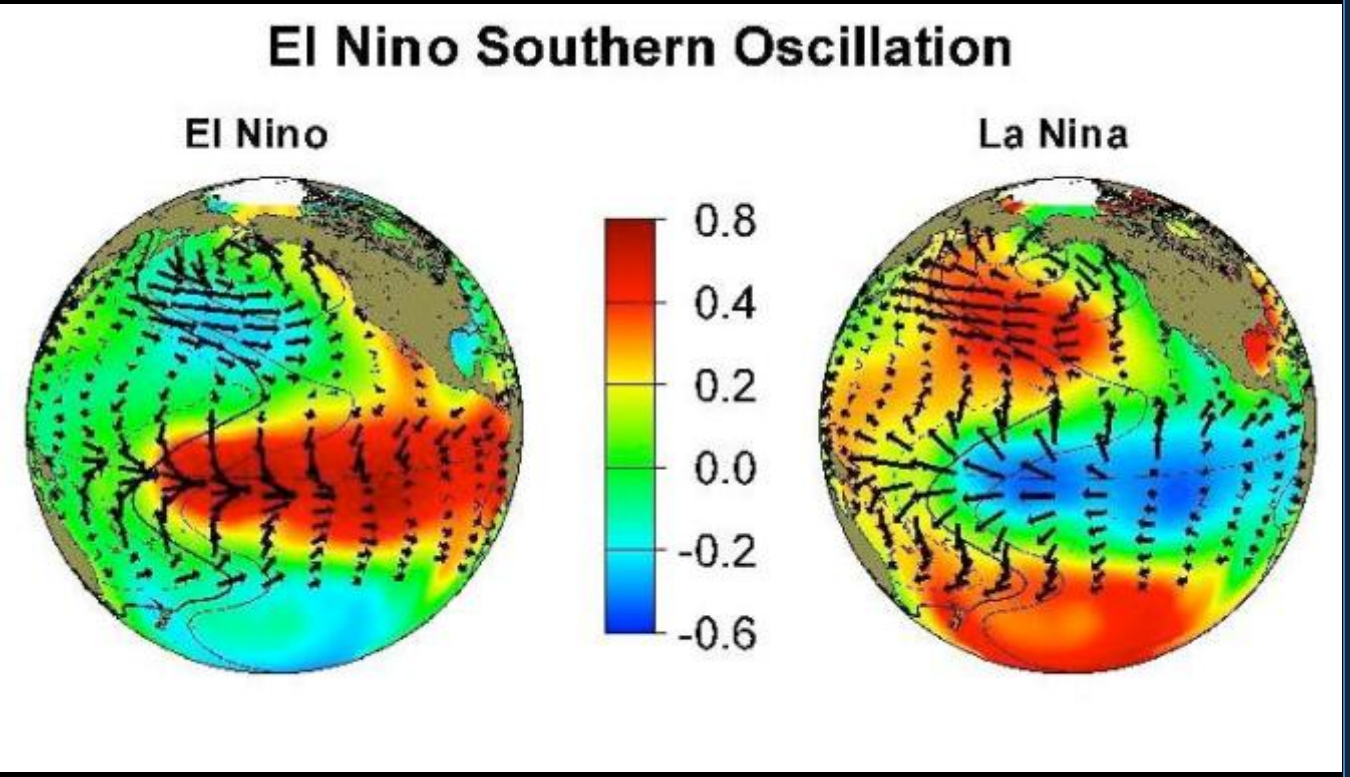
GLOBE El Niño Campaign 2016



Webinar 3-
El Niño Protocols
and Data Collection

March 15th, 2016

Tonight's Agenda

- Dorian- Welcome and Overview of tonight's program
- Dr. Uz- El Niño: Impacts Felt Around the World
- Mladen Matvijev- Maximum-Minimum Air Temperature and Precipitaton protocols
- Kevin Czajkowski- Surface Temperature protocol
- Rick Sharpe- Soil Temperature protocol
- Vicky Gorman- SMAP Soil Moisture protocol
- Mike Jabot: Biometry Tree Canopy protocol
- Marina Pavlic: Biometry Ground Cover protocol
- Questions and Answers!

In this hour-long webinar, participants will learn more about the six protocols that are available for being used in this campaign. We will have a NASA scientist describe some of the variables that are impacted during an El Niño event, and why some regions of the world will experience completely different conditions than others. We will share more information about how to collect and report data for this field campaign, and will have time for questions and answers.

Please feel free to use the chat box to ask questions after each speaker has given their presentation.

PROTOCOL QUICK SNAPSHOTS

- THE USE OF GLOBE PROTOCOLS:

- PRECIPITATION MEASUREMENTS
- MAXIMUM AND MINIMUM AIR AIR TEMPERATURE

INSTRUMENTS AND MEASUREMENTS AREA

USAGE OF INSTRUMENTS:

- GLOBE raingauge
- Hellman raingauge
- Raingauge (for example Vantage Proplus2)

PRECIPITATION MEASUREMENTS

Precipitation Protocols

Welcome | Introduction | **Protocols** | Learning Activities | Appendix

Purpose

To determine the amount of moisture input to the local environment by measuring rain and snowfall and to measure the pH of precipitation.

Overview

Students use a rain gauge and a snowboard to measure the daily amount of precipitation that has occurred. Students measure the depth and rain equivalent of each day's snow and of the total snowpack. Special pH measuring techniques for precipitation are used to determine the pH of rain and melted snow.

Student Outcomes

Students will understand that precipitation is measured in depth and this depth is assumed to apply to a large area, that precipitation has a pH that can vary, and that snow is an input of water to the surface just like rain and each snowfall is equivalent to some amount of rainfall.

Science Concepts

Earth and Space Science
- Weather can be described by quantitative measurements.
- Weather changes from day to day and over the seasons.
- Weather varies on local, regional, and global spatial scales.
- Precipitation forms by condensation of water vapor in the atmosphere.

Physical Science
- Materials exist in different states.

Geography
- The nature and extent of precipitation affects the characteristics of the physical geographic system.

Scientific Inquiry Abilities
- Use a rain gauge to measure rainfall and rain equivalent of snow.
- Use pH paper, pen, or meter to measure pH.
- Use meter sticks to measure snow depth.
- Identify answerable questions.
- Design and conduct scientific investigations.
- Use appropriate mathematics to analyze data.
- Develop descriptions and explanations using evidence.
- Recognize and analyze alternative explanations.
- Communicate procedures and explanations.

Time

In the field: 5 minutes for rain, 10-15 minutes for snow
In the lab: 5 minutes for snow rain equivalent, 5 minutes for pH
Maintenance: 10 minutes weekly for cleaning the rain gauge

Level

All

Frequency

Daily within one hour of local solar noon

Materials and Tools
- Installed rain gauge
- Snowboard
- Clean containers for pH samples 100 mL or larger
- Two or three containers for snow samples
- Carpenter's level
- Meter stick
- pH paper OR meter and pH buffers
- Salt and salt card or tweezers
- Sampling jar with lid
- 300 mL beakers or cups
- Tweezers
- Stirring rods or spoon
- Latex gloves
- *Integrated 1-Day Data Sheet*
- Distilled water for cleaning rain gauge

Liquid precipitation measurements

- Measurements daily at Local Solar Noon
- Possibility of multiday measurements (up to 7 days)
- The precipitation quantity is measured with precision of 0,1 mm

Snow height measurements

- Measurements of height of total snow cover

- Measurements of height of new snow cover

Precipitation data registration:

Precipitation (record only when collected at Local Solar Noon)

Days of accumulation: ____

Rainfall select one: ❑ Measurable ❑ Trace ❑ Missing
(if measurable is selected, complete the following fields)
Accumulation (mm): ____

Rain pH Measured With (select one): ❑ pH Paper ❑ pH Meter

pH of Rain: ____ (pH measurements only allowed when liquid amount is 3.5 mm or more)

Comments: _____

_____

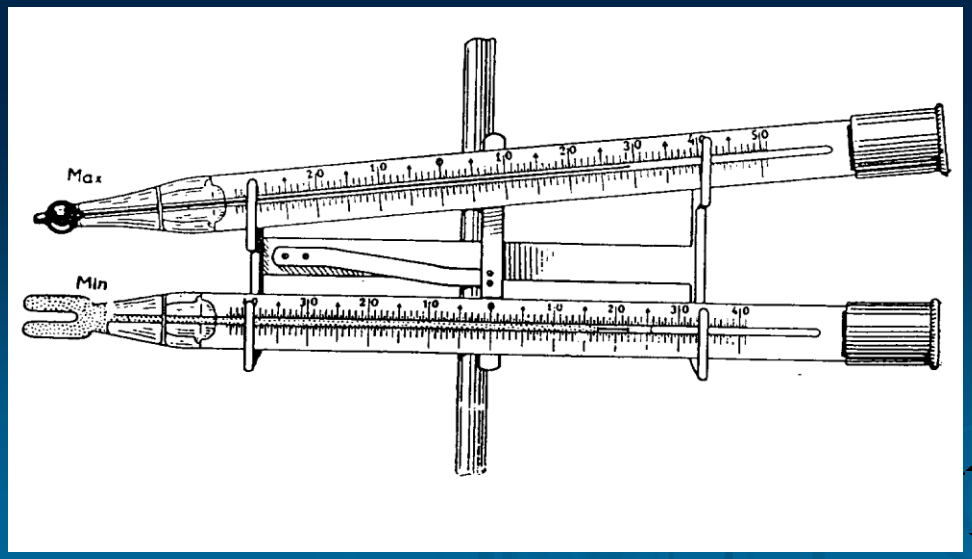
Type of precipitation data for input:

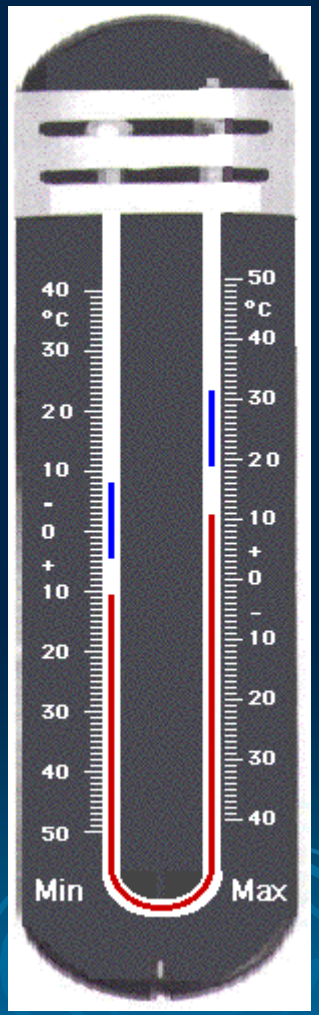
Table AT-PP-1: Reporting Precipitation

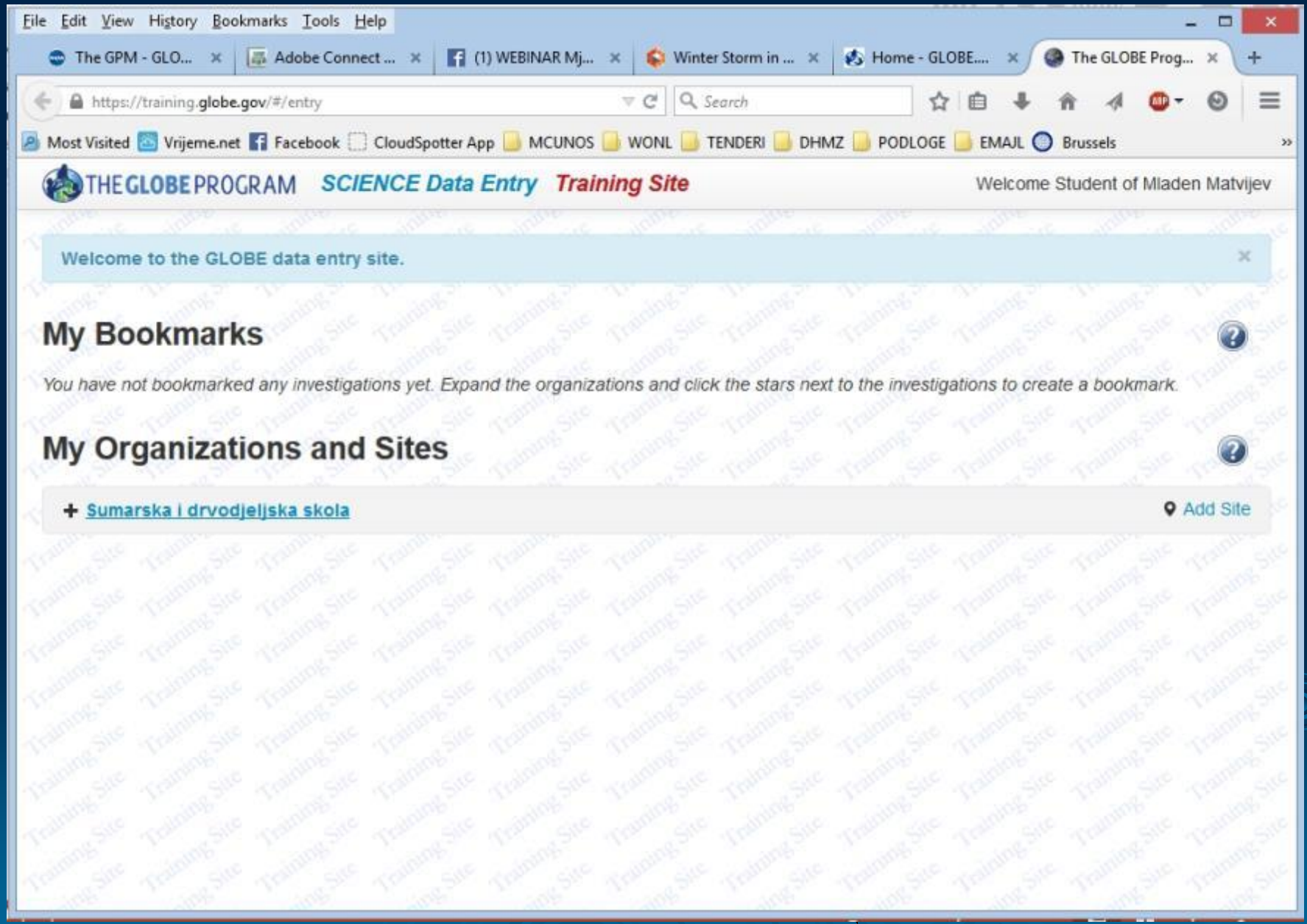
Type of Event	**Report to GLOBE the # of days since your last measurement AND…**
No rainfall	0
Rainfall > 0.5 mm with no problems reading the gauge	The rainfall amount in your rain gauge
Very small amount of rain < 0.5 mm	T (for Trace)
Spilled rain gauge before measurement could be made; gauge post fell over; etc	M (for Missing)

Air temperature measurements

- Measurements daily at Local Solar Noon
- Measurements precision 0.5 °C



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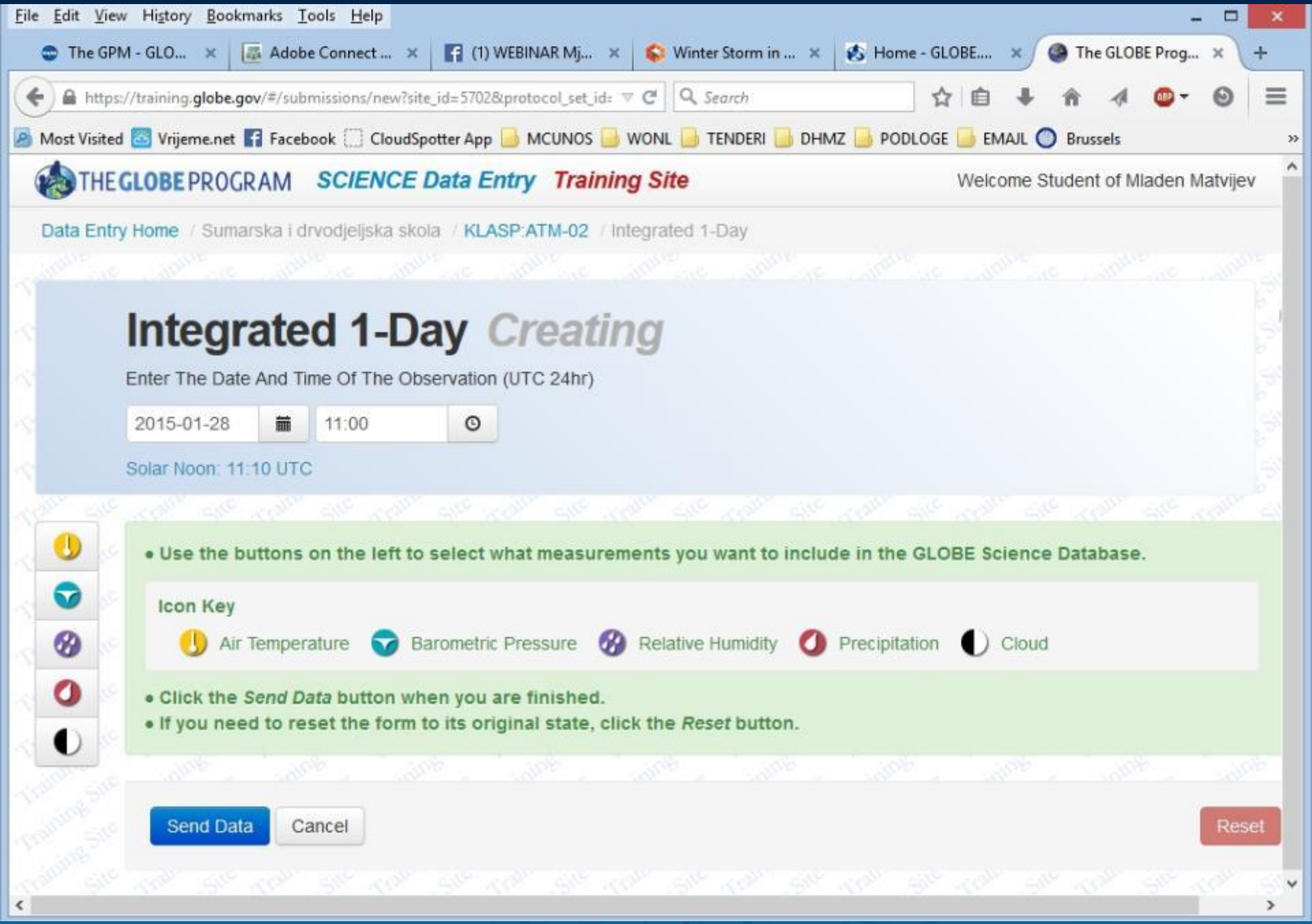
Welcome Student of Mladen Matvijev
Welcome to the GLOBE data entry site.
My Bookmarks
You have not bookmarked any investigations yet. Expand the organizations and click the stars next to the investigations to create a bookmark.
My Organizations and Sites
+ Sumarska i drvodjeljska skola
Add Site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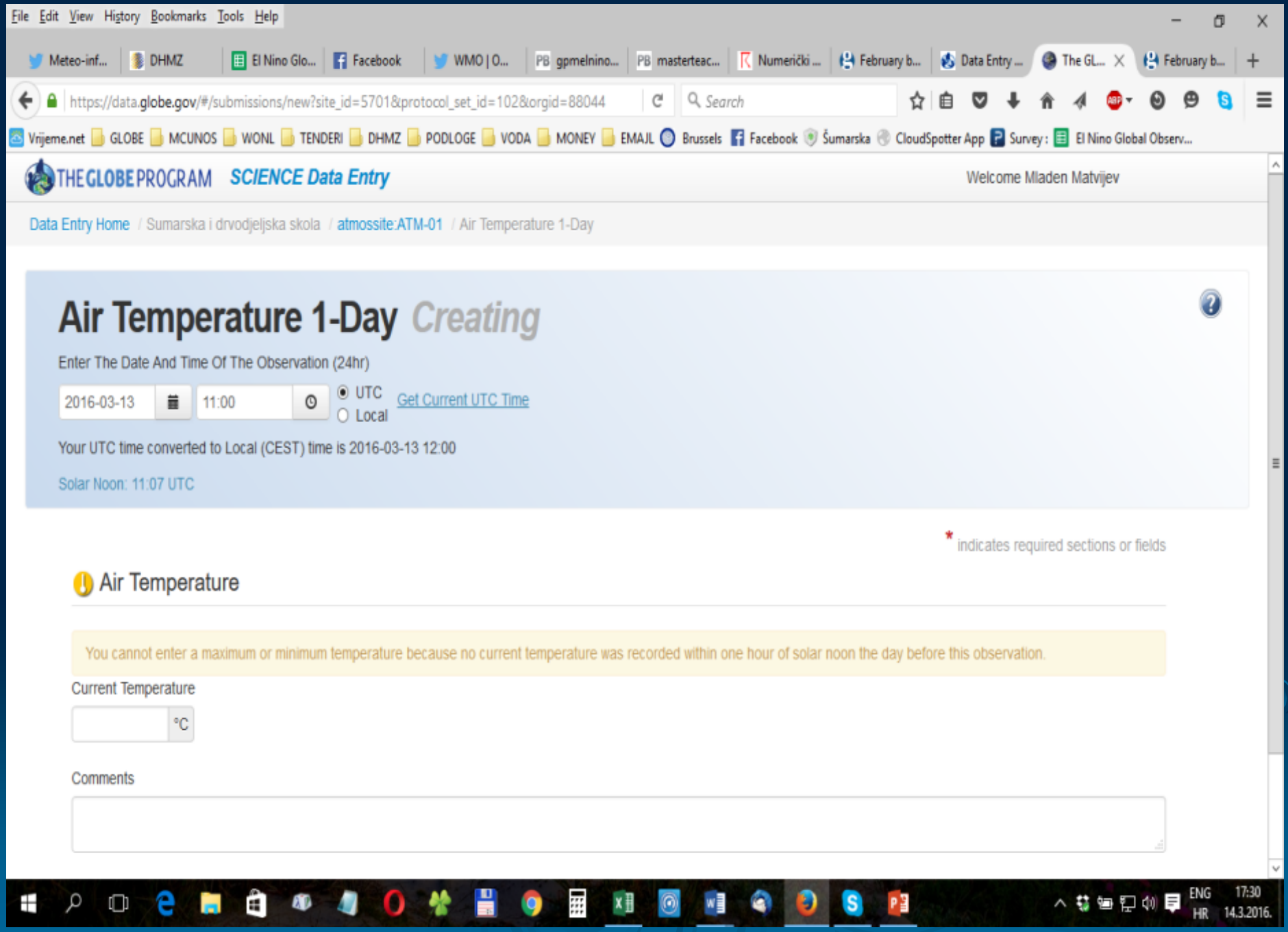
MCUNOS
WONL
TENDERI
DHMZ
PODLOGE
EMAJL
Brussels
THE GLOBE PROGRAM
SCIENCE Data Entry
Training Site
Welcome Student of Mladen Matvijev
Data Entry Home / Sumarska i drvodjeljska skola / KLASP:ATM-02 / Integrated 1-Day
Integrated 1-Day Creating
Enter The Date And Time Of The Observation (UTC 24hr)
2015-01-28
11:00
Solar Noon: 11:10 UTC
• Use the buttons on the left to select what measurements you want to include in the GLOBE Science Database.
Icon Key
Air Temperature
Barometric Pressure
Relative Humidity
Precipitation
Cloud
• Click the Send Data button when you are finished.
• If you need to reset the form to its original state, click the Reset button.
Send Data
Cancel
Reset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https://data.globe.gov/#/submissions/new?site_id=5701&protocol_set_id=102&orgid=88044
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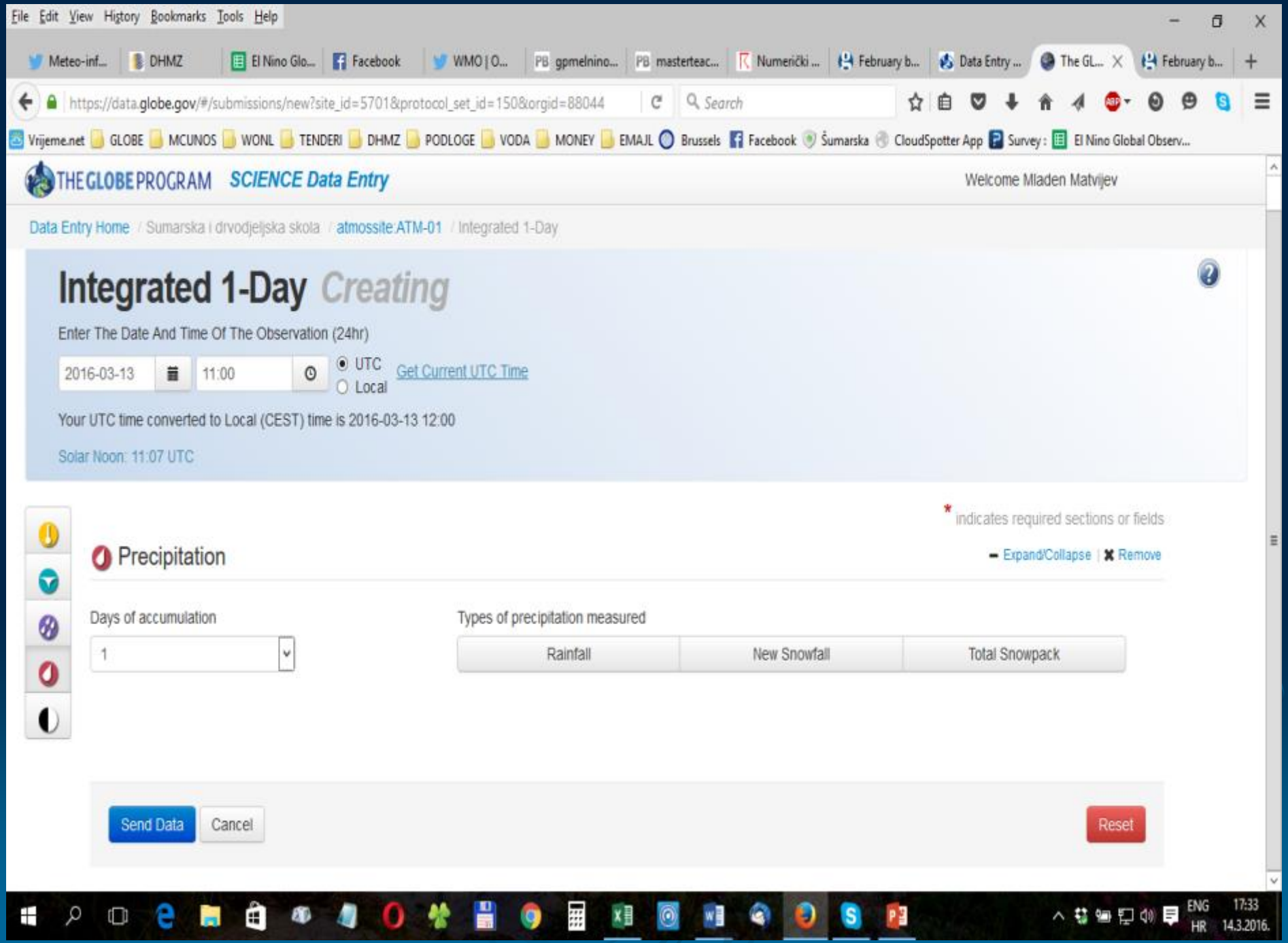
THE GLOBE PROGRAM SCIENCE Data Entry
Welcome Mladen Matvijev
Data Entry Home / Sumarska i drvodjeljska skola / atmossite:ATM-01 / Air Temperature 1-Day
Air Temperature 1-Day Creating
Enter The Date And Time Of The Observation (24hr)
2016-03-13
11:00
UTC
Local
Get Current UTC Time
Your UTC time converted to Local (CEST) time is 2016-03-13 12:00
Solar Noon: 11:07 UTC
* indicates required sections or fields
Air Temperature
You cannot enter a maximum or minimum temperature because no current temperature was recorded within one hour of solar noon the day before this observation.
Current Temperature
°C
Comments
ENG HR
17:30
14.3.2016.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2016-03-13
11:00
UTC
Local
Get Current UTC Time
Your UTC time converted to Local (CEST) time is 2016-03-13 12:00
Solar Noon: 11:07 UTC
* indicates required sections or fields
Precipitation
Expand/Collapse | Remove
Days of accumulation
1
Types of precipitation measured
Rainfall
New Snowfall
Total Snowpack
Send Data
Cancel
Reset
ENG
HR
17:33
14.3.2016.

