

# Citizen Science: Precipitation

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Kathleen Heikkinen

**“Super Science for Super Teachers – Continuing Changing the Equation” (S3T-C2tE) – Partnership between Madonna University, Lawrence Technological University and the Michigan Department of Education**

# Presentation Objectives

- I can investigate Citizen Science Projects.
- I can use technology to learn and collaborate on Citizen Science Projects.
- I can formulate real-world STEM connections beyond the classroom.

# CoCoRaHS

Community Collaborative Rain,  
Hail, and Snow Network

<http://cocorahs.org>

The next video can be found at:

<https://www.youtube.com/watch?v=YBbO4FnNizg>



# CoCoRaHS's main focus is to provide:

**Quality Precipitation Data  
&  
Educational Opportunities**

to help the public better  
understand weather and climate



# CoCoRaHS observations are used by many

- National Weather Service
- Other Meteorologists
- Hydrologists
- Emergency Managers
- City Utilities
  - Water supply
  - Water conservation
  - Storm water
- Insurance adjusters
- USDA -- Crop production
- Engineers
- Scientists studying storms
- Mosquito Control
- Farm Service Agency
- Ranchers and Farmers
- Outdoor & Recreation
- Teachers and Students
- Geoscience education tool
- Taking Measurements
- Analyzing data
- Organizing Results
- Conducting Research
- Helping the Community
- Emergency Managers
- City Utilities
  - Water supply
  - Water conservation
  - Storm water





## Training Slide Shows

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# Online Training Slide Shows

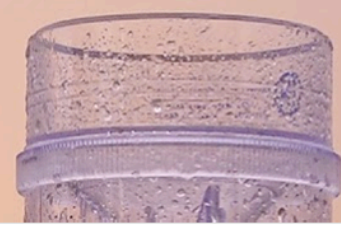
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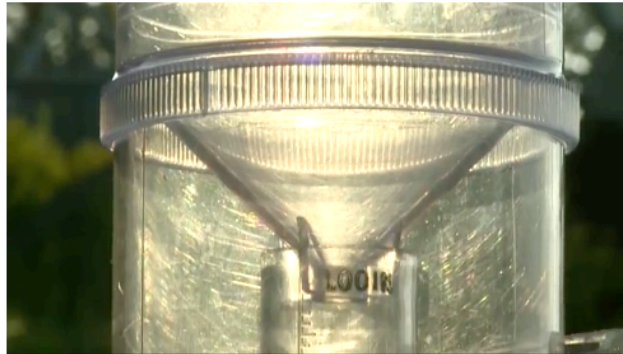
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### CoCoRaHS

4,569 views 2 years ago

Colorado State University's land-grant mission of "Teaching, Research, Service, and Extension" is embodied in the Community Collaborative Rain, Hail, and Snow Network, a technologically innovative partnership that combines community partnership, education, and research. Starting in 1998, this award winning program has grown from a local community project to a nationwide crowd-sourcing program engaging over 16,000 participants. Its unique approach to data collection and research has made i... [Read more](#)

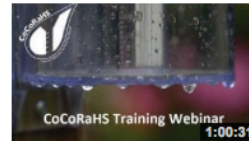
## Training

CoCoRaHS Training Videos



### Measuring Precipitation

by CoCoRaHS HQ  
2,755 views • 8 months ago



### New to CoCoRaHS? Need a Refresher on Observing?...

by CoCoRaHS HQ  
493 views • 8 months ago



### Getting started with CoCoRaHS - Introductory...

by CoCoRaHS HQ  
644 views • 2 years ago




### Measuring Precipitation: Unique Situations and...

by CoCoRaHS HQ  
666 views • 1 year ago

# Recording Data - Mobile

Logout Precip Report Details



**MI-OK-79**  
Bloomfield Township 2.0 NNE

Precipitation Report

Observation Date 2015-01-27


Observation Time 07:00

Rain/Melted Snow 0.00

Trace Precip [More Details](#)

Metric Units (mm/cm)

Submit



**MI-OK-79**  
Bloomfield Township 2.0 NNE

Precip Report History

2015-01-27	0.00"
2015-01-17	0.00"
2015-01-02	Trace
2015-01-01	Trace



### My Data Entry : Daily Precipitation Report Form

#### Enter My New Reports

- [Daily Precipitation](#)
- [Multi-Day Accumulation](#)
- [Hail](#)
- [Significant Weather](#)
- [Monthly Zeros](#)
- [Drought Impact Report](#)

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#### Precipitation Report Form

Submit Data Reset

Station Number : MI-WY-52

Station Name : Livonia 2.0 NE

\* Denotes Required Field

2/16/2015

\*Observation Date

7:00

AM

\*Observation Time

0.00

in.

\*Rain and Melted Snow to the nearest hundredth inch that has fallen in the gauge during the past 24 hours, or T for trace, or NA for unknown.

Observation Notes: (This will be available to the public)

Text input field for observation notes

#### New Snowfall

NA

in.

Accumulation of new snow in inches to the nearest tenth

NA

in.

Melted value from core to the nearest hundredth

#### Total Snow and Ice on Ground at Observation Time

NA

in.

Depth of total snow and ice (new and old) in inches to the nearest half inch

NA

in.

Melted value from core to the nearest hundredth

#### Duration Information

If a time is unknown or the storm has not ended leave it blank.

Precipitation Began

Time input field

AM PM

Precipitation Ended

Time input field

AM PM

Heaviest Precipitation Began

Time input field

AM PM

Heaviest Precipitation Lasted

Minutes input field

minutes

These times are:

