

Earth Engine for non-coders

Taught for non-coders, by a non-coder

Karin Tuxen-Bettman / September 2019

STOP!

Have you signed up for Earth Engine in the past?

If yes, sit back and relax...

If no, please sign up now at

signup.earthengine.google.com

Agenda



The “Why?”
and the “What?”



The Components of
Earth Engine



Hands-on using
the Explorer



Hands-on using
the Code Editor

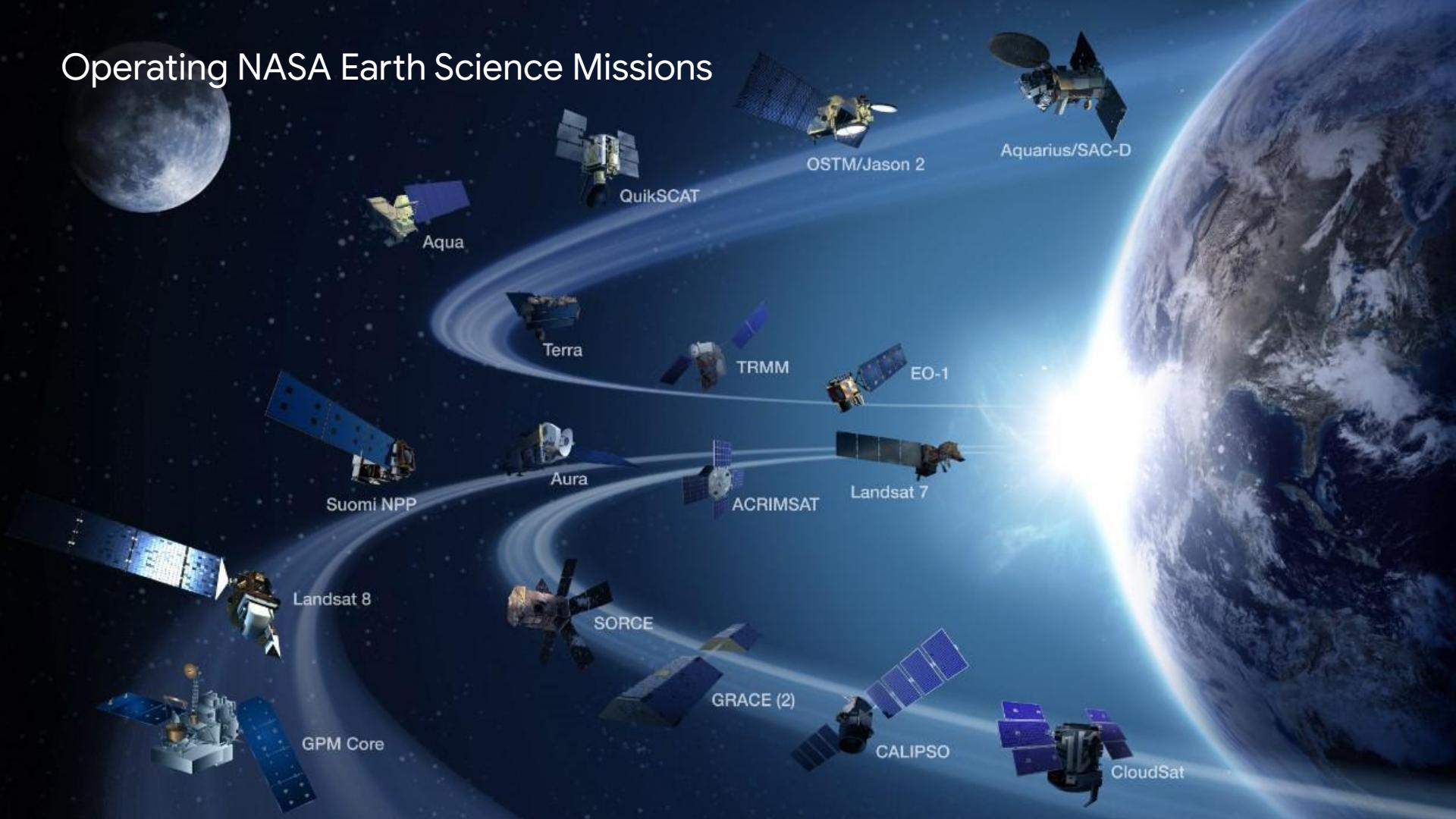
Google



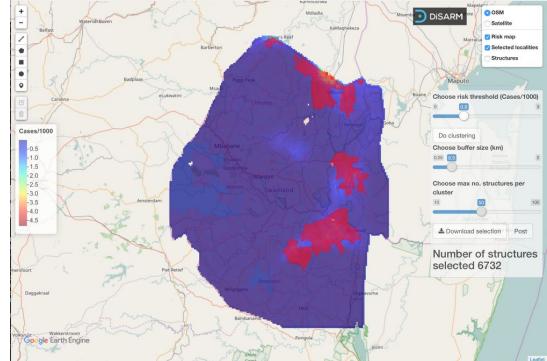
Rondonia, Brazil (1976-2009)

#GeoForGood19

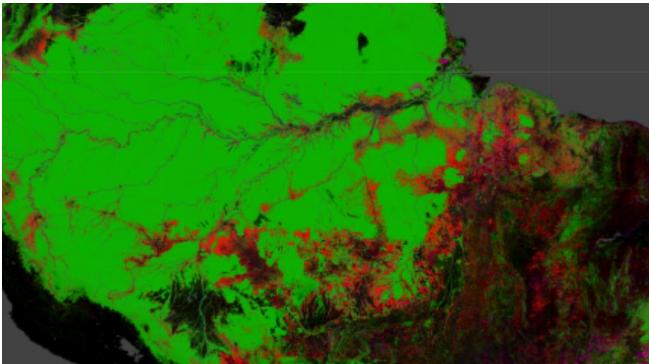
Operating NASA Earth Science Missions



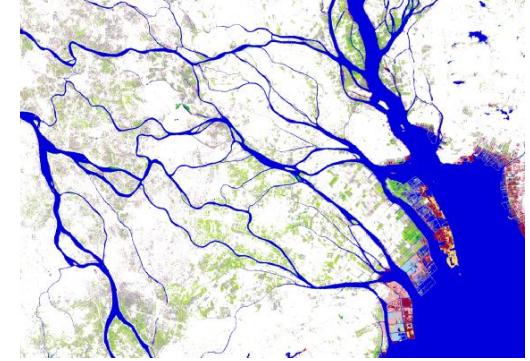
In order to make progress on global problems,
scientists and decision-makers need to be able
to ask questions of increasingly
large and complex geospatial datasets.



Infectious disease



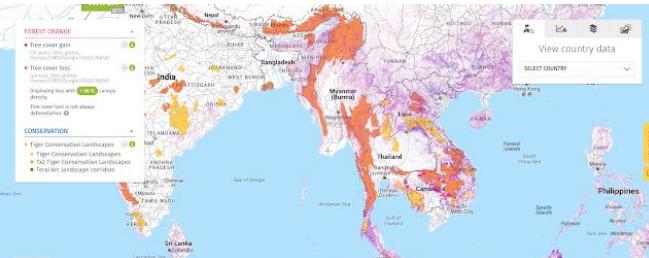
Deforestation



Water management



Land cover change



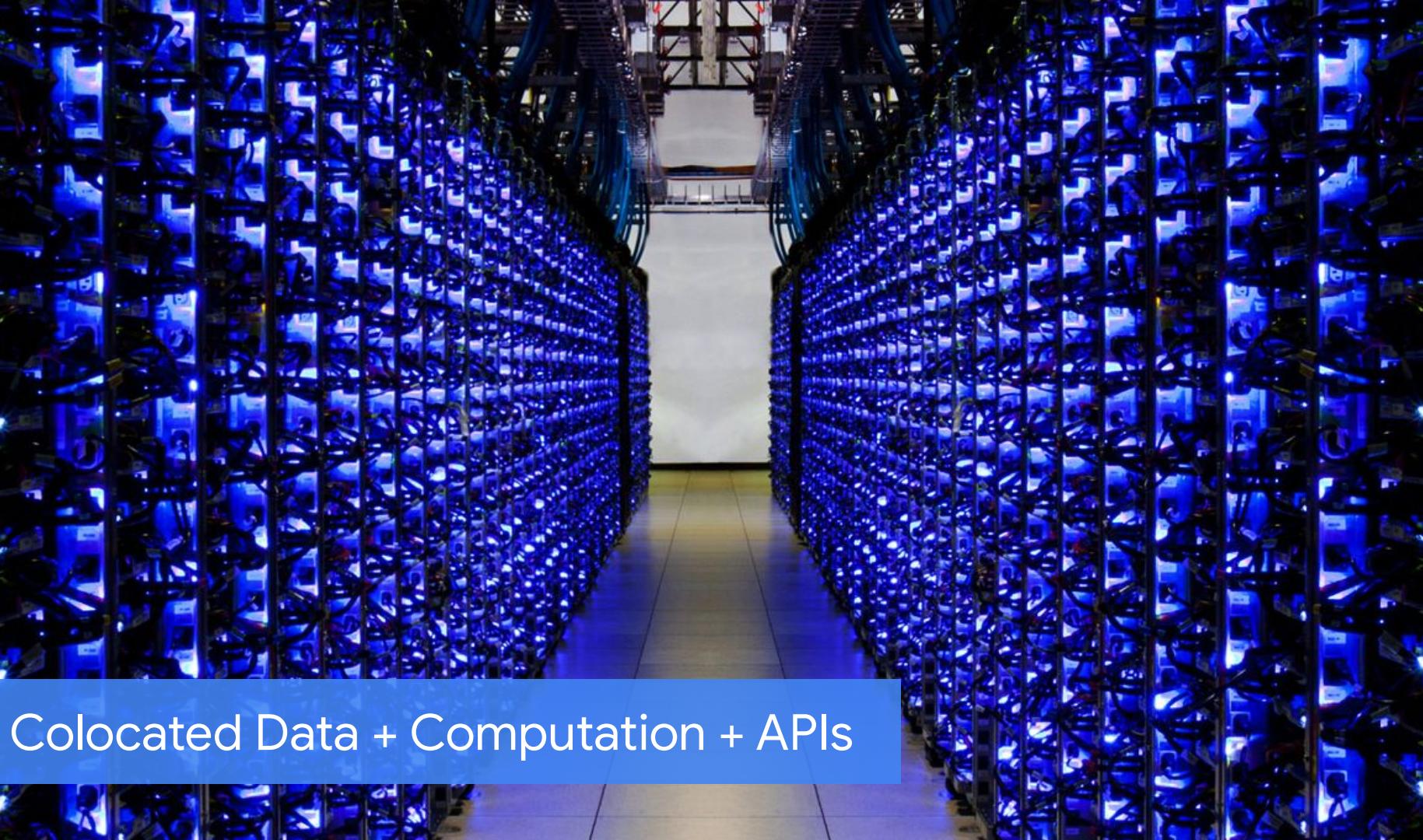
Biodiversity



Climate change

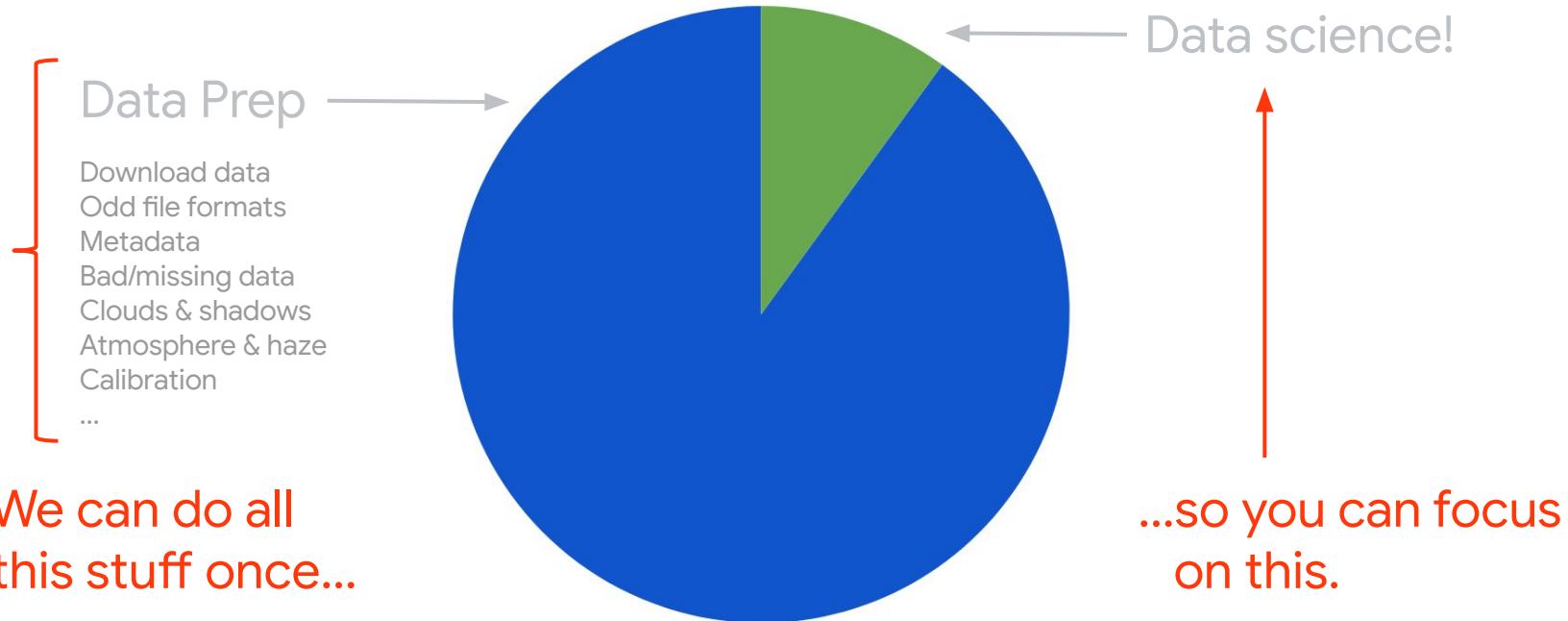


Earth Observation Data Archives



Colocated Data + Computation + APIs

The Classic Remote Sensing Workflow



Google Earth Engine goals

The screenshot shows the Google Earth Engine interface. At the top, there's a navigation bar with 'Google Earth Engine' logo, a search bar 'Search places and datasets...', and various buttons like 'Prod', 'Inspector', 'Console', and 'Tasks'. Below the navigation is a sidebar with tabs 'Scripts', 'Docs', and 'Assets'. The 'Assets' tab is active, showing a list of examples under 'Image' category: 'From Name', 'Normalized Difference', 'Expression', 'Hillshade', 'Landcover Cleanup', 'Reduce Region', 'Canny Edge Detector', 'Center Pivot Irrigation Detector', and 'Clamp'. To the right of the sidebar is a code editor window with a snippet of JavaScript code for creating a daily mosaic of NO₂ data. The main area features three large text blocks overlaid on a map of North America:

- Build the world's most advanced platform for geospatial data analysis.**
- Seamlessly integrate it into Google's products and services.**
- Use it (and help others to use it) to make substantive progress on global challenges.**

At the bottom of the map, there's a footer with 'Map data ©2019 Google, INEGI | 500 km | Terms of Use'.

earthengine.google.com



**Landsat &
Sentinel**
10-30m, 14-day



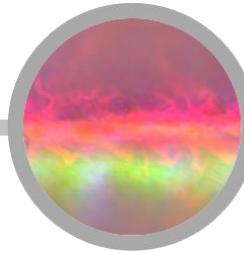
MODIS
250m daily



**Your own data
can be added!**



**Terrain &
Land Cover**



Air & Climate
NOAA NCEP, OMI, ...

