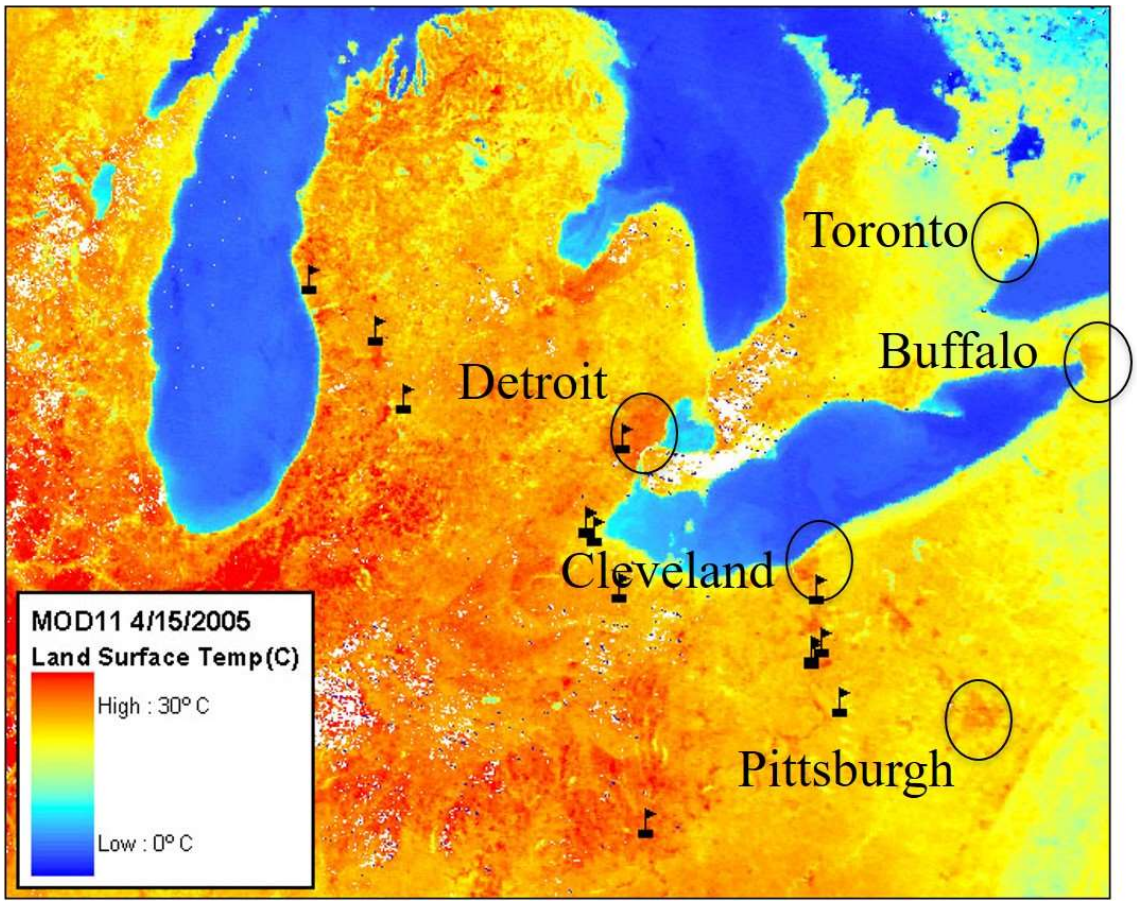
GLOBE: Study the Urban Heat Island Effect



Kevin Czajkowski

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The University of Toledo


globe.gov/web/mission-earth
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MISSION EARTH
Fusing GLOBE with NASA assets to build systematic innovation in STEM (Science, Technology, Engineering and Mathematics)
WELCOME!
GLOBE Mission EARTH is a collaborative of multiple institutions across the United States formed to increase involvement in the GLOBE Program (www.globe.gov). In addition to the members from our partner institutions, our group includes hundreds of other individuals including teachers, students and citizen scientists, located throughout the United States. More >>
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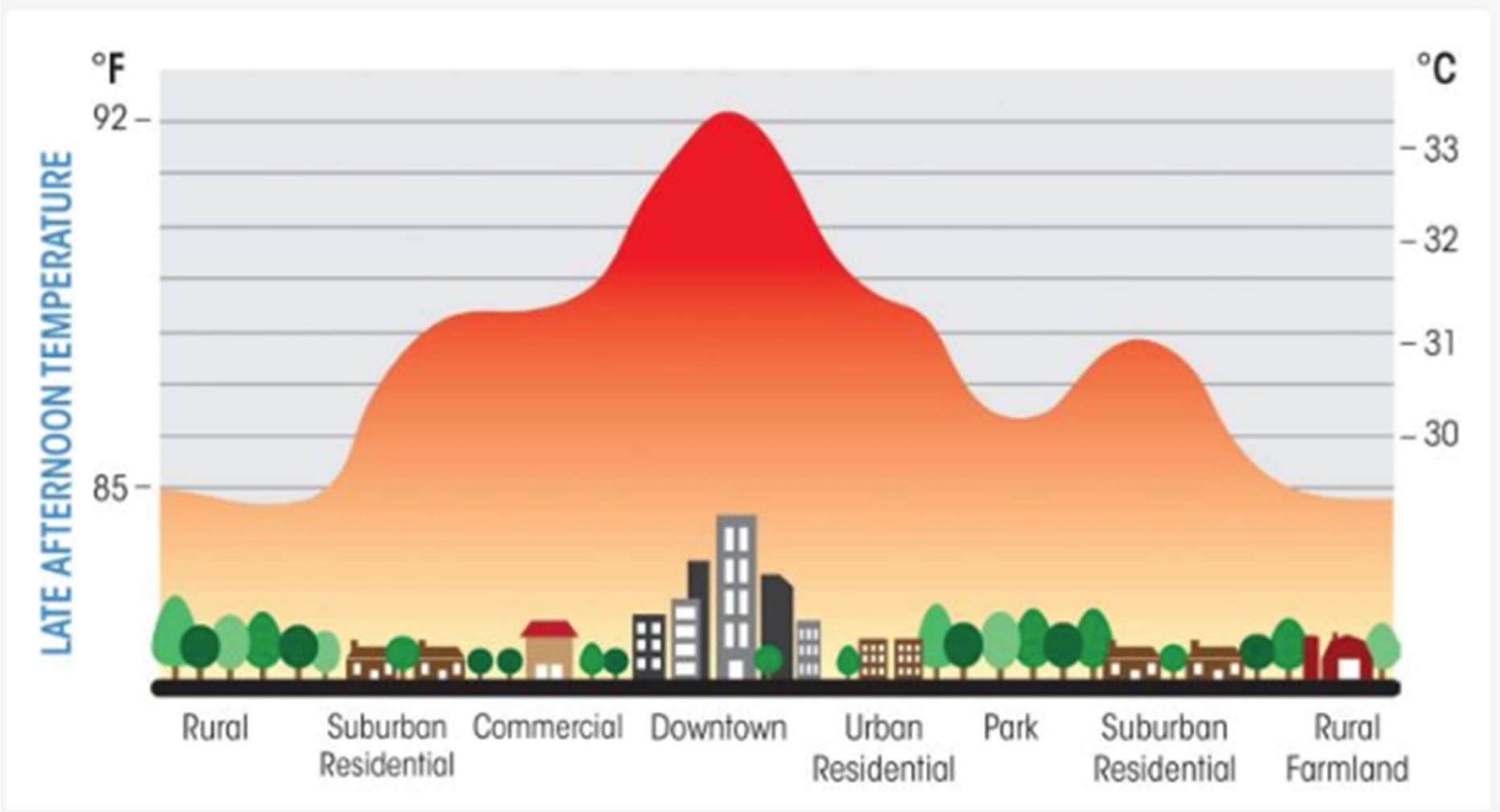
Urban Heat Island Effect