Select Time Accuracy dropdown

#### Additional Information

Recording Data – Web-Based

# Data Reported by Stations

- Dave MI – WY – 52
- Susan MI – OK – 79
- Kathleen MI – OK – 85

# Tools of the Trade – Rain



# Tools of the Trade - Snow





# It's March Madness! Join Today



<http://youtu.be/PiMQWL2TKIM>

Lincoln Middle School  
2014-2015

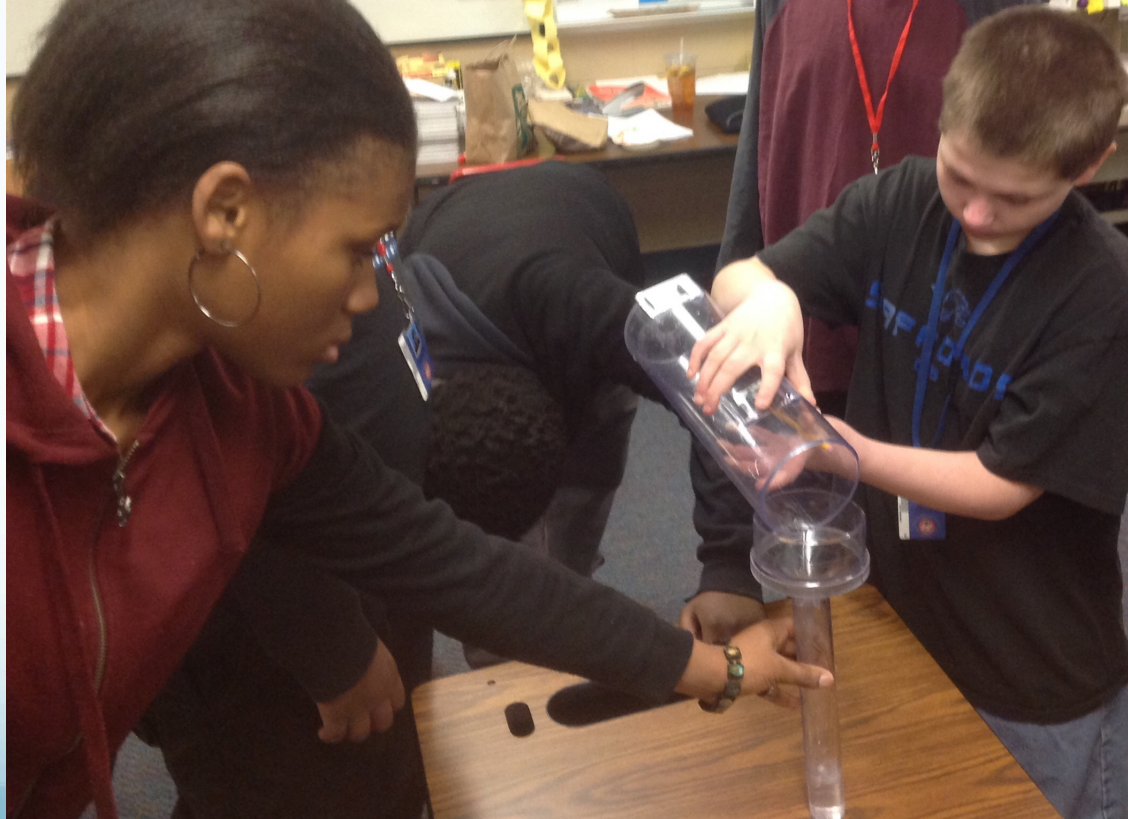
Mrs. Heikkinen's 8<sup>th</sup> Grade Students Warren, MI



Do You Remember August 11, 2014?



# Citizen Scientists Investigate!





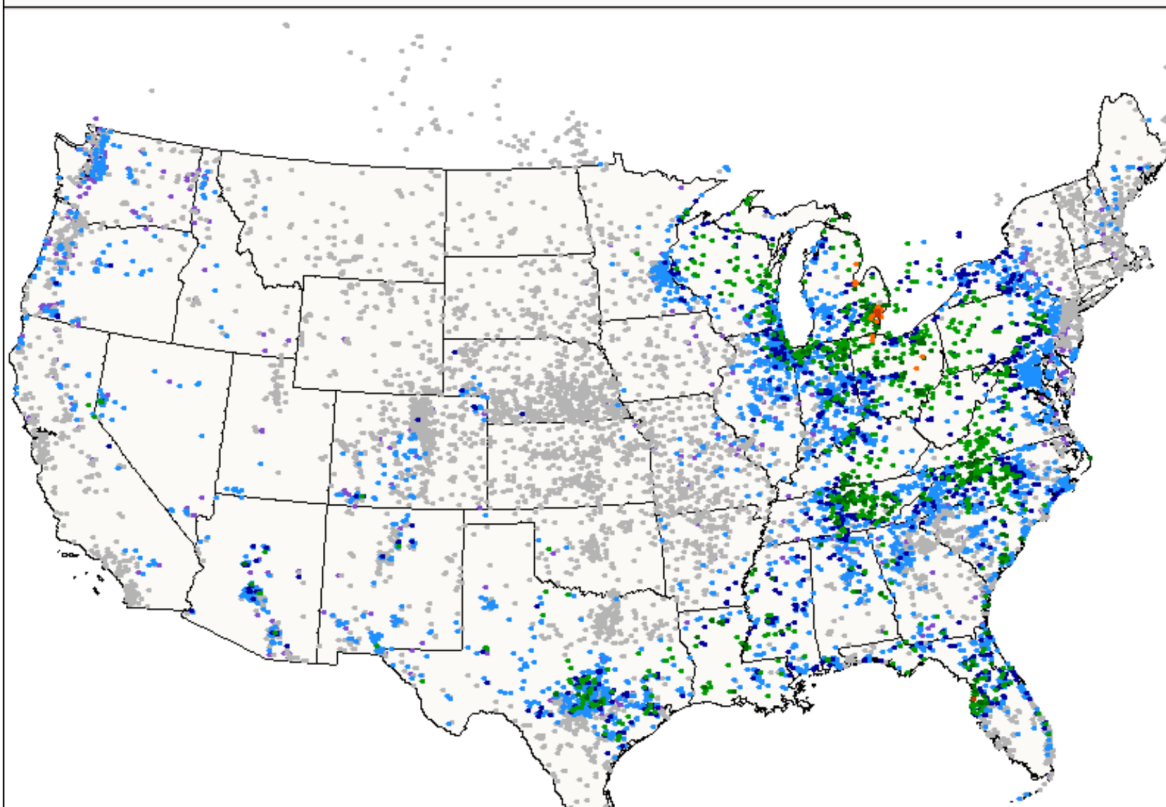
## Maps : Daily Precipitation

Map Type	Map Location	Date	Colors
Precipitation	National	No State Selected	8/12/2014
			Standard
			Get Map