Ida Middle School Students

Teacher: Lanna Harmon

University of Toledo: Kevin Czajkowski

Collecting Surface Temperature Observations

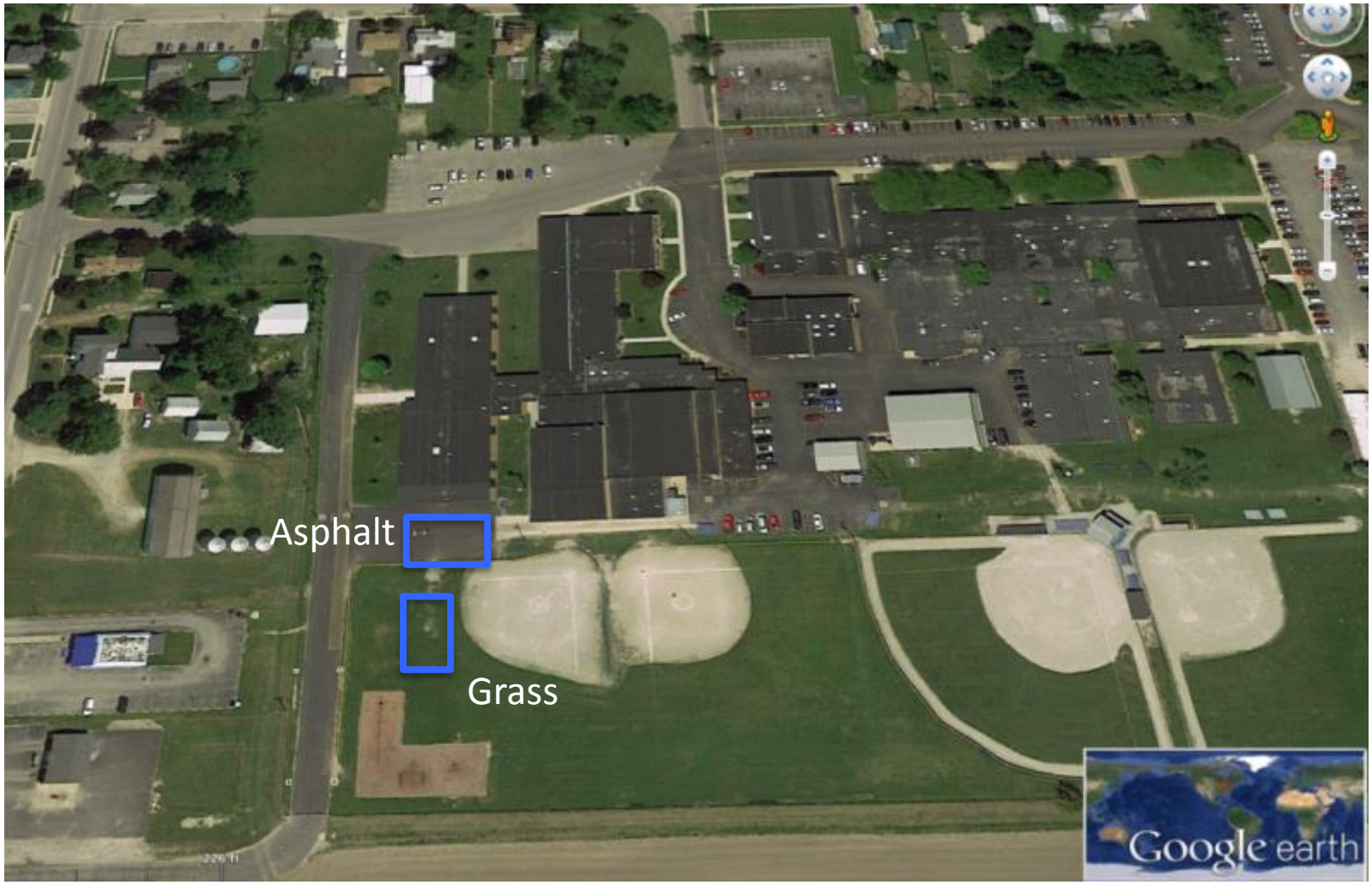
HOW?

Hold your arm at arms length and point the instrument at the ground. After you pull the trigger then read the value including the tenths of a degree Celsius.

WHEN?

Surface temperature measurements can be taken any time during the day.

