

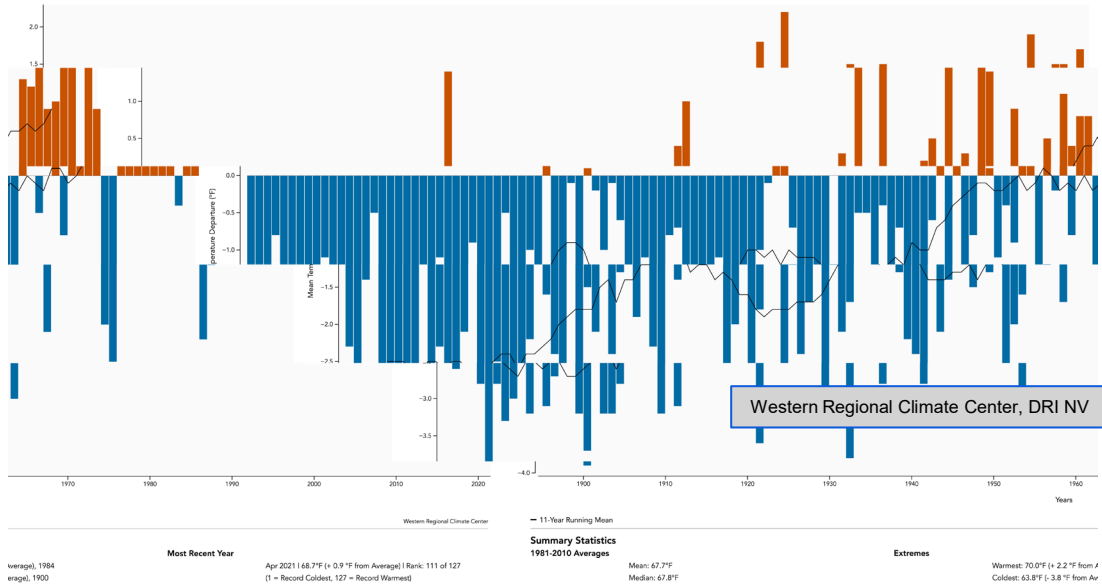


UC San Diego

SoCal Extreme Heat Research Hub

Mark Merrifield

SoCal Temperature April-September



Warming SoCal and Global temperatures in recent decades

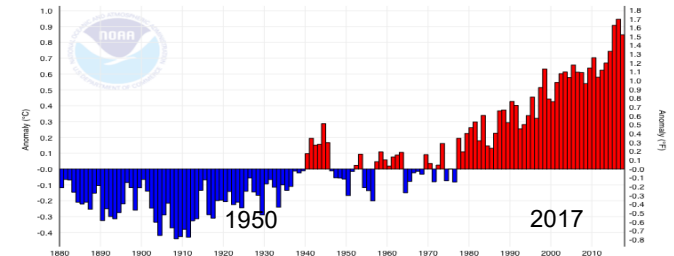
SoCal has warmed along with western U.S. and world

