



[Home](#) / [Events](#) / [Fundamentals To Use Hyperspectral and Thermal NASA Earth Observations](#)



EVENT

Fundamentals to Use Hyperspectral and Thermal NASA Earth Observations

Join us for a two-day webinar covering the fundamentals necessary to work with NASA's high-spectral resolution land-based Earth observation data from NASA's EMIT, ECOSTRESS, and PACE missions.

Overview of Google Earth Engine (GEE)

*NASA EarthData webinar:
Hyperspectral & Thermal
Fundamentals*



07.2025



credits: some slides modified from Google, SERVIR Science Coordination Office



Disclaimer

Overall purpose



- Understand / explore the basics of Google Earth Engine

Specific objectives



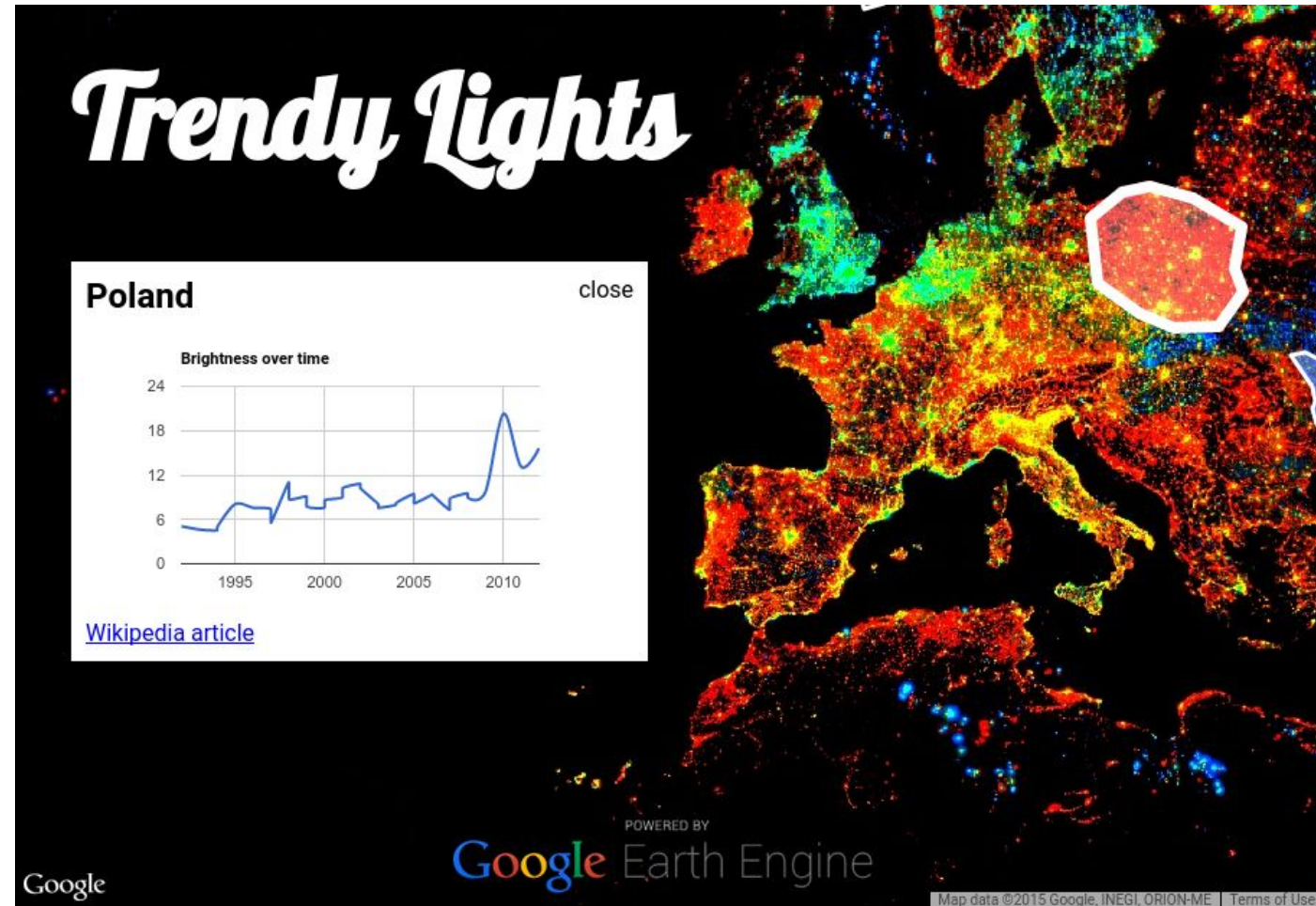
- Explore the GEE Code Editor for basic data visualization
- Examine the datasets in GEE's public catalog
- Learn about other resources
- Set stage for rest of training



