

Get started with the Google Earth Engine Python API

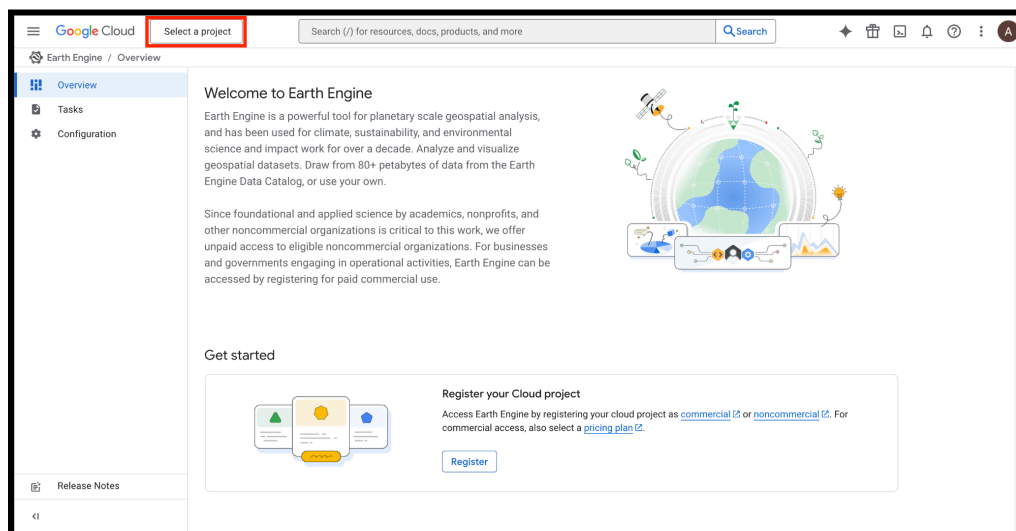
To start, make sure you are logged in to your Google account.

Step 1: Create a Google Cloud project

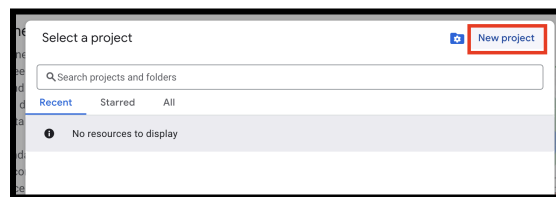
1. Visit <https://console.cloud.google.com/earth-engine>

If prompted, select your country and **agree** to the terms of service.

2. Click on “**Select a Project**”



3. Click on “**New project**”

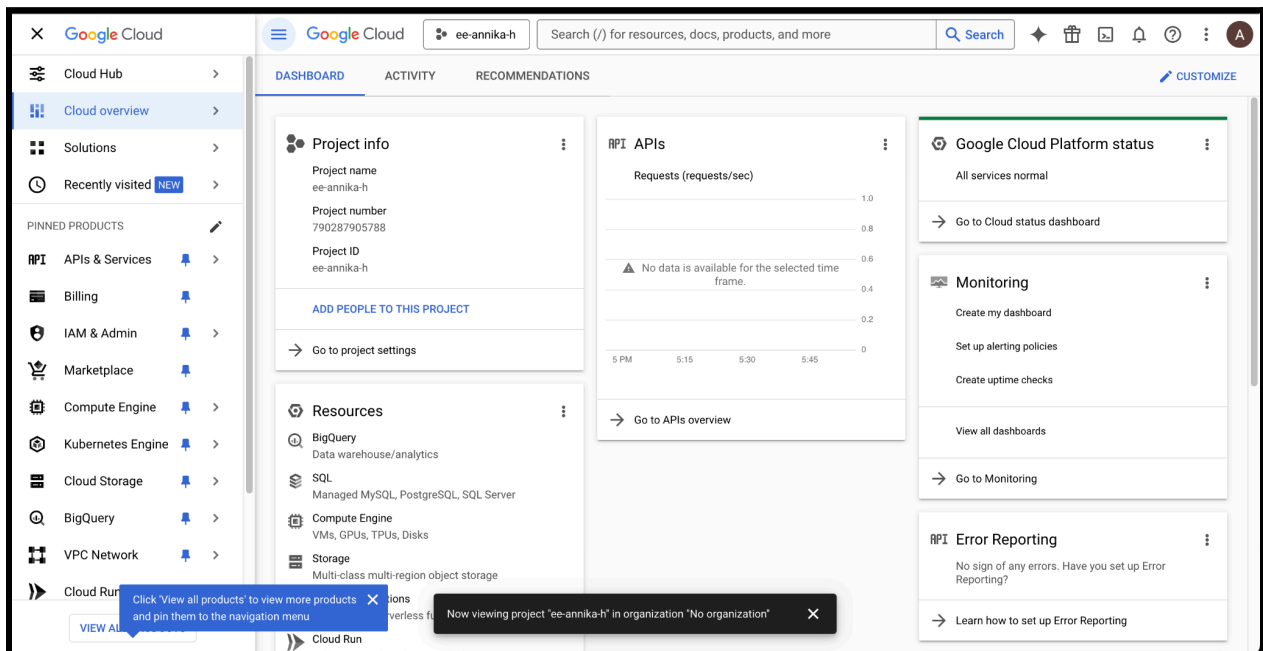
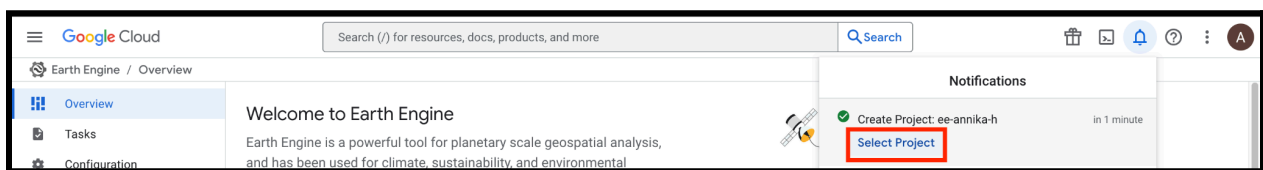


