



SMAPVEX12 Probe-Based In Situ Soil Moisture 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:

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

FOR CURRENT INFORMATION, VISIT <https://nsidc.org/data/SV12PSMA/>



National Snow and Ice Data Center

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1 DATA DESCRIPTION

This data set is comprised of in situ measurements for the Soil Moisture Active Passive Validation Experiment 2012 (SMAPVEX2012). The study site was divided into regional squares, approximately 800 m by 800 m in size, with several sample point locations.

1.1 Parameters

Parameters in this data set include volumetric soil moisture and real part of the dielectric constant. Table 1 describes the units of measurement and sources of each parameter.

Table 1. Parameter Units and Sensors

| Parameter | Unit of Measurement | Sensor | Valid range |
|--------------------------------------|---|------------------------|-------------|
| Volumetric soil moisture | Water Fraction Volume (m ³ /m ³) | Theta and Hydra Probes | 0 - 60% |
| Real part of the dielectric constant | Unitless | Theta and Hydra Probes | 0 - 110 |

1.2 File Information

1.2.1 Format and File Contents

Data are provided in ASCII text files.

SV12PSMA_Soil_Moisture_Handheld_ver4.txt contains the soil moisture data from ground sampling.

SV12PSMA_Field_Sites_ver4_coords.txt contains the UTM coordinates for the sampling points.

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

Table 2. Data Fields and Descriptions

| Column Heading | Description |
|----------------------|---|
| OBJECT_ID | ID of the sample |
| Sample_Date | 2-digit month/2-digit day/4-digit year |
| Sample Time | 2-digit hour:2-digit minute:2-digit second |
| Site_ID | ID of the field and the sample point within the field |
| Soil_Moisture_Cal | Calibrated volumetric soil moisture in m ³ /m ³ |
| Soil_Real_Dielectric | Real part of the dielectric constant measured by the probe |
| Source | Identifies the type of the probe used (either Hydra or Theta probe) |
| Calibration | Identifies whether general or field specific calibration was applied |
| Comments | Any remarks regarding the sample |

Missing data are represented by a blank [], and by -9999 for soil moisture and real part of the dielectric constant.

Table 3. Data Fields and Description

| 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

Sampling was performed on sites approximately one quarter section (0.8 km by 0.8 km) in size.

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

Measurements were taken every one to five days from 07 June 2012 through 19 July 2012.

2 DATA ACQUISITION AND PROCESSING

2.1 Acquisition

2.1.1 Section Sampling

Sampling was performed on sites approximately one quarter section (800 m by 800 m) in size. Three soil moisture samples were taken at 16 locations in a field. See more details in sections 1.1 and 2.1.1 of the [SMAPVEX12 Database Report](#), released 18 December 2012.

2.2 Instrumentation

Investigators used Stevens Hydra Probe II and Delta-T Devices ThetaProbe to measure surface volumetric soil moisture.

2.2.1 Hydra Probes

[Hydra Probes](#) are based on coaxial impedance dielectric reflectometry. The probes were connected to a PDA. They use an oscillator to generate an electromagnetic signal at 50 MHz that is propagated through three metal tines into the soil. The part of the signal that is reflected back to the unit is measured in volts and is used to numerically solve Maxwell's equations, to calculate the impedance and the real and imaginary dielectric permittivity.

2.2.2 Theta Probes

The [Theta Probes](#) have 4 separate 6-cm stainless steel rods inserted vertically into the soil. Each instrument was connected to a handheld reader, which delivers the electrical pulse, detects the return signal, and converts the period to a voltage between 0 V and about 1 V.

See the [SMAPVEX12 Hydra and Theta Probe Calibration](#) document, released 19 December 2012.

3 SOFTWARE AND TOOLS

No special tools are required to view these data. A spreadsheet program which recognizes tab-delimited text files, such as Microsoft Excel, is recommended. Any word-processing program or Web browser will also display the data.

