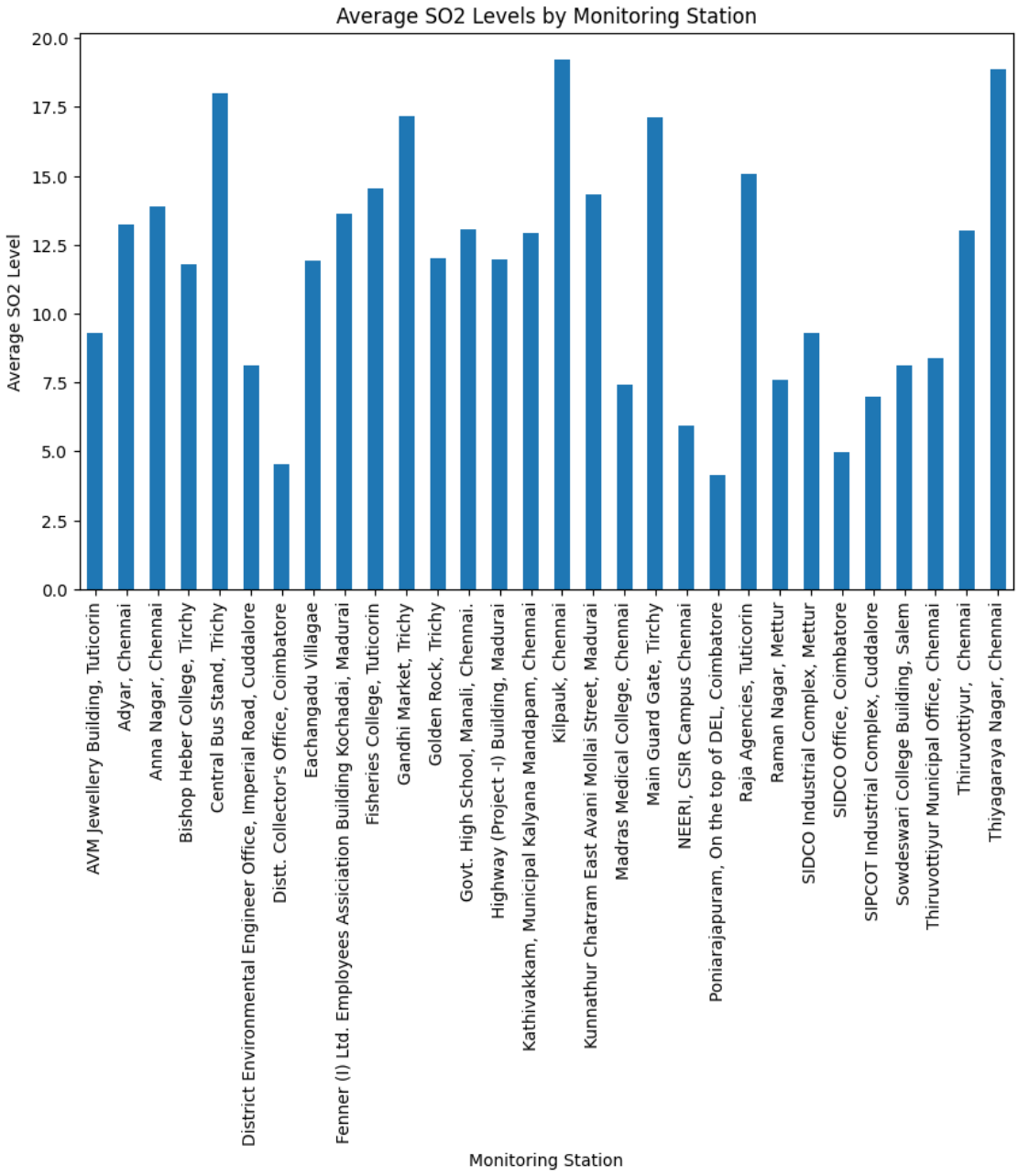
dac-phase4

October 25, 2023

[4]:
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

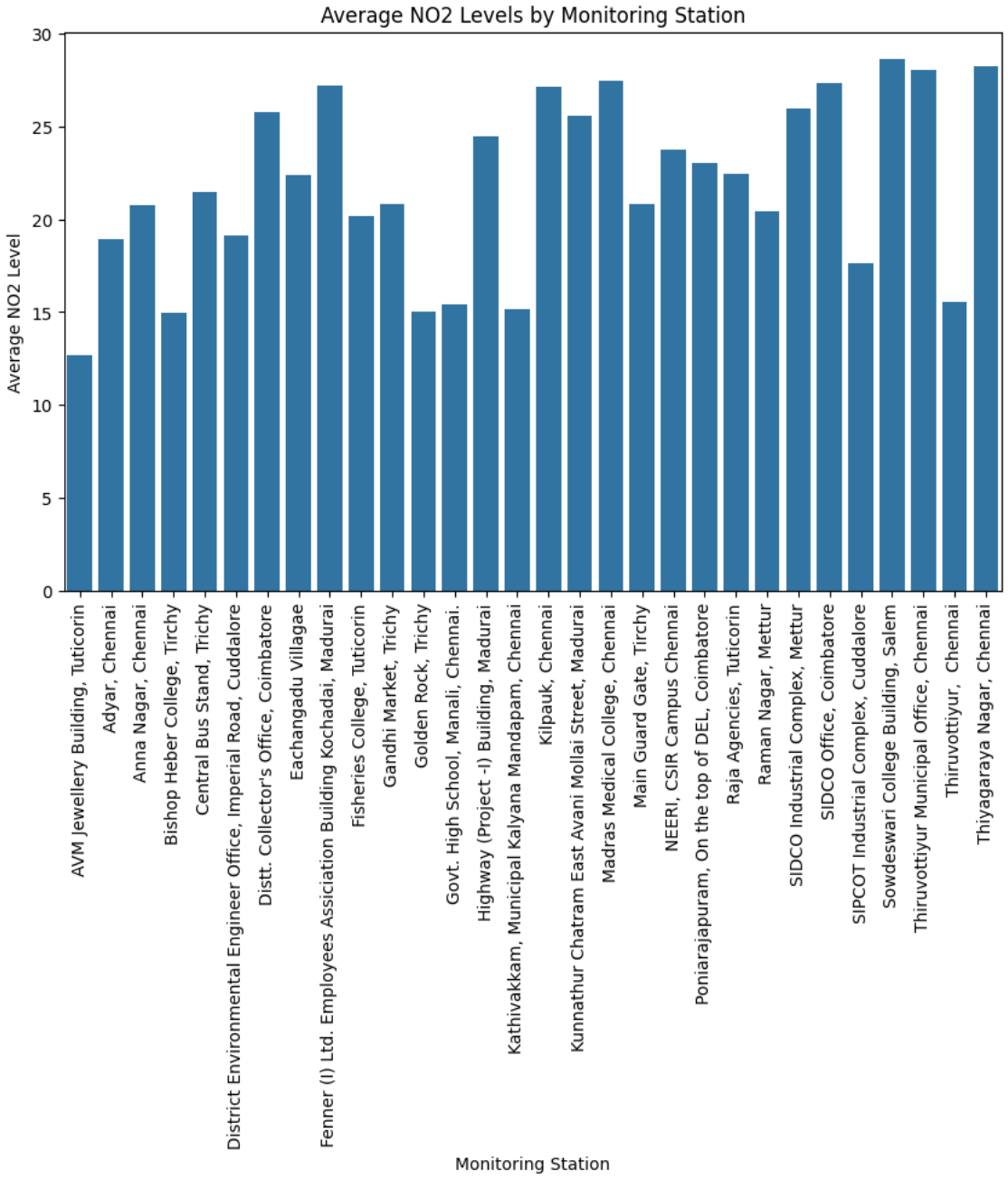
[2]:
```
df=pd.read_csv("cpcb_dly_aq_tamil_nadu-2014.csv")
```

[3]:
```
so2_avg_by_station = df.groupby('Location of Monitoring Station')['SO2'].mean()


plt.figure(figsize=(10, 6))
so2_avg_by_station.plot(kind='bar')
plt.xlabel('Monitoring Station')
plt.ylabel('Average SO2 Level')
