Geospatial Data Analysis and Visualization in Geology

Introduction

This project is about geospatial data analysis and explores the intersection of geology and data science, utilizing Python libraries such as NumPy, pandas, and Matplotlib to analyze and visualize complex geological data

Project Objectives and Data Overviews

Utilize Python Libraries
Implement Matplotlib, NumPy, and pandas for sophisticated geological data analysis and visualization tasks.

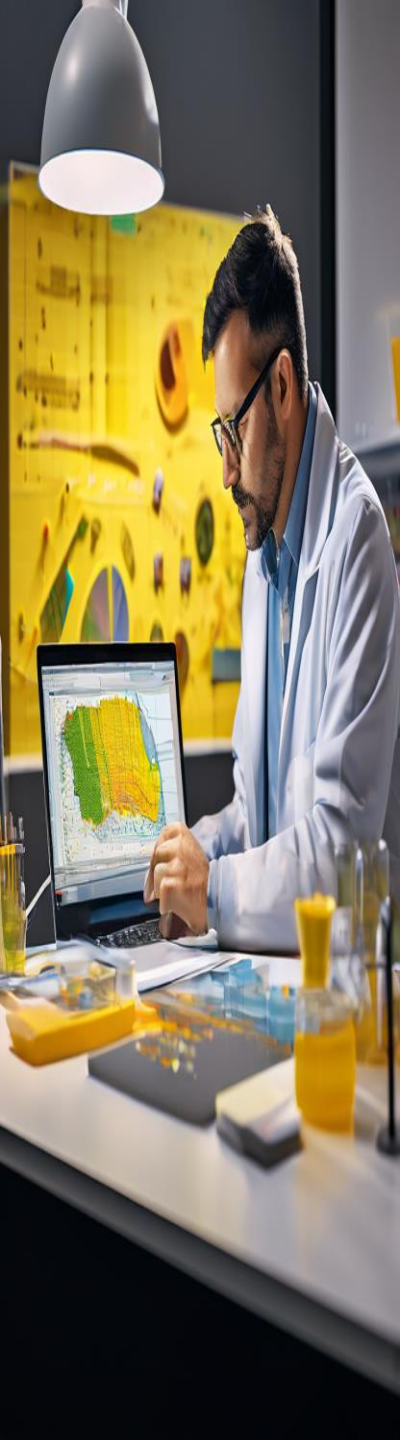
Data Manipulation
Load, clean, and manipulate complex geospatial and geological datasets to prepare them for analysis.

Statistical Analysis
Perform basic statistical analysis using NumPy to extract meaningful patterns from geological data

Visualization Creation
Develop various visualizations to interpret geological patterns and trends, offering insights into Earth's processes.

Dataset Structure

Column	Description
• Region	Geographical identifier
• Latitude	Latitude coordinate
• Longitude	Longitude coordinate
• Elevation (m)	Region elevation in meters
• Rock Type	Dominant rock classification
• Soil Composition	Percentage of soil types
• Earthquake Frequency	Number of recorded earthquakes
• Average Temperature (°C)	Annual average temperature



Exploring Data

- After setup and installation of necessary libraries We Explore and load data on Workspace any editor we are using.
- Exploring Data Contains following Things…

I. Data Loading

Import the geological dataset using pandas, examining its structure and content.