Daily Precipitation (inches x.xx), for the 24 hour period ending ~7:00 am

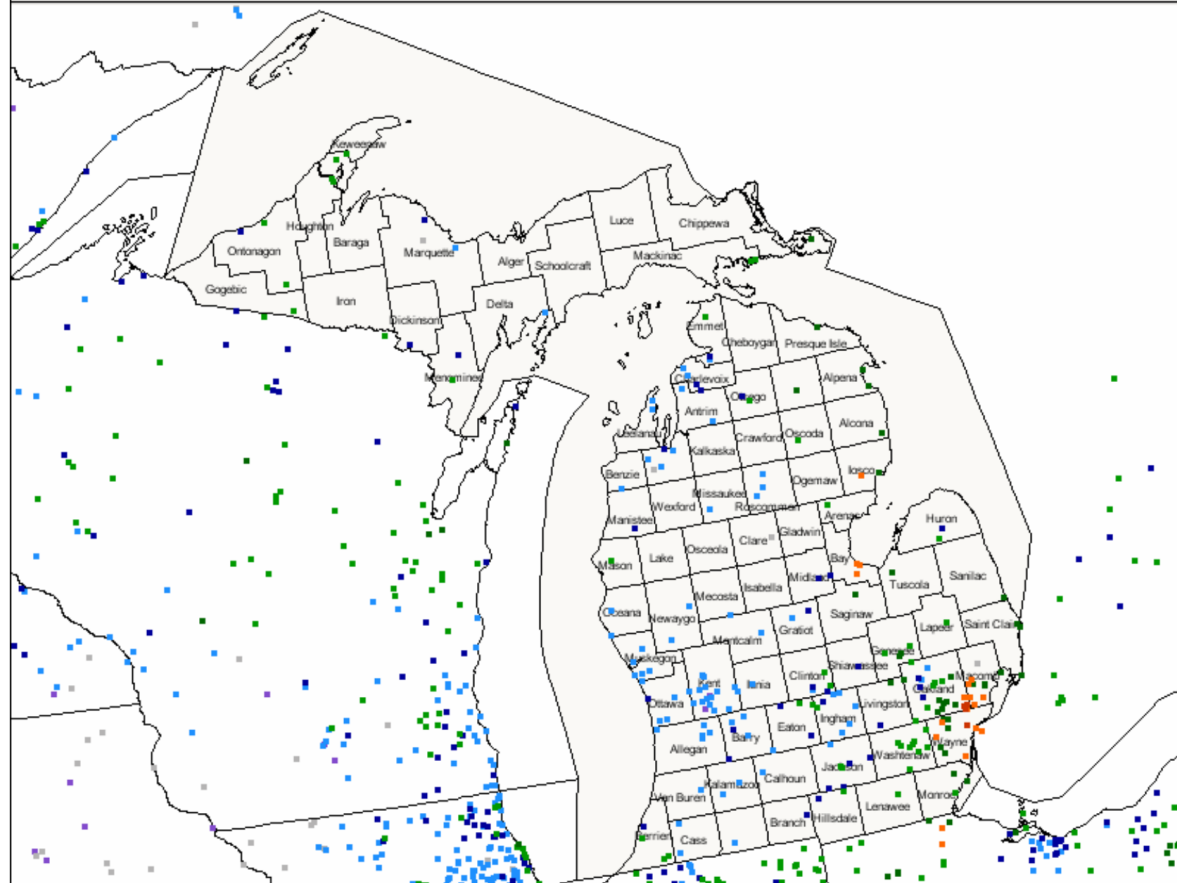
USA 8/12/2014

0.0 Trace 0.01 - 0.32 0.33 - 0.64 0.65 - 1.59 1.60 - 3.80 3.81 - 5.69 5.70 - 6.31





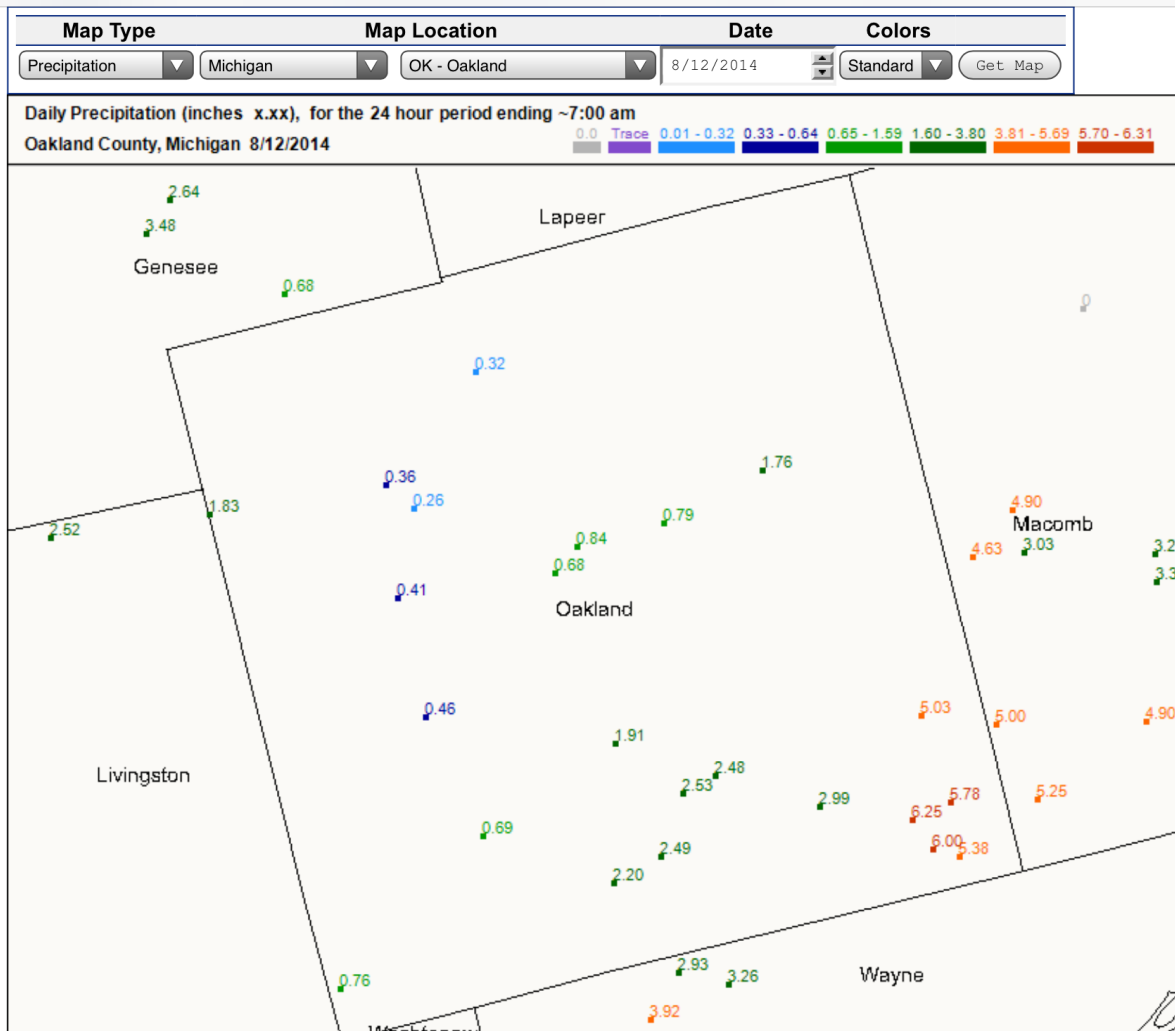
Michigan 8/12/2014



For questions or comments concerning this web page please contact [info@cocorahs.org](mailto:info@cocorahs.org).