plt.title('Average SO2 Levels by Monitoring Station')
plt.xticks(rotation=90)
plt.show()
```



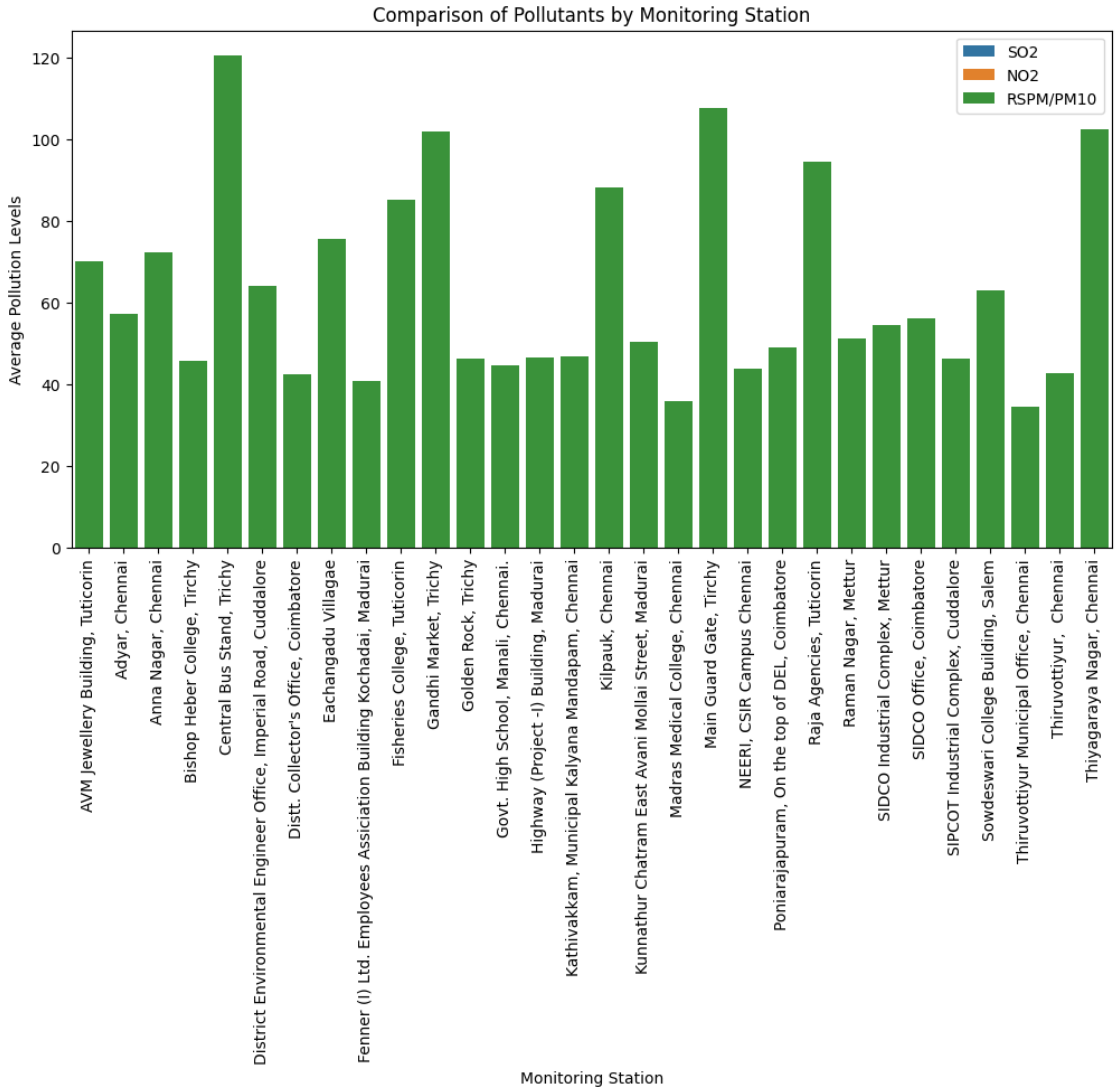
[6]:
```
pollutants = ['SO2', 'NO2', 'RSPM/PM10']
avg_pollution_levels = df.groupby('Location of Monitoring Station')[pollutants].
  ↪mean()

plt.figure(figsize=(10, 6))
sns.barplot(data=avg_pollution_levels, x=avg_pollution_levels.index, y='NO2')
plt.xlabel('Monitoring Station')
plt.ylabel('Average NO2 Level')
```

```