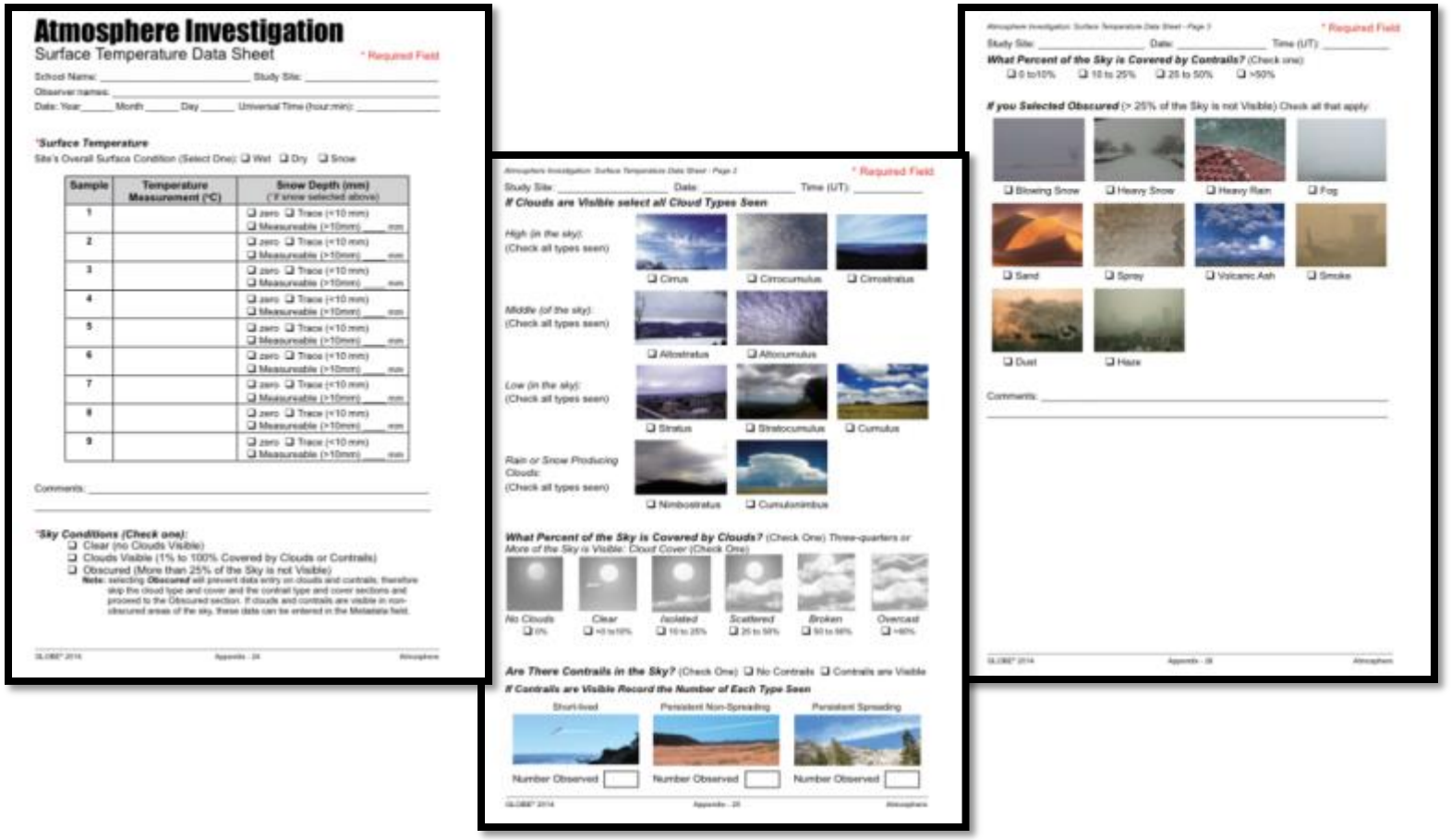
Observation Site



Take Cloud Observations

Students also check the weather shelter

Record your data on the *Surface Temperature Data Sheet*.



Atmosphere Investigation

Surface Temperature Data Sheet

* Required Field

School Name: _____ Study Site: _____

Observer names: _____

Date: Year: _____ Month _____ Day _____ Universal Time (hour:min): _____

***Surface Temperature**

Site's Overall Surface Condition (Select One): ❑ Wet ❑ Dry ❑ Snow

Sample	Temperature Measurement (°C)	Snow Depth (mm) (If snow selected above)
1		❑ zero ❑ Trace (<10 mm) ❑ Measureable (>10mm) ____ mm
2		❑ zero ❑ Trace (<10 mm) ❑ Measureable (>10mm) ____ mm
3		❑ zero ❑ Trace (<10 mm) ❑ Measureable (>10mm) ____ mm
4		❑ zero ❑ Trace (<10 mm) ❑ Measureable (>10mm) ____ mm
5		❑ zero ❑ Trace (<10 mm) ❑ Measureable (>10mm) ____ mm
6		❑ zero ❑ Trace (<10 mm) ❑ Measureable (>10mm) ____ mm
7		❑ zero ❑ Trace (<10 mm) ❑ Measureable (>10mm) ____ mm
8		❑ zero ❑ Trace (<10 mm) ❑ Measureable (>10mm) ____ mm
9		❑ zero ❑ Trace (<10 mm) ❑ Measureable (>10mm) ____ mm

Comments: _____

***Sky Conditions (Check one):**

❑ Clear (no Clouds Visible)

❑ Clouds Visible (1% to 100% Covered by Clouds or Contrails)

❑ Obscured (More than 25% of the Sky is not Visible)

Note: selecting **Obscured** will prevent data entry on clouds and contrails, therefore skip the cloud type and cover and the contrail type and cover sections and proceed to the Obscured section. If clouds and contrails are visible in non-obscured areas of the sky, these data can be entered in the Metadata field.

* Required Field

Study Site: _____ Date: _____ Time (UT): _____

If Clouds are Visible select all Cloud Types Seen

High (in the sky): (Check all types seen)

❑ Cirrus ❑ Cirrocumulus ❑ Cirrostratus

Middle (of the sky): (Check all types seen)

❑ Altostratus ❑ Altocumulus

Low (in the sky): (Check all types seen)

❑ Stratus ❑ Stratocumulus ❑ Cumulus

Rain or Snow Producing Clouds: (Check all types seen)

❑ Nimbostratus ❑ Cumulonimbus

What Percent of the Sky is Covered by Clouds? (Check One) *Three-quarters or More of the Sky is Visible: Cloud Cover* (Check One)

No Clouds ❑ 0% | Clear ❑ >0 to 10% | Isolated ❑ 10 to 25% | Scattered ❑ 25 to 50% | Broken ❑ 50 to 90% | Overcast ❑ >90%

Are There Contrails in the Sky? (Check One) ❑ No Contrails ❑ Contrails are Visible

If Contrails are Visible Record the Number of Each Type Seen

Short-lived — Number Observed ____

Persistent Non-Spreading — Number Observed ____

Persistent Spreading — Number Observed ____

* Required Field

Study Site: _____ Date: _____ Time (UT): _____

What Percent of the Sky is Covered by Contrails? (Check one)

❑ 0 to 10% ❑ 10 to 25% ❑ 25 to 50% ❑ >50%

If you Selected Obscured (> 25% of the Sky is not Visible) Check all that apply:

❑ Blowing Snow ❑ Heavy Snow ❑ Heavy Rain ❑ Fog

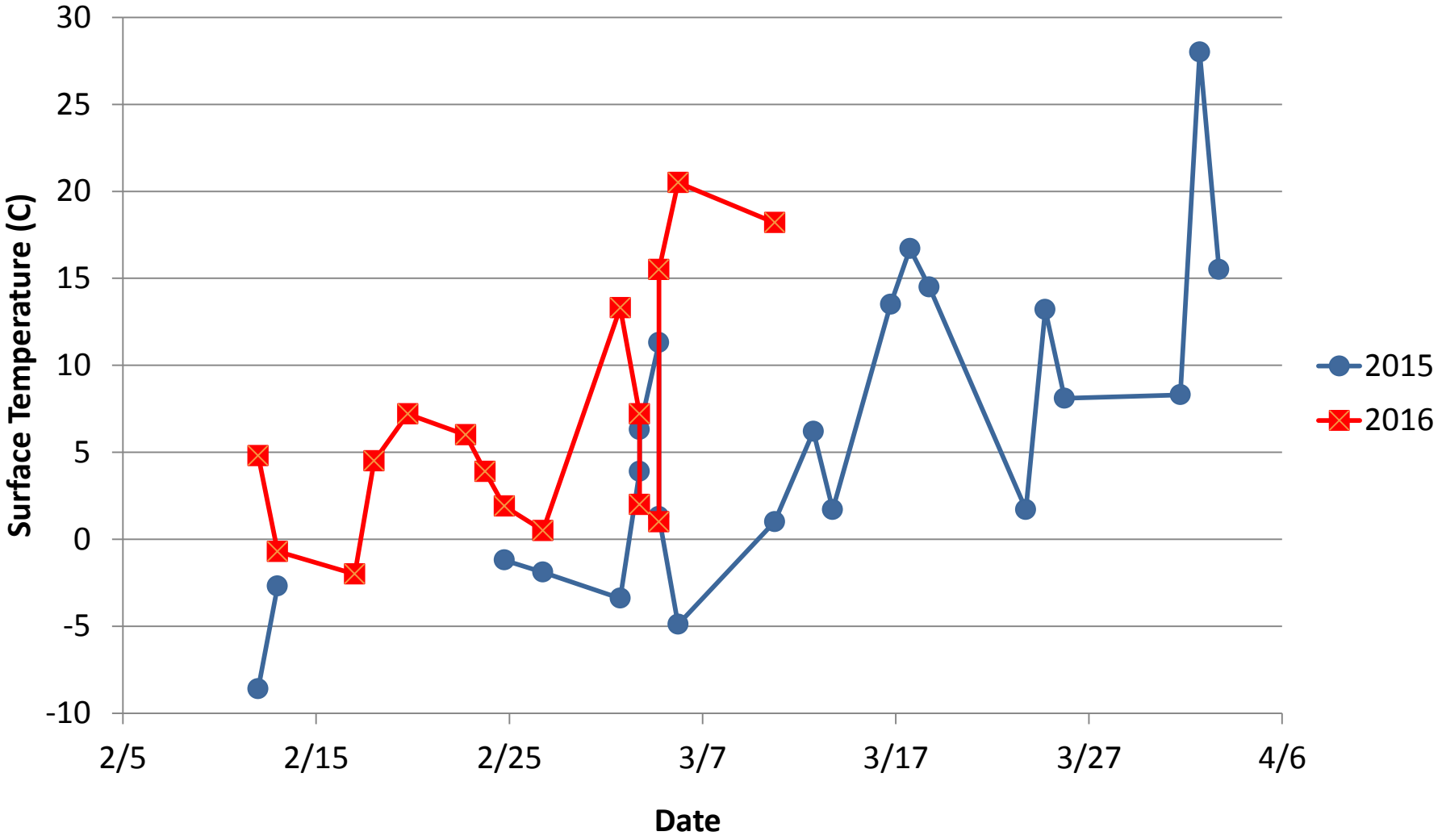
❑ Sand ❑ Spray ❑ Volcanic Ash ❑ Smoke

❑ Dust ❑ Haze

Comments: _____

Enter Data on the GLOBE Website

Ida Middle School, Michigan
Comparison of surface temperature for grass (2015 vs. 2016)

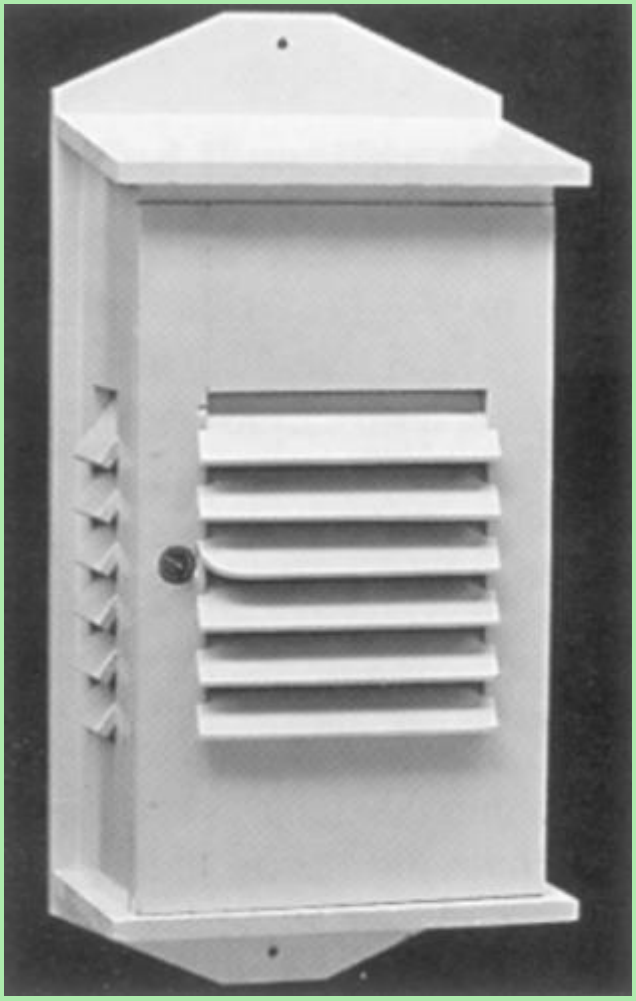


Rick Sharpe

Soil Temperature Protocols

Measurements

- **5 cm soil temperature depth**
- **50 cm soil temperature depth**
- **10 cm soil Depth**
- **Air temperatures**



