



The Trees Around the GLOBE Student Research Campaign and GLOBE European Phenology Campaign Collaboration

From Leaves to Satellites

Field observations: The importance of taking green-down observations and tree height observations at the same time and location

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 **THE GLOBE PROGRAM**

Trees Around the GLOBE Student Research Campaign Webinar

Educators and Students Aligning Greenings and Tree Height: A Collaboration Between the European Phenology Campaign and the Trees Around the GLOBE Student Research Campaign

Featuring the European Phenology Campaign Team and European Phenology Student Research



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Dana Votápková

Tuesday, October 13, 2020
9:00am EDT (1:00pm UTC, 3:00pm CET)

Sponsored by:  Supported by:    Implemented by:  **UCAR**

If you would like to attend this webinar, please send Brian and email at:

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Trees Around the GLOBE Student Research Campaign Core Team

<https://www.globe.gov/web/trees-around-the-globe/>



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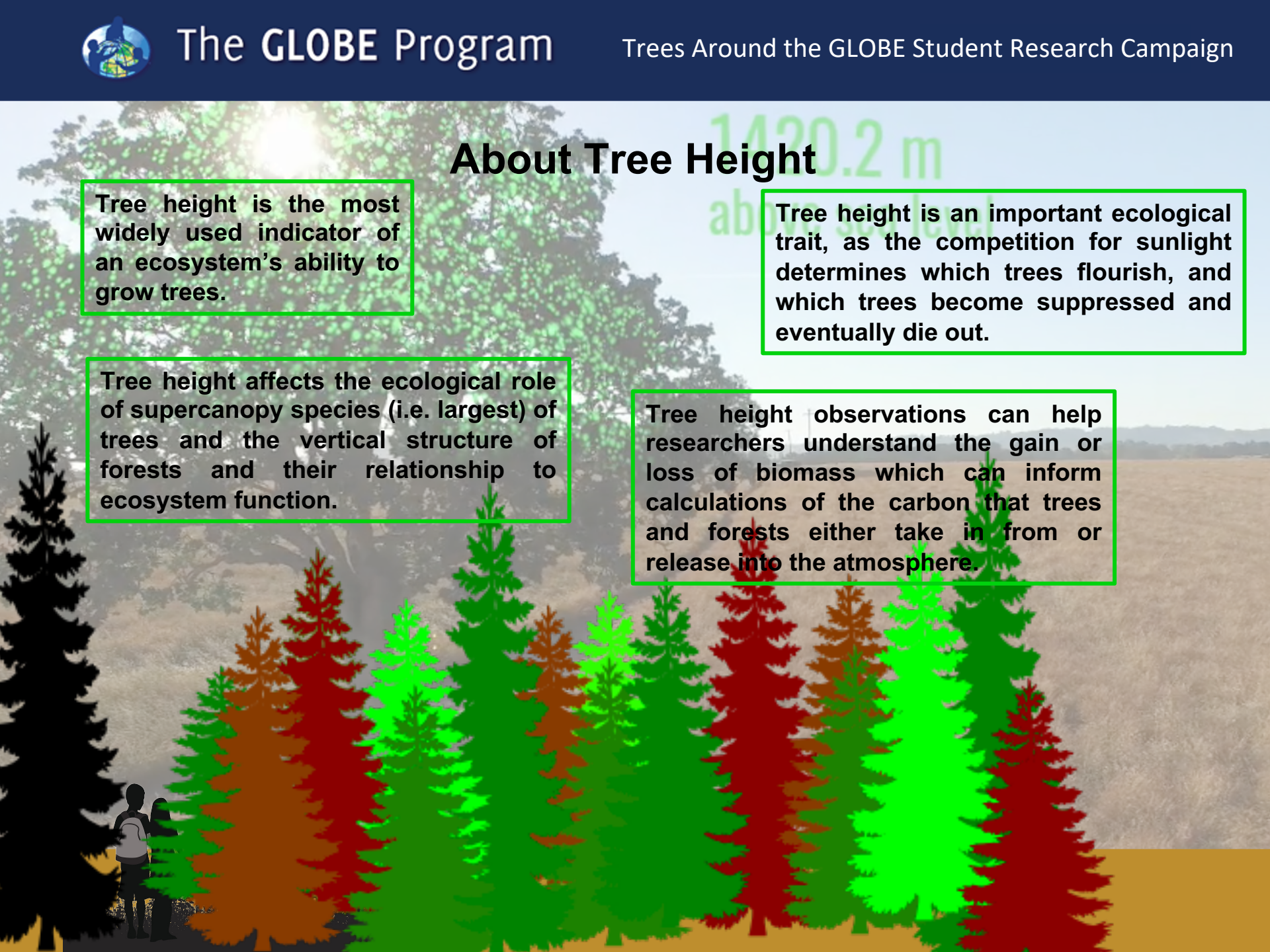
About Tree Height

Tree height is the most widely used indicator of an ecosystem's ability to grow trees.