plt.title('Average NO2 Levels by Monitoring Station')
plt.xticks(rotation=90)
plt.show()
```



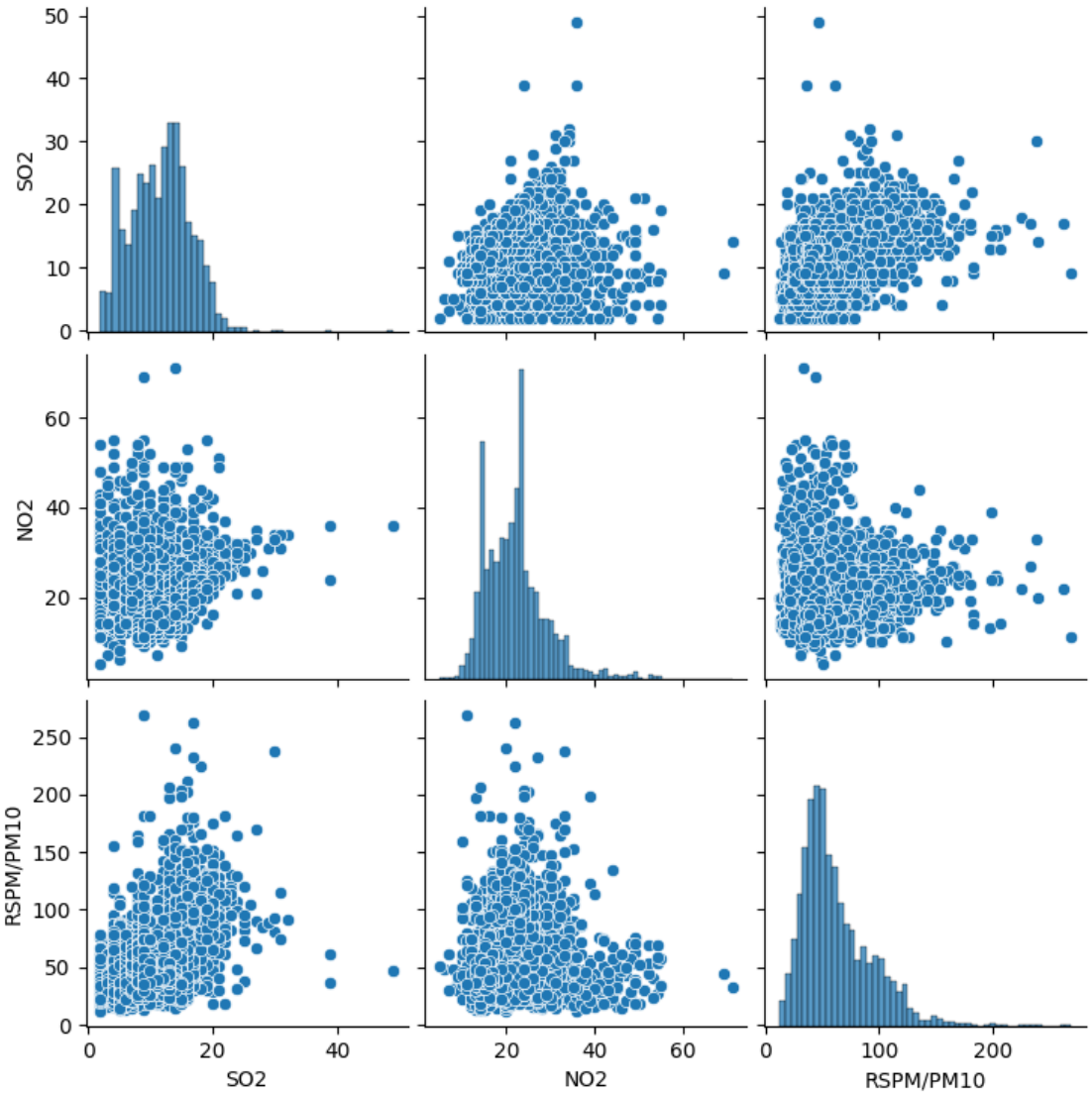
[7]:
```
plt.figure(figsize=(12, 6))
sns.barplot(data=avg_pollution_levels, x=avg_pollution_levels.index, y='SO2',␣
↪label='SO2')
```

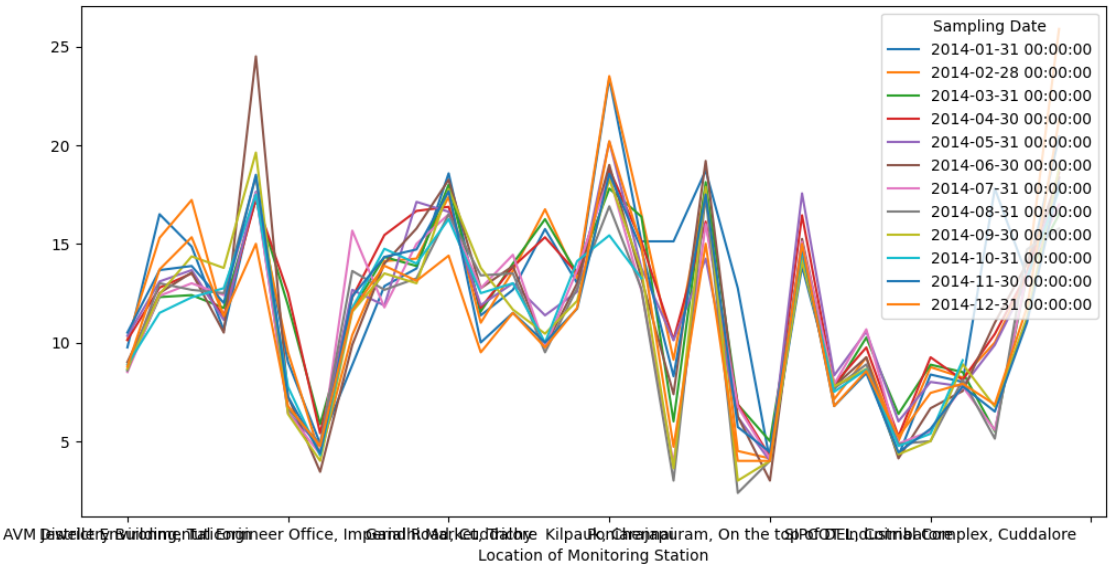
```
sns.barplot(data=avg_pollution_levels, x=avg_pollution_levels.index, y='NO2',␣
 ↪label='NO2')
sns.barplot(data=avg_pollution_levels, x=avg_pollution_levels.index, y='RSPM/
 ↪PM10', label='RSPM/PM10')
plt.xlabel('Monitoring Station')
plt.ylabel('Average Pollution Levels')
plt.title('Comparison of Pollutants by Monitoring Station')
plt.xticks(rotation=90)
plt.legend()
plt.show()

sns.pairplot(df[pollutants])
correlation_matrix = df[pollutants].corr()

df['Sampling Date'] = pd.to_datetime(df['Sampling Date'])
df.set_index('Sampling Date', inplace=True)
so2_time_series = df.groupby('Location of Monitoring Station')['SO2'].