Urban Heat Island Effect
GLOBE Field Campaign

globe.gov/web/surface-temperature-field-campaign/overview

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UHIE-Surface Temperature

- Webinars
- Meet the Scientists
- Science of the Surface Temperature Field Campaign
- Past Campaigns
- GLOBE Field Campaigns
- Discussions & Group Documents

What is the Urban Heat Island Effect (UHIE)?

Watch this NASA video below to find out!

GLOBE Urban Heat Island Student Research Studies

Leave the IRT outside for 1 hour if the outdoor temperature is much different than the indoor temperature.

What Data to Collect and When

Dr. C needs YOU to collect and submit the following data to GLOBE:

- Cloud Data
- Air Temperature
- Surface Temperature

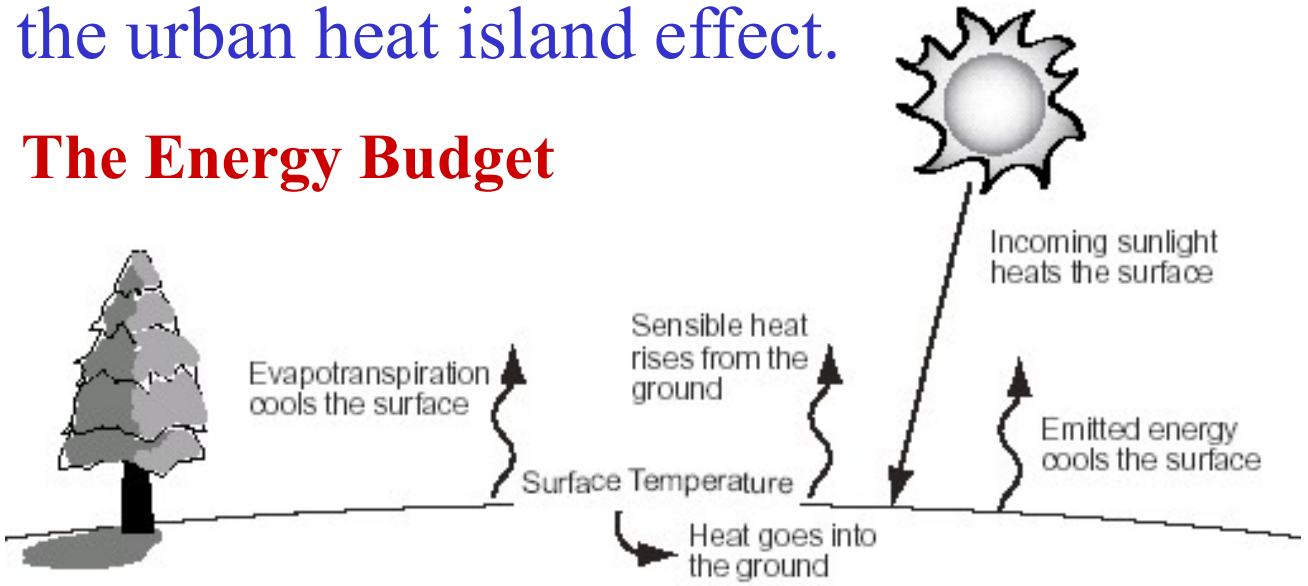
Take measurements on 5 different days within the following months:

	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Surface Temperature Field Campaign			X		X			X				

Why do We Measure Surface Temperature?

- To help us understand the influences on the rate of heat exchange between the Earth's surface and the atmosphere. This impacts the weather and climate and can help us understand Global Warming and the urban heat island effect.

The Energy Budget



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How do I take my measurements?

Photo credit: Kevin Czajkowski

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.

http://www.primexwireless.com/uploads/products/clock-custom-nasa.jpg

Caution!

