SMAPVEX16 Iowa Permanent Soil Moisture Network, Version 1

USER GUIDE

How to Cite These Data

As a condition of using these data, you must include a citation:

Cosh, M. 2021. *SMAPVEX16-Iowa Permanent Soil Moisture Network, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. https://doi.org/10.5067/P3ZUS77FW7JL. [Date Accessed].

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

FOR CURRENT INFORMATION, VISIT https://nsidc.org/data/SV16I_PNET

National Snow and Ice Data Center

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1 DATA DESCRIPTION

1.1 Parameters

Parameters for this data set include soil moisture and soil temperature.

These data consist of soil moisture, soil temperature, and precipitation measurements recorded between May 1 and September 30, 2016 by the permanent soil moisture network in the SMAPVEX16-Iowa area. The sites were spread out over an experiment domain of about 30 km by 40 km located about 30 km north of Ames, Iowa.

1.2 File Information

1.2.1 Format

Data provided in comma-separated values, (.csv) file.

Data volume: 1MB

1.2.2 File Contents

The data file contains the soil moisture, soil temperature and precipitation measurements for each station.

A	B	C	D	E	F	G	H	I	J	K	L	M
Yr	Mo	Day	Hr	Min	SM5	ST5	P_1	P_2	SM5	ST5	P_1	P_2
					1	1	1	1	2	2	2	2
2016	5	1	0	0	0.321	8.873	0	0	0.386	6.9	0	0
2016	5	1	1	0	0.321	8.817	0	0	0.388	6.9	0.254	0.254
2016	5	1	2	0	0.32	8.79	0	0.254	0.384	6.7	0	0
2016	5	1	3	0	0.321	8.748	0	0	0.386	6.7	0	0
2016	5	1	4	0	0.321	8.72	0.254	0	0.384	6.7	0	0
2016	5	1	5	0	0.324	8.678	0	0.254	0.386	6.7	0.254	0.254
2016	5	1	6	0	0.323	8.623	0	0	0.384	6.6	0	0

Figure 1. Sample of data file contents with header rows shaded for emphasis.

The data file has sixty-five columns and two header lines with the following contents:

First Header (Row 1) Explained:

- Timestamp: year (Yr), month (Mo), day (Day), hour (Hr), and minute (Min), time in local time (UTC-6),
- (SM5): Soil moisture in [m3/m3],
- (ST5): Soil temperature in [°C], and
- (P_1) and (P_2): Precipitation in [mm].

Second Header (Row 2) Explained:

- (1 to 15): Station ID Numbers

Note: Time in local time (UTC-6)

1.2.3 Naming Convention

File Name: `SMAPVEX16_IA_PermNet_v[N].csv`

File Name Components:

- Campaign: SMAPVEX16
- Site: IA; Iowa
- Experiment: PermNet
- Version: v[N]
- File format or extension: .csv

1.3 Spatial Information

1.3.1 Coverage

The Iowa experiment domain may be defined by the following coordinates:
Latitude: 42.33N – 42.54N
Longitude: 93.22W – 93.57W

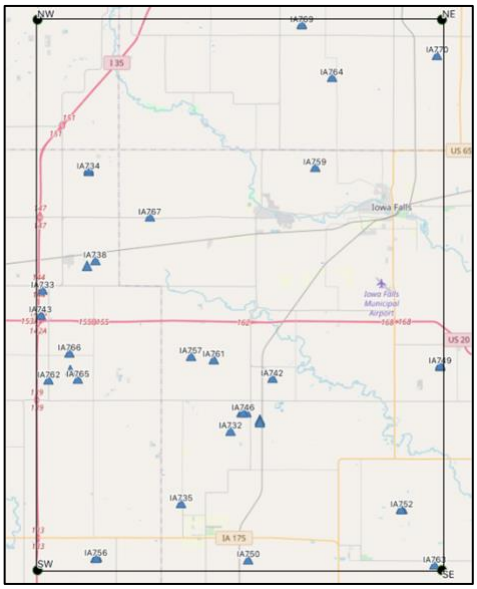

Figure 2. SV16I_PNET station locations (triangles) within experiment domain.

Table 2. Station Locations within Experiment Domain

Station	Latitude	Longitude
1	42.38803	-93.386
2	42.4693	-93.56545
3	42.45296	-93.56797
4	42.54459	-93.52527
5	42.42857	-93.52158
6	42.3896	-93.50013
7	42.51501	-93.47271
8	42.48463	-93.44149
9	42.44556	-93.44405
10	42.37937	-93.40293
11	42.42975	-93.36596
12	42.3414	-93.33422
13	42.40318	-93.30971
14	42.32831	-93.25486
15	42.42034	-93.22077
Coordinate Reference System: WGS 84		

1.3.2 Resolution

Does not apply.

1.4 Temporal Information

1.4.1 Coverage

Start: 01 May 2016

End: 30 September 2016

1.4.2 Resolution

Hourly.

2 DATA ACQUISITION AND PROCESSING

2.1 Acquisition

Stevens HydraProbes, installed in the soil horizontally at a depth of 5 cm, recorded soil moisture and soil temperature hourly. MetOne and TE525 rain gauges deployed at each station respectively collected (P_1) and (P_2) data.

2.2 Processing

The soil moisture and soil temperature values reported here represent HydraProbe sensor outputs. The soil moisture probes were set to “loam” to convert the dielectric constant to soil moisture. The precipitation values represent output from the rain gauges.

2.3 Quality, Errors, and Limitations

The “loam” calibration of the HydraProbe best reflects soil type of the experiment domain. Therefore, it is assumed that using the generic calibration would not cause any excessive errors in the soil moisture estimates. The fit of the model used in the “loam” calibration is about 0.02 m^3/m^3; (Seyfried et al. 2005). The manufacturer reports rain gauges accuracies of ±0.5% at a rain rate of 0.5in/hr for the MetOne device and ±1% at rain rates up to 1 in/hr for the TE525 gauge. However, as a result of extended deployment, gauges have other potential reliability issues, which have not been quantified here. That said, TE525 was found somewhat more reliable during the experiment.

2.4 Instrumentation

2.4.1 Description

Stevens HydraProbe

MetOne 380 precipitation gauge

Texas Electronics TE525 rain gauge

3 SOFTWARE AND TOOLS

Access the data with software capable of reading comma-separated values, .csv, files.

4 RELATED DATA SETS

SMAP Validation Data 2016

5 RELATED WEBSITES

Soil Moisture Active Passive Data

Soil Moisture Active Passive Validation Data

6 CONTACTS AND ACKNOWLEDGMENTS

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7 REFERENCES

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8 DOCUMENT INFORMATION

8.1 Publication Date

11 January 2021