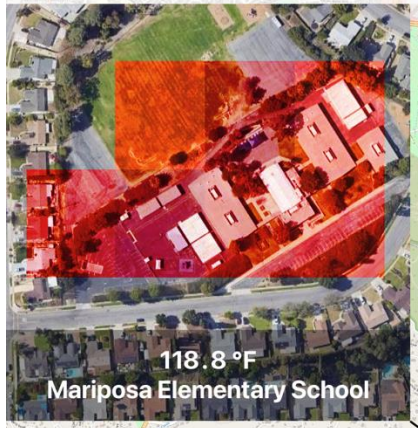
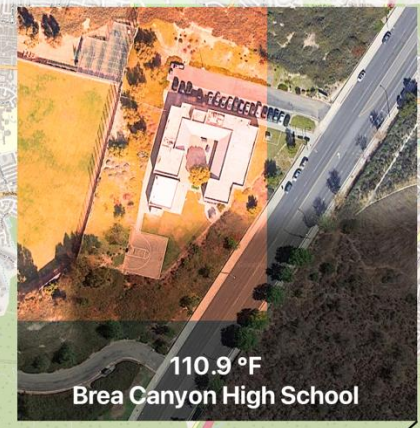
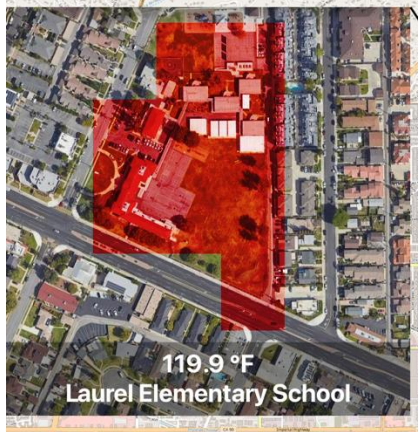
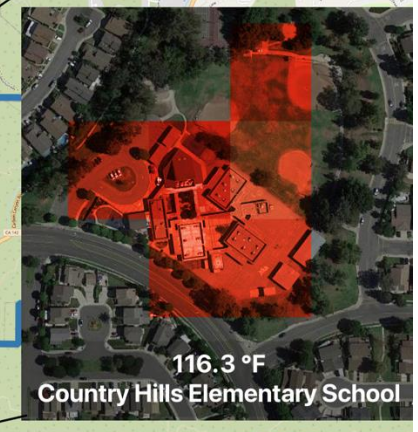
Sweltering Schools in Brea, California

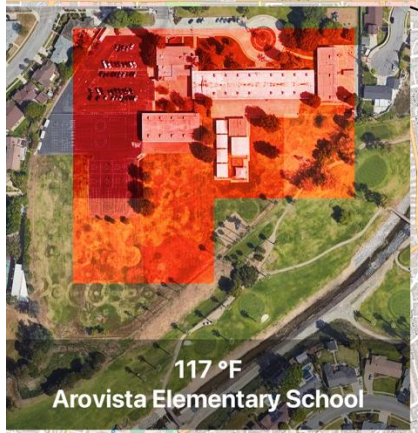
Gabriella Dauber











Temperature (°F)

