**Correlation Analysis**

import pandas as pd

# Load the datasets

caco3\_data = pd.read\_csv('CaCo3.csv', sep=';', header=None, names=['Age', 'CaCO3'])

grain\_size\_data = pd.read\_csv('grain .csv', sep=';', header=None, names=['Age', 'Grain\_Size'])

pediastrum\_data = pd.read\_csv('Huang et al. 2023.xls.csv', sep=';', decimal=',', header=None, names=['Age', 'Size', 'SD'])

# Clean and process the datasets

caco3\_data['Age'] = caco3\_data['Age'].str.replace(',', '.').astype(float)

caco3\_data['CaCO3'] = caco3\_data['CaCO3'].str.replace(',', '.').astype(float)

grain\_size\_data['Age'] = grain\_size\_data['Age'].str.replace(',', '.').astype(float)

grain\_size\_data['Grain\_Size'] = grain\_size\_data['Grain\_Size'].str.replace(',', '.').astype(float)

pediastrum\_data['Age'] = pediastrum\_data['Age'].str.replace(',', '.').astype(float)

pediastrum\_data['Size'] = pediastrum\_data['Size'].str.replace(',', '.').astype(float)

# Merge the datasets on Age

merged\_data = pd.merge(caco3\_data, grain\_size\_data, on='Age', how='inner')

merged\_data = pd.merge(merged\_data, pediastrum\_data[['Age', 'Size']], on='Age', how='inner')

# Perform correlation analysis

correlation\_matrix = merged\_data[['CaCO3', 'Grain\_Size', 'Size']].corr()

# Display the correlation matrix

print(correlation\_matrix)