Overview of GEE

What is Google Earth Engine (GEE)?

A free, web based, image analysis tool that facilitates scalable and shareable image analysis through an interactive development platform



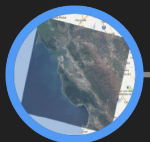
What is Google Earth Engine (GEE)?

"Big Data" analysis and visualization platform

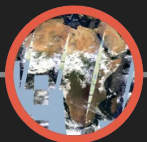
- Designed *for scientists*, not software engineers
- Goals: *make it easy, enable non-traditional users*

Focused on society's biggest challenges

- Reduce the time needed on analysis to spend more time on impact



Landsat
4, 5, 7, and
8



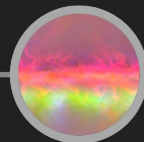
MODIS
Daily, NBAR,
etc.



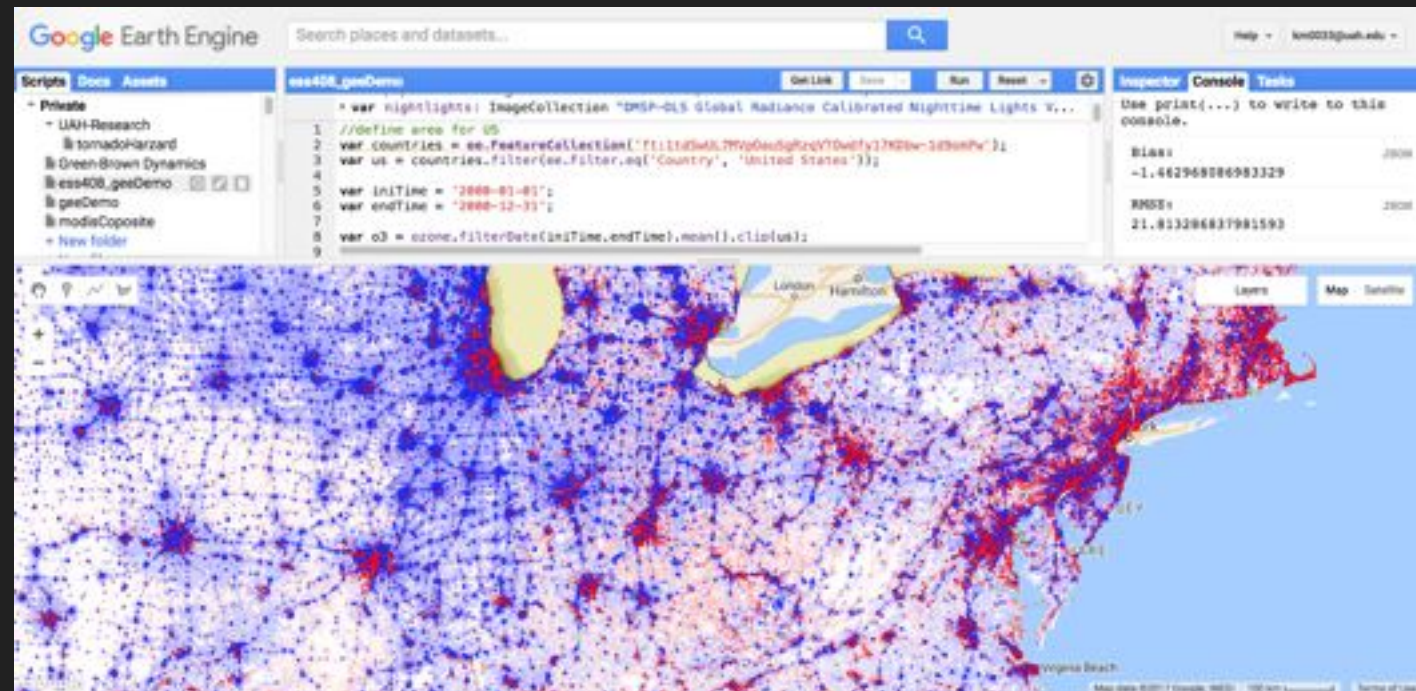
Terrain
SRTM, NED,
etc.