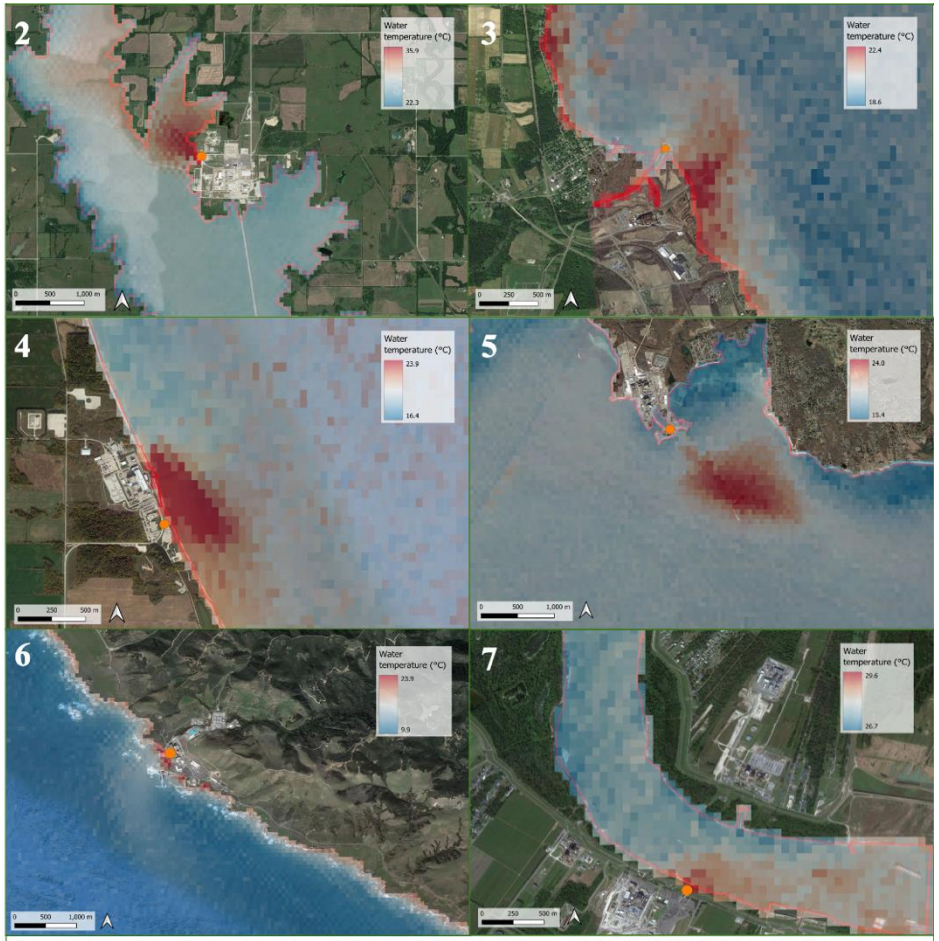
08/18/2023

01:01:26 PM PST

109.4 — 126.1

Preliminary Detection of Thermal Water Pollution Observed with ECOSTRESS: Are Nuclear Power Plants Complying with Regulations?

Jocelyn Valdivia



Figures 2-7. Six nuclear power plants and a snaphot of their thermal plumes. (Fig. 2) Wolf Creek Generating Station, KS. (Fig. 3) Greenidge Generation Holdings Inc., NY. (Fig. 4) Point Beach Nuclear Plant, WI. (Fig. 5) Dominion Millstone Power Station, CT. (Fig. 6) Diablo Canyon Power Plant, CA. (Fig. 7) Waterford 3 Nuclear Generating Station, LA. Orange marker represents approximate location of cooling water discharge. Note difference ranges for the legends.

Terrrace Tea Farming and its influence on Plant Water Use

Tea is one the most widely consumed beverages in the world and China is one of its largest producers.Tea covers almost 9 million acres of land in China alone. Understanding tea farming practices and their effects of ecosystem function is an important step in identifying and adopting sustainable agricultural practices. An initial comparison of evapotranspiration between terraced tea plantations and surrounding forest demonstrate no significant differences between the two land cover types. Under current climates,the cultivation of tea does not seem to affect ecosystem water balance,but projected changes in temperature and water availability may be of concern for the future.