 ↪resample('M').mean()
so2_time_series.unstack().plot(figsize=(12, 6))
```



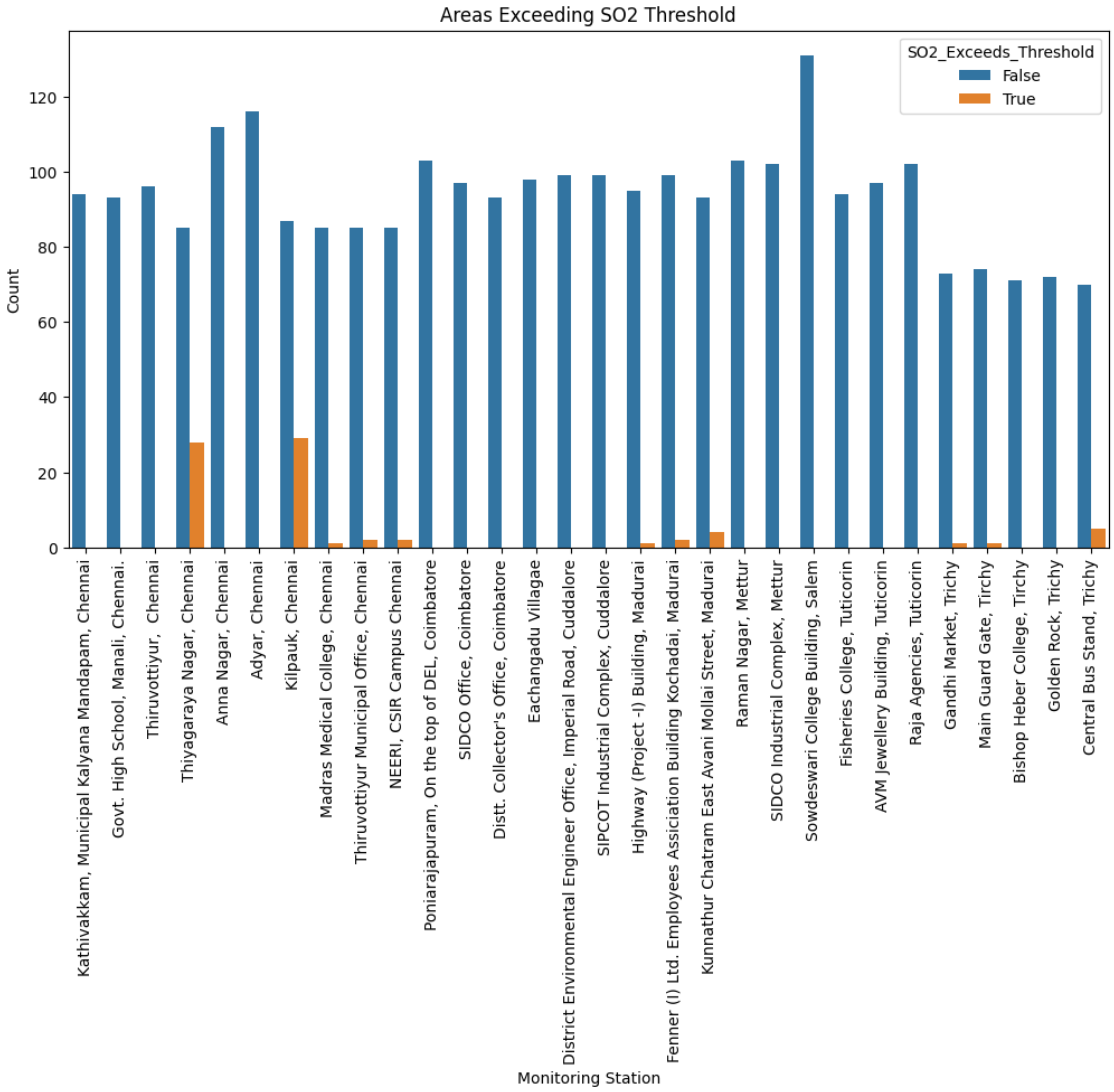

```
C:\Users\smile\AppData\Local\Temp\ipykernel_5668\805127456.py:23: UserWarning:
Could not infer format, so each element will be parsed individually, falling
back to `dateutil`. To ensure parsing is consistent and as-expected, please
specify a format.