Tree height is an important ecological trait, as the competition for sunlight determines which trees flourish, and which trees become suppressed and eventually die out.

Tree height affects the ecological role of supercanopy species (i.e. largest) of trees and the vertical structure of forests and their relationship to ecosystem function.

Tree height observations can help researchers understand the gain or loss of biomass which can inform calculations of the carbon that trees and forests either take in from or release into the atmosphere.



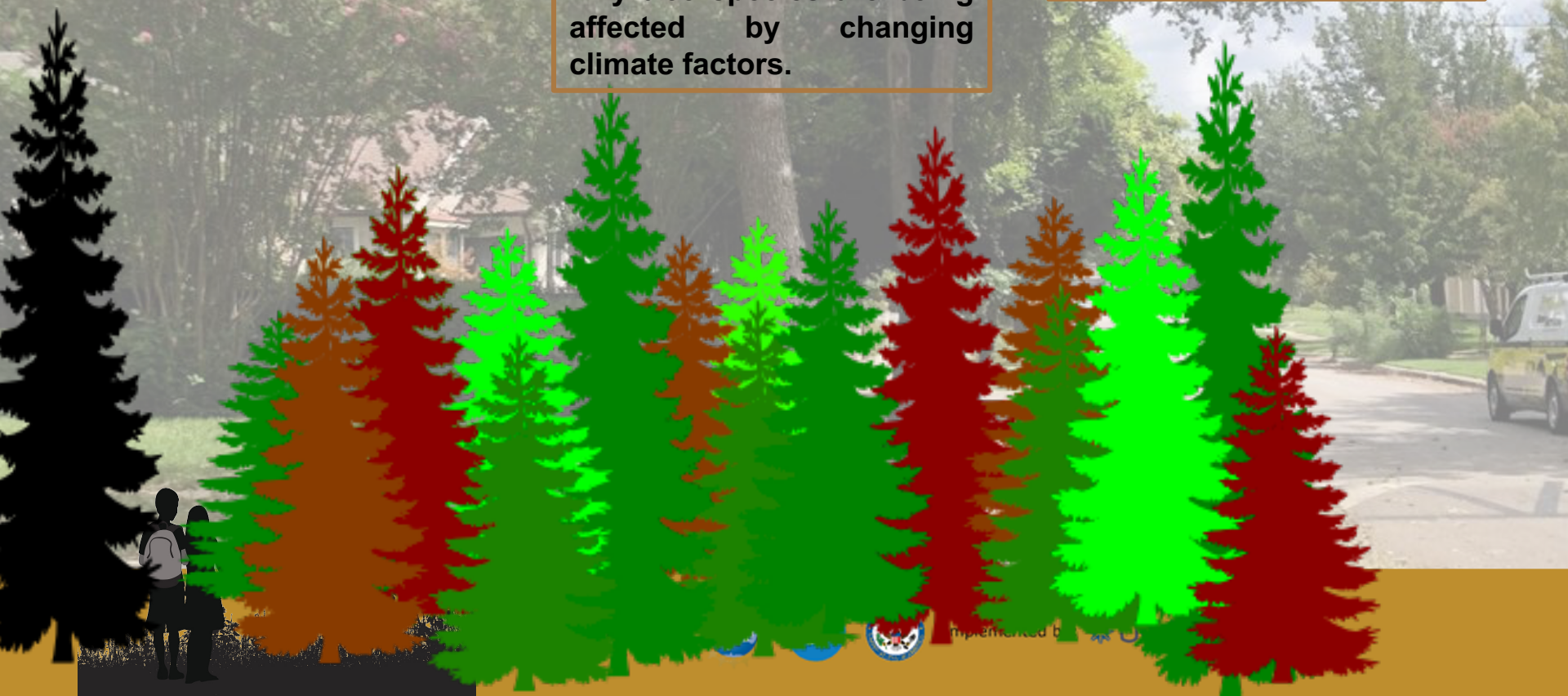


About Green-Down

Green-Down can be used to monitor the length of the growing season and changes in the timing of leaf color change and leaf fall.

Green-Down observations can help identify how and why tree species are being affected by changing climate factors.

Green-Down can serve as an indicator of the relationships between tree and leaf color, among the many different tree and plant species.