4. Enter a **project name** (this can be whatever you want), and select **"No organization"**. Note your ***project ID***, which may be slightly different from the project name. You'll need this later to authenticate.

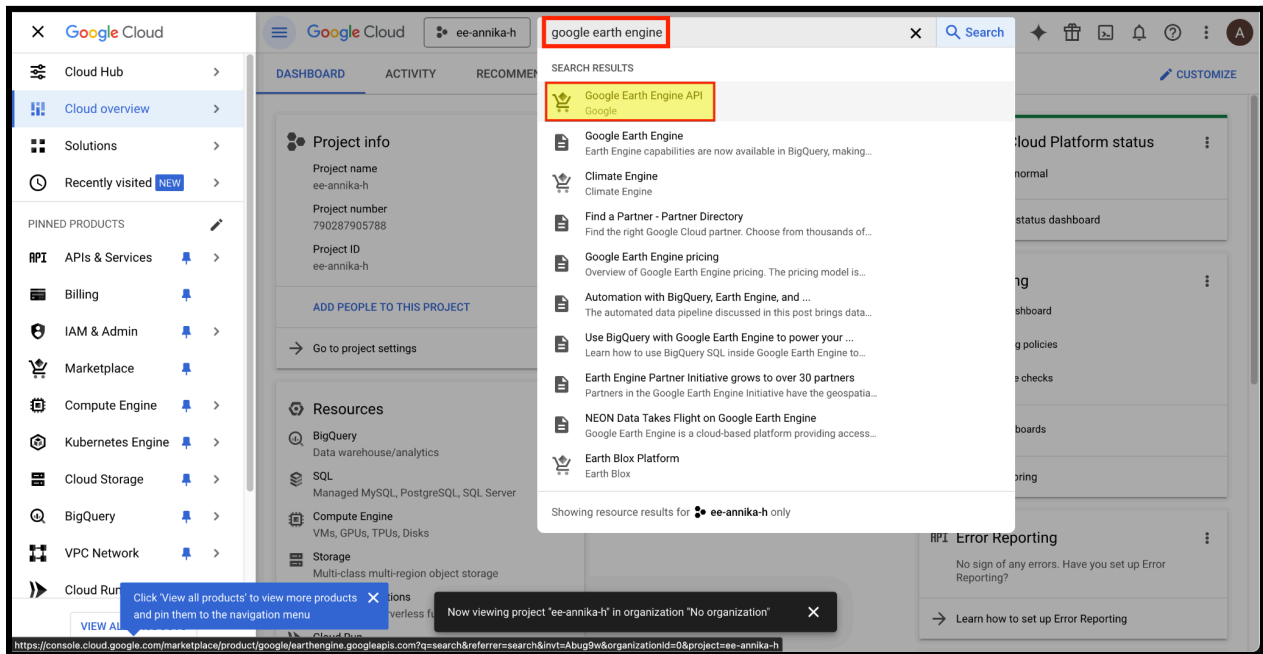
5. Click **"Create"**

Step 2: Enable Google Earth Engine API for your cloud project

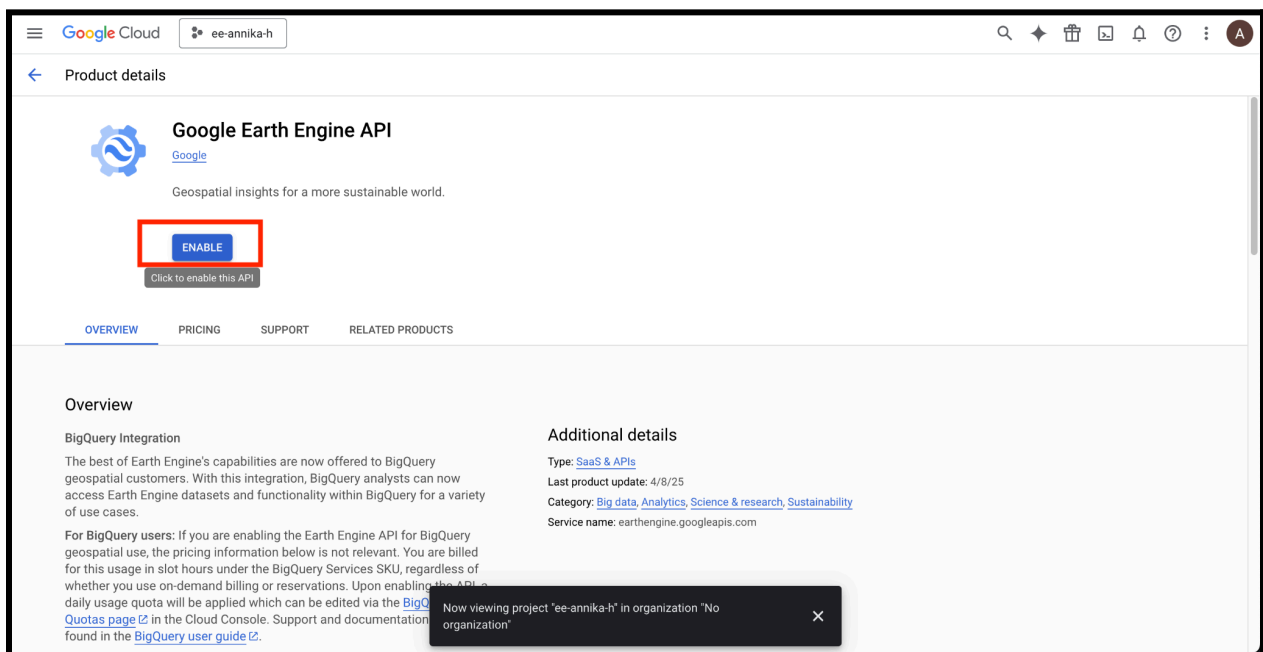
