ISO 19131 SMAPVEX16-MB POGO Soil Moisture Dataset – Data Product Specifications

Revision: A

Data product specifications: SMAPVEX16-MB POGO Soil Moisture Dataset

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Data product specifications: SMAPVEX16-MB POGO Soil Moisture Dataset / Spécifications de contenu informationnel

1. Overview

1.1. Informal description

The Soil Moisture Active/Passive Validation Experiment 2016-Manitoba (SMAPVEX16-MB) was conducted in the Carman/Elm Creek region. The purpose of the experiment was to collect a variety of ground measurements with coincident remotely-sensed data to calibrate and increase the accuracy of the National Aeronautics and Space Administration (NASA)'s Soil Moisture Active/Passive (SMAP) soil moisture products.

This dataset contains soil moisture data that was collected for the SMAPVEX16-MB experiment. Soil moisture measurements were taken from 50 agricultural fields and 2 radiometer sites within the study area. Sites were sampled on 7 dates during Phase 1 of the campaign and 6 dates during Phase 2 of the campaign. Samples that were taken during Phase 1 and Phase 2 were taken during SMAP satellite overpasses and Passive Active L- and S-band Sensor (PALS) flight days.

A Stevens Poke and Go (POGO) sensor was used to record soil real dielectric constant (RDC) values at 16 sites in each of the sample fields. 3 measurements were made at each site (top, middle and bottom of the furrow). In addition, 3 measurements were made around the core samples at Site 1 and at 1 of the other pre-determined Sites (2-16) during each sampling date for a total of 54 measurements per field. Volumetric water content (VWC) was derived from the RDC values using field specific calibration equations that were developed from the core soil moisture values and corresponding RDC measurements.

All data has been quality controlled and any erroneous records have been removed.

1.2. Data product specification - metadata

This section provides metadata about the creation of this data product specification

Data product specification – title:	SMAPVEX16-MB POGO Soil Moisture Dataset
Data product specification - reference date:	June 8, 2016 to July 10, 2016
Data product specification - responsible party:	AAFC STB
Data product specification – language:	English
Data product specification - topic category:	geoscientificInformation

1.3. Terms and definitions

- Feature attribute
  characteristic of a feature

- Class
  description of a set of objects that share the same attributes, operations, methods, relationships, and semantics [UML Semantics]
  NOTE: A class does not always have an associated geometry (e.g. the metadata class).

- Feature
  abstraction of real world phenomena

- Object
  entity with a well-defined boundary and identity that encapsulates state and behaviour [UML Semantics]
  NOTE: An object is an instance of a class.

- Package
  grouping of a set of classes, relationships, and even other packages with a view to organizing the model into more abstract structures

1.4. Abbreviations

AAFC	Agriculture and Agri-Food Canada
GPS	Global Positioning System
PALS	Passive Active L- and S-band Sensor
POGO	Poke and Go
RDC	Real Dielectric Constant
SMAP	Soil Moisture Active/Passive
SMAPVEX16-MB	Soil Moisture Active/Passive Validation Experiment 2016-Manitoba
STB	Science and Technology Branch
VWC	Volumetric Water Content

2. SPECIFICATION SCOPE

This data specification has only one scope, the general scope.

NOTE: The term ‘specification scope’ originates from the International Standard ISO19131. ‘Specification scope’ does not express the purpose for the creation of a data specification or the potential use of data, but identifies partitions of the data specification where specific requirements apply.