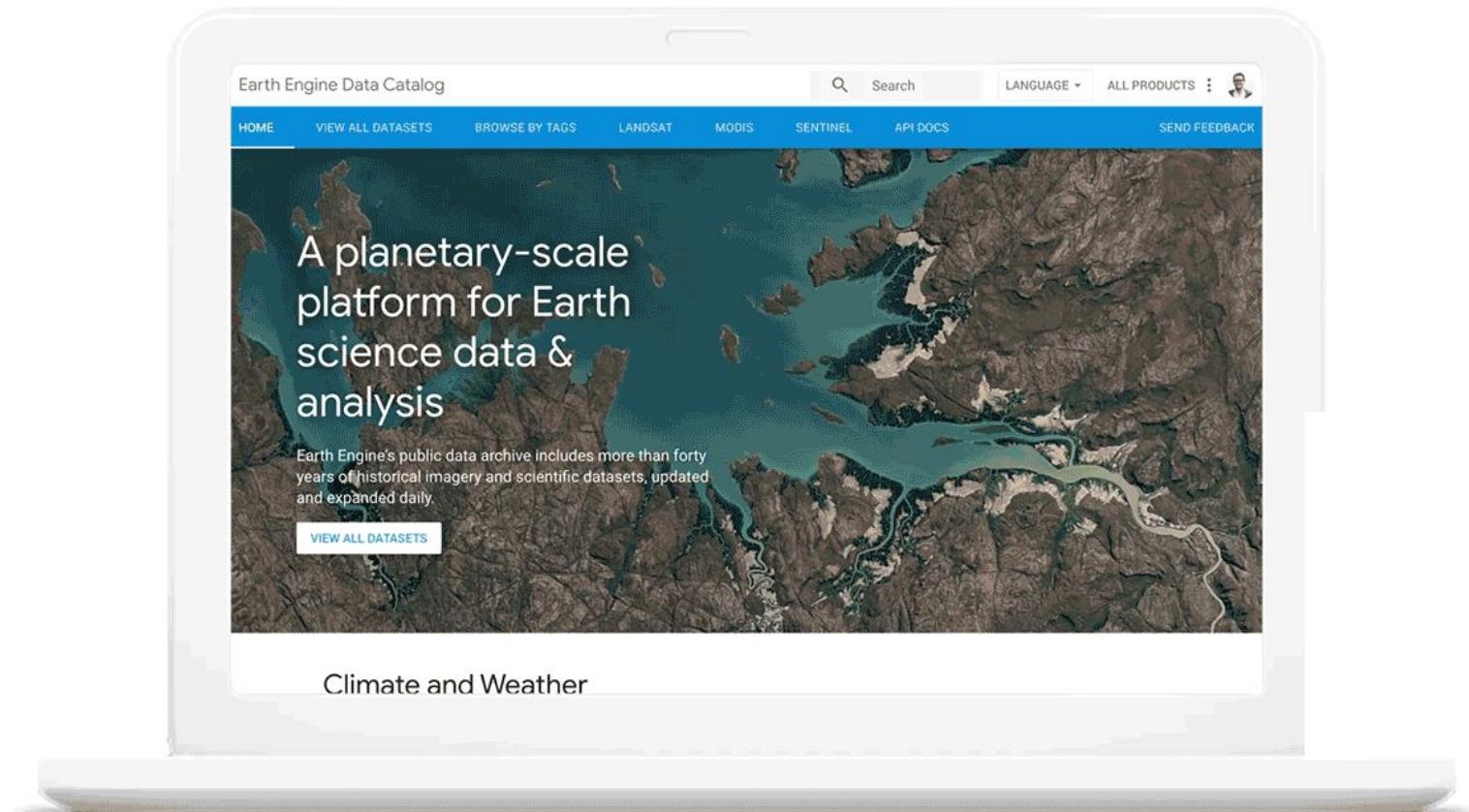
... and many more, updating daily!

> 290 public datasets

> 4000 new images every day

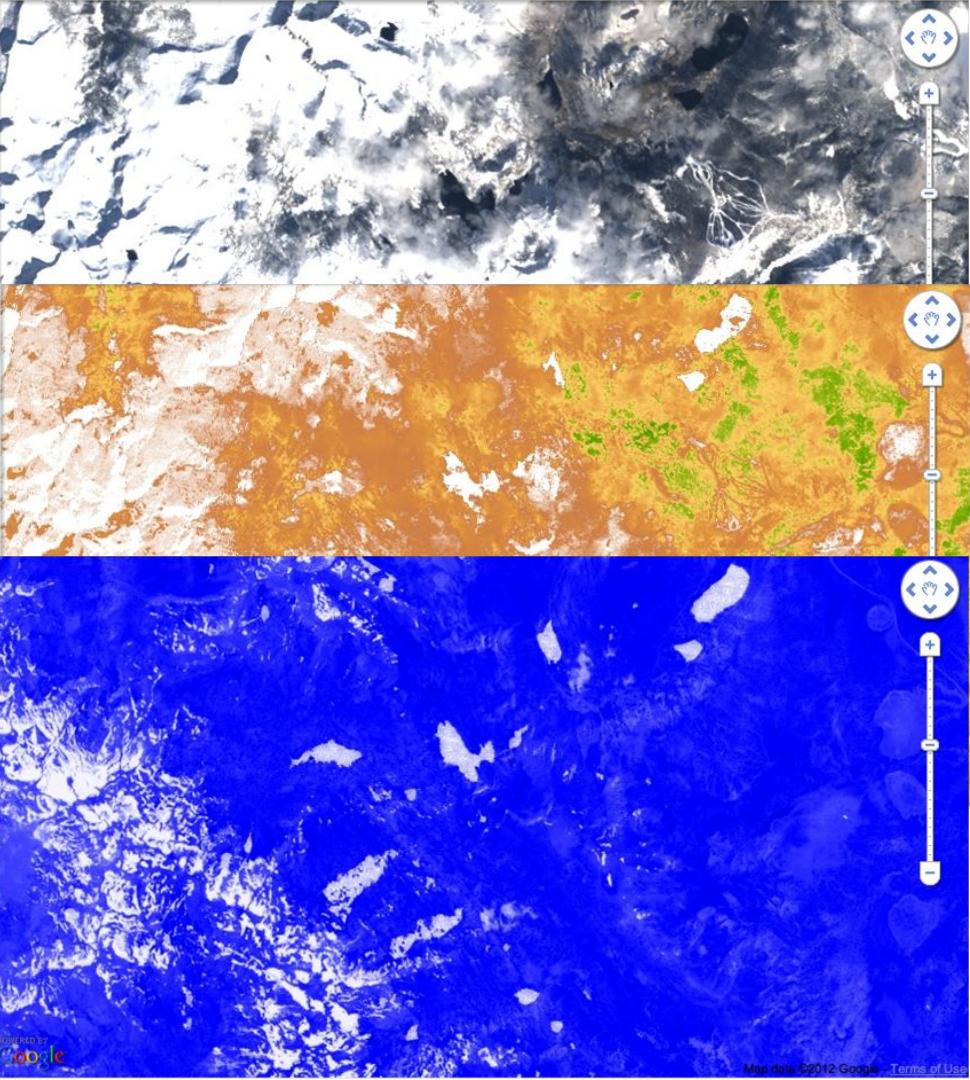
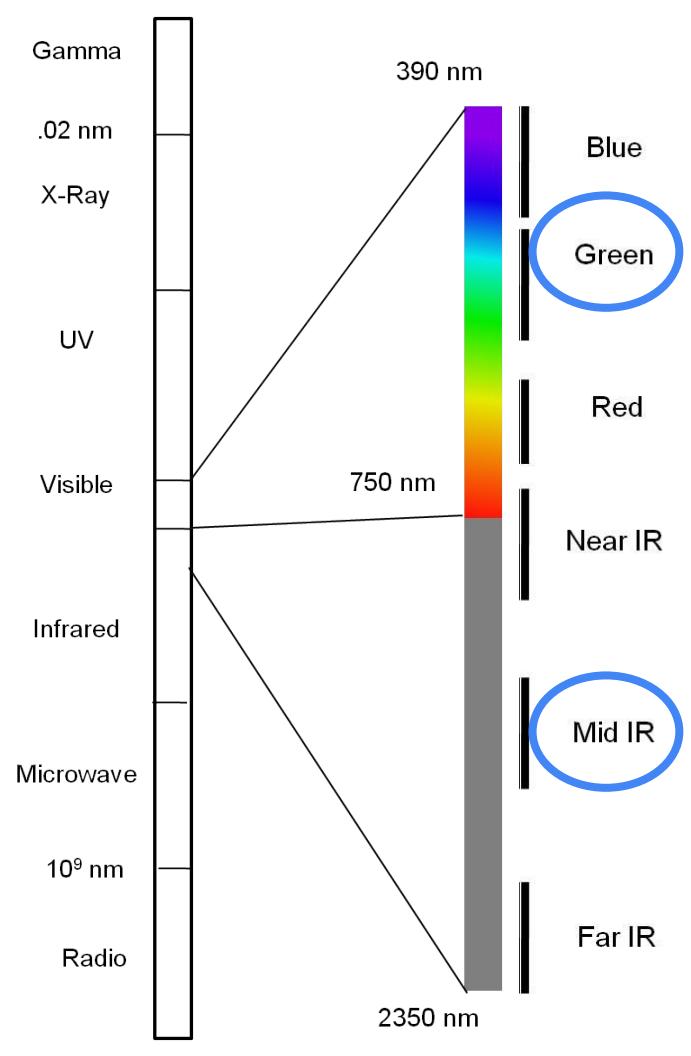
> 5 million images

> 29 petabytes of data



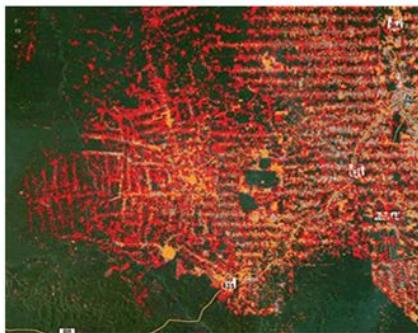
developers.google.com/earth-engine/datasets/

#GeoForGood19





Result is reassembled
...into a finished image.





A satellite map showing a coastal region with a mix of green land and blue water. The land is characterized by various shades of brown and green, indicating different types of terrain and vegetation. Several large bodies of water, likely lakes or coastal areas, are visible as dark blue regions. The map includes standard satellite navigation controls: a compass rose in the top left corner, a zoom slider with a person icon, and a scale bar below it. In the top right corner, there are buttons for "Layers", "Map", and "Satellite".

