



GLOBE

Soil Moisture

Data Sheets

SMAP Block Pattern

Print the Soil Moisture Data Sheet:

- [Soil Moisture SMAP Block Data Sheet](#)

Or select an alternative data sheet option below:

- [Soil Moisture SMAP Block: New Site](#) (2 pages)
 - Use this the first time you visit a sampling site to record site definition data.
- [Soil Moisture SMAP Block: Multi Day](#) (2 pages)
 - Use this data sheet to record multiple days of soil moisture.
- [Soil Moisture SMAP Block with field guide](#) (3 pages)
 - This data sheet has the field guide incorporated.
- [Soil Moisture SMAP Block: Simplified](#)
 - Use this data sheet when working with those new to GLOBE and collecting data.

GLOBE Soil Moisture SMAP Block Data Sheet

Name: _____ Site Name: _____

Date: _____ Time (local): _____

Soil State: Measurable Frozen Ground Snow on Ground
 Frozen water on ground Hail on ground Graupel (snow pellets) on ground

If anything except Measurable is selected, stop here!

Drying Method: 95–105°C oven 75–95°C oven Other: _____

Average drying time: _____ hours _____ minutes

Record mass to the nearest 0.1 g!

Soil Moisture: Weight Measurements

A	B	C = A - B	D	E = B - D	C/E
Wet mass: mass of wet soil and container (g)	Dry mass: mass of dry soil and container (g)	Water Weight* (g)	Mass of empty container (g)	Dry soil weight* (g)	Soil Moisture* (g/g)

*Starred column values are calculated by the database.

Container Volume Measurements

Container volume measurements are required at least once out of every 10 weight measurements but can be repeated more frequently.

Sample	Initial Volume (mL, V_i)	Final Volume (mL, V_f)	Container Volume* (mL, $V_i - V_f$)
1			
2			
3			

Comments:

GLOBE Soil Moisture SMAP Block Data Sheet: New Site (page 1)

Name: _____ Site Name: _____

Date: _____ Time (local): _____

New Site Definition

Latitude: _____ Longitude: _____

Elevation: _____ m

Surface State: Natural Plowed Graded Backfill Compacted Other

Surface Cover: Bare Ground Short Grass (under 10 cm) Long Grass (over 10 cm)

Canopy Cover: Open Some Trees (within 20 m) Canopy Overhead

Site Comments (Metadata)

Drying Method: 95–105°C oven 75–95°C oven Other: _____

Average drying time: _____ hours _____ minutes

Soil Moisture: Weight Measurements

Record mass to the nearest 0.1 g!

A	B	C = A - B	D	E = B - D	C/E
Wet mass: mass of wet soil and container (g)	Dry mass: mass of dry soil and container (g)	Water Weight* (g)	Mass of empty container (g)	Dry soil weight* (g)	Soil Moisture* (g/g)

*Starred column values are calculated by the database.

GLOBE Soil Moisture SMAP Block Data Sheet: New Site (page 2)

Container Volume Measurements

Container volume measurements are required at least once out of every 10 weight measurements but can be repeated more frequently.

Sample	Initial Volume (mL, V_i)	Final Volume (mL, V_f)	Container Volume* (mL, $V_i - V_f$)
1			
2			
3			

*Value calculated by the database.

Comments:

GLOBE Soil Moisture SMAP Block Data Sheet: Multi-Day (page 2)

Container Volume Measurements

Container volume measurements are required at least once out of every 10 weight measurements but can be repeated more frequently.

Sample	Initial Volume (mL, V_i)	Final Volume (mL, V_f)	Container Volume* (mL, $V_i - V_f$)
1			
2			
3			

*Value calculated by the database.

Additional Comments:

GLOBE Soil Moisture SMAP Block Data Sheet and Field Guide (page 1)

Name: _____ Site Name: _____

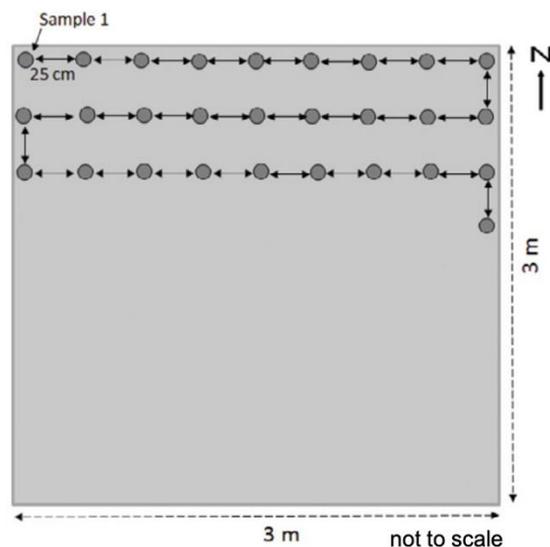
Date: _____ Time (local): _____

Soil State: Measurable Frozen Ground Snow on Ground
 Frozen water on ground Hail on ground Graupel (snow pellets) on ground

If anything except Measurable is selected, stop here!

