SMAPVEX12 Surface Roughness Data for Forest Area, Version 1

USER GUIDE

How to Cite These Data

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

Magagi, R. 2014. *SMAPVEX12 Surface Roughness Data for Forest Area, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. https://doi.org/10.5067/0OCZDB099FWR. [Date Accessed].

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

FOR CURRENT INFORMATION, VISIT https://nsidc.org/data/SV12SRF

National Snow and Ice Data Center

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1 DATA DESCRIPTION

This data set contains surface roughness data collected at several forested sites as part of the Soil Moisture Active Passive Validation Experiment 2012 (SMAPVEX12). Measurements were taken within each SMAPVEX12 forest site in the look directions of three Synthetic Aperture Radar (SAR) sensors: RADARSAT-2 (descending mode), UAVSAR, and PALS.

1.1 Parameters

Parameters in this data set include surface height variation, represented by the root mean square (RMS) in centimeters, and surface correlation length, also given in centimeters. Valid ranges for height variation are 0 - 3.21 cm and for correlation length are 0 - 30 cm. Missing data are represented by N/A.

1.2 File Information

1.2.1 Format and File Contents

Data are provided in an Excel file (`SV12SRF_SMAPVEX12_Forest_Soil_Roughness_20130418.xls`). See Table 1 for descriptions of the column headings and contents. Also provided is a text file (`SV12SRF_Field_Sites_ver4_coords.txt`) containing the UTM coordinates of the each sampling point (see Table 2).

Table 1. Data Column Descriptions for SV12SRF_SMAPVEX12_Forest_Soil_Roughness_20130418.xls

Column Heading	Description
Site_ID	ID of the field and the sample point within the field
UAV_Angle	Azimuth angle (from north) of the UAVSAR observation
UAV_RMS_Height	Surface height variation (RMS) in the look direction of UAVSAR
UAV_Corr_Length	Surface correlation length in the look direction of UAVSAR
PALS_Angle	Azimuth angle (from north) of the PALS observation
PALS_RMS_Height	Surface height variation (RMS) in the look direction of PALS
PALS_Corr_Length	Surface correlation length in the look direction of PALS
R2_Angle	Azimuth angle (from north) of the RADARSAT2 observation
R2_RMS_Height	Surface height variation (RMS) in the look direction of RADARSAT2
R2_Corr_Length	Surface correlation length in the look direction of RADARSAT2

Table 2. Data Column Descriptions for SV12SRF_Field_Sites_ver4_coords.txt

Column Heading	Description
OBJECTID	ID of the data record
Site_ID	ID of the field and the sample point within the field
X	UTM easting coordinate (meters)
Y	UTM northing coordinate (meters)

1.3 Spatial Information

1.3.1 Coverage

Southernmost Latitude: 49.44°N

Northernmost Latitude: 49.96°N

Westernmost Longitude: 98.51°W

Easternmost Longitude: 97.85°W

1.3.2 Resolution

The roughness measurements were taken over a 3 m profile.

1.3.3 Geolocation

Data are provided in Universal Transverse Mercator (UTM), Zone 14 N, World Geodetic System 1984 (WGS84) coordinates.

1.4 Temporal Information

1.4.1 Coverage and Resolution

Photographs were acquired once at each site during the campaign, from 07 June through 19 July 2012.

2 DATA ACQUISITION AND PROCESSING

2.1 Acquisition

The surface roughness measurements were made in the look directions of RADARSAT-2 (descending mode), UAVSAR, and PALS:

UAVSAR Angle = 226
PALS Angle = 180
RADARSAT2 Angle = 282

At each location, the surface roughness was measured using a digital camera and a 1 m long pin profiler consisting of 200 needles spaced from an interval of 5 mm. To adequately measure the correlation length, the roughness measurements were taken over a 3 m profile created by placing the one meter profiler end to end in the look direction of each SAR sensor. A digital camera recorded the pin meter profiles.

For each SAR sensor and at each location, the photographs of the three separate profiles were joined into a single profile using a MATLAB application, post data collection, to provide the two roughness parameters: the standard deviation of surface heights (or the RMS heights) and the correlation lengths. Due to shadow, poor quality pictures were collected over some sites. Despite a second revisit, these conditions led to no data over these sites in some directions.

See more details in sections 1.2 and 2.2.2 of the SMAPVEX12 Database Report.

2.2 Quality, Errors, and Limitations

A source of uncertainty inherent to the technique used comes from human error in placing the measurement equipment in the field for the measurements. The surface type and understory in the forest add to this error. Due to shadows in the forest, the quality of the pictures collected at some sites were poor. Despite a second revisit, these conditions led to no data over these sites in some directions, and for the second location at site F5.

Due to the measurements conditions in the forest, the data may have larger uncertainties than the roughness measurements carried out at agricultural fields.

3 SOFTWARE AND TOOLS

No special tools are required to read these data. A spreadsheet program such as Microsoft Excel is recommended for the data file, while any text editor or Web browser will display the geolocation file.

4 CONTACTS AND ACKNOWLEDGMENTS

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5 REFERENCES

McNairn, H., T. Jackson, G. Wiseman, S. Belair, A. Berg, P. Bullock, A. Colliander, M. Cosh, S. Kim, R. Magagi, M. Moghaddam, J. Adams, S. Homayouni, E. Ojo, T. Rowlandson, J. Shang, K. Goita, and M. Hosseini. 2013, In Review. The Soil Moisture Active Passive Validation Experiment 2012 (SMAPVEX12): Pre-Launch Calibration and Validation of the SMAP Satellite. *IEEE Trans. Geosci. Rem. Sens.*

6 DOCUMENT INFORMATION

6.1 Publication Date

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6.2 Date Last Updated

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