

Tiny tutorials: Supporting virtual learning by making data more accessible

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NOAA Office of Education

2020 Virtual SOS Users Collaborative Network Workshop



Who am I?

- NOAA Office of Education, Outreach & Education Coordinator
 - Since 2018 at NOAA HQ in Silver Spring, MD (but now at home);
Anacostan/Nacotchtank & Piscataway ancestral land
- Bachelor's in biology, University of MD, Baltimore County
- Master's in ecology, evolution, and marine biology, UC Santa Barbara
- Informal educator for 10+ years prior to joining NOAA



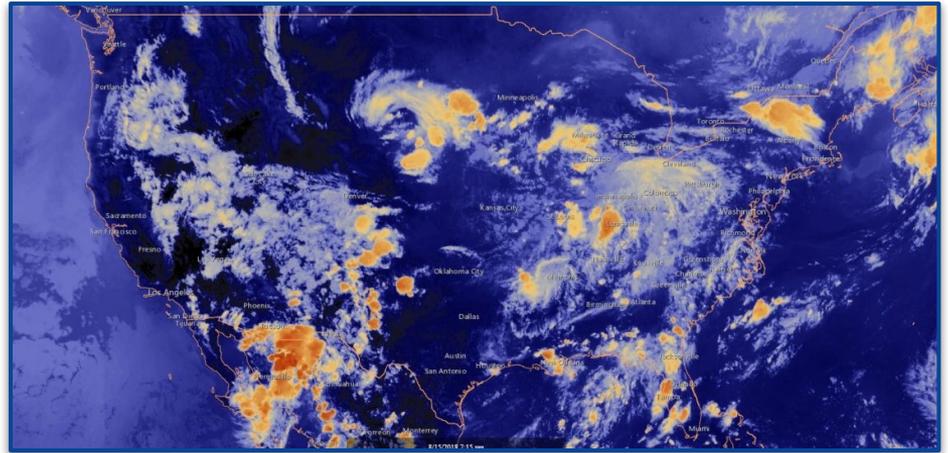
Who are you?

- Where do you work or where do you want to be working? How many years have you been in your field?
- Do you work with data?
- Do you work with data and public education or communication?