Natural variability and anthropogenic causes

Southern California has been warmer since 1977, persistently warm since 2012

Global Surface Temperature

Global Land and Ocean Temperature Anomalies, January-December



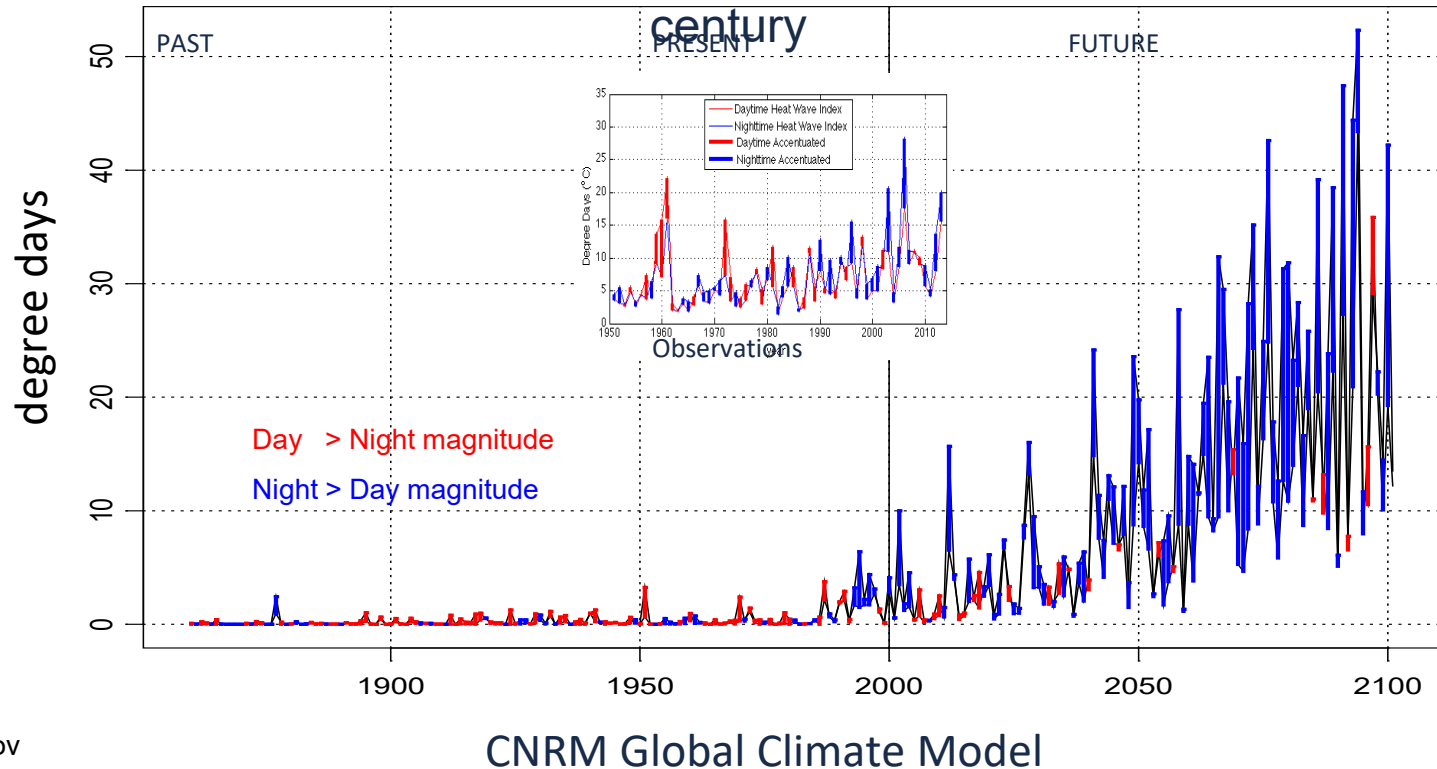
1880

