ISO 19131 SMAPVEX16-MB CropScan Dataset – Data Product Specifications

Revision: A

Data product specifications: SMAPVEX16-MB CropScan Dataset

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Data product specifications: SMAPVEX16-MB CropScan 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 table contains data collected using CropScan for the SMAPVEX16-MB experiment. Multispectral radiometers (NIR bands of 470-1640nm) were utilized to measure reflected solar radiation from the crop canopy. The radiometer has both upward- and downward-facing sensors, which capture both incoming solar radiation to the sensor and energy reflected from the canopy.

CropScan data will only be collected on the first vegetation sample site (site 2 or 3 depending on the week) in each field. The measurements will be taken at approximately the same points at which the LAI photos are captured. This will yield 14 measurements (7 in each of two rows) for one vegetation site in each field.

All records with irradiance values of <300 have been removed as part of the quality control process.

1.2. Data product specification - metadata

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

Data product specification – title:	SMAPVEX16-MB CropScan Dataset
Data product specification - reference date:	June 13 – July 12, 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
NASA	National Aeronautics and Space Administration
SMAP	Soil Moisture Active/Passive
SMAPVEX16-MB	Soil Moisture Active/Passive Validation Experiment 2016-Manitoba
STB	Science and Technology Branch

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 CropScan Dataset
Alternate Title	SMAPVEX16-MB CropScan Data
Abstract	SMAPVEX16-MB was conducted to assess and increase the overall accuracy of the soil moisture retrievals produced using the SMAP satellite. CropScan data was collected to measure the reflected solar radiation from the crop canopy.
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, CropScan, irradiance, multispectral, radiometer, wavelength
Scope identification	series

3.2. Data product identification

3.2.1. SMAPVEX16-MB CropScan Dataset

Title	SMAPVEX16-MB CropScan Dataset
Alternate Title	SMAPVEX16-MB CropScan Data
Abstract	This dataset contains data collected using CropScan to measure reflected solar radiation from

	the crop canopy.
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)
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Keywords	SMAPVEX16-MB, CropScan, irradiance, multispectral, radiometer, wavelength
Scope Identification	dataset
Feature Attribute Names	SITE_ID, TIMESTAMP, ANGLE, IRRADIANCE, READING_470, READING_550, READING_650, READING_710, READING_850, READING_970, READING_1240, READING_1640

4. DATA CONTENT AND STRUCTURE

4.1. Feature-based application schema

N/A

4.2. Feature catalogue – SMAPVEX16-MB CropScan Dataset

Title	SMAPVEX16-MB CropScan Feature Catalogue
Scope	series
Version Number	1
Version Date	March 29, 2017
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	Date and Time (TIMESTAMP)		
Definition	Time the data was collected CDT (YYYY-MM-DD HH:MM:SS).		
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. ANGLE

Name	Solar Angle (ANGLE)
Definition	Angle of solar elevation, based on latitude and longitude.

Aliases	ANGLE		
Producer	AAFC		
Value Data Type	Double		
Value Domain Type	0 (not enumerated)		
Value Domain			
	Feature Attribute Value		
	Label	Code	Definition

4.2.1.4. IRRADIANCE

Name	Irradiance (IRRADIANCE)		
Definition	Irradiance value recorded.		
Aliases	IRRADIANCE		
Producer	AAFC		
Value Data Type	Integer		
Value Domain Type	0 (not enumerated)		
Value Domain			
	Feature Attribute Value		
	Label	Code	Definition

4.2.1.5. READING_470

Name	Reading at 470 nm (READING_470)		
Definition	Reading taken at 470 nm.		
Aliases	READING_470		
Producer	AAFC		
Value Data Type	Double		
Value Domain Type	0 (not enumerated)		
Value Domain			
	Feature Attribute Value		
	Label	Code	Definition

4.2.1.6. READING_550

Name	Reading at 550 nm (READING_550)
Definition	Reading taken at 550 nm.
Aliases	READING_550
Producer	AAFC
Value Data Type	Double

Value Domain Type	0 (not enumerated)		
Value Domain			
	Feature Attribute Value		
	Label	Code	Definition

4.2.1.7. READING_650

Name	Reading at 650 nm (READING_650)		
Definition	Reading taken at 650 nm.		
Aliases	READING_650		
Producer	AAFC		
Value Data Type	Double		
Value Domain Type	0 (not enumerated)		
Value Domain			
	Feature Attribute Value		
	Label	Code	Definition

4.2.1.8. READING_710

Name	Reading at 710 nm (READING_710)		
Definition	Reading taken at 710 nm.		
Aliases	READING_710		
Producer	AAFC		
Value Data Type	Double		
Value Domain Type	0 (not enumerated)		
Value Domain			
	Feature Attribute Value		
	Label	Code	Definition

4.2.1.9. READING_850

Name	Reading at 850 nm (READING_850)		
Definition	Reading taken at 850 nm.		
Aliases	READING_850		
Producer	AAFC		
Value Data Type	Double		
Value Domain Type	0 (not enumerated)		
Value Domain			
	Feature Attribute Value		
	Label	Code	Definition

4.2.1.10. READING_970

Name	Reading at 970 nm (READING_970)		
Definition	Reading taken at 970 nm.		
Aliases	READING_970		
Producer	AAFC		
Value Data Type	Double		
Value Domain Type	0 (not enumerated)		
Value Domain			
	Feature Attribute Value		
	Label	Code	Definition

4.2.1.11. READING_1240

Name	Reading at 1240 nm (READING_1240)		
Definition	Reading taken at 1240 nm.		
Aliases	READING_1240		
Producer	AAFC		
Value Data Type	Double		
Value Domain Type	0 (not enumerated)		
Value Domain			
	Feature Attribute Value		
	Label	Code	Definition

4.2.1.12. READING_1640

Name	Reading at 1640 nm (READING_1640)		
Definition	Reading taken at 1640 nm.		
Aliases	READING_1640		
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

The location of each CropScan sampling location has been recorded with a handheld Garmin Global Positioning System (GPS) device. The device is accurate to within approximately 3m.

6.4. Temporal accuracy

Measure not used at this time.

6.5. Thematic accuracy

Measure not used at this time.

6.6. Lineage statement

Lineage Statement	CropScan data was collected during the SMAPVEX16-MB experiment. The date and time associated with each CropScan dataset has been recorded within the TIMESTAMP field.
Scope	

7. DATA CAPTURE

CropScan data was quality controlled to remove any erroneous values. All records with irradiance values of <300 have been removed as part of the quality control process.

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.