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Privacy Policy Data Usage Policy Copyright © 1998-2014, Colorado Climate Center, All rights reserved.



8:01 PM cocorahs.org

			Number		in.	in.	in.		
<b>FROST Data</b>									
8/12/2014	7:00 AM	MI-MG-19	North Muskegon 2.4 NW	0.13	NA	NA	MI	Muskegon	
8/12/2014	7:00 AM	MI-NW-2	Grant 4.8 NW	0.32	NA	NA	MI	Newaygo	
8/12/2014	7:00 AM	MI-NW-8	White Cloud 7.5 ENE	0.28	NA	NA	MI	Newaygo	
8/12/2014	7:00 AM	MI-OK-12	West Bloomfield Township 2.8 SE	2.53	NA	NA	MI	Oakland	
8/12/2014	7:00 AM	MI-OK-47	Bloomfield Township 3.1 SW	2.48	NA	NA	MI	Oakland	
8/12/2014	7:00 AM	MI-OK-53	Wixom 1.3 NE	0.69	NA	NA	MI	Oakland	
8/12/2014	7:00 AM	MI-OK-61	Davisburg 0.8 NNE	0.36	NA	NA	MI	Oakland	
8/12/2014	7:00 AM	MI-OK-62	Lake Orion 4.3 SSE	1.76	NA	NA	MI	Oakland	
8/12/2014	7:00 AM	MI-OK-70	Ferndale 0.3 NNW	5.38	NA	NA	MI	Oakland	
8/12/2014	7:00 AM	MI-OK-80	Royal Oak 1.4 ESE	5.78	NA	NA	MI	Oakland	
8/12/2014	7:00 AM	MI-OK-83	Farmington Hills 1.2 N	2.49	NA	NA	MI	Oakland	
8/12/2014	7:00 AM	MI-OK-85	Troy 1.8 S	5.03	NA	NA	MI	Oakland	
8/12/2014	7:00 AM	MI-OC-2	Montague 8.1 NW	0.03	0.0	NA	MI	Oceana	
8/12/2014	7:00 AM	MI-OC-3	Hart 3 WSW	0.15	0.0	0.0	MI	Oceana	
8/12/2014	7:00 AM	MI-OD-3	Luzerne 2.4 NE	0.65	NA	NA	MI	Oscoda	
8/12/2014	7:00 AM	MI-OT-1	Gaylord 2.2 SE	0.96	0.0	0.0	MI	Otsego	
8/12/2014	7:00 AM	MI-OW-26	Grand Haven 4.2 S	0.42	NA	NA	MI	Ottawa	
8/12/2014	7:00 AM	MI-RS-4	Roscommon 4.7 SW	0.18	NA	NA	MI	Roscommon	
8/12/2014	7:00 AM	MI-SC-7	Port Huron 2.0 SSW	1.94	NA	NA	MI	St. Clair	
8/12/2014	7:00 AM	MI-SC-8	Algonac 0.4 SW	2.02	NA	NA	MI	St. Clair	
8/12/2014	7:00 AM	MI-VB-4	Paw Paw 3.6 NNE	0.11	NA	NA	MI	Van Buren	
8/12/2014	7:00 AM	MI-WS-3	Plymouth 5.4 W	1.08	NA	NA	MI	Washtenaw	
8/12/2014	7:00 AM	MI-WS-7	Ann Arbor 3.1 SE	1.15	0.0	0.0	MI	Washtenaw	
8/12/2014	7:00 AM	MI-WS-18	Ypsilanti 1.1 ENE	1.53	NA	NA	MI	Washtenaw	
8/12/2014	7:00 AM	MI-WS-20	Ann Arbor 1.7 NNW	1.24	NA	NA	MI	Washtenaw	
8/12/2014	7:00 AM	MI-WS-24	Ann Arbor 2.6 NNE	1.15	NA	NA	MI	Washtenaw	
8/12/2014	7:00 AM	MI-WS-25	Saline 3.8 SSW	1.37	NA	NA	MI	Washtenaw	
8/12/2014	7:00 AM	MI-WS-28	Dexter 0.3 ENE	0.73	NA	NA	MI	Washtenaw	

- Frost
- Optics
- Snowflake
- Thunder

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8:02 PM cocorahs.org

8/12/2014	7:00 AM	MI-KN-7	East Grand Rapids 0.7 SSW	T	0.0	0.0	MI	Kent	
8/12/2014	7:00 AM	MI-KN-11	Lowell 1.4 ESE	0.04	0.0	NA	MI	Kent	
8/12/2014	7:00 AM	MI-KN-14	Grandville 1.3 WSW	0.02	0.0	0.0	MI	Kent	
8/12/2014	7:00 AM	MI-KN-17	Alto 4.5 SW	0.04	NA	NA	MI	Kent	
8/12/2014	7:00 AM	MI-KN-31	Byron Center 2.9 NE	T	NA	NA	MI	Kent	
8/12/2014	7:00 AM	MI-KN-39	Wyoming 0.5 NNE	0.02	NA	NA	MI	Kent	
8/12/2014	7:00 AM	MI-KN-43	Caledonia 4.4 WNW	0.03	NA	NA	MI	Kent	
8/12/2014	7:00 AM	MI-KN-64	Grand Rapids 3.8 SE	0.06	NA	NA	MI	Kent	
8/12/2014	7:00 AM	MI-KN-65	Belmont 1.0 WNW	0.13	NA	NA	MI	Kent	
8/12/2014	7:00 AM	MI-LP-1	Lum 1.0 NW	0.96	NA	NA	MI	Lapeer	
8/12/2014	7:00 AM	MI-LL-3	Northport 0.1 SW	0.04	NA	NA	MI	Leelanau	
8/12/2014	7:00 AM	MI-LN-7	Adrian 5.2 NE	1.47	NA	NA	MI	Lenawee	
8/12/2014	7:00 AM	MI-MB-7	Shelby 0.4 SSE	4.90	NA	NA	MI	Macomb	
8/12/2014	7:00 AM	MI-MB-9	New Baltimore 0.4 SSE	2.34	NA	NA	MI	Macomb	
8/12/2014	7:00 AM	MI-MB-16	Clinton 2.3 N	3.28	NA	NA	MI	Macomb	
8/12/2014	7:00 AM	MI-MB-44	Warren 1.6 W	5.25	NA	NA	MI	Macomb	
8/12/2014	7:00 AM	MI-MQ-1	Marquette 5.5 SSE	0.23	NA	NA	MI	Marquette	
8/12/2014	7:00 AM	MI-MQ-15	Marquette 16.0 NW	0.52	NA	NA	MI	Marquette	
8/12/2014	7:00 AM	MI-MD-4	Midland 4.4 W	0.58	NA	NA	MI	Midland	
8/12/2014	7:00 AM	MI-MK-1	Lake City 5.0 SSW	0.23	NA	NA	MI	Missaukee	
8/12/2014	7:00 AM	MI-MR-1	Newport 3.1 SE	2.08	NA	NA	MI	Monroe	
8/12/2014	7:00 AM	MI-MR-4	Monroe 3.1 SW	1.55	NA	NA	MI	Monroe	
8/12/2014	7:00 AM	MI-MT-5	Stanton 5.0 ENE	0.07	NA	NA	MI	Montcalm	
8/12/2014	7:00 AM	MI-MY-2	Atlanta 0.9 SW	1.94	NA	NA	MI	Montmorency	
8/12/2014	7:00 AM	MI-MG-12	Norton Shores 3.0 WNW	0.26	NA	NA	MI	Muskegon	
8/12/2014	7:00 AM	MI-MG-18	Norton Shores 2.3 SSE	0.24	NA	NA	MI	Muskegon	