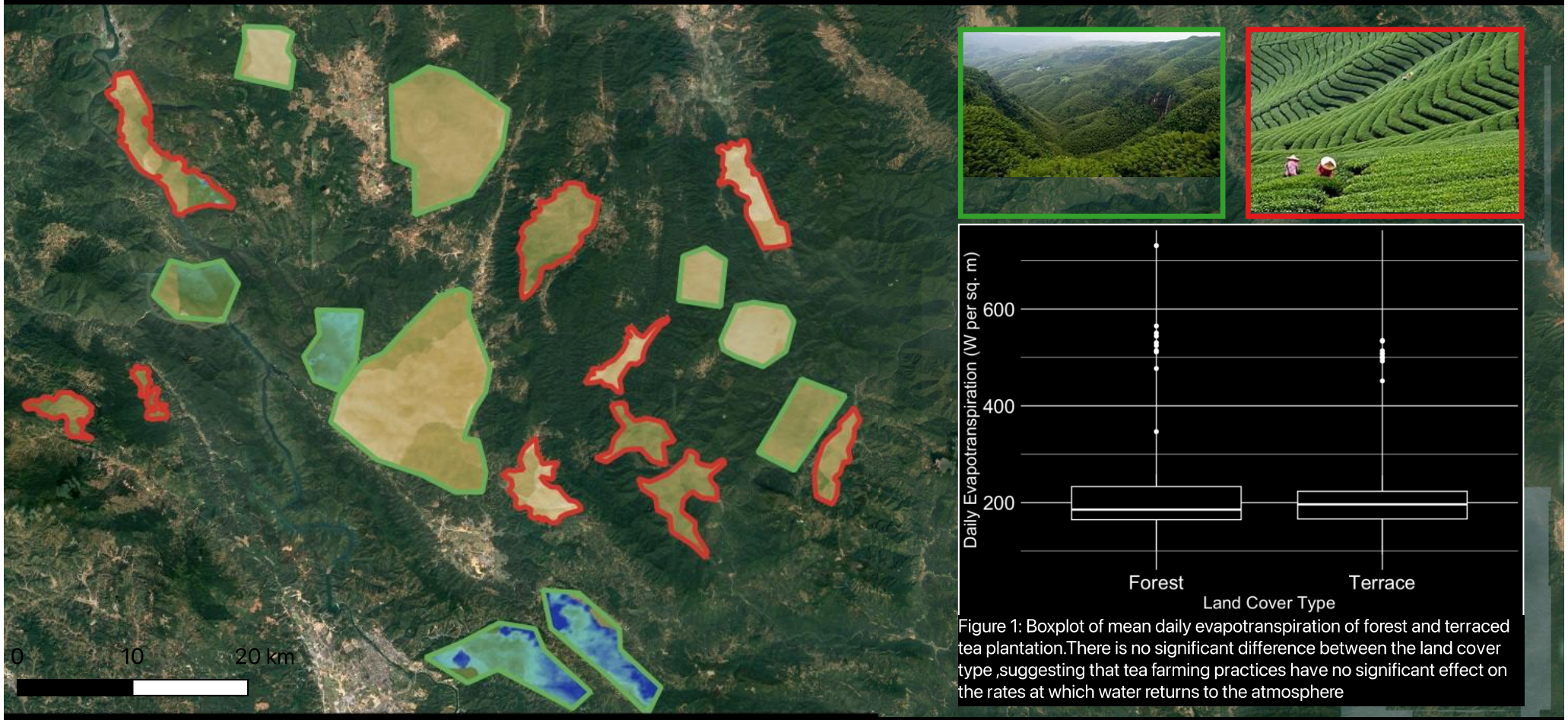


Figure 1: Boxplot of mean daily evapotranspiration of forest and terraced tea plantation.There is no significant difference between the land cover type ,suggesting that tea farming practices have no significant effect on the rates at which water returns to the atmosphere

Methods: Daily evapotranspiration data from 2018-2020 of tea terraces and forests (n = 10 each land cover type) from Dadugang in Southwest China were downloaded from NASA's ECOSTRESS mission (Collection 1).Data collected during tea's growth period (October-February) were selected and averaged over time. Only those scenes with data for >80% of the pixels in the polygon were selected for use.

Forest

Terrace

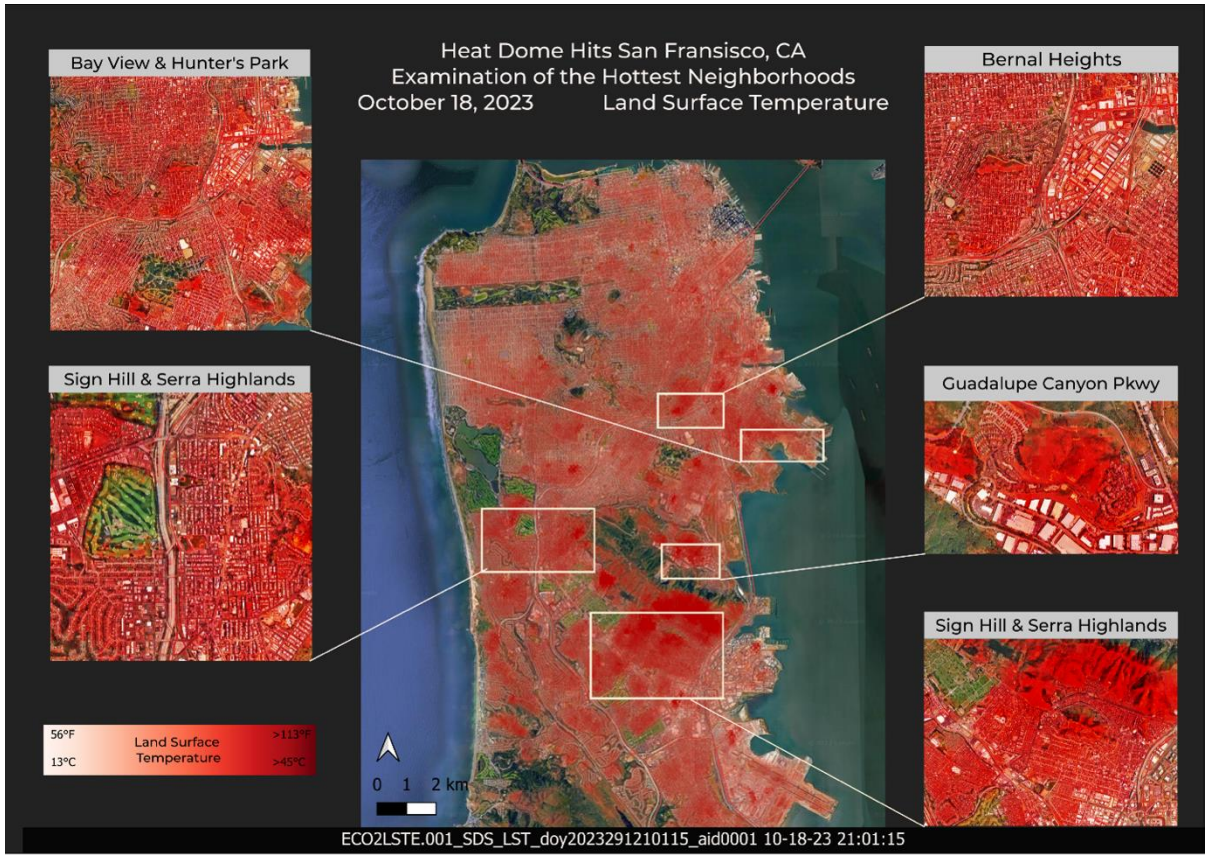
Evapotranspiration rate (W per sq.m)