Land Cover
GlobCover, NLCD,
etc.



Atmospheric
NOAA NCEP,
etc.



What data does GEE have?

~**90 PB** Public Data Catalog (updated daily)

Imagery

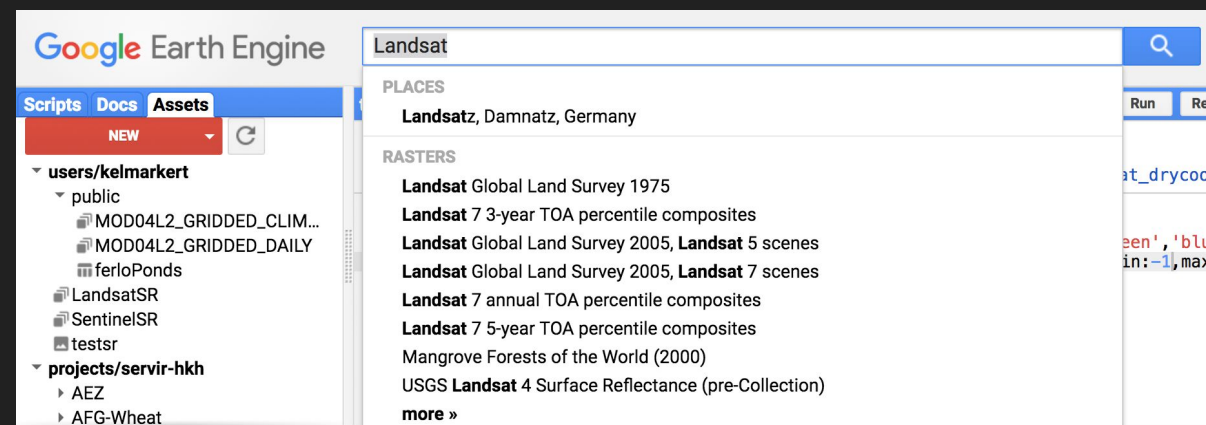
Landsat 4-9	7 bands, 30m
MODIS	250m Daily Global
Sentinel-1	10m SAR
Sentinel-2	12 bands, 10/20/60m

Geophysical

Digital Elevation
Land Cover
Surface Temperature, etc.

