Sentinel-3 OLCI L2 Biogeochemistry Data Access Program with Python

Edwards Taufiqurrahman

2024-08-01

Introduction

Sentinel-3 OLCI

Sentinel-3 is part of Copernicus Program, Europe's ambitious remote sensing program aimed to "providing accurate, timely and easily accessible information to improve the management of the environment, understand and mitigate the effects of climate change and ensure civil security,"[1]

Sentinel-3 Ocean and Land Colour Instrument (OLCI) collect and provides data to monitor ocean and land geophysical parameters, for example sea surface Chlorophyll-a concentration.

[1] https://sentiwiki.copernicus.eu/web/copernicus-programme

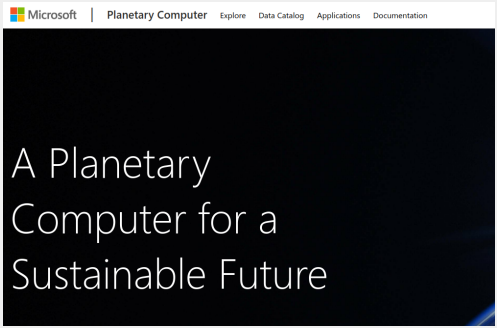
Sentinel-3 OLCI Usage

Applications	OLCI Geophysical Products						
	Rxxx	PAR	T865	A865	IWV	OTCI	GI-FAPAR RC681 RC865
Mapping and monitoring of Land Use and Cover (LUC)						✓	✓
Athmospheric Monitoring			✓	✓	✓		
Climate Change Monitoring	✓	✓	✓	✓	✓	✓	✓

Figure 1: Sentinel-3 OLCI products and application (https://sentiwiki.copernicus.eu/web/olci-applications)

Data access provided by several organizations. Copernicus' WEkEO and Microsoft's Planetary Computer to name two of them.

(a) WEkEO



(b) Planetary Computer

Figure 2: Two example of Sentinel-3 data provider: WEkEO and Planetary Computer

Tutorial on Accessing Sentinel-3 OLCI

Tutorial on Accessing Sentinel-3 OLCI

Using Github Codespace

Python and Github/Jupyterhub can be used to access and open satellite datasets.

(a) Python

(b) JupyterHub

(c) Github Codespaces

Figure 3: Python, Jupyter and Github make it easier to use satellite dataset.

Note

Python is “easy” and reliable. Cloud infrastructure such as Github Codespace and JupyterHub make it even more easier.