200 400

Maisey Runkel (Chapman University)

OBSERVING EARTH FROM ABOVE

Training the Next Generation in Environmental Remote Sensing



Gregory Goldsmith (goldsmith@chapman.edu)
Joshua Fisher – Chapman University
Monae Verbeke – Institute for Learning Innovation

Project-Based and Active Learning Curriculum

TUTORIALS

FOLLOW-ALONG TUTORIALS TO LEARN HOW TO ACCESS AND VISUALIZE DATA FROM ECOSTRESS

TUTORIALS

TUTORIAL 1

INSTALLING QGIS

Actions: Installing QGIS

Estimated time: 30 minutes

TUTORIAL 2

MAKING BASIC MAPS IN QGIS

Actions: Making Basemaps, Adding Layers

Estimated time: 30 minutes

TUTORIAL 3

DRAWING AN AREA OF INTEREST

Actions: Drawing Shapefiles

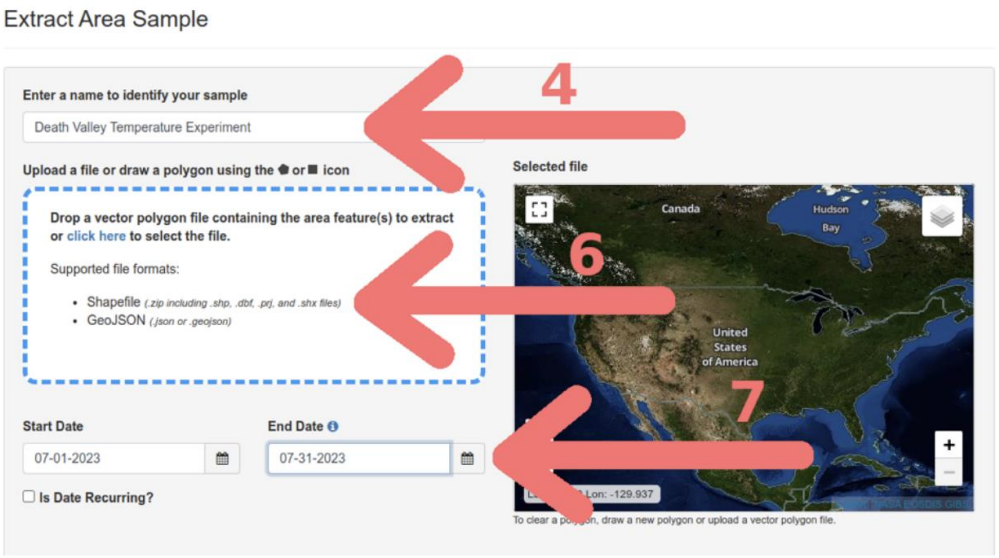
Estimated time: 30 minutes

Follow-Along Tutorials Using Open-Source Software/Interfaces

1) Installing QGIS
2) Making Maps in QGIS
3) Drawing Areas of Interest
4) Accessing Data with AppEEARS
5) Visualizing Data with QGIS
6) Dealing with Cloudy Days
7) Adding Inset Maps and Exporting
8) Evapotranspiration with ECOSTRESS
9) Water-Use Efficiency with ECOSTRESS
10) Evaporative Stress with ECOSTRESS
11) Raster Math
12) Making Better Maps

Observing Earth from Above (Env 329) v24.06

Schmid College of Science and Technology, Chapman University



6. Drag and drop (or use the *click here to select the file* link) to upload the shapefile **DeathValleyNational-Park.zip**. The map should update with a polygon that encompasses Death Valley National Park.
7. Update the *Start* and *End* Date Fields for our month of interest: 07/01/2023 to 07/31/2023

NOTE: While AρρEEARS provides access to a wealth of different data products, here we are primarily focusing on data from the ECOSTRESS instrument.