Weather Forecasts, Climate Models
+300 more analysis ready datasets

Custom user assets



Data Availability

~50 years
historical
coverage

SRTM

20+ petabytes of
data

MODIS

Landsat

*credits: modified from H. Parache,
SERVIR Science Coordination Office*



EARTH FLEET



Key

- International Partners
- U.S. Partner
- ISS Instrument
- JPSS Instrument
- Cubesat
- Launch Date TBD
- Earth System
- Observatory Mission
- Formulation
- Implementation
- Operating
- Extended

Invest/CubeSats

- MURI-FD 2023
- ARGOS* 2025
- ARCSTONE* 2025
- ACMES* 2025
- GRITSS-FD* 2025
- GRATTIS* 2025

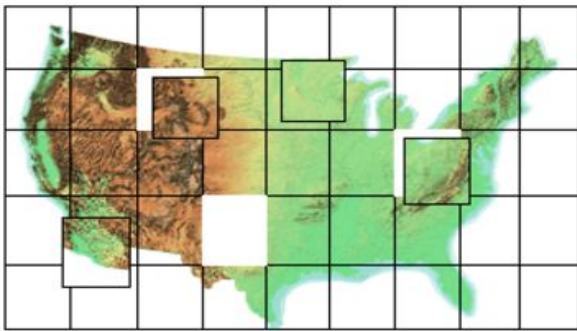
JPSS Instruments

- OMPS-Limb 2017
- CERES 2017
- OMPS-Limb 2022
- Libera 2027
- OMPS-Limb 2027
- OMPS-Limb 2032

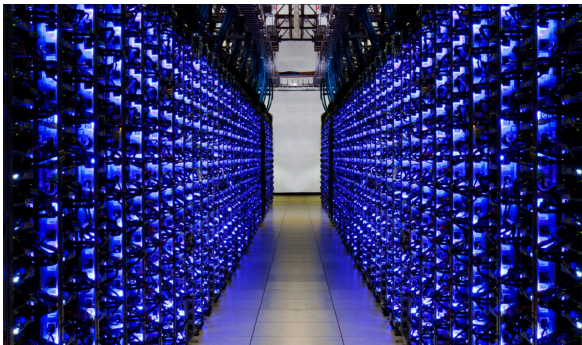
GEE facilitates scalable and shareable image analysis

- Leverages the GEE image collections and Google's super computers
 - Cloud processing, distributed computation
 - Ability to perform analysis on large scale datasets
- Collaboratively share data, algorithms, and visualizations using URLs

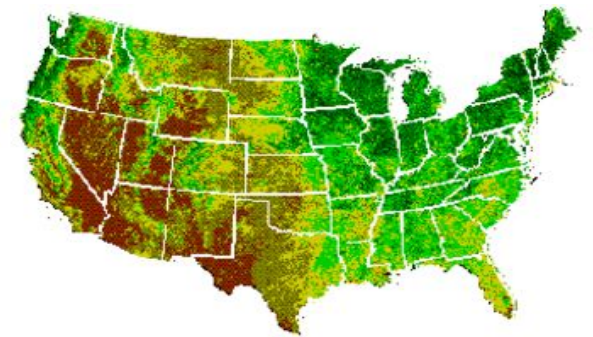
Divides data into independent grids



Storage Clusters (petabytes of data)
Computing clusters (1,000's of CPUs)



Merges all grid calculations



GEE is an Interactive development platform

- Mapping, plotting and printing interface
- Comprehensive toolset to analyze data
 - Library of scientific algorithms ready to use
 - Building blocks to create your own workflow
- Save and share work routines
 - Example scripts
 - Consult the GEE Developers' forum
 - Share your own repository
- GEE Developers Forum

How do you use it?