6. After creating your project, click on **“Select Project”** under Notifications. This will show the dashboard for the Google Cloud project you just created. This will take you to console.cloud.google.com/home/dashboard



7. In the search bar at the top of the screen, type in “google earth engine” and select “**Google Earth Engine API**” in the search results.



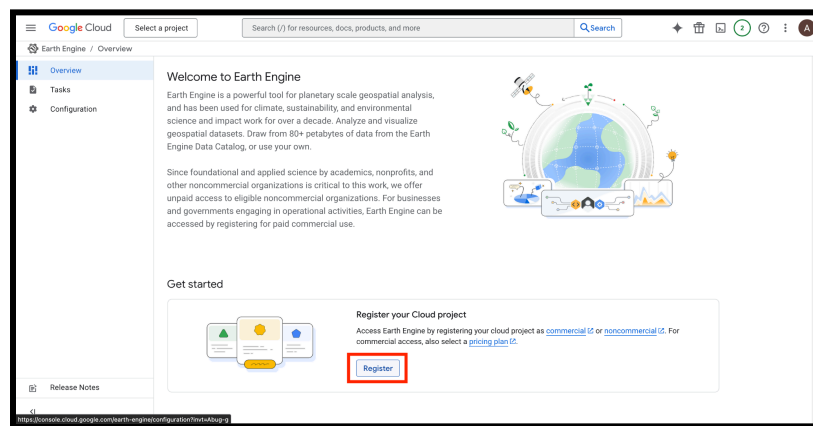
8. Click the “**Enable**” button.



