



INTRODUCCIÓN A GOOGLE EARTH ENGINE

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<http://pafyc.uclm.es/>

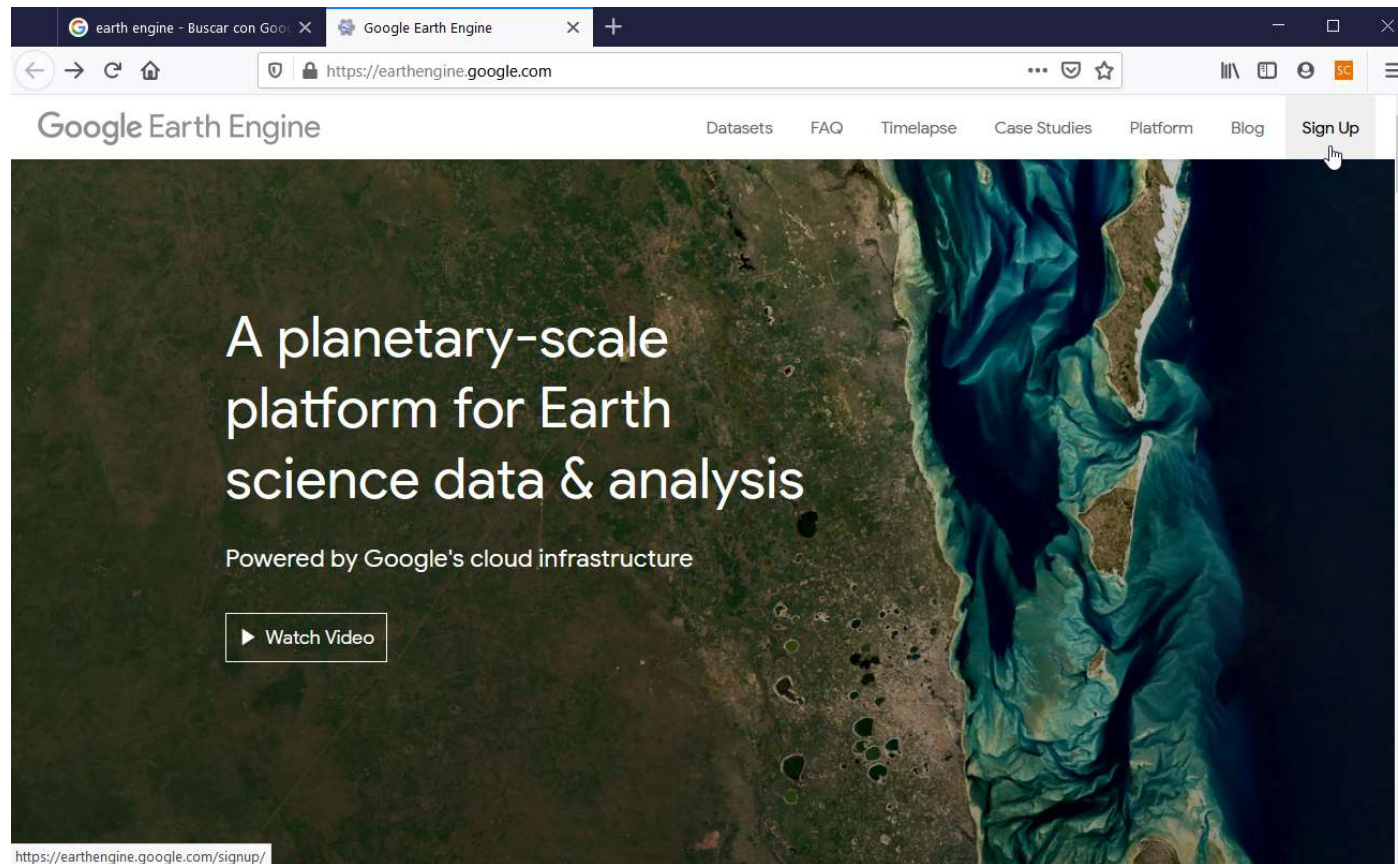
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INTRODUCCIÓN A GOOGLE EARTH ENGINE



