

Google Earth Engine and machine learning for Earth monitoring

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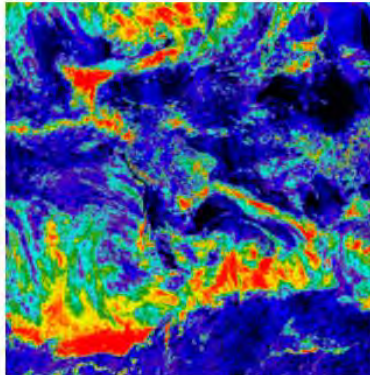
auzhinskiy@jinr.ru; Tel.: +79057766865

The Earth Engine Data Catalog

Datasets tagged climate in Earth Engine

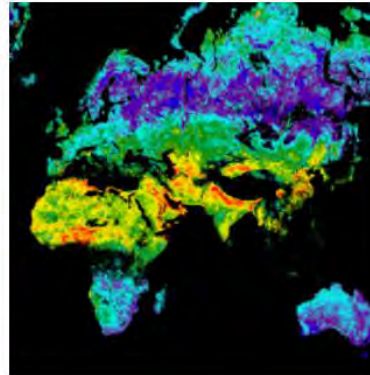
Filter list of datasets

Sentinel-5P NRTI CLOUD: Near Real-Time Cloud



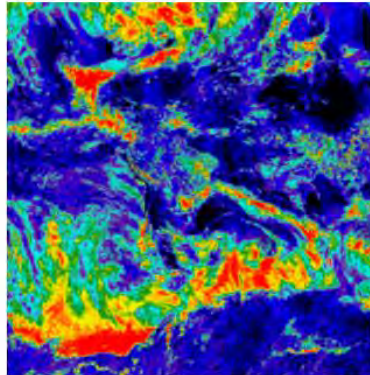
NRTI/L3_CLOUD This dataset provides near real-time high-resolution imagery of cloud parameters. The TROPOMI/S5P cloud properties retrieval is based on the OCRA and ROCINN algorithms currently being used in the operational GOME and GOME-2 products. OCRA retrieves the cloud fraction using measurements in the UV/VIS spectral ...

Sentinel-5P OFFL CH4: Offline Methane



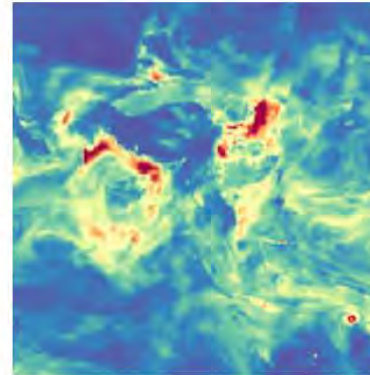
OFFL/L3_CH4 This dataset provides offline high-resolution imagery of methane concentrations. Methane (CH4) is, after carbon dioxide (CO2), the most important contributor to the anthropogenically enhanced greenhouse effect. Roughly three-quarters of methane emissions are anthropogenic and as such it is important to continue

Sentinel-5P OFFL CLOUD: Near Real-Time Cloud



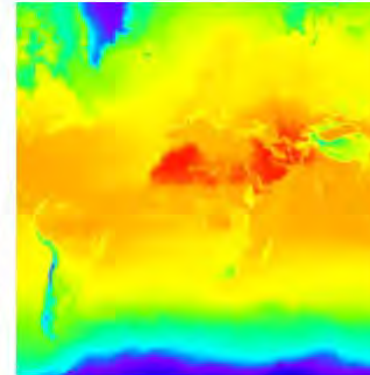
OFFL/L3_CLOUD This dataset provides offline high-resolution imagery of cloud parameters. The TROPOMI/S5P cloud properties retrieval is based on the OCRA and ROCINN algorithms currently being used in the operational GOME and GOME-2 products. OCRA retrieves the cloud fraction using measurements in the UV/VIS spectral regions ...

Copernicus Atmosphere Monitoring Service (CAMS) Global Near-Real-Time



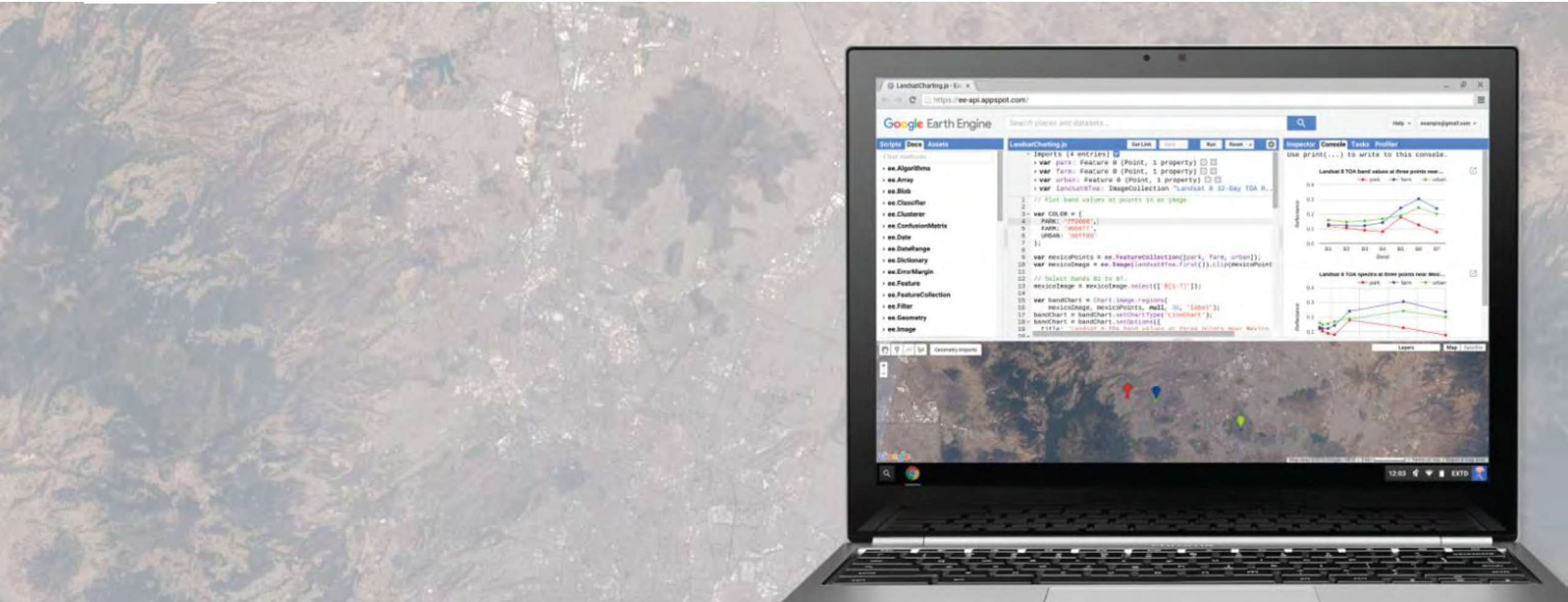
The Copernicus Atmosphere Monitoring Service provides the capacity to continuously monitor the composition of the Earth's atmosphere at global and regional scales. The main global near-real-time production system is a data assimilation and forecasting suite providing two 5-day forecasts per day for aerosols and chemical ...

ERA5 Daily Aggregates - Latest Climate Reanalysis Produced by ECMWF / Copernicus Climate



ERA5 is the fifth generation ECMWF atmospheric reanalysis of the global climate. Reanalysis combines model data with observations from across the world into a globally complete and consistent dataset. ERA5 replaces its predecessor, the ERA-Interim reanalysis. ERA5 DAILY provides aggregated values for each day for ...

JavaScript code editor <https://code.earthengine.google.com/>



* python too!

<https://developers.google.com/>

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

<https://code.earthengine.google.com/>

<https://explorer.earthengine.google.com/>

The image shows a screenshot of the Google Earth Engine playground interface. The interface is divided into several sections:

- Search for datasets or places:** A search bar at the top center.
- Script manager:** A sidebar on the left showing a list of scripts.
- API documentation:** A link in the top left corner.
- Asset manager:** A link in the top left corner.
- Get a link (URL) to the script:** A link in the top left corner.
- Save the script:** A button in the top left corner.
- Run the script:** A button in the top left corner.
- Help button:** A button in the top right corner.
- Feedback button:** A button in the top right corner.
- Code Editor:** A central area for writing and editing code.
- Inspector:** A panel on the right for inspecting map elements.
- Console output:** A panel on the right for viewing script execution output.
- Task manager:** A panel on the right for managing tasks.
- Geometry Tools:** A sidebar on the left for drawing and editing shapes.
- Zoom:** A sidebar on the left for zooming in and out of the map.
- Map:** A satellite map of a coastal area.
- Layer manager:** A panel on the right for managing map layers.