Soil Moisture: In the Field

1. Locate your sampling point within your site, 25 cm from the previous sample point, and cut or pull away any grass or ground cover.
2. Dig the trowel 5 cm into the soil and place your sample into the pre-marked sealable bag or soil can.
3. Place a flag or other marker in the spot from which the sample was taken so that it is clear where to take future samples.



Every 10th sample:

1. Smooth the soil surface by scraping across it with the trowel.
2. Push the can all the way into the soil so that the bottom of the can is even with the ground surface.
 - a. If the soil is hard, place a wooden block on top of the can and pound it into the soil with a hammer. If the soil is so hard you cannot pound the can into the ground, take a sample in a bag and try again when the ground is softer.
3. Use the trowel to dig the filled sample can out of the soil by putting it underneath the can and lifting it out without spilling any of the sample in the can.
4. Level the top of the sample by scraping across it with the trowel. If a rock or other object sticks out of the top of the sample, return the sample to the ground, wipe the can clean and take a new sample. Seal the sample.
5. Take your samples back to the lab and follow the In the Lab Field Guide (page 2).

GLOBE Soil Moisture SMAP Block Data Sheet and Field Guide (page 2)

Drying Method: 95–105°C oven 75–95°C oven Other: _____

Average drying time: _____ hours _____ minutes

Record mass
to the nearest
0.1 gram!

Soil Moisture: In the Lab

1. Calibrate the balance according to the manufacture's instructions.
2. Place the sample in the container on the balance. If using a bag, shake it to move the soil to one end of the bag. Fold the bag so the soil occupies as little space as possible and can be placed entirely on the scale.
3. Weigh and record the mass to the nearest 0.1 g.

Wet mass (A) = _____ g

4. Open the container and dry using one of the following options:

- A 250-watt heating lamp (Dries in about 2–3 days)
- A drying oven (Use cans only! Dries overnight)
- Air drying (Dries in 2–5 days)

5. Determine when the sample is dry by weighing it, drying for a few more hours or another day, and then weighing it again. When the mass of the sample does not change, it can be considered dry.

6. Determine the mass of the dry sample to the nearest 0.1 g and record it.

Dry mass (B) = _____ g

7. Determine the mass of the empty container or bag if you have not yet done so. Record the mass.

Mass of empty container (D) = _____ g

8. Dried soil can be returned to fill in the sample holes on site.

9. The following calculations are completed by the database, but you can calculate them here as well:

Water weight (C) = A - B = _____ g

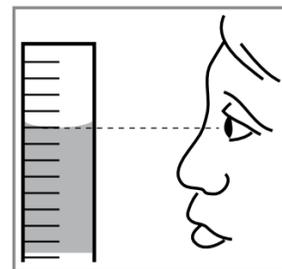
Dry soil weight (E) = B - D = _____ g

Soil Moisture = (C / E) = _____ g

Soil Moisture: In the Lab, 10th sample

Every tenth soil sample is taken with a can. Follow these instructions to determine the container volume measurements.

1. Transfer all the soil from the can into a bag labeled with the sample collection date and site name.
2. Find the volume of the can using a graduated cylinder:
 - a. Fill a graduated cylinder with water and record the initial volume on the table below. Be sure to record the volume from the bottom of the meniscus (see figure on right).
 - b. Clean off the rim of the graduated cylinder as well as the protective ring to avoid unaccounted water drops from entering the can.
 - c. Pour the water into the can until it fills the can to the brim.
 - d. Record the volume of water left in the graduated cylinder as the final volume.
3. Use the equation below to find the volume of the can (V_{can}):



$$V_{\text{can}} = V_i - V_f$$

Where V_i is the initial volume in the graduated cylinder and V_f is the final volume.

4. Repeat steps 2–3 twice more, recording data in the table below.
5. Perform the steps on page 2 to dry and weigh your soil sample.

Sample	Initial Volume (mL, V_i)	Final Volume (mL, V_f)	Container Volume* (mL, $V_i - V_f$)
1			
2			
3			

 Comments:

GLOBE Soil Moisture SMAP Block Data Sheet: Simplified

Name: _____

Site Name: _____

Date: _____ Time (local): _____

What is the soil like?:

- I can collect soil samples (**Measurable**)
 Frozen Ground
 Snow on Ground
 Frozen water on ground
 Hail on ground
 Graupel (snow pellets) on ground

If anything except **Measurable is selected, stop here!**

After you collect your samples and bring them to the lab, fill in this section:

Soil Drying Method:

- 95–105°C oven
 75–95°C oven
 Other: _____

Average drying time: _____ hours _____ minutes

Soil Moisture Measurements

A	B	C = A - B	D	E = B - D	C ÷ E
Wet mass: mass of wet soil and container (g)	Dry mass: mass of dry soil and container (g)	Water Weight* (g)	Mass of empty container (g)	Dry soil weight* (g)	Soil Moisture* (g/g)
-		=			