Soil Temperature Site

Soil temperatures are measured

- **Atmospheric site.**
- **Soil Moisture site**

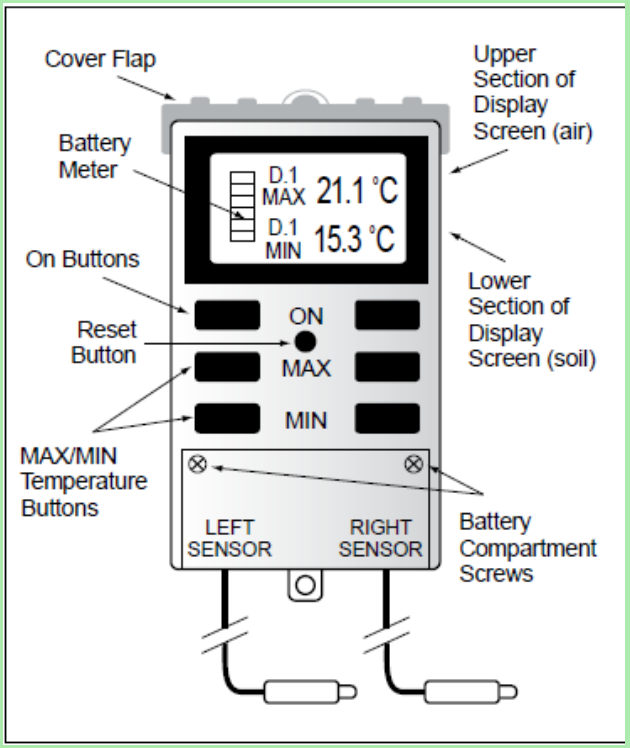
Multi-Day Data Collection

Equipment Needed

- **Multi-day digital thermometer**

  .

- **Weather instrument shelter.**
- **Left sensor is placed 5 cm deep.**
- **Right sensor is 50 cm deep.**

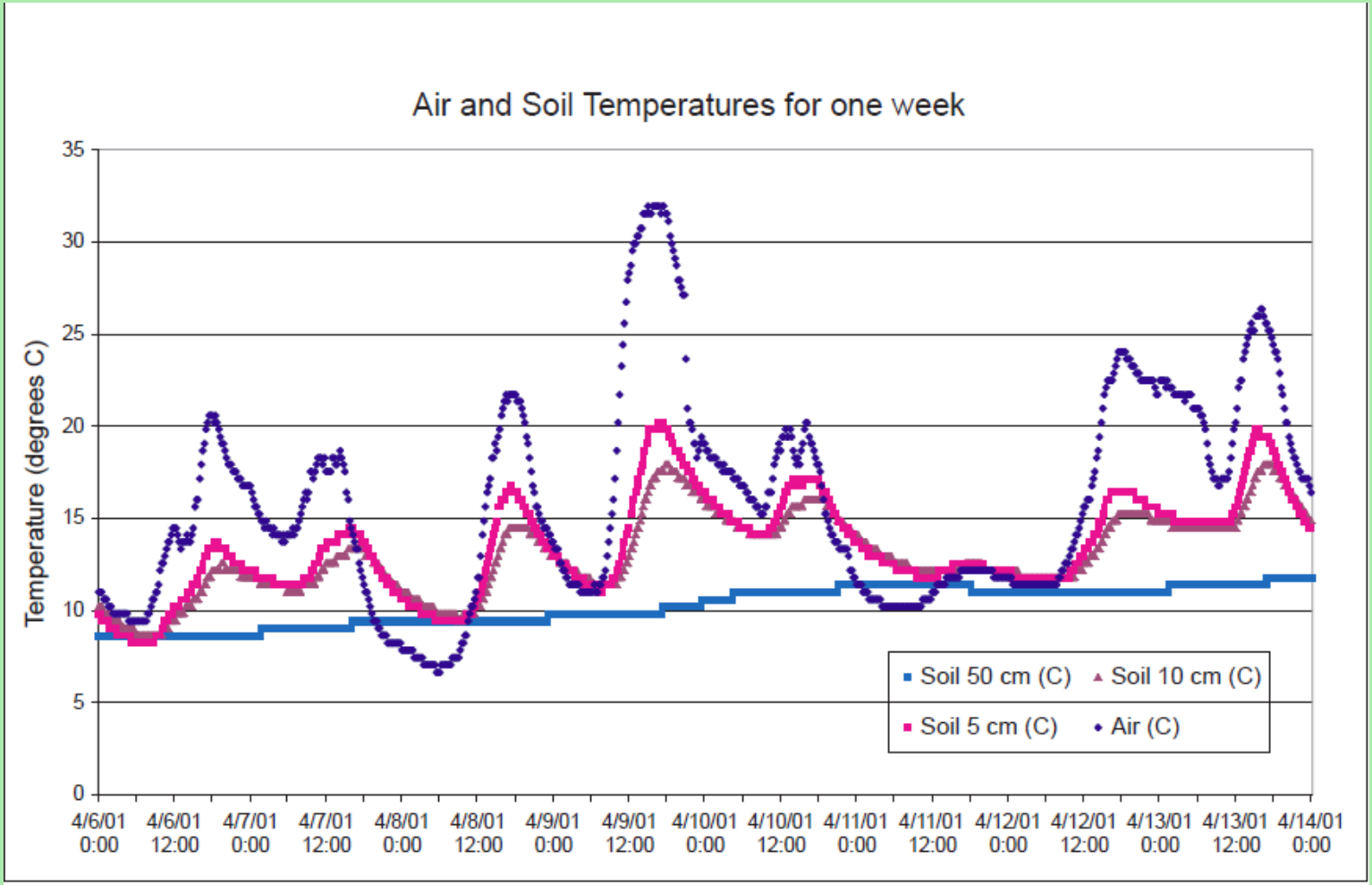


Multi-Day Collection 10 cm Depth

A second digital thermometer

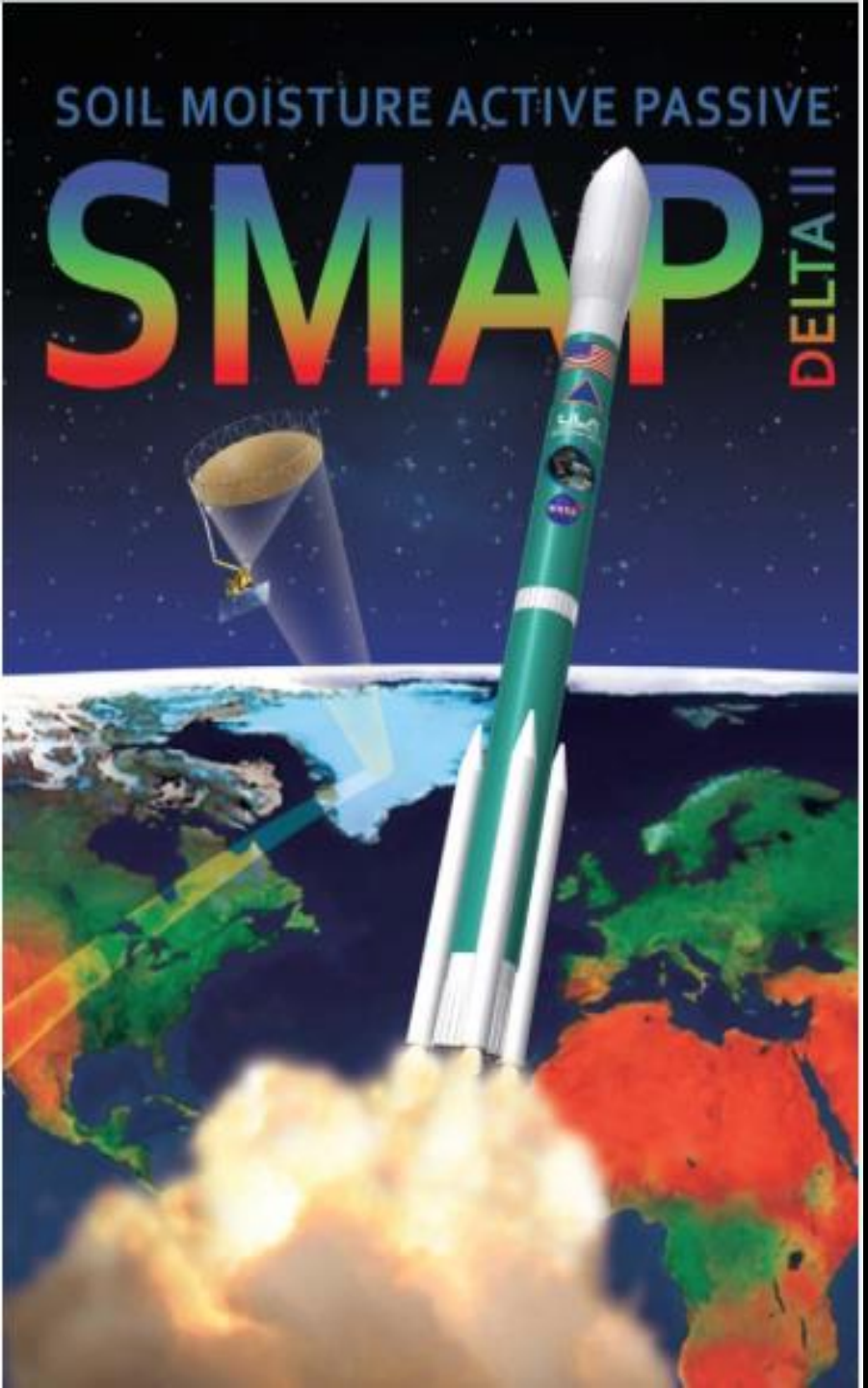
- **Enables data collection at the 10 cm depth simultaneously.**
- **Enables air temperatures to be collected as well.**
- **Allows minimum/maximum temperature data to be collected.**

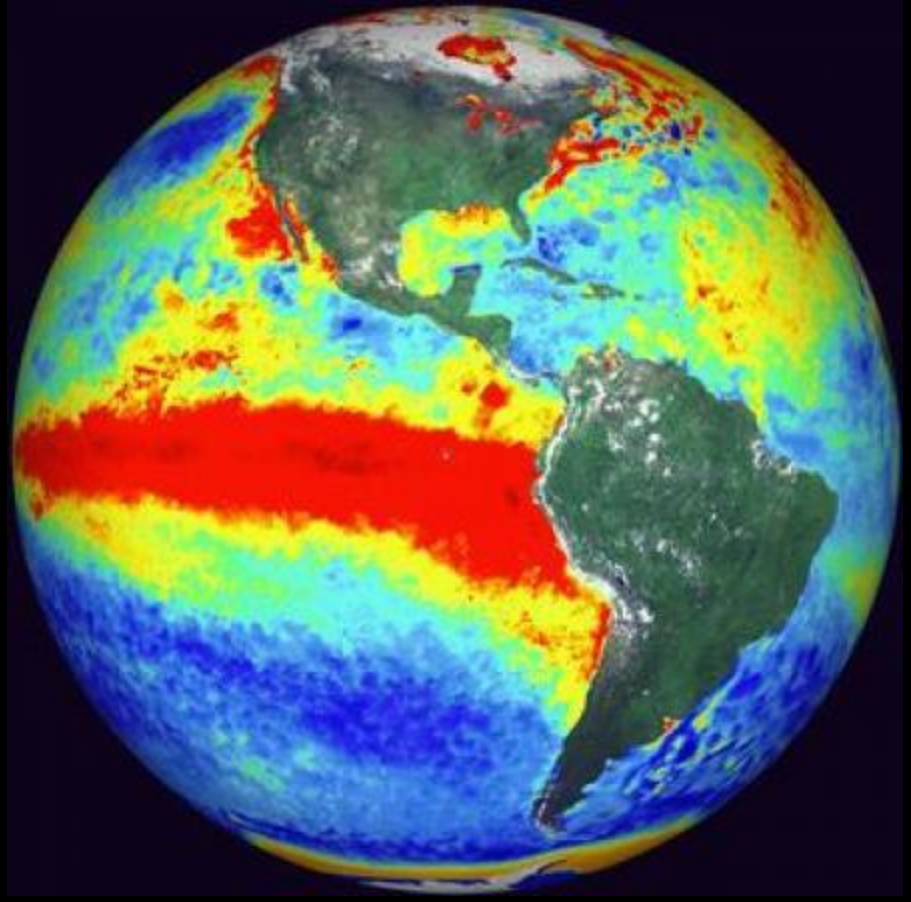
Air and Soil Temperatures



Soil Temperature Importance

- Soil acts as insulator against air temperature changes.
- Satellites measure only the top 5 centimeters.
- Weather forecasts are more accurate if soil moisture is known.