II. Missing Value Treatment

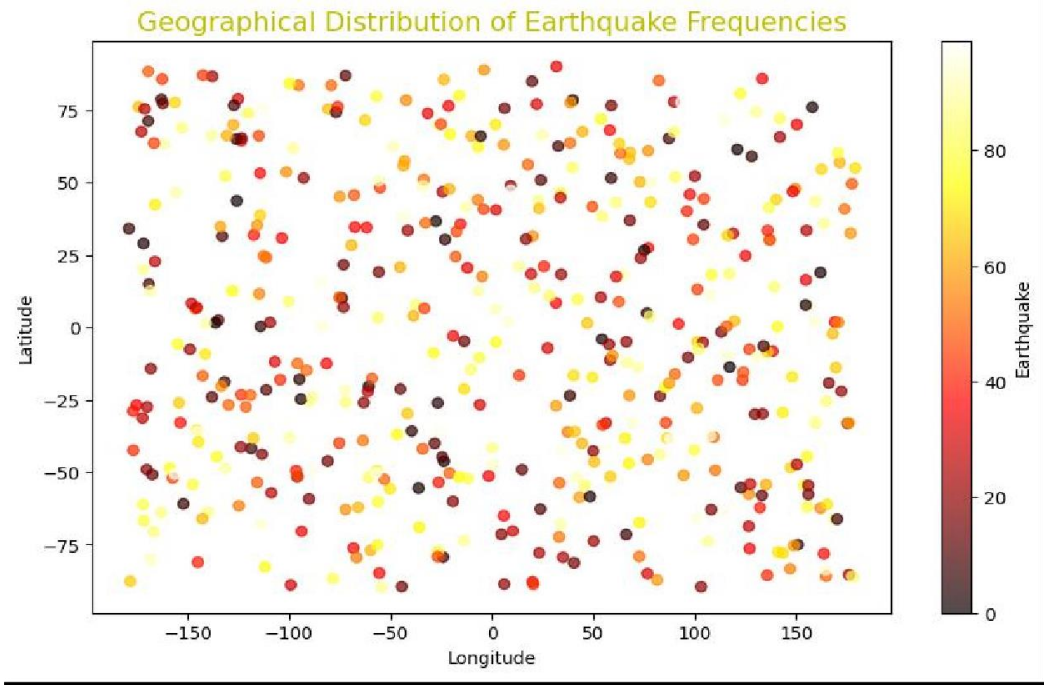
Identify and handle missing data points using appropriate techniques like imputation or removal.

III. **Data Validation**

Perform checks to ensure data integrity and consistency across all variables

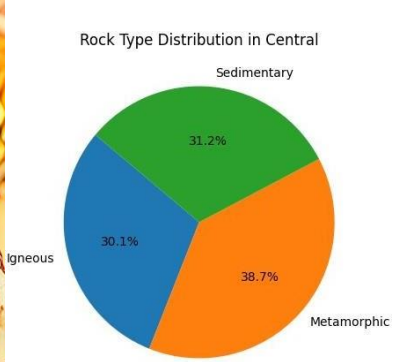
Earthquake Pattern Analysis

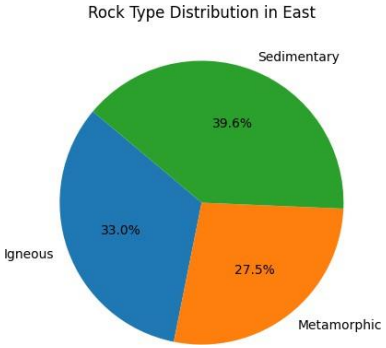
This analysis is done using scatter plot and using the values of latitude,longitude and EaarthQuake Frequency Here is the visualization for that…

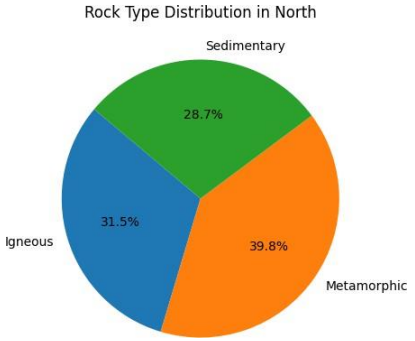


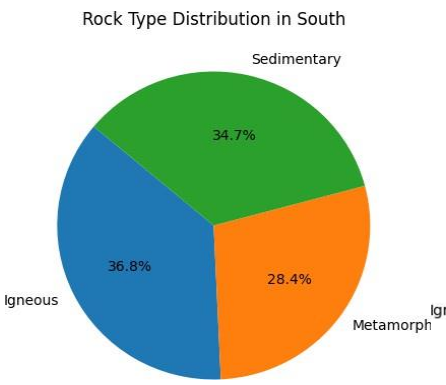
Rock Type Distribution Analysis

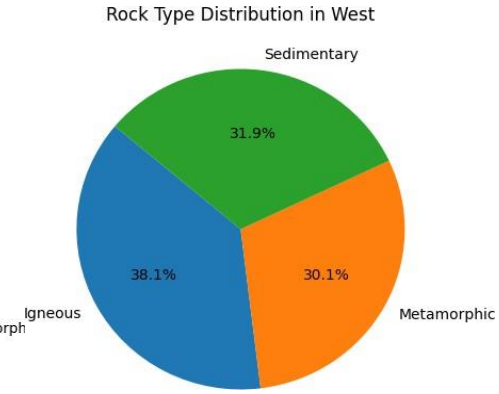
- Here we check the distribution of different rocks acroos various regions e.g.(sedimentary, igneous, and metamorphic).