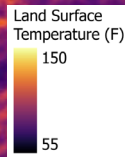
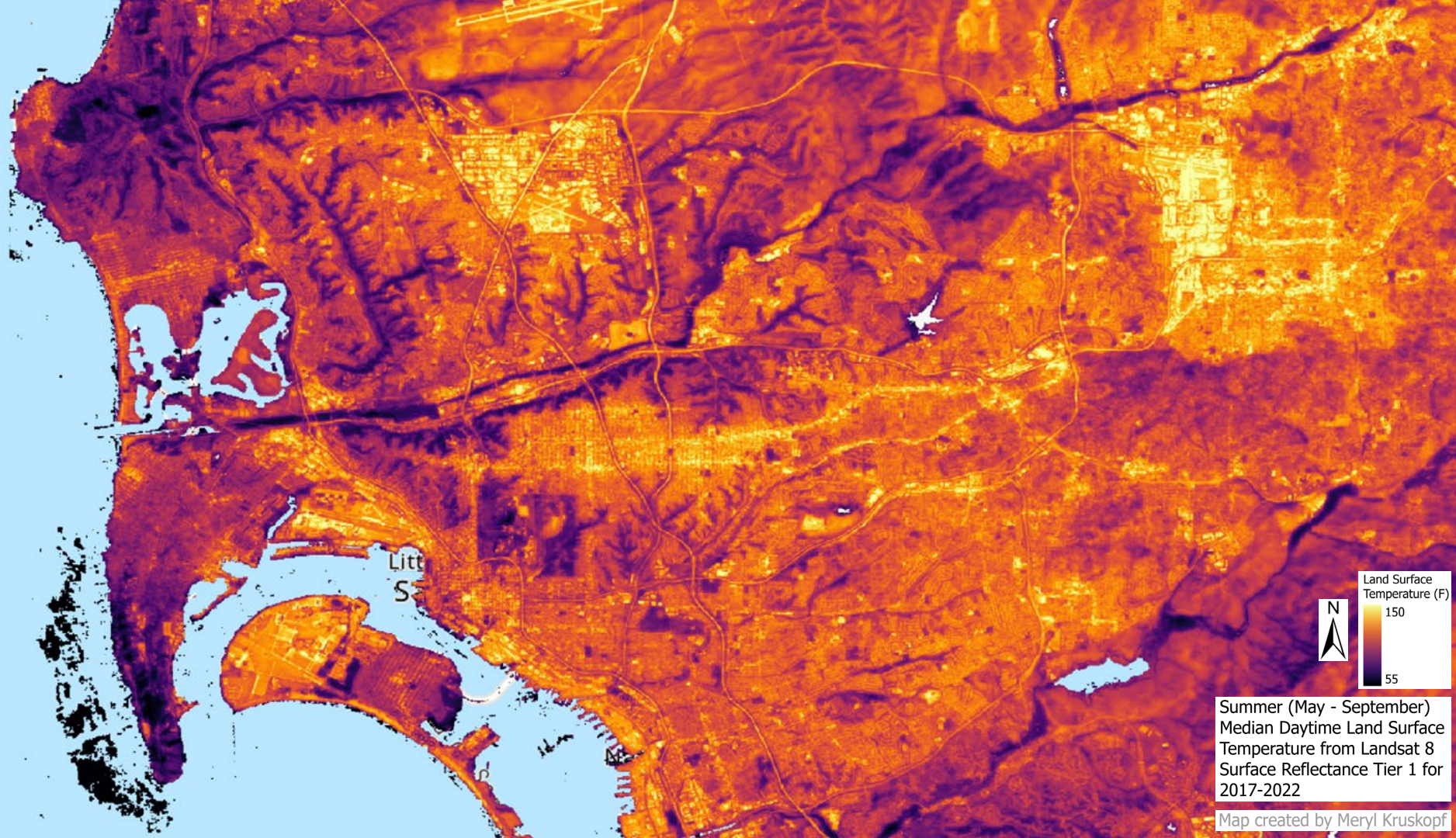
1950

2017

California Heat Waves and Climate Change

A vetted **climate model** under a **mild emissions scenario** shows that the number of heat waves days will increase significantly over the course of the