Layers

Map Satellite

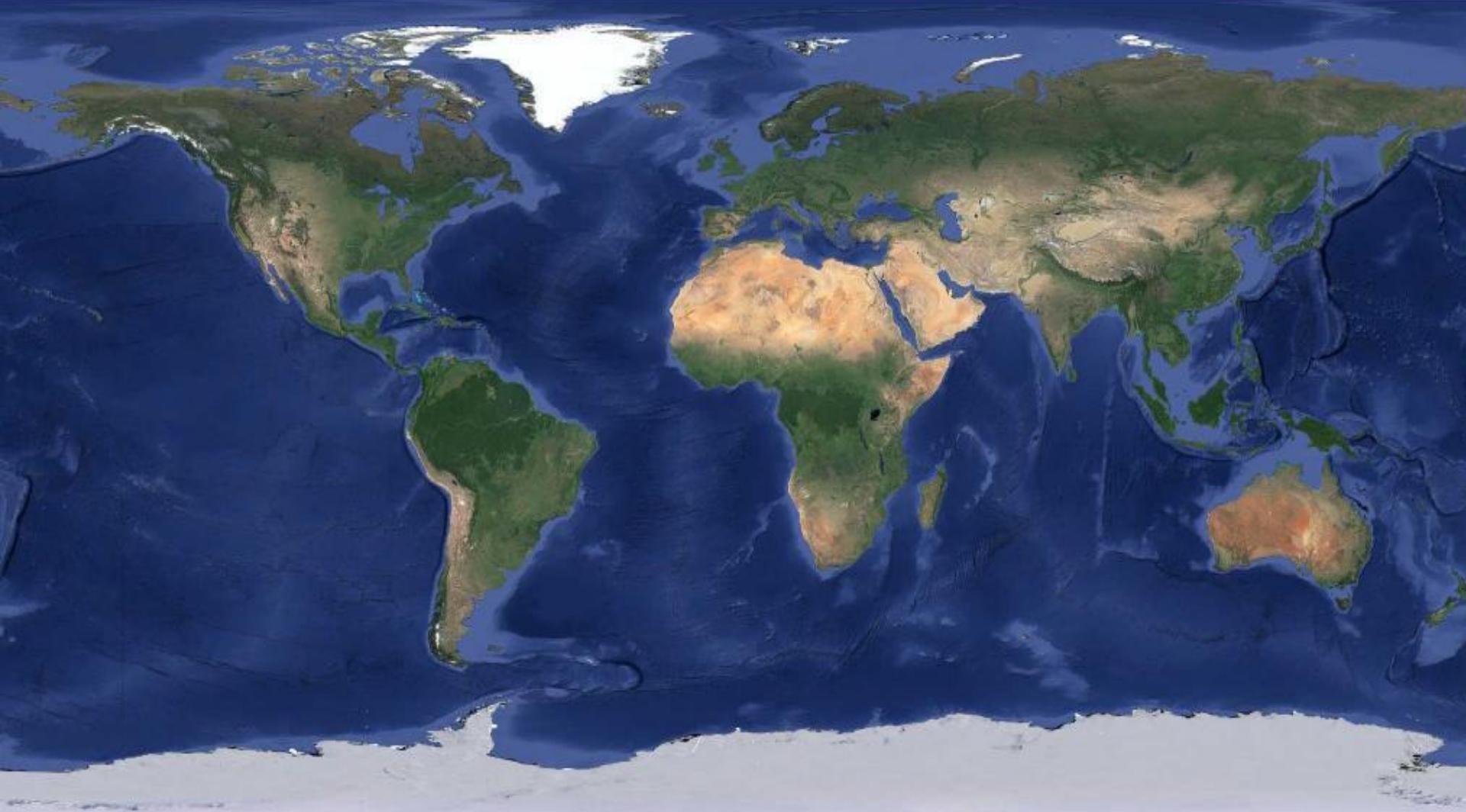
 Layers

Map Satellite



+

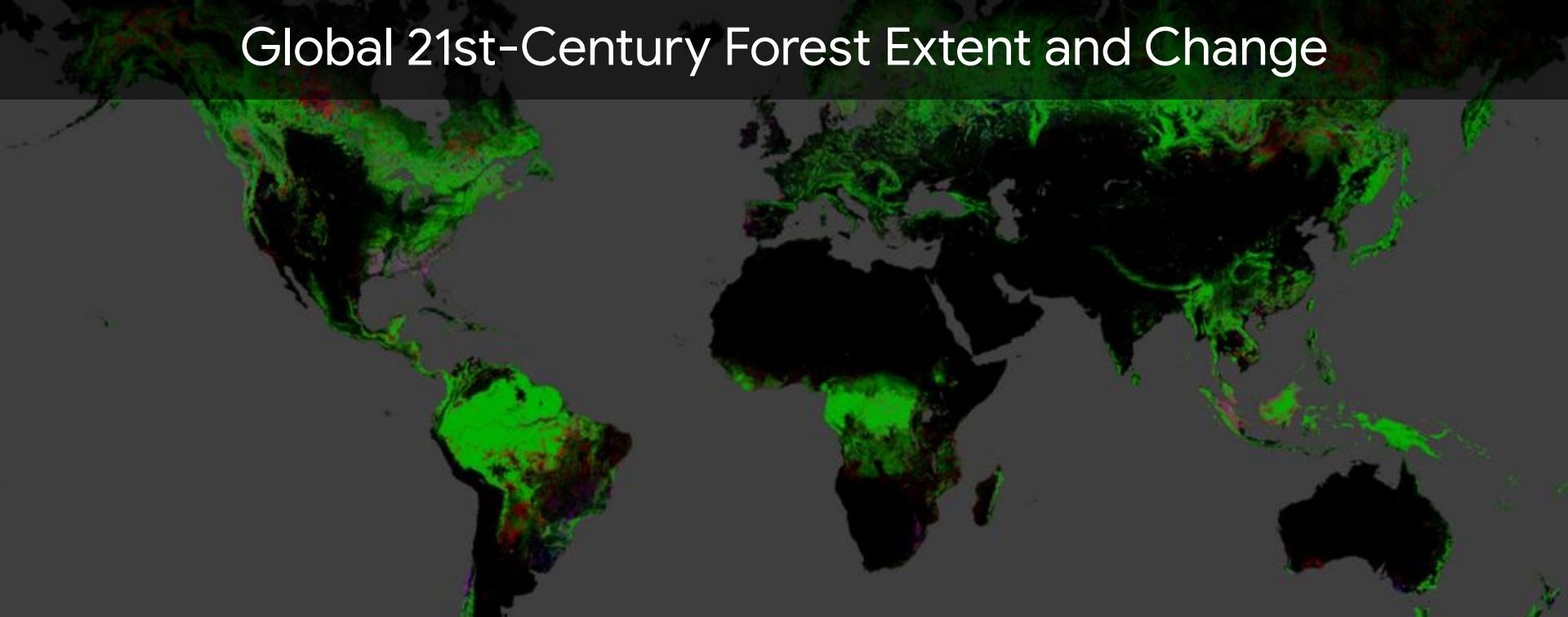
-





earthengine.google.com/timelapse

Global 21st-Century Forest Extent and Change



earthenginepartners.appspot.com/



Global 21st-Century Forest Extent and Change

654,178

Landsat
Images

12

Years
of data

1,000,000

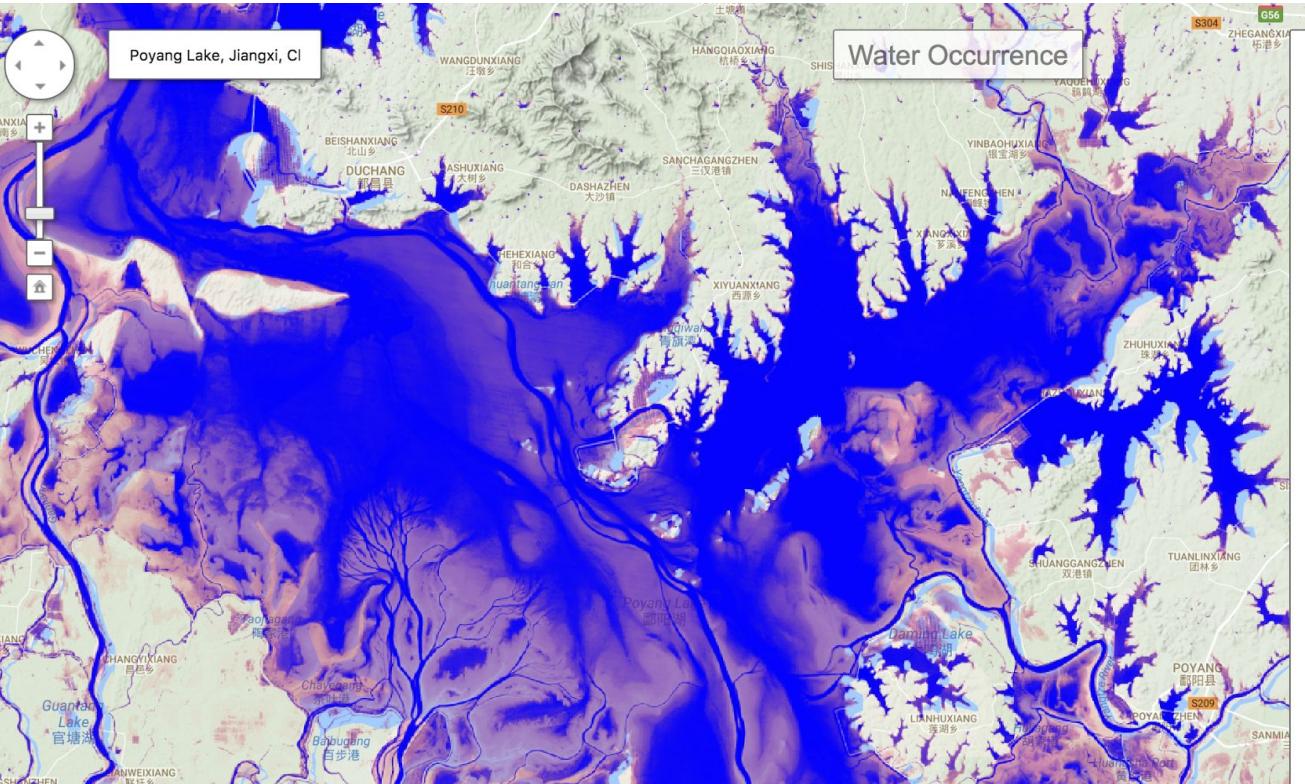
CPU-hours of
Computation

10,000

CPUs
Used

4

Days to
Complete



global-surface-water.appspot.com



Powered by Google Earth Engine

[Paper](#) | [Full Text](#)

The European Commission's Joint Research Centre developed this new water dataset in the framework of the Copernicus Programme. This maps the location and temporal distribution of water surfaces at the global scale over the past 32 years and provides statistics on the extent and change of those water surfaces. The dataset, produced from Landsat imagery (courtesy USGS and NASA), will support applications including water resource management, climate modelling, biodiversity conservation and food security.

Note: Click anywhere on the map to obtain temporal profile charts for that location.

 Download Datasets

FAQ | Contact: irc-surfacewater@ec.europa.eu

Water Occurrence (1984-2015) ②

>0%

Sometimes Water

Water Occurrence Change Intensity

ON

100%

Always Water

Always Water

26

37



Water Occurrence

Poyang Lake, Jiangxi, CI

3,066,102

Landsat
Scenes

1,823

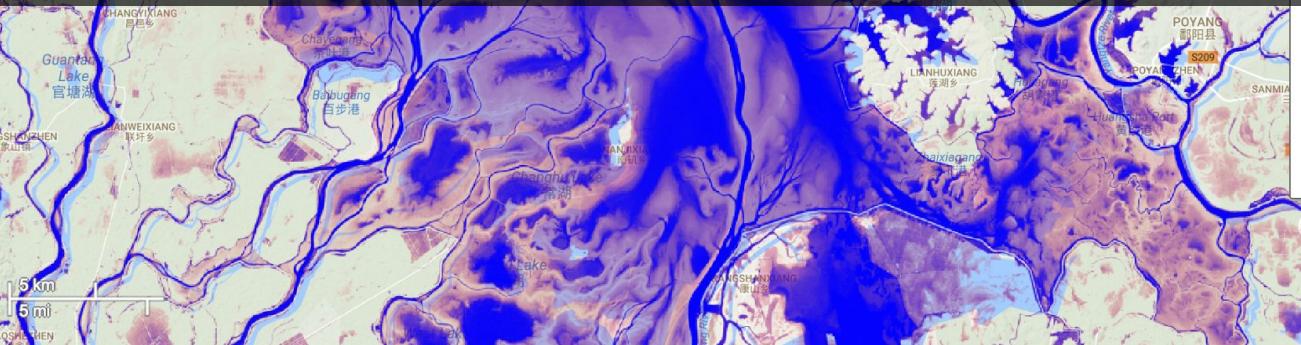
Terapixels
of Data

10,000,000

Hours of
Computation

10,000

CPUs
Used



Water Occurrence (1984-2015)

>0%

Sometimes Water

ON

100%

Always Water

Water Occurrence Change Intensity

[Paper](#) | [Full Text](#)

The European Commission's Joint Research Centre developed this new water dataset in the framework of the Copernicus Programme. This maps the location and temporal distribution of water surfaces at the global scale over the past 32 years and by using statistics on the recent change of these water surfaces. The dataset produced from Landsat imagery (courtesy USGS and NASA), will support applications including water resource management, climate modelling, biodiversity conservation and food security.

Note: Click anywhere on the map to obtain temporal profile charts for that location.

[Download Datasets](#)

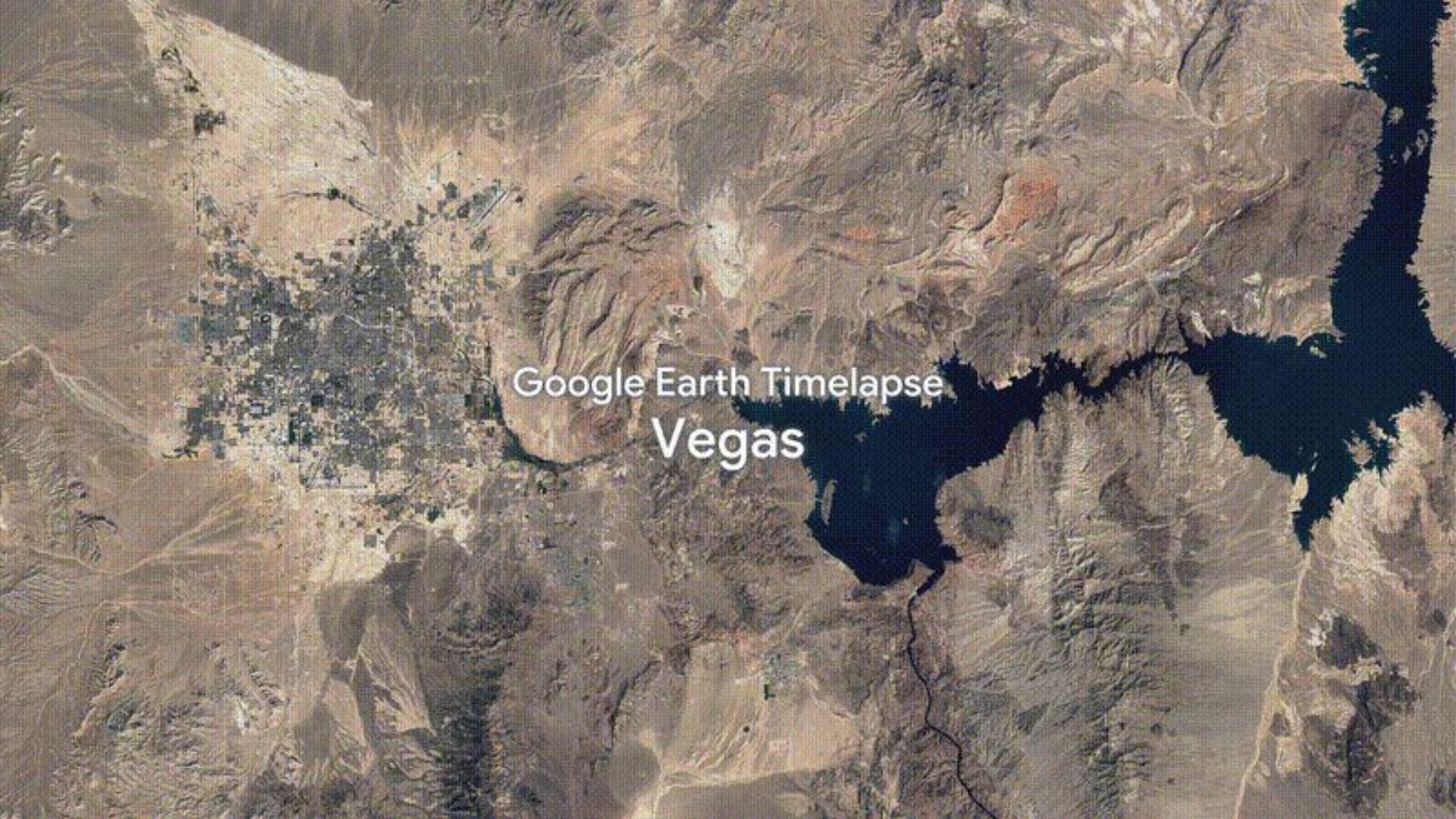
[FAQ](#) | Contact: jrc-surfacewater@ec.europa.eu



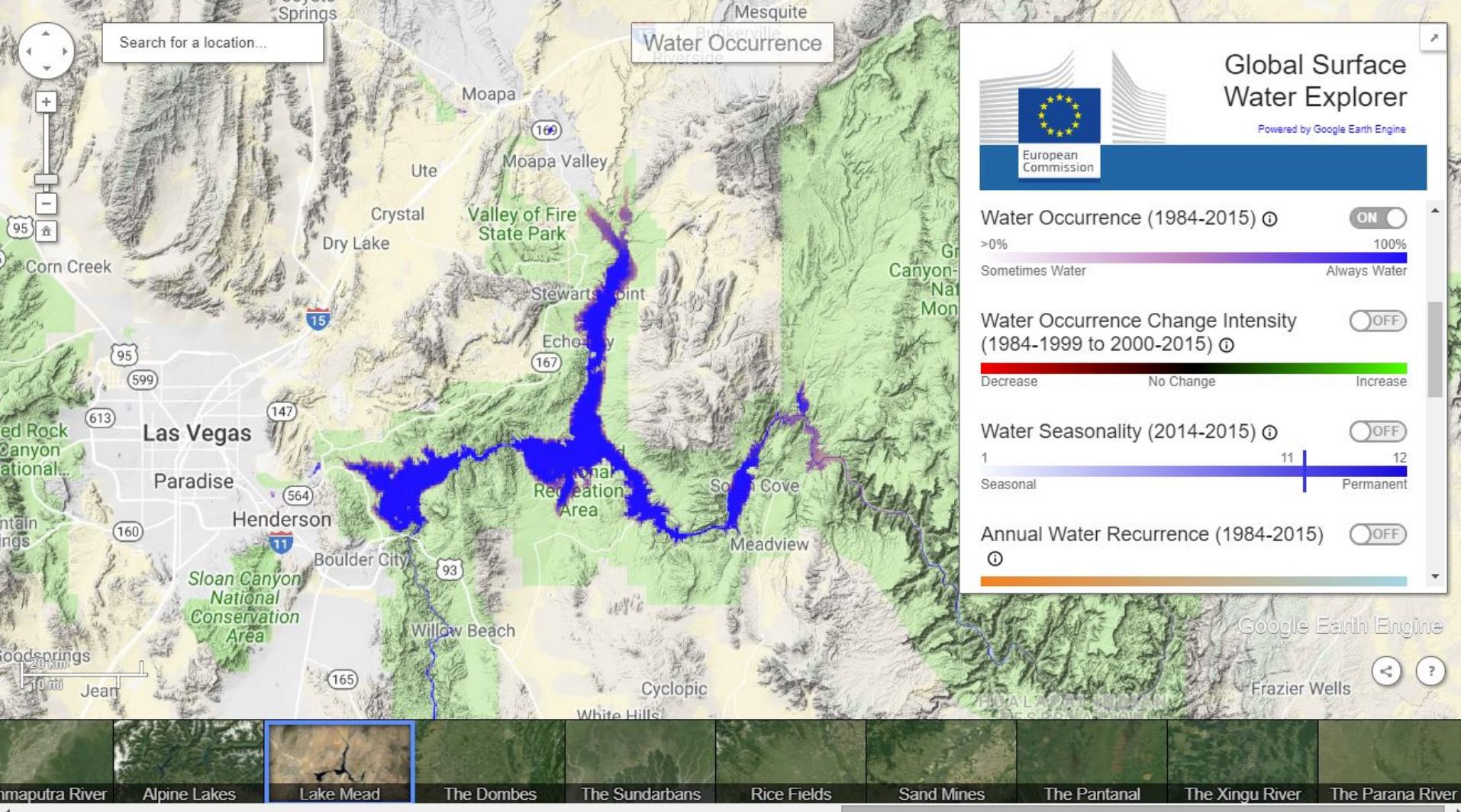
Global Surface
Water Explorer

Powered by Google Earth Engine





Google Earth Timelapse
Vegas



1984

0%

Surface Water
% Change

Agenda



The “Why?”
and the “What?”



**The Components
of Earth Engine**



Hands-on using
the Explorer



Hands-on using
the Code Editor

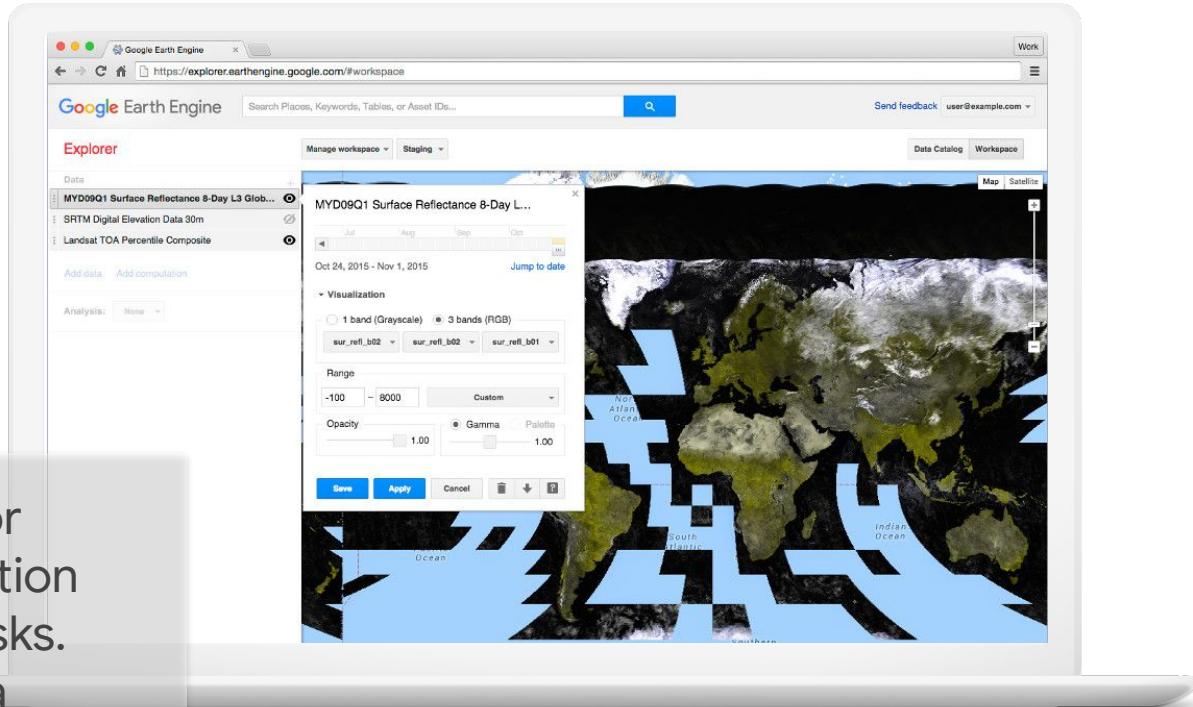
The Code Editor - code.earthengine.google.com

The screenshot shows the Google Earth Engine Code Editor interface. The top navigation bar includes a search bar, version information (version: 13502964d), and user account details. The main workspace is divided into several panels: a left sidebar with 'Scripts', 'Docs', and 'Assets' tabs, a central code editor with a snippet for creating a NO2 composite, a bottom-left panel for 'Geometry Imports', and a bottom-right map view of North America. The map displays a heatmap of NO2 concentrations, with higher values (red) visible over the Great Lakes and parts of the central United States. Labels on the map include 'San Francisco', 'Ottawa', 'Montreal', 'Toronto', 'Philadelphia', 'Gulf of California', 'Gulf of Mexico', and state/province abbreviations like CA, CO, MT, ND, SD, MN, WI, MI, OH, PA, NJ, DE, MD, VA, NC, GA, AL, MS, LA, TX, OK, KS, NE, CO, UT, NV, AZ, HI, PR, and NOVA SCOTIA.