3. DATA PRODUCT IDENTIFICATION

3.1. Data series identification

Title	SMAPVEX16-MB POGO Soil Moisture Dataset
Alternate Title	SMAPVEX16-MB Handheld Soil Moisture Data
Abstract	SMAPVEX16-MB was conducted to assess and increase the overall accuracy of the soil moisture retrievals produced using the SMAP satellite. The POGO was used to collect RDC values at 16 sites within each of the sampling fields. 3 measurements were taken around the core sample as well as 1 other pre-determined site.
Purpose	This dataset is used to assess and increase the overall accuracy of the SMAP soil moisture product.
Topic Category	geoscientificInformation
Spatial Representation Type	textTable
Spatial Resolution	
Geographic Description	Carman/Elm Creek, Manitoba, Canada
Supplemental Information	Principle Investigators: Heather McNairn - Agriculture and Agri-Food Canada; Tom Jackson - United States Department of Agriculture; Co-Investigators(Canada): Amine Merzouki, Anna Pacheco, Jarrett Powers - Agriculture and Agri-Food Canada; Stephane Belair, Peter Toose - Environment and Climate Change Canada; Monique Bernier - Institut National de la Recherche Scientifique(INRS); Aaron Berg, Tracy Rowlandson - University of Guelph; Paul Bullock - University of Manitoba; RoTimi Ojo - Manitoba Agriculture; Alexandre Roy - University of Montreal; Ramata Magagi - University of Sherbrooke; Co-Investigators(United States): Alicia Joseph, Peggy O'Neill - NASA Goddard Space Flight Centre; Andreas Colliander, Sab Kim - NASA Jet Propulsion Lab; Mike Cosh - United States Department of Agriculture; Co-Investigators(International): Giuseppe Satalino - National Research Council of Italy (ISSIA-CNR)
Constraints	SMAPVEX16-MB field data will be placed on the University of Sherbrooke website. Access will be limited by password that will be provided to principle and co-investigators listed below. Principle and Co-Investigators are to ensure that staff, graduate students and post docs respect the terms of the agreement on usage and distribution. Access to the website will be restricted until August 1, 2017 for preliminary research and quality control. After August 1, 2017 all field data will be transferred to

	the National Snow and Ice Data Centre to be made publically available.
Keywords	SMAPVEX16-MB, soil moisture, POGO sensor, real dielectric constant, volumetric water content
Scope identification	series

3.2. Data product identification

3.2.1. SMAPVEX16-MB POGO Soil Moisture Dataset

Title	SMAPVEX16-MB POGO Soil Moisture Dataset
Alternate Title	SMAPVEX16-MB Handheld Soil Moisture Data
Abstract	This dataset includes RDC and soil moisture information recorded using the Stevens POGO device.
Purpose	SMAP produces global soil moisture products. This dataset is used to assess and increase the overall accuracy of the SMAP soil moisture product.
Topic Category	geoscientificInformation
Spatial Representation Type	textTable
Spatial Resolution	
Geographic Description	Carman/Elm Creek, Manitoba, Canada
Supplemental Information	Principle Investigators: Heather McNairn - Agriculture and Agri-Food Canada; Tom Jackson - United States Department of Agriculture; Co-Investigators(Canada): Amine Merzouki, Anna Pacheco, Jarrett Powers - Agriculture and Agri-Food Canada; Stephane Belair, Peter Toose - Environment and Climate Change Canada; Monique Bernier - Institut National de la Recherche Scientifique(INRS); Aaron Berg, Tracy Rowlandson - University of Guelph; Paul Bullock - University of Manitoba; RoTimi Ojo - Manitoba Agriculture; Alexandre Roy - University of Montreal; Ramata Magagi - University of Sherbrooke; Co-Investigators(United States): Alicia Joseph, Peggy O'Neill - NASA Goddard Space Flight Centre; Andreas Colliander, Sab Kim - NASA Jet Propulsion Lab; Mike Cosh - United States Department of Agriculture; Co-Investigators(International): Giuseppe Satalino - National Research Council of Italy (ISSIA-CNR)
Constraints	SMAPVEX16-MB field data will be placed on the University of Sherbrooke website. Access will be limited by password that will be provided to principle and co-investigators listed below. Principle and Co-Investigators are to ensure that staff, graduate

	students and post docs respect the terms of the agreement on usage and distribution. Access to the website will be restricted until August 1, 2017 for preliminary research and quality control. After August 1, 2017 all field data will be transferred to the National Snow and Ice Data Centre to be made publically available.
Keywords	SMAPVEX16-MB, soil moisture, POGO sensor, real dielectric constant, volumetric water content
Scope Identification	dataset
Feature Attribute Names	SITE_ID, TIMESTAMP, LOCATION, RDC, SOIL_MOISTURE

4. DATA CONTENT AND STRUCTURE

4.1. Feature-based application schema

Figure <#> - <Insert dataset title> UML Class Diagram

4.2. Feature catalogue – SMAPVEX16-MB POGO Soil Moisture Dataset

Title	SMAPVEX16-MB POGO Soil Moisture Feature Catalogue
Scope	series
Version Number	1
Version Date	December 15, 2016
Producer	AAFC

System-generated attributes (for example, OBJECTID, Shape, Shape Length and Area) are not defined in the feature catalog.