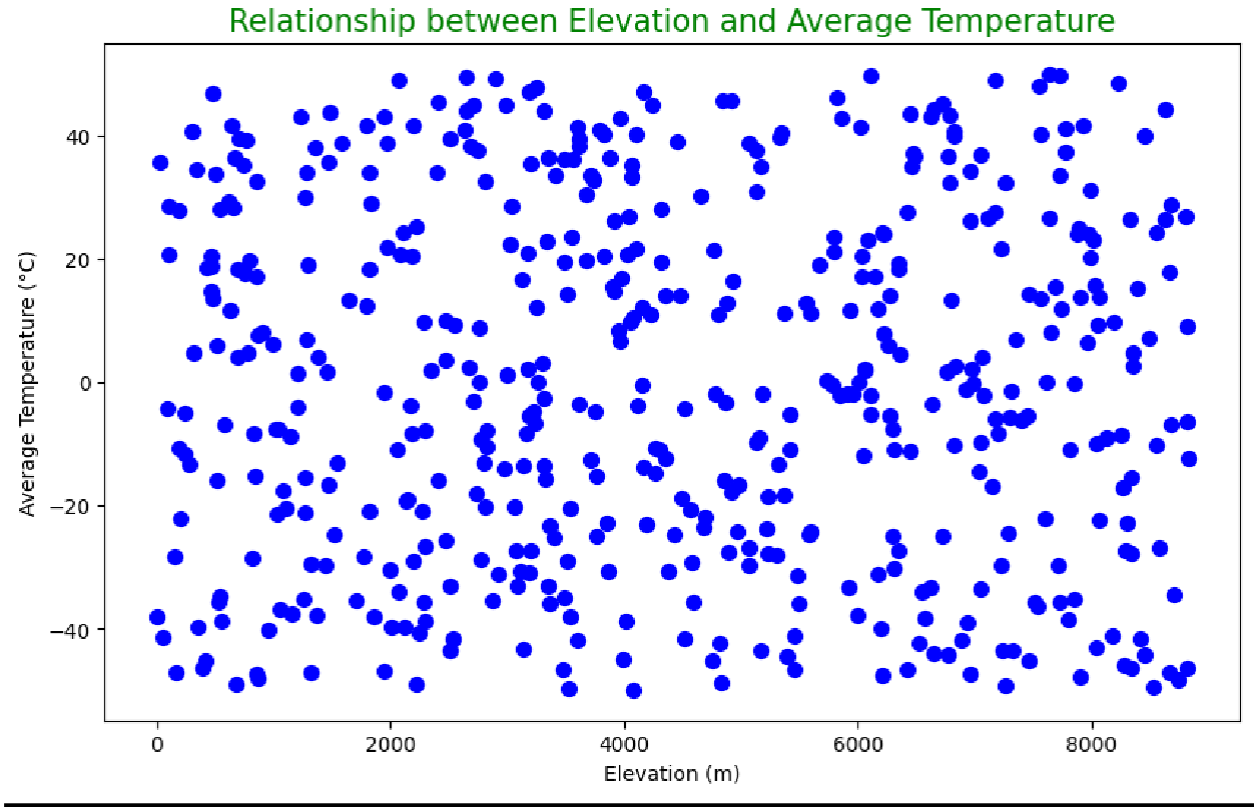


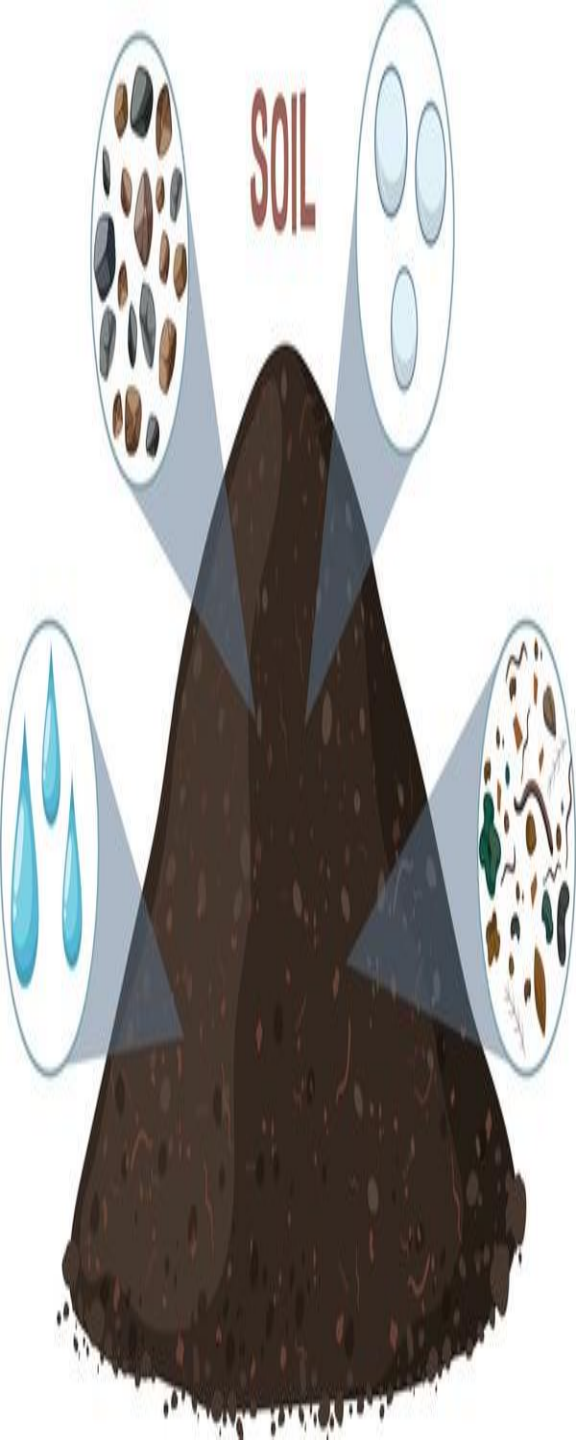




Elevation and Temperature Relationship

