ASSIGNMENT - 7

Roll No. 33278

```
# PROBLEM STATEMENT: Visualize the data using Python libraries
matplotlib, seaborn by plotting the graphs for Air Quality (asgn 5)

import pandas as pd
import numpy as np

df = pd.read_csv('AirQuality_visualization.csv',delimiter=';')

df
```

```
            Date      Time CO(GT)  PT08.S1(CO)  NMHC(GT) C6H6(GT)  \
0     10/03/2004  18.00.00    2,6       1360.0     150.0     11,9
1     10/03/2004  19.00.00      2       1292.0     112.0      9,4
2     10/03/2004  20.00.00    2,2       1402.0      88.0      9,0
3     10/03/2004  21.00.00    2,2       1376.0      80.0      9,2
4     10/03/2004  22.00.00    1,6       1272.0      51.0      6,5
...          ...       ...    ...          ...       ...      ...
9466         NaN       NaN    NaN          NaN       NaN      NaN
9467         NaN       NaN    NaN          NaN       NaN      NaN
9468         NaN       NaN    NaN          NaN       NaN      NaN
9469         NaN       NaN    NaN          NaN       NaN      NaN
9470         NaN       NaN    NaN          NaN       NaN      NaN

      PT08.S2(NMHC)  NOx(GT)  PT08.S3(NOx)  NO2(GT)  PT08.S4(NO2)  \
0            1046.0    166.0        1056.0    113.0        1692.0
1             955.0    103.0        1174.0     92.0        1559.0
2             939.0    131.0        1140.0    114.0        1555.0
3             948.0    172.0        1092.0    122.0        1584.0
4             836.0    131.0        1205.0    116.0        1490.0
...             ...      ...           ...      ...           ...
9466            NaN      NaN           NaN      NaN           NaN
9467            NaN      NaN           NaN      NaN           NaN
9468            NaN      NaN           NaN      NaN           NaN
9469            NaN      NaN           NaN      NaN           NaN
9470            NaN      NaN           NaN      NaN           NaN

      PT08.S5(O3)     T    RH      AH  Unnamed: 15  Unnamed: 16
0          1268.0  13,6  48,9  0,7578          NaN          NaN
1           972.0  13,3  47,7  0,7255          NaN          NaN
2          1074.0  11,9  54,0  0,7502          NaN          NaN
3          1203.0  11,0  60,0  0,7867          NaN          NaN
4          1110.0  11,2  59,6  0,7888          NaN          NaN
...           ...   ...   ...     ...          ...          ...
9466          NaN   NaN   NaN     NaN          NaN          NaN
9467          NaN   NaN   NaN     NaN          NaN          NaN
9468          NaN   NaN   NaN     NaN          NaN          NaN
```

```
9469          NaN   NaN   NaN     NaN           NaN           NaN
9470          NaN   NaN   NaN     NaN           NaN           NaN

[9471 rows x 17 columns]
```

```
df = df.rename(columns={'T': 'Temperature'})
df = df.rename(columns={'RH': 'Relative Humidity'})
df = df.rename(columns={'AH': 'Absolute Humidity'})
df
```

```
            Date      Time CO(GT)  PT08.S1(CO)  NMHC(GT) C6H6(GT)  \
0     10/03/2004  18.00.00    2,6       1360.0     150.0     11,9
1     10/03/2004  19.00.00      2       1292.0     112.0      9,4
2     10/03/2004  20.00.00    2,2       1402.0      88.0      9,0
3     10/03/2004  21.00.00    2,2       1376.0      80.0      9,2
4     10/03/2004  22.00.00    1,6       1272.0      51.0      6,5
...          ...       ...    ...          ...       ...      ...
9466         NaN       NaN    NaN          NaN       NaN      NaN
9467         NaN       NaN    NaN          NaN       NaN      NaN
9468         NaN       NaN    NaN          NaN       NaN      NaN
9469         NaN       NaN    NaN          NaN       NaN      NaN
9470         NaN       NaN    NaN          NaN       NaN      NaN

      PT08.S2(NMHC)  NOx(GT)  PT08.S3(NOx)  NO2(GT)  PT08.S4(NO2)  \