4 CONTACTS AND ACKNOWLEDGMENTS

Grant Wiseman

Science and Technology Branch
Agriculture and Agri-Food Canada
200-303 Main Street
Winnipeg, MB R3C 3G7, Canada
e-mail: grant.wiseman@agr.gc.ca
phone: +1 204.259.4006

Paul Bullock

Department of Soil Science
University of Manitoba
13 Freedman Crescent
Winnipeg, Manitoba R3T 2N2, Canada
e-mail: paul.bullock@ad.umanitoba.ca
phone: +1 204.474.8666

Aaron Berg

Department of Geography
University of Guelph
Guelph, ON, N1G 2W1, Canada
e-mail: aberg@uoguelph.ca
phone: +1 519.824.4120

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4.1.1 Field Sampling Team

Aaron Berg, University of Guelph
Alan Rich, University of Manitoba
Alicia Joseph, NASA GSFC
Alexandra Konings, MIT
Amine Merzouki, Agriculture and Agri-Food Canada
Bin Fang, U.S. Carolina
Brandon Wyrha, Agriculture and Agri-Food Canada
Brian Miller, University of Manitoba
Catherine Champagne, Agriculture and Agri-Food Canada
Craig Smith, Environment Canada
Christina Neva Rivera, Agriculture and Agri-Food Canada
Dominik Schneider, University of Colorado
Erika Podest, JPL
Erle Einarsson, Agriculture and Agri-Food Canada
Evan Rodgers, Agriculture and Agri-Food Canada
Grant Wiseman, Agriculture and Agri-Food Canada
Greg Gibbons, Agriculture and Agri-Food Canada
Heather McNairn, Agriculture and Agri-Food Canada
Hida Manns, University of Guelph
Hoda Jafarian, University of Sherbrooke
Jacqueline Freeman, Agriculture and Agri-Food Canada
Jeff Ouellette, Ohio State
Jennifer Watts, University of Montana
Jiali Shang, Agriculture and Agri-Food Canada
John Fitzmaurice, Agriculture and Agri-Food Canada
Jon Belanger, University of Guelph
Justin Adams, University of Guelph
Kalifa Goïta, University of Sherbrooke
Karel Janik, University of Sherbrooke
Kaighin McColl, MIT
Kurt Gottfried, Agriculture and Agri-Food Canada
Luis Perez, FIU - Florida International University
Marco Carrera, Environment Canada, Meteorological Research Division
Maria Abrahamowicz, Environment Canada

Mariko Burgin, University of Southern California
Maheshwari Neelman, Texas A&M
Matt Jones, University of Montana
Mehdi Hosseini, University of Sherbrooke
Mike Cosh, USDA, ARS Hydrology and Remote Sensing Laboratory
Mustafa Aksoy, Ohio State
Najib Djamai, University of Sherbrooke
Nandita Gaur, Texas A&M
Narendra Das, JPL
Parag Narvekar, MIT
Parinaz Rahimzadeh, University of Guelph
Patrick Rollin, Agriculture and Agri-Food Canada
Paul Bullock, University of Manitoba
Peggy O'Neill, NASA GSFC
Rachel Molloy, Agriculture and Agri-Food Canada
Rebecca Warren, University of Guelph
Rebecca Scriver, University of Guelph
Ramata Magagi, University of Sherbrooke
Robert Terwilleger, University of Florida
Rotimi Ojo, University of Manitoba
Ruzbeh Akbar, University of Southern California
Sab Kim, JPL
Sarah Banks, Agriculture and Agri-Food Canada
Sarah Dyck, Environment Canada
Saeid Homayouni, Agriculture and Agri-Food Canada
Shawna McKnight, Georgia Institute of Technology
Sonia Becenko, Agriculture and Agri-Food Canada
Stacie Westervelt, University of Manitoba
Steven Chan, JPL
Syed Anwar, Agriculture and Agri-Food Canada
Tien-Hoa Liao, University of Washington
Tracy Rowlandson, University of Guelph
Vanessa Escobar, NASA GSFC

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6 DOCUMENT INFORMATION

6.1 Publication Date

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