

Methane Monitoring from Space: Comprehensive Installation Guide

Table of Contents

1. Introduction	2-2
2. System Requirements	2-2
3. Installing Python	2-2
4. Installing Visual Studio Code	3-3
5. Installing Jupyter Notebook	3-3
6. Cloning the repository from GitHub	4-4
7. Installing Required Python Dependencies	4-5
8. Running the Code Locally	5-5
9. Running on Microsoft Planetary Computer Hub	5-5
10. Troubleshooting	5-5

Introduction

This guide provides a step-by-step walkthrough for installing the necessary software and libraries to run the code for monitoring methane concentrations from space. The code uses Python and various specialized libraries to visualize methane concentrations as a heat map. By following this guide, you'll be able to visualize methane concentrations globally, contributing to crucial environmental research.

System Requirements

Operating System: Windows, macOS, or Linux

RAM: At least 4GB (8GB recommended)

Disk Space: At least 2GB free

Internet Connection: Required for downloading software and libraries

Installing Python

Why Python?

Python is the programming language used for the code. It is widely used for scientific computing and data analysis.

Steps:

1. **Navigate:** Open your web browser and go to [Python's official website](https://www.python.org/).
2. **Download:** look for the latest Python installer for your operating system.
3. **Install:** Run the installer.
 - Important: Make sure to check the box that says "Add Python to PATH" during installation.
4. **Verify:** To verify the installation, open Command Prompt (CMD) and run:

Python --version

Installing Visual Studio Code

Why Visual Studio Code?

Visual Studio Code (VS Code) is a code editor that supports Python and Jupyter Notebook.

Steps:

1. **Navigate:** Go to [VS Code's official website](https://code.visualstudio.com/).
2. **Download:** Grab the installer for your operating system.
3. **Install:** Run the installer and follow the on-screen instructions.
4. **Extensions:** After installation, open VS Code and install the Python extension from the marketplace.

Installing Jupyter Notebook

Why Jupyter Notebook?

Jupyter Notebook allows you to run Python code in an interactive manner and is widely used for data analysis and visualization.

Steps:

1. **Command Prompt:** Open Command Prompt (CMD) as an administrator.
2. **Install:** Run the following command to install Jupyter Notebook:

pip install notebook

Cloning the repository from GitHub

Why GitHub?

GitHub is a popular platform for hosting code repositories and provides a range of benefits for developers and teams. GitHub enables users to access the pipeline from anywhere at any time.

Steps:

1. **Navigate:** On GitHub.com, navigate to the main page of the repository.
2. Above the list of files, click <Code>.
3. Copy the URL for the repository.
 - To clone the repository using HTTPS, under "HTTPS", click <Copy>.
 - To clone the repository using an SSH key, including a certificate issued by your organization's SSH certificate authority, click SSH, then click <Copy>.
 - To clone a repository using GitHub CLI, click GitHub CLI, then click <Copy>.
4. Open Terminal.
5. Change the current working directory to the location where you want the cloned directory.
6. **Run:** Type 'git clone', and then paste the URL you copied earlier.
git clone https://github.com/YOUR-USERNAME/YOUR-REPOSITORY
7. Press Enter to create your local clone.

Installing Required Python Dependencies

Why These Libraries?

These Dependencies are essential for data manipulation, visualization, and scientific computing which are crucial for the code. And the dependencies should be installed through "requirements.txt" provided.

Steps:

1. **Command Prompt:** Open Command Prompt (CMD) as an administrator.
2. **Run:** Install each dependency by running the following commands one by one:

```
pip install -r requirements.txt
```

Running the Code Locally

Steps:

1. **VS Code:** Open Visual Studio Code.
2. Navigate to the folder where your code is saved.
3. **Terminal:** Open a new terminal within VS Code.
4. **Run:** Run the following command to start Jupyter Notebook:

```
jupyter notebook
```

5. Open the notebook containing your code and run the cells.

Running on Microsoft Planetary Computer Hub

Steps:

1. **Navigate:** Head over to [Microsoft Planetary Computer Hub](#).
2. **Account:** Sign in or create an account.
3. **Upload:** Get your Jupyter Notebook up there.
4. **Run:** Execute the code by running the cells.

Troubleshooting

Encountered a roadblock? Don't worry; we've got you covered.

1. **Python Libraries:** If you encounter issues with Python libraries, try updating them using `pip install --upgrade <library_name>`.
2. **Jupyter Notebook:** For issues related to Jupyter Notebook, refer to the [official documentation](#).