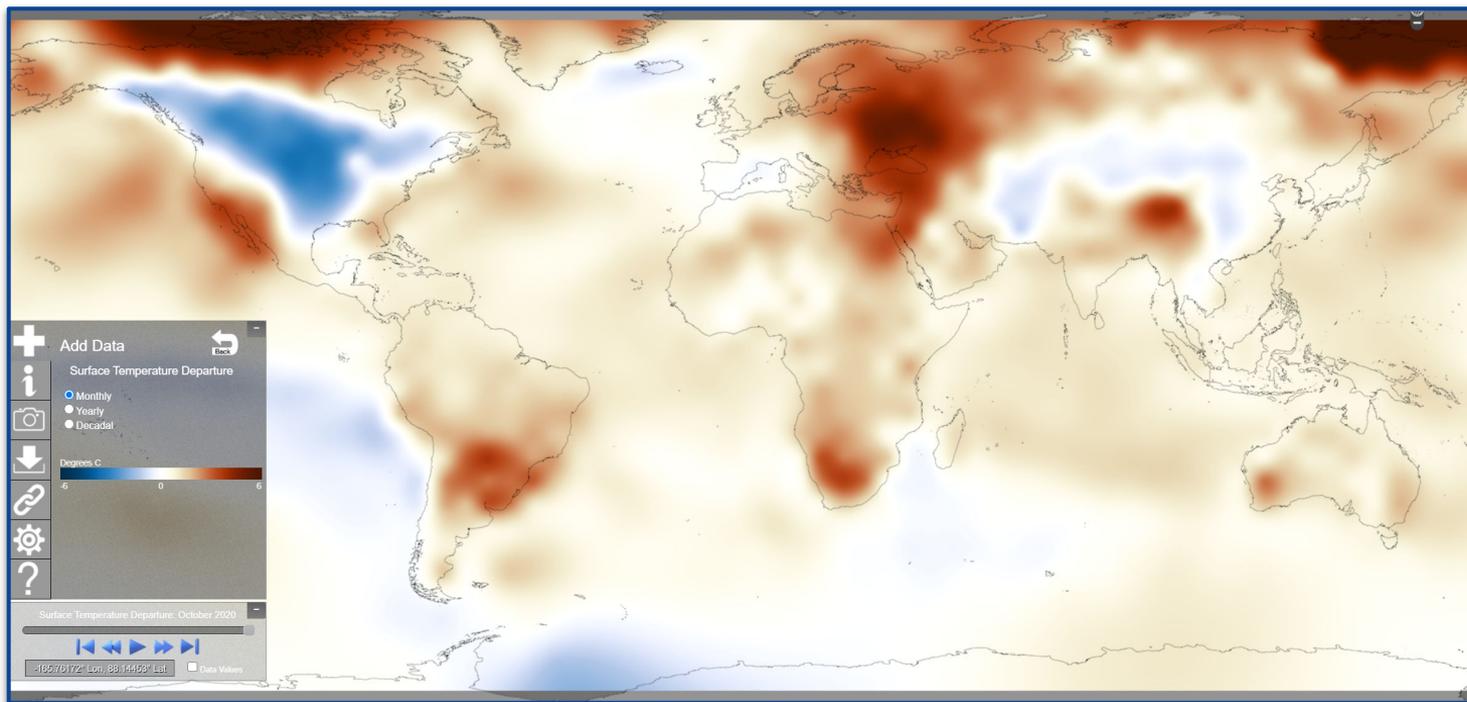


Agenda

- Why is data important?
- How can people engage with data?
- What is a tiny tutorial?
- How did we make our tiny tutorials?
- Final tips



Data!



Ways anyone can engage with data

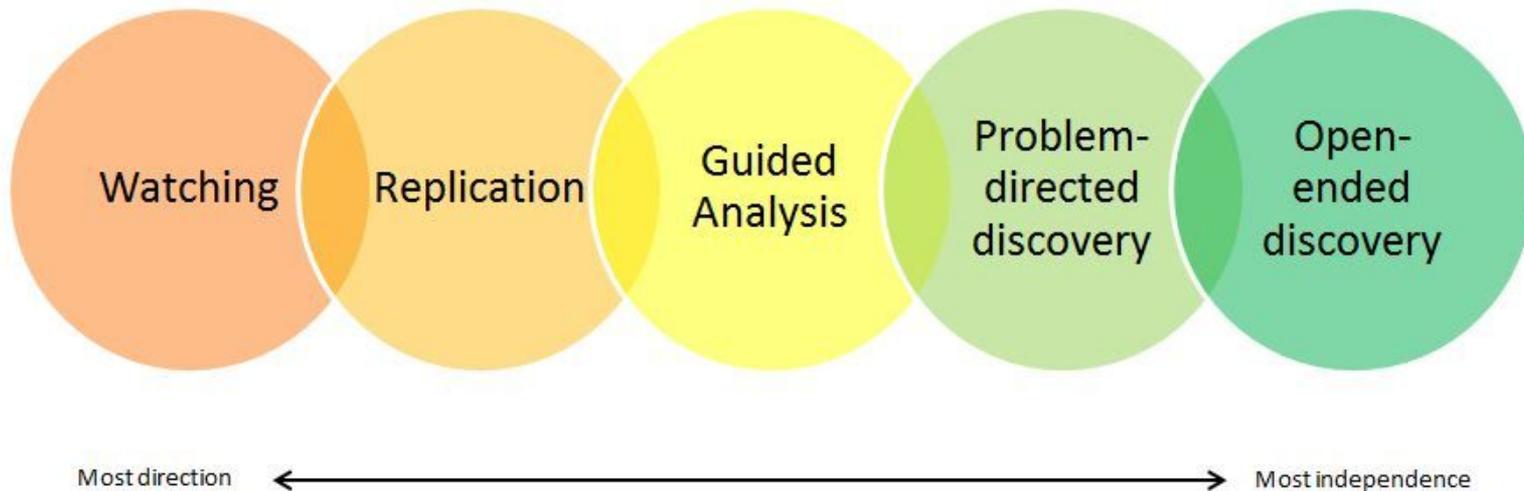
- Data collection
 - Observations
 - Experiments
 - Models/simulations
- Data analysis and interpretation
 - Comparisons
 - Combining different data sets
 - Statistics
- Citizen science!
 - Education at home citizen science resource collection:



<https://www.noaa.gov/education/resource-collections/education-at-home/citizen-science>



Ways anyone can engage with data



Why is it important to teach with data?