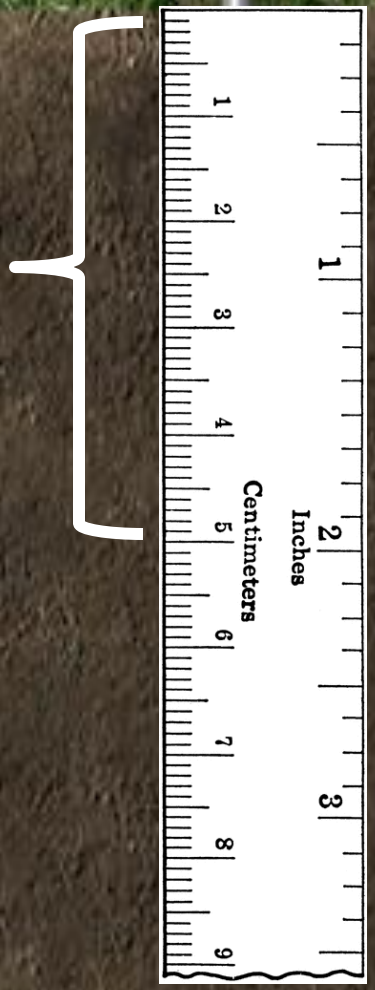




El Niño Campaign
Soil Moisture – SMAP

Vicky Gorman

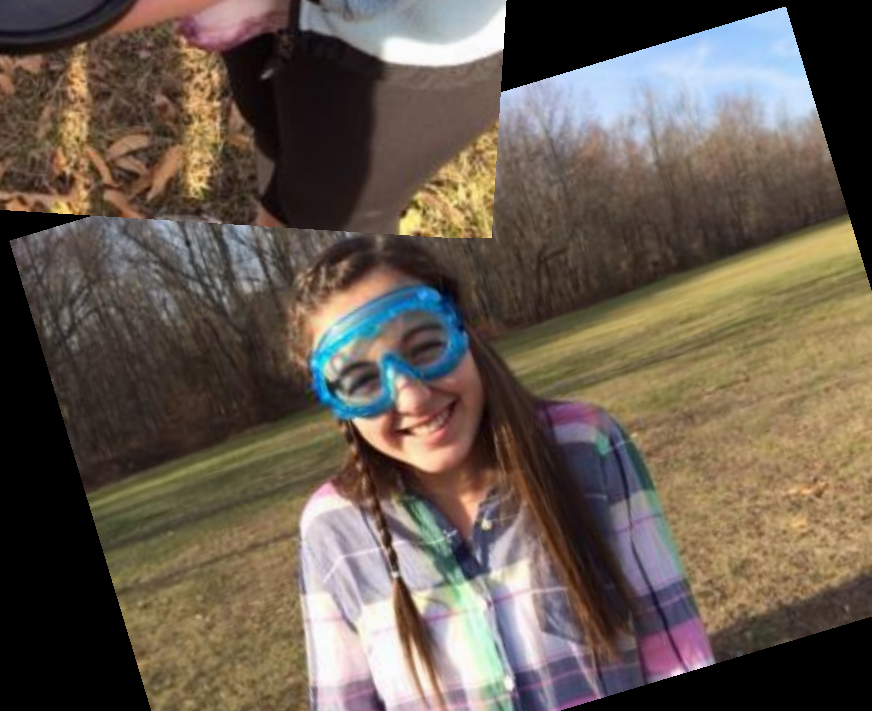
SMAP measures moisture in the first 5 cm (2 in) of the soil.

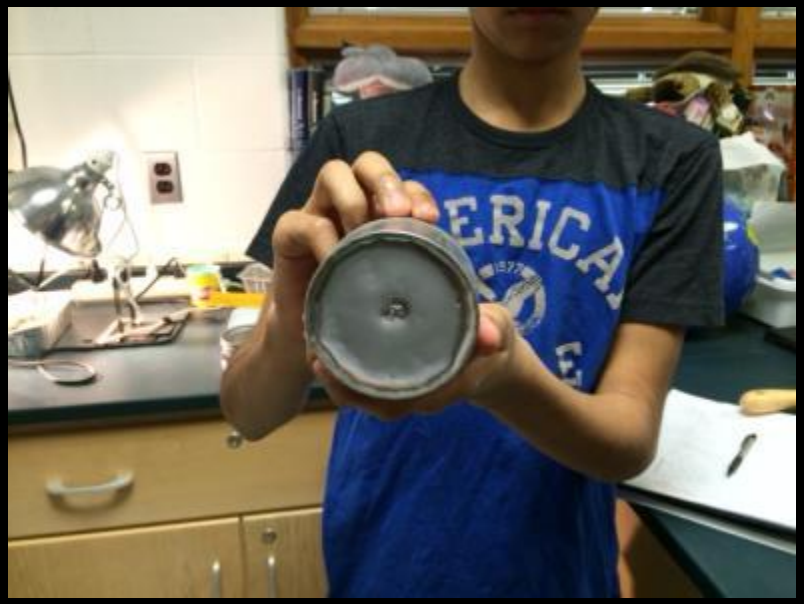


Enthusiastic Students







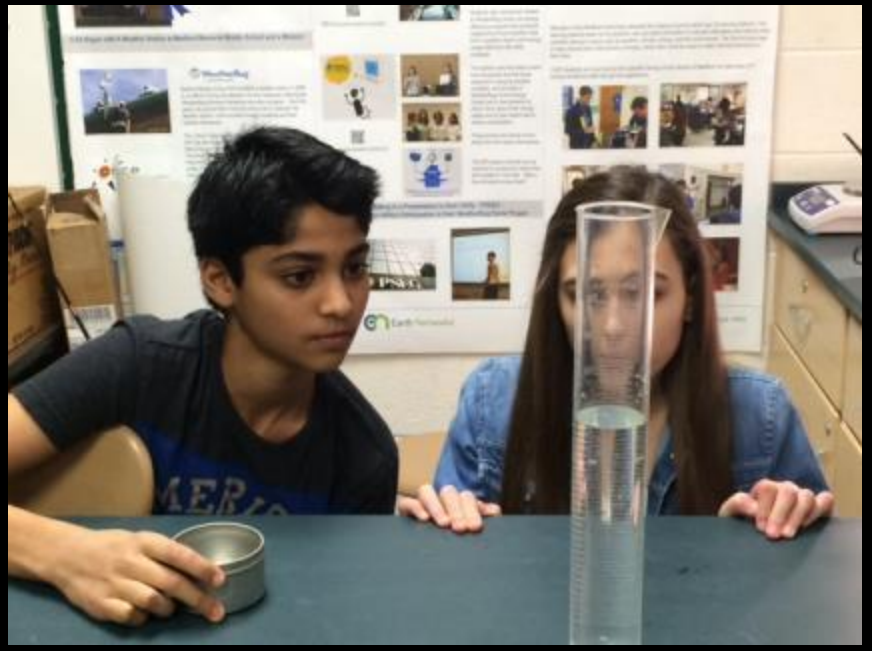


These tins came with lids, but we learned the hard way not to use the metal lids.
If the lid was put on a tin filled with soil and a hole in the bottom, it was virtually impossible to get the lid off.

- Raining
- Standing water (saturated)
- Snow on ground
- Snowing

- Hail on ground
- Graupel (snow pellets) on ground
- Frozen water on ground
- Frozen ground


AMERICAN
EAGLE



Manage | Go to | 9 | Victoria Gorman

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SIGN OUT

Featured

GLOBE/SMAP Reaches Goal of 1,000 Protocol Measurements by 31 January SMAP Launch Anniversary!

Thanks to the hard work and dedication of all participants, the current Soil Moisture Field Campaign reached its goal of 1,000 protocol

View GLOBE Around the World

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RECENT MEASUREMENTS

s, Weatherbug, Measured on: 2016-03-14

Crestwood High School, United States, Weathe

Enter Data

Visualize Data

Edit Controls | Manage | Go to | 9 | Victoria Gorman

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GLOBE Data > Data Entry

◀ GLOBE Data

Data Entry

- Live Data Entry
- Training Data Entry
- Email Data Entry (EMDE)
- Data Entry Mobile App

Data Entry

GLOBE Data Entry consists of several options:

Live Data Entry – These pages are for entering environmental data – collected at defined sites, according to protocol, and using approved instrumentation – for entry into the official GLOBE science database.

Training Data Entry – These pages are for practicing data entry, either during workshops or when providing others a view of the data entry process. These data

http://www.globe.gov/web/guest/home

THE GLOBE PROGRAM *SCIENCE Data Entry*

English

Welcome Victoria Gorman

Welcome to the GLOBE data entry site.