Do not take the temperature of shadowed areas including the shadow that your body may cast.

Caution!

Extend your arm in front of you to take the observations. You don't want to measure the temperature of your feet.

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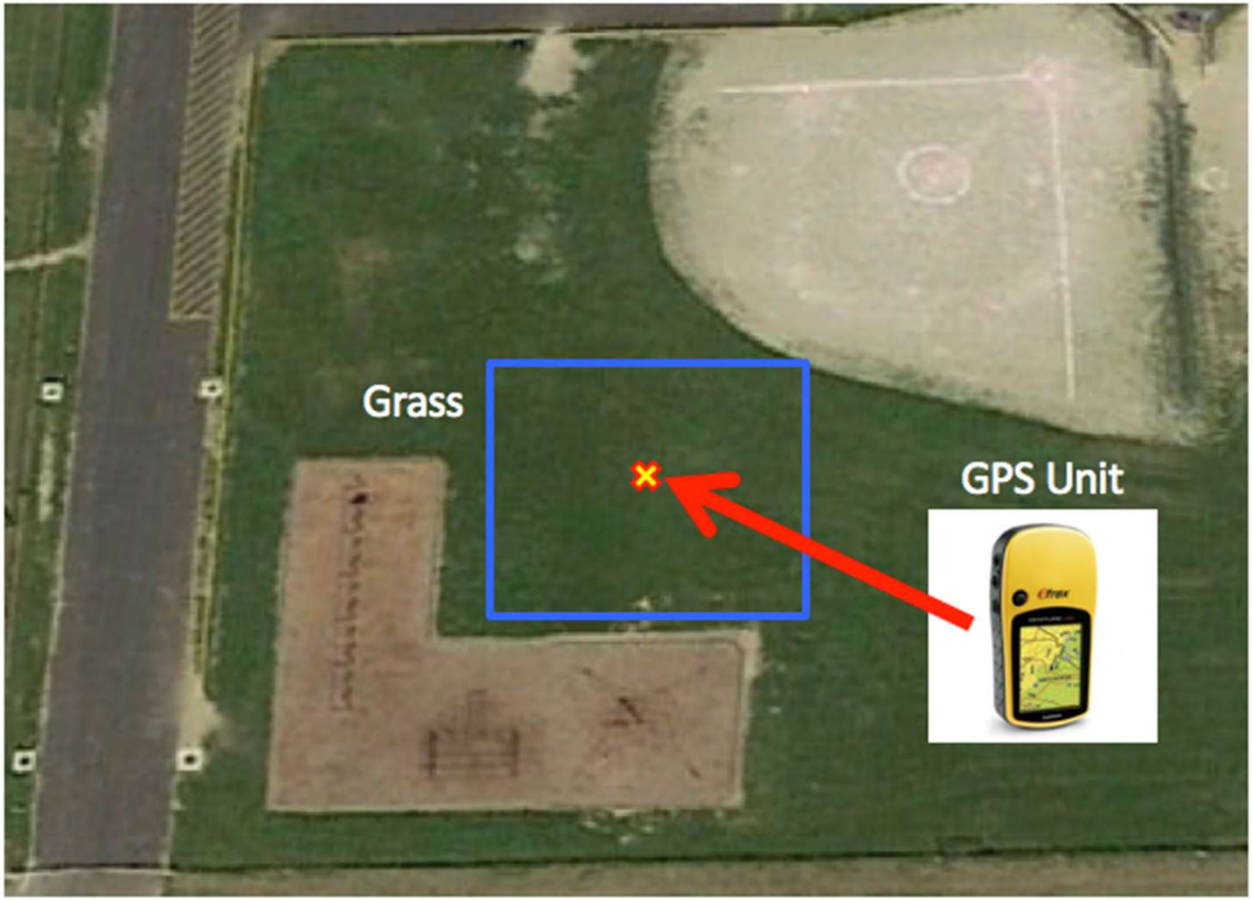
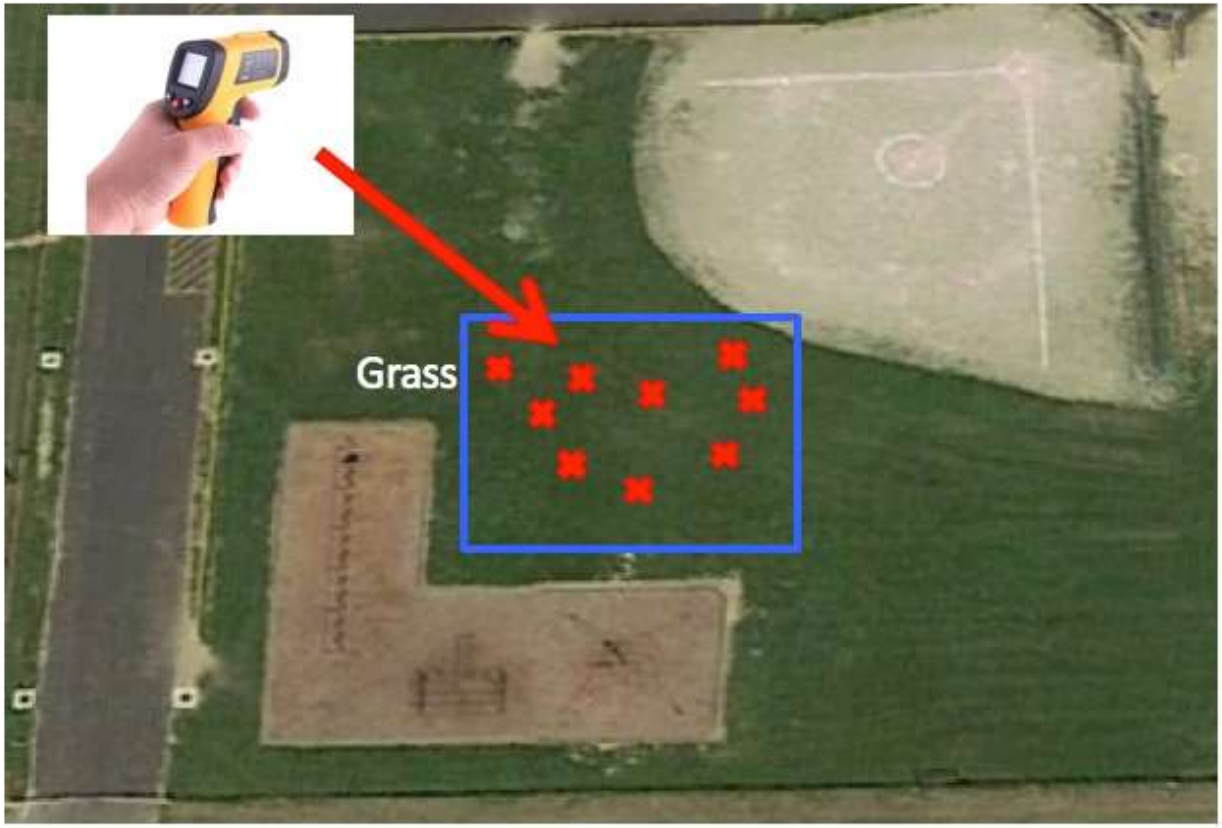
2. Collect GPS data of the center of each study area.