- Data is all around us
- Data connects your audiences to their world
- Data analysis skills prepare students for many careers
- Data literacy leads to science literacy



Data is built into NGSS

- Next Generation Science Standards (NGSS) has data as a concept throughout
- Included in Crosscutting Concepts, Science & Engineering Principles, Engineering Connections, and Nature of Science Connections
- Science & Engineering Practices has a whole section called “Analyzing and Interpreting Data”



Data is built into NGSS

Analyzing and Interpreting Data			
<p>Scientific investigations produce data that must be analyzed in order to derive meaning. Because data patterns and trends are not always obvious, scientists use a range of tools—including tabulation, graphical interpretation, visualization, and statistical analysis—to identify the significant features and patterns in the data. Scientists identify sources of error in the investigations and calculate the degree of certainty in the results. Modern technology makes the collection of large data sets much easier, providing secondary sources for analysis.</p>			
Primary School (K-2)	Elementary School (3-5)	Middle School (6-8)	High School (9-12)
<p>Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.</p> <ul style="list-style-type: none"> Record information (observations, thoughts, and ideas). Use and share pictures, drawings, and/or writings of observations. Use observations (firsthand or from media) to describe patterns and/or 	<p>Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.</p> <ul style="list-style-type: none"> Represent data in tables and/or various graphical displays (bar graphs, pictographs, and/or pie charts) to reveal patterns that indicate relationships. 	<p>Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.</p> <ul style="list-style-type: none"> Construct, analyze, and/or interpret graphical displays of data and/or large data sets to identify linear and nonlinear relationships. 	<p>Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.</p> <ul style="list-style-type: none"> Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.



**National Oceanic and Atmospheric Administration's
National Weather Service**

Local forecast by "City, St"

RSS RSS Feeds

Warnings **Current** By State/County... UV Alerts

Observations **Radar** Satellite Snow Cover Surface Weather... Observed Precip

Forecasts **Local** Graphical Aviation Marine Hurricanes Severe Weather Fire Weather Text Messages By State By Message Type National

Forecast Num Model Status Model MOS GFS Prod Climat Past (hourly)

Site Map **News**

National Observations

Warnings & Forecasts Graphical Forecasts National Maps Radar Water Air Quality

River Observations River Forecasts Long-Range River Flood Risk Precipitation River Download

Auto Refresh: OFF

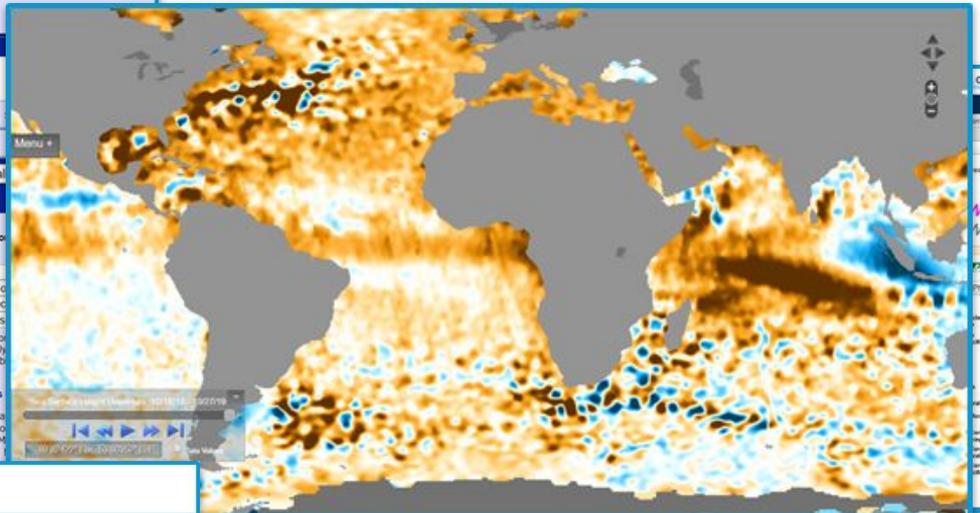
All Locations

Click on the map or below:

- United States
- NWS Weather Forecast
- NWS River Forecast
- Water Resources
- Probability and forecast
- Observations only
- Forecasts available

9264 total gauges
[Show all locations](#)

- 5 Gauges: MA
- 5 Gauges: MO
- 58 Gauges: MI
- 101 Gauges: MN



IOOS | Integrated Ocean Observing System

ABOUT COMMUNICATIONS DATA IOOS IN ACTION REGIONS COMMUNITY

IOOS is our eyes on the ocean, coasts, and Great Lakes. We are an integrated network observing data and developing tracking and predictive tools to benefit the economy, home, across the nation, and around the globe.