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# Data Leads to Investigation

Integrates the GLOBE Project (talk about later) with CoCoRaHS data.

School site study for 10 days to compare and contrast current data with August 11 flood.

# Atmosphere Investigation

## Data Sheet

School Name Lincoln Middle School 10/7-10/15

Day of the week	T	W	TH	F	M	T	W
Date	10/7	10/8	10/9	10/10	10/11	10/12	10/13
Local time (hour:min)	11:38	10:48	1:01	12:52	10:23	11:35	10:15
Universal time (hour:min)	3:08 pm	2:18 pm	5:01 pm	4:32 pm	2:23 pm	3:30 pm	2:22 pm
Observer name(s)							

### Cloud Type (Check all types seen)

Cirrus	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cirrocumulus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Altostratus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Altostratus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stratus	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stratocumulus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cumulus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nimbostratus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cumulonimbus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### Cloud Cover (Check one)

No clouds (0%)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clear (0% - 10%)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Isolated (10% - 25%)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scattered (25% - 50%)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken (50% - 90%)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overcast (90% - 100%)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Sky obscured	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### If Sky Obscured (Check all that apply)

Fog	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smog	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Haze	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Volcanic ash	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dust	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spray	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Heavy rain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Heavy snow	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blowing snow	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

GLOBE™ 2000

Appendix - 2

Atmosphere

Atmosphere Investigation: Data Sheet - Page 3

## SECTION NINETEEN

Day of the week: T, W, TH, F, M, T, W

Date: 10/7, 10/8, 10/9, 10/10, 10/11, 10/12, 10/13, 10/14, 10/15

### Precipitation pH

Measurement method for pH:  paper  pen  meter

pH of the rain or melted snow - Sample 1	ph 4				ph 4	ph 4	ph 3	ph 4
pH of the rain or melted snow - Sample 2	ph 4				ph 4	ph 5	ph 4	ph 4
pH of the rain or melted snow - Sample 3	ph 4				ph 4	ph 4	ph 4	ph 4
pH of the rain or melted snow - Average								
pH of the melted snowpack: Sample 1								
pH of the melted snowpack: Sample 2								
pH of the melted snowpack: Sample 3								
pH of the melted snowpack: Average								

### Relative Humidity

Dry bulb temperature

(°C) - Sling Psychrometer

Wet bulb temperature

(°C) - Sling Psychrometer

Relative Humidity (%)

81%	65%	55%	50%	83%	78%	80%
-----	-----	-----	-----	-----	-----	-----

### Maximum, Minimum, and Current Temperatures

Current air temperature: (°C)

Maximum daily air temperature: (°C)

Minimum daily air temperature: (°C)

Minimum daily air temperature: (°C)

Minimum daily air temperature: (°C)

56°F	54°F	57°F	56°F	60°F	64°F	59°F
68°F	58°F	58°F	56°F	73°F	73°F	67°F
46°F	48°F	38°F	37°F	53°F	60°F	57°F

Comments (Unusual conditions):

Atmosphere Investigation: Data Sheet - Page 2

School Name \_\_\_\_\_

Day of the week: T, W, TH, F, M, T, W

Date: 10/7, 10/8, 10/9, 10/10, 10/11, 10/12, 10/13, 10/14, 10/15

### Rainfall

Number of days rain has accumulated	1	1	1	1	2	2	3
Rainwater in rain gauge (mm)*	.01	0.00	0.00	0.00	.11	0.00	.65

\* Remember: Record 0.0 when there has been no rainfall or snowfall.

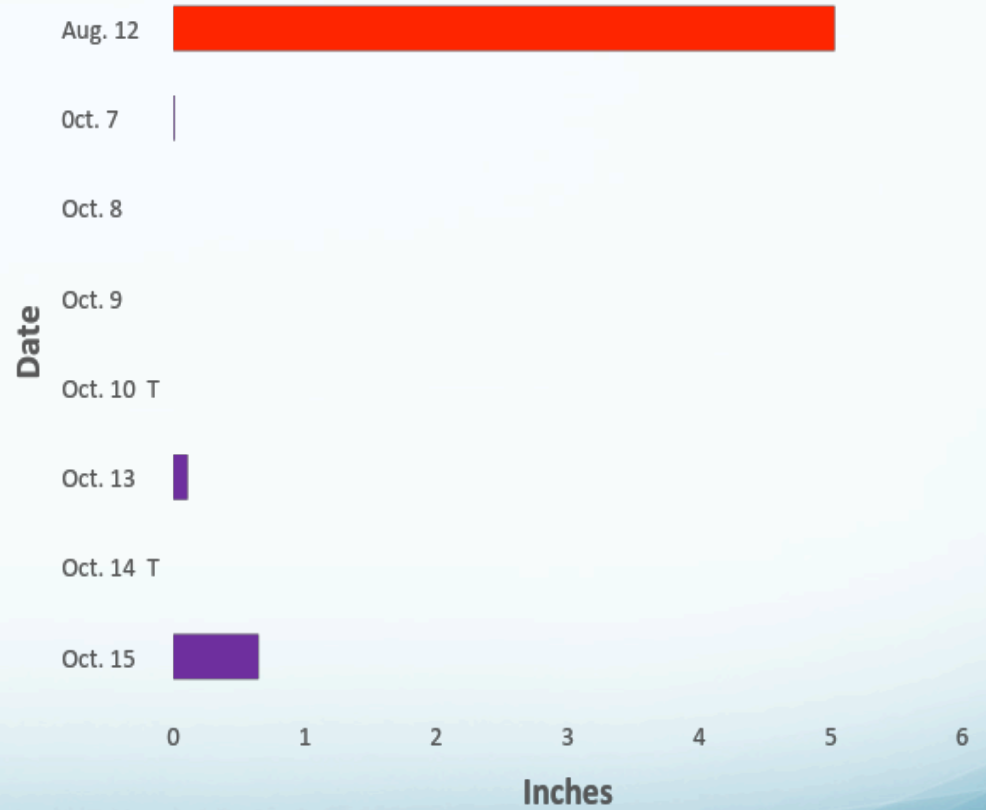
M for missing if you were not able to take an accurate reading.