Arrows point from the labels to the corresponding UI elements in the screenshot.

Basics

<https://code.earthengine.google.com/6b24f55c3c60991a09352ce552fd310a>

Scripts Docs Assets

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Owner (1)

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 - ndvi_calculation
 - razm2
 - razmeri
 - romania

New Script * Get Link Save Run Reset Apps Settings

```

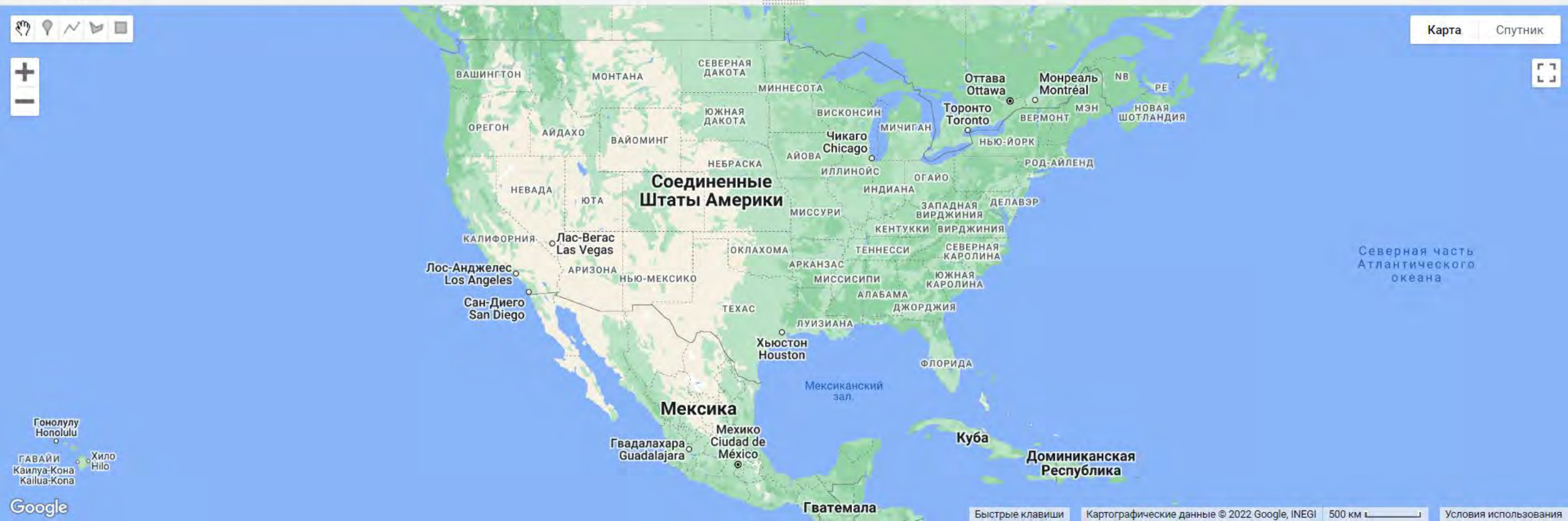
1 // Use single (or double) quotes to make a string.
2 var greetString = 'Ahoy there!';
3 // Use parentheses to pass arguments to functions.
4 print(greetString);
5
6 // Store a number in a variable.
7 var number = 42;
8 print('The answer is:', number);
9
10 // Use square brackets [] to make a list.
11 var listOfNumbers = [0, 1, 1, 2, 3, 5];
12 print('List of numbers:', listOfNumbers);
13
14

```

Inspector Console Tasks

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

- Ahoy there! JSON
- The answer is:
42 JSON
- List of numbers:
[0,1,1,2,3,5] JSON



Scripts Docs Assets

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 - romania
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New Script *

Get Link Save Run Reset Apps

```

1 // Use curly brackets {} to make a dictionary of key:value pairs.
2 var object = {
3   foo: 'bar',
4   baz: 13,
5   stuff: ['this', 'that', 'the other thing']
6 };
7 print('Dictionary:', object);
8 // Access dictionary items using square brackets.
9 print('Print foo:', object['foo']);
10 // Access dictionary items using dot notation.
11 print('Print stuff:', object.stuff);

```

Inspector Console Tasks

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

Dictionary:	JSON
Object (3 properties)	JSON
Print foo:	JSON
bar	JSON
Print stuff:	JSON
["this","that","the other thing"]	JSON



Scripts Docs Assets

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New Script * Get Link Save Run Reset Apps Settings

```

1 // The reflect function takes a single parameter: element.
2 var reflect = function(element) {
3   // Return the argument.
4   return element;
5 };
6 print('A good day to you!', reflect('Back at you!'));

```

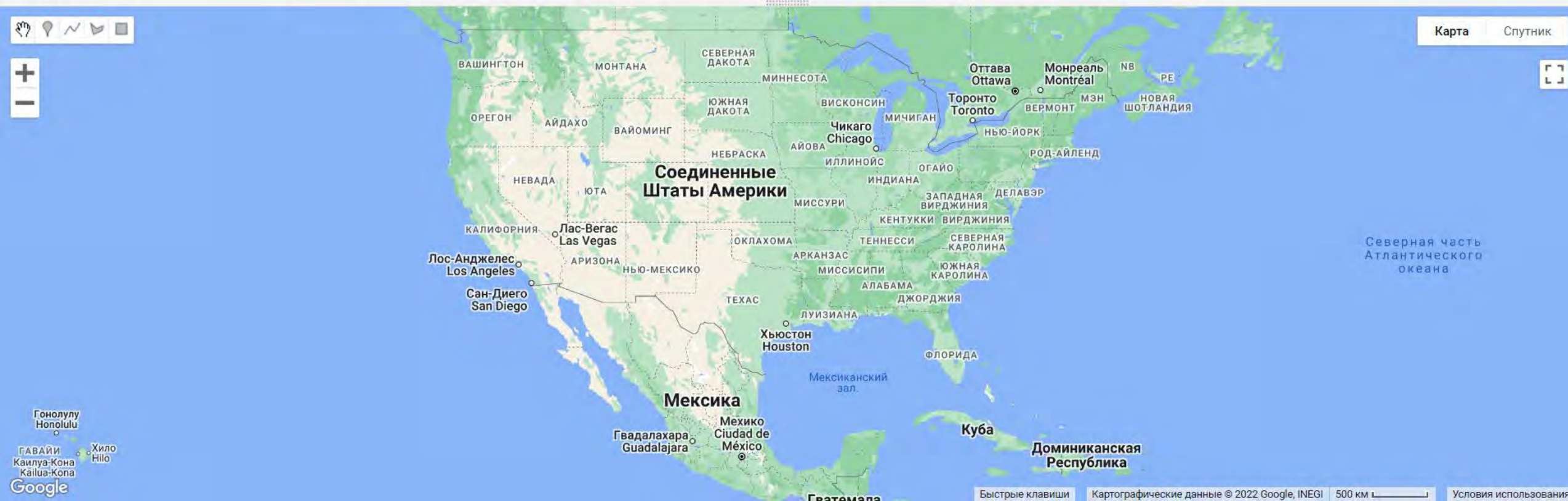
Inspector Console Tasks

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

```

A good day to you!      JSON
Back at you!           JSON