- A web-based environment for:
- performing analyses
 - investigating datasets
 - managing scripts, data
 - building interactive tools

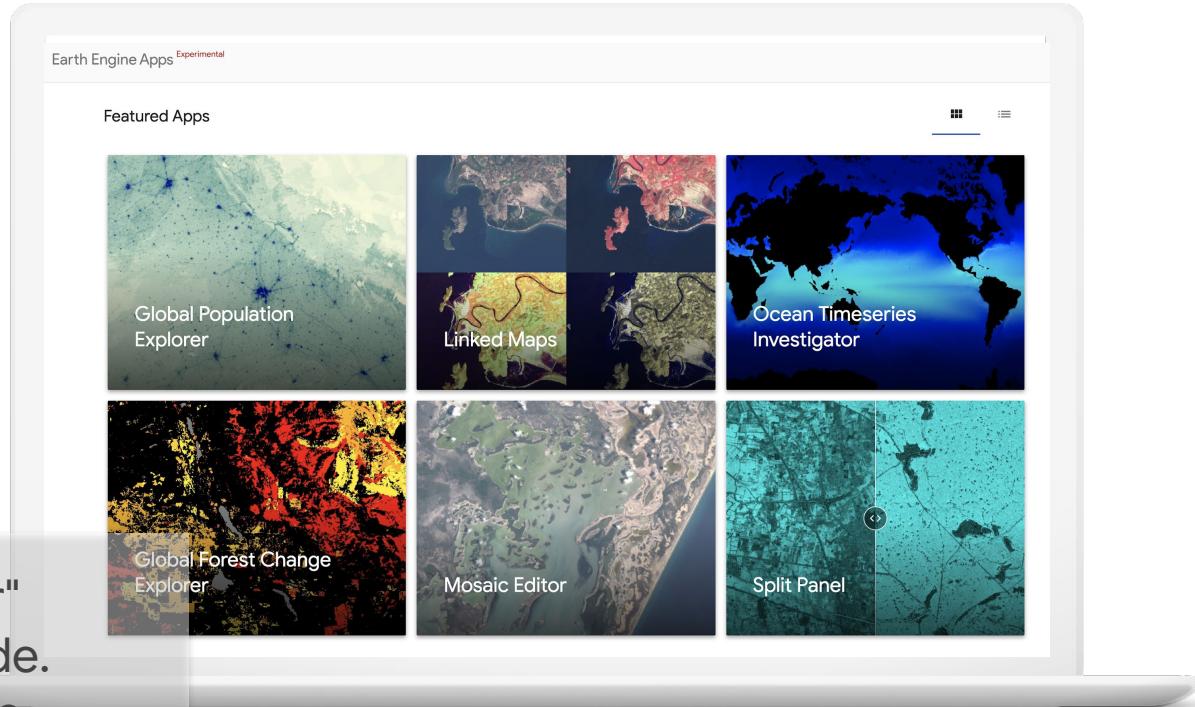
The Explorer

- A simple interface for performing visualization and classification tasks.
- The Explorer drives a substantial portion (~40%) of Earth Engine traffic.



Earth Engine Apps

EE Apps are "Code Editor" windows without the code. They enable you to create tools for your audience.



Agenda



The “Why?”
and the “What?”



The Components of
Earth Engine



**Hands-on using
the Explorer**



Hands-on using
the Code Editor

Hands-on

- **Exercise #1: “The Warm Up”: Perform a classification in the Explorer**
- Exercise #2: “Getting Comfortable”: Perform a classification in the Code Editor
- Exercise #3: Use the Data Catalog
- Exercise #4: Do raster analysis, e.g. NDVI
- Exercise #5: Do vector analysis, e.g. Buffer
- Exercise #6: Create your own background Map Style
- Exercise #7: Export your image

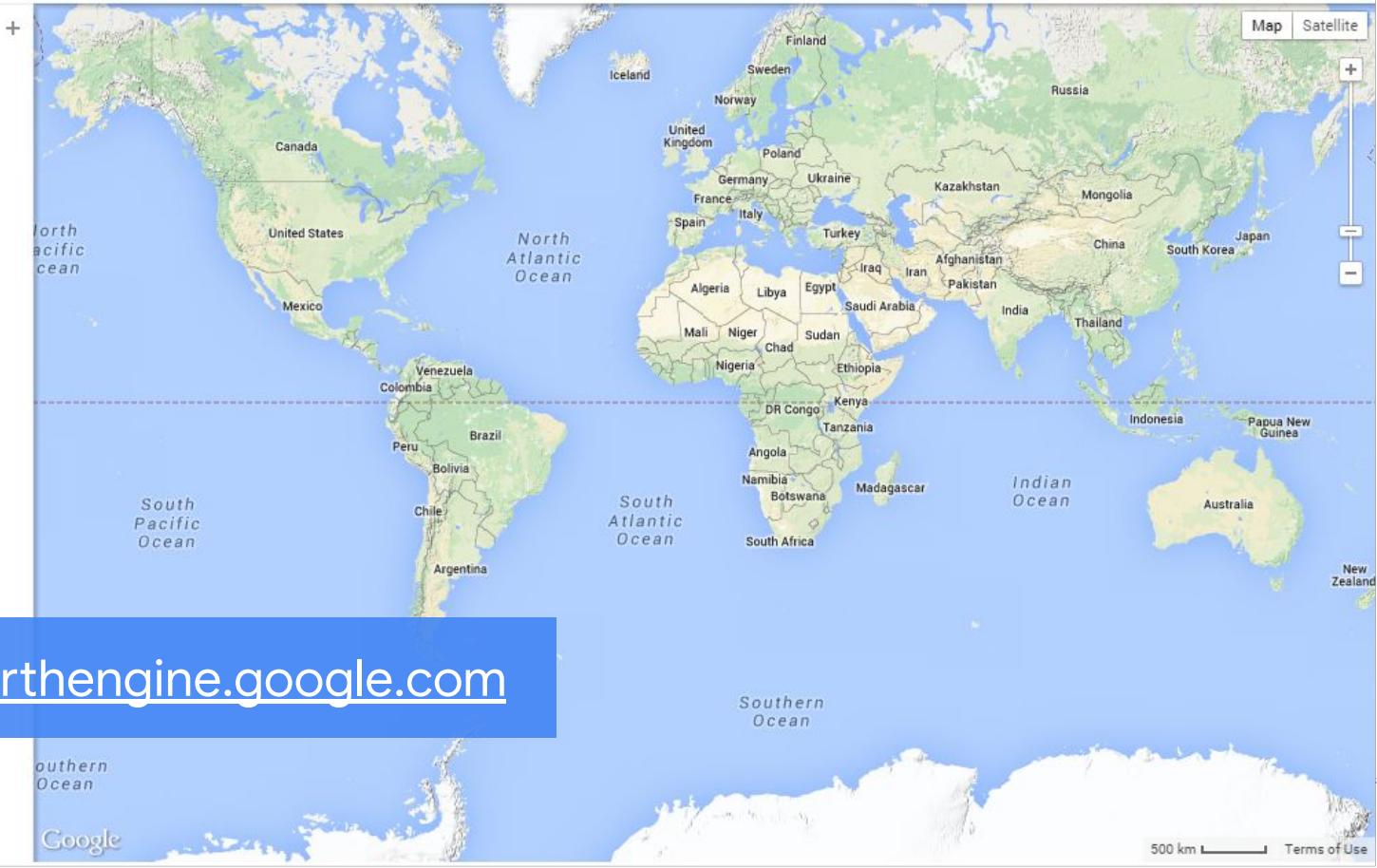
Earth Engine

[Home](#)[Data Catalog](#)[Workspace](#)

Data

[Add data](#)

Sign in to
Earth Engine.



Go to explorer.earthengine.google.com

Southern
Ocean

Google

500 km Terms of Use

Cacoal



Send feedback karintuxen@google.com

Earth Engine

Data

Add data Add computation

Analysis:

None

Zoom into your area
of interest.

OR

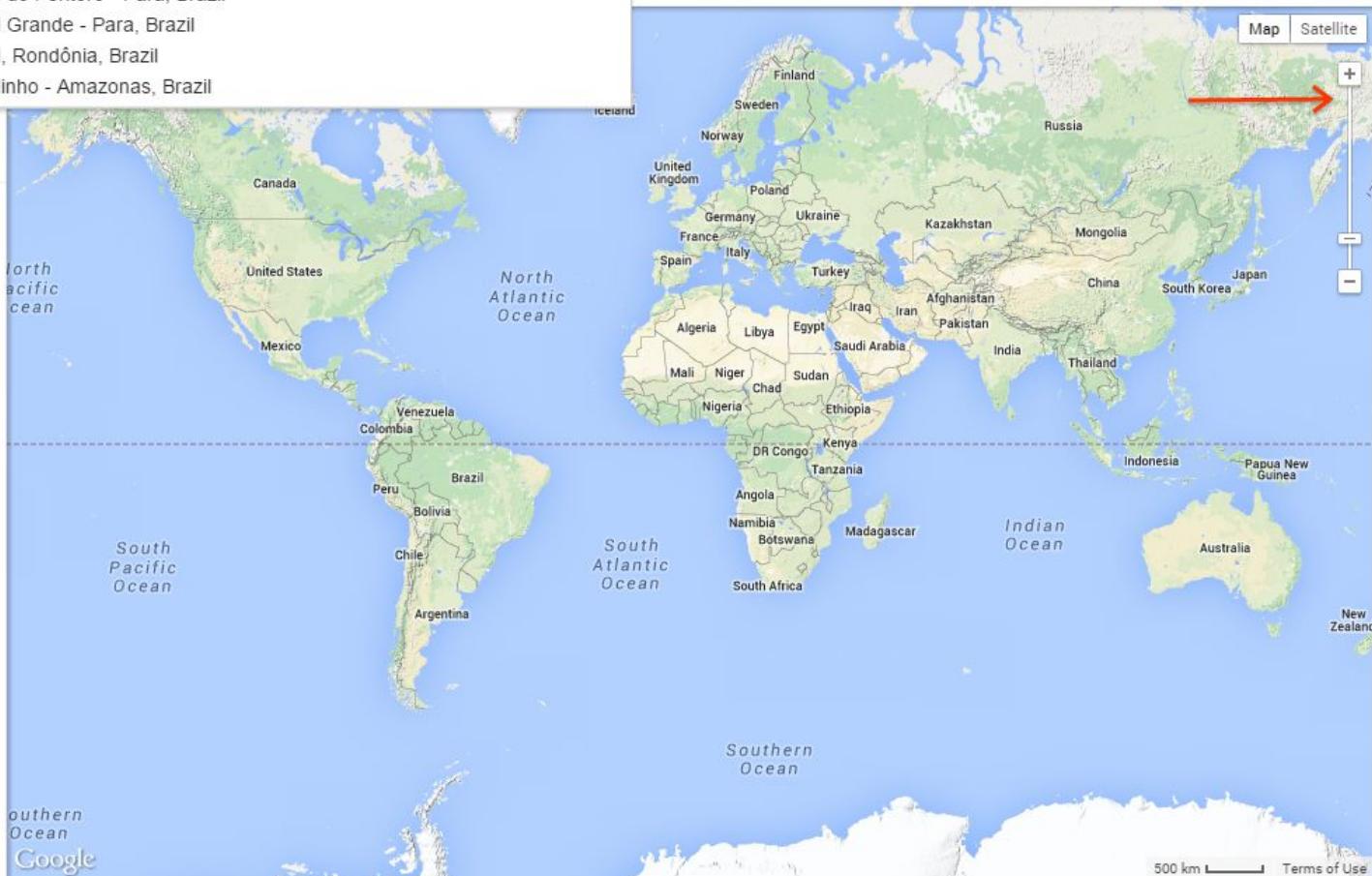
Type a place into the
search bar.

PLACES

- Cacoal - Rondônia, Brazil
- Cacoal do Peritoró - Para, Brazil
- Cacoal Grande - Para, Brazil
- Cacoal, Rondônia, Brazil
- Cacoalinho - Amazonas, Brazil

Home Data Catalog Workspace

Map Satellite



Search Places, Keywords, Tables, or Asset IDs... 

Send feedback karintuxen@google.com

FEATURED

RASTERS

Landsat TOA Percentile Composite 

CLASSIFIED RASTERS

- GlobCover 2009
- MCD12Q1-1 IGBP
- MCD12Q1-2 UMD
- MCD12Q1-3 LAI/fPAR
- MCD12Q1-4 NPP
- MCD12Q1-5 PFT

VECTORS

- Fusion Table
- Hand-drawn points and polygons

Home Data Catalog Workspace

Map Satellite

Earth Engine

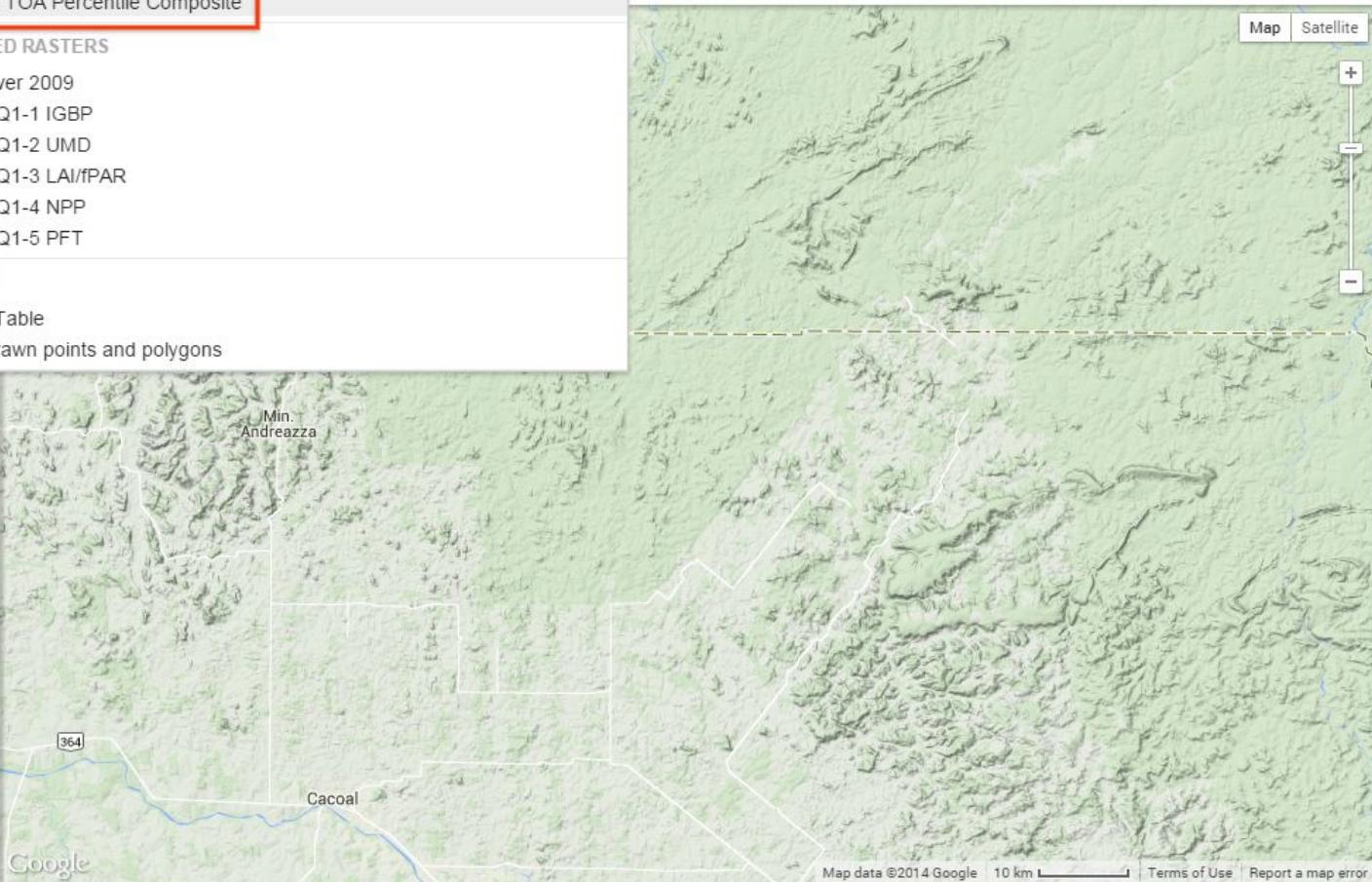
Data

Add data Add computation

Analysis: None

Click "Add data"