1. Crear usuario de desarrollo accediendo inscribiéndose en la página, <https://earthengine.google.com/>
Para descargar los resultados de los scripts se puede indicar una carpeta de Google Drive, por lo que conviene crear el usuario empleando el propio usuario de Google



INTRODUCCIÓN A GOOGLE EARTH ENGINE



Tras acceder con la cuenta de Google se despliega un formulario y tras proceder se recibe un correo

SIGN UP

Sign up for Earth Engine

If you'd like to become an Earth Engine developer, please sign up by providing the following information. We can't accept all applications, so please fill out all fields as best you can so we can evaluate your request for access. If you are accepted, you will receive an email within one week.

To facilitate the evaluation process, we suggest that you sign up with an email associated with your organization. Tip: You don't need a Gmail account to create a Google Account. You can [use your non-Gmail email address to create one instead](#).

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1. Crear usuario de desarrollo accediendo inscribiéndose en la página, <https://earthengine.google.com/>

The image shows a screenshot of an email received from Google Earth Engine. The email header indicates it was sent on Monday, April 19, 2021, at 10:04, to the email address daherlo19700113@gmail.com. The email content includes a 'Welcome to Earth Engine!' message, a 'THANK YOU' banner, and a list of resources for developers. To the left of the email content is a browser window showing the Earth Engine website's welcome page, which also says 'THANK YOU' and 'Welcome to Earth Engine!'. The website page includes a 'KEEP EXPLORING' button and a 'LOG OUT' button.

Google Earth Engine <earthengine-noreply@google.com>
Lun 19/04/2021 10:04
Para: daherlo19700113@gmail.com

Welcome to Earth Engine!

Greetings, Earth Engine Developer, and welcome! You now have access to:

- The [Earth Engine Code Editor](#) - the primary Earth Engine development environment.
- The [Earth Engine Developer docs](#) - including our [development guides](#), [API reference](#), and [and tutorials](#).
- The [Earth Engine Explorer](#) - a graphical user interface. No programming skills needed.

Note that it may take a few days before this change is propagated through the system.

To get started with Earth Engine, we suggest you:

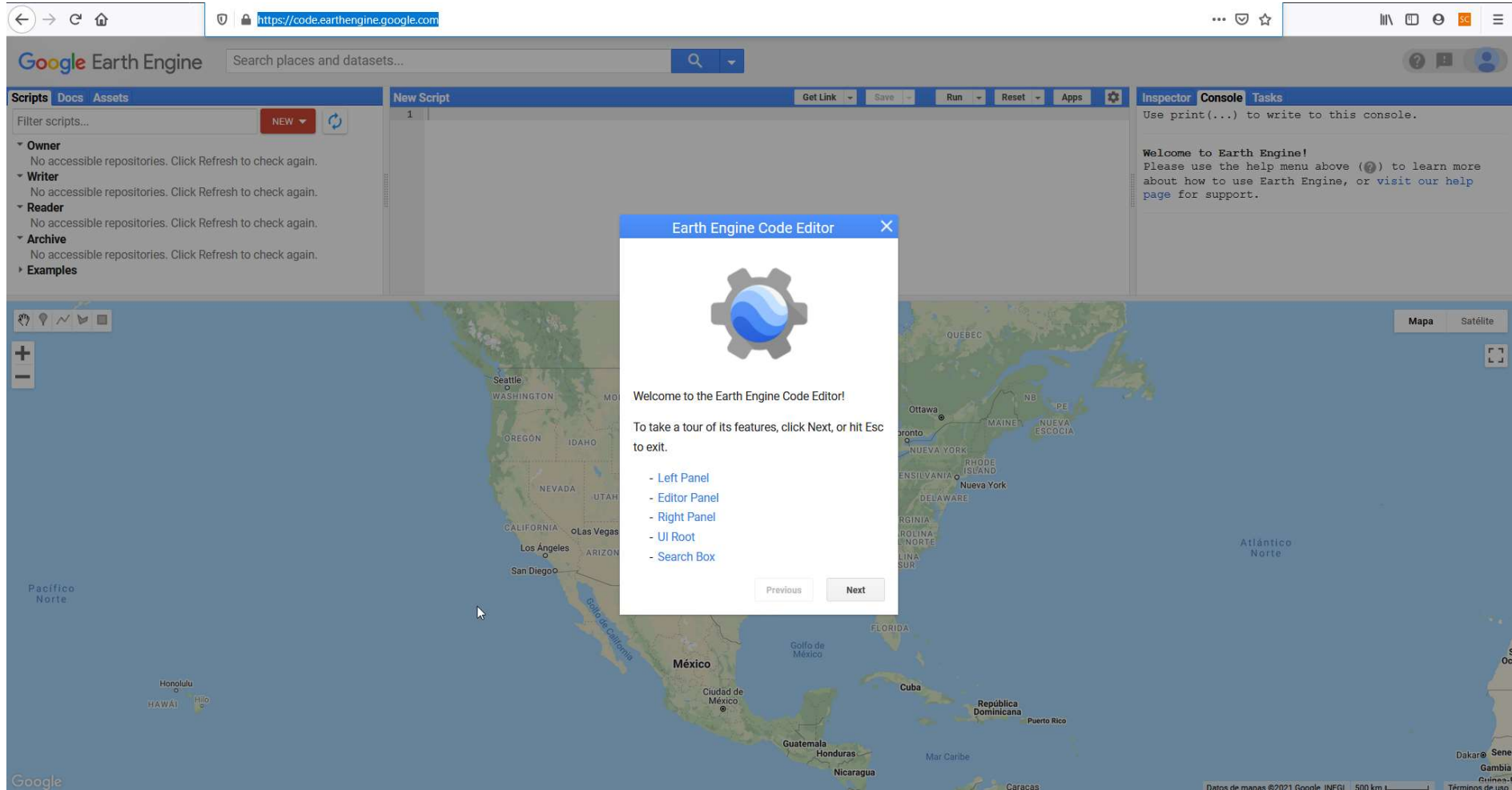
- Read our [Frequently Asked Questions](#).
- Check out our [Get Started](#) guide, [tutorials](#), and complete [documentation](#).
- Visit the Earth Engine [developers list](#).

It's great to have you on board. We look forward to seeing what you can do with Earth Engine!

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2. Al acceder al editor de código, <https://code.earthengine.google.com/>, se solicita usuario



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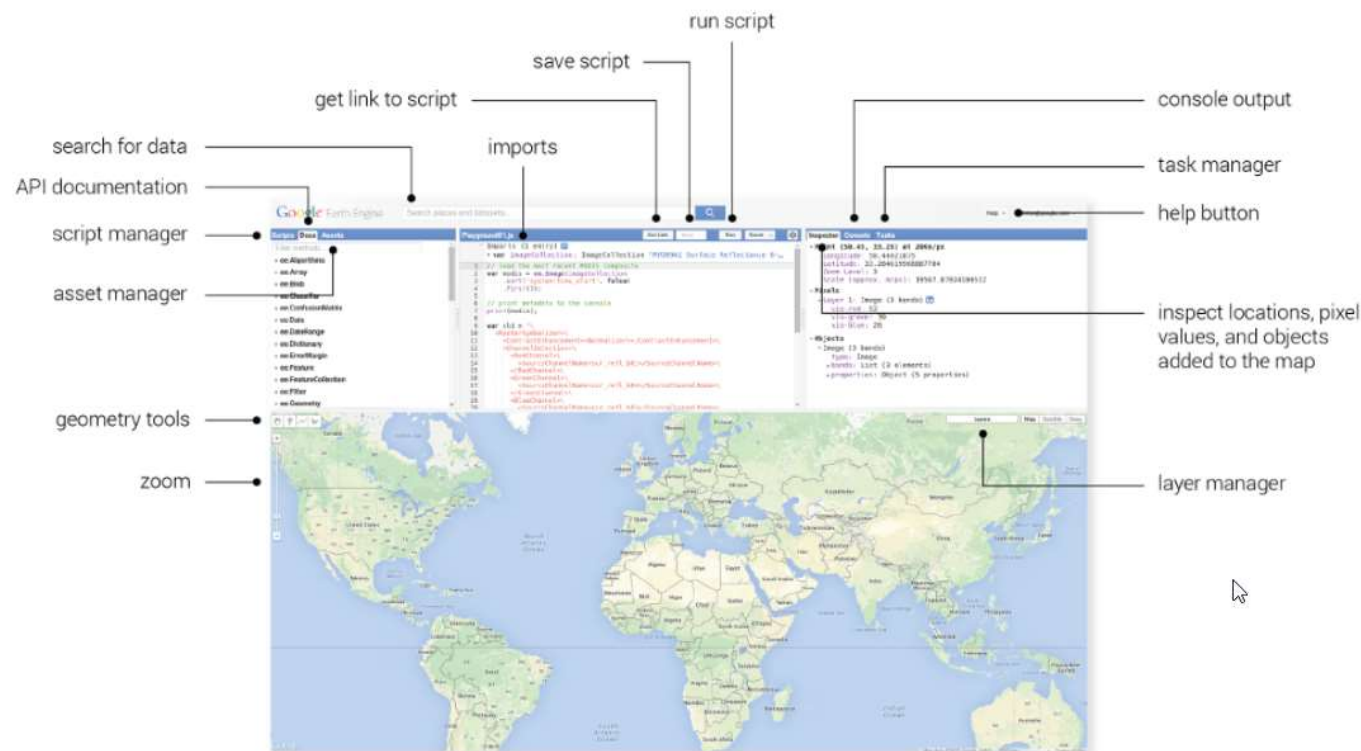
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Code Editor