Record latitude, longitude and elevation.



3. Take 9 random surface temperature readings

Take 9 random surface temperature readings within **each** study area. The 9 random observations ensure a good average for the site is observed.



Caution!

Do not mix cover types in one study area.

In this case, the study area mistakenly has grass *and* bare ground.

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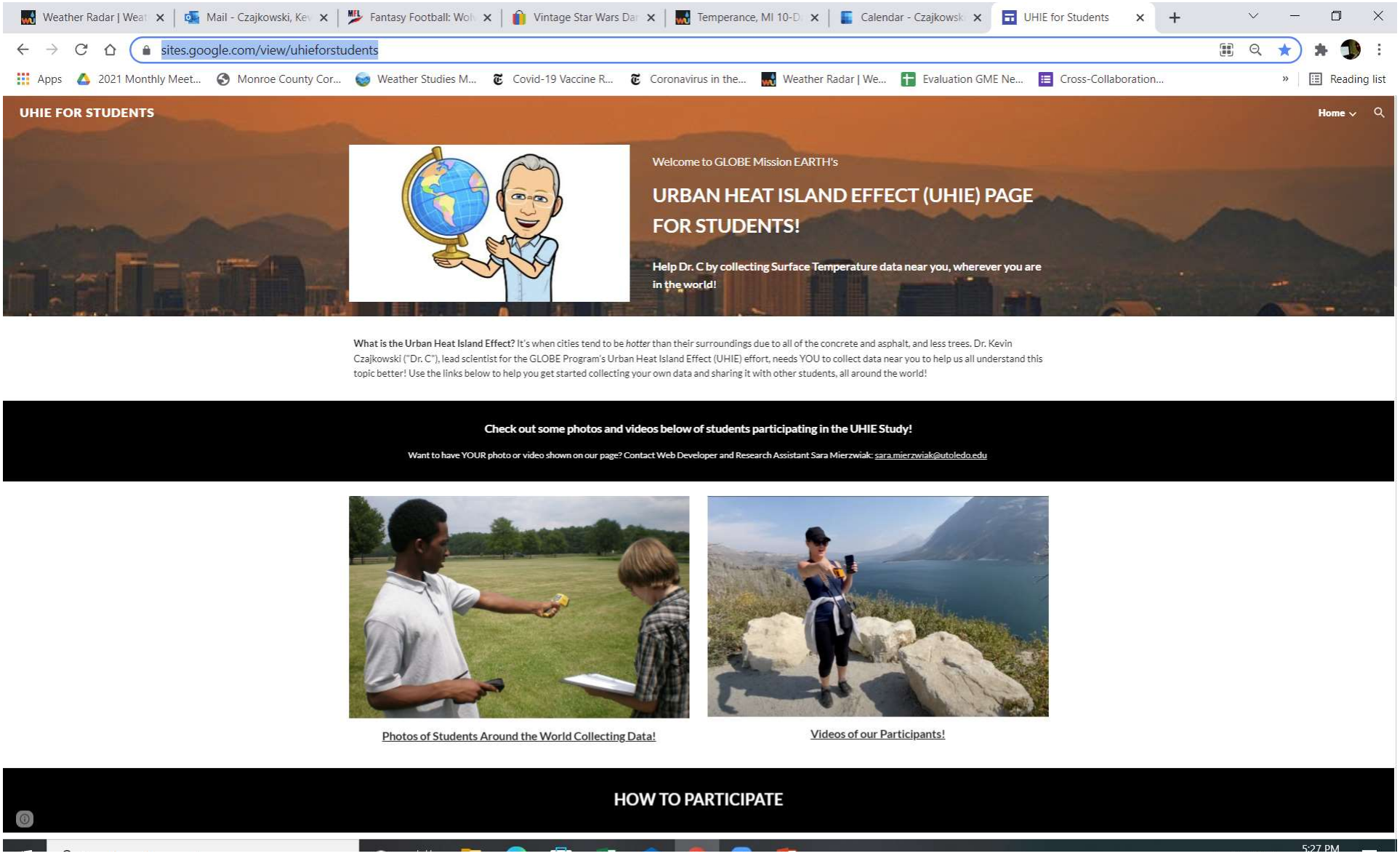
https://sites.google.com/view/uhieforstudents



https://sites.google.com/view/uhieforstudents/home/completed-student-projects?authuser=0

COMPLETED STUDENT PROJECTS

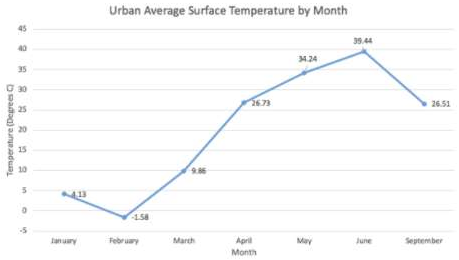
Check out some amazing examples of projects completed by students who have investigated the UHIE!