Select "Landsat TOA
Percentile
Composite"



Earth Engine

Manage workspace

Staging

Home

Data Catalog

Workspace

Data

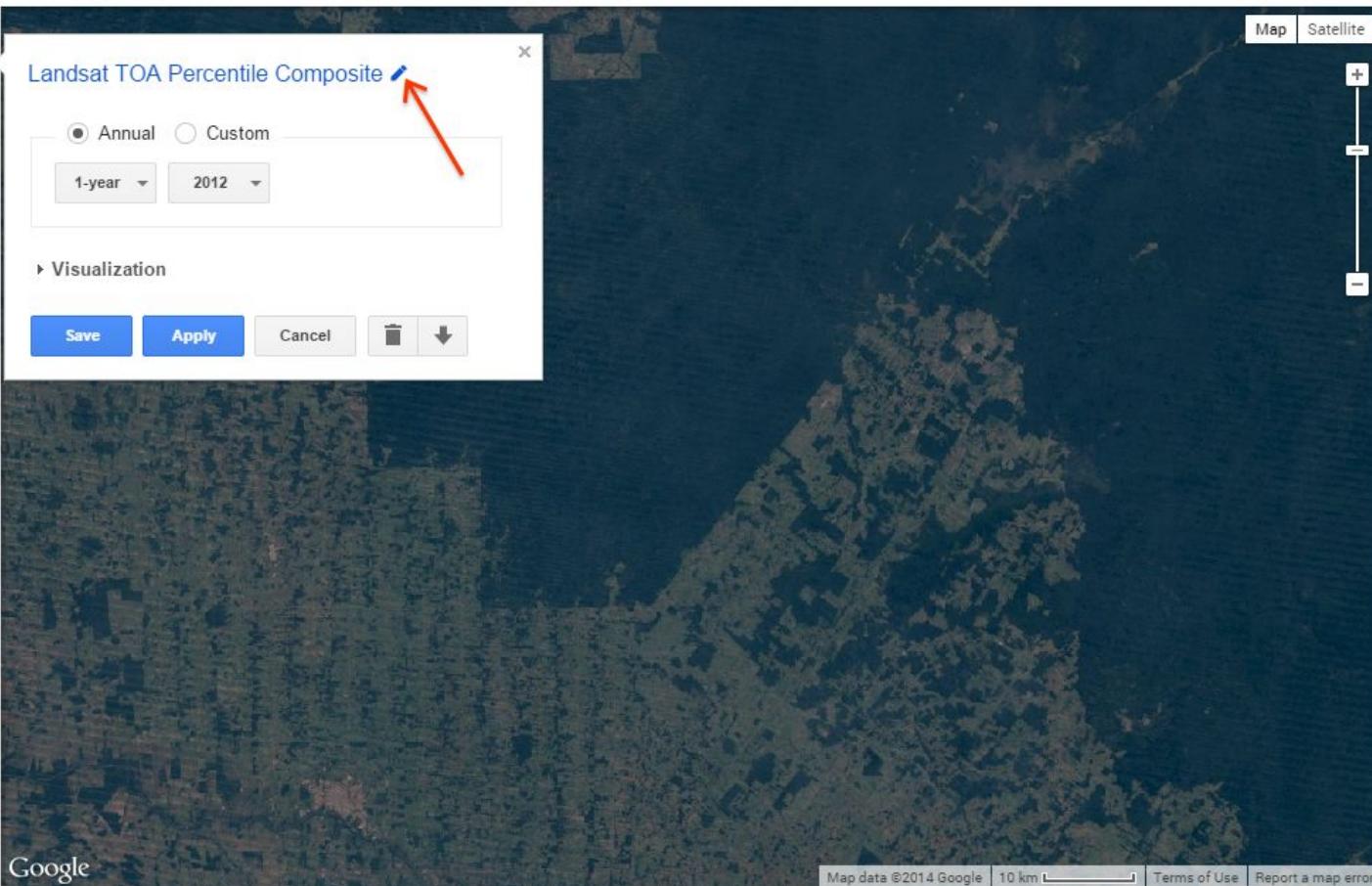
Landsat TOA Percentile Composite

Add data Add computation

Analysis: None

Edit the display name with the pencil.

Click Save.



Earth Engine

Data

Hand-drawn points and polygons

2012

[Add data](#) [Add computation](#)

Classes

[Add class](#) [Get palette](#)Analysis: [None](#)

FEATURED

RASTERS

Landsat TOA Percentile Composite

CLASSIFIED RASTERS

GlobCover 2009

MCD12Q1-1 IGBP

MCD12Q1-2 UMD

MCD12Q1-3 LAI/fPAR

MCD12Q1-4 NPP

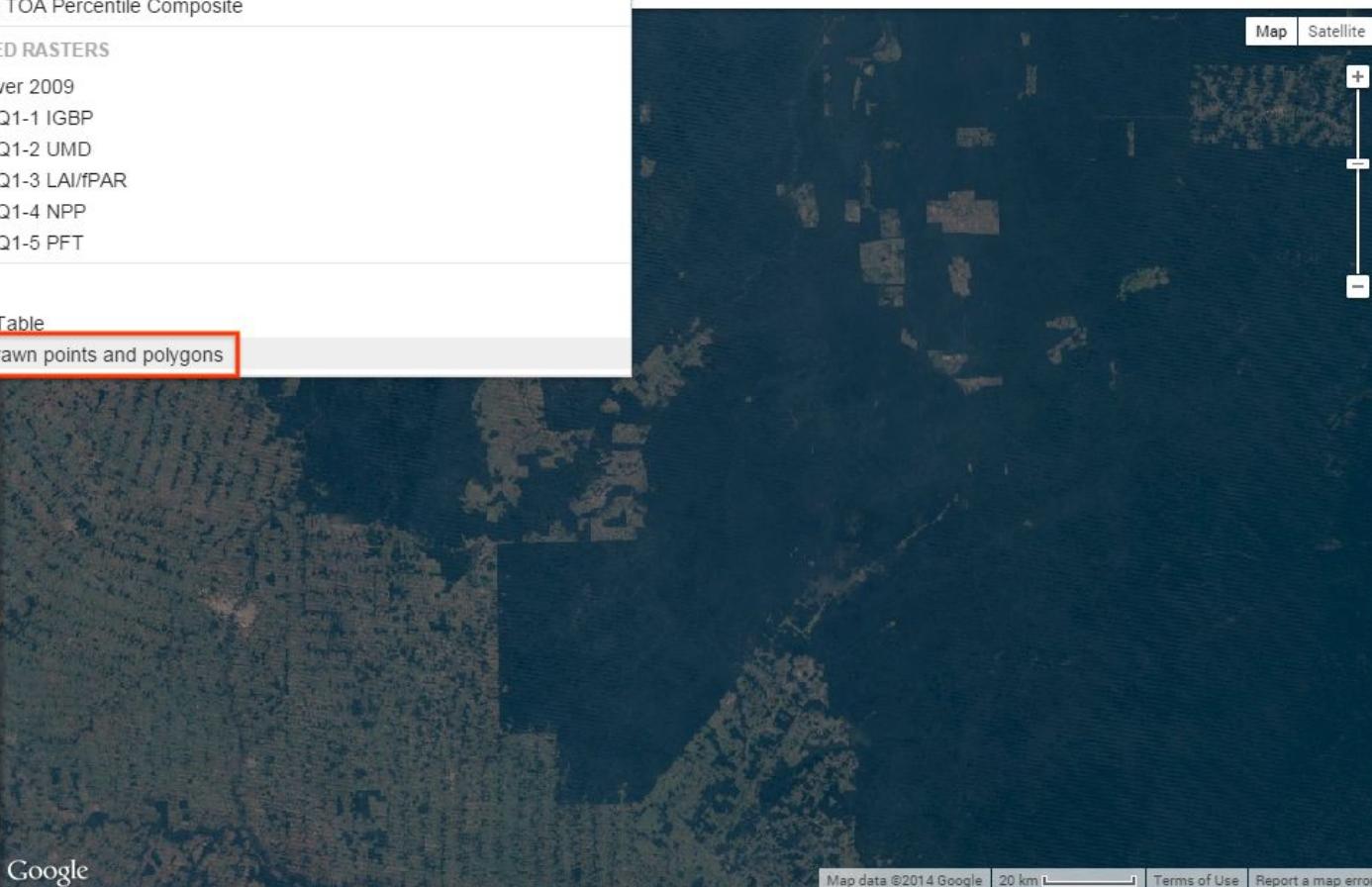
MCD12Q1-5 PFT

VECTORS

Fusion Table

Hand-drawn points and polygons

Add training points,
by clicking 'Add data',
and then
'Hand-drawn points
and polygons'.



Earth Engine

Manage workspace

Staging

Home

Data Catalog

Workspace

Map

Satellite

Data

Hand-drawn points and polygons



Point drawing.



Exit

2012

Add data Add computation

Classes

Non Forest

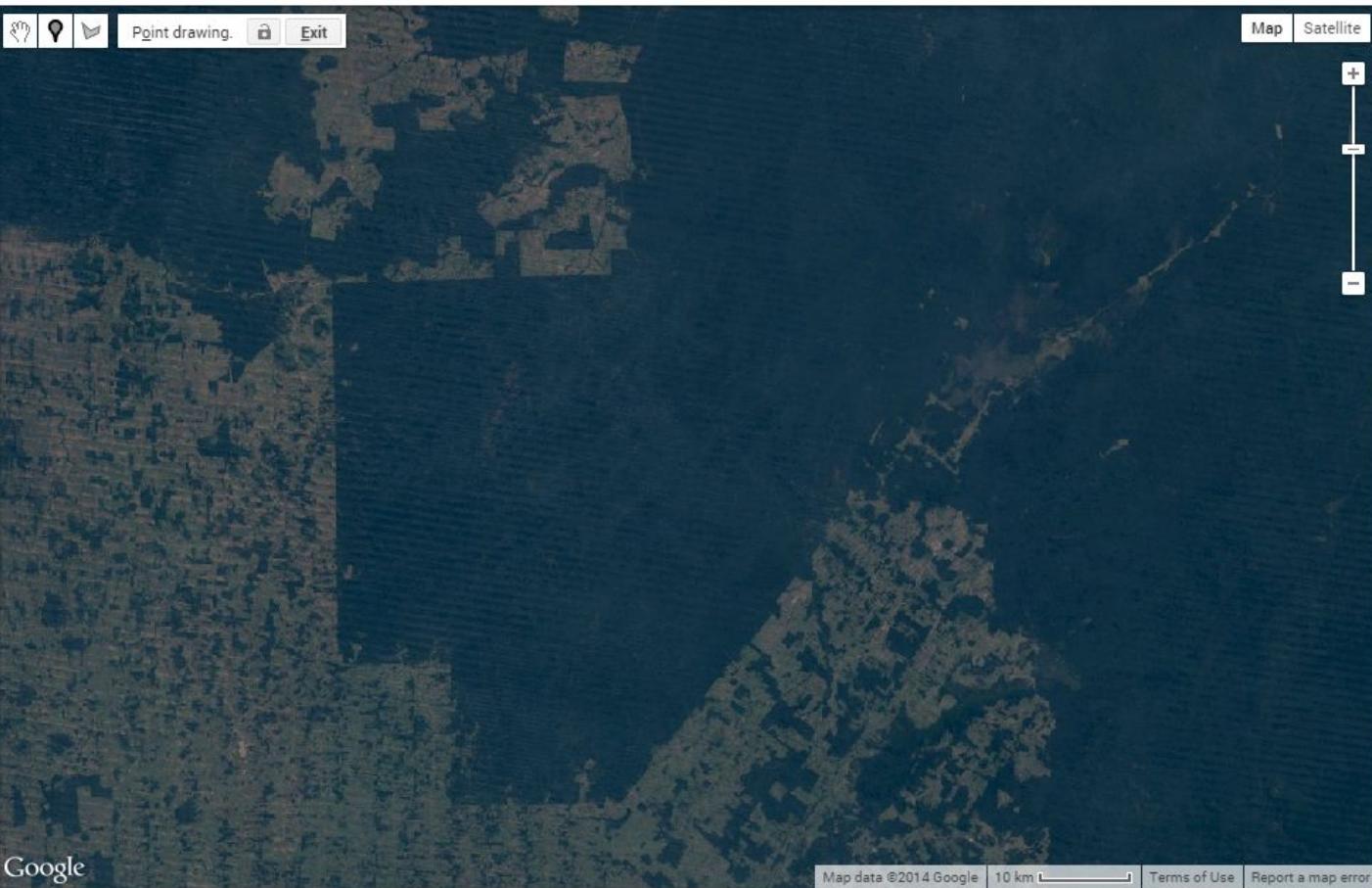
Forest

Add class

Get palette

Analysis:

None



Click 'Add class' to
add 2 classes:

Non Forest
&
Forest

Earth Engine

Manage workspace ▾

Staging ▾

Home

Data Catalog

Workspace

Data

Hand-drawn points and polygons

2012

Add data Add computation

Classes

Non Forest - 11 points

Forest - 8 points

Add class Get palette

Analysis: None ▾

Select a Class, and click on the  tool to add training points for that class.



Point drawing.



Exit



Earth Engine

Manage workspace

Staging

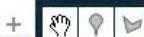
Home

Data Catalog

Workspace

Data

Hand-drawn points and polygons



Add data Add computation

Classes

Non Forest - 11 points

Forest - 8 points

Add class Get palette

Analysis:

None

None

Train a classifier

Cross-validate

Compare

Click 'Train a classifier'.



Earth Engine

Manage workspace ▾ Staging ▾

Home Data Catalog Workspace

Data

Hand-drawn points and polygons



+

○

○

○

○

Model, trained Oct 22, 2014 at 11:47pm (89.47%)



2012

Add data Add computation

Classes

Non Forest - 11 points

Forest - 8 points

Add class Get palette

Analysis: Train a classifier ▾

Classifier

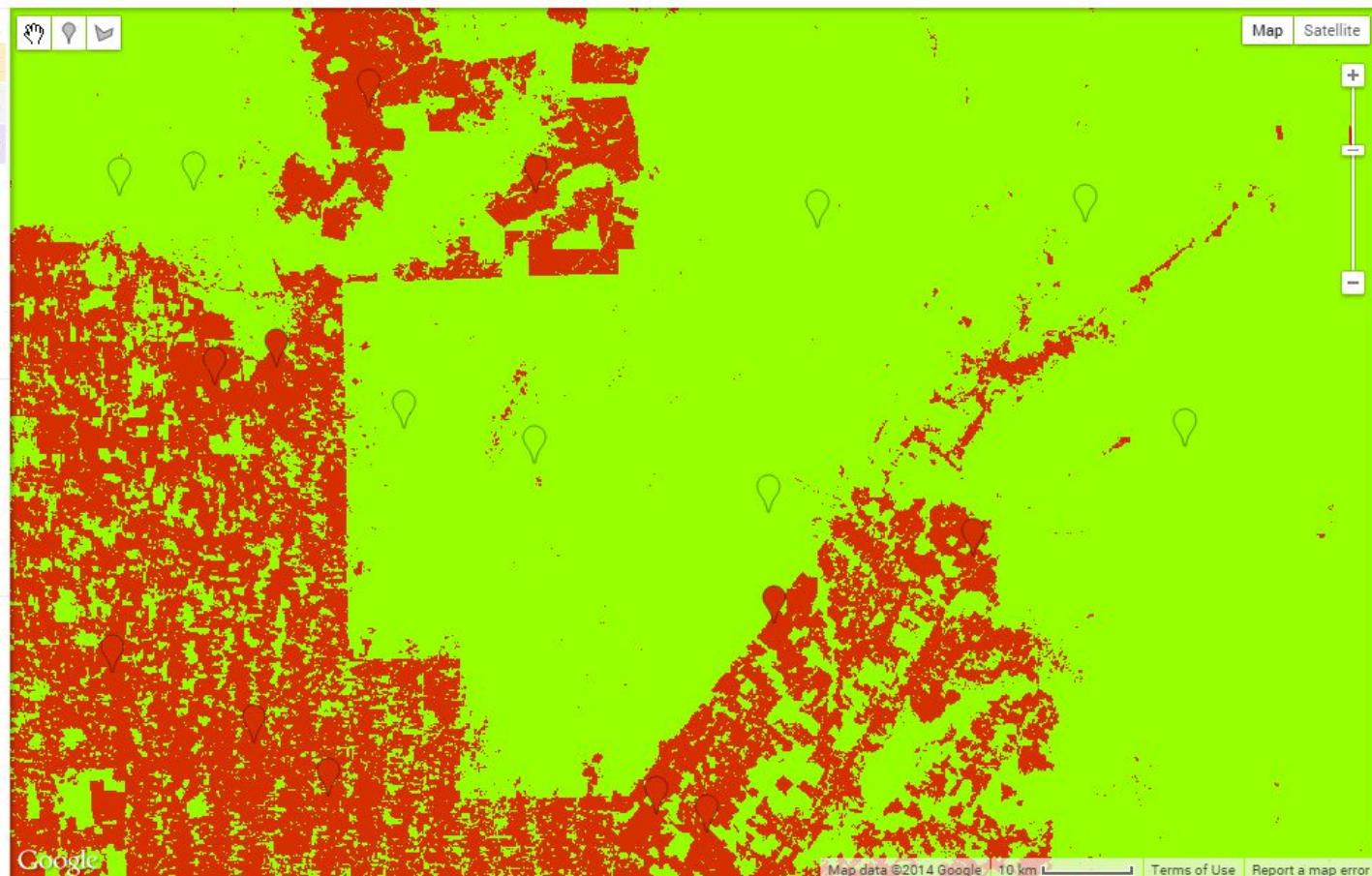
Resolution (m)

