



SMEX02 SSM/I Brightness Temperature Data, Iowa, Version 1

USER GUIDE

How to Cite These Data

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

Jackson, T. and J. Wen. 2003. *SMEX02 SSM/I Brightness Temperature Data, Iowa, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. <https://doi.org/10.5067/WK4WA91H9B1Z>. [Date Accessed].

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National Snow and Ice Data Center

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1 DETAILED DATA DESCRIPTION

1.1 Format

Data are provided in ASCII text format.

1.2 File Naming Convention

The data files use the following convention:

TDmmdyyssttt.rr.txt

where:

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)

For example, the file "TD04302002150312.lo.txt" was acquired on April 30, 2002 from the F15 satellite at 3:12 AM, and the frequency is low. Low-frequency files contain brightness temperatures for 19.3, 22.22, and 37.0 GHz, while high-frequency files contain brightness temperatures for the 85.5 GHz channel.

1.3 File Size

File sizes range from 33 bytes to 244 KB.

1.4 Volume

Total volume is 175 MB.

1.5 Spatial Coverage

Southernmost Latitude: 34.5°N

Northernmost Latitude: 44.5°N

Westernmost Longitude: 100°W

Easternmost Longitude: 90.0°W

1.6 Temporal Coverage

Data were acquired from 29 April and 13 July 2002.

1.6.1 Temporal Resolution

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

1.7 Parameter or Variable

1.7.1 Parameter Description

The following table describes the data columns for the low frequency (.lo.txt) files:

Table 1. Parameters for Low Frequency Files

Column	Parameter
1	Latitude in degrees North
2	Longitude in degrees West
3	19 GHz V TB
4	19 GHz H TB
5	22 GHz V TB
6	37 GHz V TB
7	37 GHz H TB

The following table describes the data columns for the high frequency (.hi.txt) files:

Table 2. Parameters for High Frequency Files

Column	Parameter
1	Latitude in degrees North
2	Longitude in degrees West
3	85 GHz V TB
4	85 GHz H TB

1.7.2 Unit of Measurement

Unit of measurement is brightness temperature (TBs).

1.7.3 Sample Data Record

The following is a sample from the file "TD04302002141607.lo.txt."

44.46	-99.63	268.11	261.98	268.53	266.66	263.45
44.36	-99.92	263.14	254.22	264.36	262.16	255.76
44.45	-99.17	271.20	264.89	269.96	268.66	264.65
44.35	-99.46	268.16	261.98	268.36	266.83	263.48
44.24	-99.75	264.23	254.94	263.38	260.59	254.14

The next sample is from the file "TD04302002141607.hi.txt."

44.46	-99.87	265.55	262.71
44.46	-99.63	265.66	263.68
44.41	-99.78	262.97	260.78
44.36	-99.92	261.02	257.87
44.45	-99.40	267.14	263.88
44.40	-99.55	264.68	262.11

2 DATA ACQUISITION AND PROCESSING

2.1 Data Acquisition Methods

Data were available to the investigators as antenna temperatures. Latitude and longitude coordinates for each pixel were included with these records. Each orbit consisted of about 5 mb of data in compressed mode. When a study area was specified in the data search procedure, all orbits that cross that area were extracted. For an individual satellite, two orbits might cover parts of the study area. On a given day, it was possible to have coverage by each of the three satellites twice a day. It was also possible to have no coverage. During the SMEX02 period from April 29 to July 13th, SSM/I overpasses were available.

2.2 Derivation Techniques and Algorithms

2.2.1 Processing Steps

The raw SSM/I data sets were acquired and further processed by reducing the data set size by eliminating scans without coverage in the SMEX02 region, 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. Data are provided as separate files for low- (19.3, 22.2, and 37.0) and high-frequency channels (85 GHz) because the frequency of measurement is higher for 85 GHz.

2.3 Sensor or Instrument Description

The SSM/I instrument package has been available on at least one Defense Meteorological Satellite Program (DMSP) satellite since 1987. It is a conical scanning microwave radiometer system operating at a look angle of 53°. The following table summarizes the key features of the instruments. The nominal swath width is 1400 km. Data are collected at 128 locations across track on every scan at 85 GHz. Only 64 observations are made across track on every other scan at the other frequencies.

Table 3. Instrument Features

Frequency (GHz)	Polarization	Spatial Resolution (km)
19.3	H and V	69 x 43
22.2	V	60 x 40
37.0	H and V	37 x 28
85.5	H and V	15 x 13

The next table lists the characteristics of the various platforms that were in operation during SMEX02. For a given satellite, coverage is possible twice a day, approximately 12 hours apart, on the ascending and descending passes.

Table 4. Platform Characteristics

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

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

3 REFERENCES AND RELATED PUBLICATIONS

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Teng, W. L., J. R. Wang, and P. C. Doraiswamy. 1993. Relationship between satellite microwave radiometric data, antecedent precipitation index, and regional soil moisture. *Int. J. of Remote Sensing*. 14:2483-2500. 1993.

4 CONTACTS AND ACKNOWLEDGMENTS

Thomas J. Jackson

Jun Wen

US Department of Agriculture (USDS) Agricultural Research Service (ARS) Hydrology Lab.

5 DOCUMENT INFORMATION

5.1 Publication Date

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5.2 Date Last Updated

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