URBAN HEAT ISLAND AT THE UNIVERSITY OF TOLEDO

Check out this awesome project investigating the Urban Heat Island at the University of Toledo, by Graduate Student Tahmineh Ladi. This research is presented in the form of an ArcGIS Online Storymap!

How do Navarre's Asphalt Surface Temperatures Compare with Ivano-Frankivsk City Environmental Station?

Kadin C., Bryson W., Nicholas P., Schawn G., Dallas W., & Jorge P., Elementary



Urban Heat Island Effect: Case Study on Croatia

Jordan Doore, Undergraduate Student

here to search

Research & Resources

- Student Research Reports
- Student Resources
- Teaching Resources
- Higher Ed Resources
- Publications
- GLOBE Equipment

Assessing the Effects of Surface Temperature and Tree Coverage in Select Suburban Parks

Organization(s): Crestwood High School

Country: United States of America

Student(s): Yasmina Abbas, Marwa Aidibi, Zainab Zaidan

Grade Level: Secondary School (grades 9-12, ages 14-18)

GLOBE Teacher: Diana Rae Johns

Contributors: Mr. David Bydlowski and Mr. Andy Henry of the NASA AREN Program

Report Type(s): International Virtual Science Symposium Report

Protocols: Air Temperature, Surface Temperature

Presentation Poster: View Document

Optional Badges: Be a Data Scientist, Make An Impact, Be a STEM Professional

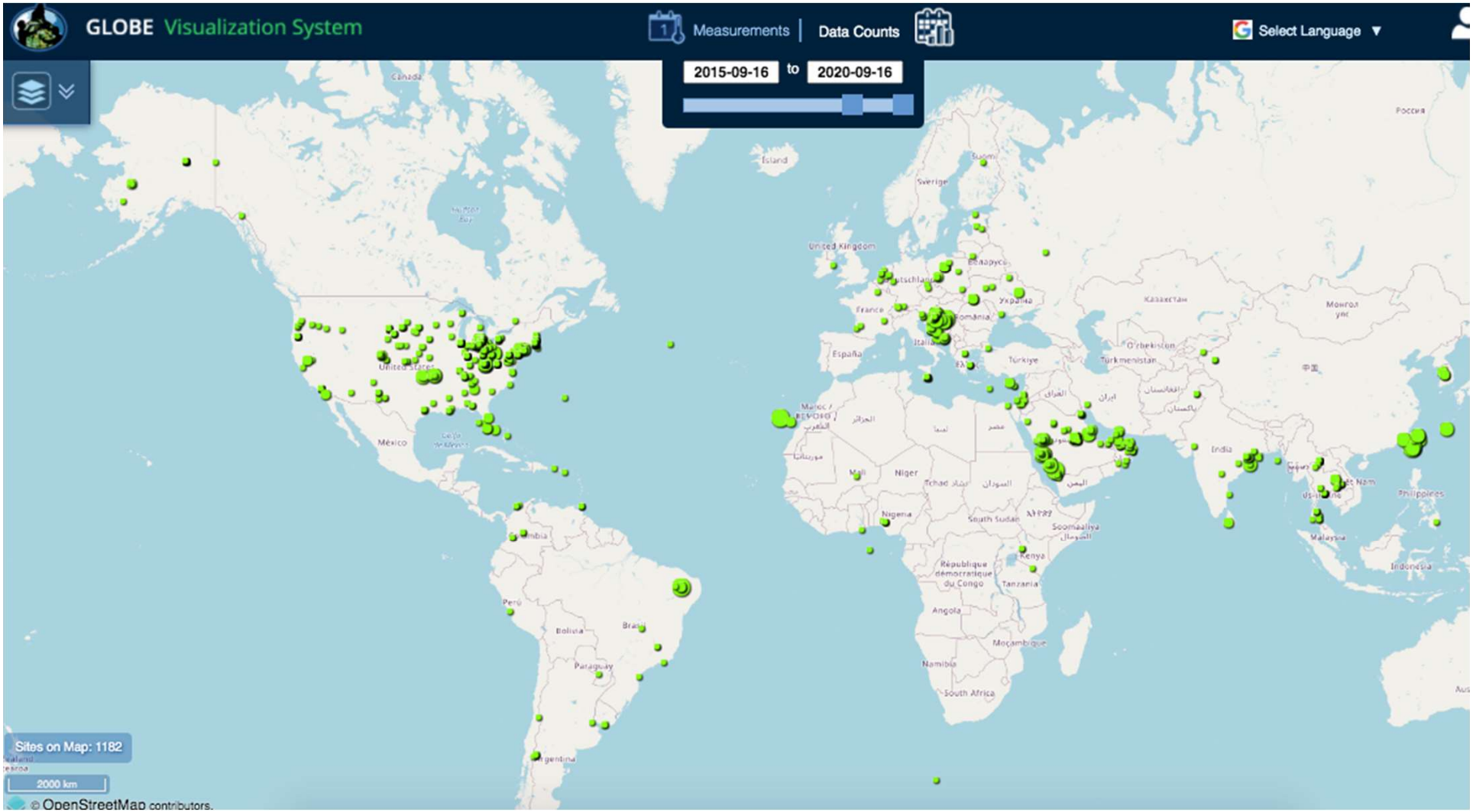
Language(s): English

Date Submitted: 03/11/2022

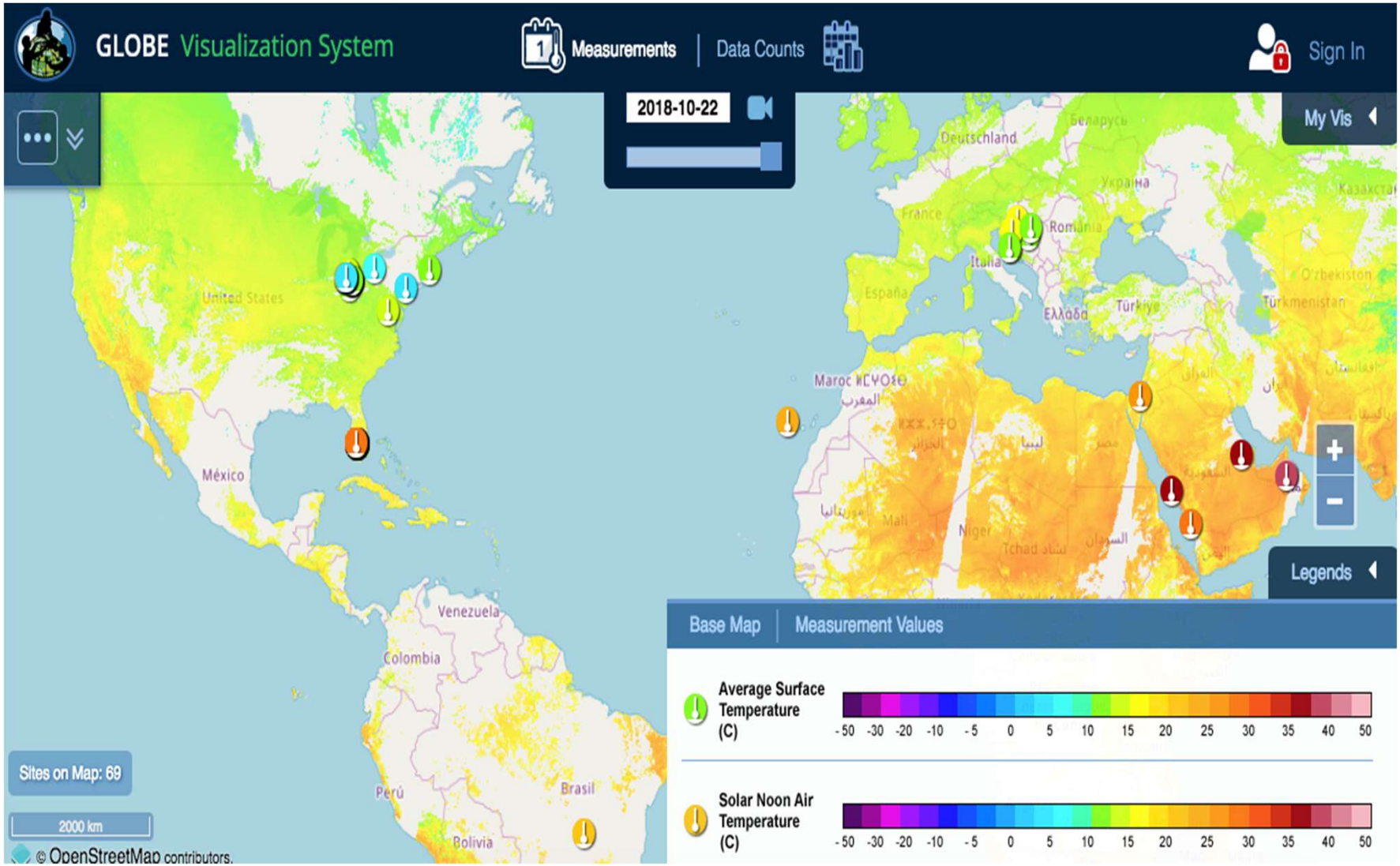
Need Urban Heat Island/Tree Studies

- Take surface temperature and air temperature observations (can use the GO app)
- Use the GO app to take tree height observations
- Compare in the sun and in the shade
- Map trees (through land cover) in your area