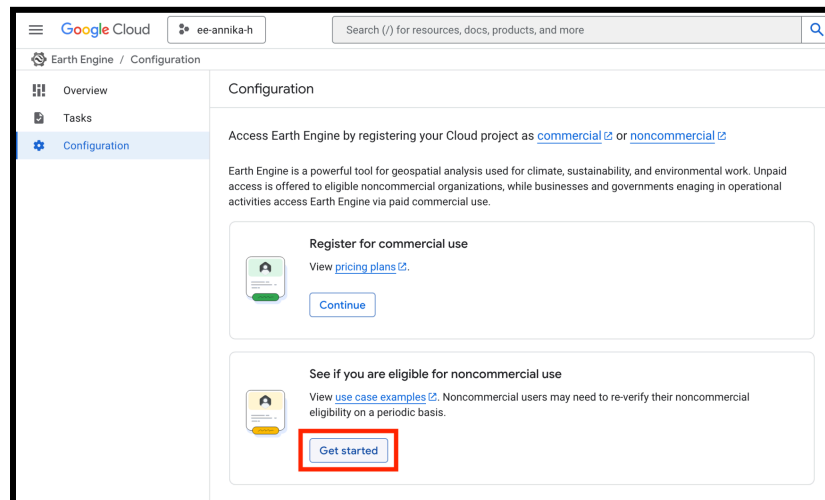
Step 3: Register your Google Cloud project as non-commercial

9. Return to <https://console.cloud.google.com/earth-engine>

10. Under “Register your Cloud project”, click the “**Register**” button.



11. Under “See if you are eligible for noncommercial use”, click “**Get started**”.



12. Under “1: Select your organization type”, choose “**Public or private academic institution**”

13. Click **Next**

The screenshot shows the Google Cloud Earth Engine registration interface. The browser address bar displays 'Google Cloud' and the user profile 'ee-annika-h'. The page title is 'Earth Engine / Configuration / Register'. A left sidebar contains links for 'Overview', 'Tasks', and 'Configuration' (which is highlighted). The main content area is titled 'Register' and shows a progress indicator with five steps: 1. Select your organization type, 2. Check noncommercial eligibility, 3. Choose your plan, 4. Describe your work, and 5. Review summary. Step 1 is the active step. It contains the question 'Which of the following best describes you or your organization? *' and a dropdown menu with the selected option 'Public or private academic institution (including faculty, staff, stud...'. A red rectangle highlights this dropdown menu. Below the dropdown is a 'Next' button. At the bottom of the step list, there are 'Register' and 'Cancel' buttons. The footer of the page includes 'Release Notes' and a '<1' indicator.

14. Under “2: Check noncommercial eligibility”, make the selections in the following screenshot. (If you are affiliated with the University of Dar es Salaam or another academic institution, you may list that instead of University of California Irvine.) Make the selections in the following screenshot.

2

Check noncommercial eligibility

What is the name of your academic institution? *

University of California Irvine

Will you receive any payment (including fee-for-service) from commercial entities, operational entities, or government organizations for applications or data created using Earth Engine? Note: This does not include research-only grants. *

☐ Yes

☒ No

How would you describe your use of Earth Engine? *

☒ Scientific research
e.g., advancing remote sensing methodologies

☐ Decision making
e.g., analysis that focuses on decision support

What is your research question? *

How have surface water resources changed over time?

What is the geographic scope of your study? *

☒ Global

☐ Regional

Have you previously published work on this topic that used Earth Engine? *

☐ Yes

☒ No

Check eligibility

15. Click the “**Check eligibility**” button

16. A grey box indicating that you are eligible for noncommercial use should show up. Click **Next**.

The screenshot shows the 'Register' page of the Earth Engine registration process. It includes several questions with radio button options. A grey information box at the bottom states: 'Based on your answers, you are eligible for noncommercial Earth Engine use.' The 'Next' button is highlighted with a red rectangle. A progress bar at the bottom shows three steps: '3 Choose your plan', '4 Describe your work', and '5 Review summary'.

← Register

include research-only grants.

☐ Yes
☒ No

How would you describe your use of Earth Engine? *

☒ Scientific research
e.g., advancing remote sensing methodologies

☐ Decision making
e.g., analysis that focuses on decision support

What is your research question? *

How have surface water resources changed over time?

