CLPX-Satellite: SSM/I Brightness Temperature Grids, Version 1

USER GUIDE

How to Cite These Data

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

Brodzik, M. J. (ed.). 2003. *CLPX-Satellite: SSM/I Brightness Temperature Grids, Version 1.* [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. https://doi.org/10.5067/SFI3P7OGHUO8. [Date Accessed].

National Snow and Ice Data Center

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1   DETAILED DATA DESCRIPTION

This data set provides gridded passive microwave brightness temperatures. Data are provided for passive microwave frequencies at 19, 22, 37 and 85 GHz, separated by ascending and descending satellite passes, and include time files. Grid resolution is 25 km, which approximates the sampling resolution of the original swath data. The interpolation involves no averaging of original swath data. Backus-Gilbert optimal interpolation is used to artificially increase (16 times) the density of brightness temperature measurements in the satellite swath reference frame. This process uses actual antenna patterns to create the oversampled array, and the net effect is as if the additional samples had been made by the satellite radiometer itself, i.e., the beam patterns and spatial resolutions of the interpolated data approximate those of the original samples. Please see the documentation for the global version of this data set at http://nsidc.org/data/nsidc-0032.html for complete details.

Things about this data set that are different from the global data set are:

1) temporal coverage is limited to 1 February 2002 - 31 May 2002 and 1 February 2003 - 31 May 2003

2) projection/grid is not EASE-Grids, it is CLPX lrsa_geo720.0 and lrsa_utm25000 (see the section on grid resolution), however, interpolation is Backus-Gilbert, so all the benefits of this interpolation are shared with the global data set.

3) filenames are different

4) CLPX grid dimensions are GEO720.0: 23 cols by 18 rows. UTM25000: 17 cols by 17 rows.

5) grid resolution for CLPX is limited to the CLPX grids that approximate 25 km, so any reference in the global data set documentation to the 12.5 km grids may be ignored.

1.1 Format

There are 14 brightness temperature files per day for a given projection. Data are 2-byte unsigned integers, compressed, little-endian (i.e., PC or VAX) byte-order, representing temperatures in tenths of Kelvins. The fill value is 0.

There are two time files per day for a given projection. Data are 1-byte unsigned integers, representing the time of day (UTC) in tenths of hours. The fill value is 255.

There are two geolocation files for each grid (geo and utm), with grid latitude and longitude coordinates. Data are 8-byte, little-endian, double-precision values, representing decimal degrees. File extension is .double.

1.2 File and Directory Structure

Data are provided in a compressed (tarred and zipped) file named nsidc0144_ssmi_v01.tgz. Within this compressed file, data files are in the following directory structure:

```
geo/
  2002/
    02/
      BG-F13-LRSA_GEO720.0.01.2002032A.19H, etc.
    03/
    04/
    05/
  2003/
    02/
    03/
    04/
    05/
lrsa_geo720.0.lat.23x18x1.double
lrsa_geo720.0.lon.23x18x1.double

utm/
  2002/
    02/
      BG-F13-LRSA_UTM25000.01.2002032A.19H, etc.
    03/
    04/
    05/
  2003/
    02/
    03/
    04/
    05/
lrsa_utm25000.lat.17x17x1.double
lrsa_utm25000.lon.17x17x1.double
```

1.3 File Naming Convention

The compressed file is named `nsidc0144_ssmi_v01.tgz`. Individual data files are named `BG-F13-ggg.vv.yyyydddp.ccc` where

BG: Brightness temperature interpolation method is Backus-Gilbert

F13: Source data are from DMSP-F13 SSM/I

ggg: grid name (LRSA_GEO720.0 or LRSA_UTM25000)

vv: 2-digit data version number

yyyy: 4-digit year

ddd: 3-digit day of year

p: pass direction, one of {A(scending), D(escending)}

ccc: channel/polarization or time, one of {19H, 19V, 22V, 37H, 37V, 85H, 85V, TIM}