Surface temperature observations in the last 5 years

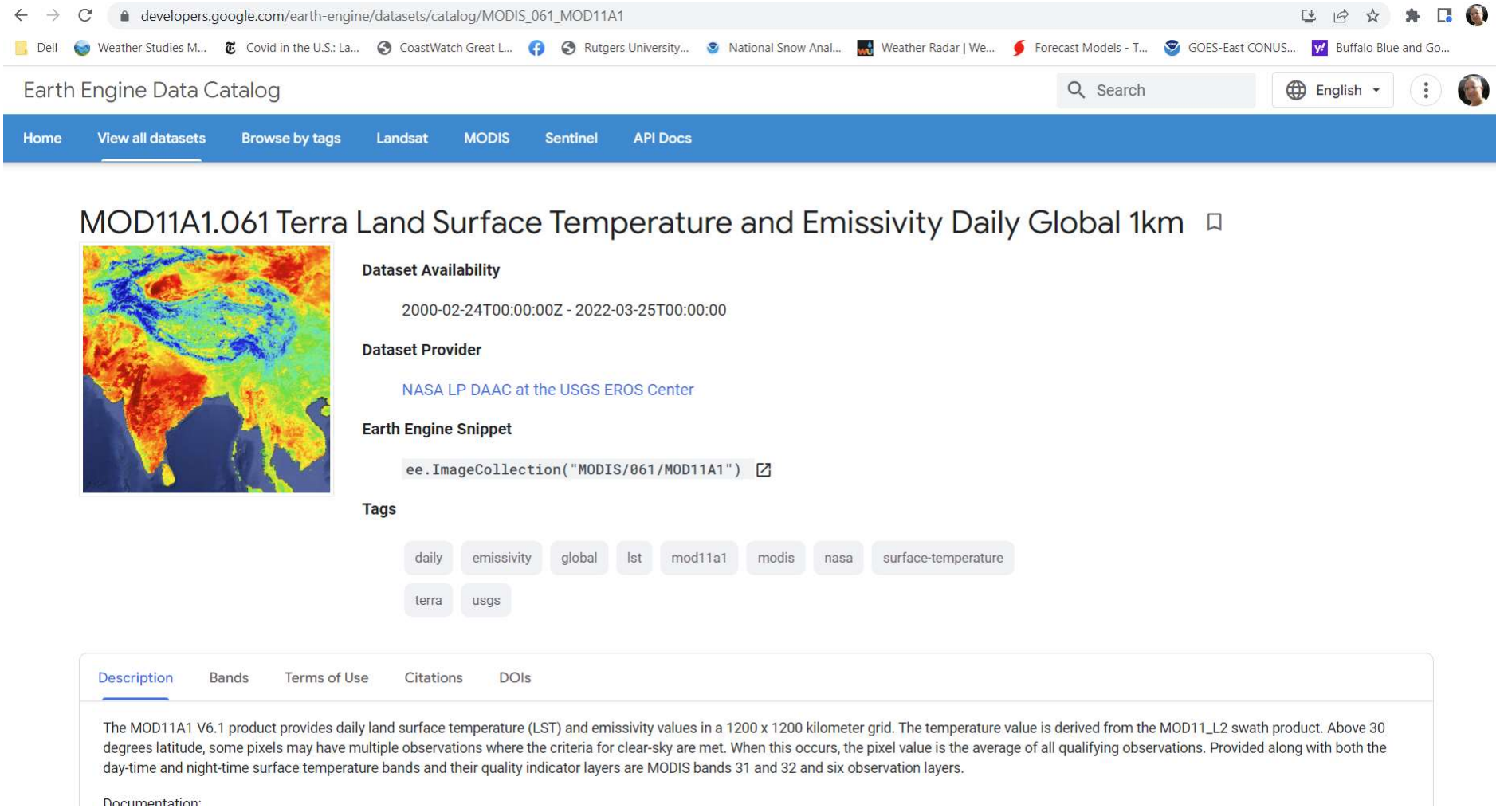


MODIS Terra LST vs. student surface temperature

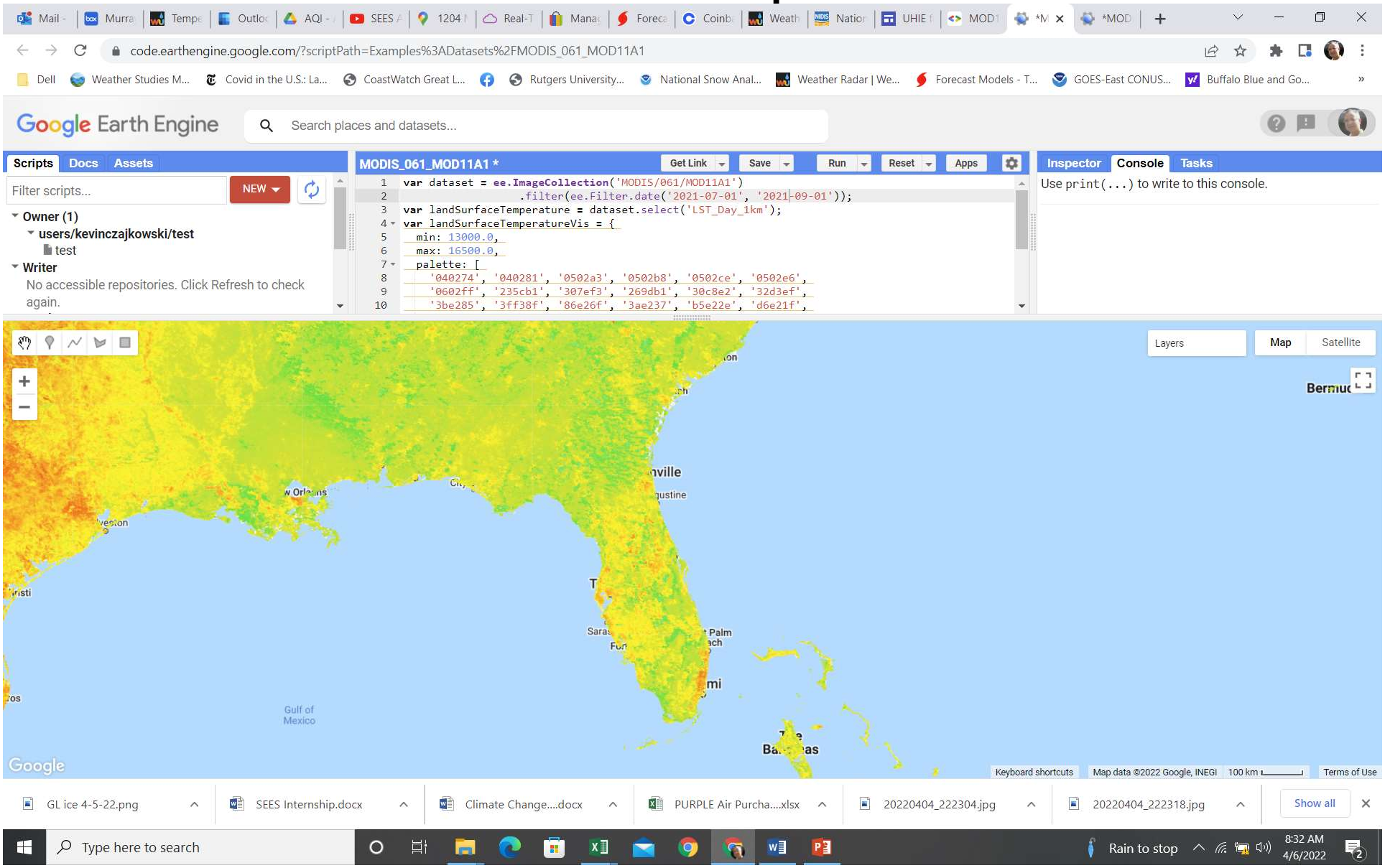


Google Earth Engine, MODIS Land Surface Temperature

https://developers.google.com/earth-engine/datasets/catalog/MODIS_061_MOD11A1

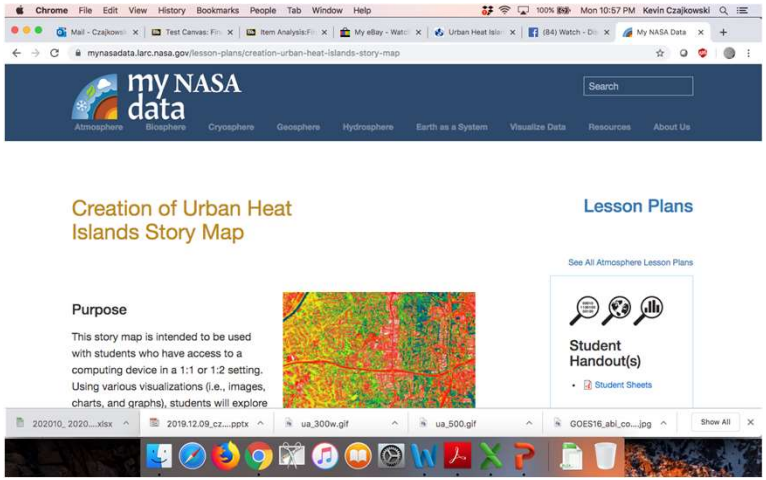


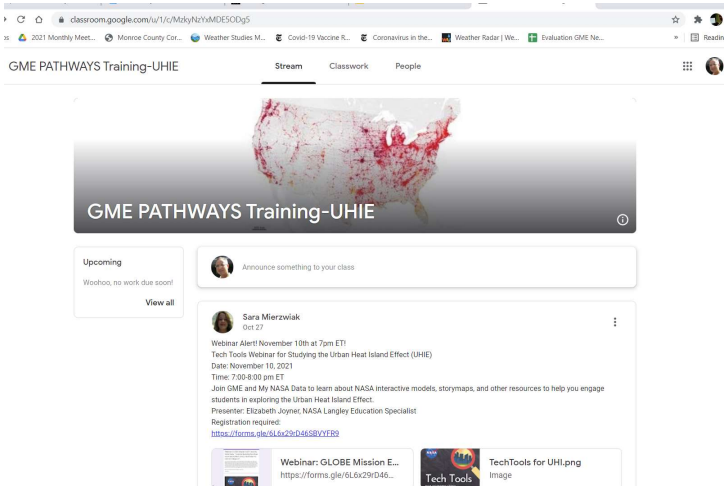
Google Earth Engine, MODIS Land Surface Temperature



Other Resources

https://mynasadata.larc.nasa.gov/lesson-plans/creation-urban-heat-islands-story-map