What is the geographic scope of your study? *

☒ Global
☐ Regional

Have you previously published work on this topic that used Earth Engine? *

☐ Yes
☒ No

i Based on your answers, you are eligible for noncommercial Earth Engine use.

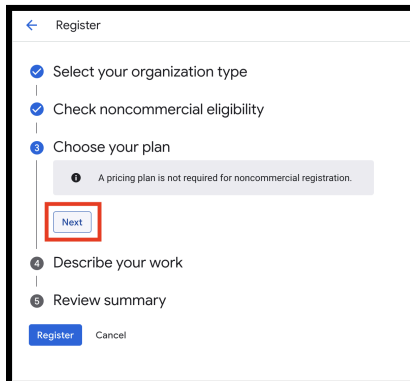
Next

3 Choose your plan

4 Describe your work

5 Review summary

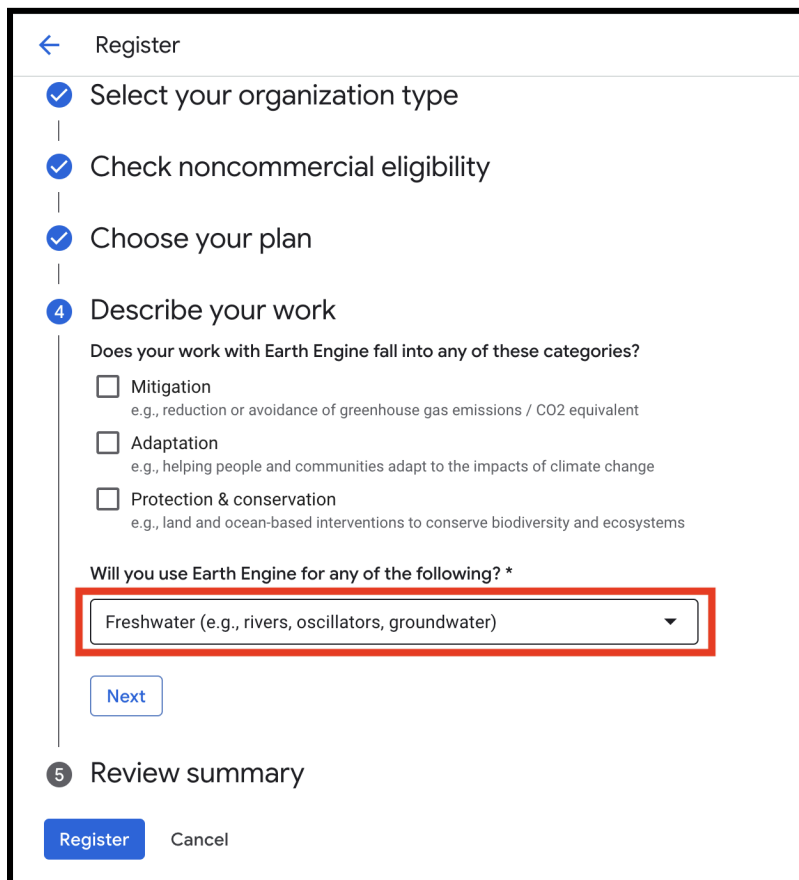
17. Under “3: Choose your plan”, click **Next**



The screenshot shows a mobile app interface for a registration process. At the top, there's a back arrow and the title 'Register'. Below it, a progress indicator shows five steps: 1. Select your organization type (checked), 2. Check noncommercial eligibility (checked), 3. Choose your plan (active), 4. Describe your work, and 5. Review summary. Under step 3, there's a message: 'A pricing plan is not required for noncommercial registration.' Below this message is a blue 'Next' button, which is highlighted with a red rectangle. At the bottom, there are 'Register' and 'Cancel' buttons.

18. Under “4: Describe your work”, select **Freshwater**.

19. Click **Next**



The screenshot shows the same 'Register' form, now at step 4: Describe your work. The progress indicator shows steps 1, 2, and 3 as completed, and step 4 as active. The question is 'Does your work with Earth Engine fall into any of these categories?'. There are three options, each with an unchecked checkbox: 'Mitigation' (e.g., reduction or avoidance of greenhouse gas emissions / CO2 equivalent), 'Adaptation' (e.g., helping people and communities adapt to the impacts of climate change), and 'Protection & conservation' (e.g., land and ocean-based interventions to conserve biodiversity and ecosystems). Below this, there's another question: 'Will you use Earth Engine for any of the following? *'. There's a dropdown menu with the text 'Freshwater (e.g., rivers, oscillators, groundwater)' and a downward arrow. This dropdown menu is highlighted with a red rectangle. Below the dropdown is a blue 'Next' button. At the bottom, there are 'Register' and 'Cancel' buttons.