Recorded Lectures, Lesson Plans, Syllabi, and More

VIDEOS

VIDEOS ON THE SCIENCE, SCIENCE COMMUNICATION, AND SCIENCE CAREERS

OBSERVING EARTH FROM ABOVE

- HOME
- TUTORIALS
- VIDEOS
- TEACHING MATERIALS
- OUTCOMES
- BLOG
- CONTACT

SCIENCE AND COMMUNICATION VIDEOS

PRINCIPLES OF ECOSTRESS #1

PRINCIPLES OF ECOSTRESS #2

EVAPOTRANSPIRATION FROM ECOSTRESS #1

EVAPOTRANSPIRATION FROM ECOSTRESS #2

Nine Schools Have Joined Chapman University

UC RIVERSIDE

WESLEYAN UNIVERSITY

NAU NORTHERN ARIZONA UNIVERSITY

OXY Occidental College

CALIFORNIA STATE UNIVERSITY, NORTHRIDGE 1958

TEXAS A&M UNIVERSITY CORPUS CHRISTI

COLORADO STATE UNIVERSITY

observingearthfromabove.com

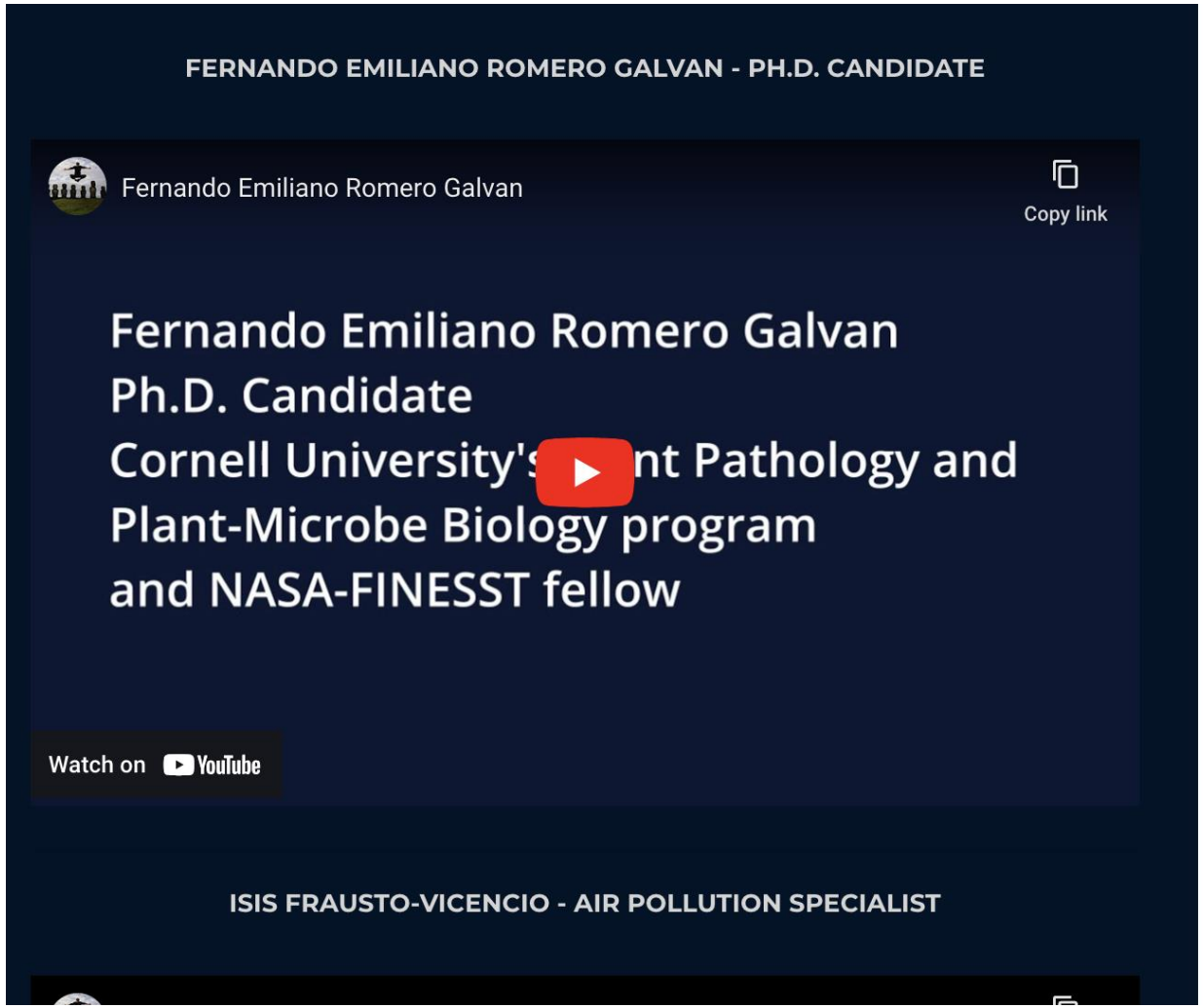
Data since launch in September 2024:

- More than 700 active users engaged in more than 2300 sessions

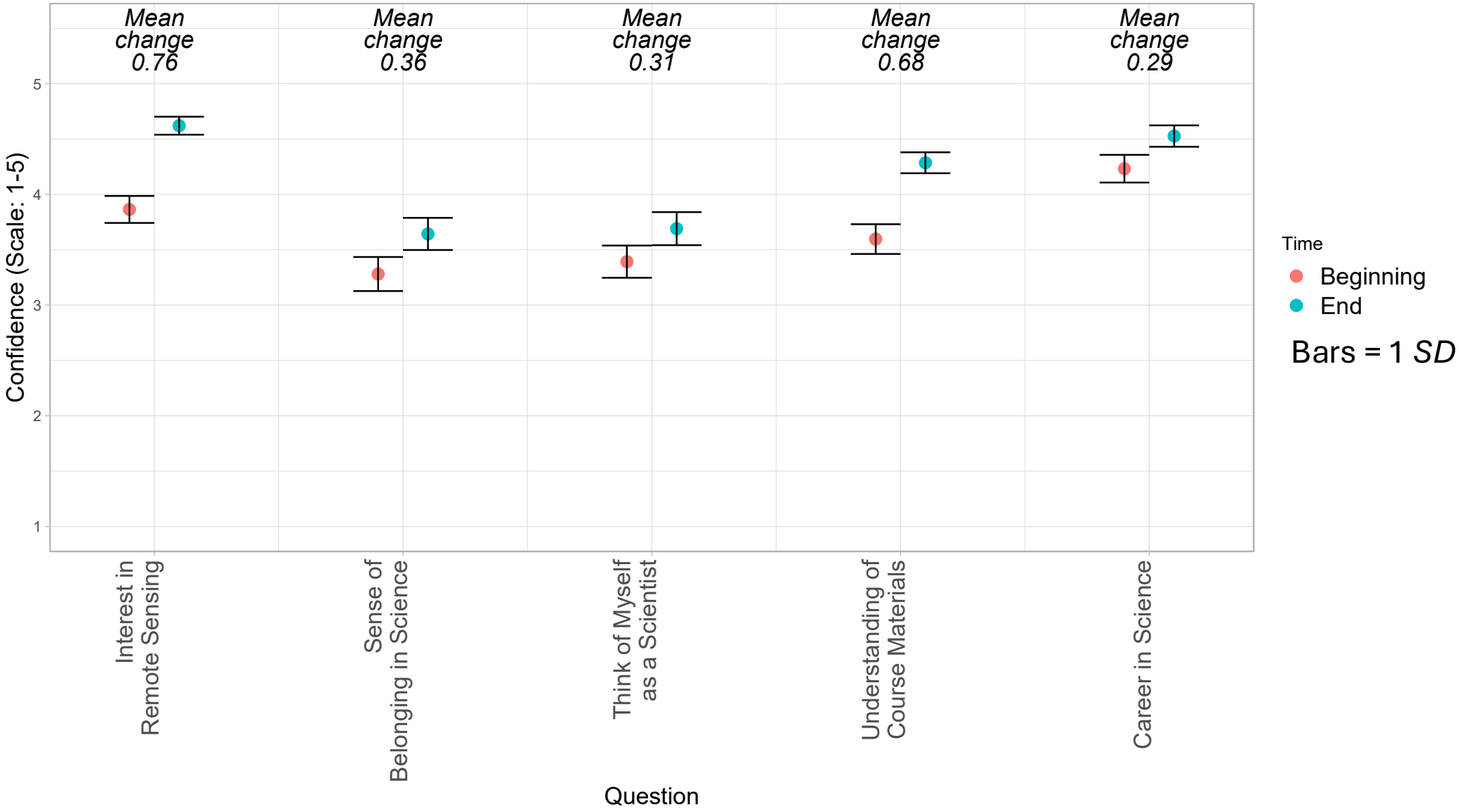
-Users average 5 min per visit and make about 7 clicks per visit on the site.

-Tutorials dominate the traffic, but there have been more than 100 visits to the teaching materials.

-78% of our traffic is direct, which is not surprising (Goldsmith et al. 2014).



Participation Improves Science Interest, Identity, Belonging…



n = 59 students from 7 institutions; IRB #24-12

Results are robust...

Students Particularly Engage with Real-World Approach

"The projects connected classroom theories to real-world environmental issues, which made the learning process incredibly relevant and engaging" (Interview A).

"Tackling real-world problems through projects developed my ability to analyze complex datasets and think critically about potential solutions" (Interview B).

"The course challenged us to find innovative solutions to environmental issues, which really enhanced my problem-solving skills" (Interview E).

"The hands-on GIS component was unlike anything offered in my other courses, providing not just insight but real-world skills" (Interview C).