```



Scripts Docs Assets

Filter scripts... NEW Refresh

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New Script * Get Link Save Run Reset Apps Settings

```

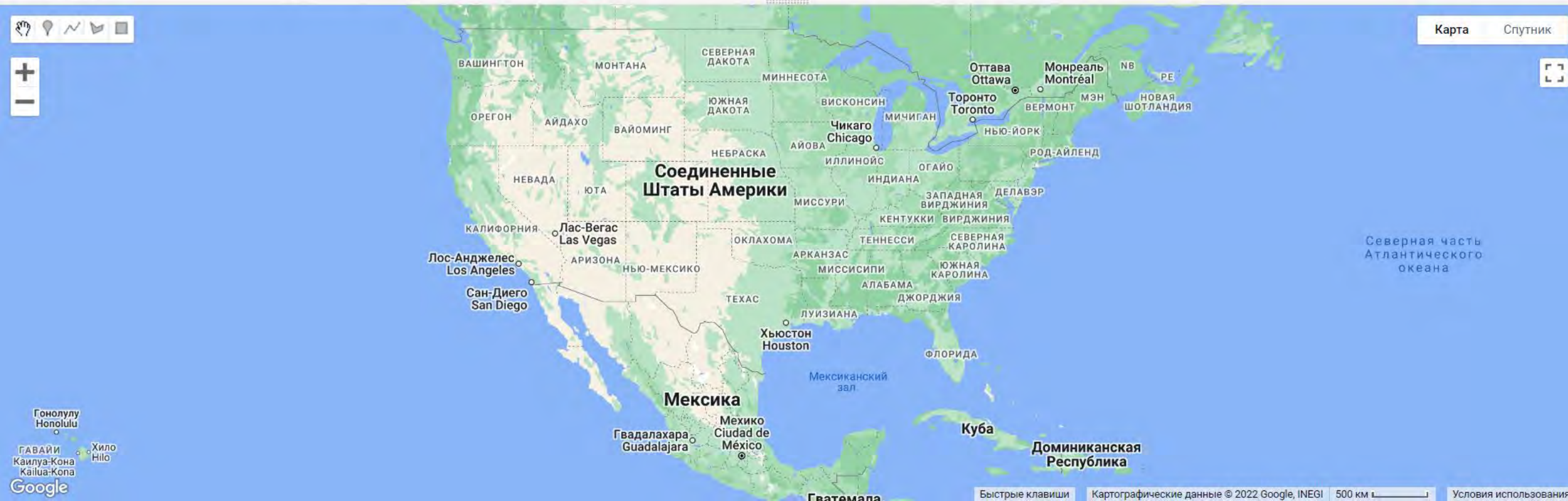
1 // Define a date in Earth Engine.
2 var date = ee.Date('2015-12-31');
3 print('Date:', date);
4
5 // Get the current time using the JavaScript Date.now() method.
6 var now = Date.now();
7 print('Milliseconds since January 1, 1970', now);
8
9 // Initialize an ee.Date object.
10 var eeNow = ee.Date(now);
11 print('Now:', eeNow);

```

Inspector Console Tasks

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

Date:	JSON
▶ Date (2015-12-31 00:00:00)	JSON
Milliseconds since January 1, 1970	JSON
1657653540108	
Now:	JSON
▶ Date (2022-07-12 19:19:00)	JSON



Data Catalog

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

Earth Engine Data Catalog

Search Language

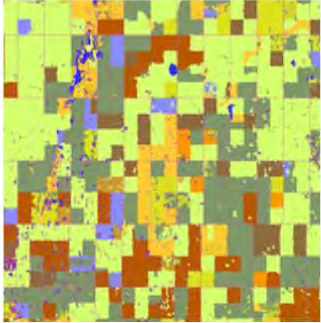

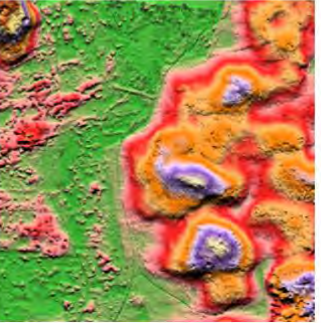
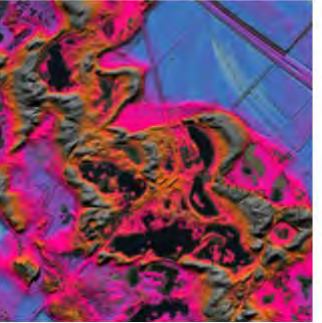

Home View all datasets Browse by tags Landsat MODIS Sentinel API Docs

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](#).

Filter list of datasets

Canada AAFC Annual Crop Inventory	Allen Coral Atlas (ACA) - Geomorphic Zonation and Benthic Habitat - v1.0	AHN Netherlands 0.5m DEM, Interpolated	AHN Netherlands 0.5m DEM, Non-Interpolated	AHN Netherlands 0.5m DEM, Raw Samples
				
Starting in 2009, the Earth Observation Team of the Science and Technology Branch (STB) at Agriculture and Agri-Food Canada (AAFC) began the process of generating annual crop type digital maps. Focusing on the Prairie Provinces	The Allen Coral Atlas dataset maps the geomorphic zonation and benthic habitat for the world's shallow coral reefs at 5m pixel resolution. The underlying satellite image data are temporal composites of PlanetScope	The AHN DEM is a 0.5m DEM covering the Netherlands. It was generated from LIDAR data taken in the spring between 2007 and 2012. It contains ground level samples with all other items above ground (such as buildings, bridges, trees	The AHN DEM is a 0.5m DEM covering the Netherlands. It was generated from LIDAR data taken in the spring between 2007 and 2012. It contains ground level samples with all other items above ground (such as buildings, bridges, trees	The AHN DEM is a 0.5m DEM covering the Netherlands. It was generated from LIDAR data taken in the spring between 2007 and 2012. This version contains both ground level samples and items above ground level (such as buildings,

Images

https://developers.google.com/earth-engine/datasets/catalog/CGIAR_SRTM90_V4?hl=en

<https://code.earthengine.google.com/31f672aec5b2a3f8bc7d1fbf23450935>

```
// Instantiate an image with the Image constructor.
```

```
var image = ee.Image('CGIAR/SRTM90_V4');
```

```
// Zoom to a location.
```

```
Map.setCenter(37.02540746271644,56.766160331658845, 12);
```

```
Map.addLayer(image);
```

```
//Map.addLayer(image, {min: 50, max: 180});
```

```
//Map.addLayer(image, {min: 50, max: 180, palette: ['blue', 'green', 'red']}, 'custom palette');
```

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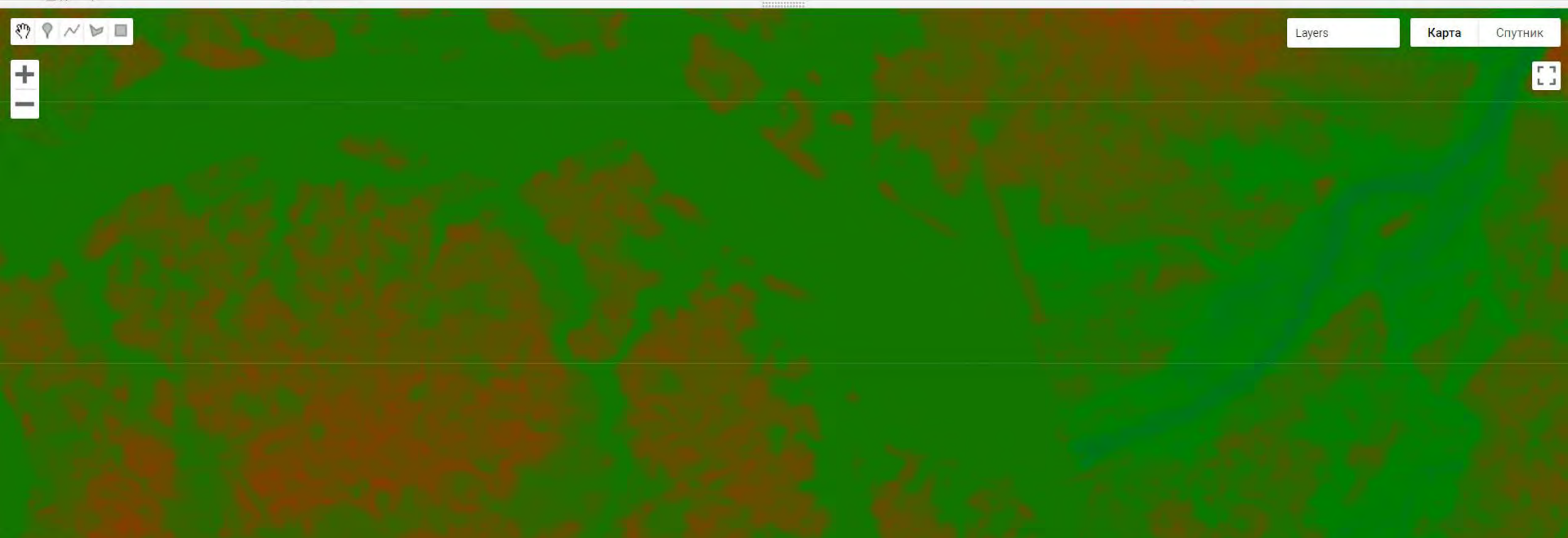
lip/image * Get Link Save Run Reset Apps Settings

```

1 // Instantiate an image with the Image constructor.
2 var image = ee.Image('CGIAR/SRTM90_V4');
3
4 // Zoom to a location.
5 Map.setCenter(37.02540746271644,56.766160331658845, 12);
6
7 //Map.addLayer(image);
8 //Map.addLayer(image, {min: 50, max: 180});
9 Map.addLayer(image, {min: 50, max: 180, palette: ['blue', 'green', 'red']}, 'custom palette');
```

