



# SMEX03 SSM/I Brightness Temperature Data: Alabama, Georgia, Oklahoma, Brazil, Version 1

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## USER GUIDE

### How to Cite These Data

As a condition of using these data, you must include a citation:

Jackson, T. 2008. *SMEX03 SSM/I Brightness Temperature Data, Alabama, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. doi: <https://doi.org/10.5067/YLI4RKVMWFB3>. [Date Accessed].

Jackson, T. 2013. *SMEX03 SSM/I Brightness Temperature Data, Georgia, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. doi: <https://doi.org/10.5067/GV0UAV142XP3>. [Date Accessed].

Jackson, T. 2013. *SMEX03 SSM/I Brightness Temperature Data, Oklahoma, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. doi: <https://doi.org/10.5067/SOBRFX0NIEA6>. [Date Accessed].

Jackson, T. 2013. *SMEX03 SSM/I Brightness Temperature Data, Brazil, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. doi: <https://doi.org/10.5067/PH1WL436U95H>. [Date Accessed].

FOR QUESTIONS ABOUT THESE DATA, CONTACT [NSIDC@NSIDC.ORG](mailto:NSIDC@NSIDC.ORG)

FOR CURRENT INFORMATION, VISIT <https://nsidc.org/data/NSIDC-0338> or  
<https://nsidc.org/data/NSIDC-0564> or <https://nsidc.org/data/NSIDC-0562> or  
<https://nsidc.org/data/NSIDC-0563>



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# 1 DETAILED DATA DESCRIPTION

This user guide applies to the following SMEX03 SSM/I data sets:

NSIDC-0338 (SMEX03 SSM/I Brightness Temperature Data, Alabama)

NSIDC-0562 (SMEX03 SSM/I Brightness Temperature Data, Georgia)

NSIDC-0563 (SMEX03 SSM/I Brightness Temperature Data, Oklahoma)

NSIDC-0564 (SMEX03 SSM/I Brightness Temperature Data, Brazil)

## 1.1 Format

Data are provided in ASCII text files (.txt).

The following tables describe the column headings for the low (\*.lo.txt) and high (\*.hi.txt) frequency data files.

**Table 1.** Column Headings for Low Frequency Data Files

Column	Parameter
1	Latitude in degrees North
2	Longitude in degrees West
3	T <sub>b</sub> 19 v-pol
4	T <sub>b</sub> 19 h-pol
5	T <sub>b</sub> 22 v-pol
6	T <sub>b</sub> 37 v-pol
7	T <sub>b</sub> 37 h-pol

**Table 2.** Column Headings for High Frequency Data Files

Column	Parameter
1	Latitude in degrees North
2	Longitude in degrees West
3	T <sub>b</sub> 85 v-pol

4	T <sub>b</sub> 85 h-pol
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## 1.2 File and Directory Structure

The top directory level contains tarred and gzipped files containing the data for each SMEX03 study region and the readme file as shown in Figure 1.

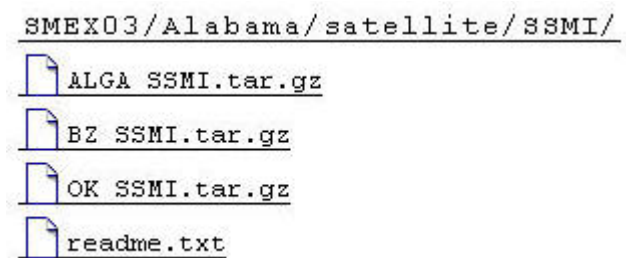


Figure 1. Top Level SMEX03 SSM/I Directory Structure.

## 1.3 File Naming Convention

Data files are named according to the following convention. Table 3 describes the naming convention variables.

### File Naming Convention

TDmmdyyyysstttt.rr.txt

### Example File Name

TD04292003132345.hi.txt

Table 3. File Name Description

Variable	Description
mm	month
dd	day
yyyy	year
ss	satellite number
tttt	start time of swath (hour and minute of local standard time)
rr	frequency set (lo or hi)

Tarred and gzipped files are named according to the following convention, where reg indicates the SMEX03 special region. Table 4 lists the regions

### File Naming Convention

reg\_SSMI.tar.gz

### Example File Name

ALGA\_SSMI.tar.gz

**Table 4.** SMEX03 Regions

Region Code	Region Name
ALGA	Alabama and Georgia
BZ	Brazil
OK	Oklahoma

## 1.4 Spatial Coverage

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### Alabama / Georgia:

Southernmost Latitude: 28.0° N

Northernmost Latitude: 38.0° N

Westernmost Longitude: 90.0° W

Eastermost Longitude: 80.0° W

### Oklahoma:

Southernmost Latitude: 30.0° N

Northernmost Latitude: 40.0° N

Westernmost Longitude: 103.0° W

Eastermost Longitude: 93.0° W

### Brazil:

Southernmost Latitude: 20.0° S

Northernmost Latitude: 0.0° S

Westernmost Longitude: 60.0° W

Easternmost Longitude: 40.0° W

## 1.5 Temporal Coverage

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Alabama / Georgia: 29 April 2003 to 29 September 2003

Oklahoma: 29 April 2003 to 23 September 2003

Brazil: 29 September 2003 to 28 February 2004

### 1.5.1 Temporal Resolution

For a given satellite, coverage is possible twice a day, approximately 12 hours apart, on the ascending and descending passes.