IRB #24-12

Instructors Surprised by Student Engagement

“I was surprised when a student who struggled at first ended up doing an independent project over winter break, using the materials from the class. She said she never thought of herself as someone who could do this kind of analysis.” (Interview 1)

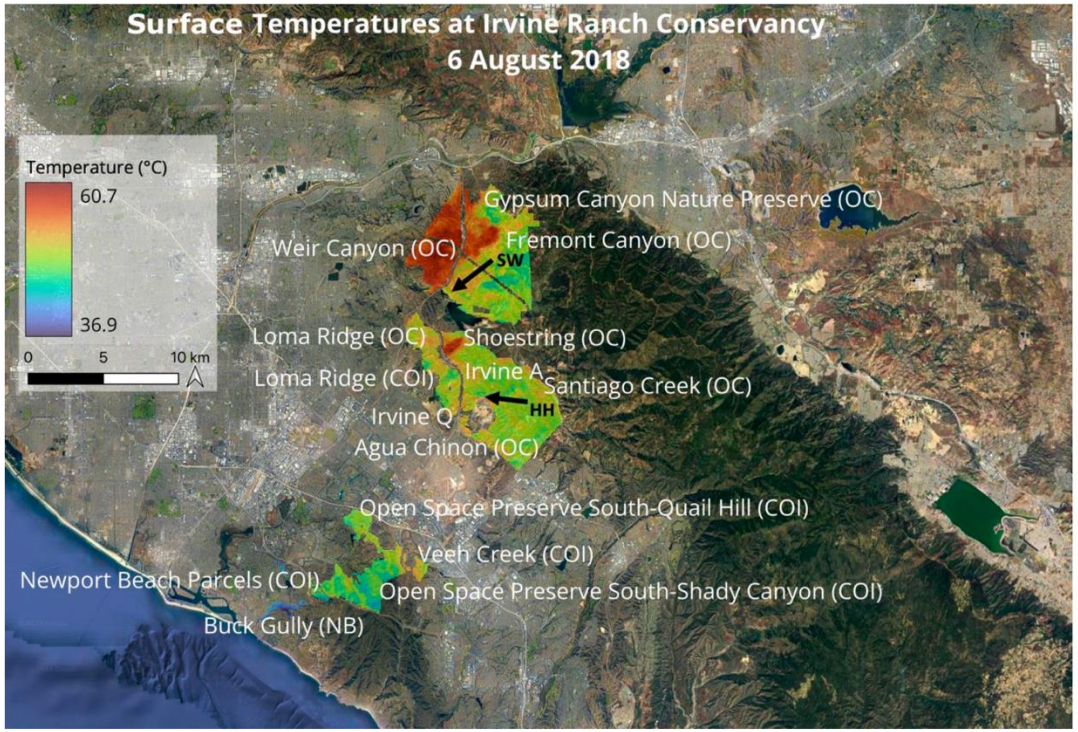
“I think the most rewarding part was when one of my quieter students asked me after class how they could get more involved in research like this. I hadn’t realized they were even that interested.” (Interview 2)

The student, despite not being able to fit the class into her schedule, *“went through all the course material on her own just because she found it so valuable. That told me a lot about the impact.”* (Interview 3)

Leaf thermal tolerances of native plant species in California Coastal Sage Scrub

Goldsmith, G.R., Acosta, C.*, Adame, A.*, Anzai, A.*, Chrisman, I.*, Clark, N.*, Dauber, G.*, Eljenholm, C., Gallagher, C.*, Gregory, N.C., Hernández, E., Hunt, C.*, Jolly, A.R., Pessi, L.*, Rosa, P.*, Schettino González, N.*, Skender, E.*, Snow, S.*, Solis, B.M.*, Soliz, J.*, Soo, T.J.*, Sukhdeo, H.*, Summers, H.*, Ta, M.*, Wallace, S.* ***In Review***