My Interests Are... All

- IOOS Region Map
- Alaska - AOOOS
- Caribbean - CARCOOS
- Central And Northern California - CeNCOOS
- Great Lakes - GLOOS
- Gulf Of Mexico - GCOOS
- Mid-Atlantic - MARCOOS
- Northeast Atlantic - NERACOOS
- Pacific Islands - PacIOOS
- Pacific Northwest - NANOOS
- Southeast Atlantic - SECOORA
- Southern California - SESCOORA

Ther safety at

Eyes on the Ocean™ - IOOS Bl-weekly - 30 October 2019

IOOS at OceanObs'19

SECOORA: Eyes on Hurricane Dorian

City, ST

Enter Your City, ST or ZIP Code

Remember Me

Privacy Policy

American Samoa Guam Puerto Rico/Virgin Islands

Click on the map above for detailed alerts or: Warnings By State Public Alerts in XML/GAP v1.1 and ATOM Formats

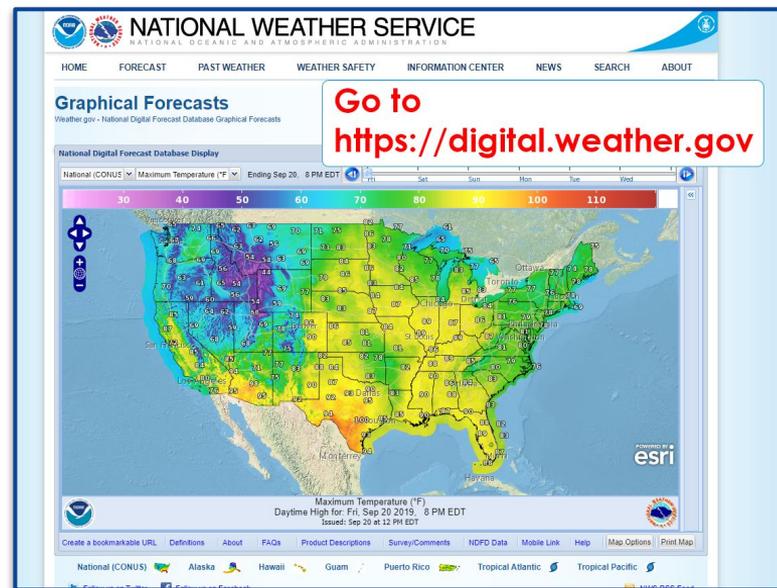


When it comes to using a new online data portal, sometimes the first few clicks are the hardest.



Tiny tutorials: A simple way to explore data

- 5-8 screenshots with instructions
- Stitched together in a gif, but also presented as slides
- Created for a non-technical audience
- Does not show all features of a data product
- Find our tiny tutorials at: noaa.gov/tiny-tutorials



Tiny tutorial: Historical hurricane tracks

- Made without input from subject matter experts



Tiny tutorial: Historical hurricane tracks

NOAA Education
Tiny tutorial

Historical hurricane tracks



noaa.gov/education

Tiny tutorial: CrowdMag

- Made in partnership with the National Centers for Environmental Information (NCEI)
- Worked with education and subject matter experts from NCEI
 - Screenshots and photos courtesy Trinity Foreman/NCEI/NOAA



What is NCEI?

- The National Centers for Environmental Information
- Part of the NOAA National Environmental Satellite, Data, and Information Service (NESDIS)
- The home of NOAA data: *The Nation's leading authority for environmental data, and manage one of the largest archives of atmospheric, coastal, geophysical, and oceanic research in the world.*
- Explore more at <https://www.ncei.noaa.gov/>



What is NCEI?



National Centers for
Environmental Information

Product Categories

Use the categories list to
browse multiple categories.

[Air Temperature and Atmospheric Properties](#)

[Arctic and Sea Ice](#)

[Ecosystems and Natural Resources](#)

[Geomagnetism](#)

[Global Climate](#)

[Gulf of Mexico](#)

Looking for Data?