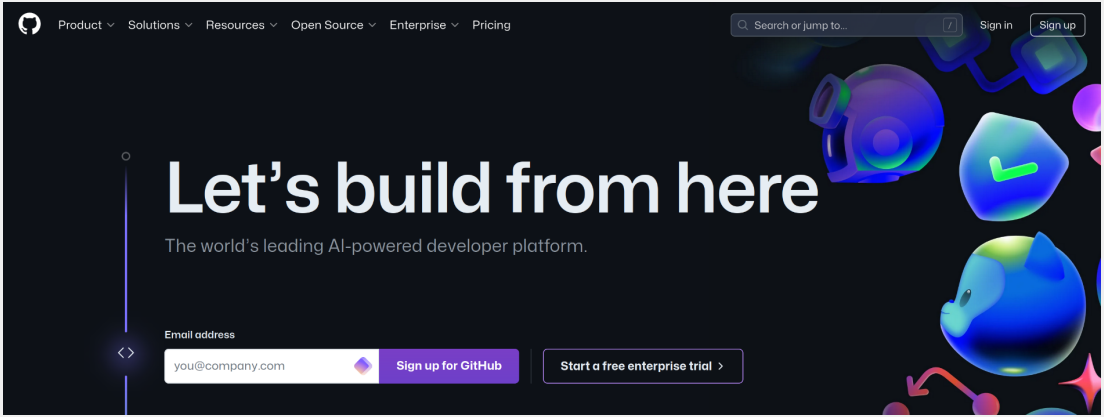
Caution

This tutorial will guide you using **Github Codespaces**

Step 1: Create Github Account

Steps

Easy. Just go to `https://github.com/signup`

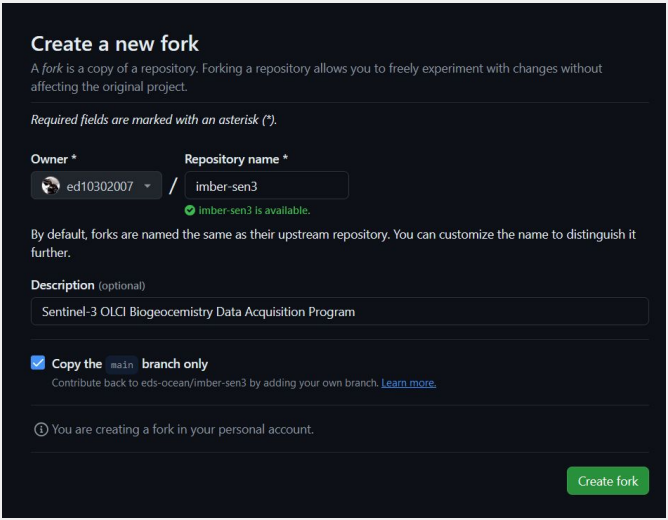


Step 2: Make a Copy of the Code Repository I

Steps

1. Log-in to your Github & go to `https://github.com/eds-ocean/imber-sen3`,
2. Click **Fork**,
3. Continue as example on the next slide.

Step 2: Make a Copy of the Code Repository II



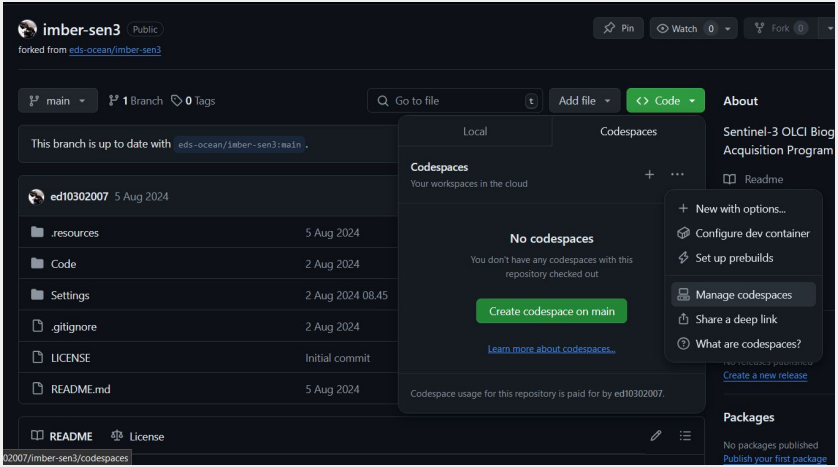
Step 3: Create Github Codespace I

Steps

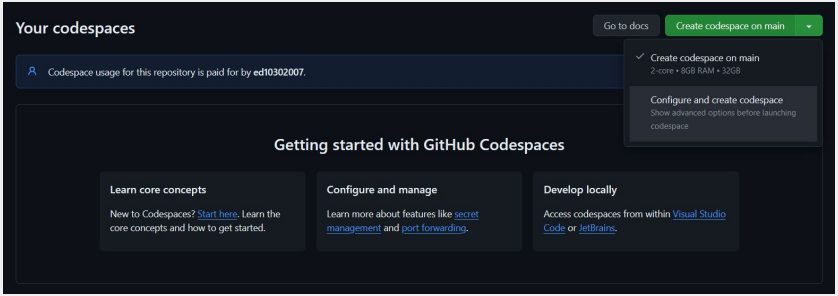
1. On the forked repository, click **Code**, then select tab **Codespaces**,
2. Click the three dots (...) and select **Manage Codespaces**,
3. Click down arrow beside **Create codespace on main** and then select **Configure and create codespace**,
4. Click **Configure and create codespace** and fill parameter like in the example.

(see next slides)