0            1046.0    166.0        1056.0    113.0        1692.0
1             955.0    103.0        1174.0     92.0        1559.0
2             939.0    131.0        1140.0    114.0        1555.0
3             948.0    172.0        1092.0    122.0        1584.0
4             836.0    131.0        1205.0    116.0        1490.0
...             ...      ...           ...      ...           ...
9466            NaN      NaN           NaN      NaN           NaN
9467            NaN      NaN           NaN      NaN           NaN
9468            NaN      NaN           NaN      NaN           NaN
9469            NaN      NaN           NaN      NaN           NaN
9470            NaN      NaN           NaN      NaN           NaN

      PT08.S5(O3) Temperature Relative Humidity Absolute Humidity  \
0          1268.0        13,6              48,9            0,7578
1           972.0        13,3              47,7            0,7255
2          1074.0        11,9              54,0            0,7502
3          1203.0        11,0              60,0            0,7867
4          1110.0        11,2              59,6            0,7888
...           ...         ...               ...               ...
9466          NaN         NaN               NaN               NaN
9467          NaN         NaN               NaN               NaN
9468          NaN         NaN               NaN               NaN
9469          NaN         NaN               NaN               NaN
9470          NaN         NaN               NaN               NaN

      Unnamed: 15  Unnamed: 16
```

```
0              NaN           NaN
1              NaN           NaN
2              NaN           NaN
3              NaN           NaN
4              NaN           NaN
...            ...           ...
9466           NaN           NaN
9467           NaN           NaN
9468           NaN           NaN
9469           NaN           NaN
9470           NaN           NaN

[9471 rows x 17 columns]
```

```
df = df.drop(['Unnamed: 15', 'Unnamed: 16'],axis=1)
```

```
df
```

```
            Date      Time CO(GT)  PT08.S1(CO)  NMHC(GT) C6H6(GT)  \
0     10/03/2004  18.00.00    2,6       1360.0     150.0     11,9
1     10/03/2004  19.00.00      2       1292.0     112.0      9,4
2     10/03/2004  20.00.00    2,2       1402.0      88.0      9,0
3     10/03/2004  21.00.00    2,2       1376.0      80.0      9,2
4     10/03/2004  22.00.00    1,6       1272.0      51.0      6,5
...          ...       ...    ...          ...       ...      ...
9466         NaN       NaN    NaN          NaN       NaN      NaN
9467         NaN       NaN    NaN          NaN       NaN      NaN
9468         NaN       NaN    NaN          NaN       NaN      NaN
9469         NaN       NaN    NaN          NaN       NaN      NaN
9470         NaN       NaN    NaN          NaN       NaN      NaN

      PT08.S2(NMHC)  NOx(GT)  PT08.S3(NOx)  NO2(GT)  PT08.S4(NO2)  \
0            1046.0    166.0        1056.0    113.0        1692.0
1             955.0    103.0        1174.0     92.0        1559.0
2             939.0    131.0        1140.0    114.0        1555.0
3             948.0    172.0        1092.0    122.0        1584.0
4             836.0    131.0        1205.0    116.0        1490.0
...             ...      ...           ...      ...           ...
9466            NaN      NaN           NaN      NaN           NaN
9467            NaN      NaN           NaN      NaN           NaN
9468            NaN      NaN           NaN      NaN           NaN
9469            NaN      NaN           NaN      NaN           NaN
9470            NaN      NaN           NaN      NaN           NaN

      PT08.S5(O3) Temperature Relative Humidity Absolute Humidity