Air Temperature and Atmospheric Properties

[Apparent Temperature](#)

[Air Stagnation Index](#)

[Atmospheric Climate Data Records](#)

[ASOS Temperature Departure and Degree Day Maps](#)

[AVHRR Surface Reflectance](#)

[Climate at a Glance](#)

[Climate Data Online](#)

[Climate Normals](#)

[Climate Reports](#)

[Coastal Wind and Water](#)

[Cooperative Observer Network \(COOP\)](#)

[Daily Weather Records](#)

[Fundamental Climate Data Records](#)

[Global-Scale Microwave Sounding Unit Temperatures](#)

[Global Temperature and Precipitation Maps](#)

[Heat Stress Index](#)

[Integrated Global Radiosonde Archive \(IGRA\)](#)

[Local Climatological Data \(LCD\)](#)

[National Climate Report](#)

[National Temperature Index](#)

[National Temperature and Precipitation Maps](#)

[National Trends](#)

[NCEI GIS Climate Maps](#)

[NOAA Merged Land Ocean Global Surface Temperature Analysis \(NOAA GlobalTemp\)](#)

[North America Climate Extremes Monitoring \(NACEM\)](#)

[Radiosonde Atmospheric Temperature Products for Assessing Climate \(RATPAC\)](#)

[Residential Energy Demand Temperature Index \(REDTI\)](#)

[Upper Air Climate Report](#)

[U.S. Climate Extremes](#)

[U.S. Climate Extremes Index](#)

[U.S. Historical Climatology Network \(USHCN\)](#)

[U.S. Percentage Areas \(Very Warm/Cold\)](#)

[U.S. Streaks](#)

[U.S. Wind Climatology](#)



Tiny tutorial: CrowdMag

NOAA Education
Tiny tutorial

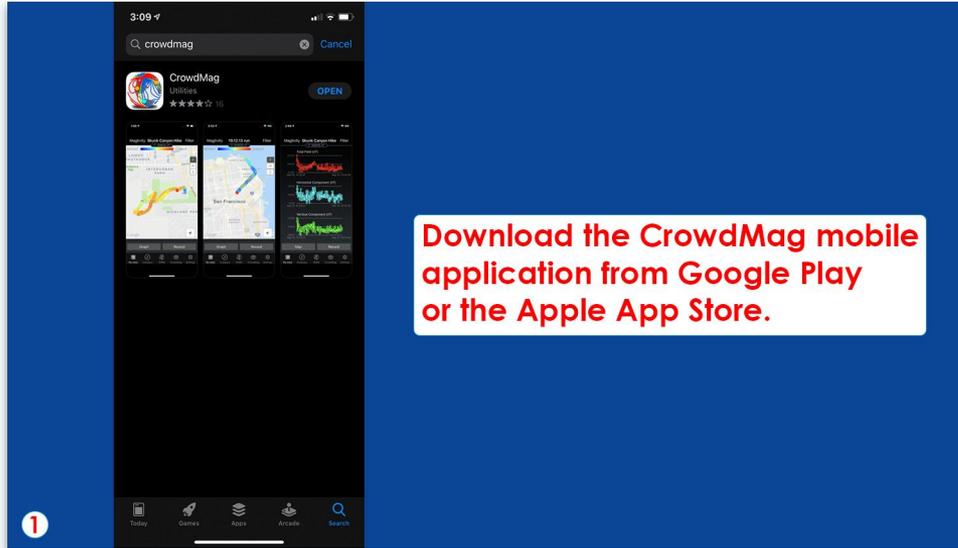
CrowdMag: Crowdsourced magnetic data



noaa.gov/education



Slide 1

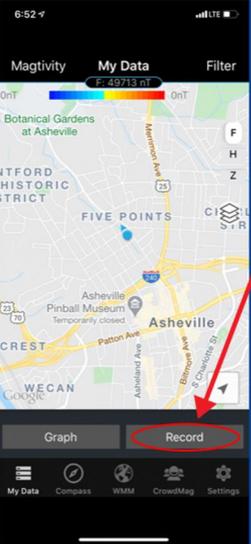


Original text:

Download the CrowdMag application



Slide 2



2

Magtivity My Data Filter

OnT — — — — OnT

Botanical Gardens at Asheville

ANTFORD HISTORIC DISTRICT

FIVE POINTS

Asheville Pinball Museum Temporarily closed

CREST

WE CAN COOKS

Graph **Record**

My Data Compass WMM CrowdMag Settings

Open the application and tap “Record” to begin recording your “magtivity.” It is best to do this outside while you move around.