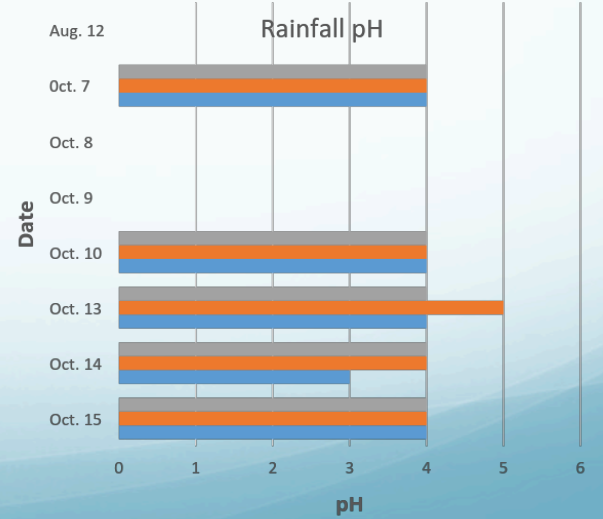
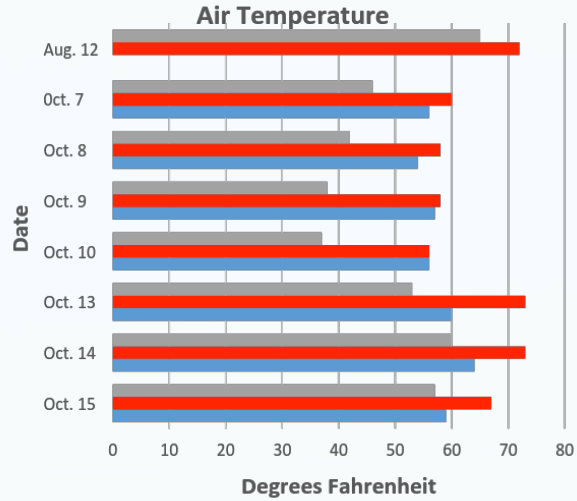
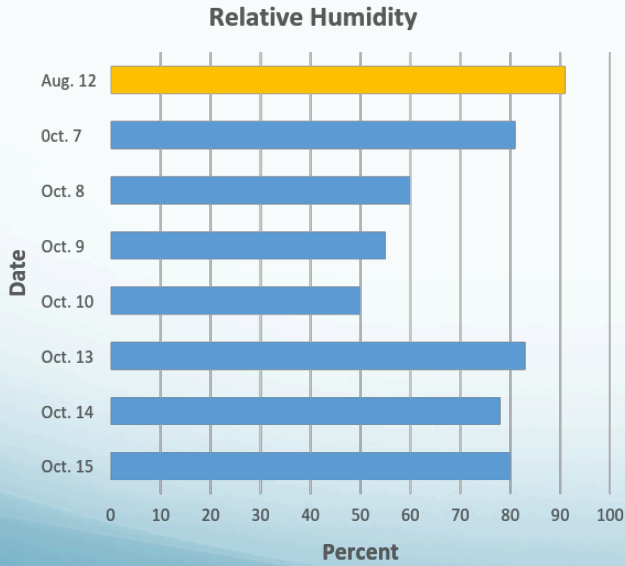
T for trace if the amount of rainfall is less than 0.5 mm.

### Solid Precipitation

Total depth of snowpack on the ground - Sample 1 (mm)							
Total depth of snowpack on the ground - Sample 2 (mm)							
Total depth of snowpack on the ground - Sample 3 (mm)							
Number of days snow has accumulated							

# Rainfall



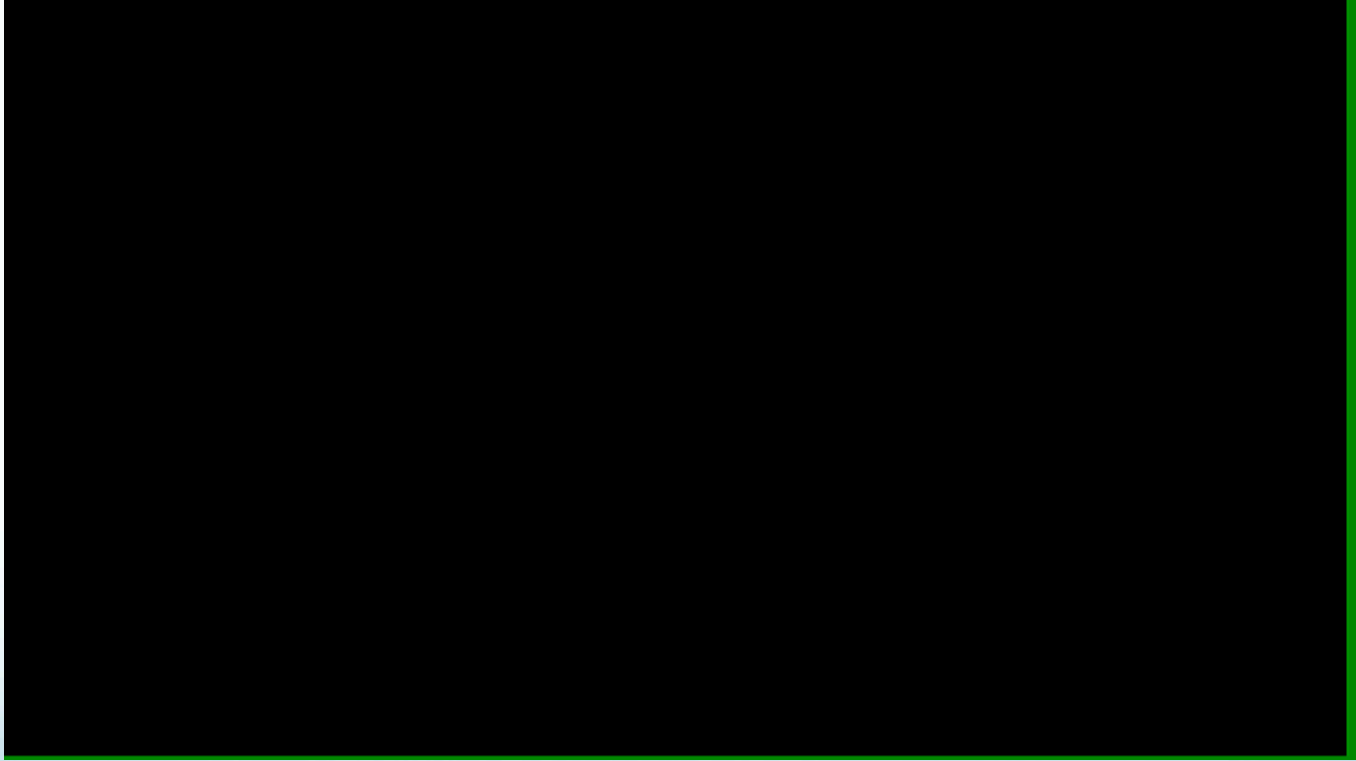


Sit Back, Take a Minute, Reflect





# Welcome to the GLOBE Program



<http://www.globe.gov/globe-videos/home-trailer.mp4>

[globe.gov](http://globe.gov)