0          1268.0        13,6              48,9            0,7578
1           972.0        13,3              47,7            0,7255
2          1074.0        11,9              54,0            0,7502
3          1203.0        11,0              60,0            0,7867
4          1110.0        11,2              59,6            0,7888
```

```
...           ...         ...                ...                ...
9466          NaN         NaN                NaN                NaN
9467          NaN         NaN                NaN                NaN
9468          NaN         NaN                NaN                NaN
9469          NaN         NaN                NaN                NaN
9470          NaN         NaN                NaN                NaN

[9471 rows x 15 columns]
```

```
df['CO(GT)'] = df['CO(GT)'].str.replace(',', '.').astype(float)
df['C6H6(GT)'] = df['C6H6(GT)'].str.replace(',', '.').astype(float)
df['Temperature'] = df['Temperature'].str.replace(',',
'.').astype(float)
df['Relative Humidity'] = df['Relative Humidity'].str.replace(',',
'.').astype(float)
df['Absolute Humidity'] = df['Absolute Humidity'].str.replace(',',
'.').astype(float)
df
```

```
            Date      Time  CO(GT)  PT08.S1(CO)  NMHC(GT)  C6H6(GT)  \
0     10/03/2004  18.00.00     2.6       1360.0     150.0      11.9
1     10/03/2004  19.00.00     2.0       1292.0     112.0       9.4
2     10/03/2004  20.00.00     2.2       1402.0      88.0       9.0
3     10/03/2004  21.00.00     2.2       1376.0      80.0       9.2
4     10/03/2004  22.00.00     1.6       1272.0      51.0       6.5
...          ...       ...     ...          ...       ...       ...
9466         NaN       NaN     NaN          NaN       NaN       NaN
9467         NaN       NaN     NaN          NaN       NaN       NaN
9468         NaN       NaN     NaN          NaN       NaN       NaN
9469         NaN       NaN     NaN          NaN       NaN       NaN
9470         NaN       NaN     NaN          NaN       NaN       NaN

      PT08.S2(NMHC)  NOx(GT)  PT08.S3(NOx)  NO2(GT)  PT08.S4(NO2)  \
0            1046.0    166.0        1056.0    113.0        1692.0
1             955.0    103.0        1174.0     92.0        1559.0
2             939.0    131.0        1140.0    114.0        1555.0
3             948.0    172.0        1092.0    122.0        1584.0
4             836.0    131.0        1205.0    116.0        1490.0
...             ...      ...           ...      ...           ...
9466            NaN      NaN           NaN      NaN           NaN
9467            NaN      NaN           NaN      NaN           NaN
9468            NaN      NaN           NaN      NaN           NaN
9469            NaN      NaN           NaN      NaN           NaN
9470            NaN      NaN           NaN      NaN           NaN

      PT08.S5(O3)  Temperature  Relative Humidity  Absolute Humidity
0          1268.0         13.6               48.9             0.7578
1           972.0         13.3               47.7             0.7255
2          1074.0         11.9               54.0             0.7502
3          1203.0         11.0               60.0             0.7867
```

```
4          1110.0         11.2                59.6              0.7888
...           ...          ...                 ...                 ...
9466          NaN          NaN                 NaN                 NaN
9467          NaN          NaN                 NaN                 NaN
9468          NaN          NaN                 NaN                 NaN
9469          NaN          NaN                 NaN                 NaN
9470          NaN          NaN                 NaN                 NaN

[9471 rows x 15 columns]
```