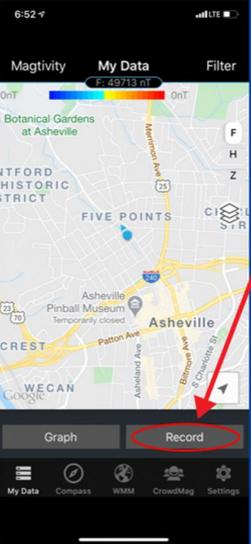
“Magtivity” is a magnetic activity recording that uses your phone’s internal magnetometer to measure the magnetic field of an area.

Original text:

Open the application and click “Record” once outside.



Slide 2



2

Open the application and tap “Record” to begin recording your “magtivity.” It is best to do this outside while you move around.

“Magtivity” is a magnetic activity recording that uses your phone’s internal magnetometer to measure the magnetic field of an area.

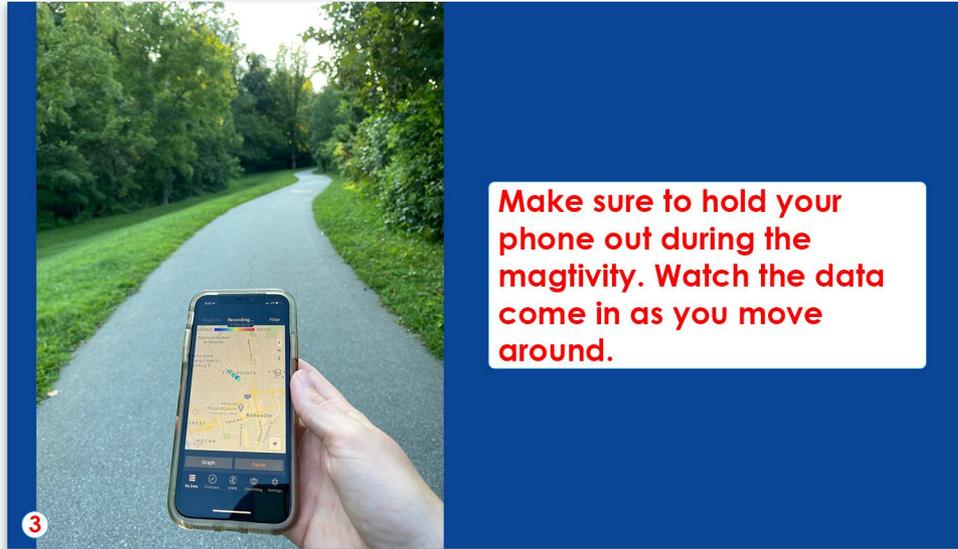
Then:

Open the application and click “Record” once ready to start your “magtivity”.

Magtivity = magnetic activity recording.



Slide 3

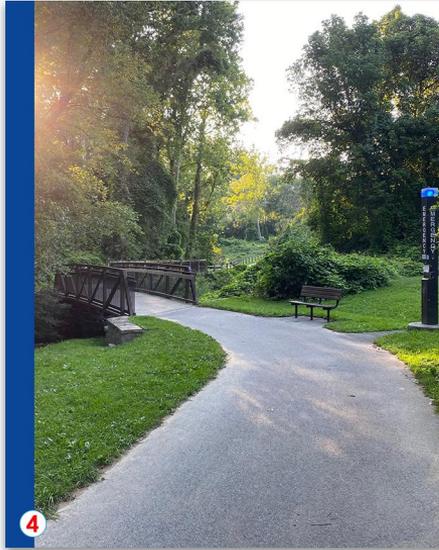


Original text:

Make sure to hold your phone out as you record the magtivity readings as you walk.



Slide 4: Not in the original draft!



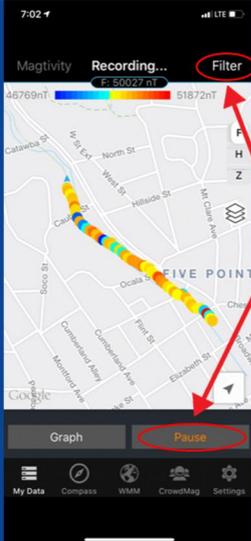
Pay attention as you approach large metal objects (like bridges) to see how they change the color of your path. Different colors show changes in magnetic field readings.

Original text:

Watch as you approach large metal objects to see how they change the color of your path which signifies changes in the magnetic field readings.



Slide 5



7:02 LTE

Magtivity Recording... **Filter**

46769nT 51872nT

Catawba St North St Hillside St Mt. Carmel Ave
W. 9th St W. 10th St
Coke St
Sloop St
Ocala St FIVE POINT
Dunbarwood Ave
Comptonwood Ave
Mountain Ave
Elizabet St

Graph **Pause**

My Data Compass WMM CrowdMag Settings

5

When finished recording the magtivity, tap “Pause.”