The Global Learning and Observations to Benefit the Environment (GLOBE) program is a worldwide hands-on, primary and secondary school-based science and education program.

[globe.gov](http://globe.gov)

GLOBE connects students to  
GLOBE Partner Satellite  
Missions.

## Field Campaigns

Field Campaigns

Satellite Partnerships

Earth System Science Projects

Field Campaign Archive

Join

NASA Satellite Overpass  
Calculator

SMAP

GPM

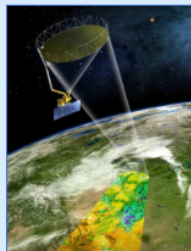
CloudSat

CALIPSO

### Satellite Partnerships

2015 will be an exciting year for NASA Missions and GLOBE! Here are four opportunities to take part in GLOBE Campaigns related to NASA Missions: Soil Moisture Active Passive Mission (SMAP), Global Precipitation Measurement (GPM), CloudSat and CALIPSO.

To stay connected to the GLOBE Partner Satellite Missions, be sure to [sign up to receive communications about the missions](#).



#### Soil Moisture Active Passive Mission (SMAP)

The NASA Soil Moisture Active Passive or SMAP Mission launched on 31 January 2015. Once in orbit and checked out, SMAP will provide measurements of soil moisture and freeze/thaw state. The SMAP Mission will produce daily maps of soil moisture with global coverage every three days.

The SMAP team is looking for GLOBE Program students to take measurements at their schools after the satellite mission is launched. Once the satellite is launched, it will be several months until the satellite sends soil moisture data back to Earth. Once satellite data are available, students will be able to compare these remotely sensed data to the actual soil moisture data that they collect at their school locations. Schools will be able to see how frequently their location will be viewed by SMAP within its 1000-km wide swath every 8 days (SMAP is in an exact 8-day repeat orbit). To see when the satellite will pass over/near your school, you can use this [SMAP Orbit Overpass Calculator Tool](#).

You will have the chance to provide real science data that will help NASA scientists validate real SMAP satellite data. Those schools that participate frequently will interact with actual NASA scientists.

THE GLOBE COMMUNITY, THE SMAP TEAM AND NASA NEED YOUR DATA! YOUR PARTICIPATION IN THE SMAP-GLOBE PROGRAM PARTNERSHIP IS VITAL TO UNDERSTANDING OUR PLANET'S SOIL MOISTURE!

JOIN US TODAY! Get started [HERE](#).



#### Global Precipitation Measurement (GPM)

The Global Precipitation Measurement (GPM) satellite mission "will use multiple satellites orbiting Earth to collect rain, snow and other precipitation data worldwide every three hours." In GLOBE, students also take regular precipitation data. Updates [here](#).

## Field Campaigns

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Satellite Partnerships

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NASA Satellite Overpass Calculator

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GPM

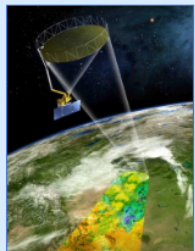
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# Let's Take a Look

<https://www.youtube.com/watch?v=6orv6v4ZLjQ>



# PRECIPITATION MEASUREMENT MISSIONS

Home GPM TRMM Science Applications Meetings Data Access Resources Education

## GPM Launches Field Campaign for Students

This spring, students worldwide are invited to grab rain gauges and learn how scientists use ground measurements to validate satellite precipitation data. NASA's Global Precipitation Measurement, or GPM, mission is partnering with the Global Learning and Observations to Benefit the Environment (GLOBE) program to conduct a field campaign where students will measure rain and snow in their hometowns from Feb. 1 through mid-April 2015 and then analyze the data...



FEATURED ARTICLES

1 2 3 4 5

## TRMM

TROPICAL RAINFALL MEASURING MISSION

Launched by NASA and JAXA in 1997, TRMM carries the first on-orbit active/passive instrument package to study the intensity and structure of tropical rainfall. [Get data](#)



## GPM

GLOBAL PRECIPITATION MEASUREMENT

An international satellite mission launched by NASA and JAXA on Feb. 27, 2014, that will set new standards for precipitation measurements worldwide using a network of satellites united by the GPM Core Observatory. [Get data](#)



## MISSION UPDATES

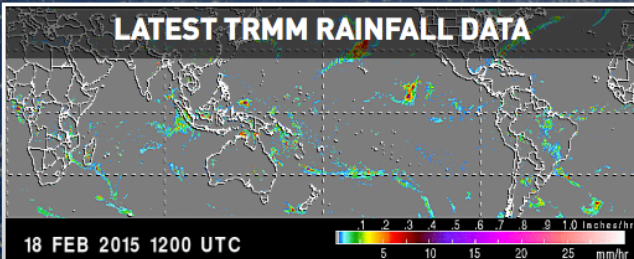
Thursday, December 4, 2014

### Updated GPM Radiometer Products

The Precipitation Processing System (PPS) has begun producing updated GPM radiometer products as of 12/4/2014 due to an error discovered in the calculation of the Sun Angle in the PPS Geolocation... [More...](#)

1 of 83 >>

## LATEST TRMM RAINFALL DATA



[Download TRMM Data](#) | [Extreme Events](#) | [Precipitation Maps](#)

GPM Data

Launch

Multimedia

Science

## GPM

Overview

Join

Documents

Discussions

Useful Links

Members

### The Global Precipitation Measurement (GPM) Satellite Mission

"The Hook"

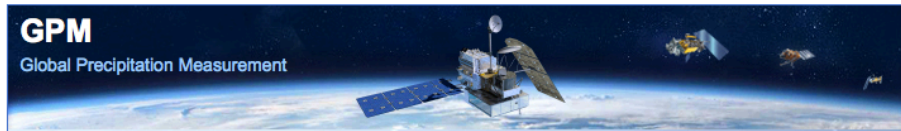
How to Participate

Meet the STEM Team

GPM Resources

Webinars

Blog Posts



#### The GPM Mission

NASA's Global Precipitation Measurement Mission (GPM) measures precipitation from space. GPM [launched](#) from the Tanegashima Space Center, Japan on February 27, 2014. GPM [mission data](#) will advance our understanding of water and energy cycles and extend the use of precipitation data to directly [benefit society](#).

