SMAPVEX16 Manitoba Surface Roughness Data, Version 1

USER GUIDE

How to Cite These Data

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

McNairn, H., K. Gottfried, and J. Powers. 2018. *SMAPVEX16 Manitoba Surface Roughness Data, Version 1.* [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. https://doi.org/10.5067/C18GQDVVRHOY. [Date Accessed].

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

FOR CURRENT INFORMATION, VISIT https://nsidc.org/data/SV16M_SR

National Snow and Ice Data Center

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1 DATA DESCRIPTION

1.1 Parameters

The main parameters of this data set are surface root mean square (RMS) height and correlation length.

1.2 File Information

1.2.1 Format

Data are available in a single Comma Separated Values (.csv) file.

Location information for the relevant field sites are available in a Keyhole Markup language zipped (.kmz) file.

Extensible Markup Language (.xml) files with associated metadata are also provided.

1.2.2 File Contents

Table 1. File Contents

Column Header	Description
SITE_ID	Unique ID of the field site where sampling occurred. Each field had 16 possible sample locations.
PALS_HEIGHT	The average RMS height (cm), measured in the look direction of the Passive Active L- and S-band Sensor (PALS)
PALS_COR_L	Correlation length (cm), measured in the look direction of PALS
R2_HEIGHT	RMS height (cm), measured in the look direction of RADARSAT-2
R2_COR_L	Correlation length (cm), measured in the look direction of RADARSAT-2

1.2.3 Naming Convention

SV16M_SR_SoilRoughness_Vers3.csv
SV16M_SR_FieldSites.kmz

SV16M_SR is short for SMAPVEX16 (Soil Moisture Active Passive Validation Experiment 2016) Manitoba Surface Roughness Data.

1.2.4 File size

The CSV file is approximately 2.6 KB.

The KMZ file is approximately 29 KB.

1.3 Spatial Information

1.3.1 Coverage

Northernmost Latitude: 49.761171° N
Southernmost Latitude: 49.384076° N
Easternmost Longitude: 97.756264° W
Westernmost Longitude: 98.098417° W

1.3.2 Resolution

Data are point measurements. The distance between measurements varies.

1.3.3 Geolocation

Table 2 provides information on the appropriate coordinate reference system for this data set.

Table 2. Coordinate Reference System

Geographic coordinate system	NAD83(CSRS)
Projected coordinate system	NAD83(CSRS) / UTM Zone 14N
Longitude of true origin	-99
Latitude of true origin	0
Scale factor at longitude of true origin	0.9996
Datum	NAD83 Canadian Spatial Reference System
Ellipsoid/spheroid	GRS 1980
Units	meter
False easting	500000
False northing	0
EPSG code	3158
PROJ4 string	+proj=utm +zone=14 +ellps=GRS80 +towgs84=0,0,0,0,0,0,0 +units=m +no_defs
Reference	https://epsg.io/3158

1.4 Temporal Information

1.4.1 Coverage

June 10 2016 through June 15 2016

1.4.2 Resolution

Sites were sampled only once.

2 DATA ACQUISITION AND PROCESSING

2.1 Background

This data set was collected as part of the 2016 Soil Moisture Active Passive Validation Experiment conducted in the Carman/Elm Creek region of Manitoba, Canada. The experiment was designed to calibrate and increase the accuracy of NASA's Soil Moisture Active Passive (SMAP) products. For this data set, soil surface roughness measurements were collected to coincide with SMAP satellite overpasses and Passive Active L- and S-band Sensor (PALS) flights.

2.2 Acquisition

Soil surface roughness measurements were taken at 50 agricultural fields. Though each field had a total of 16 sampling locations, data were only collected at Sites 1 and 2. Prior to the campaign, the location of each sample site was determined in ArcGIS. During the campaign, sites were identified using Garmin GPS units. The accuracy of each GPS unit was approximately 3 m.

At each location, soil surface roughness was measured using a digital camera and a custom, portable pin profilometer. To construct the profilometer, 200 metal pins with red tips were spaced 5 mm apart along a 1 m long white board; the board was supported by a pair of legs and had a mechanism to release the pins. Pins were spaced five millimeters apart. Figure 1 shows the profilometer in use. A retractable metal bar, attached to the white board, supported a digital camera which was used to take pictures of the roughness profiles. Figure 2 shows the digital camera in use alongside the profilometer. Vegetation was removed or flattened if it interfered with the roughness measurements or the photograph.

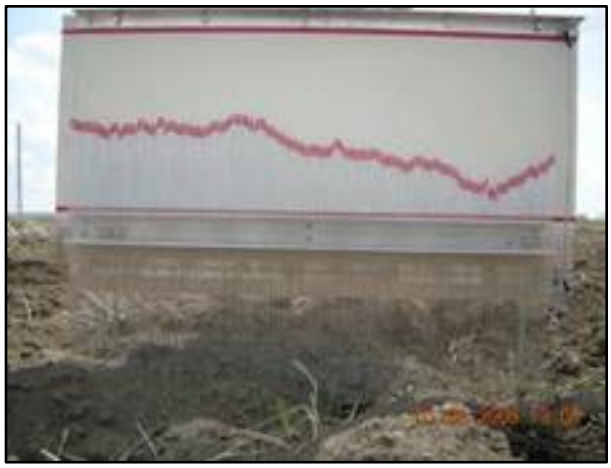

Figure 1. Portable Pin Profilometer

Figure 2. Digital Camera and Profilometer

Three profilometer measurements were taken at each site, for a total profile length of three meters. The profilometer was moved between measurements so that the end of the one measurement became the start of the next measurement. All measurements were collected in the same look direction as the two Synthetic Aperature Radar (SAR) sensors, RADARSAT-2 (descending mode) and PALS. For the PALS flight, the look direction is approximately 90 degrees. For the RADARSAT2 (descending mode), the look direction is approximately 282 degrees.

2.3 Processing

For each site, photographs of the three profilometer measurements were joined into a single profile using MATLAB. Using this extended profile, the average RMS height and the correlation length were calculated for each SAR sensor (RADARSAT-2 and PALS).

3 SOFTWARE AND TOOLS

Data were post-processed in MATLAB. MATLAB is a computing software and proprietary programming language developed by MathWorks. More details about the software and language can be found on the MathWorks website.

4 RELATED DATA SETS

SMAP Data | Overview

5 RELATED WEBSITES

SMAP at the NASA Jet Propulsion Laboratory

SMAPVEX16 at the NASA Jet Propulsion Laboratory

6 CONTACTS AND ACKNOWLEDGMENTS

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7 DOCUMENT INFORMATION

7.1 Publication Date

14 August 2018

7.2 Date Last Updated

27 August 2018