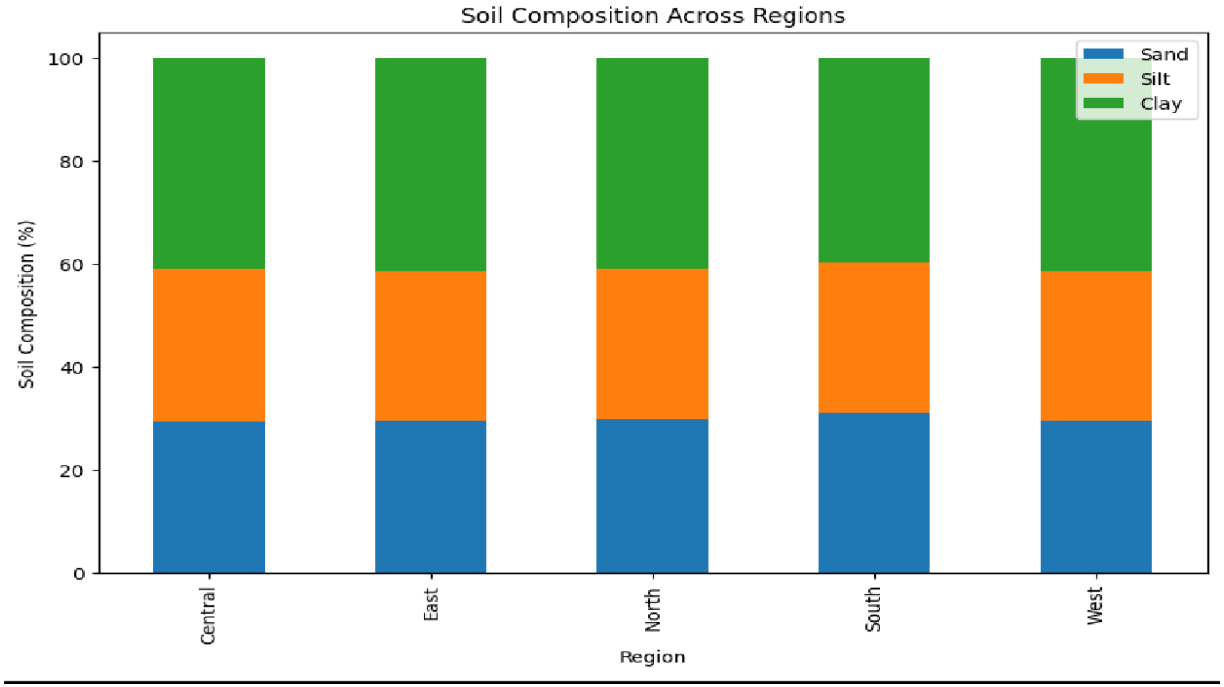
- Here we check the relatioship of temprature and elevation using grapgh.