Inspector Console Tasks

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



Images computation

<https://code.earthengine.google.com/a4b27505dfd223c7f5878e97ca42d06b>

<https://developers.google.com/earth-engine/apidocs/ee-terrain-slope>

```
// Instantiate an image with the Image constructor.  
var image = ee.Image('CGIAR/SRTM90_V4');  
  
// Apply an algorithm to an image.  
var slope = ee.Terrain.slope(image);  
  
// Zoom to a location.  
Map.setCenter(37.02540746271644, 56.766160331658845, 12);  
  
Map.addLayer(slope, {min: 0, max :5}, 'slope');
```

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 - ndvi_calculation
 - razm?

```

image comp *
1 // Instantiate an image with the Image constructor.
2 var image = ee.Image('CGIAR/SRTM90_V4');
3
4 // Apply an algorithm to an image.
5 var slope = ee.Terrain.slope(image);
6
7 // Zoom to a location.
8 Map.setCenter(37.02540746271644,56.766160331658845, 12);
9
10 Map.addLayer(slope, {min: 0, max :5}, 'slope');|

```

Inspector Console Tasks

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

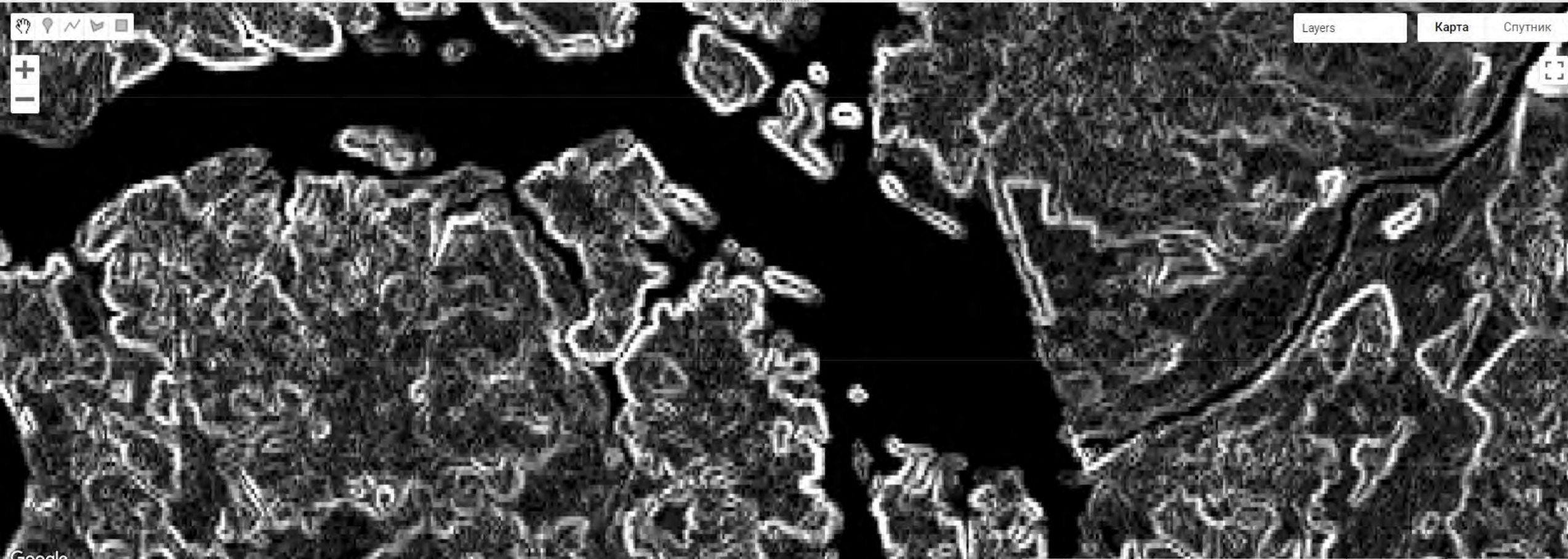


Image statistics

<https://code.earthengine.google.com/37d0c570ad54bf3d0232386d868be168>

```
// Instantiate an image with the Image constructor.
var image = ee.Image('CGIAR/SRTM90_V4');

// Zoom to a location.
Map.setCenter(37.02540746271644,56.766160331658845, 12);
var p1 = ee.Geometry.Point(37.02540746271644,56.766160331658845);
var p2 = ee.Geometry.Point(37.03502049982581,56.770864050772836);

var mean = image.reduceRegion({
  reducer: ee.Reducer.mean(),
  geometry: p1,
  scale: 90
});

print(mean);

var mean = image.reduceRegion({
  reducer: ee.Reducer.mean(),
  geometry: p2,
  scale: 90
});

print(mean);

Map.addLayer(image, {min: 50, max: 180, palette: ['blue', 'green', 'red']}, 'custom palette');
Map.addLayer(p1);
Map.addLayer(p2);
```


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- ndvi calculation

image statistics *

Get Link

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Apps



Inspector

Console

Tasks

```
1 // Instantiate an image with the Image constructor.
2 var image = ee.Image('CGIAR/SRTM90_V4');
3
4 // Zoom to a location.
5 Map.setCenter(37.02540746271644, 56.766160331658845, 12);
6 var p1 = ee.Geometry.Point(37.02540746271644, 56.766160331658845);
7 var p2 = ee.Geometry.Point(37.03502049982581, 56.770864050772836);
8
9 var mean = image.reduceRegion({
10   reducer: ee.Reducer.mean(),
11   geometry: p1,
12   scale: 30
13 });
14
```

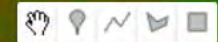
Use print(...) to write to this console.

Object (1 property)
elevation: 134

JSON

Object (1 property)
elevation: 120

JSON



Layers

Карта

Спутник



Image Collections

https://developers.google.com/earth-engine/datasets/catalog/LANDSAT_LC08_C02_T1_TOA

<https://code.earthengine.google.com/92fc966d883b11f9850b36504e6ea5eb>

```
var point = ee.Geometry.Point(37.02540746271644,56.766160331658845);  
var l8 = ee.ImageCollection('LANDSAT/LC08/C02/T1_TOA');
```

```
var spatialFiltered = l8.filterBounds(point);  
print('spatialFiltered', spatialFiltered);
```

```
var temporalFiltered = spatialFiltered.filterDate('2022-06-01', '2022-07-17');  
print('temporalFiltered', temporalFiltered);
```

```
// This will sort from least to most cloudy.  
var sorted = temporalFiltered.sort('CLOUD_COVER');
```

```
// Get the first (least cloudy) image.  
var scene = sorted.first();
```

```
Map.setCenter(37.02540746271644,56.766160331658845, 12);  
var visParams = {bands: ['B4', 'B3', 'B2'], max: 0.3};  
Map.addLayer(scene, visParams, 'true-color composite less clouds');  
Map.addLayer(temporalFiltered, visParams, 'true-color composite');
```