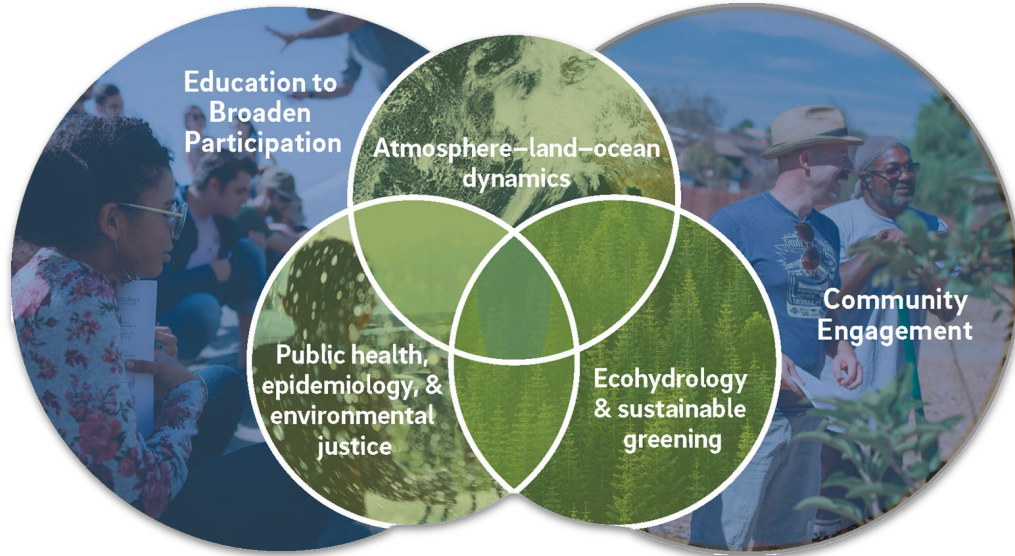


Summer (May - September)
Median Daytime Land Surface
Temperature from Landsat 8
Surface Reflectance Tier 1 for
2017-2022

Map created by Meryl Kruskopf

SoCal Heat Hub

- Topic: Extreme heat and its impacts in the coastal zone & sustainable adaptation
- 5-year lifespan, ending in 2027
- Funded by NSF Coastlines and People (CoPe) program
- Comprised of a team of 15+ scientists and educators, and a growing group of collaborators



Atmosphere–Land–Ocean Dynamics

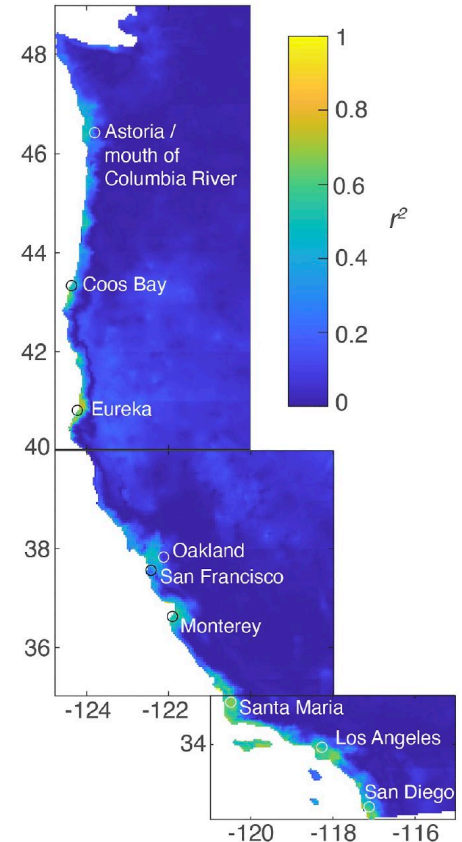


How do ocean, atmosphere, and land processes drive and/or modulate extreme heat across varied coastal zone climates, and what changes are expected with climate change?

EXTREME HEATING DAYS IN THE COASTAL ZONE

The number of summer heatwave days in the coastal zone tracks sea surface temperature.

The relationship between SST and summer heat waves extends along the US west coast



Public Health and Epidemiology

What are the locally-specific health impacts of extreme heat, and how do they vary according to land use and socioeconomic factors?

Ecohydrology & Sustainable Greening

What is the locally-specific relationship between temperature and vegetation?
Where/how can vegetation be used for heat adaptation, and what are the associated climate/water resource constraints?

Interactive map tool

A tool to support research
“co-production” and
community engagement.

[“Ecohydrology and Heat Explorer” Tool](#)
[Learn how to use the tool](#)

Ecohydrology and Heat Explorer

This interactive map allows exploration of interactions between heat, plants, and water. You can display a map and also look at patterns over time in key data layers representing heat (Land Surface Temperature or LST), plant greenness (Normalized Difference Vegetation Index or NDVI), plant cover (Tree Canopy Cover or TCC), and the combination of plant transpiration and soil evaporation (Evapotranspiration or ET).