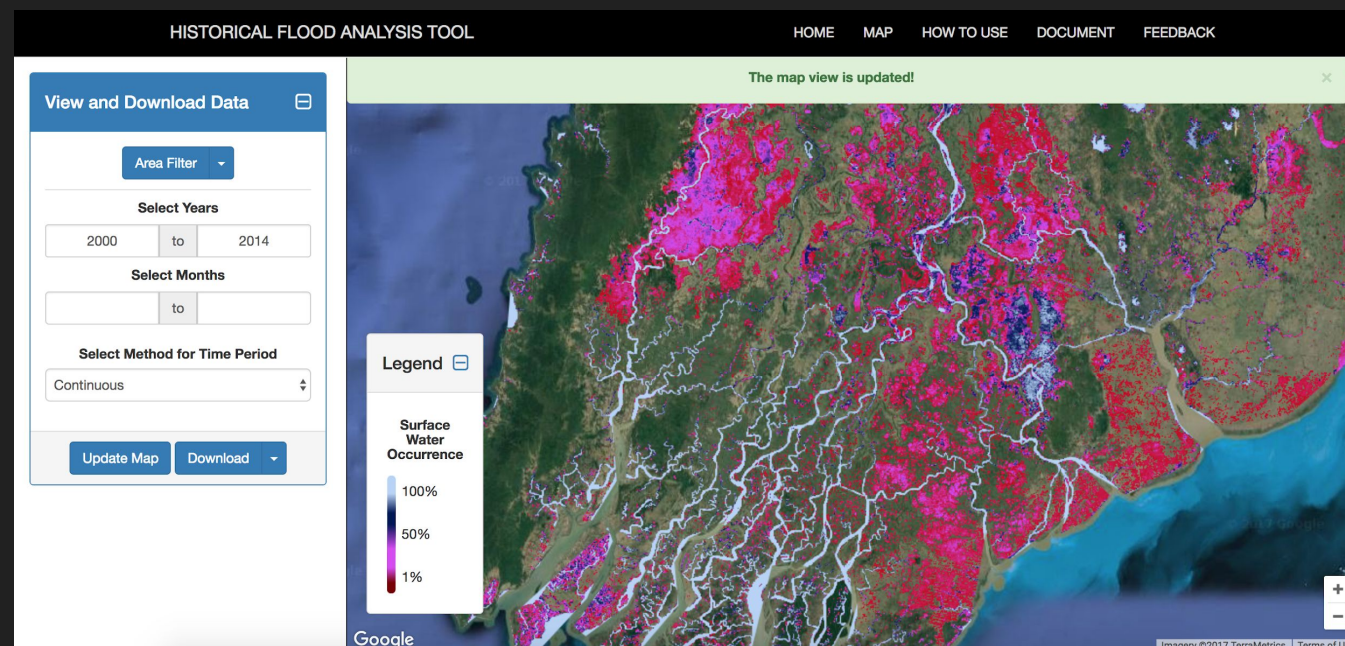
JavaScript API

- interactive Code Editor
- easy to use and instant results
- easy to implement web apps