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```

collections
  1 var point = ee.Geometry.Point(37.02540746271644, 56.766160331658845);
  2 var l8 = ee.ImageCollection('LANDSAT/LC08/C02/T1_TOA');
  3
  4 var spatialFiltered = l8.filterBounds(point);
  5 print('spatialFiltered', spatialFiltered);
  6
  7 var temporalFiltered = spatialFiltered.filterDate('2022-06-01', '2022-07-17');
  8 print('temporalFiltered', temporalFiltered);
  9
 10 // This will sort from least to most cloudy.
 11 var sorted = temporalFiltered.sort('CLOUD_COVER');
 12
 13 // Get the first (least cloudy) image.
 14 var scene = sorted.first();
 15
 16 Map.setCenter(37.02540746271644, 56.766160331658845, 12);
 17 var visParams = {bands: ['R4', 'R3', 'R2'], max: 0.3};

```

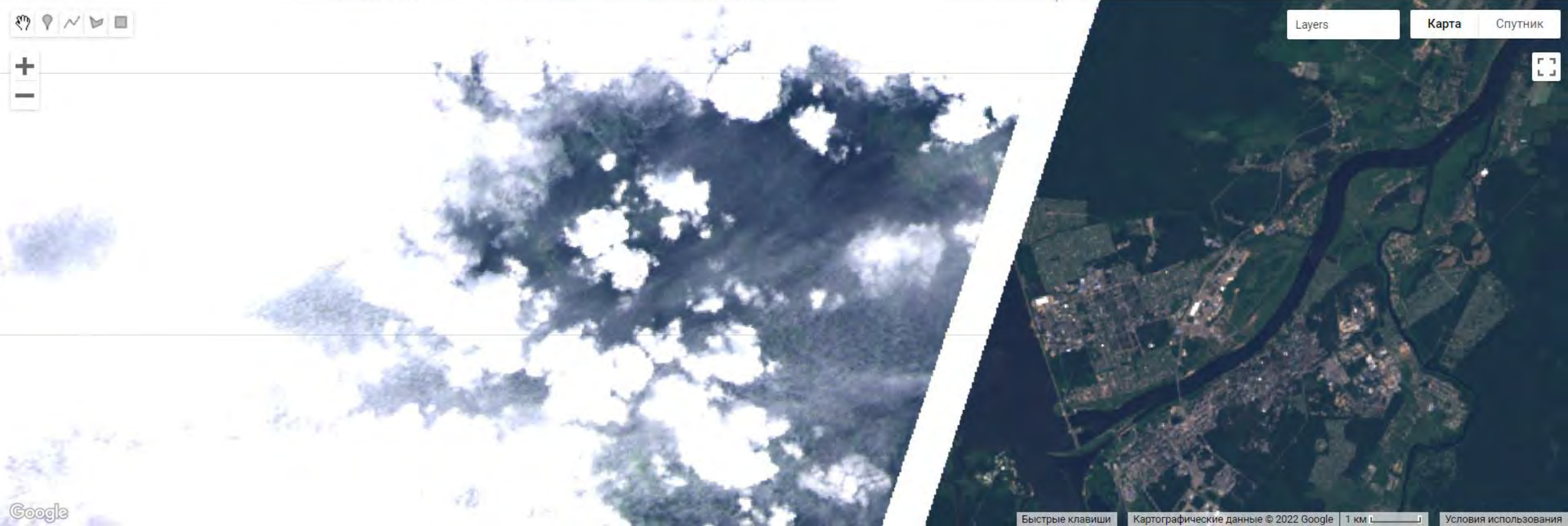
Inspector Console Tasks

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

```

spatialFiltered
  ImageCollection LANDSAT/LC08/C02/T1_TOA (464 elements, 17 band... JSON
temporalFiltered
  ImageCollection LANDSAT/LC08/C02/T1_TOA (5 elements, 17 bands) JSON

```



Median image

<https://code.earthengine.google.com/e06d18ab4bda8ae5c6500407d8bd97d5>

```
var l8 = ee.ImageCollection('LANDSAT/LC08/C02/T1_TOA').filterDate('2022-06-01', '2022-07-17');
```

```
Map.addLayer(l8, {bands: ['B4', 'B3', 'B2'], max: 0.3}, 'l8 collection');
```

```
// Get the median over time, in each band, in each pixel.
```

```
var median = l8.median();
```

```
Map.addLayer(median, {bands: ['B4', 'B3', 'B2'], max: 0.3}, 'l8 median');
```

```
Map.setCenter(37.02540746271644, 56.766160331658845, 12);
```

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collection composite *

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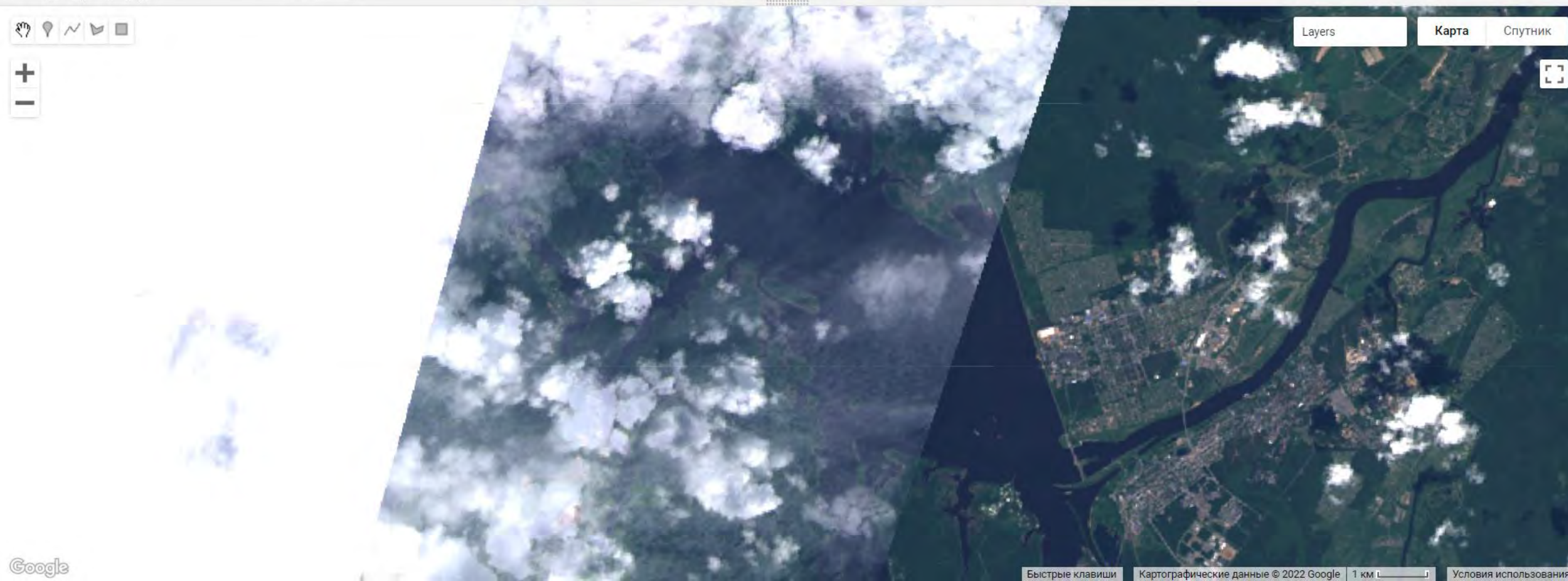
```

1 var l8 = ee.ImageCollection('LANDSAT/LC08/C02/T1_TOA').filterDate('2022-06-01', '2022-07-17');
2
3 Map.addLayer(l8, {bands: ['B4', 'B3', 'B2'], max: 0.3}, 'l8 collection');
4
5 // Get the median over time, in each band, in each pixel.
6 var median = l8.median();
7 Map.addLayer(median, {bands: ['B4', 'B3', 'B2'], max: 0.3}, 'l8 median');
8 Map.setCenter(37.02540746271644, 56.766160331658845, 12);
9

```

Inspector Console Tasks

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



Masking

<https://developers.google.com/earth-engine/apidocs/ee-image-updatemask>

https://developers.google.com/earth-engine/datasets/catalog/UMD_hansen_global_forest_change_2021_v1_9?hl=en

<https://code.earthengine.google.com/976753b4bfb128c1cc8293ac60fe1b3f>

```
var l8 = ee.ImageCollection('LANDSAT/LC08/C02/T1_TOA').filterDate('2022-06-01', '2022-07-17');
```

