files. The ASCII text files are described below:

ASCII text files are named using the following convention:

scarb_g8fir_yymmdd_x

where:

yymmdd indicates the year (yy), month (mm), and day (dd) and x indicates a number 1 through 4 for the time of day UTC (1 = 1145, 2 = 1445, 3 = 1745 and 4 = 2045). The dates given in the files themselves are indicated by yyddd where yy indicates the year and ddd indicates Julian date.

The file size is variable depending on the number of fires detected for that time period (the largest ASCII text file is approximately 260K). There are a total of 550 ASCII text files.

Each ASCII text file consists of information for active fires identified in GOES-8 multispectral imagery by the GOES-8 ABBA at a specific time period. The first line in each ASCII text file includes the Julian date and UTC time for the fire product. The second line contains column description headers. Each successive line contains information for a given fire pixel including fire pixel location (longitude/latitude); estimated fire size (km2) and average fire temperature (K); fire pixel ecosystem type; and fire pixel flag. The ecosystem type is based on the Olson World Ecosystems database (Version 1.4D, Olson, 1992).

The fire flags range from 0-2 and are defined as follows:

0	The fire pixel was identified and processed by the GOES-8 ABBA. The GOES-8 ABBA was able to determine estimates of sub-pixel fire characteristics (size and temperature).
1	Although the fire pixel was identified by the GOES-8 ABBA, it was saturated and could not be processed for sub-pixel fire characteristics.
2	Although the fire pixel was identified by the GOES-8 ABBA, it could not be processed for sub-pixel fire characteristics due to cloud contamination.

Geophysical parameters in the data files are as follows:

Parameter	Unit	Fill Value	Minimum Value (Deg)	Maximum Value (Deg)
Longitude	degrees	none	-75.77 (or 75.77 W)	-36.12 (or 36.12 W)
Latitude	degrees	none	-39.87 (or 39.87 S)	.13 (or .13 N)
Fire size	km2	-9.0000	0.0005	2.3900
Fire temperature	Kelvin	-9.	400.	1472.
Ecosystem type	unitless	none	23	59
Fire flag	unitless	none	0	2

Geophysical parameters in the ordering system are FIRE EXTENT and FIRE COUNT which also map to BIOMASS BURNING.

Software Access:

15. Data Access:

Contact Information:

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Procedures for Obtaining Data:

The Langley DAAC provides multiple interfaces to access its data holdings. The graphical and character user interfaces allow users to search and order data; and web interfaces allow direct access to some data holdings for immediate downloading or placing media orders, for searching the data holdings, and downloading electronically available holdings, and for ordering prepackaged CD-ROMs and videocassettes. All of these methods are easily obtained from the Langley DAAC web site.

Data Center Status/Plans:

The Langley DAAC will continue to archive these data sets.

16. Output Products and Availability:

17. References:

1. Matson, M, and J. Dozier, 1981: Identification of subresolution high temperature sources using a thermal IR sensor. Photo. Engr. and Rem. Sens., 47, 1311-1318.

2. Menzel, W.P., and E.M. Prins, 1996: Monitoring biomass burning with the new generation of geostationary satellites. In Biomass Burning and Global Change, edited by J.S. Levine, pp. 56-64, The MIT Press, Cambridge, MA.

3. Olson, J.S., 1992: World Ecosystems (WE1.4). Digital Raster Data on a 10-minute geographic 1080x2160 grid. In Global Ecosystems Database, Version 1.0: Disc A. Boulder, CO: U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Geophysical Data Center.

4. Prins, E.M. and W.P. Menzel, 1994: Trends in South American biomass burning detected with the GOES visible infrared spin scan radiometer atmospheric sounder from 1983 to 1991. Jour. Geo. Res., Vol. 99, 16,719-16735.

5. Prins, E.M., W.P. Menzel, D.E. Ward, 1997a: GOES-8 ABBA Diurnal Fire Monitoring during SCAR-B. In SCAR-B Proceedings, edited by V.W.J.H. Kirchhoff, pp 153-157, Transtec Editorial, Sao Paulo, Brazil.

6. Prins, E.M., W.P. Menzel, J.M. Feltz, and D.E. Ward, 1997b: An Overview of GOES-8 Diurnal Fire and Smoke Results for SCAR-B and the 1995 Fire Season in South America. Submitted to the Journal of Geophysical Research, SCAR-B special issue.

7. Prins, E.M. and J.M. Feltz, 1997c: SCAR-B GOES-8 Automated Biomass Burning Algorithm (ABBA: Version 4.5) Fire Product. Contained in the Regional Satellite Fire Compilation CD, IGBP-DIS Office, Toulouse, France

18. Glossary of Terms:

EOSDIS Glossary.

19. List of Acronyms:

EOSDIS Acronyms.

20. Document Information:

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