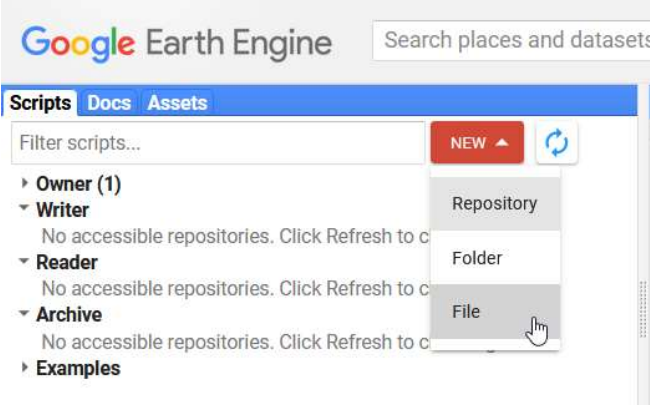
The Earth Engine Code Editor at code.earthengine.google.com is a web-based IDE for the Earth Engine JavaScript API. It requires log in with a Google Account that's been enabled for Earth Engine access. Code Editor features are designed to make developing complex geospatial workflows fast and easy. The Code Editor has the following elements (illustrated in the figure):



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2. Crear un fichero (solicita crear repositorio dentro, escribir/copiar código en un fichero, salvar y ejecutar)



Google Earth Engine Search places and datasets

Scripts Docs Assets

Filter scripts...

NEW

- Repository
- Folder
- File

Owner (1)

- Writer
- Reader
- Archive
- Examples

New repository

Git repositories created through this dialog can be shared with other users.

Changes pushed to this repository by other tools will be reflected in the Code Editor.

The repository names must be unique and cannot be changed later.

users/daherlo19700113/

CANCEL CREATE

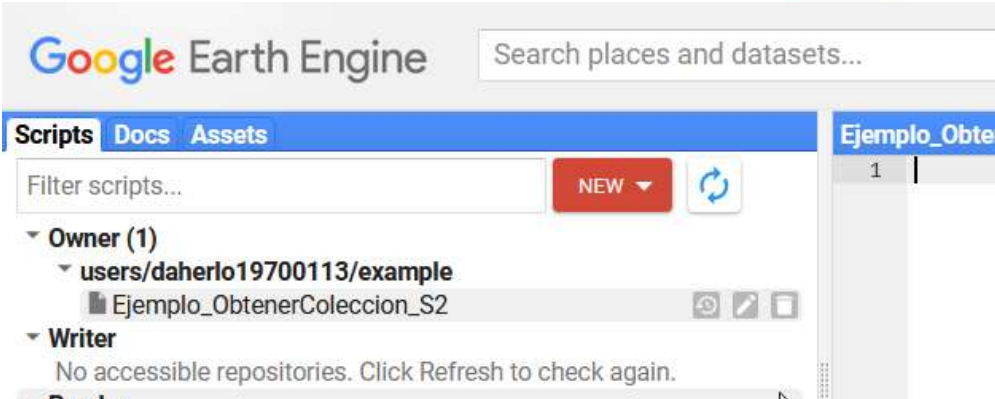
Create file

Enter a name or path for the file:

users/daherlo19700113/example

Enter description (optional):

