Soil Temperature Protocol

Purpose

To measure near-surface soil temperature , and to detect diurnal changes in soil temperature

Materials and Tools

- *Dial probe thermometer*
- *12 cm nail and hammer*
- *A wooden block with 6 mm diameter hole through it*

How to Measure Soil Temperature

Please Note: The temperature sensor on the soil temperature probe is located 2 cm from the end. Therefore, if the thermometer is 7cm in the soil, your measurement is at 5cm. Likewise, if the thermometer is 12cm down, the temperature is taken at 10cm.

1. ***Make a pilot hole to 5 cm.*** *Insert the nail through your wood block and push it to the 2 cm mark (above the block). If the ground is so hard you have to use a hammer, then complete the pilot hole to 7cm. Remove the nail using a twisting motion. If the ground cracks and bulges up as you remove the pilot nail, move 25 cm and try again. Try to minimize the amount you disturb the soil.*

2. ***Insert the thermometer to 7 cm.*** *Insert the thermometer through your block.* ***Gently*** *push and twist the thermometer until the head is resting on the block. Do not force it, as this will damage your instrument.*

3. ***Read the soil temperature at 5 cm.*** *Wait at least 2 minutes; read the thermometer. Wait another minute, and reread the thermometer. Repeat until consecutive readings are within 0.5 - 1.0° C of each other. Record this value on the Soil Temperature Data Work Sheet.*

4. ***Remove the thermometer and the block.*** *Use a twisting motion - try not to disturb the soil.*

5. ***Repeat steps 1-4 without the wood block.*** *Gently push and twist your thermometer fully into the ground using the* ***same hole*** *as before to make your 10cm measurement. (The thermometer has to be 12cm into the soil.)*

6. ***Report your measurements*** *to the GLOBE Student Data Server on the Soil Temperature Data Entry Sheet.*

Weekly Measurements

Take three sets of soil temperature measurements next to your current soil moisture star pattern sampling location or next to your Atmospheric weather shelter at 5 and 10 cm depths. Complete these measurements within 1 hour of local solar noon and within a period of 20 minutes. Record your time to the nearest 10 minutes (e.g. if you take the 5 cm reading at XX:06, select the next 10 minute mark, XX:10, as your time of observation.

Diurnal/Seasonal Measurements

Take diurnal temperature measurements every three months, preferably during March, June, September, and December. Repeat the measurements every 2 to 3 hours on two consecutive days. Try to take at least 5 readings per day. Offset each new reading by at least 10 cm. Read the current temperature at your Atmosphere Investigation Instrument Shelter and record it in your GLOBE Student Notebook each time you measure soil temperature.