The Importance of Taking Coincident Tree Height and Green-Down Observations in the Same Location

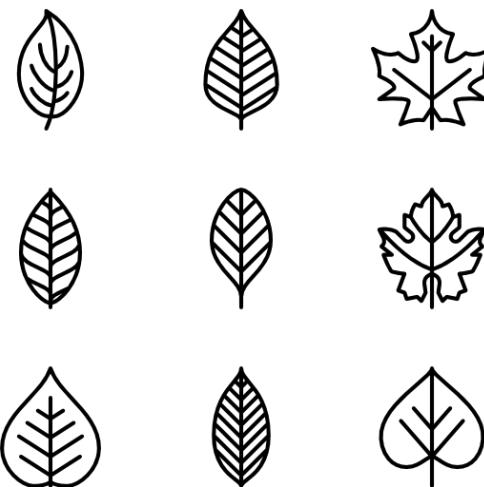
Trees Around the GLOBE Student Research Campaign

Tree Height, Land Cover, Greenings
<https://www.globe.gov/web/trees-around-the-globe>

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European Phenology Campaign

Greenings (Green-up, Green-down, Carbon Cycle)
<https://www.globe.gov/web/european-phenology-campaign>





The Importance of Taking Coincident Tree Height and Green-Down Observations in the Same Location

What are we asking you to do? When you take a tree height measurement or observation, please take Greenings - Green Up or **Green-Down** (depending on the season) and if possible, identify the genus and species of the tree you are observing.

Why are we asking you to do this? Greenings (Green-Up and **Green-Down**) measurements help scientists validate satellite estimates of the beginning and end of the plant growing season in a particular location and by identifying the genus and species of a tree, you can add to the knowledge of global tree species distribution.

Bottom Line:

Taking observations of tree height and green-down at the same time and same location allows for more comprehensive scientific knowledge of a local environment or ecosystem and how the Earth functions as a system.

Knowing the tree height at the time of green-down helps us understand how it is possible to see a change in the rate of tree growth, evident in tree height observations taken at the same time each year of the same tree.

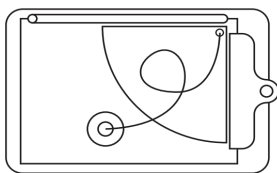
Some climate factors (i.e. unusually warm Autumn, accelerated frost events, etc.) during the growing season of trees can affect the structure and function of terrestrial ecosystems by inhibiting plant growth reducing carbon uptake, and disturbing nutrient cycling.



Several Ways to Measuring Tree Height with GLOBE

GLOBE Hand-Held Clinometer

Build a Clinometer



1. Pull a knotted string through the circle in the upper right corner.
2. Attach a weight to the bottom of the string.
3. Tape your straw to the top of the page.
4. Clip to a clipboard or hold against a hard surface.

What is a clinometer?

A clinometer is a tool for measuring angles of slope or elevation. You will need this angle to calculate the height of trees and other objects.

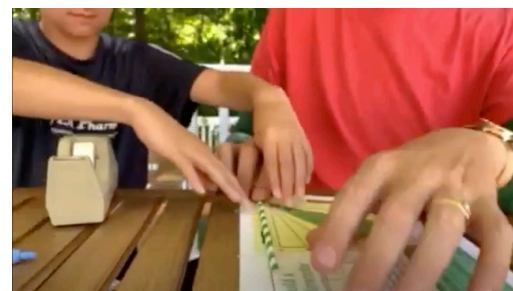
Measuring tree height is just one way that scientists study the health of forests. Give it a try using this paper clinometer.

Materials

- ☐ Straw
- ☐ String
- ☐ Tape
- ☐ Scissors
- ☐ Pen or pencil
- ☐ Hard surface (clipboard, book, cardboard)
- ☐ Weight (beads, paper clip, metal washer)