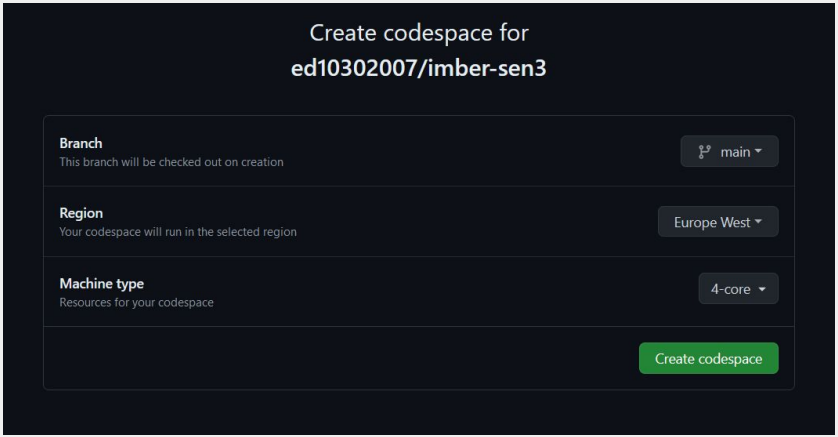
Step 3: Create Github Codespace II



Step 3: Create Github Codespace III



Step 3: Create Github Codespace IV



Tutorial on Accessing Sentinel-3 OLCI

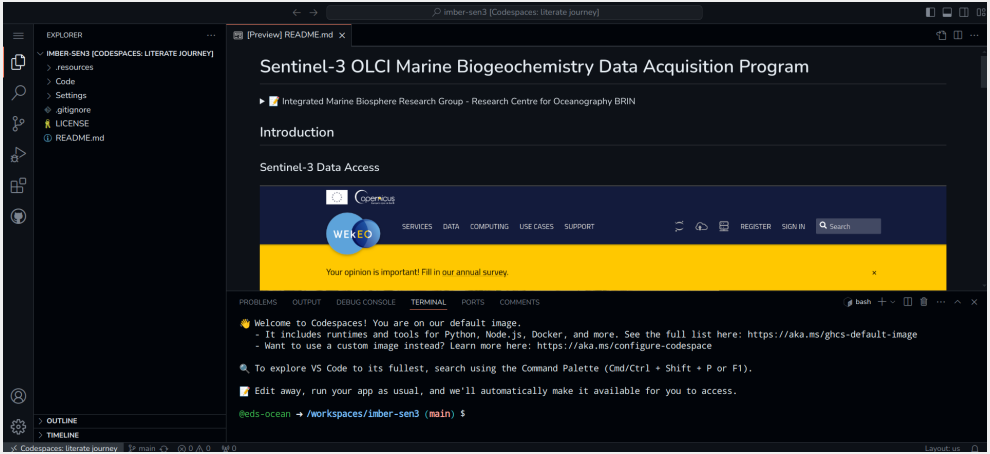
Running the Code

Codespace Overview

Github Codespace is an environment to run code from various programming language. By default, it opened in VS-Code web and screen will open the Readme file in a Jupyter Notebook page. It also provide Terminal to work on Linux command line environment.

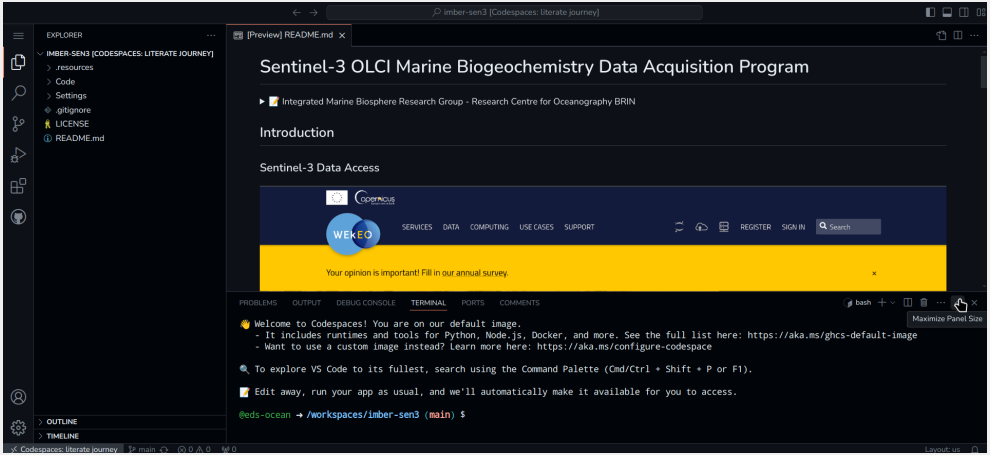
We will just use the Terminal in this tutorial. Of course you can alway try to use the Notebook to run the code.