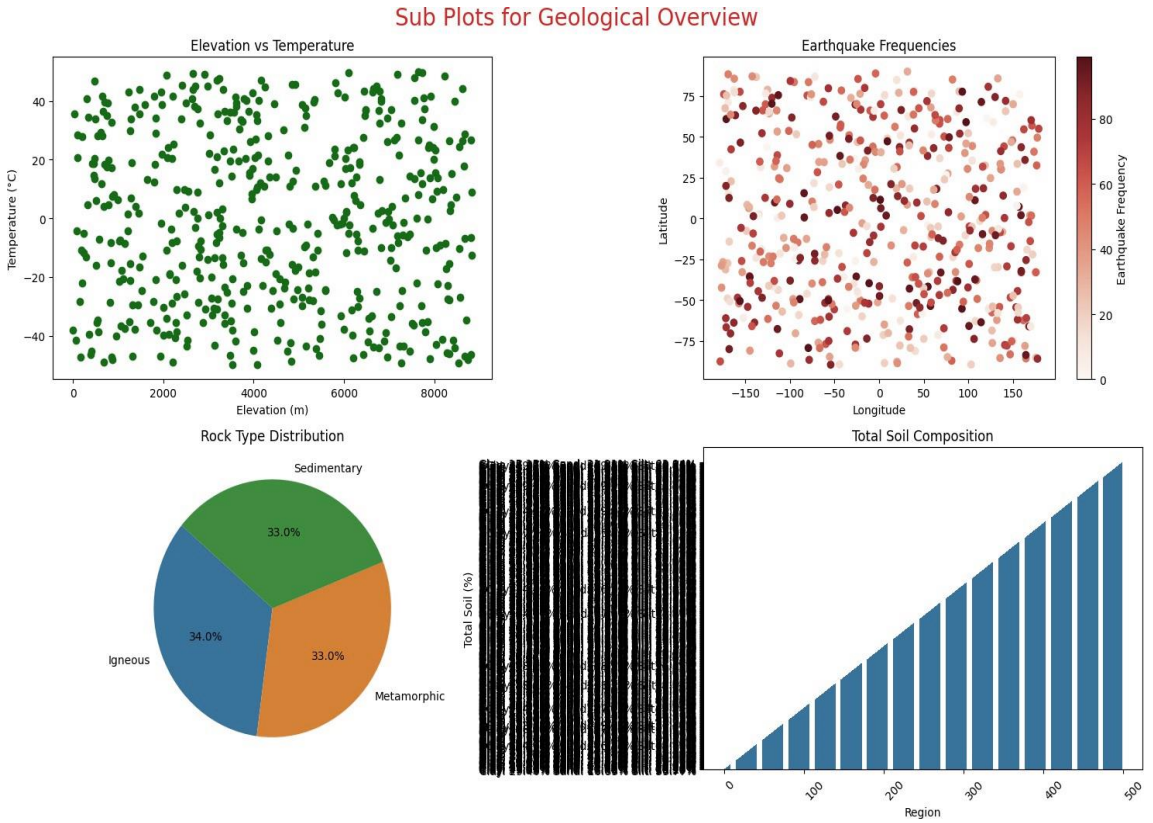
Soil Composition Analysis

- Soil composition is checked using bar charts across the regions.



Comprehensive Geological Overview

- All the tasks we have done are mentioned below.



Conclusion

- **Enhanced Geological Understanding.**
- **Informed Decision-Making**
- **Practical Impact:**
- **Foundation for Future Work**


THANK YOU