The way satellites "see" rain is not the same as the way rain gauges collect precipitation on the ground, and to make sure the algorithms used by the satellites to provide rain totals are working well, we need to do what is called [ground validation](#). Using a simple rain gauge, teachers and students can help collect data to explore the question, "How do ground-based observations compare to satellite rainfall estimates?" For more information on the GPM-GLOBE Student Field Campaign, click on the "How to Participate" and other links on the left.



*Students reading a rain gauge during an outdoor education program in Montgomery County, Maryland.*

Image Credit: NASA/Dorian Janney

## GPM

**Overview** [Join](#) [Documents](#) [Discussions](#) [Useful Links](#) [Members](#)

"The Hook"

**How to Participate**

Meet the STEM Team

GPM Resources

Webinars

Blog Posts

### How to Participate

You and your students can join the GLOBE community in participating in NASA's Global Precipitation Measurement (GPM) Mission.

To get started, use the following links to download helpful documents:

1. GPM Precipitation Student Field Campaign [Teacher Participation Guide](#)
2. [Overview presentation](#) about the field campaign and GPM Mission
3. [Instrument Construction, Site Selection and Set-Up Guide](#)
4. [Precipitation Protocols](#)
5. [GPM Precipitation Field Campaign Data Sheet](#) (or the [Atmosphere Investigation Integrated 1-Day Data Sheet](#) can be used if other types of atmosphere observations will be made at the same time

#### Purpose:

The GPM Mission looks at one important aspect of the water cycle – precipitation. However, the way satellites "see" rain is not the same as the way rain gauges collect precipitation on the ground, and to make sure the algorithms used by the satellites to provide rain totals are working well, we need to do what is called ground validation. This campaign is an opportunity for students to participate in ground validation for the GPM satellite, looking at the question, "How do ground-based observations compare to satellite rainfall estimates?" Students will also be able to compare their data with that of participating schools around the globe, networks of "official" rain gauges, as well as to long-term climatological data, and look for patterns and anomalies.

#### Timing:

February 1st through April 15th, 2015. Rain gauges should be in place by Friday, January 30th to start data collection the next week. We prefer that you collect daily data during the entire time frame if at all possible, but even a week at the beginning of each month will be helpful. Remember that multi-day accumulations can be submitted over weekends or other periods during which daily observations were not possible.

# Citizen Science

The collection and analysis of data relating to the natural world by members of the general public, typically as part of a collaborative project with professional scientists.



# K12Science

2012

MIDDLE SCHOOL SCIENCE MINUTE-  
CITIZEN SCIENCE


12/7/12

I was recently reading the November, 2012 issue of *Science Scope*, a publication of the National Science Teachers Association. In the magazine, Jennifer Fee and Nancy Trautmann, wrote an article entitled "Connecting to Your Community Through Birds and Citizen Science." Within the article they explained what is meant by the term "Citizen Science." They defined a citizen scientist as a person who collaborates with scientists to gather data on projects and contributes to scientific research.




Please click on the **PLAY** button to enjoy this podcast.

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USA npn National Phenology Network Taking the Pulse of Our Planet

ABOUT US PARTNER WITH US EDUCATE GET DATA PUBLICATIONS NEWS AND EVENTS



### Phenology and Climate Change

The ways in which the world is responding to climate change are not well understood. Phenology is a great indicator of current and future climate impacts on people, plants, animals and our natural areas.

SIGN UP FOR "THE CONNECTION"  First Name  Email  SIGN UP FOLLOW US:  

Our quarterly e-newsletter for partners covers new tools and research in the world of phenology.



neon Citizen Science • Sponsored by the National Science Foundation



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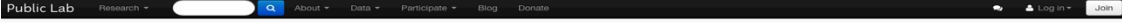


### WELCOME TO NEON'S Citizen Science Academy

Here you will find courses, modules and tutorials designed to help you implement Citizen Science programs in your educational setting.

But how about?

- \* Hobby Science
- \* Project-Based Science
- \* Public Science



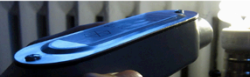
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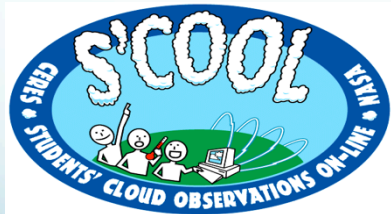
- An open community of contributors about and help to develop cheaper, open environmental testing. [today](#)
- A set of experimental tools Browse and freely download the designs, or purchase a kit to get involved today.
- A network of local groups Find a nearby chapter or start one yourself to find local collaborators and support.



# Citizen Science Projects and Beyond



**Project BudBurst™**  
Timing is everything!



- Bird Count – Bird Observations
- Public Laboratory – Engineering
- Galaxy Zoo – Galaxies
- WeatherFlow – Wind
- Journey North – Monarchs, Hummingbirds, Tulips, Robins
- S'COOL – Clouds
- GLOBE at Night – Light Pollution
- Wildlife Tracker – Wildlife: Motion Detecting Cameras
- Project Budburst – Plants



# Citizen Science and Beyond

## Apps



Secchi  
mPing  
What's Invasive  
Loss of the Night  
Marine Debris Tracker  
NoiseTube  
Project Noah  
iNaturalist

# PARTICIPATION IN SCIENTIFIC RESEARCH: LEARNING FROM CITIZEN SCIENCE

Instead of teaching young people about science, we want them to do science. That's one of the central notions in teaching science as inquiry and it's a core part of the ***Next Generation Science Standards***. Said that way it sounds simple, but when we step back and try to articulate exactly what doing science means it becomes a bit tricky. Is it collecting data? Is it developing research questions? Is it defending and advancing arguments based on evidence? The short answer to each of these questions is "Yes, and...". Science is a sophisticated process through which we understand the natural and designed world. Any definition of the science we want people, as full citizens in our democracy, to engage in is going to need to reflect that sophistication.

The Smithsonian

# Citizen Science: Precipitation

David Bydlowski, Susan Croskey,  
Kathleen Heikkinen

**“Super Science for Super Teachers – Continuing Changing the Equation” (S3T-C2tE) – Partnership between Madonna University, Lawrence Technological University and the Michigan Department of Education**