Fast Naive Bayes

30

Train classifier and display results

Choose a Classifier,
and click 'Train
classifier and display
results'



Earth Engine

Manage workspace ▾ Staging ▾

Home Data Catalog Workspace

Data

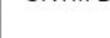
Hand-drawn points and polygons



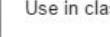
SRTM Digital Elevation Data Version 4



Model, trained Oct 22, 2014 at 11:47pm (89.47%)



2012



Add data Add computation

Classes

Non Forest - 11 points

Forest - 8 points

Add class Get palette

Analysis: Train a classifier ▾

Classifier

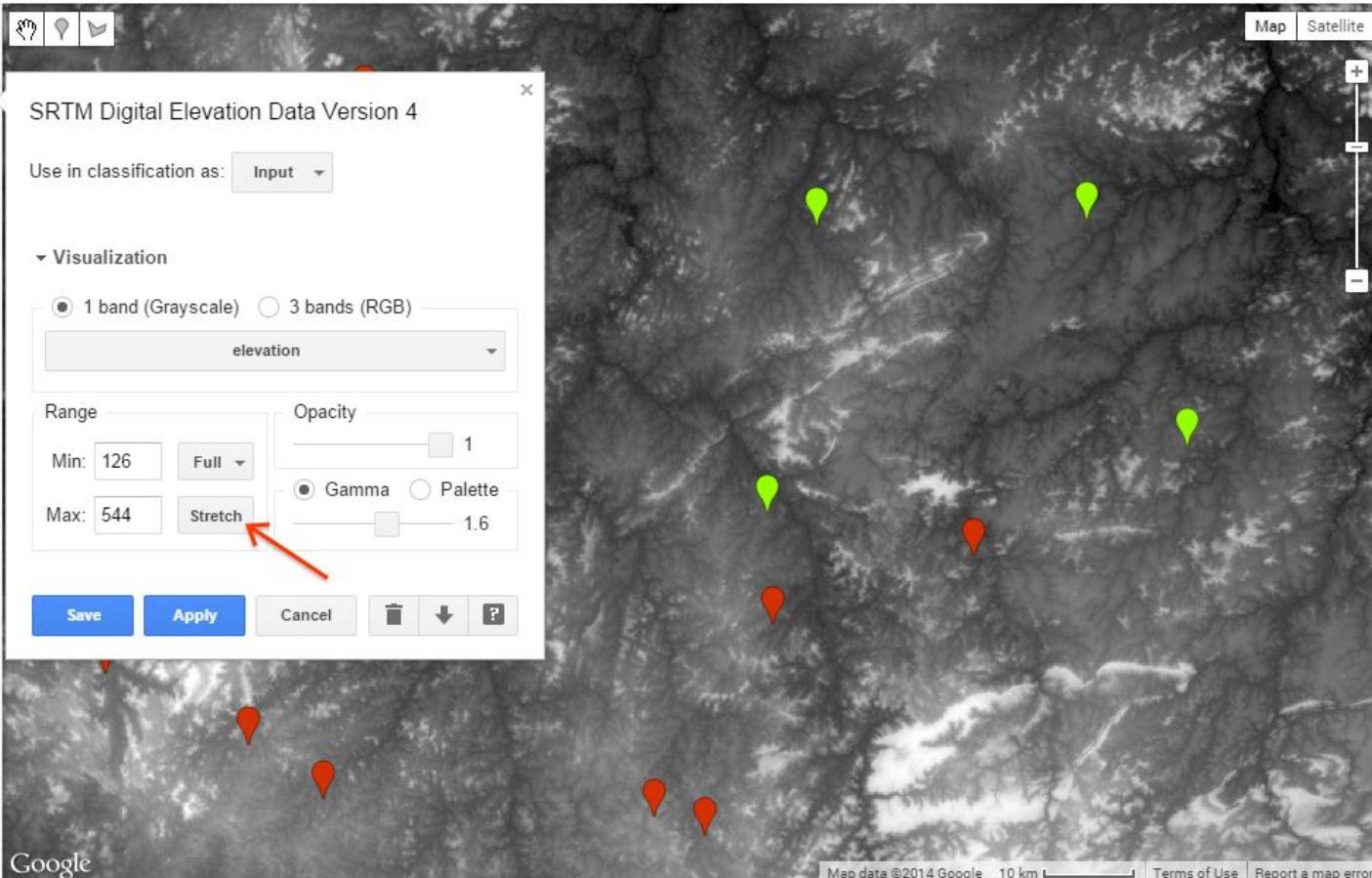
Fast Naïve Bayes

Resolution (m)

30

In the search box, search for “elevation” and add SRTM data.

Click ‘Stretch’ to visualize the data better.



Earth Engine

Data

Hand-drawn points and polygons

Workspace saved 0s ago ▾

Staging ▾

Save now

Restore saved workspace

Clear workspace

Import/export...

Share workspace...

Model, trained Oct 22, 2014 at 11:49pm (94.74%)

SRTM Digital Elevation Data Version 4

Model, trained Oct 22, 2014 at 11:47pm (89.47%)

2012

Add data Add computation

Classes

Non Forest - 11 points

Forest - 8 points

Add class Get palette

Analysis: Train a classifier ▾

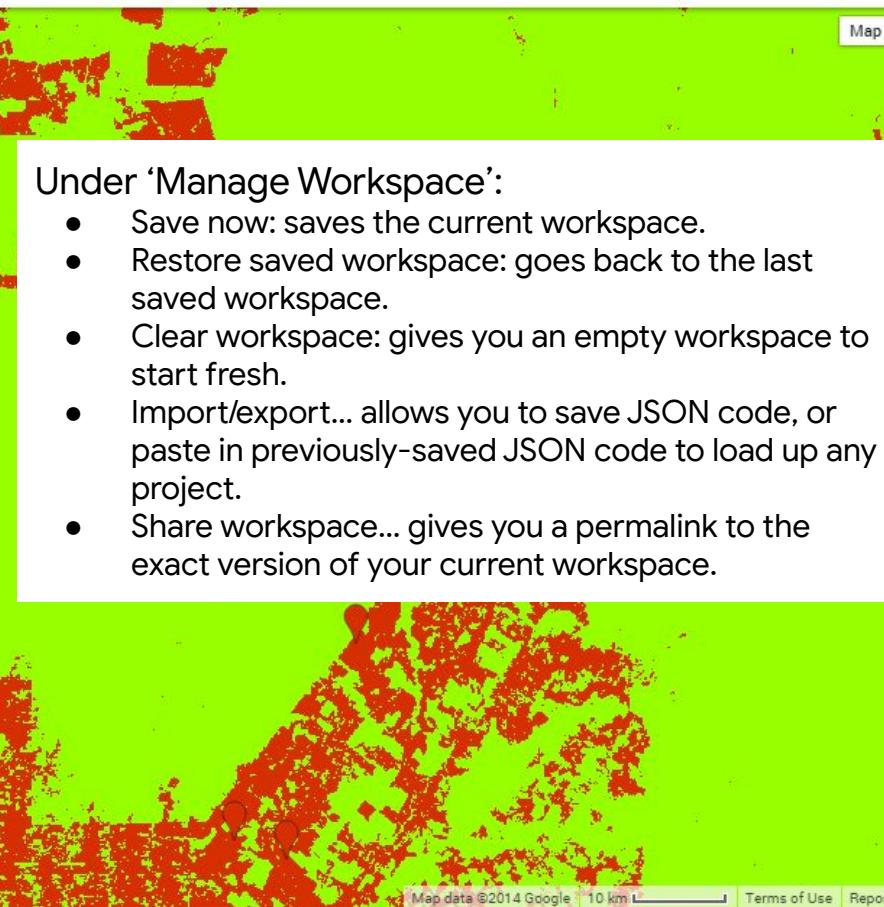
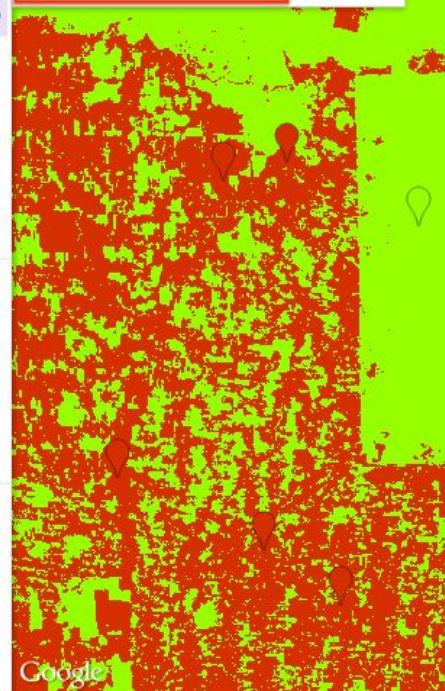
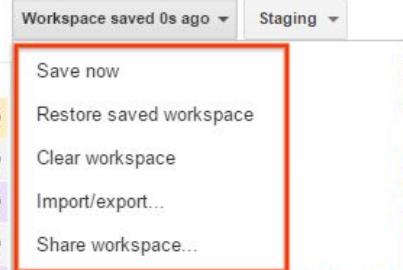
Classifier

Fast Naive Bayes ▾

Resolution (m)

30

Train classifier and display results



Under 'Manage Workspace':

- Save now: saves the current workspace.
- Restore saved workspace: goes back to the last saved workspace.
- Clear workspace: gives you an empty workspace to start fresh.
- Import/export... allows you to save JSON code, or paste in previously-saved JSON code to load up any project.
- Share workspace... gives you a permalink to the exact version of your current workspace.

Earth Engine

Workspace saved 0s ago

Staging

Home Data Catalog Workspace

Data

Hand-drawn points and polygons



Map Satellite

Model, trained Oct 22, 2014 at 11:49pm (94.74%)



SRTM Digital Elevation Data Version 4



Model, trained Oct 22, 2014 at 11:47pm (89.47%)



2012



Add data Add computation

Classes

Non Forest - 11 points

Forest - 8 points

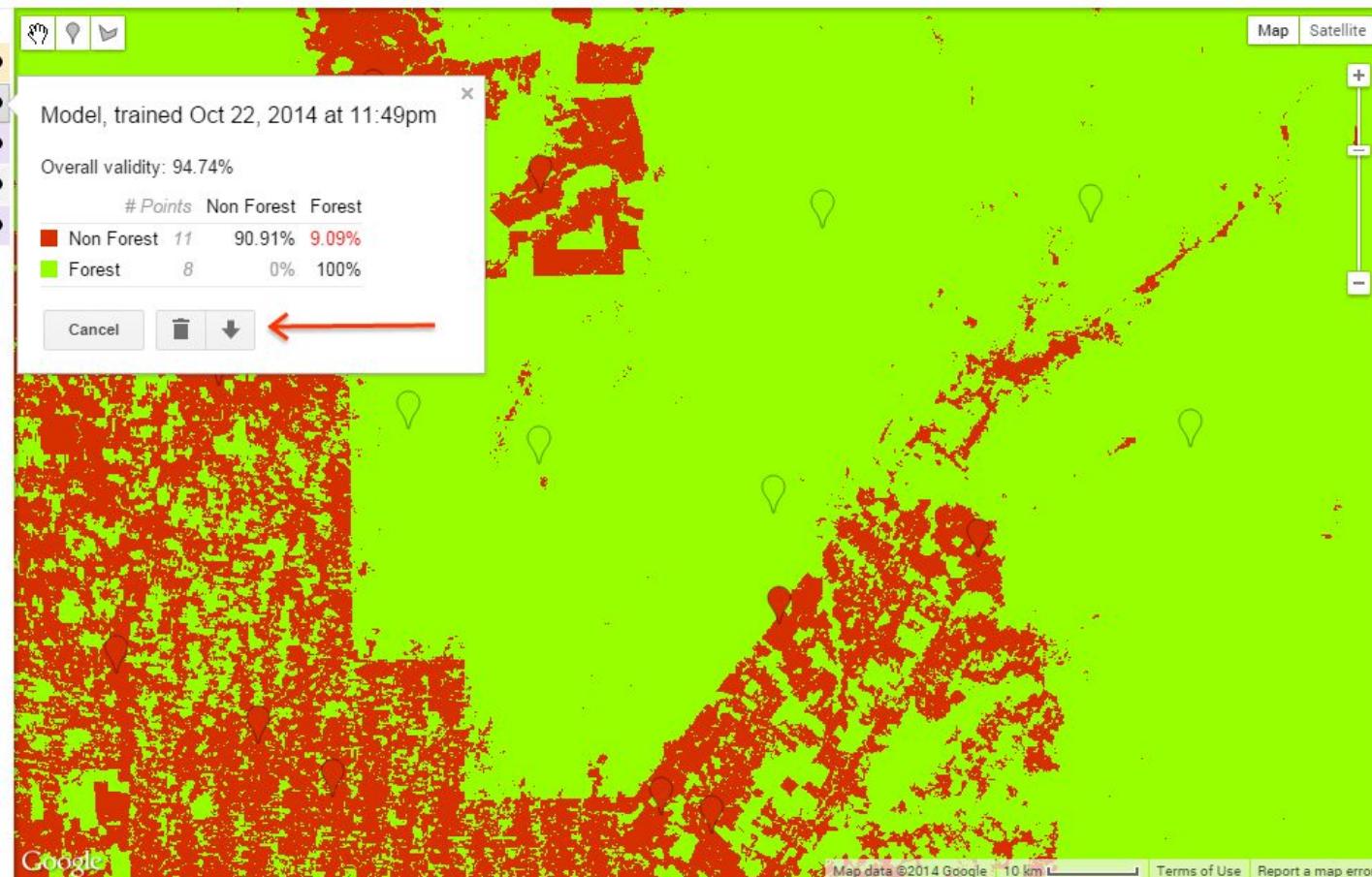
Add class Get palette

Analysis: Train a classifier

Classifier

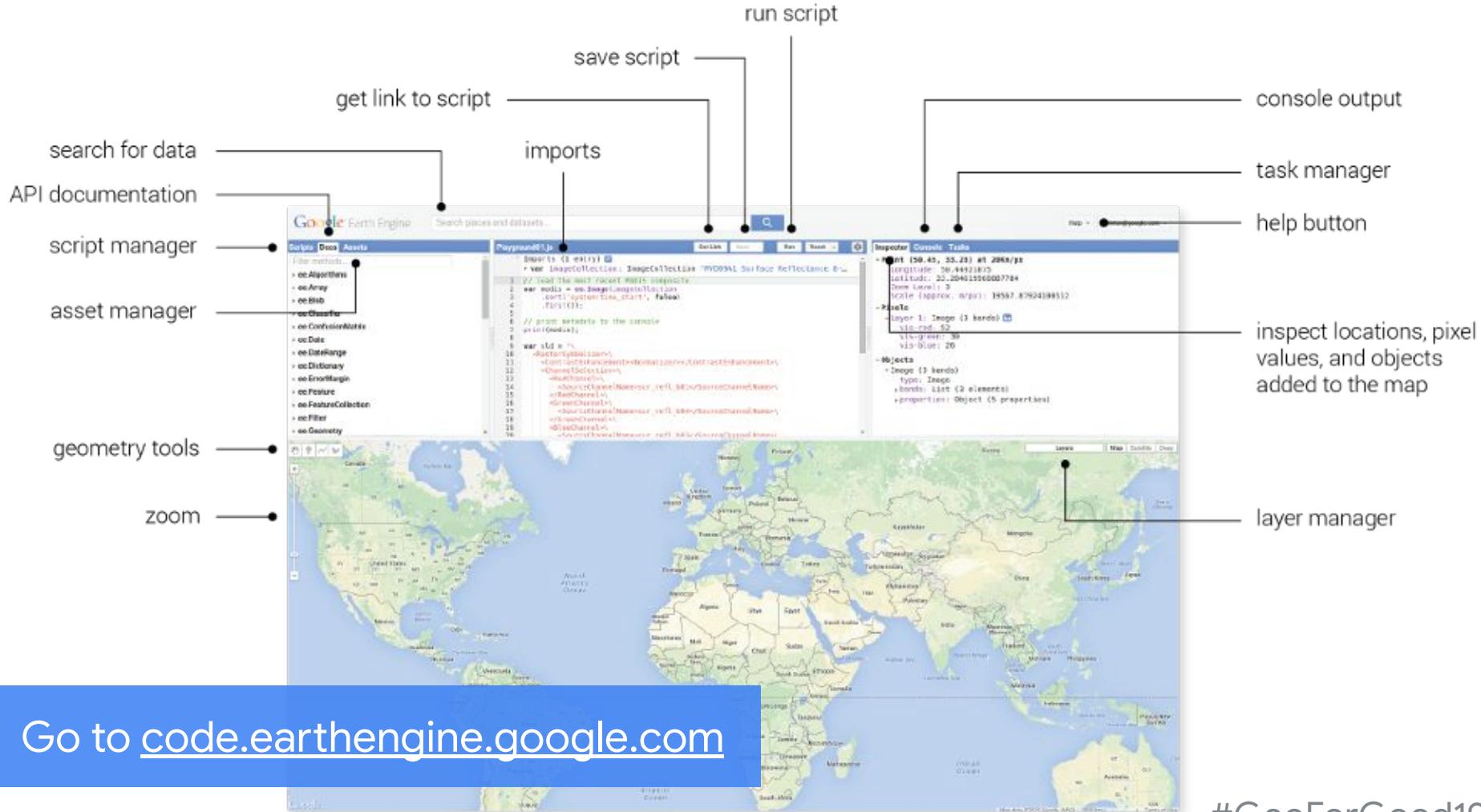
Resolution (m)

You can download results by clicking the download button for a layer.