20. Click the blue “Register” button.

← Register

What is your research question?

How have surface water resources changed over time?

What is the geographic scope of your study?

Global

Have you previously published work on this topic that used Earth Engine?

No

Your work

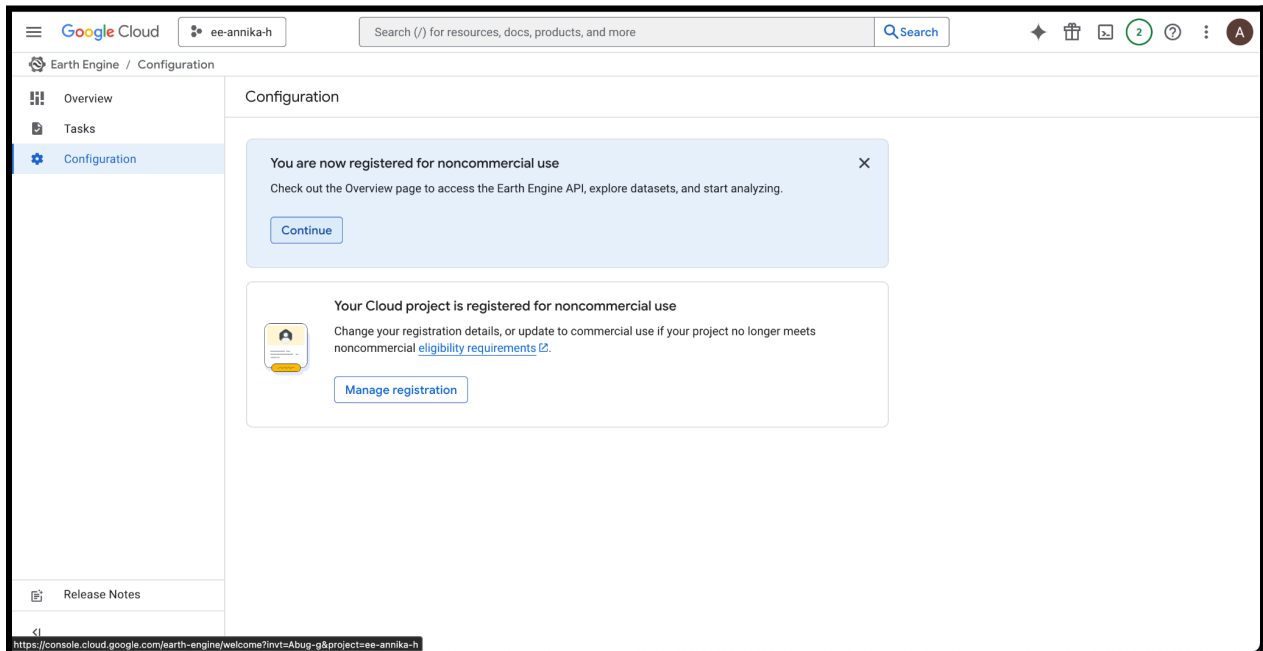
Will you use Earth Engine for any of the following?

Freshwater (e.g., rivers, oscillators, groundwater)

i To make changes, click the relevant step title and edit your answers.