Then tap “Filter” to remove any noisy (or unexpected) data. These data will still be sent to NOAA, but will make your data visualization look cleaner.

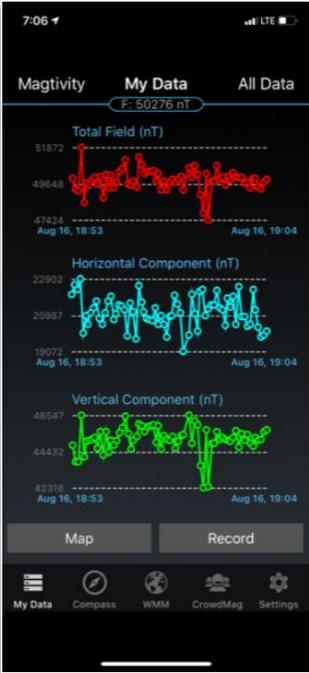
Original text:

Watch this reading as you approach large metal objects to see how they change the magnetic field readings abruptly.

When finished, press “Pause” and “Graph” to see the graphical depiction of the data.

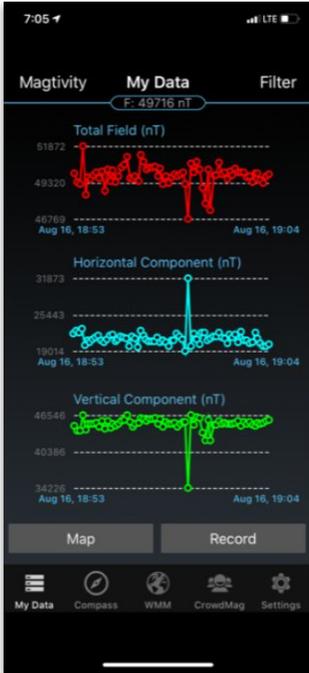


Deleted slides



You will be brought to a graph of the magnetic readings measured.

Select “Filter” to remove erroneous readings.

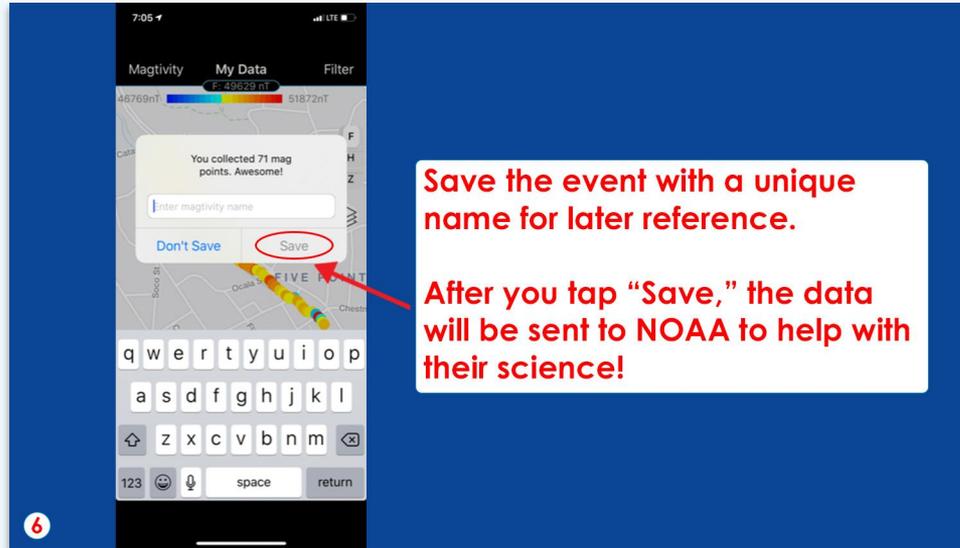


Note all dramatic changes in the magnetic field measured by spikes in the graph.

Select “Map” to look at the specific location of points measured.



Slide 6



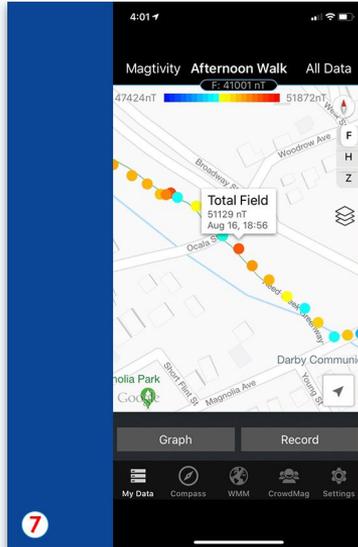
Original text:

Save the event with a unique name for later reference.

