



SMEX03 Landsat Thematic Mapper Imagery: Oklahoma, Version 1

USER GUIDE

How to Cite These Data

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

Jackson, T. and M. Cosh. 2007. *SMEX03 Landsat Thematic Mapper Imagery: Oklahoma, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. <https://doi.org/10.5067/LG4W1RGPEA4I>. [Date Accessed].

FOR QUESTIONS ABOUT THESE DATA, CONTACT NSIDC@NSIDC.ORG

FOR CURRENT INFORMATION, VISIT <https://nsidc.org/data/NSIDC-0322>



National Snow and Ice Data Center

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1 DETAILED DATA DESCRIPTION

This data set provides imagery developed from Landsat 5 Thematic Mapper (TM) and Landsat 7 Enhanced Thematic Mapper (ETM+) data for use in studying land cover features during the Soil Moisture Experiment 2003 (SMEX03).

For this study, TM and ETM+ bands 2, 3, and 4 were combined to make false color composites.

- Vegetation appear as shades of red. Brighter reds indicate thicker vegetation.
- Soils with little or no vegetation appear as shades from white (sands) to green or brown, depending on moisture and vegetation content.
- Water appears blue.
- Urban areas appear as blue-gray.
- Clouds and snow appear bright white.

1.1 Format

Data are provided as GeoTIFF image files with associated TIFF world files (TFW) containing georeferencing information. GeoTIFF defines a set of publicly available TIFF tags that describe cartographic and geodetic information associated with TIFF images. GeoTIFF enables referencing a raster image to a known geodetic model or map projection. The initial tags are followed by image data, that in turn, may be interrupted by more descriptive tags. By using the GeoTIFF format, both metadata and image data can be encoded into the same file.

TFW files provide georeference information for the image with the same file name. Each TFW file is a text file with six numbers, described below:

Table 1. TFW File Rows

Row	Description
1	the dimension of a pixel in map units in the x direction
2	rotation term for row
3	rotation term for column
4	the dimension of a pixel in map units in the y direction
5	x coordinate for upper left corner
6	y coordinate for upper left corner

1.2 File Naming Convention

Files are named according to the following convention:

Example File Names: TM5_071003.tif and TM5_071003.tfw

TM#_MMDDYY.tif and TM#_MMDDYY.tfw

Where

= Landsat number (5 or 7)

MM = month

DD = day

YY = year

1.3 Spatial Coverage

Southernmost Latitude: 34.42° N

Northernmost Latitude: 36.88° N

Westernmost Longitude: 98.34° W

Easternmost Longitude: 97.42° W

1.3.1 Spatial Resolution

The Landsat TM and ETM+ data are high-resolution 30 m data.

1.3.2 Projection

1.4 Temporal Coverage

13 April, 29 April, and 10 July 2003

1.5 Parameter or Variable

Infrared Imagery (Band 4)

Visible Imagery (Bands 2 and 3)

1.5.1 Parameter Description

Bands 2, 3, and 4 as blue, green, and red are used to generate false color images that can be used to identify land cover and vegetation.

1.5.2 Parameter Source

TM scenes from Landsat 5 and ETM+ scenes from Landsat 7 were acquired during the study period. The following table details the Landsat coverage for the dates of the study.

Table 2: Landsat Coverage Details

Row	Description
1	the dimension of a pixel in map units in the x direction
2	rotation term for row
3	rotation term for column
4	the dimension of a pixel in map units in the y direction
5	x coordinate for upper left corner
6	y coordinate for upper left corner

1.5.3 Sample Data Record



Figure 1. False Color Image of the Oklahoma City Area, Sample from Image File TM5_071003.tif.

2 SOFTWARE AND TOOLS

2.1 Software and Tools

A program which recognizes the GeoTIFF file format is recommended for these images.

3 DATA ACQUISITION AND PROCESSING

3.1 Sensor or Instrument Description

TM is a multispectral scanning radiometer carried on Landsats 4 and 5. The TM has seven spectral bands, with a spatial resolution of 30 m for most bands.

ETM+, an improved version of TM, is carried on Landsat 7. The ETM+ has eight spectral bands with a spatial resolution of 30 m for most bands.

4 REFERENCES AND RELATED PUBLICATIONS

Jackson, T. and M. Cosh. 2007. SMEX03 Landsat Thematic Mapper Imagery: Oklahoma. [indicate subset used]. Boulder, Colorado USA: NASA National Snow and Ice Data Center Distributed Active Archive Center. doi: [10.5067/LG4W1RGPEA4I](https://doi.org/10.5067/LG4W1RGPEA4I).

U.S. Geological Survey (USGS). Landsat Missions. 1 May 2008. <http://landsat.usgs.gov/> 1 May 2008.

Sheffner, Ed. Landsat Program. 5 October 1991. <http://geo.arc.nasa.gov/sge/landsat/landsat.html> 31 October 2007.

4.1 Related Data Collections

[AMSR-E/Aqua Data at NSIDC](#): AMSR-E standard products available at NSIDC

4.2 Related Websites

Please see the [USDA SMEX03](#) Web site for in depth information on the science mission and goal of the SMEX project.

5 CONTACTS AND ACKNOWLEDGMENTS

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6 DOCUMENT INFORMATION

6.1 Publication Date

31 October 2007

6.2 Date Last Updated

1 May 2008 - Updated new USGS Landsat web page