```
// Get the median over time, in each band, in each pixel.
```

```
var median = l8.median();
```

```
Map.addLayer(median, {bands: ['B4', 'B3', 'B2'], max: 0.3}, 'l8 median');
```

```
Map.setCenter(37.02540746271644, 56.766160331658845, 12);
```

```
// Load or import the Hansen et al. forest change dataset.
```

```
var hansenImage = ee.Image('UMD/hansen/global_forest_change_2021_v1_9');
```

```
// Select the land/water mask.
```

```
var datamask = hansenImage.select('datamask');
```

```
// Create a binary mask.
```

```
var mask = datamask.eq(1);
```

```
// Update the composite mask with the water mask.
```

```
var maskedComposite = median.updateMask(mask);
```

```
Map.addLayer(maskedComposite, {bands: ['B4', 'B3', 'B2'], max: 0.3}, 'masked');
```

Scripts Docs Assets

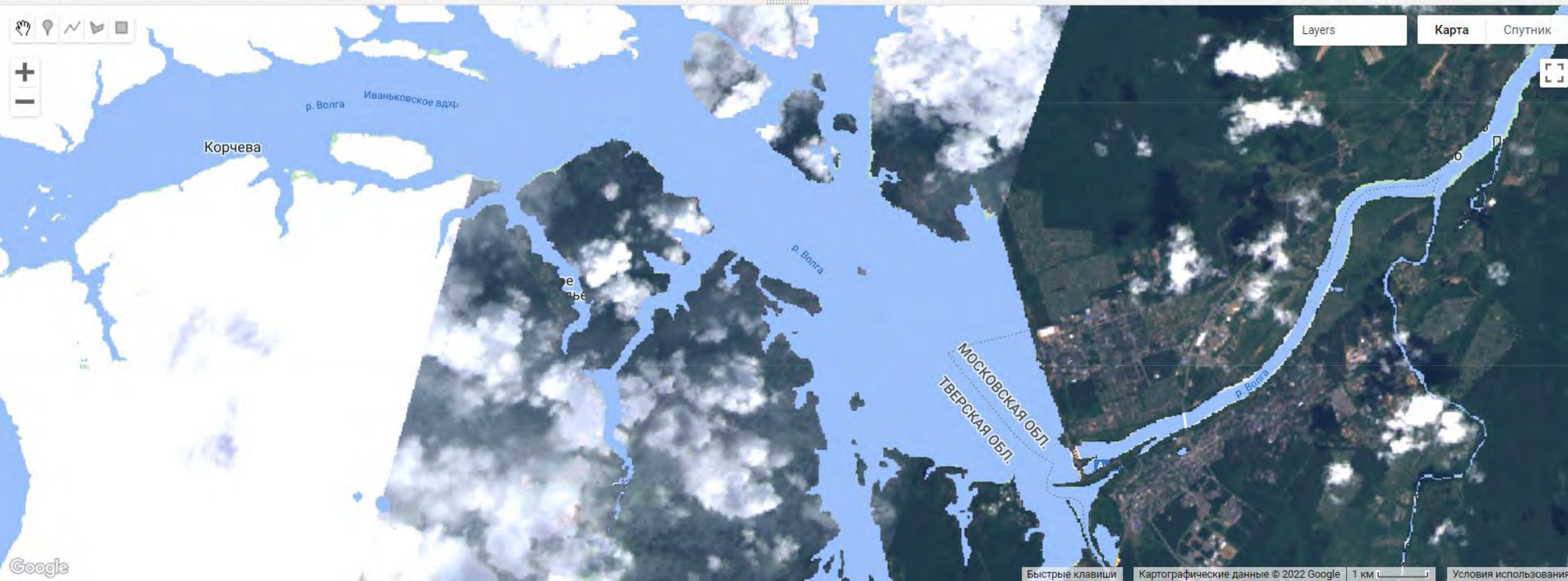
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 - Ivanovo
 - Poland

```

collection mask *
6 Map.setCenter(37.02540746271644,56.766160331658845, 12);
7
8 // Load or import the Hansen et al. forest change dataset.
9 var hansenImage = ee.Image('UMD/hansen/global_forest_change_2021_v1_9');
10
11 // Select the land/water mask.
12 var datamask = hansenImage.select('datamask');
13
14 // Create a binary mask.
15 var mask = datamask.eq(1);
16
17 // Update the composite mask with the water mask.
18 var maskedComposite = median.updateMask(mask);
19 Map.addLayer(maskedComposite, {bands: ['B4', 'B3', 'B2'], max: 0.3}, 'masked');
  
```

Inspector Console Tasks

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



Clouds

<https://code.earthengine.google.com/36ce292efce7e367f53aac53ed970fbf>

https://developers.google.com/earth-engine/datasets/catalog/LANDSAT_LC08_C02_T1_L2#description

```
var dataset = ee.ImageCollection('LANDSAT/LC08/C02/T1_L2')
  .filterDate('2022-05-01', '2022-07-17');

// Applies scaling factors.
function applyScaleFactors(image) {
  var opticalBands = image.select('SR_B.').multiply(0.0000275).add(-0.2);
  var thermalBands = image.select('ST_B.*').multiply(0.00341802).add(149.0);
  return image.addBands(opticalBands, null, true)
    .addBands(thermalBands, null, true);
}

dataset = dataset.map(applyScaleFactors);

var visualization = {
  bands: ['SR_B4', 'SR_B3', 'SR_B2'],
  min: 0.0,
  max: 0.3,
};

Map.setCenter(37.02540746271644, 56.766160331658845, 12);

Map.addLayer(dataset, visualization, 'clouds');
```

```
function maskL8sr(image) {
  // Bit 0 - Fill
  // Bit 1 - Dilated Cloud
  // Bit 2 - Cirrus
  // Bit 3 - Cloud
  // Bit 4 - Cloud Shadow
  var qaMask = image.select('QA_PIXEL').bitwiseAnd(parseInt('11111', 2)).eq(0);
  var saturationMask = image.select('QA_RADSAT').eq(0);

  // Apply the scaling factors to the appropriate bands.
  var opticalBands = image.select('SR_B.').multiply(0.0000275).add(-0.2);

  // Replace the original bands with the scaled ones and apply the masks.
  return image.addBands(opticalBands, null, true)
    .updateMask(qaMask)
    .updateMask(saturationMask);
}

// Map the function over one year of data.
var collection = ee.ImageCollection('LANDSAT/LC08/C02/T1_L2')
  .filterDate('2022-05-01', '2022-07-17')
  .map(maskL8sr);

var composite = collection.median();

