



SMAPVEX12 Surface Roughness Data for Agricultural Area, Version 1

USER GUIDE

How to Cite These Data

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

McNairn, H., J. Powers, and G. Wiseman. 2014. *SMAPVEX12 Surface Roughness Data for Agricultural 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/QB4JHGKXH16O>. [Date Accessed].

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

FOR CURRENT INFORMATION, VISIT <https://nsidc.org/data/SV12SRA>



National Snow and Ice Data Center

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1 DATA DESCRIPTION

This data set contains surface roughness data collected at several agricultural sites as a part of the Soil Moisture Active Passive Validation Experiment 2012 (SMAPVEX12). Measurements were taken at two locations within each SMAPVEX12 field 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 cm and for correlation length are 0 - 30 cm.

1.2 File Information

1.2.1 Format and File Contents

Data are provided in the following ASCII text files:

- SV12SRA_Soil_Roughness_ver4.txt contains the surface roughness data.
- Field_Sites_ver4_coords.txt contains the UTM coordinates for the sampling points.

Table 1 describes the sampling data columns of the data file, while Table 2 describes the columns of the geolocation file.

Table 1. Data Fields and Descriptions for SV12SRA_Soil_Roughness_ver4.txt

Column Heading	Description
OBJECTID	ID of the sample
Site_ID	ID of the field and the sample point within the field
UAV_Height	Surface height variation (RMS) in the look direction of UAVSAR
UAV_Cor_L	Surface correlation length in the look direction of UAVSAR
PALS_Height	Surface height variation (RMS) in the look direction of PALS
PALS_Cor_L	Surface correlation length in the look direction of PALS
R2_Height	Surface height variation (RMS) in the look direction of RADARSAT2
R2_Cor_L	Surface correlation length in the look direction of RADARSAT2

Table 2. Data Column Descriptions for 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

Eastermost Longitude: 97.85°W

1.3.2 Resolution

A one-meter grid board was used for in situ measurements.

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 at each site one time from 07 June through 19 July 2012.

2 DATA ACQUISITION AND PROCESSING

2.1 Acquisition

Surface roughness was measured using a digital camera and a 1-m long pin profilometer consisting of 200 needles spaced from an interval of 5 mm. Three end-to-end images were captured to create a 3-m profile. 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.

UAVSAR Angle = 226

PALS Angle = 180

RADARSAT2 Angle = 282

NULL values in the table are due to their bad quality, few pictures were not processed or the software fails to estimate the correlation length.

See more details in sections 1.1 and 2.1.2 of the [SMAPVEX12 Database Report](#), released 18 December 2012.

2.2 Quality, Errors, and Limitations

Human error in placing the measurement equipment in the field for the measurements. See more details in sections 2.1.2 of the [SMAPVEX12 Database Report](#), released 18 December 2012.

The roughness parameters are probably the most unreliable parameter in the process of soil moisture retrieval using microwave remote sensing. The first problem is that the scattering characteristics of natural surfaces are very complex and are still not completely understood; this makes validation of measured roughness parameters very difficult.

The quality of the data corresponds to the quality of the roughness measurements carried out in similar soil moisture field experiments. See more details in sections 2.1.2 of the [SMAPVEX12 Database Report](#), released 18 December 2012.

3 SOFTWARE AND TOOLS

No special tools are required to read these data. Any text editor or Web browser will display the ASCII text files.

4 CONTACTS AND ACKNOWLEDGMENTS

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5 REFERENCES

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6 DOCUMENT INFORMATION

6.1 Publication Date

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6.2 Date Last Updated

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