My Bookmarks

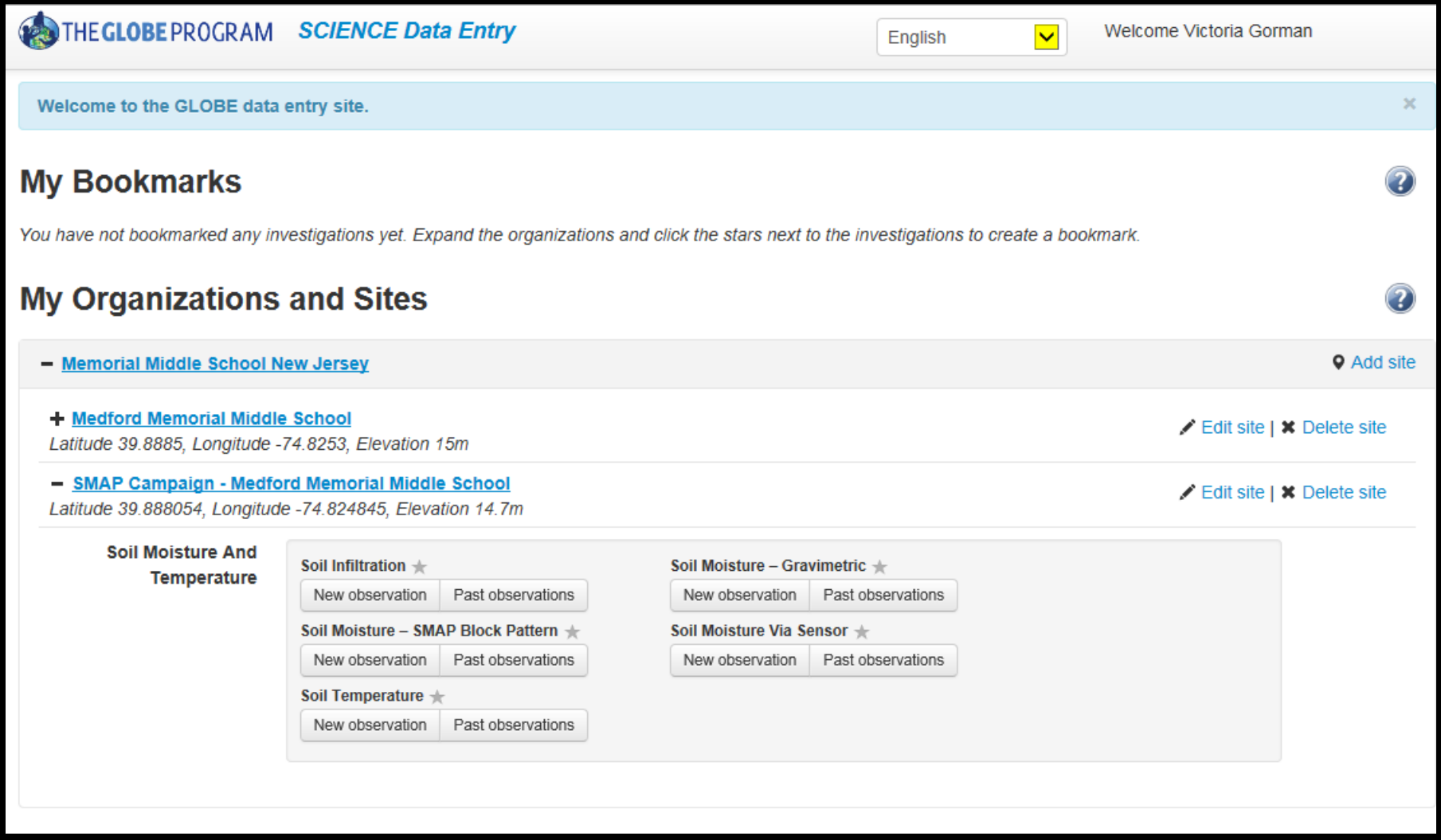
You have not bookmarked any investigations yet. Expand the organizations and click the stars next to the investigations to create a bookmark.

My Organizations and Sites

− **Memorial Middle School New Jersey** — Add site

+ **Medford Memorial Middle School** — Edit site | Delete site
Latitude 39.8885, Longitude -74.8253, Elevation 15m

+ **SMAP Campaign - Medford Memorial Middle School** — Edit site | Delete site
Latitude 39.888054, Longitude -74.824845, Elevation 14.7m


THE GLOBE PROGRAM
SCIENCE Data Entry
English
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Add site
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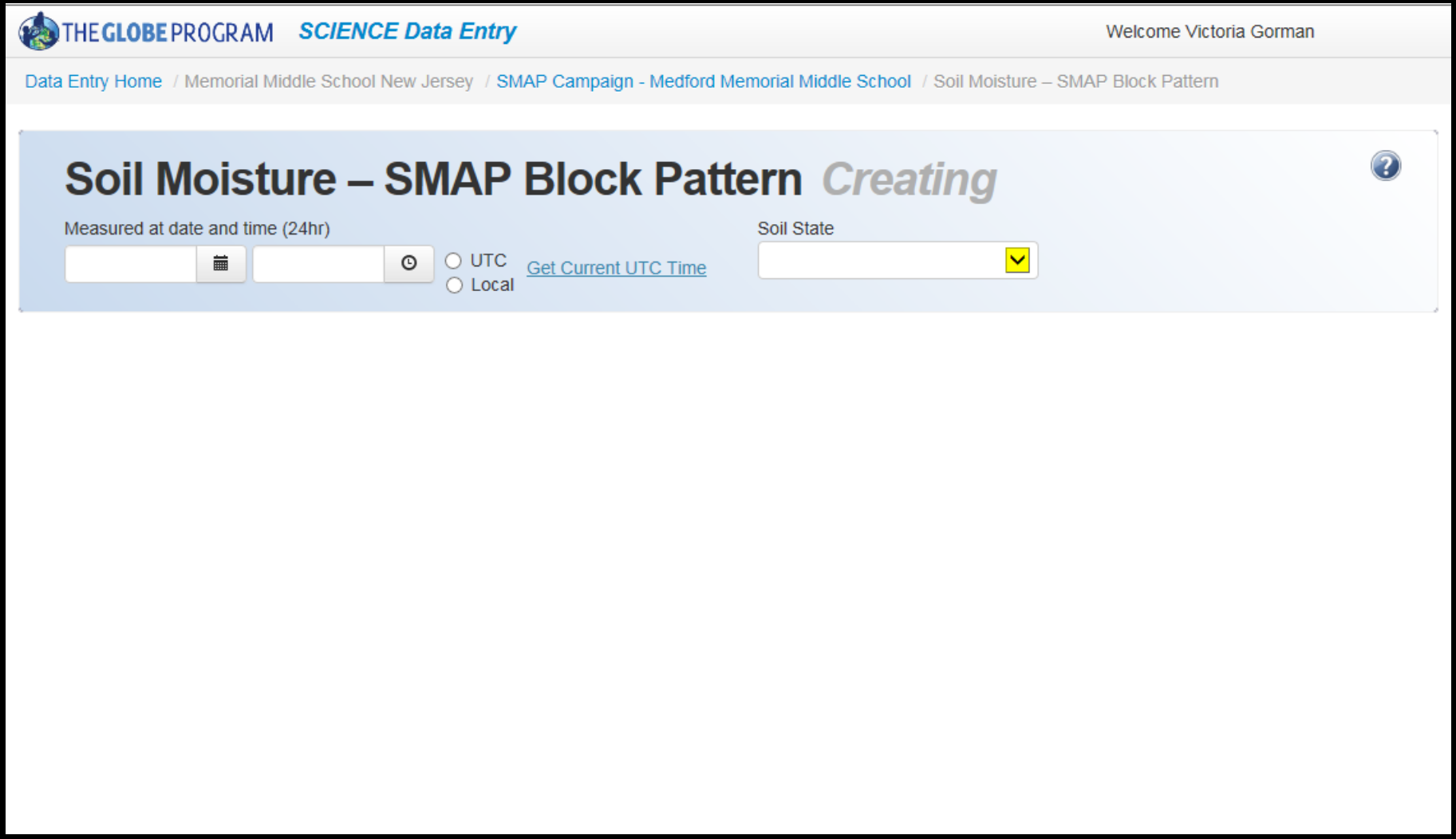
Edit site | Delete site
SMAP Campaign - Medford Memorial Middle School
Latitude 39.888054, Longitude -74.824845, Elevation 14.7m
Edit site | Delete site
Soil Moisture And Temperature
Soil Infiltration
New observation
Past observations
Soil Moisture – Gravimetric
New observation
Past observations
Soil Moisture – SMAP Block Pattern
New observation
Past observations
Soil Moisture Via Sensor
New observation
Past observations
Soil Temperature
New observation
Past observations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Data Entry Home / Memorial Middle School New Jersey / SMAP Campaign - Medford Memorial Middle School / Soil Moisture – SMAP Block Pattern
Soil Moisture – SMAP Block Pattern Creating
Measured at date and time (24hr)
UTC
Local
Get Current UTC Time
Soil State

THE GLOBE PROGRAM *SCIENCE Data Entry* Welcome Victoria Gorman

Data Entry Home / Memorial Middle School New Jersey / SMAP Campaign - Medford Memorial Middle School / Soil Moisture – SMAP Block Pattern

Soil Moisture – SMAP Block Pattern *Creating*

Measured at date and time (24hr)

2016-03-14 12:10 (UTC / Local) Get Current UTC Time

Soil State: Measurable

Your UTC time converted to Local (EDT) time is 2016-03-14 08:10

* indicates required sections or fields

Drying

Drying Method *: Other

Average Drying Time (HH:mm): 15 : 15

Weight Measurement

Wet soil *(a)* *: 247.9 g

Dry soil *(b)* *: 192.3 g

Water weight *(c)*: *a - b* = ***55.60 g***

Empty container weight *(d)* *: 14.0 g

Dry soil weight *(e)*: *b - d* = ***178.30 g***

Gravimetric Soil Moisture *(f)*: *c / e* = ***0.31 g/g***

Empty container weight *(d)*	Dry soil weight *(e)*	Gravimetric Soil Moisture *(f)*
14.0 g	*b - d* = ***178.30 g***	*c / e* = ***0.31 g/g***

Container Volume Measurements

Container Volume Measurements are required at least once out of every 10 weight measurements, but can be repeated more frequently if desired. Below is your most recently measured Average Sample Volume.

Previous Average Sample Volume: 235 ml Measured on: 2016-02-22

Number of samples since last volume measurement: 6

Would you like to:

(•) Continue to use this value ( ) Enter new measurement

Measure the Initial and Final volume of your measuring cylinder and the container volume will be calculated automatically.

	Initial Volume (V_i) *	Final Volume (V_f) *	Container Volume Measurements (V_i - V_f)
Sample 1	315 ml	80 ml	$V_i - V_f$ = ***235.00 ml***
Sample 2	325 ml	90 ml	$V_i - V_f$ = ***235.00 ml***
Sample 3	335 ml	100 ml	$V_i - V_f$ = ***235.00 ml***

New Average Sample Volume: **235.00 ml**

OBSERVATION NUMBER _____

Ready for Computer? _____ Initials _____ In Computer? _____ Initials _____

Soil (Pedosphere) Investigation

Soil Moisture Data Sheet - SMAP Block Pattern

* Required Field

Study Site: Medford Memorial Middle School

Observer names: _____

Date samples collected: Date (Year-Month-Day): _____

Local Time: ____:____ (Hours:Min) UT ____:____ (Hours:Min)

Soil State: (check one) *

❒ Measureable ❒ Frozen ground ❒ Snow on ground ❒ Graupel on ground

❒ Hail on Ground ❒ Frozen water on ground

Note: If Measureable is selected, continue below; all other selections stop here.

Note: If the ground is saturated with puddles (standing water), check "Frozen water on ground" and in the notes section, write "Ground saturated with liquid water, not frozen."

