SMAPVEX08 Land Cover Classification Map, Version 1

USER GUIDE

How to Cite These Data

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

Cosh, M. 2015. *SMAPVEX08 Land Cover Classification Map, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. https://doi.org/10.5067/CPB005XLAIIG. [Date Accessed].

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

FOR CURRENT INFORMATION, VISIT https://nsidc.org/data/SV08LC

National Snow and Ice Data Center

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1 DETAILED DATA DESCRIPTION

This data set consists of land cover classification data derived from satellite imagery and of data obtained in the field as part of the Soil Moisture Active Passive Validation Experiment 2008 (SMAPVEX08). Images from the ResourceSat-1/IRS-P6 AWiFS and SPOT HRV of the Maryland study area were retrieved for the summer of 2008 and classified using in situ data collected by sampling teams in the fall of 2008. The land use classification image provides information about vegetation present in the study area at a resolution of 10 m.

1.1 Format

Data are provided in a binary file and a header file called ENVI FST, which indicates it is an Environment for Visualizing Images "dbFast" data file. An associated Extensible Markup Language (XML) metadata file is also provided.

Number of rows: 7956
Number of columns: 8885
Number of bands: 1
File layout: BSQ
Upper left corner in east-west direction: 375325
Upper left corner in north-south direction: 4361460
Pixel size in east-west direction: 10 m
Pixel size in north-south direction: 10 m
UTM zone: 18 N (WGS84)

1.2 File and Directory Structure

Data files are available at:

https://n5eil01u.ecs.nsidc.org/SMAP_VAL/SV08LC.001/

1.3 File Naming Convention

The binary data file is named SV08LC_SMAPVEX08_Class.fst. The header file is SV08LC_SMAPVEX08_Class.hdr.

“Class” in the file names indicates that these are land cover classification files.

1.4 File Size

The data file is approximately 68 MB.

1.5 Spatial Coverage

Southernmost Latitude: 38.8°N
Northernmost Latitude: 39.1°N
Westernmost Longitude: 76.3°W
Easternmost Longitude: 75.6°W

1.5.1 Spatial Resolution

10 m

1.5.2 Projection

UTM 18 N (WGS84)

1.5.3 Grid Description

Data are on a rectangular grid with a cell size of 10 m by 10 m.

Upper left corner in east-west direction: 375325
Upper left corner in north-south direction: 4361460
Number of rows: 7956
Number of columns: 8885

1.6 Temporal Coverage and Resolution

Satellite images were obtained for June and August 2008; in situ data were collected over several days in October 2008. All data were combined into a single map.

1.7 Parameter or Variable

1.7.1 Parameter Description

The measured parameter for this data set is land cover classification. Land cover classification distinguishes between crop types, water, roads, and urban areas. The land cover classes are designated as follows:

0 Unclassified

1 Corn/Corn Stubble

2 Forest

3 Soybeans

4 Water

5 Grassland

6 Urban/Roads

1.7.2 Parameter Range

Valid parameter values are specified as follows:

Land cover class: 1–6

Unclassified: 0

2 SOFTWARE AND TOOLS

Various software packages can be used to read the data, such as the Environment for Visualizing Images (ENVI) and Interactive Data Language (IDL).

3 DATA ACQUISITION AND PROCESSING

3.1 Processing Steps

Two scenes were used to construct the land cover classification for SMAPVEX08 on the Delmarva Peninsula. The following steps outline the procedure used to produce this image:

1. Ground truth data in and around Ruthsburg, Maryland were collected.
2. Ground truth data were converted to regions of interest (ROIs) within ENVI and one third were set aside for verification purposes.
3. ResourceSat-1/IRS-P6 AWiFS data for 19 June 2008 and SPOT imagery for 20 August 2008 were collected and imported to IDL/ENVI and geo-registered.
4. The amount of clouds present was small enough in the study region so that cloud masking became unnecessary.
5. Within IDL/ENVI, a supervised Mahalanobis Distance classification was conducted with a variety of maximum distances per land cover type:
    a. Corn/Corn Stubble: 10 DN
    b. Forest: 8 DN
    c. Soybeans: 15 DN
    d. Water: 8 DN
    e. Grassland: 10 DN
6. A classification image was generated and a confusion matrix calculated.

7. Accuracies were calculated using a set of ROIs that were set aside for verification. Overall accuracy is 99.88 percent. The Kappa Coefficient is 0.9919. Table 1 lists accuracies by land cover type:

Table 1. Accuracies by Land Cover Type

—	Corn	Forest	Soybean	Water	Grassland	Ground Truth
Unclassified				0.01		0.01
Corn	97.18		3.76			0.99
Forest		100			0.25	5.99
Soybean	2.81		93.41	0.02	0.25	0.83
Water			0.14	99.96		92.07
Grassland	0.02		2.69		99.49	0.12
Total	100	100	100	100	100	100

8. A road network from USGS was overlaid on the land cover image with a swath-width of approximately 30 m per centerline.
9. A road network from USGS was overlaid on the land cover image with a swath-width of approximately 30 m per centerline.
10. A road network from USGS was overlaid on the land cover image with a swath-width of approximately 30 m per centerline.

3.2 Errors and Limitations

The usage of two scenes, both acquired before the campaign, causes additional error to the classification. As such, the classification quality is not high.

4 VERSION HISTORY

Version 1 (June 2015)

5 CONTACTS AND ACKNOWLEDGMENTS

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6 DOCUMENT INFORMATION

6.1 Publication Date

June 2015

6.2 Date Last Updated

October 2020