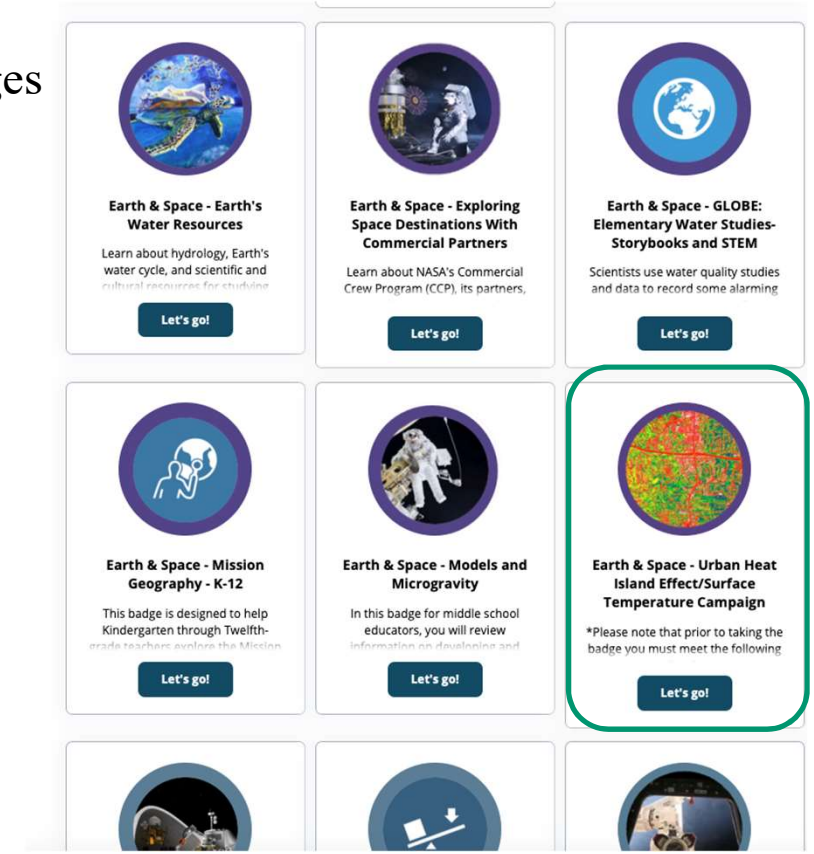




Email me if you would like to join our Google Classroom – kevin.Czajkowski@utoledo.edu

NASA Urban Heat Island Badge

Create an account to see the pages offered.
Self-paced
Time: Less than 10 hours.



You need to be GLOBE Trained.

https://www.nasa.gov/audience/foreducators/best/badging.html

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Facebook: https://www.facebook.com/globemissionearth/

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