observer.globe.gov

Learn How To Build And Use A Paper Clinometer To Measure Tree Height

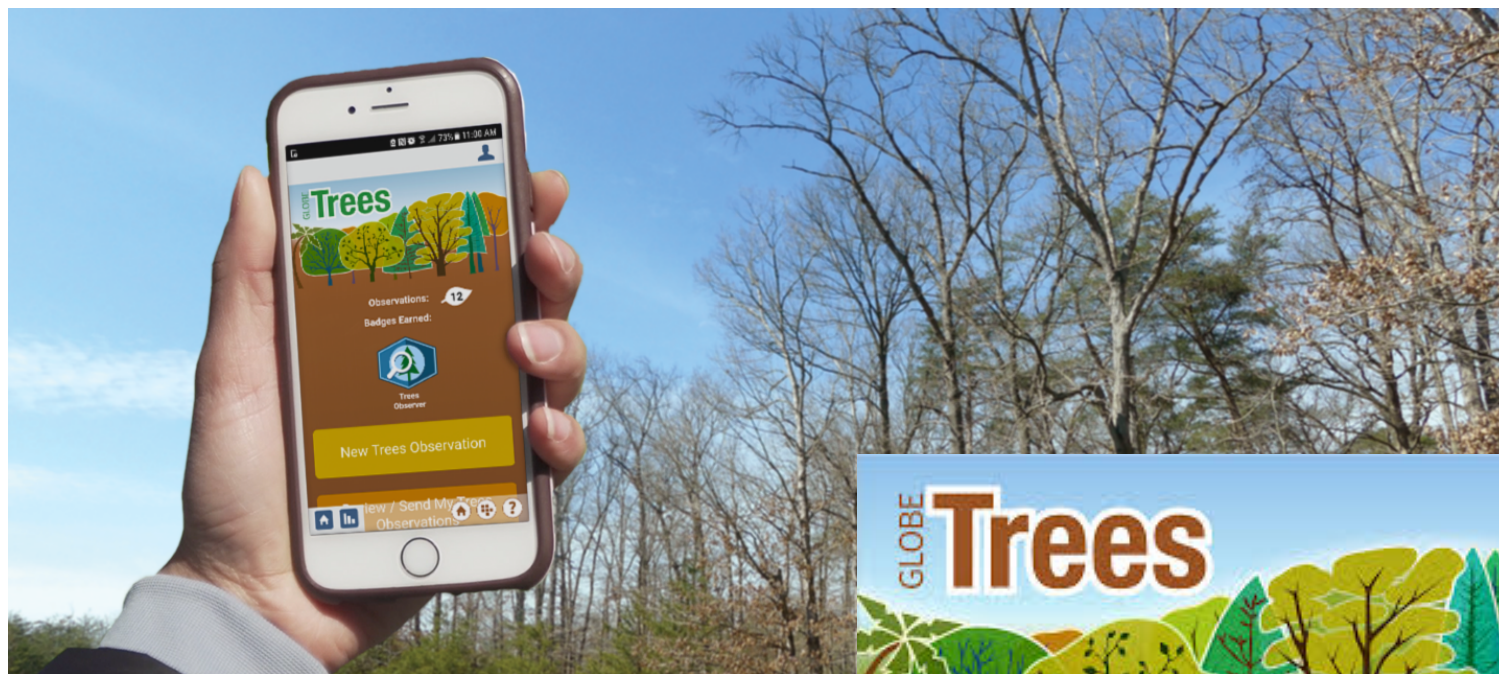


<https://youtu.be/Ky6KhGLw1AU>



Several Ways to Measuring Tree Height with GLOBE

NASA GLOBE Observer Citizen Science App

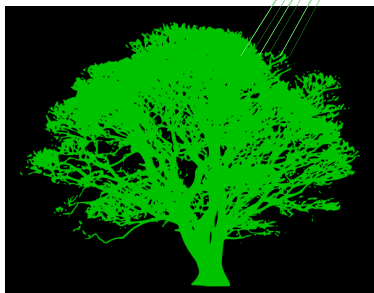


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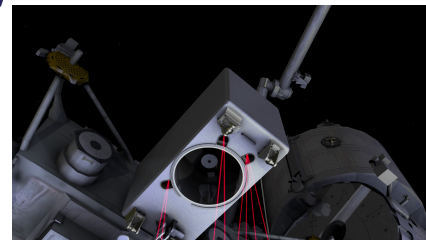


HOW DOES NASA OBSERVE TREE HEIGHT AND GREENINGS (GREEN-DOWN) FROM SPACE?

A FEW OF THE ASSOCIATED SCIENCE MISSIONS LOOKING AT TREE HEIGHT



ICESat-2 and GEDI use a technology called Light Detection and Ranging or LIDAR. LIDAR is an active remote sensing technology (the laser version of radar) which uses pulses of laser light to measure 3D structure and height of objects on Earth.



Ice, Cloud, and land Elevation Satellite-2 (ICESat-2)

ICESat-2 measurements are made over the Earth's surface between 88° N and 88° S

Global Ecosystem Dynamics Investigation (GEDI) on ISS

GEDI measurements are made over the Earth's surface between 51.6° N and 51.6° S

Comparing the ground-based and space-based data is vital to understanding measurement accuracy and allows for student and professional researchers to build their research using a robust dataset.

Online tools can help with this.

TAKE IT AWAY, PEDER!