Hands-on

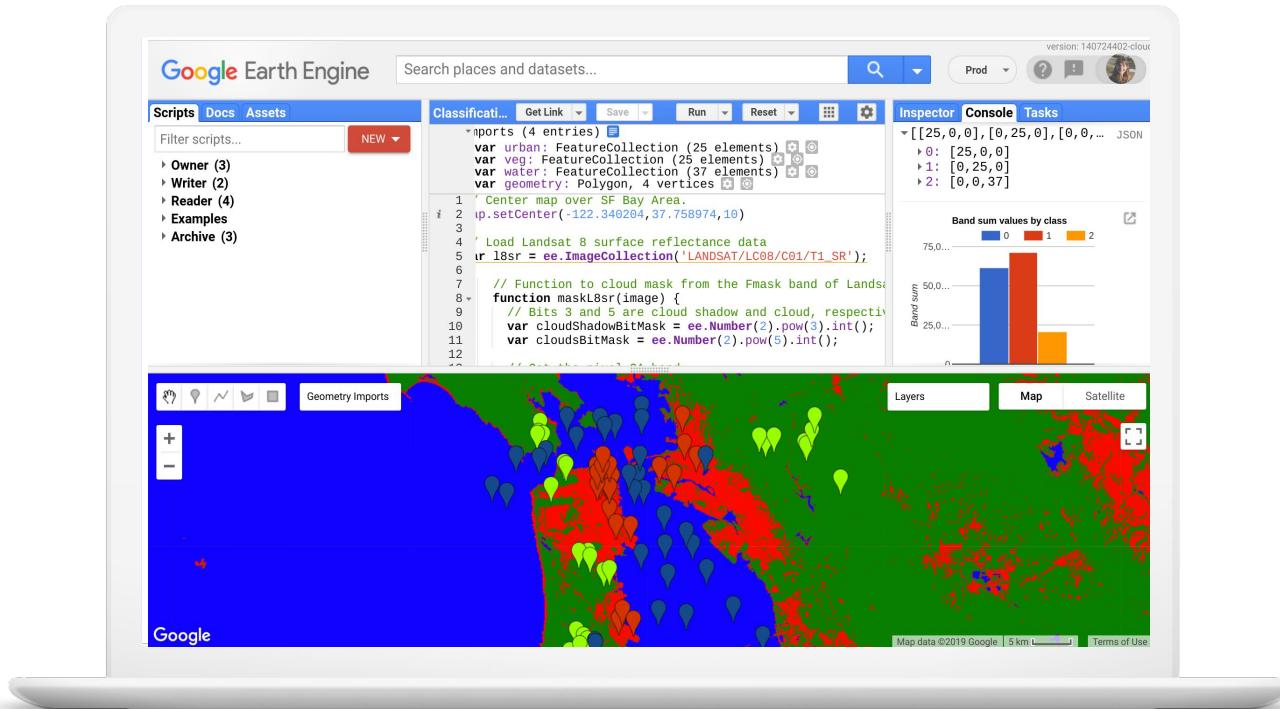
- Exercise #1: “The Warm Up”: Perform a classification in the Explorer
- **Exercise #2: “Getting Comfortable”:** Perform a classification in the Code Editor
- Exercise #3: Use the Data Catalog
- Exercise #4: Do raster analysis, e.g. NDVI
- Exercise #5: Do vector analysis, e.g. Buffer
- Exercise #6: Create your own background Map Style
- Exercise #7: Export your image



Go to code.earthengine.google.com

#GeoForGood19

Now let's examine a Classification in the Code Editor!



Click here: code.earthengine.google.com/cc2b393f4e74e6a7067ed9bd0423f2c1

#GeoForGood19

Hands-on

- Exercise #1: “The Warm Up”: Perform a classification in the Explorer
- Exercise #2: “Getting Comfortable”: Perform a classification in the Code Editor
- **Exercise #3: Use the Data Catalog**
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- Exercise #5: Do vector analysis, e.g. Buffer
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- Exercise #7: Export your image

Let's go find data!

The screenshot shows the Earth Engine Data Catalog homepage. At the top, there is a navigation bar with links for HOME, VIEW ALL DATASETS, BROWSE BY TAGS, LANDSAT, MODIS, SENTINEL, API DOCS, and SEND FEEDBACK. To the right of the navigation bar is a search bar with a magnifying glass icon and the word "Search". Further to the right are buttons for "ALL PRODUCTS" and a profile icon. The main content area features a satellite map of a coastal region with a large body of water and forested land. Overlaid on the map is the text "A planetary-scale platform for Earth science data & analysis". Below this, a smaller text block states: "Earth Engine's public data archive includes more than forty years of historical imagery and scientific datasets, updated and expanded daily." At the bottom left of the map area is a white button with the text "VIEW ALL DATASETS".

Go to developers.google.com/earth-engine/datasets

#GeoForGood19

[HOME](#)[VIEW ALL DATASETS](#)[BROWSE BY TAGS](#)[LANDSAT](#)[MODIS](#)[SENTINEL](#)[API DOCS](#)[SEND FEEDBACK](#)

Landsat Collections

Landsat, a joint program of the USGS and NASA, has been observing the Earth continuously from 1972 through the present day. Today the Landsat satellites image the entire Earth's surface at a 30-meter resolution about once every two weeks, including multispectral and thermal data.

Landsat data is available in Earth Engine in its raw form, as Surface Reflectance, TOA-corrected reflectance, and in various ready-to-use computed products such as NDVI and EVI vegetation indices.





Landsat 8

2013 - Present



Landsat 7

1999 - Present



Landsat 5

1984 – 2012





Surface Reflectance

Atmospherically corrected surface reflectance from the Landsat 8 OLI/TIRS sensors

Dataset Availability: April 2013 - Present

TIER 1

TIER 2



Top of Atmosphere

Landsat 8 Collection 1 calibrated top-of-atmosphere (TOA) reflectance

Dataset Availability: April 2013 - Present

TIER 1

T1 + REAL-TIME

TIER 2



Raw Images

Landsat 8 Collection 1 DN values, representing scaled, calibrated at-sensor radiance.

Dataset Availability: April 2013 - Present

TIER 1

T1 + REAL-TIME

TIER 2



```
function maskL8sr(image) {
  // Bits 3 and 5 are cloud shadow and cloud, respectively.
  var cloudShadowBitMask = (1 << 3);
  var cloudsBitMask = (1 << 5);
  // Get the pixel QA band.
  var qa = image.select('pixel_qa');
  // Both flags should be set to zero, indicating clear conditions.
  var mask = qa.bitwiseAnd(cloudShadowBitMask).eq(0)
    .and(qa.bitwiseAnd(cloudsBitMask).eq(0));
  return image.updateMask(mask);
}

var dataset = ee.ImageCollection('LANDSAT/LC08/C01/T1_SR')
  .filterDate('2016-01-01', '2016-12-31')
  .map(maskL8sr);

var visParams = {
  bands: ['B4', 'B3', 'B2'],
  min: 0,
  max: 3000,
  gamma: 1.4,
};
Map.setCenter(114.0079, -26.0765, 10);
Map.addLayer(dataset.media(), visParams);
```

Scroll to bottom to find
“OPEN IN CODE EDITOR” button.



OPEN IN CODE EDITOR

Google Earth Engine

Search places and datasets...



Prod



Scripts Docs Assets

Filter scripts...

NEW ▾

Owner

Writer

Reader

Examples

Archive

LANDSAT_LC08_CO...

Get Link

Save

Run

Reset



```
1  /**
2   * Function to mask clouds based on the pixel_qa band of Landsat
3   * @param {ee.Image} image input Landsat 8 SR image
4   * @return {ee.Image} cloudmasked Landsat 8 image
5   */
6  function maskL8sr(image) {
7    // Bits 3 and 5 are cloud shadow and cloud, respectively.
8    var cloudShadowBitMask = (1 << 3);
9    var cloudsBitMask = (1 << 5);
10   // Get the pixel QA band.
11   var qa = image.select('pixel_qa');
12   // Both flags should be set to zero, indicating clear conditions.
13   var mask = qa.bitwiseAnd(cloudShadowBitMask).eq(0)
14     .and(qa.bitwiseAnd(cloudsBitMask).eq(0));
15   return image.updateMask(mask);
16 }
17
18 var dataset = ee.ImageCollection('LANDSAT/LC08/C01/T1_SR')
```

Inspector Console Tasks

Use print(...) to write to this console.



Map Satellite



Google

Hands-on

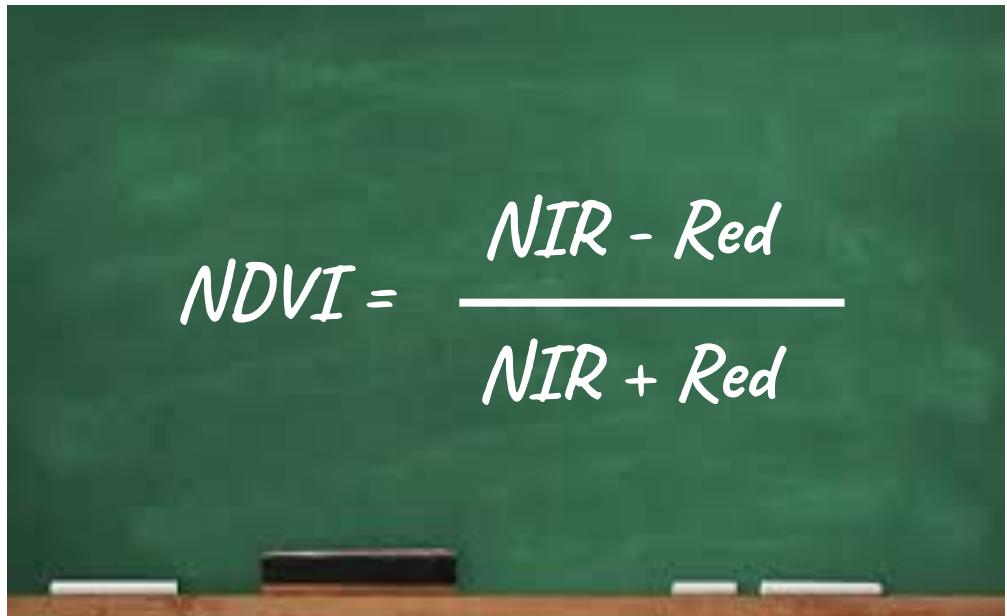
- Exercise #1: “The Warm Up”: Perform a classification in the Explorer
- Exercise #2: “Getting Comfortable”: Perform a classification in the Code Editor
- Exercise #3: Use the Data Catalog
- **Exercise #4: Do raster analysis, e.g. NDVI**
- Exercise #5: Do vector analysis, e.g. Buffer
- Exercise #6: Create your own background Map Style
- Exercise #7: Export your image

What is NDVI?

Normalized Difference Vegetation Index (NDVI) is a common **vegetation index** that **quantifies vegetation** by measuring the difference between:

- near-infrared (which vegetation strongly reflects) and
- red light (which vegetation absorbs).

$$NDVI = \frac{NIR - Red}{NIR + Red}$$





Scripts Docs Assets

ndvi

Owner (3)

Writer (2)

Reader (4)

Examples (filtered)

Image

Normalized Difference

Canny Edge Detector

Center Pivot Irrigation Detector

Hough Transform

Image Collection

Expression Map

Animated Thumbnail

ARROWS

Normalized Differen...

Get Link

Save

Run

Reset



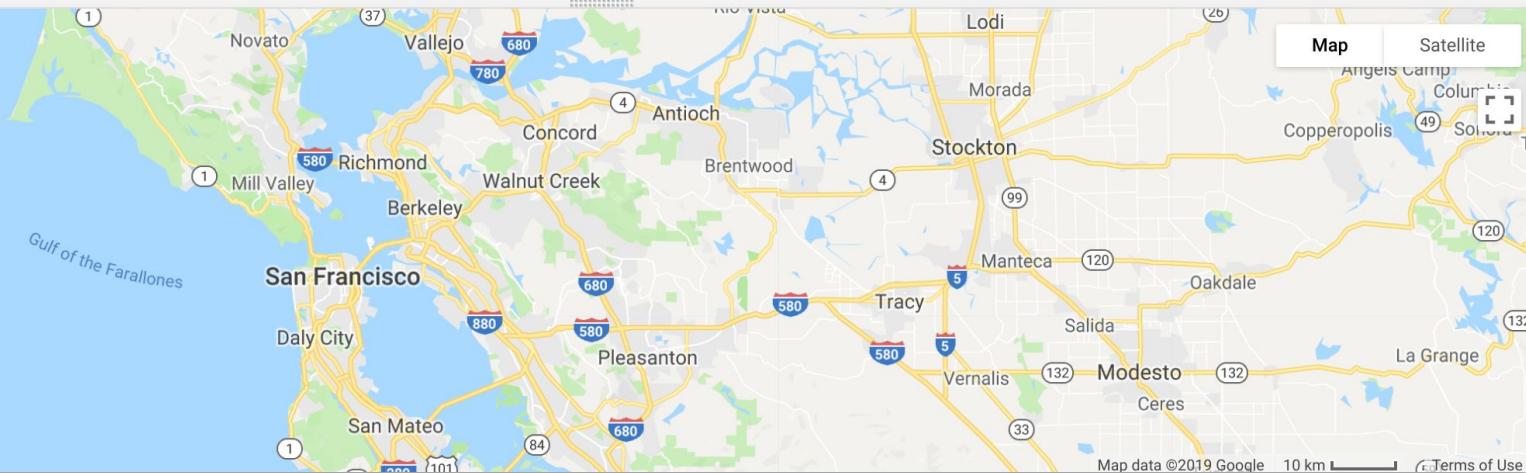
Inspector Console Tasks

Use print(...) to write to this
e.

First search for “ndvi”, then choose
“Normalized Difference”, and Run it.

```

11 // Use the normalizedDifference(A, B) to compute (A - B) / (A + B)
12 var ndvi = img.normalizedDifference(['sur_refl_b02', 'sur_refl_b01'])
13
14 // Make a palette: a list of hex strings.
15 var palette = [
16   'FFFFFF', 'CE7E45', 'DF923D', 'F1B555', 'FCD163',
17   '74A901', '66A000', '529400', '3E8601', '207401',
18   '004C00', '023B01', '012E01', '011D01', '011301'
]
```





▼ Examples (filtered)

- ▼ Image
 - Normalized Difference
 - Canny Edge Detector
 - Center Pivot Irrigation Detector
 - Hough Transform
 - ▼ Image Collection
 - Expression Map
 - Animated Thumbnail

Normalized Difference

Get Link ▾ Save

1

Run

Rese

1

```
4 // NDVI = (NIR - RED) / (NIR + RED), where
5 // RED is sur_refl_b01, 620-670nm
6 // NIR is sur_refl_b02, 841-876nm
7
8 // Load a MODIS image.
9 var img = ee.Image('MODIS/006/MOD09GA/2012_03_09');
10
11 // Use the normalizedDifference(A, B) to compute (A - B) / (A + B)
12 var ndvi = img.normalizedDifference(['sur_refl_b02', 'sur_refl_b01']);
13
14 // Make a palette: a list of hex strings.
15 var palette = ['FFCCCC', 'CC7745', 'D9E923', 'E1B555', 'ECD162', '998714']
```

Use `print(...)` to write to this console.