For example, the file called `BG-F13-LRSA_UTM25000.01.2003150D.19H` contains 19 GHz, horizontally-polarized brightness temperatures, descending passes only, for day 150 (May 30), 2003, gridded to the CLPX 25 km UTM grid, using a Backus-Gilbert interpolation method. The designator '.01.' indicates this is version 1 processing of these data.
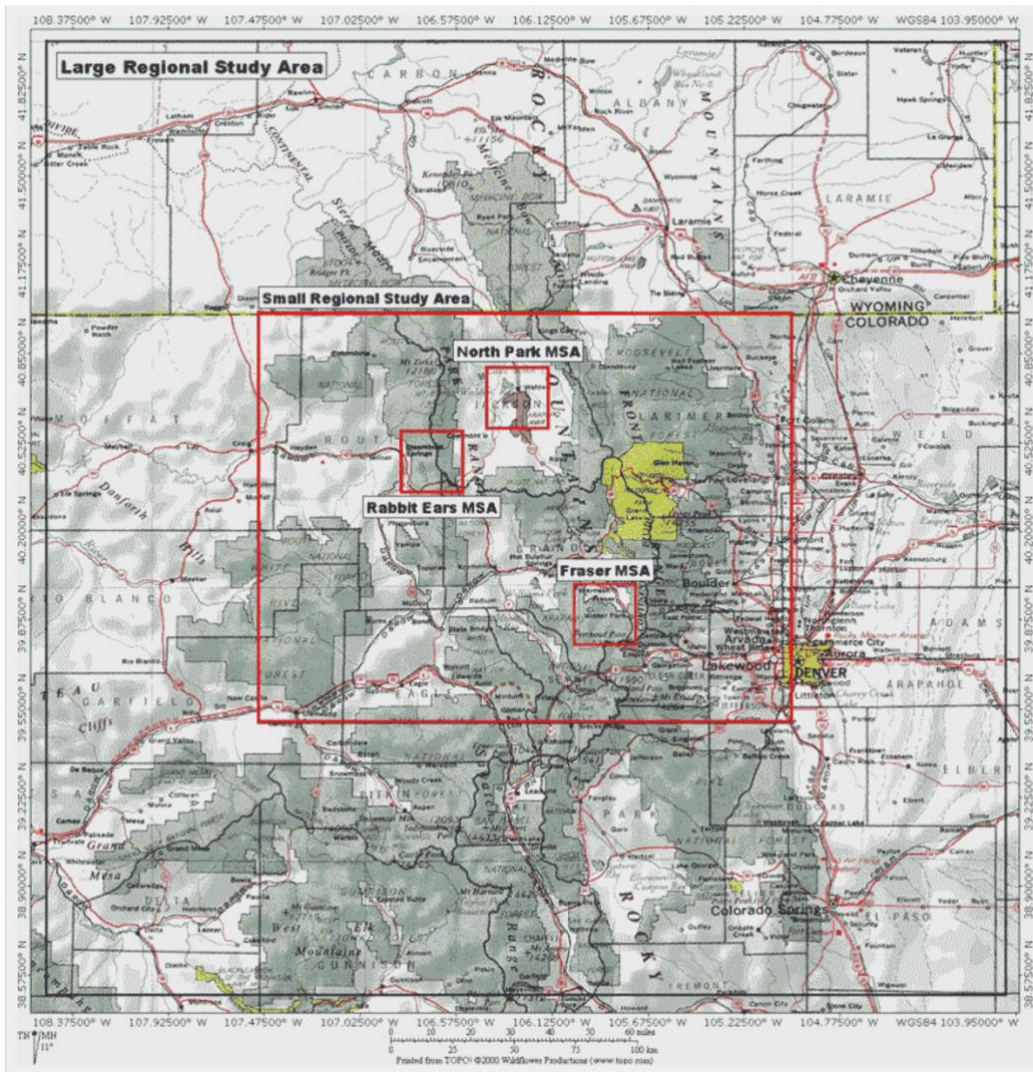
1.4 Spatial Coverage

This data set covers the CLPX LRSA in Colorado and Wyoming.