4.2.1. Feature attributes

4.2.1.1. SITE_ID

Name	Site Identification (SITE_ID)		
Definition	Unique ID to identify the site where sampling occurs. Each field has 16 sampling locations.		
Aliases	SITE_ID		
Producer	AAFC		
Value Data Type	String		
Value Domain Type	0 (not enumerated)		
Value Domain			
	Feature Attribute Value		
	Label	Code	Definition

4.2.1.2. TIMESTAMP

Name	Timestamp (TIMESTAMP)		
Definition	Time of sampling in Central Daylight Savings Time (YYYY-MM-DD HH:MM).		
Aliases	TIMESTAMP		
Producer	AAFC		
Value Data Type	Date and time		
Value Domain Type	0 (not enumerated)		
Value Domain			
	Feature Attribute Value		
	Label	Code	Definition

4.2.1.3. LOCATION

Name	Location (LOCATION)		
Definition	Insertion of the POGO in relationship to the planter/seeder furrow (either top, middle or bottom) or measurement around the soil core (calibration).		
Aliases	LOCATION		
Producer	AAFC		
Value Data Type	String		
Value Domain Type	0 (not enumerated)		
Value Domain			
	Feature Attribute Value		
	Label	Code	Definition

4.2.1.4. RDC

Name	Real Dielectric Constant (RDC)		
Definition	Real dielectric constant value measured by Stevens POGO at the 0-5cm depth.		
Aliases	RDC		
Producer	AAFC		
Value Data Type	Double		
Value Domain Type	0 (not enumerated)		
Value Domain			
	Feature Attribute Value		
	Label	Code	Definition

4.2.1.5. SOIL_MOISTURE

Name	Soil Moisture (SOIL_MOISTURE)		
Definition	Calibrated volumetric soil moisture value (cm3/cm3) measured by Stevens POGO at the 0-5cm depth.		
Aliases	SOIL_MOISTURE		
Producer	AAFC		
Value Data Type	Double		
Value Domain Type	0 (not enumerated)		
Value Domain			
	Feature Attribute Value		
	Label	Code	Definition

5. REFERENCE SYSTEMS

5.1. Spatial reference system

Not applicable.

5.2. Temporal reference system

Gregorian calendar

6. DATA QUALITY

6.1. Completeness

Measure not used at this time.

6.2. Logical consistency

Measure not used at this time.

6.3. Positional accuracy

Measure not used at this time.

6.4. Temporal accuracy

The location of each sample site was created using ArcGIS. These points were loaded onto handheld Garmin Global Positioning Systems (GPS) and were used to navigate to the site by field team members. The accuracy of the GPS device is within approximately 3m.

6.5. Thematic accuracy

Measure not used at this time.

6.6. Lineage statement

Lineage Statement	Soil moisture measurements were taken from 50 agricultural fields and 2 radiometer sites within the study area. Sites were sampled on 7 dates during Phase 1 of the campaign and 6 dates during Phase 2 of the campaign. Samples that were taken during Phase 1 and Phase 2 were taken during SMAP satellite overpasses and PALS flight days.
Scope	

7. DATA CAPTURE

A Stevens POGO sensor was used to record soil RDC values at 16 sites in each of the sample fields. 3 measurements were made at each site (top, middle and bottom of the furrow). In addition, 3 measurements were made around the core samples at Site 1 and at 1 of the other pre-determined Sites (2-16) during each sampling date for a total of 54 measurements per field. VWC was derived from the RDC values using field specific calibration equations that were developed from the core soil moisture values and corresponding RDC measurements.

All data has been quality controlled and any erroneous records have been removed.

8. DATA MAINTENANCE

Unknown.

9. PORTRAYAL

Not applicable.

10. DATA PRODUCT DELIVERY

Csv
Format name : Comma Delimited
Format version: 1.0
Specification: A delimited data format that has fields/columns separated by the comma character.
Languages: eng
Character set: utf8

11. METADATA

Not applicable.