SMAPVEX12 In Situ Vegetation 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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National Snow and Ice Data Center

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1 DATA DESCRIPTION

This data set contains in situ vegetation data collected at several agricultural sites as a part of the Soil Moisture Active Passive Validation Experiment 2012 (SMAPVEX12).

1.1 Parameters

The parameters included in this data are described in Table 1.

Table 1. Parameter units and valid ranges

Parameter	Unit	Valid range
Vegetation Water Content (VWC)	g/m^2	0 - 40,000
Total net weight	g	0 - 8000
Total dry biomass	g	0 - 2000
Fraction of water content	%	0 - 100
Height of the plants	cm	0 - 300
Diameter of the plants	cm	0 - 3

1.2 File Information

1.2.1 Format and File Contents

Data are provided in the following ASCII text files:

- `SV12VA_Crop_Biomass_ver4.txt` contains biomass related parameters.
- `SV12VA_Crop_Height_Diam_ver4.txt` contains plant height and diameter measurements.
- `Field_Sites_ver4_coords.txt` contains the locations of the sampling sites.

The following tables provide descriptions for each column in the data files.

Table 2. Data Column Descriptions for SV12VA_Crop_Biomass_ver4.txt (Biomass file)

Column Heading	Description
OBJECTID	ID of the sample
Sample_Date	month/day/year
Site_ID	ID of the field and the sample point within the field
Crop_Type	Type of the crop

Column Heading	Description
Crop_Part	Part of the plant (total, stems, leaves, tassel, flower or heads, or pasture)
Net_W_Sample_Total_g	Total net weight of the sample [g]
Total_Dry_Biomass_g	Total dry biomass in the sample [g]
Plant_Water_Cont_PCT	Fraction of water content in the sample (in percentage)
Area_Plant_Water_Cont_g_m2	Vegetation Water Content [g/m2]
Air_to_OD_Cor_Applied	Indicates whether the air-dry to oven-dry correction has been applied

Table 3. Data Columns for SV12VA_Crop_Height_Diam_ver4.txt (Plant height and diameter file)

Column	Description
OBJECTID	ID of the sample
Date	Date of the sample (month/day/year)
Crop	Type of the crop
Site_ID	ID of the field and the sample point within the field
Mean_Heigh	Mean height computed from the 10 height measurements [cm]
Mean_Diame	Mean diameter computed from the 10 diameter measurements [cm]
Height_1	Height sample 1 [cm]
Height_2	Height sample 2 [cm]
Height_3	Height sample 3 [cm]
Height_4	Height sample 4 [cm]
Height_5	Height sample 5 [cm]
Height_6	Height sample 6 [cm]
Height_7	Height sample 7 [cm]
Height_8	Height sample 8 [cm]
Height_9	Height sample 9 [cm]
Height_10	Height sample 10 [cm]
Diameter_1	Diameter sample 1 [cm]
Diameter_2	Diameter sample 2 [cm]
Diameter_3	Diameter sample 3 [cm]
Diameter_4	Diameter sample 4 [cm]
Diameter_5	Diameter sample 5 [cm]
Diameter_6	Diameter sample 6 [cm]
Diameter_7	Diameter sample 7 [cm]
Diameter_8	Diameter sample 8 [cm]

Column	Description
Diameter_9	Diameter sample 9 [cm]
Diameter_10	Diameter sample 10 [cm]

Table 4. Data Column Descriptions for Field_Sites_ver4_coords.txt

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

In situ measurements were sampled within .5 m by .5 m squares.

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 and Resolution

In situ samples and measurements were collected on thirteen days from 07 June through 19 July 2012.

2 DATA ACQUISITION AND PROCESSING

During SMAPVEX12, non-flight days were dedicated to collecting vegetation data. The goal of the experimental plan was to measure vegetation conditions once per week for each field. This strategy was a compromise between capturing the changes in crop growth and available resources. By and large for the vast majority of fields this time table was achieved. However, field access due to impassible roads or aerial spraying did influence this schedule.

Vegetation measurements were collected at three of the 16 soil moisture sample points. Sample points 2, 11 and 14 were selected as this distribution was expected to capture variance in vegetation conditions across each field, and also provided ease of navigation within the field. At each of these three points, measurements of crop height and stem diameter were made. In addition biomass samples were collected and photos to measure Leaf Area Index (LAI) were taken. Due to different planting approaches of various crops, and the accumulation of crop biomass, the strategy to acquire vegetation measurements varied depending on crop type. For wheat, forage and pasture crops crews collected biomass, height and stem diameter measurements within a 0.5 m x 0.5 meter biomass square. All other crops have wide row and plant spacing and thus these measurements were taken along two adjacent plant rows.

Crop height and stem diameter can vary significantly along and between rows and thus multiple measurements are required. For all crops, 10 height and diameter measurements were taken using a tape measure (height) or caliper (stem diameters). For wheat, forage and pasture 10 plants were randomly selected within the biomass square for measurement. For corn, beans and canola five consecutive plants were measured in one row, with five more measured in the adjacent row. The height was measured to the top of the upper most part of the canopy, whether leaf or fruit. Leaves were left in their natural orientation, and not extended, for this measurement. The diameter was measured half way up the crop (at mid-level). Heights were recorded on field sheets.

Vegetation biomass and water content were determined via destructive sampling. One biomass sample was collected at each of the three measurement points (2, 11 and 14). For wheat, forage and pasture fields a 0.5 m x 0.5 meter square was placed over the canopy. All above ground biomass was collected by cutting all vegetation at the soil level. For beans, corn and canola crops, five plants along two rows (10 plants in total) were collected. Knowledge of the density of the crop permits scaling of these measurements to a unit area (m2). Dead plant matter (residue) was not included in the sampling. Following cutting, biomass samples were placed first in a paper bag, and then a plastic bag to minimize water loss prior to weighing the wet sample. Vegetation will degrade rapidly (within a few hours) and thus weighing of the wet sample must be completed quickly. During most vegetation sampling days, the lab crew set up a temporary weighing station located on site in Elm Creek. When convenient to do so, crews periodically brought their vegetation samples to this

temporary station for weighing. More than 900 biomass samples were collected during SMAPVEX12.

The SMAPVEX experimental plan called for the determination of vegetation water content as a function of plant organ. Thus, for the sample collected from point 2, the lab crew segmented this sample by plant organs (heads, leaves, stalks, seeds/pods, tassels) prior to weighing the wet sample. Due to level of effort, the wheat samples were only segmented into heads and leaves/stems. The proportion of biomass in the wheat stalk is considered small relative to that of the leaves and heads.

See more details in sections 1.1 and 2.1.3 of the SMAPVEX12 Database Report, released 18 December 2012.

2.1 Quality, Errors, and Limitations

Some additional error was introduced for the corn sampling due to the uncertainty in the air-dry to oven-dry conversion. See details of the sampling approach in section 2.1.3 of the SMAPVEX12 Database Report, released 18 December 2012.

In general, the quality of the data meets the typical quality expected from this type of field campaign with the given sampling strategy. See details of the sampling approach in section 2.1.3 of the SMAPVEX12 Database Report, released 18 December 2012.

3   SOFTWARE AND TOOLS

No special tools are required to view these data. A spreadsheet program such as Microsoft Excel is recommended.

4   CONTACTS AND ACKNOWLEDGMENTS

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4.1 Acknowledgments

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5   DOCUMENT INFORMATION

5.1 Publication Date

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5.2 Date Last Updated

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