Upper Left Boundary: 42 N, 108.5 W

Lower Right Boundary: 38.5 N, 104 W

1.4.1 Spatial Coverage Map

The following map shows the CLPX LRSA:

1.4.2   Spatial Resolution

Latitude_Resolution: GEO720.0: 0.2 degrees

Longitude_Resolution: GEO720.0: 0.2 degrees

Latitude_Resolution: UTM25000: 25000m

Longitude_Resolution: UTM25000: 25000m

1.4.3   Projection and Grid Description

Geographic (GEO) Grid: 23 cols x 18 rows

UL: 42.05N, 108.55W

LR: 38.45N, 103.95W

Universal Transverse Mercator (UTM) Grid: 17 cols x 17 rows

UL: 42.16N, 108.93W

LR: 38.39N, 103.85W

Please see the Geographic grid description and the Universal Transverse Mercator grid description for the lrsa_geo720.0 and lrsa_utm25000 grids, respectively.

1.5 Temporal Coverage

Brightness temperature data were collected between 01 February and 31 May 2002, and between 01 February and 31 May 2003.

1.6 Parameter or Variable

Parameters presented in this data set are passive microwave brightness temperatures.

2 SOFTWARE AND TOOLS

2.1 Quality Assessment

2.1.1 Measurement Error for Parameters

Geolocation errors in input Wentz data are no more than 10 km, "although there may be exceptions" (Sharon Tremble, e-mail to M.J. Brodzik, 18 January 1996). Additional error introduced by nearest-neighbor interpolation from the over-sampled array is approximately 6 km for the 25 km grids.

2.1.2 Additional Quality Assessment

Selected TB and time files have been visualized and manually inspected by data center operators before being archived and distributed.

3 DATA ACQUISITION AND PROCESSING

Please see the SSM/I sensor/instrument description. The source for the raw antenna temperature and brightness temperature data for this data set is Remote Sensing Systems, Santa Rosa, California (Wentz 1993). The interpolation involves no averaging of original swath data.

3.1 Error Sources

Geolocation errors in input Wentz data are no more than 10 km, "although there may be exceptions" (Sharon Tremble, e-mail to M.J. Brodzik, 18 January 1996). Additional error introduced by nearest-neighbor interpolation from the over-sampled array is approximately 6 km for the 25 km grids.

4   REFERENCES AND RELATED PUBLICATIONS

Armstrong, R. L., K. W. Knowles, M. J. Brodzik, and M. A. Hardman. 1994, updated 2017. DMSP SSM/I-SSMIS Pathfinder Daily EASE-Grid Brightness Temperatures. Boulder, CO: National Snow and Ice Data Center. doi: http://dx.doi.org/10.5067/3EX2U1DV3434

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Galantowicz, J. F. 1995. Microwave Radiometry of Snow-Covered Grasslands for the Estimation of Land-Atmosphere Energy and Moisture Fluxes. Ph.D. Thesis, Department of Electrical Engineering and Computer Science and Department of Atmospheric, Oceanic, and Space Sciences. University of Michigan, Ann Arbor.

Poe, G. A. 1990. Optimum interpolation of imaging microwave radiometer data. IEEE Trans. Geosci. Remote Sensing GE-28:800-810.

Stogryn, A. 1978. Estimates of brightness temperatures from scanning radiometer data. IEEE Trans. Antennas Propagat. AP-26:720-726.

Wentz, F. J. 1993. User's Manual SSM/I Antenna Temperature Tapes, Revision 2. Remote Sensing Systems Technical Report 120193. Santa Rosa, CA. 13 p.

4.1 Related Data Collections

AMSR-E Validation Data Sets

DMSP SSM/I-SSMIS Pathfinder Daily EASE-Grid Brightness Temperatures

5   CONTACTS AND ACKNOWLEDGMENTS

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6   DOCUMENT INFORMATION

6.1 Publication Date

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6.2 Date Last Updated

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