CANCEL OK



Google Earth Engine Search places and datasets

Scripts Docs Assets

Filter scripts...

NEW

Owner (1)

- users/daherlo19700113/example
 - Ejemplo_ObtenerColeccion_S2
- Writer
- Reader

INTRODUCCIÓN A GOOGLE EARTH ENGINE



2. Crear un fichero (solicita crear repositorio dentro, escribir/copiar código en un fichero, salvar y ejecutar

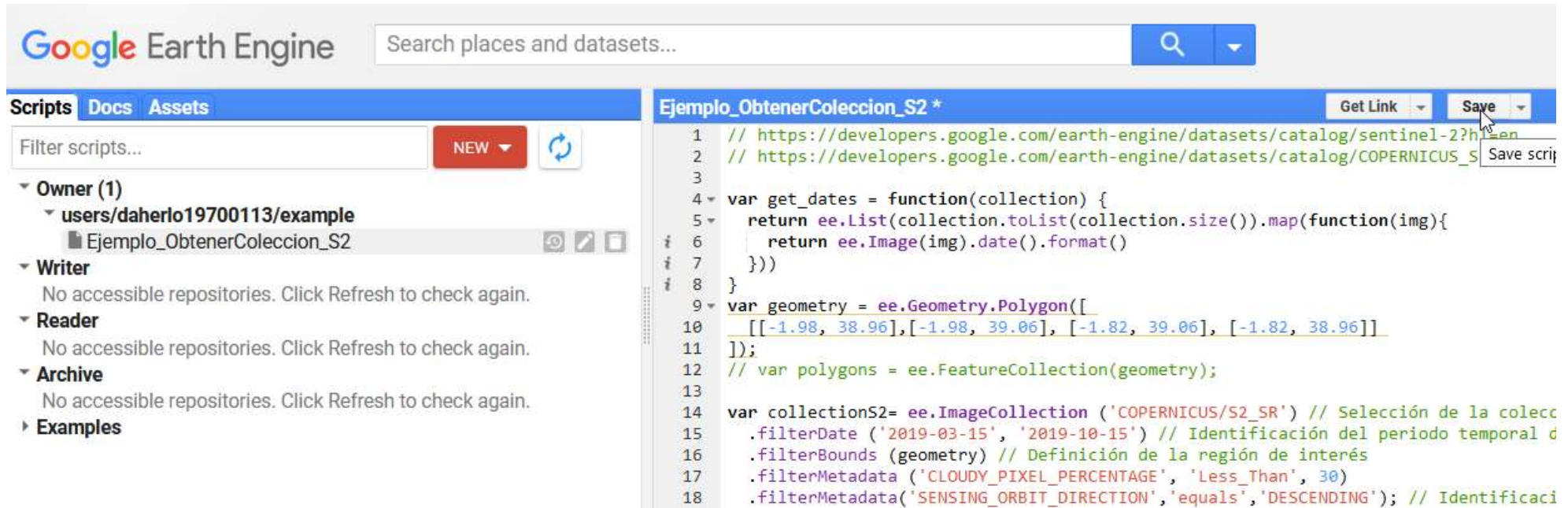
```
M:\EjemploGEE\agricola\Ejemplo_ObtenerColeccion_S2.js - Notepad++
Archivo  Editar  Buscar  Vista  Codificación  Lenguaje  Configuración  Herramientas  Macro  Ejecutar  Plugins  Ventana  ?
markers.xml  Markers.xml  new 9  parameters_pp_processing_tools.xml  parameters_pp_processing_tools.xml  metadata.py  utils.py  ds.py  image.py  calc_rad2refl.py  micasense_calibration.py

1  // https://developers.google.com/earth-engine/datasets/catalog/sentinel-2?hl=en
2  // https://developers.google.com/earth-engine/datasets/catalog/COPERNICUS_S2_SR#description
3
4  var get_dates = function(collection) {
5    return ee.List(collection.toList(collection.size()).map(function(img) {
6      return ee.Image(img).date().format()
7    })))
8  }
9
10 var geometry = ee.Geometry.Polygon([
11   [[-1.98, 38.96], [-1.98, 39.06], [-1.82, 39.06], [-1.82, 38.96]]
12 ]);
13 // var polygons = ee.FeatureCollection(geometry);
14
15 var collectionS2= ee.ImageCollection ('COPERNICUS/S2_SR') // Selección de la colección de la misión espacial
16   .filterDate ('2019-03-15', '2019-10-15') // Identificación del periodo temporal de análisis
17   .filterBounds (geometry) // Definición de la región de interés
18   .filterMetadata ('CLOUDY_PIXEL_PERCENTAGE', 'Less Than', 30)
19   .filterMetadata('SENSING_ORBIT_DIRECTION','equals','DESCENDING'); // Identificación de cobertura de nubes mínima
20
21 var dates = get_dates(collectionS2);
22 console.log(dates.getInfo());
23 print(collectionS2)
24 Export.table.toDrive({
25   collection: collectionS2,
26   description:'ColeccionS2',
27   folder: 'gee_giaa',
28   fileFormat: 'GeoJSON'
29 });
30 // editor online de json: https://jsoneditoronline.org
```