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 9471 entries, 0 to 9470
Data columns (total 15 columns):
 #   Column             Non-Null Count  Dtype
---  ------             --------------  -----
 0   Date               9357 non-null   object
 1   Time               9357 non-null   object
 2   CO(GT)             9357 non-null   float64
 3   PT08.S1(CO)        9357 non-null   float64
 4   NMHC(GT)           9357 non-null   float64
 5   C6H6(GT)           9357 non-null   float64
 6   PT08.S2(NMHC)      9357 non-null   float64
 7   NOx(GT)            9357 non-null   float64
 8   PT08.S3(NOx)       9357 non-null   float64
 9   NO2(GT)            9357 non-null   float64
 10  PT08.S4(NO2)       9357 non-null   float64
 11  PT08.S5(O3)        9357 non-null   float64
 12  Temperature        9357 non-null   float64
 13  Relative Humidity  9357 non-null   float64
 14  Absolute Humidity  9357 non-null   float64
dtypes: float64(13), object(2)
memory usage: 1.1+ MB
```

```
df.head()
```

```
         Date      Time  CO(GT)  PT08.S1(CO)  NMHC(GT)  C6H6(GT)  \
0  10/03/2004  18.00.00     2.6       1360.0     150.0      11.9
1  10/03/2004  19.00.00     2.0       1292.0     112.0       9.4
2  10/03/2004  20.00.00     2.2       1402.0      88.0       9.0
3  10/03/2004  21.00.00     2.2       1376.0      80.0       9.2
4  10/03/2004  22.00.00     1.6       1272.0      51.0       6.5

   PT08.S2(NMHC)  NOx(GT)  PT08.S3(NOx)  NO2(GT)  PT08.S4(NO2)
PT08.S5(O3)  \
0         1046.0    166.0        1056.0    113.0        1692.0
1268.0
1          955.0    103.0        1174.0     92.0        1559.0
972.0
```

```
2          939.0    131.0        1140.0    114.0        1555.0
1074.0
3          948.0    172.0        1092.0    122.0        1584.0
1203.0
4          836.0    131.0        1205.0    116.0        1490.0
1110.0
```

```
   Temperature  Relative Humidity  Absolute Humidity
0         13.6               48.9             0.7578
1         13.3               47.7             0.7255
2         11.9               54.0             0.7502
3         11.0               60.0             0.7867
4         11.2               59.6             0.7888
```

```
df=df.drop_duplicates()
```

```
df.isna().sum()
```

```
Date                 1
Time                 1
CO(GT)               1
PT08.S1(CO)          1
NMHC(GT)             1
C6H6(GT)             1
PT08.S2(NMHC)        1
NOx(GT)              1
PT08.S3(NOx)         1
NO2(GT)              1
PT08.S4(NO2)         1
PT08.S5(O3)          1
Temperature          1
Relative Humidity    1
Absolute Humidity    1
dtype: int64
```

```
df = df.fillna(df.select_dtypes(include=['number']).mean())
df = df.dropna()
```

```
df.isna().sum()
```

```
Date                 0
Time                 0
CO(GT)               0
PT08.S1(CO)          0
NMHC(GT)             0
C6H6(GT)             0
PT08.S2(NMHC)        0
NOx(GT)              0
PT08.S3(NOx)         0
NO2(GT)              0
PT08.S4(NO2)         0
```

```
PT08.S5(O3)           0
Temperature           0
Relative Humidity     0
Absolute Humidity     0
dtype: int64
```

df

	Date	Time	CO(GT)	PT08.S1(CO)	NMHC(GT)	C6H6(GT)	\
0	10/03/2004	18.00.00	2.6	1360.0	150.0	11.9	
1	10/03/2004	19.00.00	2.0	1292.0	112.0	9.4	
2	10/03/2004	20.00.00	2.2	1402.0	88.0	9.0	
3	10/03/2004	21.00.00	2.2	1376.0	80.0	9.2	
4	10/03/2004	22.00.00	1.6	1272.0	51.0	6.5	
...	...	...	...	...	...	...	
9352	04/04/2005	10.00.00	3.1	1314.0	-200.0	13.5	
9353	04/04/2005	11.00.00	2.4	1163.0	-200.0	11.4	
9354	04/04/2005	12.00.00	2.4	1142.0	-200.0	12.4	
9355	04/04/2005	13.00.00	2.1	1003.0	-200.0	9.5	
9356	04/04/2005	14.00.00	2.2	1071.0	-200.0	11.9	

	PT08.S2(NMHC)	NOx(GT)	PT08.S3(NOx)	NO2(GT)	PT08.S4(NO2)	\
0	1046.0	166.0	1056.0	113.0	1692.0	
1	955.0	103.0	1174.0	92.0	1559.0	
2	939.0	131.0	1140.0	114.0	1555.0	
3	948.0	172.0	1092.0	122.0	1584.0	
4	836.0	131.0	1205.0	116.0	1490.0	
...	...	...	...	...	...	
9352	1101.0	472.0	539.0	190.0	1374.0	
9353	1027.0	353.0	604.0	179.0	1264.0	
9354	1063.0	293.0	603.0	175.0	1241.0	
9355	961.0	235.0	702.0	156.0	1041.0	
9356	1047.0	265.0	654.0	168.0	1129.0	

	PT08.S5(O3)	Temperature	Relative Humidity	Absolute Humidity
0	1268.0	13.6	48.9	0.7578
1	972.0	13.3	47.7	0.7255
2	1074.0	11.9	54.0	0.7502
3	1203.0	11.0	60.0	0.7867
4	1110.0	11.2	59.6	0.7888
...	...	...	...	...
9352	1729.0	21.9	29.3	0.7568
9353	1269.0	24.3	23.7	0.7119
9354	1092.0	26.9	18.3	0.6406
9355	770.0	28.3	13.5	0.5139
9356	816.0	28.5	13.1	0.5028

[9357 rows x 15 columns]