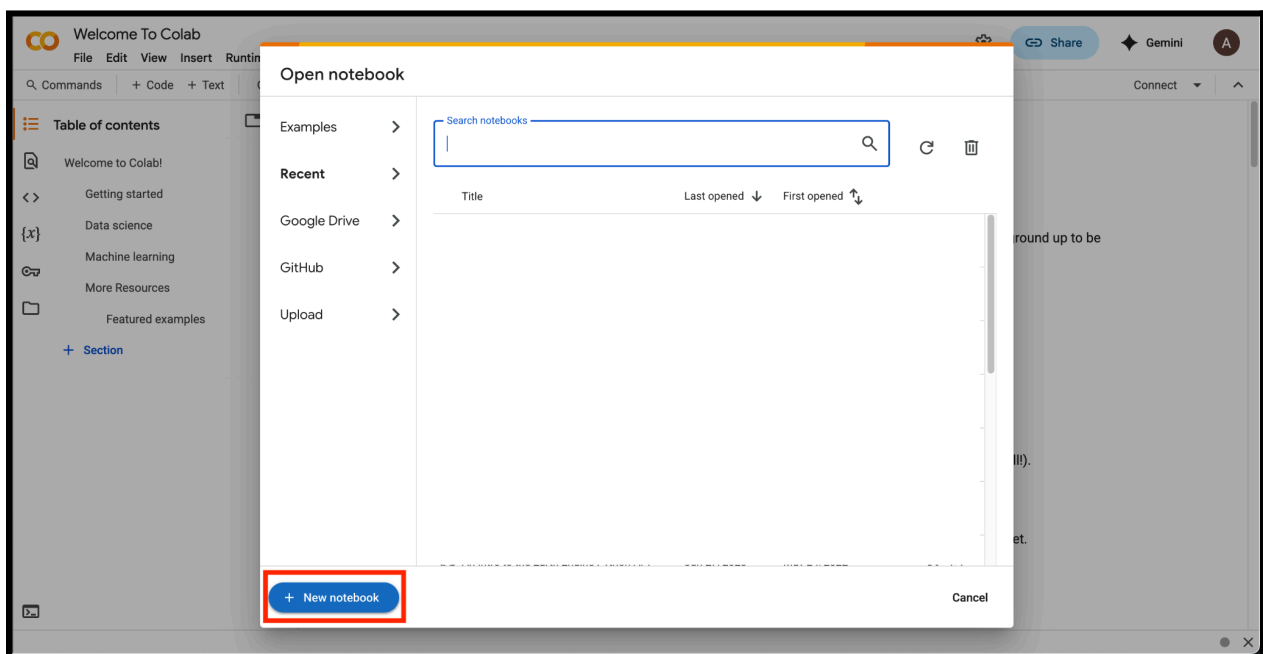
i This information is collected to verify noncommercial eligibility, inform product improvements, and assess the sustainability impact of Earth Engine usage, subject to the [Google Cloud Privacy Notice](#).

Register Cancel



Step 4: Open a Colab notebook and authenticate with your Google Cloud project ID

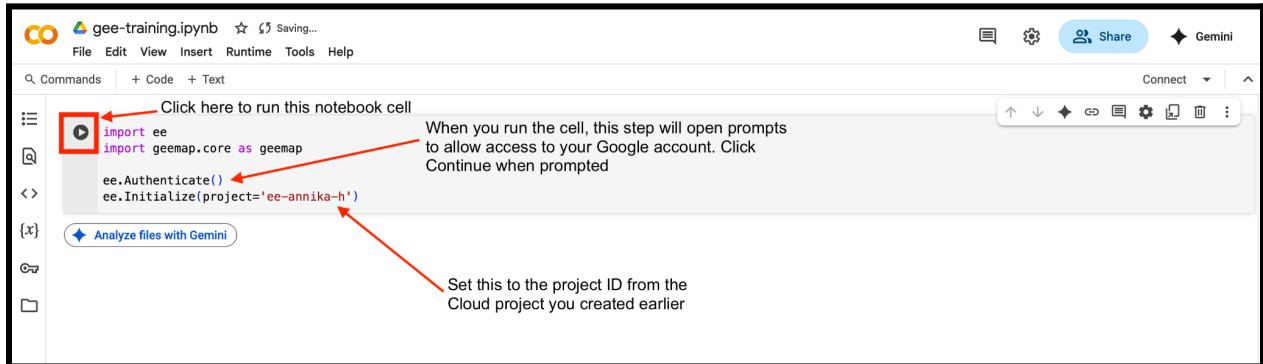
21. Visit <https://colab.research.google.com/> and click **+ new notebook**