// Display the results.
Map.addLayer(composite, {bands: ['SR_B4', 'SR_B3', 'SR_B2'], min: 0, max: 0.3}, 'no clouds');
```


Scripts Docs Assets

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```

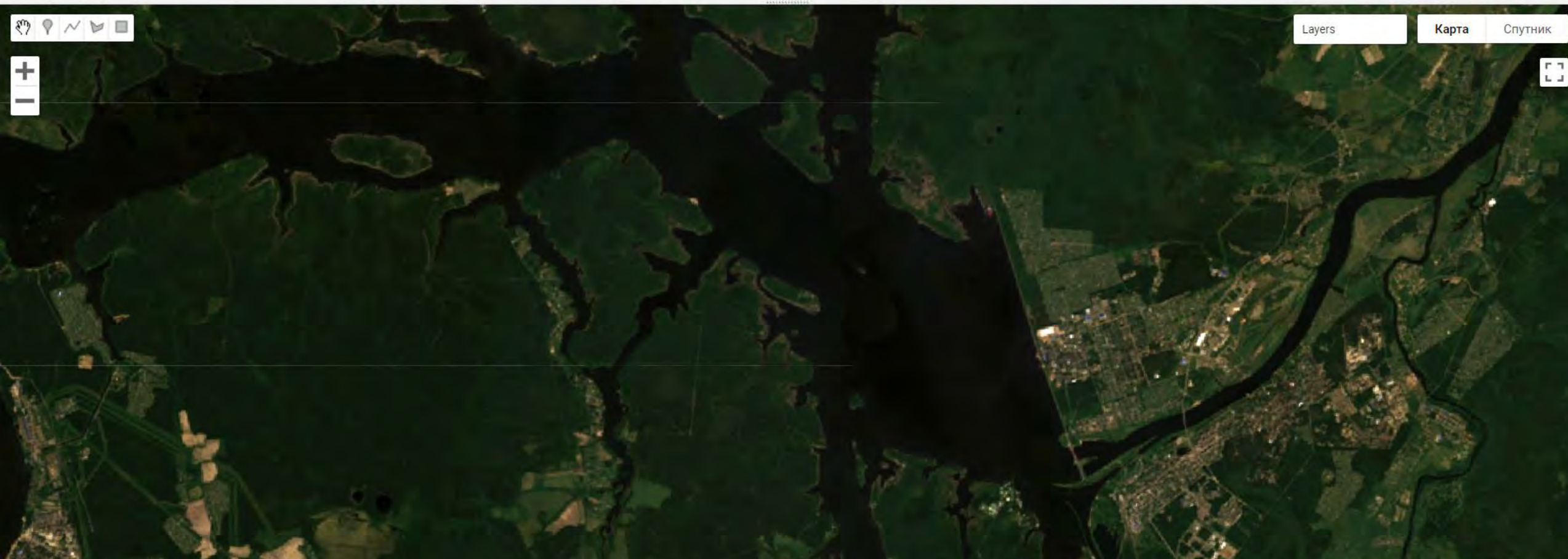
collection clouds *
Get Link Save Run Reset Apps

1 var dataset = ee.ImageCollection('LANDSAT/LC08/C02/T1_L2')
2   .filterDate('2022-05-01', '2022-07-17');
3
4
5 // Applies scaling factors.
6 function applyScaleFactors(image) {
7   var opticalBands = image.select('SR_B.').multiply(0.0000275).add(-0.2);
8   var thermalBands = image.select('ST_B.*').multiply(0.00341802).add(149.0);
9   return image.addBands(opticalBands, null, true)
10     .addBands(thermalBands, null, true);
11 }
12
13 dataset = dataset.map(applyScaleFactors);
14

```

Inspector Console Tasks

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



Map navigation controls: Hand, Location pin, Line, Polygon, Rectangle, Zoom in (+), Zoom out (-)

Layers Карта Спутник

NDVI

<https://code.earthengine.google.com/ec9e2f81b63ad006475b263f5f0cd661>

```
var point = ee.Geometry.Point(37.02540746271644,56.766160331658845);
var l8 = ee.ImageCollection('LANDSAT/LC08/C02/T1_TOA');

// Get the least cloudy image in 2015.
var image = ee.Image(
  l8.filterBounds(point)
    .filterDate('2022-06-01', '2022-07-17')
    .sort('CLOUD_COVER')
    .first()
);

// Compute the Normalized Difference Vegetation Index (NDVI).
var nir = image.select('B5');
var red = image.select('B4');
var ndvi = nir.subtract(red).divide(nir.add(red)).rename('NDVI');

// Display the result.
Map.setCenter(37.02540746271644,56.766160331658845, 12);
var ndviParams = {min: -1, max: 1, palette: ['blue', 'white', 'green']};
Map.addLayer(ndvi, ndviParams, 'NDVI image');
```

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```

collection ndvi
4 // Get the least cloudy image in 2015.
5 var image = ee.Image(
6   18.filterBounds(point)
7     .filterDate('2022-06-01', '2022-07-17')
8     .sort('CLOUD_COVER')
9     .first()
10  );
11
12 // Compute the Normalized Difference Vegetation Index (NDVI).
13 var nir = image.select('B5');
14 var red = image.select('B4');
15 var ndvi = nir.subtract(red).divide(nir.add(red)).rename('NDVI');
16

```

Inspector Console Tasks

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



Charts

<https://code.earthengine.google.com/ec976be7da2129036839e1cf2f21cbbb>

```
//var cloud_perc = 60;//Max cloud percentile per scene.

// Import the Landsat 8 TOA image collection.
var l8 = ee.ImageCollection('LANDSAT/LC08/C01/T1_TOA')
  .filterDate('2021-03-01', '2021-12-01');
//   .filter(ee.Filter.lt('CLOUD_COVER', cloud_perc));

// Map a function over the Landsat 8 TOA collection to add an NDVI band.
var withNDVI = l8.map(function(image) {
  var ndvi = image.normalizedDifference(['B5', 'B4']).rename('NDVI');
  return image.addBands(ndvi);
});

var roi = ee.Geometry.Rectangle(37.01900746271644,56.76360331658845,37.0340746271644,56.76860331658845);
Map.setCenter(37.02540746271644,56.766160331658845, 12);
Map.addLayer(roi, {color: 'blue'}, 'clouds');

// Create a chart.
var chart = ui.Chart.image.series({
  imageCollection: withNDVI.select('NDVI'),
  region: roi,
  reducer: ee.Reducer.median(),
  scale: 30
}).setOptions({title: 'NDVI over time'});

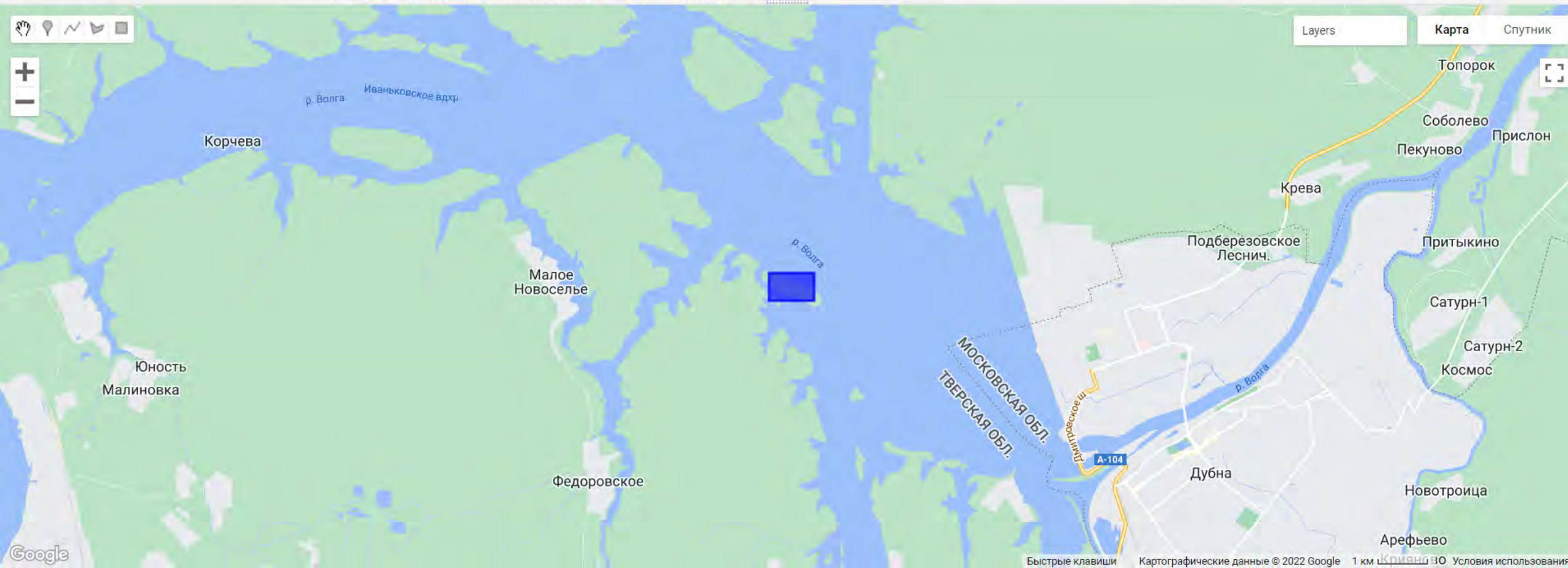
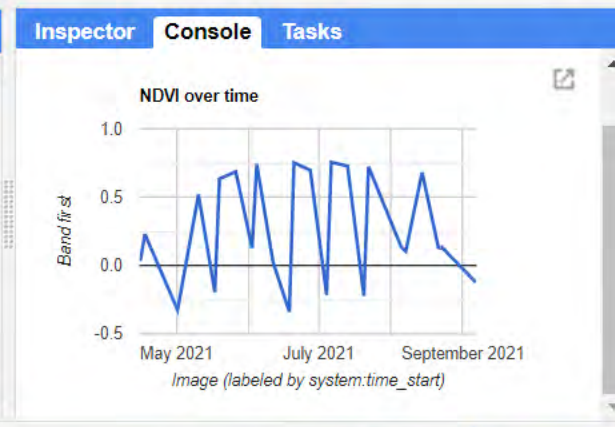
// Display the chart in the console.
print(chart);
```

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- Manual Legend
- Mobile Friendly UI
- Mosaic Editor
- Ocean Timeseries Investigator
- Population Explorer
- Split Panel
- Two Chart Inspector
- Zoom Box
- Datasets
- Demos