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2. Crear un fichero (solicita crear repositorio dentro, escribir/copiar código en un fichero, salvar y ejecutar)



The screenshot displays the Google Earth Engine web interface. The top navigation bar includes the Google Earth Engine logo, a search bar, and a dropdown menu. Below the navigation bar, there are tabs for 'Scripts', 'Docs', and 'Assets'. The 'Scripts' tab is active, showing a list of scripts on the left and a script editor on the right. The script editor is titled 'Ejemplo_ObtenerColeccion_S2 *'. The code in the editor is as follows:

```
1 // https://developers.google.com/earth-engine/datasets/catalog/sentinel-2?hl=en
2 // https://developers.google.com/earth-engine/datasets/catalog/COPERNICUS_S2
3
4 var get_dates = function(collection) {
5   return ee.List(collection.toList(collection.size()).map(function(img){
6     return ee.Image(img).date().format()
7   })))
8 }
9
10 var geometry = ee.Geometry.Polygon([
11   [[-1.98, 38.96], [-1.98, 39.06], [-1.82, 39.06], [-1.82, 38.96]]
12 ]);
13 // var polygons = ee.FeatureCollection(geometry);
14
15 var collectionS2= ee.ImageCollection ('COPERNICUS/S2_SR') // Selección de la colecc
16   .filterDate ('2019-03-15', '2019-10-15') // Identificación del periodo temporal d
17   .filterBounds (geometry) // Definición de la región de interés
18   .filterMetadata ('CLOUDY_PIXEL_PERCENTAGE', 'Less_Than', 30)
19   .filterMetadata('SENSING_ORBIT_DIRECTION','equals','DESCENDING'); // Identificaci
```

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2. Crear un fichero (solicita crear repositorio dentro, escribir/copiar código en un fichero, salvar y ejecutar)