**Indicates Undergraduate Student*

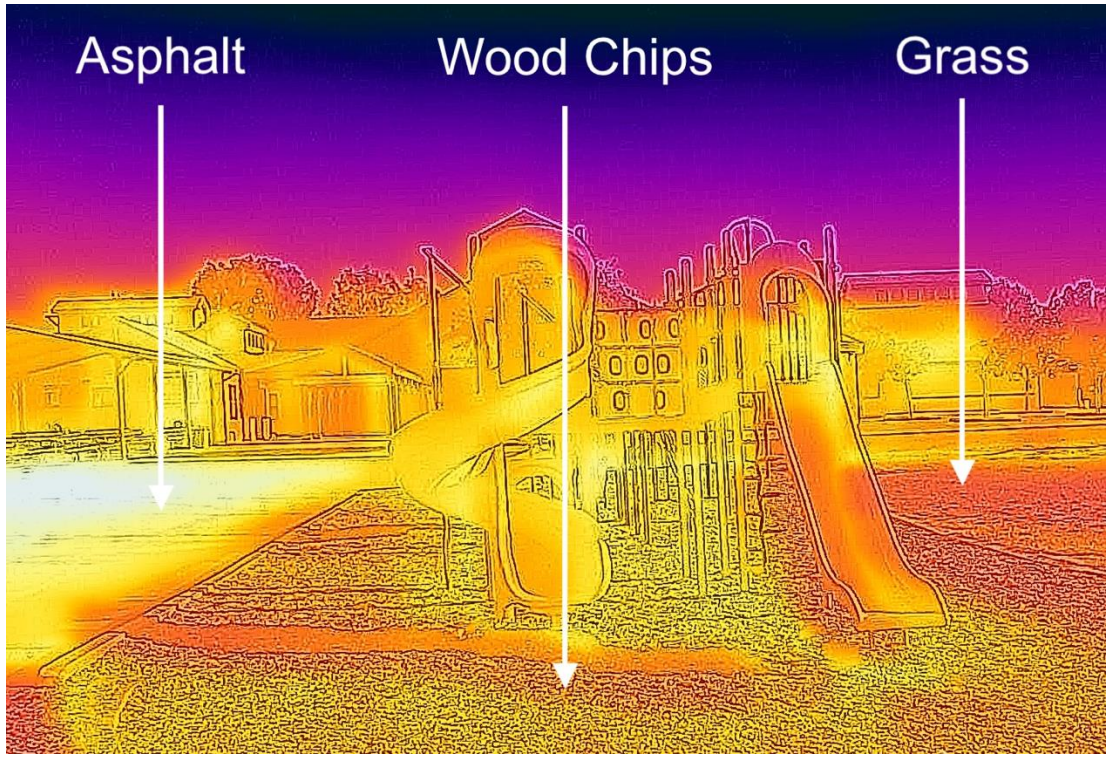


Temperature Landscapes to Inform Conservation/Restoration

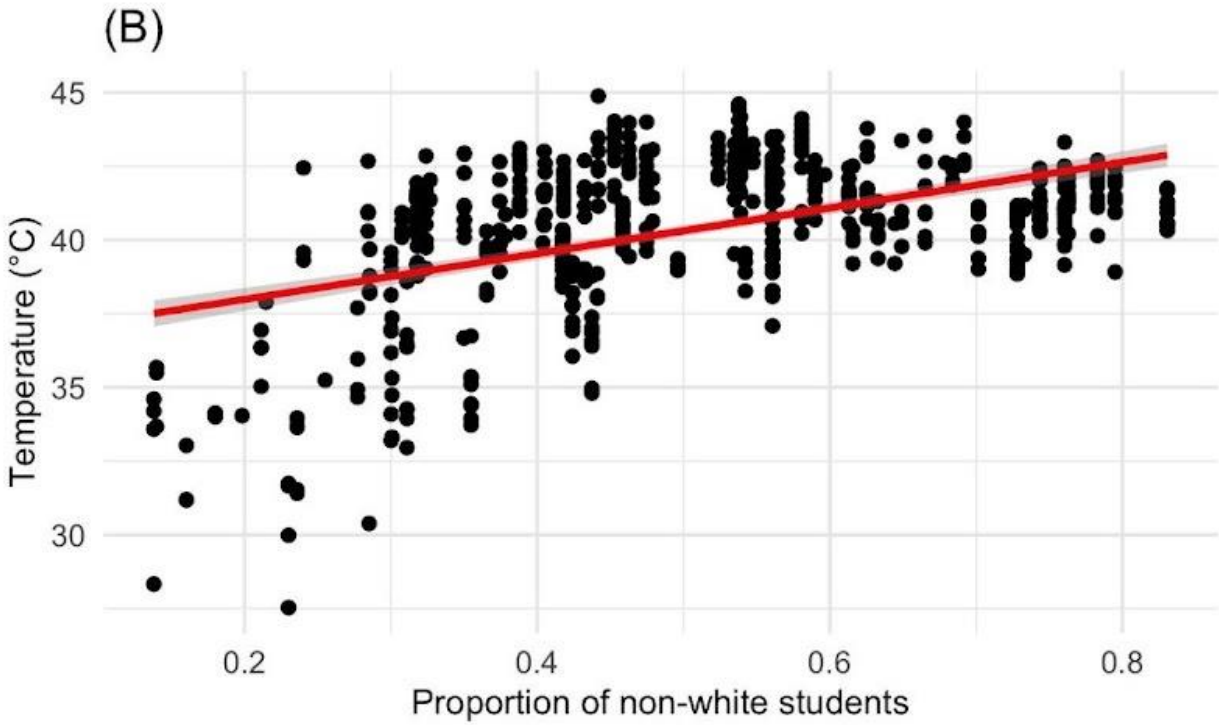
Coverage in LA Times and KTLA

High-minority, low-income public schools in Southern California have disproportionately high surface temperatures

Joaquin Murillo*, Gabriella Dauber*, Joshua B. Fisher, & Gregory R. Goldsmith ***In Review***



Data on >600 public schools in Orange County



Minority populations go to schools with hotter surface temperatures.

Lessons Learned

-Short, standalone modules are the way to go. Providing full curriculum is useful, but there are challenges to implementation.

-Undergraduates can build beautiful maps.

-If you build it, they will not come. Ideally, you build it with them.

-To realize the full potential of NASA missions, we need to grow our user base.

Read More at AGU's EOS