Hands-on

- Exercise #1: “The Warm Up”: Perform a classification in the Explorer
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- Exercise #7: Export your image

Google Earth Engine

Search places and datasets...



Prod



Scripts Docs Assets

buffer

- ▶ Owner (3)
- ▶ Writer (2)
- ▶ Reader (4)
- ▶ Examples (filtered)
 - ▼ Feature Collection
 - Buffer
 - Join
- ▶ Archive (3)

+
-

Buffer

Get Link

Save

Run

Reset

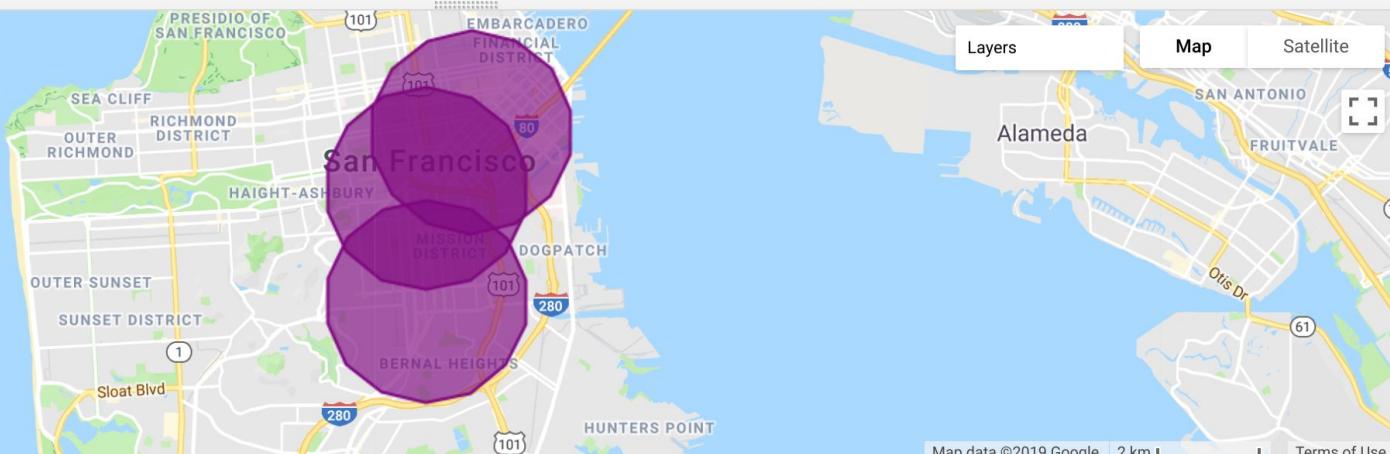


Inspector Console Tasks

Use print(...) to write to this console.

```

1 // Feature buffer example.
2 // Display the area within 2 kilometers of San Francisco BART stations.
3
4 // Instantiate a FeatureCollection of BART locations in Downtown San Francisco.
5 // (points).
6 var stations = [
7   ee.Feature(
8     ee.Geometry.Point(-122.42, 37.77), {'name': '16th St. Mission'}
9   ),
10  ee.Feature(
11    ee.Geometry.Point(-122.42, 37.75), {'name': '24th St. Mission'}
12  ),
13  ee.Feature(
14    ee.Geometry.Point(-122.41, 37.78),
15    {'name': 'Civic Center/UN Plaza (CIVC)'})
16];
17 var bartStations = ee.FeatureCollection(stations);
18
19 // Map a function over the collection to buffer each feature.
20 var buffered = bartStations.map(function(f) {
21   return f.buffer(2000, 100); // Note that the errorMargin is set to 100 meters.
22 });
23
24 // Print the buffered FeatureCollection to the console.
25 print(buffered);
26
27 // Map the buffered FeatureCollection to the map.
28 Map.setCenter(-122.41, 37.78, 12);
29 Map.addLayer(buffered, {color: 'purple'}, 'BART Buffer');
30
31 // Set the map to display the buffer around the Civic Center/UN Plaza station.
32 Map.setCenter(-122.41, 37.78, 12);
33 Map.setZoom(12);
34 
```



Hands-on

- Exercise #1: “The Warm Up”: Perform a classification in the Explorer
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Google Earth Engine

Search places and datasets...



Prod



Scripts Docs Assets

- ▶ Primitive
- ▶ Cloud Masking
- ▶ Code Editor
 - Map Center Object
 - Map Style
- ▶ User Interface
 - Airstrip Thumbnails
 - Async Inspector
 - Collection Slider
 - Forest Change
 - Landsat Explorer
 - Layer Filters

Map Style

Get Link

Save

Run

Reset



```
1 // Set a custom basemap style and default to the satellite map type.
2 var styles = {
3   'Soft Blue': [
4     {
5       featureType: 'all',
6       stylers: [
7         { saturation: -80 }
8       ]
9     },
10    {
11      featureType: 'road.arterial',
12      elementType: 'geometry',
13      stylers: [
14        { hue: '#00ffee' },
15        { saturation: 50 }
16      ]
17    }
18  ]
19}
```

Inspector Console Tasks

Use print(...) to write to this console.



Create map style

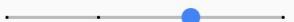


Adjust density of features

Roads



Landmarks



Labels



Select theme



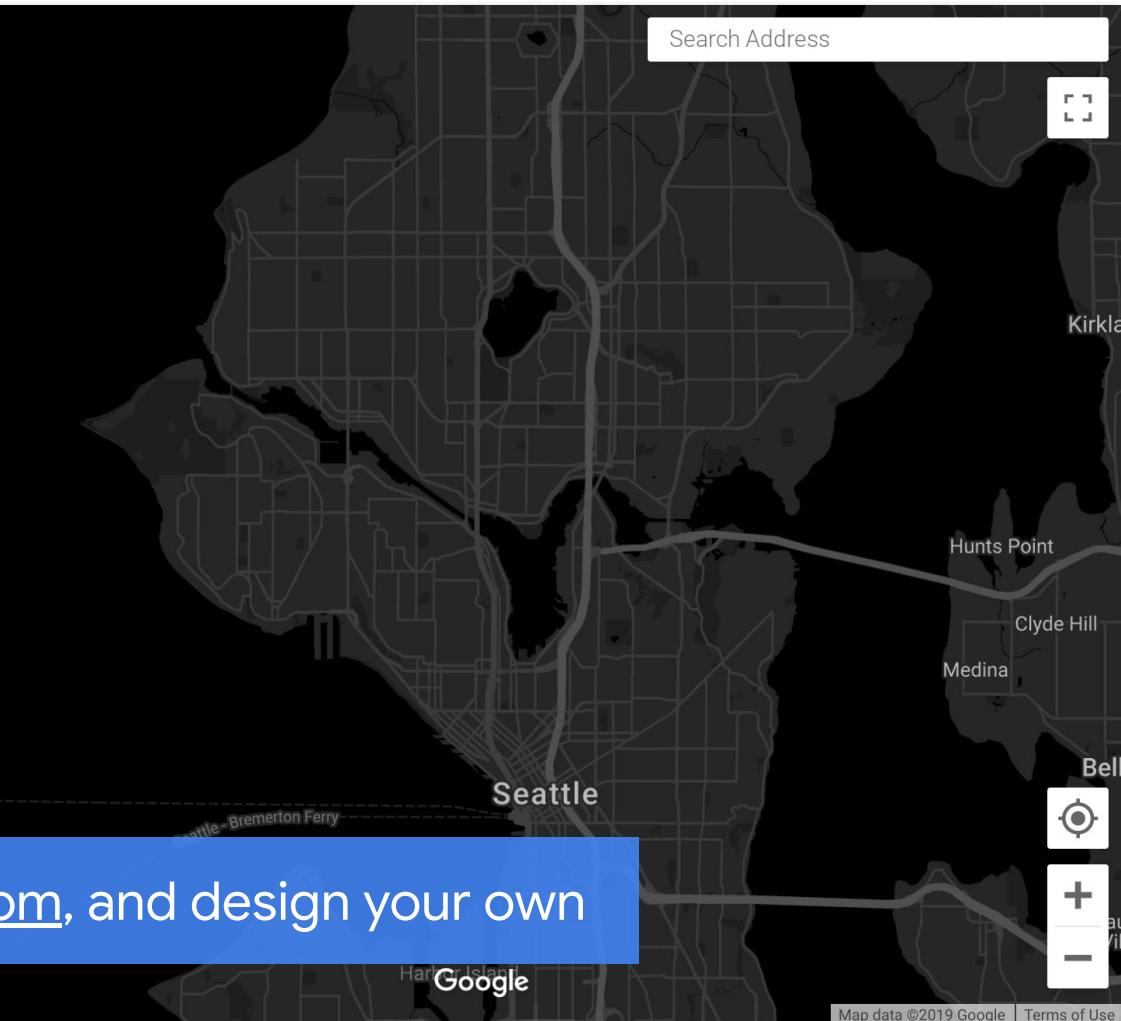
Standard



Silver



Retro



Go to mapstyle.withgoogle.com, and design your own

MORE OPTIONS

FINISH

Google

Create map style



Adjust density of features

Roads

Landmarks

Labels



Select theme



Standard



Silver



Retro



Dark

MORE OPTIONS

Export Style



Copy and paste the JSON into your app or website code.

```
[  
  {  
    "elementType": "geometry",  
    "stylers": [  
      {  
        "color": "#212121"  
      }  
    ]  
  },  
  {  
    "elementType": "labels.icon".  
  }]
```

COPY JSON

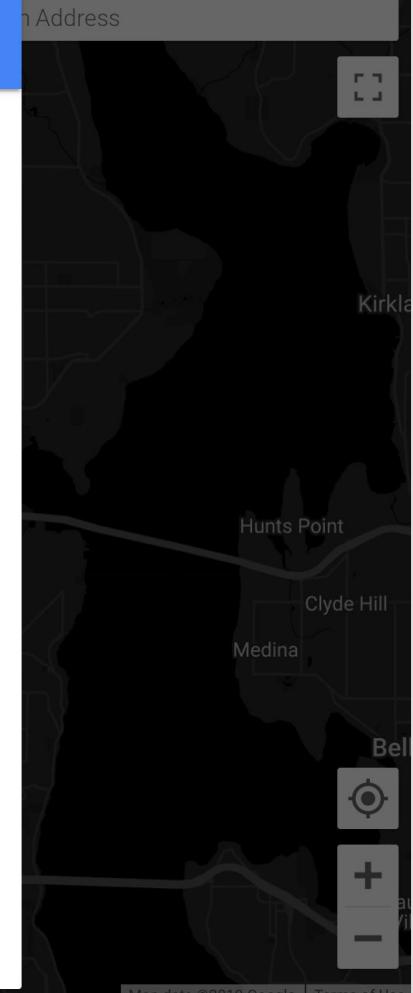
Copied to clipboard

Grab the URL for the Google Static Maps API.

```
https://maps.googleapis.com/maps/api/staticmap?  
key=YOUR_API_KEY&center=47.648248570591896,-122.36602376050388&zoom=1  
2&format=png&maptype=roadmap&style=element:geometry%7Ccolor:0x212121&  
style=element:labels.icon%7Cvisibility:off&style=element:labels.text.fi  
ll%7Ccolor:0x757575&style=element:labels.text.stroke%7Ccolor:0x212121&  
style=feature:administrative%7Celement:geometry%7Ccolor:0x757575&style
```

Remember to enter your API key in the URL.

COPY URL



Scripts Docs Assets

- ▶ Feature Collection
- ▶ Charts
- ▶ Arrays
- ▶ Primitive
- ▶ Cloud Masking
- ▶ Code Editor

- Map Center Object
- Map Style
- User Interface
 - Airstrip Thumbnails
 - Async Inspector
 - Collection Slider
 - Forest Change
 - Landsat Explorer
 - Layer Filters

Find “Map Style”, then paste the copied code in between the brackets [], and click Run.

```
 9
10
11
12
13
14
15
16
17
18
19 } ] } }
```

elementType": "labels.icon",
"stylers": [
 {
 "visibility": "off"
 }]



Hands-on

- Exercise #1: “The Warm Up”: Perform a classification in the Explorer
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- **Exercise #7: Export your image**

Google Earth Engine

Search places and datasets...



Prod



Scripts Docs Assets

export

▼ Export

▼ Export.image

Export.image(image, taskName, param...

Export.image.toAsset(image, descripti...

Export.image.toCloudStorage(image, d...

Export.image.toDrive(image, descriptio...

▼ Export.map

Export.map.toCloudStorage(image, de...

▼ Export.table

Export.table(features, taskName, para...

Export.table.toAsset(collection, descri...

Link cc2b393f4e74e6a7067e...

Get Link

Save

Run

Reset



Inspector

Console

Tasks

Use print(...) to write to file.

+ properties) JSON

],[0,25,0],[0... JSON

um values by class

0 25 50 75

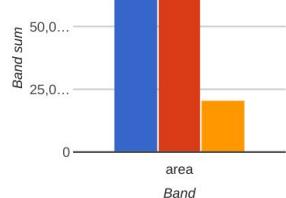
area Band

Select this text, and type: Ctrl + /

```

99         actual. landcover ,
100         predicted: 'classification'
101     });
102     print(confusionMatrix);
103     print(confusionMatrix.accuracy);
104
105     var visualization = classified
106     .visualize({
107         min: 0,
108         max: 2,
109         palette: ['red', 'green', 'blue']);
110
111     Export.image.toDrive({
112         image: visualization,
113         description: 'LandcoverExport',
114         fileNamePrefix: 'Landcover',
115         region: geometry,
116         scale: 30
117     })

```



Want more Earth Engine in the future?

The screenshot shows the Google Earth Engine API website. At the top, there's a navigation bar with links for GUIDES, REFERENCE, TUTORIALS, EDU, REST API, CLOUD, DATA CATALOG, TIMELAPSE, and SEND FEEDBACK. A search bar is also present. On the left, a sidebar contains sections for Developer's Guide (with sub-links for Introduction, Get Started, Earth Engine Code Editor, Python Installation, Command Line Tool, and Get Help), Machine Learning (with sub-links for Overview of ML in Earth Engine, Supervised Classification Algorithms, Unsupervised Classification Algorithms, TensorFlow models, TensorFlow example workflows, and TFRecord data format), and Image (with sub-links for Image Overview and Image Visualization). The main content area features a large heading 'Get Started with Earth Engine'. Below it is a 'Contents' section with links to How to use these docs, The Code Editor, Opening and running code in the Code Editor, and Earth Engine data structures. There's also a '...' link. Further down, a paragraph explains the purpose of the guide and links to tutorials and a JavaScript style guide. Another paragraph describes the capabilities of Google Earth Engine, mentioning its infrastructure and public data catalog. At the bottom of the main content area, there's a footer with links for Earth Engine API, Google Cloud, and Google Earth Engine Data Catalog. The footer also includes social media icons for GitHub, Stack Overflow, and YouTube.

Google Earth Engine API

GUIDES REFERENCE TUTORIALS EDU REST API CLOUD DATA CATALOG TIMELAPSE SEND FEEDBACK

Search ALL PRODUCTS :

Developer's Guide

Introduction

Get Started

Earth Engine Code Editor

Python Installation

Command Line Tool

Get Help

Machine Learning

Overview of ML in Earth Engine

Supervised Classification Algorithms

Unsupervised Classification Algorithms

TensorFlow models

TensorFlow example workflows

TFRecord data format

Image

Image Overview

Image Visualization

Get Started with Earth Engine

Contents ▾

- How to use these docs
- The Code Editor
- Opening and running code in the Code Editor
- Earth Engine data structures

...

This Get Started guide is intended as a quick way to start programming with the Earth Engine JavaScript API. For an introductory look at JavaScript and more in-depth exercises with the Earth Engine API, see the [tutorials](#). For suggestions on JavaScript coding style, see the [Google JavaScript Style Guide](#).

Google Earth Engine allows users to run algorithms on georeferenced imagery and vectors stored on Google's infrastructure. The Google Earth Engine API provides a library of functions which may be applied to data for display and analysis. Earth Engine's [public data catalog](#) contains a large amount of publicly available imagery and vector datasets. Private assets can also be created in users' personal folders.

Earth Engine API | Google Cloud | Google Earth Engine Data Catalog

GitHub Stack Overflow YouTube

Go to developers.google.com/earth-engine

#GeoForGood19

Want more Earth Engine this week?

- EE Code Editor & Javascript  (Wednesday at 10:30am)
- Make your own EE app  (Monday at 4:15pm, or Wednesday at 2:15pm)
- Learn EE basics through applied examples  (Thursday at 11:15am)

Thanks!