Drying:

Drying Method (oven and temperature range) Other (heat lamps) Drying time (hrs:min): _____

Weight Measurements:

	Container with sample before drying (a)	Container with sample after drying (b)	Water Weight (c) a - b = xx g *(Calculated value by database)*	Empty Container Weight (d)	Dry Soil Weight (e) b - d = xx g *(Calculated value by database)*
Sample	____ g	____ g			____ g

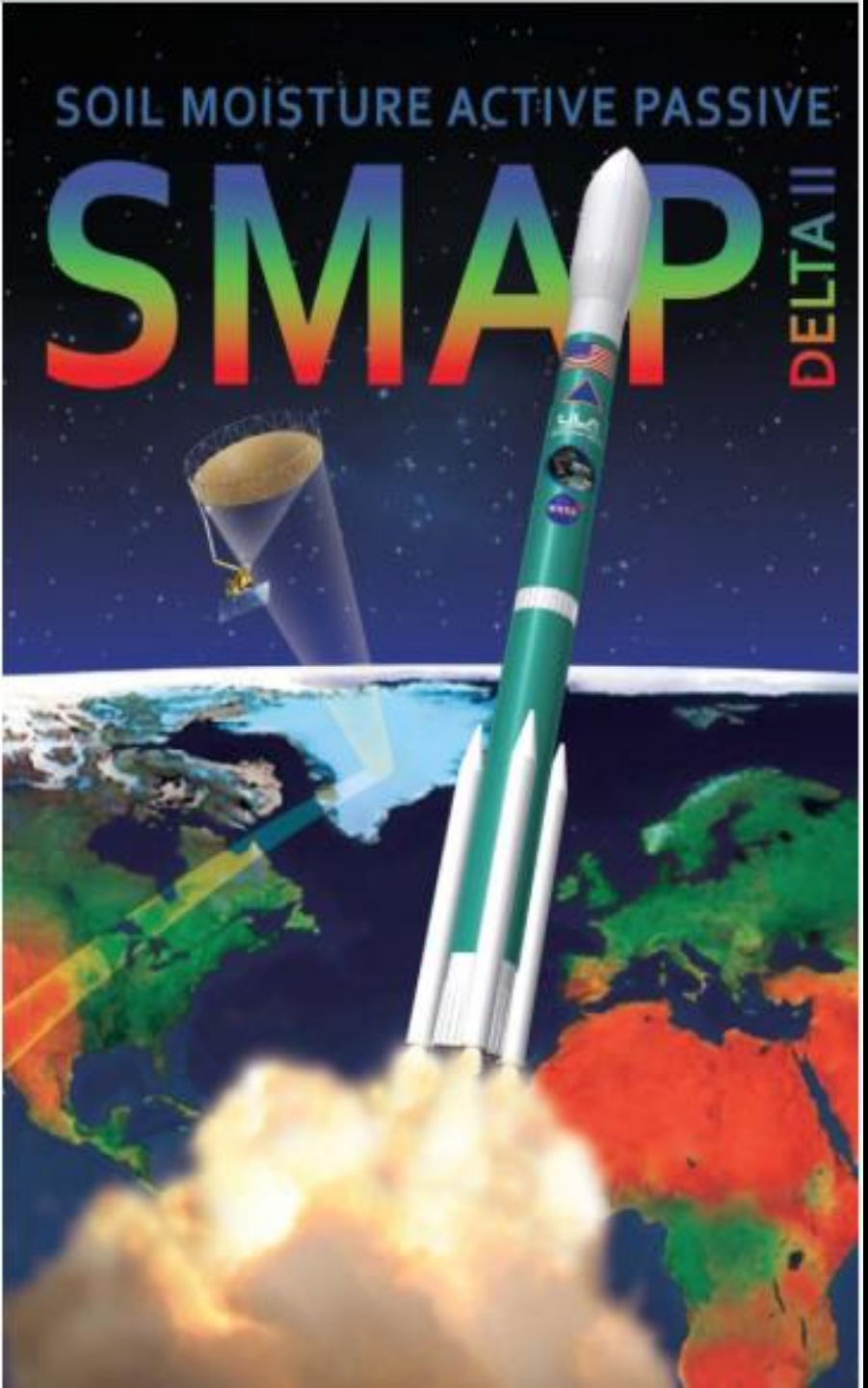
Gravimetric Soil Moisture (f) c / e = xx g/g *(Calculated value by database)*

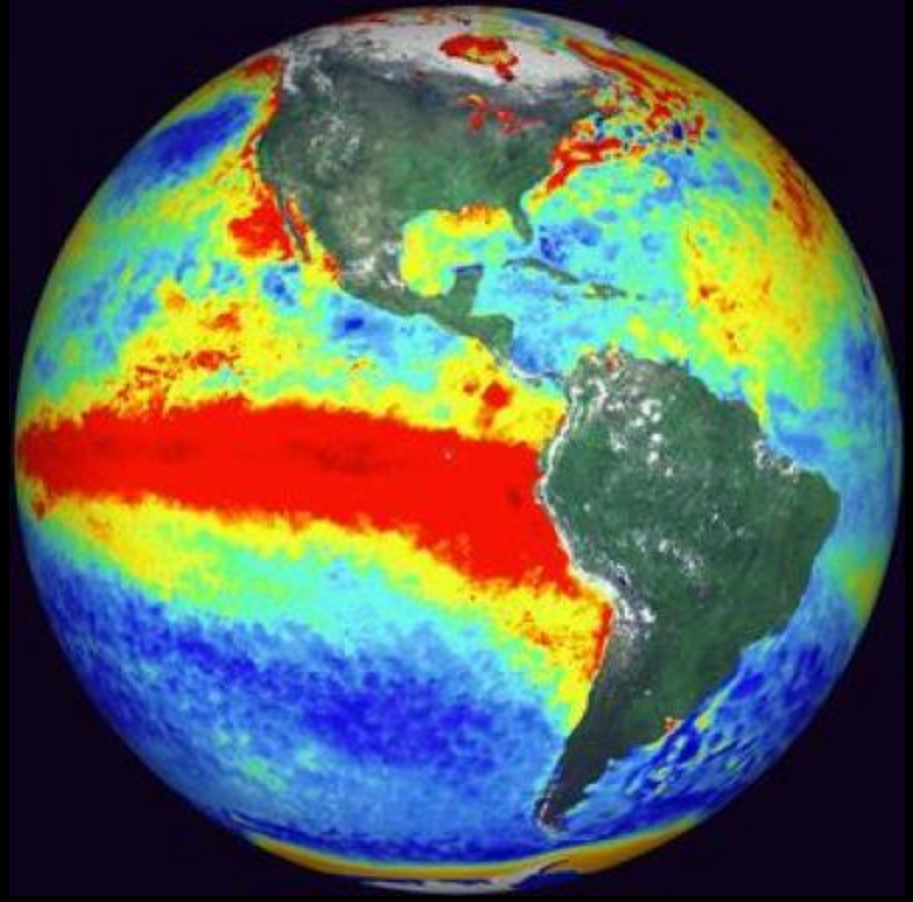
Container Volume Measurements:

Container volume measurements are required at least once out of every 10 weight measurements, but can be repeated more frequently if desired. Below is your most recently measured Average Sample Volume

Measure the Initial and Final volume of your measuring cylinder 3 times; container volume and average container volume will be calculated during data entry

	Initial Volume (V_i)	Final Volume (V_f)	Container Volume (V_i - V_f) *(Calculated value by database)*
Sample 1	____ mL	____ mL	





Vicky Gorman
vgorman@medford.k12.nj.us

Biometry – Tree Canopy Cover

Canopy Cover and Ground Cover
Field Guide

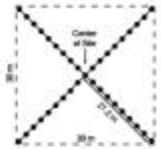
Task

Take ground and canopy cover measurements while pacing half-diagonals to determine the MUC class of your Land Cover Sample Sites.

What You Need

- ❑ Tubular densiometer
- ❑ Tree Canopy and Ground Cover Data Sheet
- ❑ Shrub Canopy and Ground Cover Data Sheet
- ❑ Compass
- ❑ Species ID keys and/or other local sp guides
- ❑ Pen or pencil
- ❑ Clipboard

In the Field



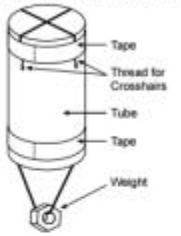
Land Cover Sample Site with the four 21.2 m half diagonals (in the NE, SE, SW and NW directions) sampling.

- Locate the center of your homogeneous Land Cover Sample Site. This is your starting point. Take the measurements described in Steps 2 and 3 from the cent of the Sample Site by walking the distance of a half-diagonal (21.2 m) in each of following four directions: NE, SE, SW and NW (using a compass for bearing). S after each pace (2 steps) to complete Steps 2 and 3.
- There are two possible data sheets to use for measuring Canopy and Ground Cover, the Tree Canopy and Ground Cover Data Sheet or the Shrub Canopy and Ground Cover Data Sheet. The following step will help you decide which one to However, if you are still confused about which sheet to use, you may want to ch a different site where the decision is clearer.

Investigation Instruments: Densiometer

B. Densiometer

Figure BIO-D-1: Homemade Densiometer



A densiometer is an instrument used for taking measurements of canopy cover as part of the biometry measurements described in the Biometry Protocol. The following includes directions to construct and use the densiometer.

Required Materials

- 4 cm diameter by 7.5 cm long tube (toilet paper tubes, construction paper, PCV pipe)
- 34 cm of thread or dental floss
- metal nut or washer
- tape

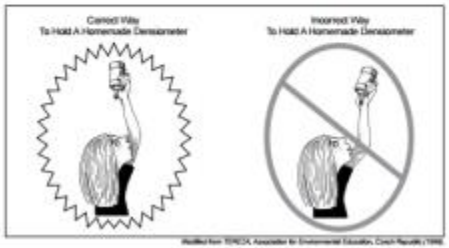
Construction

1. Gather the required materials for each densiometer.
2. Attach (with tape) two threads at right angles across the diameter of one end of the tube to form a crosshair. Leave a slight end hanging at the bottom of the tape so you can tighten the threads if they loosen.
3. Attach (with tape) an 18 cm piece of thread with a metal nut or washer hanging loosely from it across the diameter of the other end of the tube (opposite the crosshairs).

Directions for Use

1. Look up through the densiometer, making sure the densiometer is vertical and the metal nut/washer is directly below the intersection of the crosshairs at the top of the tube. See Figure BIO-D-2 and Figure LAND-SS-6. **Note:** Only use the densiometer for looking UP at the canopy cover. Do not use it for looking DOWN at ground cover.

Figure BIO-D-2: Correct and Incorrect Way to Hold a Homemade Densiometer



GRS Densiometer

Mike Jabot

PRIRODOSLOVNA I GRAFIČKA ŠKOLA RIJEKA,CROATIA

BIOMETRY

MARINA PAVLIĆ

RED TAPE TO MARK THE LINES OF THE PIXEL

USING FLEXIBLE MEASURING TAPE

WHAT DO YOU NEED FOR CANOPY AND GROUND COVER

1.FLEXIBLE MEASURING TAPE

2.RED TAPE TO MARK THE PIXEL

3.GPS

4.DENZIOMETER-STUDENTS CAN MAKE THEM.BETTER TO H
MY STUDENTS MADE THEM FROM TOILET PAPER TUBES (
THROUGH IT AND KEEP IT VERTICAL- THE WEIGHT ASSUR

5.CLINOMETER-YOU CAN MAKE IT OR BUY IT (30$ WITH CO

6.COMPASS-COMES WITH CLINOMETER

7.MUC FIELD GUIDE

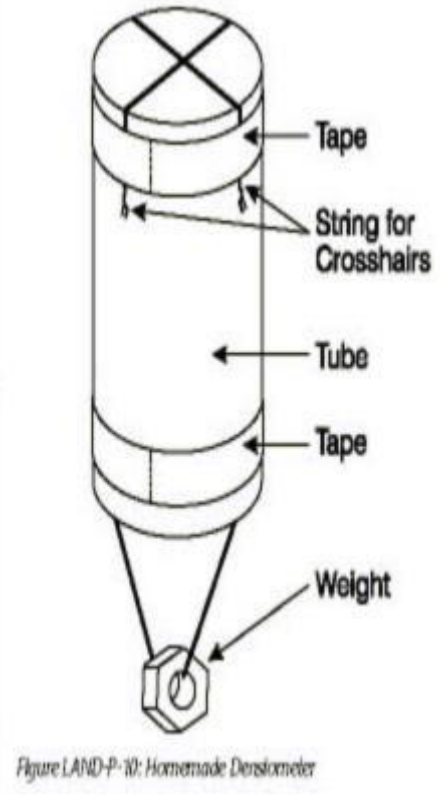


Figure LAND-P-10: Homemade Densiometer

STEPS TO TAKE

1.CHOOSE THE PIXEL,MEASURE THE CENTER
COORDINATES
2.TAKE STEPS AND DO THE CANOPY AND GROUND
COVER USING DENSIOMETER
3.MEASURE TREE HEIGHT WITH CLINOMETER
4.MEASURE TREE CIRCUMFERENCE
5.DETERMINE DOMINANT AND CO-DOMINANT TYPE
6.CONSULT MUC FIELD GUIDE TO DETERMINE THE COVER TYPE AND WRITE A MUC NUMBER