Default codespace screen

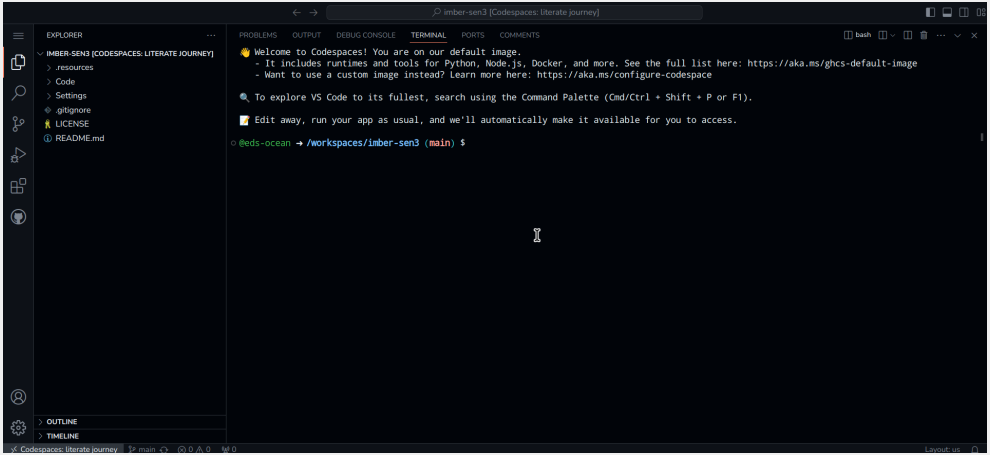


Codespace II

Click on the arrow to maximize terminal



Maximized terminal screen



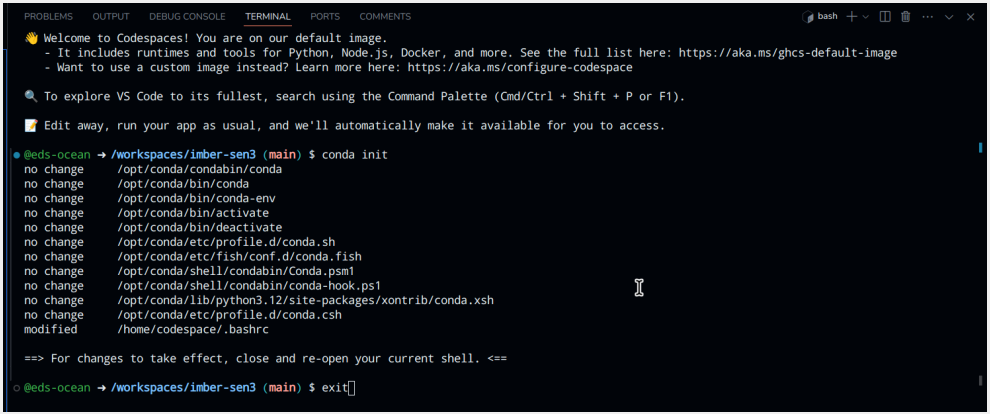
Install Conda Environment I

Steps

1. Initiate conda,
2. Restart terminal,
3. Install conda environment from yml file.

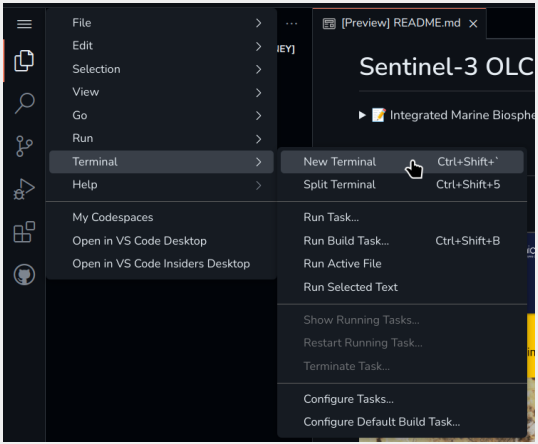
Install Conda Environment II

Type `conda init` to initiate Conda. Wait until finished and then type `exit` to close the Terminal



Install Conda Environment III

Open new terminal by clicking `three-lines > Terminal > New Terminal`



Install Conda Environment IV

Newly openend terminal. Note that it now have (`base`) on left side.

Install Conda Environment V

Step

1. Now type code below,

```
conda env create -f Settings/sen3_pc.yml
```

2. Wait until finished, then type,

```
conda activate sen3_pc
```

Run the code

Step

Type:

```
python Code/mode_1_planetarycomputer.py
```