Once you hit save, the data are automatically sent to NOAA to help in their science!



Slide 7



After recording, tap each dot to see the magnetic data.

**Blue dots indicate areas with a lower magnetic field value.
Red dots indicate a higher magnetic field value.
If dot colors are consistent, there aren't any magnetic disturbances.**

Do red and blue dots correlate with objects in the area, such as a bridge, pipe, or powerline?

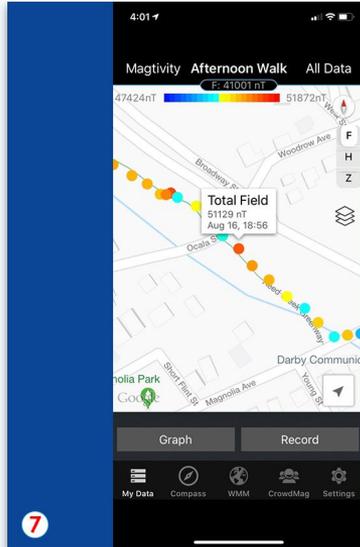
Original text:

Select specific dots to see the time recorded and the associated magnetic reading [and see if you can correlate it with an object in the area, such as a bridge, pipe, or powerline].

Select “Settings” to export the data.



Slide 7



After recording, tap each dot to see the magnetic data.

**Blue dots indicate areas with a lower magnetic field value.
Red dots indicate a higher magnetic field value.
If dot colors are consistent, there aren't any magnetic disturbances.**

Do red and blue dots correlate with objects in the area, such as a bridge, pipe, or powerline?

Then:

Once recorded, you can select specific dots to see the time recorded and the associated magnetic reading. See if you can correlate higher and lower readings with objects in the area, such as a bridge, pipe, or powerline.

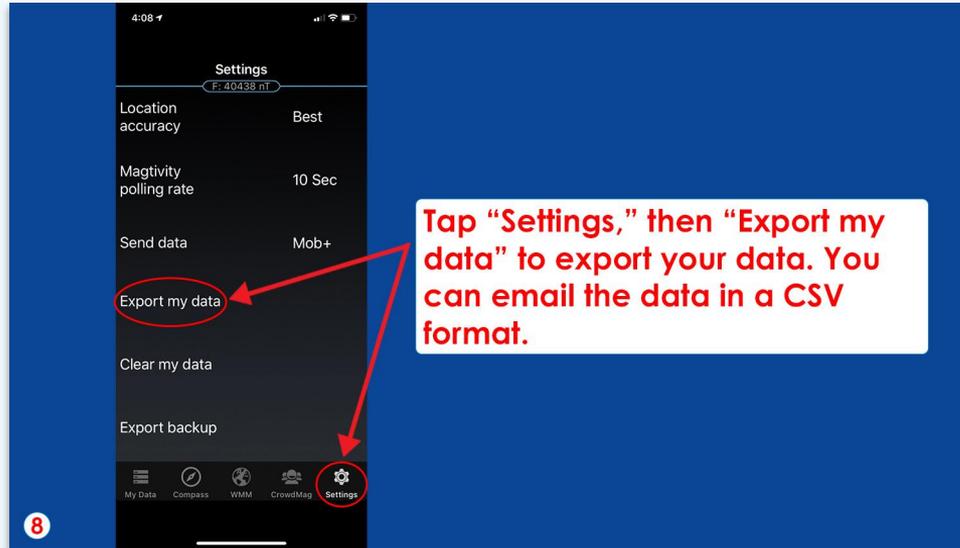
Blue spots indicate areas with a low magnetic field [value]. Red spots indicate areas with a strong [high] magnetic field [value].

[If your values are constant along the path then you don't have any magnetic disturbances.]

Select "Settings" to export the data or to change the magtivity settings.



Slide 8



Original text:

Select "Export my data" and select the recording you wish to save.

This will give you the ability to email the complete data file in CSV format.



Final tips

- Identify data that can be useful for your intended audience
- Use plain and inclusive language
- Keep it simple, keep it short
- Keep it visually consistent
- Edit, edit, edit



Thank you!

Any questions?

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