Toggle Base Map

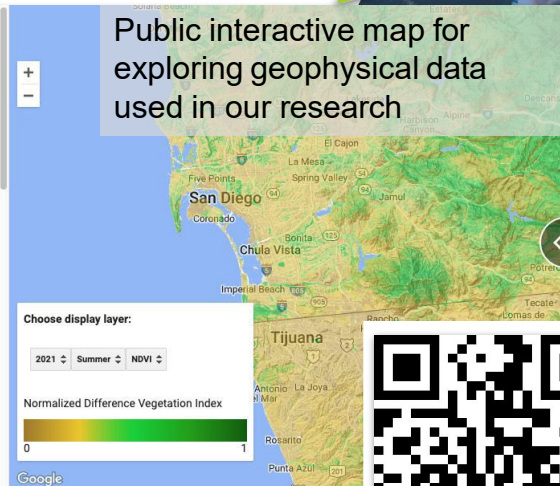
Instructions

Select data layers to display on one or both sides of the slider using the drop-down menu options. Zoom in or out using the +/- buttons. Drag the slider from side to side to compare different time periods and/or layers. To generate charts of LST, NDVI, and ET over time, click a point on the map or draw a polygon on one or both sides of the slider. Map layers and charts may take several minutes to display. For additional instructions: [click here](#)

About This Map

Data
The interactive map displays the following data:

Layers - Normalized Difference Vegetation



Education to
Broaden
Participation

Atmosphere–land–ocean
dynamics

Community
Engagement

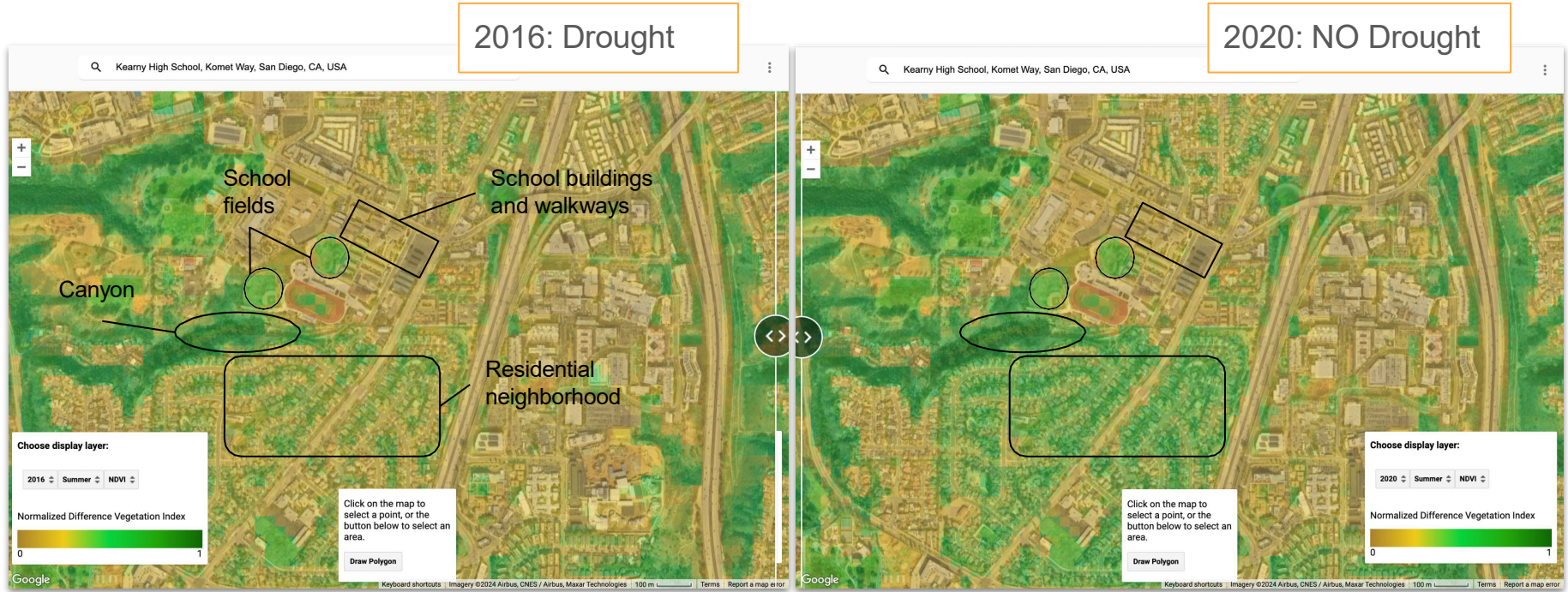
Public health,
epidemiology, &
environmental
justice