  df['Sampling Date'] = pd.to_datetime(df['Sampling Date'])
```

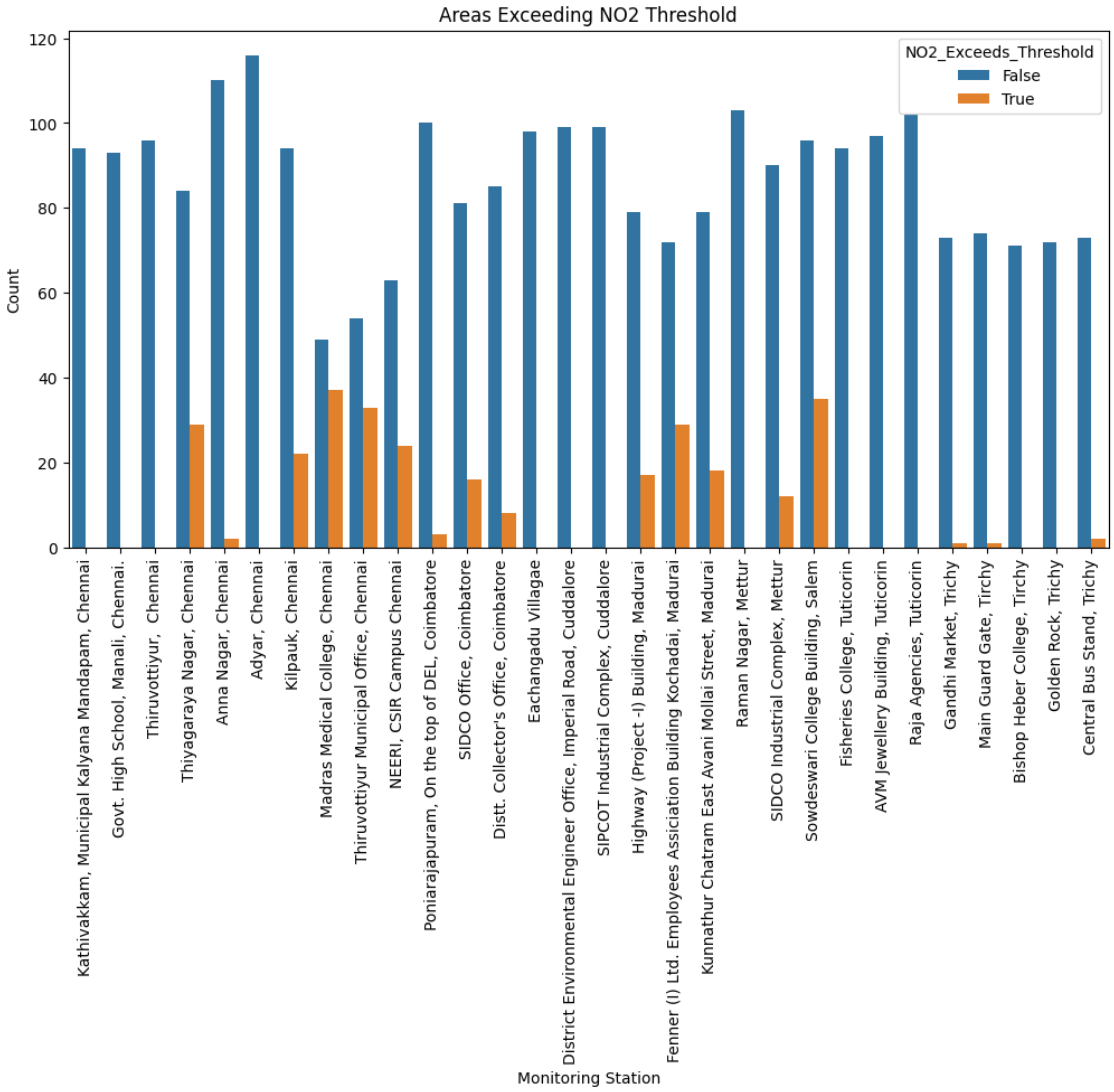
[7]: <Axes: xlabel='Location of Monitoring Station'>


SO2
NO2
RSPM/PM10
0
10
20
30
40
50
20
40
60
0
50
100
150
200
250
0
20
40
20
40
60
0
100
200



[8]:
```
thresholds = {
    'SO2': 20,
    'NO2': 30,
    'RSPM/PM10': 50
}

for pollutant, threshold in thresholds.items():
    df[f'{pollutant}_Exceeds_Threshold'] = df[pollutant] > threshold
for pollutant in pollutants:
    plt.figure(figsize=(12, 6))
    sns.countplot(data=df, x='Location of Monitoring Station',␣
 ↪hue=f'{pollutant}_Exceeds_Threshold')
    plt.xlabel('Monitoring Station')
    plt.ylabel('Count')
    plt.title(f'Areas Exceeding {pollutant} Threshold')
    plt.xticks(rotation=90)
    plt.show()
```


Areas Exceeding SO2 Threshold
SO2_Exceeds_Threshold
False
True
Count
0
20
40
60
80
100
120
Kathivakkam, Municipal Kalyana Mandapam, Chennai
Govt. High School, Manali, Chennai.