The screenshot displays the Google Earth Engine web interface. On the left, the 'Scripts' panel shows a list of scripts under the user 'daherlo19700113/example', with 'Ejemplo_ObtenerColeccion_S2' selected. The main editor area shows the script 'Ejemplo_ObtenerColeccion_S2 *' with the following code:

```
1 // https://developers.google.com/earth-engine/datasets/catalog/sentinel-2?hl=en
2 // https://developers.google.com/earth-engine/datasets/catalog/COPERNICUS_S2_SR#descri
3
4 var get_dates = function(collection) {
5   return ee.List(collection.toList(collection.size()).map(function(img){
6     return ee.Image(img).date().format()
7   })))
8 }
9
10 var geometry = ee.Geometry.Polygon([
11   [[-1.98, 38.96], [-1.98, 39.06], [-1.82, 39.06], [-1.82, 38.96]]
12 ]);
13 // var polygons = ee.FeatureCollection(geometry);
14
15 var collectionS2= ee.ImageCollection ('COPERNICUS/S2_SR') // Selección de la colección de la misión espacial
16   .filterDate ('2019-03-15', '2019-10-15') // Identificación del periodo temporal de análisis
17   .filterBounds (geometry) // Definición de la región de interés
18   .filterMetadata ('CLOUDY_PIXEL_PERCENTAGE', 'Less_Than', 30)
19   .filterMetadata('SENSING_ORBIT_DIRECTION','equals','DESCENDING'); // Identificación de cobertura de nubes mínima
20
```

The interface includes a search bar at the top, a 'Run' button with a tooltip 'Run script (Ctrl+Enter)', and a 'Reset' button. The script is saved and linked to the user's profile.

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2. Crear un fichero (solicita crear repositorio dentro, escribir/copiar código en un fichero, salvar y ejecutar)

Inspector Console Tasks

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

► List (131 elements)

▼ ImageCollection COPERNICUS/S2_SR (131 elements)

```

type: ImageCollection
id: COPERNICUS/S2_SR
version: 1618781845525962
bands: []
► features: List (131 elements)
► properties: Object (20 properties)
    
```

gee_giaa - Google Drive

drive.google.com/drive/folders/1QtFILKU9eYsMEM_8dXd74seyZ31L27dy?hl=es

Drive

Buscar en Drive

Mi unidad > gee_giaa

Nuevo

- Mi unidad
- Unidades compartidas
- Compartido conmigo
- Reciente

Inspector Console Tasks

Refresh

CollectionS2

RUN

Task: Initiate table export

Task name (no spaces) *

CollectionS2

☒ Drive ☐ Cloud Storage ☐ EE Asset

Drive folder

gee_giaa

Filename *

CollectionS2

File format *

GEO_JSON

Run Cancel

drive.google.com/drive/folders/1QtFILKU9eYsMEM_8dXd74seyZ31L27dy?hl=es

Drive

Buscar en Drive

Mi unidad > gee_giaa

Nuevo

- Mi unidad
- Unidades compartidas

| Nombre | Propietario | Última modificaci... |
|----------------------|-------------|----------------------|
| CollectionS2.geojson | yo | 10:35 |



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3. Descarga y utilizar el resultado. Ejemplo fichero JSON que se puede editar con Notepad++, copiar su contenido y consultarlo a través de algún editor de JSON (<https://codebeautify.org/online-json-editor>)

The screenshot shows the Code Beautify online JSON editor interface. The main text area on the left contains a large JSON object. The tree view on the right shows the structure of the data, including a 'features' array with 131 elements. The tree view shows a hierarchy of objects, arrays, and coordinates. The editor has a 'Load Url' button, a 'Browse' button, and a 'Download' button. The JSON content is displayed in a text area on the left, and a tree view on the right shows the structure of the data, including a 'features' array with 131 elements. The tree view shows a hierarchy of objects, arrays, and coordinates.

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Ejecutar ejemplos de GEE

The screenshot displays the Google Earth Engine (GEE) web interface. The top navigation bar includes the GEE logo, a search bar, and user account options. The left sidebar shows a tree view of scripts, with 'Demos' expanded and 'Classification' selected. The main editor area shows a JavaScript script for land cover classification using hand-located points. The script defines three training points with 'landcover' and 'system:index' properties. The 'Inspector' panel on the right shows the output of the script, including a 'CART, explained' object and a 'Confusion Matrix'.

```

1 // This demonstration uses hand-located points to train a classifier.
2 // Each training point has a field called 'landcover' containing
3 // class labels at that location. The following block contains
4 // construction code for the points. Hover on the 'urban' variable
5 // and click, 'Convert' in the dialog.
6 var urban = /* color: #ff0000 */ ee.FeatureCollection(
7   [
8     ee.Feature(
9       ee.Geometry.Point([-122.40898132324219, 37.78247386188714]),
10      {
11        "landcover": 0,
12        "system:index": "0"
13      }
14     ),
15     ee.Feature(
16       ee.Geometry.Point([-122.40623474121094, 37.77107659627034]),
17      {
18        "landcover": 0,
19        "system:index": "1"
20      }
21     ),
22     ee.Feature(
23       ee.Geometry.Point([-122.39799499511719, 37.785187237567705]),
24      {
25        "landcover": 0,
26        "system:index": "2"
27      }
28     )
29   ]
30 );
  