Ecohydrology
& sustainable
greening

<https://tinyurl.com/ycynj8bf>

Interactive map tool

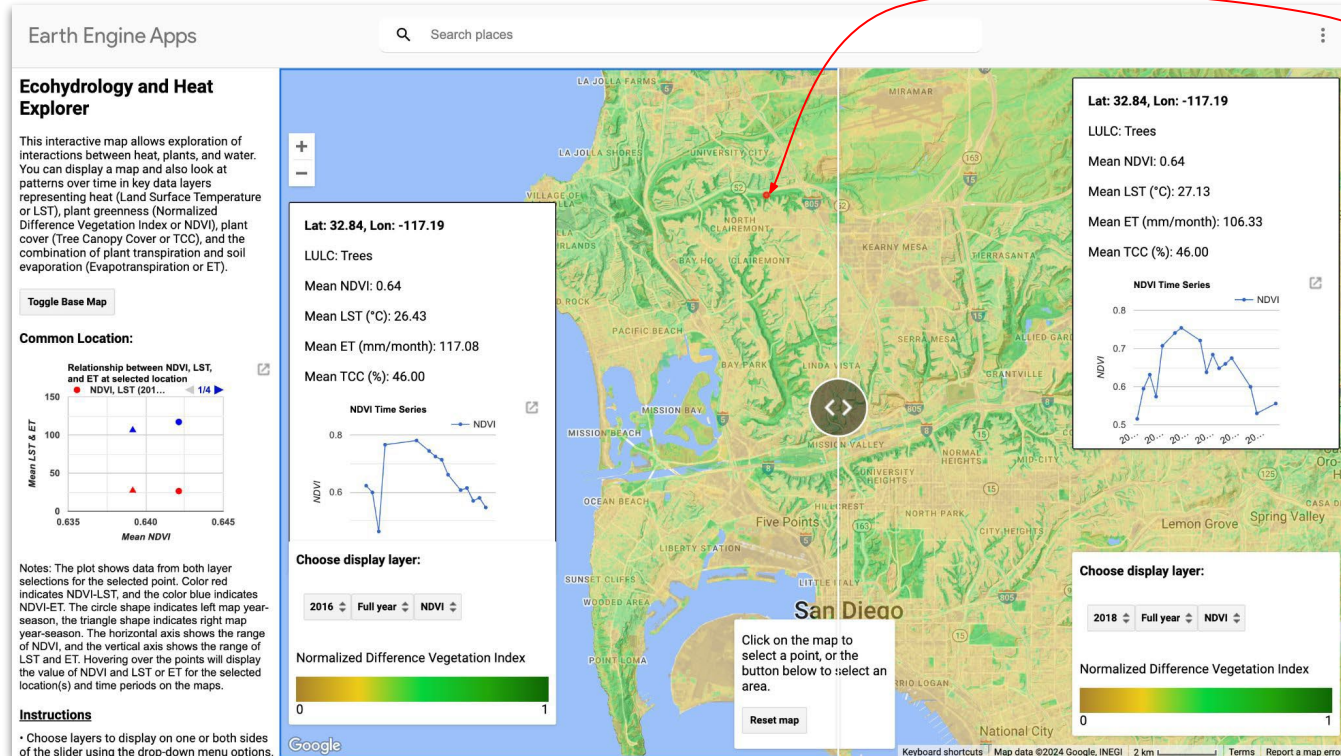
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Example: Looking at NDVI in different years (2016, 2020) at a local high school