Thiruvottiyur, Chennai
Thiyagaraya Nagar, Chennai
Anna Nagar, Chennai
Adyar, Chennai
Kilpauk, Chennai
Madras Medical College, Chennai
Thiruvottiyur Municipal Office, Chennai
NEERI, CSIR Campus Chennai
Poniarajapuram, On the top of DEL, Coimbatore
SIDCO Office, Coimbatore
Distt. Collector's Office, Coimbatore
Eachangadu Villagae
District Environmental Engineer Office, Imperial Road, Cuddalore
SIPCOT Industrial Complex, Cuddalore
Highway (Project -I) Building, Madurai
Fenner (I) Ltd. Employees Assiciation Building Kochadai, Madurai
Kunnathur Chatram East Avani Mollai Street, Madurai
Raman Nagar, Mettur
SIDCO Industrial Complex, Mettur
Sowdeswari College Building, Salem
Fisheries College, Tuticorin
AVM Jewellery Building, Tuticorin
Raja Agencies, Tuticorin
Gandhi Market, Trichy
Main Guard Gate, Tirchy
Bishop Heber College, Tirchy
Golden Rock, Trichy
Central Bus Stand, Trichy
Monitoring Station


Areas Exceeding NO2 Threshold
NO2_Exceeds_Threshold
False
True
Count
0
20
40
60
80
100
120
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Thiruvottiyur, Chennai
Thiyagaraya Nagar, Chennai
Anna Nagar, Chennai
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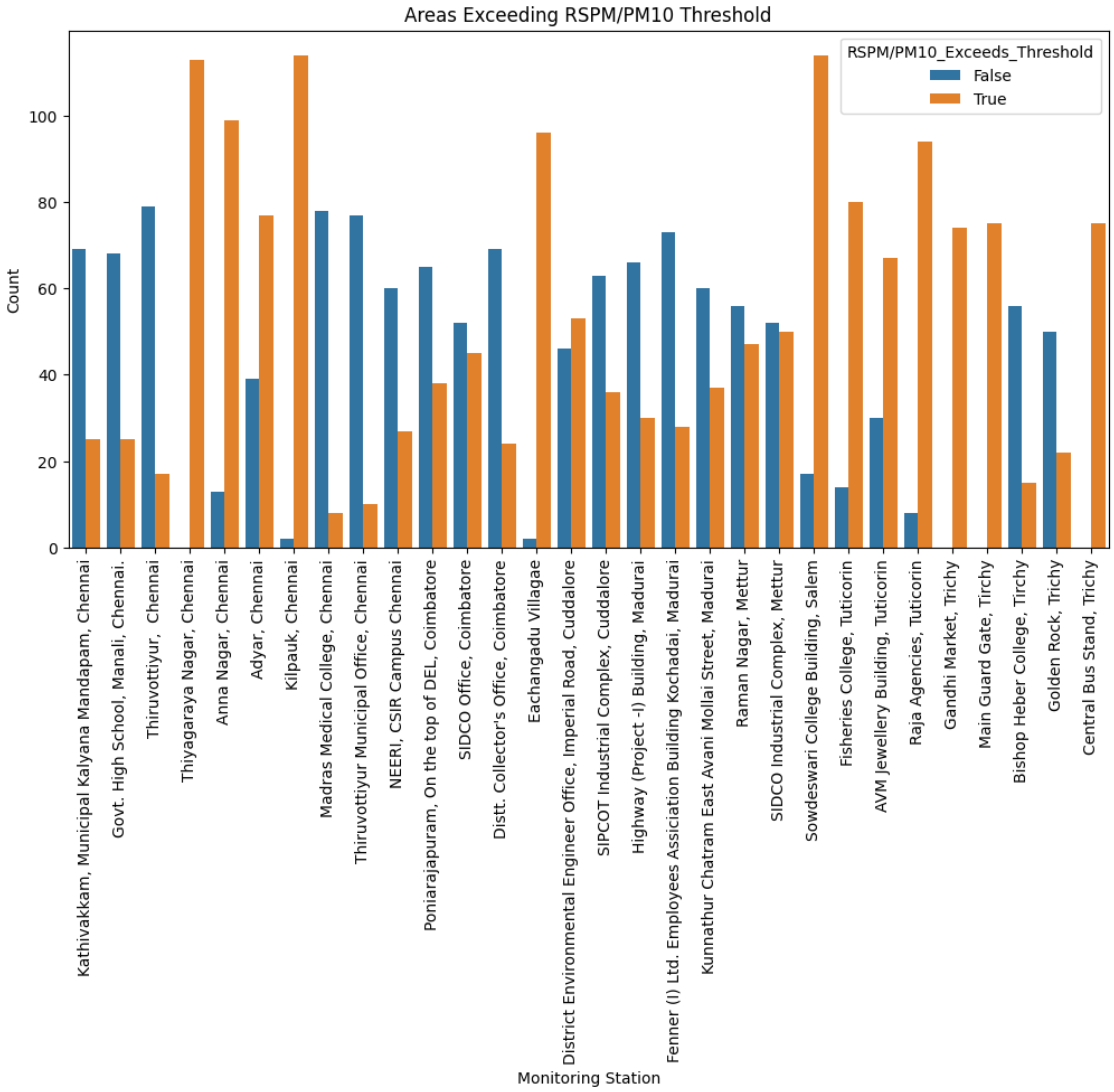
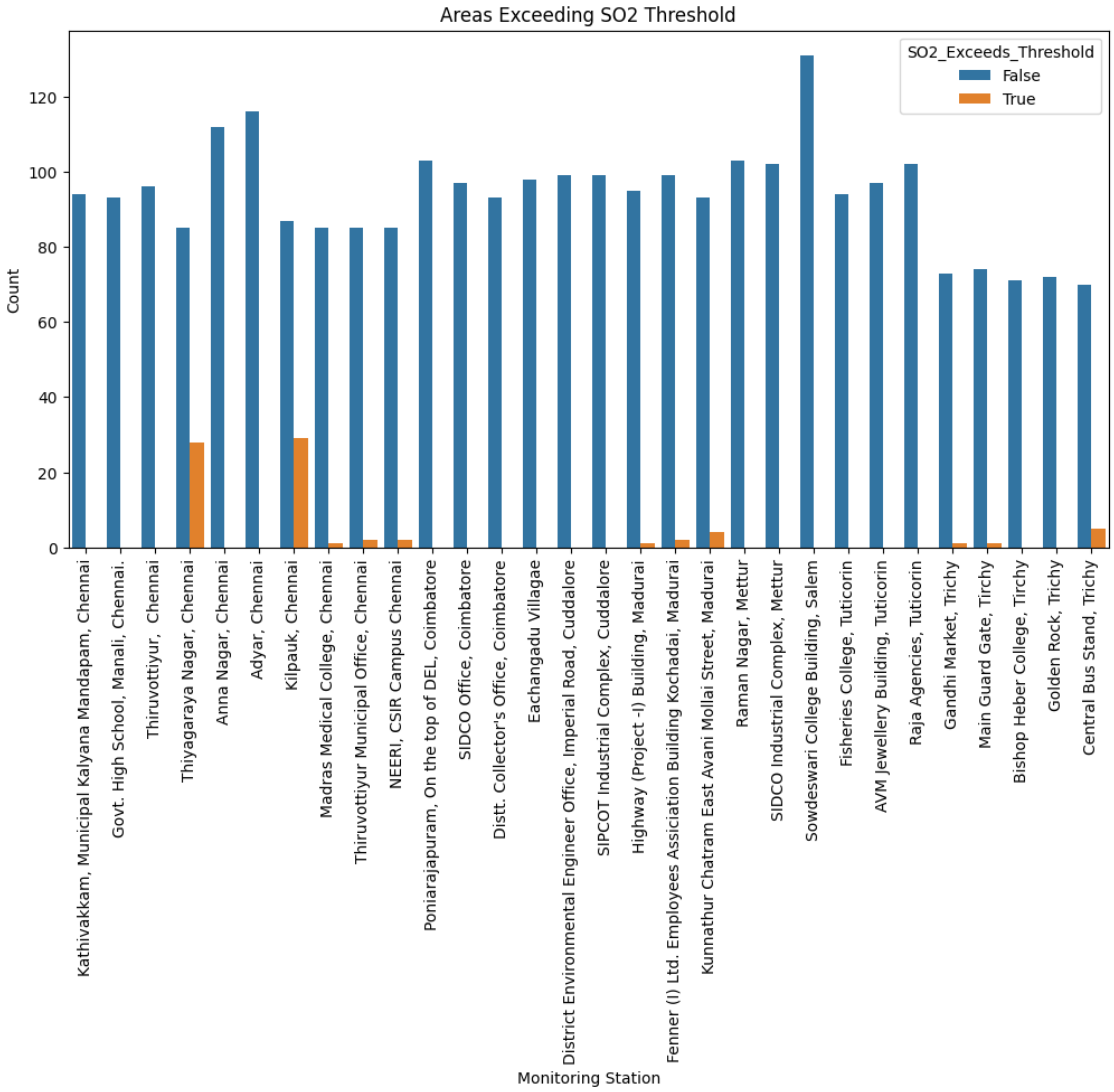


[9]:
```
avg_pollution_levels.describe()
correlation_matrix
plt.figure(figsize=(12, 6))
sns.countplot(data=df, x='Location of Monitoring Station',␣
 ↪hue='SO2_Exceeds_Threshold')
plt.xlabel('Monitoring Station')
plt.ylabel('Count')
plt.title('Areas Exceeding SO2 Threshold')
plt.xticks(rotation=90)
plt.savefig('SO2_Exceedance.png')
```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