```

lip/Charting
1 //var cloud_perc = 60;//Max cloud percentile per scene.
2
3 // Import the Landsat 8 TOA image collection.
4 var l8 = ee.ImageCollection('LANDSAT/LC08/C01/T1_TOA')
5   .filterDate('2021-03-01', '2021-10-01');
6   //   .filter(ee.Filter.lt('CLOUD_COVER', cloud_perc));
7
8 // Map a function over the Landsat 8 TOA collection to add an NDVI band.
9 var withNDVI = l8.map(function(image) {
10   var ndvi = image.normalizedDifference(['B5', 'B4']).rename('NDVI');
11   return image.addBands(ndvi);
12 });
13
14 var roi = ee.Geometry.Rectangle(37.01900746271644, 56.76360331658845, 37.0340746271644, 56.76860331658845);
15

```



Burn Areas

<https://developers.google.com/earth-engine/datasets/catalog/FIRMS?hl=en>

<https://code.earthengine.google.com/e9c2c3dd7cfb47bb55111557da6102d0>

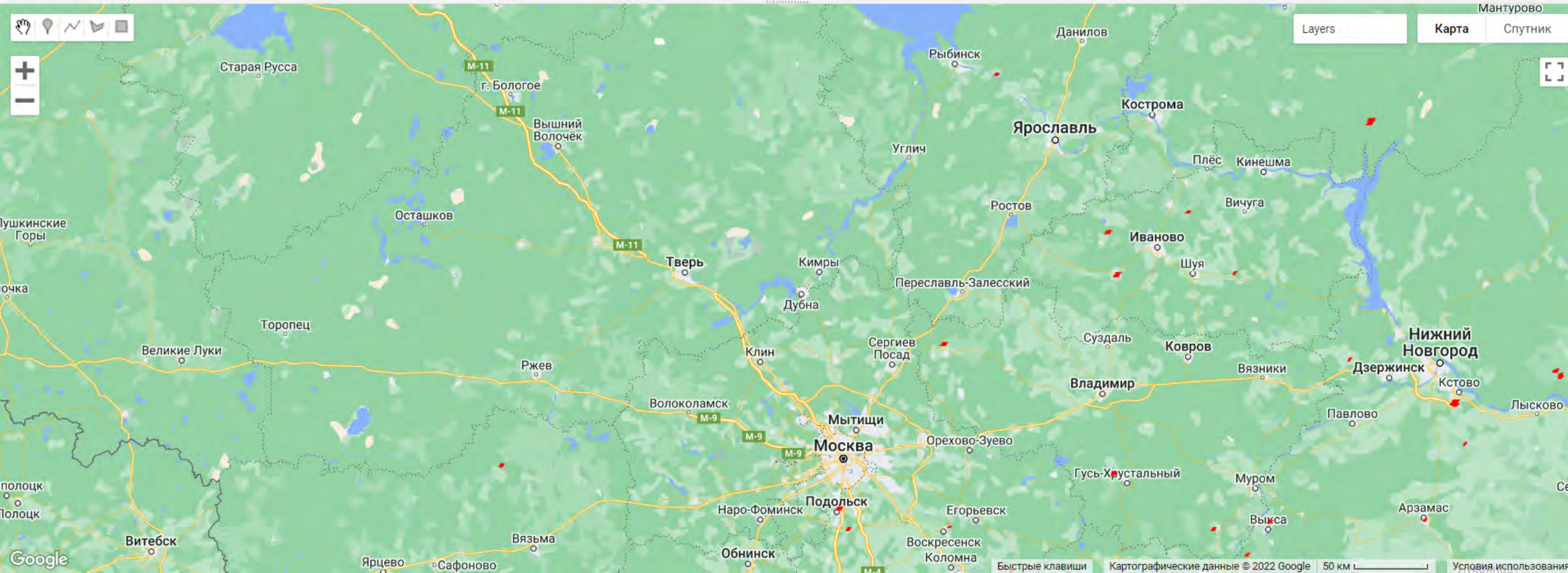
```
var dataset = ee.ImageCollection('FIRMS').filter(
  ee.Filter.date('2022-07-01', '2022-07-16'));
var fires = dataset.select('T21');
var firesVis = {
  min: 325.0,
  max: 400.0,
  palette: [
    'ff0000', 'fd4100', 'fb8200', 'f9c400', 'f2ff00', 'b6ff05',
    '7aff0a', '3eff0f', '02ff15', '00ff55', '00ff99', '00ffdd',
    '00ddff', '0098ff', '0052ff', '0210ff', '3a0dfb', '7209f6',
    'a905f1', 'e102ed', 'ff00cc', 'ff0089', 'ff0047', 'ff0004'
  ]
};
Map.setCenter(37.02540746271644, 56.766160331658845, 7);
Map.addLayer(fires, firesVis, 'Fires');
```

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 - Ivanovo
 - Poland
 - Sweden
 - TOA corrections

```
lip/fires *
3 var fires = dataset.select('T21');
4 var firesVis = {
5   min: 325.0,
6   max: 400.0,
7   palette: [
8     'ff0000', 'fd4100', 'fb8200', 'f9c400', 'f2ff00', 'b6ff05',
9     '7aff0a', '3eff0f', '02ff15', '00ff55', '00ff99', '00ffdd',
10    '00ddff', '0098ff', '0052ff', '0210ff', '3a0dfb', '7209f6',
11    'a905f1', 'e102ed', 'ff00cc', 'ff0089', 'ff0047', 'ff0004'
12  ]
13 };
14 Map.setCenter(37.02540746271644, 56.766160331658845, 7);
15 Map.addLayer(fires, firesVis, 'Fires');
16
```

Inspector Console Tasks

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



Timeseries

https://developers.google.com/earth-engine/datasets/catalog/Tsinghua_FROM-GLC_GAIA_v10?hl=en#description

<https://code.earthengine.google.com/cdd574d1d7466208b1eb5bff5fb7c02e>



Land use classification

<https://developers.google.com/earth-engine/apidocs/ee-classifier-libsvm>

<https://code.earthengine.google.com/1828d8cf8bd900884f4a9746ee214252>

The screenshot displays the Google Earth Engine web interface. At the top, the search bar contains "Search places and datasets...". The left sidebar shows a file tree with folders like "Scripts", "Docs", and "Assets", and a sub-tree under "lip" containing "experiment", "Charting", "basics", "changes", "classification", "collection clouds", and "collection mask". The main editor area shows a JavaScript script titled "lip/classification *". The script defines a function "prepSrL8" that processes Landsat 8 surface reflectance images, including steps for quality assessment and scaling factors. The script is as follows:

```
1 // Define a function that scales and masks Landsat 8 surface reflectance images.
2 function prepSrL8(image) {
3   // Develop masks for unwanted pixels (fill, cloud, cloud shadow).
4   var qaMask = image.select('QA_PIXEL').bitwiseAnd(parseInt('11111', 2)).eq(0);
5   var saturationMask = image.select('QA_RADSAT').eq(0);
6
7   // Apply the scaling factors to the appropriate bands.
8   var getFactorImg = function(factorNames) {
9     var factorList = image.toDictionary().select(factorNames).values();
```

The right sidebar contains the "Inspector", "Console", and "Tasks" panels. The "Console" panel shows the instruction "Use print(...) to write to this console." Below the script editor, a map visualization shows the results of the classification. The map uses a color scale where green represents forest, yellow/orange represents agricultural land, and blue represents water bodies. A large, complex water body is highlighted in blue, with several smaller tributaries and streams also shown in blue. The map includes standard navigation controls like zoom in (+) and zoom out (-) buttons, and a "Layers" panel. The bottom of the interface shows the Google logo, keyboard shortcuts, copyright information for 2022, and a scale bar indicating 2 km.