Interactive map tool

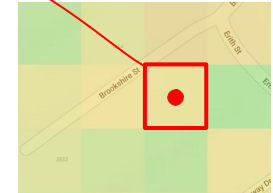
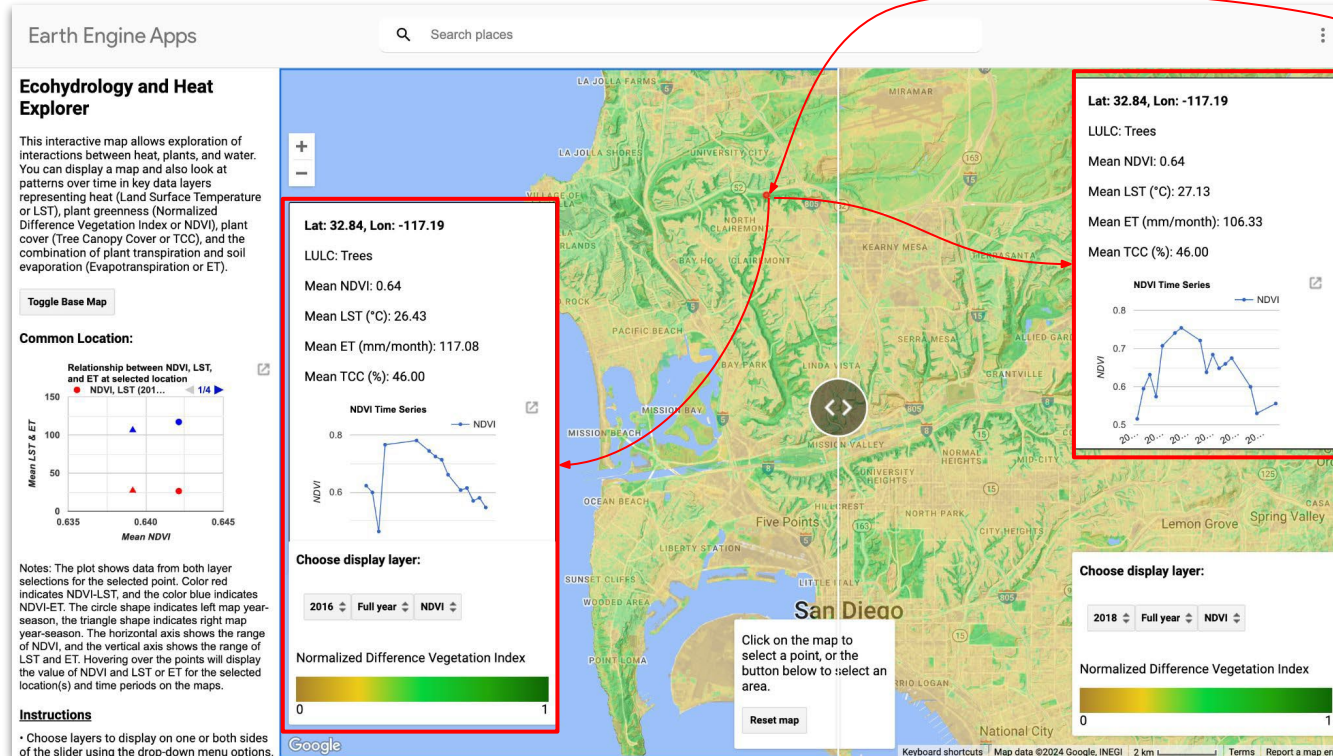
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Summarizing data
for an **individual**
“cell” or “pixel”

Interactive map tool

["Ecohydrology and Heat Explorer" Tool](#)
[Learn how to use the tool](#)



Summarizing data for an **individual** "cell" or "pixel"

Get NDVI, LST, and ET values for specific locations and time periods.

Community Engagement

Enable long-term, equitable engagement with regional government agencies and community partners with the goal of informing research and products produced by research theme areas 1–3.

“Accelerating Regional Heat Action Planning Across San Diego”

Funded by the Extreme Heat and Community Resilience Program (EHCRP)

Led by San Diego Regional Climate Collaborative in partnership with the cities of San Diego, La Mesa, and Chula Vista

Evaluation of regional extreme heat resources that will enable coordinated planning and action, e.g., the development of Heat Action and Adaptation Strategies, Heat Action Planning, Cooling Solutions Toolbox, and Heat Vulnerability Indexes.

Scripps Oceanography contribution:
Evaluation of in situ and remote sensing data, and regional weather and climate model simulations



Education to Broaden Participation

Expand the Hub's impact through extensive education activities that will broaden participation of underrepresented students from K12 through college.

Develop curricula that use a local phenomenon (extreme heat in SoCal) to anchor the broader phenomenon of global change.

Community Weather Stations