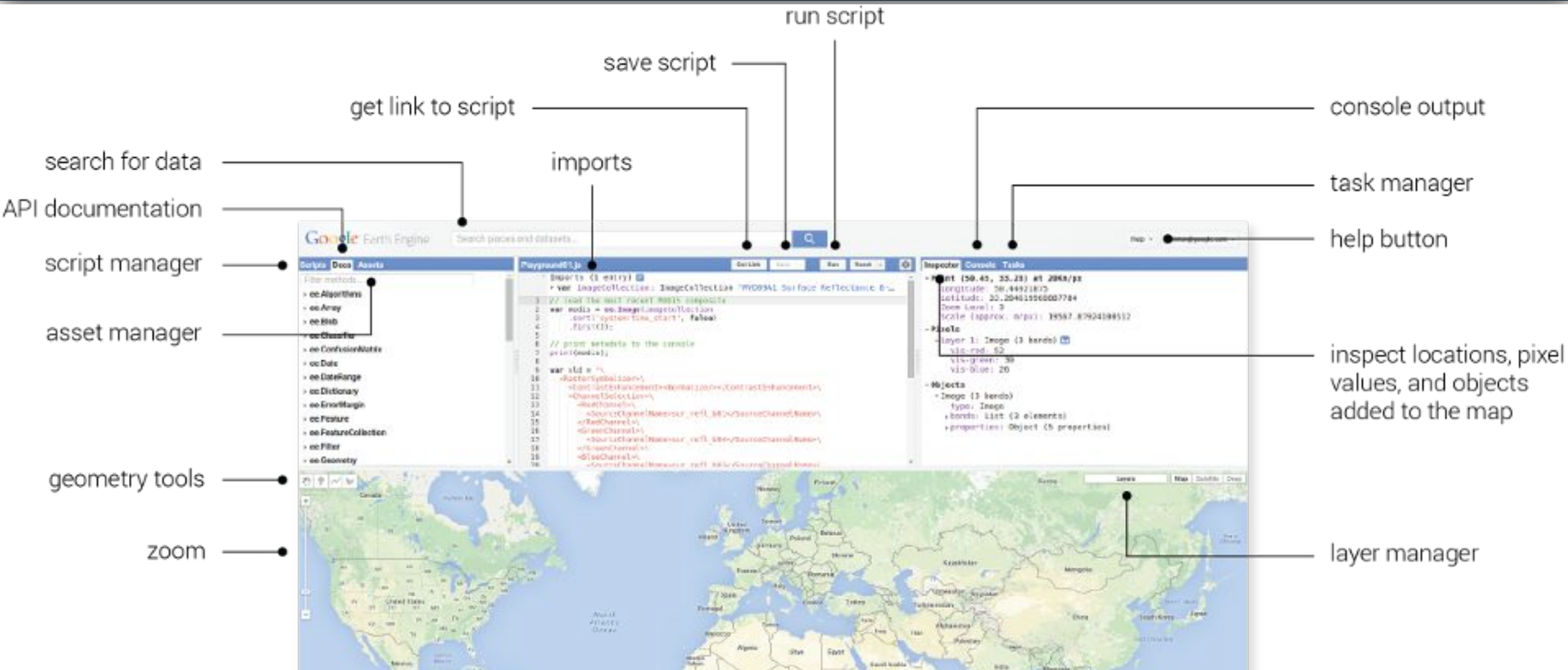
Python API

Python module

- Web Apps with App Engine
- Jupyter Notebooks



GEE Code Editor: <https://code.earthengine.google.com>



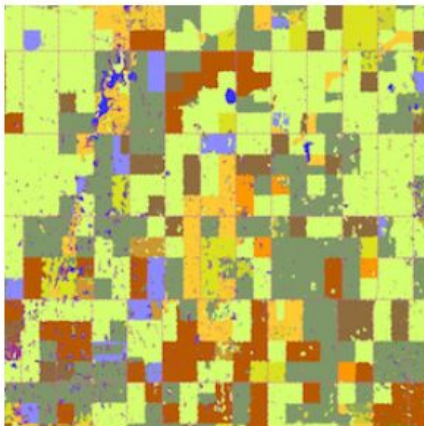
credits: modified from Google

Earth Engine Data Catalog

Earth Engine's public data catalog includes a variety of standard Earth science raster datasets. You can import these datasets into your script environment with a single click. You can also upload your own [raster data](#) or vector data for private use or sharing in your scripts.

Looking for another dataset not in Earth Engine yet? Let us know by [suggesting a dataset](#).

Canada AAFC Annual Crop Inventory



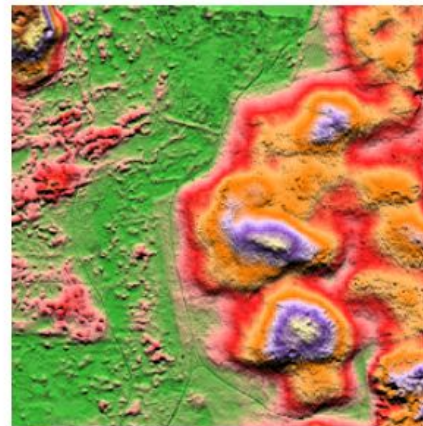
Starting in 2009, the Earth Observation Team of the Science and Technology Branch (STB) at Agriculture and Agri-Food

