ISO 19131 SMAPVEX16-MB US Radiometer Angular Dataset – Data Product Specifications

Revision: A

Data product specifications: SMAPVEX16-MB US Radiometer Angular Dataset

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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 data from the University of Sherbrooke (US) L-Band radiometer that was installed to measure brightness temperatures (TB) on a wheat crop on Field 105 for the SMAPVEX16-MB experiment. The radiometer was deployed at the edge of the field and was adjusted to different incidence angles during morning soil moisture sampling and Passive Active L- and S-band Sensor (PALS) flight days. The multi-angular measurements were also collected in the evening when Soil Moisture and Ocean Salinity (SMOS) acquisitions were available.

The instrument was installed on June 7, 2016 and continuously collected data until the end of the campaign on July 22, 2016. Continuous data collection was stopped during the 2 campaign windows to conduct regular routine calibrations, and to record the soil surface TB at multiple angles from 30 to 70 degrees in 5 degree increments. In each instance, the radiometer's continuous measurements were halted for no more than 2 hours and for usually much less time (20-30 minutes) to conduct the calibration and the multi-angular measurements.

1.2. Data product specification - metadata

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

Data product specification – title:	SMAPVEX16-MB US Radiometer Angular Dataset
Data product specification - reference date:	June 7, 2016 to July 22, 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
NASA	National Aeronautics and Space Administration
PALS	Passive Active L- and S-band Sensor
SMAP	Soil Moisture Active/Passive
SMAPVEX16-MB	Soil Moisture Active/Passive Validation Experiment 2016-Manitoba
SMOS	Soil Moisture and Ocean Salinity
STB	Science and Technology Branch
TB	Brightness Temperature
US	University of Sherbrooke

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 US Radiometer Angular Dataset
Alternate Title	SMAPVEX16-MB Radiometer Data
Abstract	SMAPVEX16-MB was conducted to assess and increase the overall accuracy of the soil moisture retrievals produced using the SMAP satellite. This dataset contains multi-angular TB measurements from the US radiometer.
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, radiometer, L-Band, brightness temperature
Scope identification	series

3.2. Data product identification

3.2.1. SMAPVEX16-MB US Radiometer Angular Dataset

Title	SMAPVEX16-MB US Radiometer Angular Dataset
Alternate Title	SMAPVEX16-MB US Radiometer Data
Abstract	This dataset contains multi-angular TB measurements from the US radiometer.
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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	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, radiometer, L-Band, brightness temperature
Scope Identification	dataset
Feature Attribute Names	TIMESTAMP, INC_ANGLE, TBH, TBH_STD, TBV, TBV_STD

4. DATA CONTENT AND STRUCTURE

4.1. Feature-based application schema

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

4.2. Feature catalogue – SMAPVEX16-MB US Radiometer Angular Dataset

Title	SMAPVEX16-MB US Radiometer Angular Feature Catalogue
Scope	series
Version Number	1
Version Date	December 21, 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. TIMESTAMP

Name	Timestamp (TIMESTAMP)		
Definition	Time of sampling CDT (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

4.2.1.2. INC_ANGLE

Name	Incidence Angle (INC_ANGLE)		
Definition	Incidence angle (°) of ground measurement. Measurements were taken in 5° increments from 30-70°.		
Aliases	INC_ANGLE1		
Producer	AAFC		
Value Data Type	Double		
Value Domain Type	0 (not enumerated)		
Value Domain			
	Feature Attribute Value		
	Label	Code	Definition

4.2.1.3. TBH

Name	Horizontal Brightness Temperature (TBH)

Definition	Brightness temperature by incidence angle (°K, 2-3 minutes average) in the horizontal polarization.		
Aliases	TBH1		
Producer	AAFC		
Value Data Type	Double		
Value Domain Type	0 (not enumerated)		
Value Domain			
	Feature Attribute Value		
	Label	Code	Definition

4.2.1.4. TBH_STD

Name	Horizontal Brightness Temperature Standard Deviation (TBH_STD)		
Definition	Standard deviation of horizontal brightness temperature by incidence angle (°K, 2-3 minutes).		
Aliases	TBH_STD1		
Producer	AAFC		
Value Data Type	Double		
Value Domain Type	0 (not enumerated)		
Value Domain			
	Feature Attribute Value		
	Label	Code	Definition

4.2.1.5. TBV

Name	Vertical Brightness Temperature (TBV)		
Definition	Brightness temperature by incidence angle (°K, 2-3 minutes average) in the vertical polarization.		
Aliases	TBV1		
Producer	AAFC		
Value Data Type	Double		
Value Domain Type	0 (not enumerated)		
Value Domain			
	Feature Attribute Value		
	Label	Code	Definition

4.2.1.6. TBV_STD

Name	Vertical Brightness Temperature Standard Deviation (TBV_STD)
Definition	Standard deviation of vertical brightness temperature by incidence angle (°K, 2-3 minutes).

Aliases	TBV_STD1		
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

Measure not used at this time.

6.5. Thematic accuracy

Measure not used at this time.

6.6. Lineage statement

Lineage Statement	The instrument was installed on June 7, 2016 and continuously collected data until the end of the campaign on July 22, 2016. Continuous data collection was stopped during the 2 campaign windows to conduct regular routine calibrations.
Scope	

7. DATA CAPTURE

This dataset contains measurements from the US L-Band radiometer that was installed to collect TB data on

a wheat crop on Field 105 for the SMAPVEX16-MB experiment. The radiometer collected multi-angular measurements.

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.