



SMEX02 Land Surface Information: Land Use Classification, Version 1

USER GUIDE

How to Cite These Data

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

Doraiswamy, P. C. and A. J. Stern. 2004. *SMEX02 Land Surface Information: Land Use Classification, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. <https://doi.org/10.5067/6IX22IHYNWBT>. [Date Accessed].

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

FOR CURRENT INFORMATION, VISIT <https://nsidc.org/data/NSIDC-0276>



National Snow and Ice Data Center

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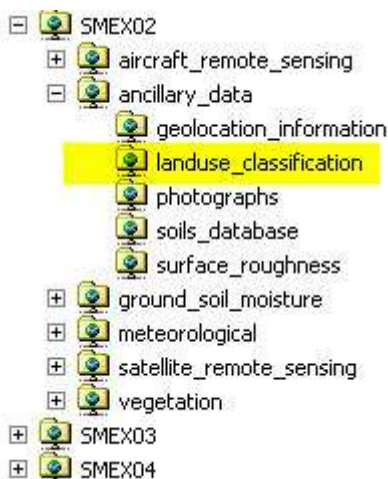
1 DETAILED DATA DESCRIPTION

1.1 Format

Data are provided as one flat binary file, 3831 rows by 1851 columns with no header.

1.2 File and Directory Structure

Land use classification data are located under the SMEX02 ancillary data directory on the FTP site, as shown in this image:



1.3 File Naming Convention

Data are in a single file named "classification.bil."

1.4 Spatial Coverage

Southernmost Latitude: 41.7° N

Northernmost Latitude: 42.04° N

Westernmost Longitude: 93.8° W

Easternmost Longitude: 93.2° W

1.4.1 Projection Description

Universal Transverse Mercator (UTM), Zone 15, Spheroid WGS84, Datum WGS84

1.5 Temporal Coverage

Data were collected for three dates: 14 May, 1 July, and 17 July 2002.

1.6 Parameter or Variable

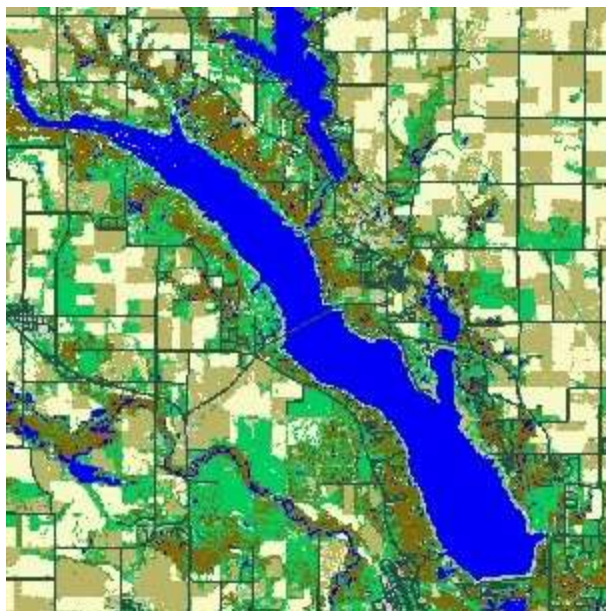
1.6.1 Parameter Description

The parameters in this study are land use (vegetation) classifications. Land use classification distinguishes between crop types, water, roads, and urban areas. Pixels have a resolution of 30 m. The following table describes the values assigned to the vegetation and other elements in the land use classification file:

Value	Class
0	Unclassified
1	Alfalfa
2	Corn
3	Grass
4	Soybean
5	Trees
6	Urban
7	Water
10	Overlaid roads

1.6.2 Sample Image

A sample image from the data is shown below:



2 SOFTWARE AND TOOLS

2.1 Quality Assessment

Corn and soybean accuracies are good, but due to the large sample size of the corn and soybeans, accuracies in other land features are not as good. Small misclassifications in the soybean or corn areas can create larger inaccuracies in other classes. The following table shows the image readings and ground truth readings, and the accuracies calculated.

Image	Alfalfa	Corn	Grass	Soybean	Trees	Urban	Water	Total	Accuracy
Alfalfa	66	-	3	20	1	-	-	90	73.33333333
Corn	12	19291	209	379	17	-	10	19918	96.85209358
Grass	50	97	472	93	104	4	46	866	54.5034642
Soybean	136	66	63	14429	14	14	1	14723	98.00312436
Trees	18	100	45	72	77	-	63	375	20.53333333
Urban	3	2	7	20	1	2	0	35	5.714285714
Water	-	7	5	1	6	-	56	75	74.66666667
Total	285	19563	804	15014	220	20	176		
Accuracy	23.15789474	98.6096202	58.70646766	96.10364	35	10	31.81818	36082	95.319

Accuracies on the right in the chart are based on the image being the correct class for the ground truth. For example, of 90 classified alfalfa pixels, 66 of them are in the ground truth data for alfalfa, for 73 percent accuracy. The accuracy at the bottom of the chart is the ground truth compared to the image. For example, of the 285 pixels that were deemed to be alfalfa on the ground, only 66 of them were classified by Landsat Thematic Mapper (TM) to be alfalfa, while 136 of them were classified as soybean.

3 DATA ACQUISITION AND PROCESSING

3.1 Data Acquisition Methods

The land use classification data were derived from Landsat TM imagery and ground truth data. Landsat TM data were collected for three dates: 14 May, 1 July, and 17 July 2002. Data were used from Path 26, Row 30 and the southern portion of Path 26, Row 31, to cover the SMEX02 area. Ground truth data was collected on two separate trips in June and July 2002.

3.2 Derivation Techniques and Algorithms

3.2.1 Processing Steps

The Landsat TM data was imported into ERDAS software for processing and classification. The land use classification image was registered to the road network provided by the Iowa Department of Transportation. The road network was converted into an image that showed each road as 60 meters wide. This image was embedded onto the classified image to remove the speckle along the roadways and to improve the image quality.

4 REFERENCES AND RELATED PUBLICATIONS

Please [see the SMEX02 Web site](#) for more information.

Dobson, M. C. and Ulaby, F. T. 1998. Mapping soil moisture distribution with imaging radar. In *Principles & application of imaging radar*, Henderson, F. M. and Lewis, A. J., 407- 430, New York: John Wiley & Sons.

5 CONTACTS AND ACKNOWLEDGMENTS

Paul C. Doraiswamy

US Department of Agriculture (USDA) Hydrology and Remote Sensing Lab

Beltsville, MD

USA

Alan J. Stern

US Department of Agriculture (USDA) Hydrology and Remote Sensing Lab

Beltsville, MD

USA

Acknowledgments:

The investigators thank the Soil Moisture Experiment 2002 Science Team, the National Soil Tilth Laboratory, the National Aeronautics and Space Administration (NASA), NASA Aqua AMSR Terrestrial Hydrology and Global Water Cycle Programs, and all those who collected and analyzed the data, including: Rogier Van der Velde, Ann Hsu, and Laura Kimes. They also want to thank the many graduate students and volunteers who collected field photographs.

6 DOCUMENT INFORMATION

6.1 Publication Date

November 2005

6.2 Date Last Updated

21 April 2021