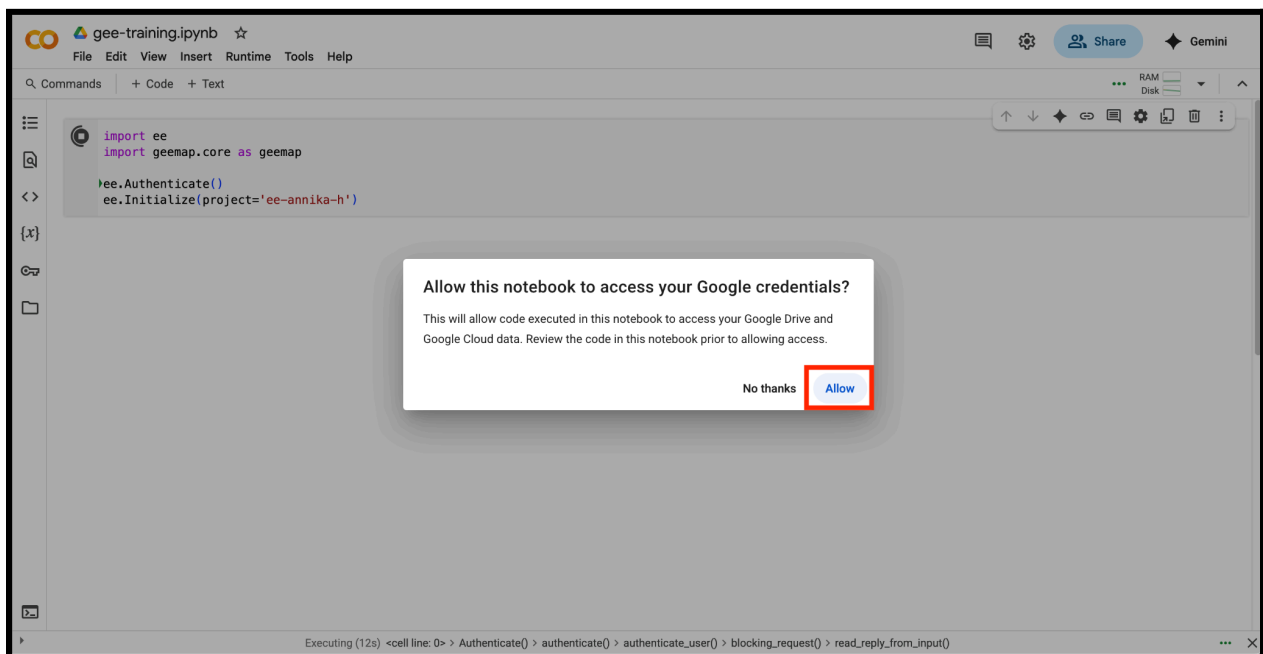
22. Paste the following text in the notebook cell, replacing PROJECT_ID with the project ID from your Google Cloud project (making sure it is enclosed in 'quotation marks'):

```
import ee
import geemap.core as geemap
ee.Authenticate()
ee.Initialize(project='PROJECT_ID')
```

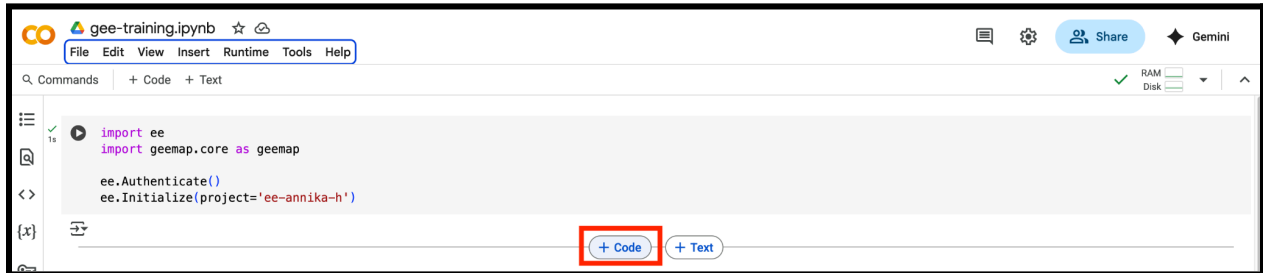
23. Click the **run button** (triangle in a circle) on the left side of the notebook cell



24. Click through the prompts requesting access to your google account (allow all)



25. You're ready to start using Google Earth Engine! Click **+ Code** to add a new notebook cell.



26. Paste the following code into a code cell to test out the **ee** and **geemap** modules. This should give you a map of air temperature that looks like the one in the screenshot below.

```
jan_2023_temperature = (
    ee.ImageCollection('ECMWF/ERA5_LAND/MONTHLY_AGGR')
    .filterDate('2023-01')
    .select('temperature_2m').first()
)

visualization_params = {'min': 250, 'max': 320}

Map = geemap.Map()

Map.addLayer(
    jan_2023_temperature,
    visualization_params,
    'Air temperature [K] at 2m height'
)

Map
```