```

The 'Inspector' panel shows the following output:

- CART, explained
- Object (5 properties)
- Confusion Matrix
- [[3,0,0],[0,8,0],[0,0,12]]

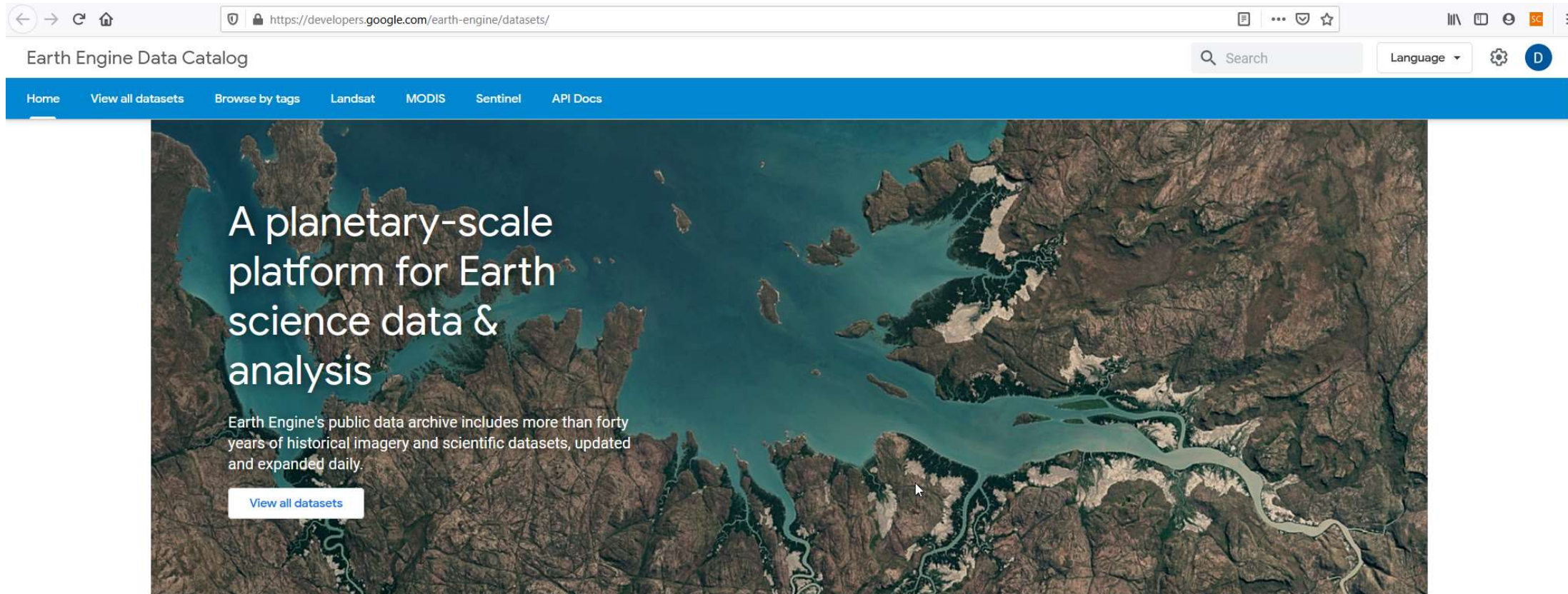
The bottom panel shows a map of the study area with a land cover classification overlay. The map is color-coded: red for urban areas, green for forest, and blue for water. The map includes a scale bar (10 km) and a 'Datos de mapas ©2021 Google' footer.

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Consultar fuentes de datos



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Consultar la documentación, cursos, ...