## 1.6 Parameter or Variable

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Brightness Temperature (T<sub>b</sub>) in units of kelvin (K)

### 1.6.1 Parameter Description

The brightness temperatures are given by channel: 19.3, 22.2, 37.0, and 85.5 GHz.

### 1.6.2 Sample Data Record

Low Frequencies: The following is a sample from the file TD04292003132343.lo.txt. The first three lines are shown. See Format for column headings.

28.04 -85.46 212.17 157.06 246.36 224.99 174.41

28.08 -85.20 212.98 158.99 248.69 227.32 178.99

28.12 -84.95 211.80 156.60 247.29 228.85 183.20

High Frequency: The following is a sample from the file TD04292003132343.hi.txt. The first three lines are shown. See Format for column headings.

28.01 -84.92 270.57 258.45

28.02 -84.79 267.10 252.69

28.03 -84.66 267.13 250.93

## 2 DATA ACQUISITION AND PROCESSING

### 2.1 Data Acquisition Methods

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Data are first acquired as antenna temperatures in Temperature Data Record (TDR) format. Latitude and longitude coordinates for each pixel are included with these records. When a study area is specified in the data search procedure, all orbits that cross that area are extracted. On a given day, it is possible to have coverage by each of the three satellites twice a day. It is also possible to have no coverage.

### 2.2 Derivation Techniques and Algorithms

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#### 2.2.1 Processing Steps

Additional processing consists of eliminating scans without coverage in the SMEX03 study regions, converting the antenna temperatures to brightness temperatures, and reformatting the data into ASCII files. The processed data files include a latitude and longitude assigned to each data point.

### 2.3 Sensor or Instrument Description

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SSM/I is a seven-channel, four-frequency, linearly polarized passive microwave radiometric system. It is a conical scanning total power microwave radiometer system operating at a look angle of 53 degrees. The nominal swath width is 1400 km. Data are collected at 128 points across track on every scan at 85 GHz. Only 64 points of observation are made across track on every other scan at the other frequencies.

SSM/I is flown aboard Defense Meteorological Satellite Program (DMSP) satellites F8, F10, F11, F12, F13, F14, and F15. Table 5 lists the characteristics of the relevant platforms that were in operation during SMEX03.

**Table 5.** SSM/I Satellites

Satellite	Launch Date	Supported Through	Ascending Equatorial Crossing Time (local time)
F13	March 1995	present	18:15
F14	May 1997	present	20:21
F15	December 1999	present	21:31

The SSM/Is orbit the earth about 14.1 times per day with an orbital period of about 102 minutes. The minimum data unit, an orbit, consists of two passes. These are pole-to-pole swaths, one

ascending (south to north) and one descending (north to south). The first pass of a Coordinated Universal Time (UTC) day is defined as the first complete pass of the day.

For more information, see the [SMMR, SSM/I, and SSMIS Sensors Summary](#).

## 3 REFERENCES AND RELATED PUBLICATIONS

Heymsfield, G. A. and R. Fulton. 1992. Modulation of SSM/I Microwave Soil Radiances by Rainfall. *Remote Sensing of Environment* 29:187-202.

Hollinger, J. P., J. L. Peirce, and G. A. Poe. 1990. SSM/I Instrument Evaluation. *IEEE Transactions on Geoscience and Remote Sensing* 28:781-790.

Jackson, T. J. 1997. Soil Moisture Estimation Using SSM/I Satellite Data Over a Grass Land Region. *Water Resources Research* 33:1475-1484.

Teng, W. L., J. R. Wang, and P. C. Doraiswamy. 1993. Relationship Between Satellite Microwave Radiometric Data, Antecedent Precipitation Index, and Regional Soil Moisture. *International Journal of Remote Sensing* 14:2483-2500.

### 3.1 Related Data Collections

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- [AMSR-E/Aqua Data at NSIDC](#): AMSR-E standard products available at NSIDC.
- [DMSP SSM/I-SSMIS Daily Polar Gridded Brightness Temperatures](#)
- [DMSP SSM/I-SSMIS Pathfinder Daily EASE-Grid Brightness Temperatures](#).
- [AMSR-E/Aqua L2A Global Swath Spatially-Resampled Brightness Temperatures](#).

## 4 CONTACTS AND ACKNOWLEDGMENTS

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## 5 DOCUMENT INFORMATION

### 5.1 Publication Date

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1 April 2008



## 5.2 Date Last Updated

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