SMAPVEX16 Manitoba CropScan 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 CropScan 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/Y4W64RE5RWBF. [Date Accessed].

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

FOR CURRENT INFORMATION, VISIT https://nsidc.org/data/SV16M_CRS

National Snow and Ice Data Center

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1 DATA DESCRIPTION

1.1 Parameters

The main parameters for this data set are solar irradiance (W/m^2) and incidence angle (degrees)

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

Data are presented in a single .csv file, `SV16M_CRS_CropScan_Vers3.csv`. Table 1 includes details on this file's contents; Figure 1 displays file headers and 14 rows of sample data.

Table 1. File Contents

Column Headers	Description
SITE_IT	Unique ID of the field site where sampling occurred. Each field had 16 possible sample locations
TIMESTAMP	Time the data was collected in Central Daylight Savings Time, presented in MM/DD/YY HH:MM format
ANGLE	Angle of solar elevation (degrees, °), based on latitude and longitude
IRRADIANCE	Solar irradiance, watts per square meter (W/m^2)
READING_470	Percent reflectance (%), reading taken at 470 nm
READING_550	Percent reflectance (%), reading taken at 550 nm
READING_650	Percent reflectance (%), reading taken at 650 nm
READING_710	Percent reflectance (%), reading taken at 710 nm
READING_850	Percent reflectance (%), reading taken at 850 nm
READING_970	Percent reflectance (%), reading taken at 970 nm
READING_1240	Percent reflectance (%), reading taken at 1240 nm
READING_1640	Percent reflectance (%), reading taken at 1640 nm

SITE_ID	TIMESTAMP	ANGLE	IRRADIANCE	READING_470	READING_550	READING_650	READING_710	READING_850	READING_970	READING_1240	READING_1640
206-2	6/13/16 9:49	50.6	592	3.62	7.63	5.18	12.2	28.96	26.86	26.09	16.57
206-2	6/13/16 9:49	50.6	589	3.87	9.21	5.06	14.81	40.23	36.07	33.06	17.6
206-2	6/13/16 9:50	50.4	595	4.11	8.58	5.91	13.63	30.99	28.83	28.05	17.72
206-2	6/13/16 9:50	50.4	599	4.17	9.38	5.54	14.78	37.56	34	31.64	17.73
206-2	6/13/16 9:50	50.4	608	3.92	9.05	5.35	14.84	37.88	34.51	31.35	17.12
206-2	6/13/16 9:50	50.4	587	4.04	9.64	5.33	15.28	41.12	36.62	33.9	18.15
206-2	6/13/16 9:51	50.3	606	4.26	9.31	6.19	15.27	35.69	33.35	31.66	18.84
206-2	6/13/16 9:53	49.9	600	4.06	8.19	6.02	12.71	29.09	26.85	26.69	17.08
206-2	6/13/16 9:53	49.9	634	4	7.84	5.86	12.53	26.07	24.95	24.68	16.68
206-2	6/13/16 9:53	49.9	637	4.19	7.89	6.3	12.58	25.9	24.94	24.85	17.34

Figure 1. Sample Data

1.2.3 Naming Convention

File names are the following:

`SV16M_CRS_CropScan_Vers3.csv`

`SV16M_CRS_FieldSites.kmz`

`SV16M_CRS` is short for SMAPVEX16 (Soil Moisture Active Passive Validation Experiment 2016) Manitoba CropScan Data.

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 coordinate reference system for this data set.

Table 2. Geolocation Details

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

13 June 2016 through 12 July 2016

1.4.2 Resolution

Each field site was only sampled once during the campaign period.

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, ground measurements were collected to coincide with SMAP satellite overpasses and Passive Active L- and S-band Sensor (PALS) flights.

2.2 Acquisition

Data were collected from 50 agricultural fields in the SMAPVEX16 Manitoba study area. Though each field had 16 possible sampling locations (Sites 1-16), CropScan observations were limited to Site 2 (for scans conducted on 13 June and 15 June 2016) and Site 3 (for scans conducted between 16 June and 12 July 2016). Leaf area index (LAI) photos were also captured from Sites 2

and 3 during the same observation period. Prior to the campaign, the location of each sampling location (Sites 2 and 3) were determined in ArcGIS. During the campaign, sites were identified using Garmin GPS units. The accuracy of each GPS unit was approximately 3 m.

Data were collected using a CropScan instrument, a multi-spectral optical radiometer (NIR bands 470-1640 nm) that measured solar radiation from crop canopies. At each scan location, field crews collected data from two crop rows, at seven locations per row, for a total of 14 scans per Site. For each scan, the CropScan instrument was mounted on a pole and held above the crop canopy. Upward-facing sensors on the radiometer captured incoming solar radiation, while downward-facing sensors captured energy reflected back from the canopy. Reflected radiation was collected at spectral bands defined by the instrument model and filters.

2.3 Quality, Errors, and Limitations

All records with irradiance <300 nm have been removed.

2.4 Instrumentation

Data were collected using CropScan multi-spectral optical radiometers, with NIR bands of 470-1640 nm. More details can be found on the CropScan website.

3 RELATED DATA SETS

SMAPVEX16 Leaf Area Index

SMAP Data | Overview

4 RELATED WEBSITES

SMAP at NASA

SMAPVEX16

5 CONTACTS AND ACKNOWLEDGMENTS

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6 DOCUMENT INFORMATION

6.1 Publication Date

03 August 2018

6.2 Date Last Updated

31 August 2018