Allen Coral Atlas (ACA) -
Geomorphic Zonation and Benthic
Habitat - v1.0



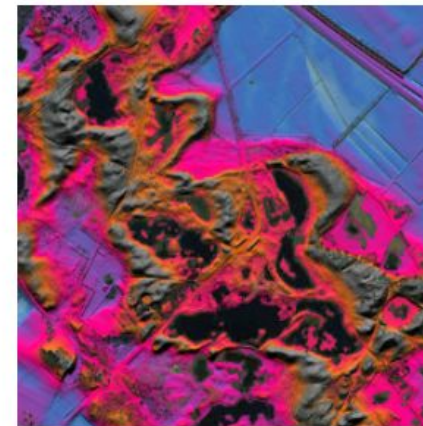
The Allen Coral Atlas dataset maps the geomorphic zonation and benthic habitat for the world's shallow coral reefs at 5m

AHN Netherlands 0.5m DEM,
Interpolated



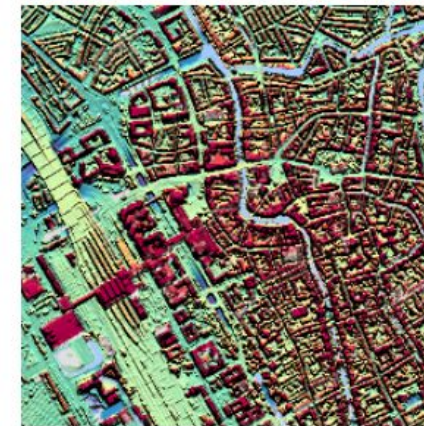
The AHN DEM is a 0.5m DEM covering the Netherlands. It was generated from LIDAR data taken in the spring between 2007 and

AHN Netherlands 0.5m DEM, Non-
Interpolated





The AHN DEM is a 0.5m DEM covering the Netherlands. It was generated from LIDAR data taken in the spring between 2007 and

AHN Netherlands 0.5m DEM, Raw
Samples



The AHN DEM is a 0.5m DEM covering the Netherlands. It was generated from LIDAR data taken in the spring between 2007 and

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 [samapriya / awesome-gee-community-datasets](#) Public

<> Code ⌚ Issues 8 🛠 Pull requests 💬 Discussions 🎬 Actions 📁 Projects 📖 Wiki 🛡 Security 📈 Insights

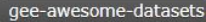

☰ README.md

awesome-gee-community-datasets

 Follow @samapriyaroy < 2k  awesome Community Datasets 909 SupportedBy:  JetStream

The awesome-gee-community-datasets are community sourced geospatial datasets made available for use by the larger Google Earth Engine community and shared publicly as Earth Engine assets. The project was started with the idea that a lot of research datasets are often unavailable for direct use and require preprocessing before use. This catalog lives and serves alongside the [Google Earth Engine data catalog](#) and also houses datasets that are often requested by the community and under a variety of open license.

You can read about the history and more in the [Medium Post article here](#)

Copy this badge as you contribute datasets:  

Use this in your Readme.md file

```
![contributor](https://img.shields.io/badge/gee--awesome--datasets-data%20commons%20contributor-green)
```

Community Catalog Site

Online Awesome Google Earth Engine Community Catalog:

Community Datasets added by users and made available for use at large

[Submit your Datasets to be included in the list: Using the template Link here](#)

No releases published

Packages

No packages published

Contributors 3



samapriya Samapriya Roy




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☰ awesome-gee-community-catalog ⚙ 🔍

awesome-gee-community-catalog



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DOI [10.5281/zenodo.15190103](#) status  uptime release [v3.5.0](#)  Sponsor 

The awesome-gee-community-catalog is an **unfunded open source grassroots project** with a mission to help collect **community sourced** and **community generated** geospatial datasets. Our goal is to make data **accessible** and tie it to an analysis platform **fostering accessibility** and **reducing digital divide**. This catalog lives and serves alongside the [Google Earth Engine data catalog](#).

<https://gee-community-catalog.org>