```
df['Absolute Humidity'] = df['Absolute Humidity'].multiply(100)
df
```

	Date	Time	CO(GT)	PT08.S1(CO)	NMHC(GT)	C6H6(GT)	\
0	10/03/2004	18.00.00	2.6	1360.0	150.0	11.9	
1	10/03/2004	19.00.00	2.0	1292.0	112.0	9.4	
2	10/03/2004	20.00.00	2.2	1402.0	88.0	9.0	
3	10/03/2004	21.00.00	2.2	1376.0	80.0	9.2	
4	10/03/2004	22.00.00	1.6	1272.0	51.0	6.5	
...	...	...	...	...	...	...	
9352	04/04/2005	10.00.00	3.1	1314.0	-200.0	13.5	
9353	04/04/2005	11.00.00	2.4	1163.0	-200.0	11.4	
9354	04/04/2005	12.00.00	2.4	1142.0	-200.0	12.4	
9355	04/04/2005	13.00.00	2.1	1003.0	-200.0	9.5	
9356	04/04/2005	14.00.00	2.2	1071.0	-200.0	11.9	

	PT08.S2(NMHC)	NOx(GT)	PT08.S3(NOx)	NO2(GT)	PT08.S4(NO2)	\
0	1046.0	166.0	1056.0	113.0	1692.0	
1	955.0	103.0	1174.0	92.0	1559.0	
2	939.0	131.0	1140.0	114.0	1555.0	
3	948.0	172.0	1092.0	122.0	1584.0	
4	836.0	131.0	1205.0	116.0	1490.0	
...	...	...	...	...	...	
9352	1101.0	472.0	539.0	190.0	1374.0	
9353	1027.0	353.0	604.0	179.0	1264.0	
9354	1063.0	293.0	603.0	175.0	1241.0	
9355	961.0	235.0	702.0	156.0	1041.0	
9356	1047.0	265.0	654.0	168.0	1129.0	

	PT08.S5(O3)	Temperature	Relative Humidity	Absolute Humidity
0	1268.0	13.6	48.9	75.78
1	972.0	13.3	47.7	72.55
2	1074.0	11.9	54.0	75.02
3	1203.0	11.0	60.0	78.67
4	1110.0	11.2	59.6	78.88
...	...	...	...	...
9352	1729.0	21.9	29.3	75.68
9353	1269.0	24.3	23.7	71.19
9354	1092.0	26.9	18.3	64.06
9355	770.0	28.3	13.5	51.39
9356	816.0	28.5	13.1	50.28

[9357 rows x 15 columns]

```
import seaborn as sns
import matplotlib.pyplot as plt

def remove_outliers(column):
    Q1 = column.quantile(0.25)
    Q3 = column.quantile(0.75)
```

```
    IQR = Q3 - Q1
    threshold = 1.5 * IQR
    outlier_mask = (column < Q1 - threshold) | (column > Q3 +
threshold)
    return column[~outlier_mask]

df.columns
```

```
Index(['Date', 'Time', 'CO(GT)', 'PT08.S1(CO)', 'NMHC(GT)',
'C6H6(GT)',
       'PT08.S2(NMHC)', 'NOx(GT)', 'PT08.S3(NOx)', 'NO2(GT)',
'PT08.S4(NO2)',
       'PT08.S5(O3)', 'Temperature', 'Relative Humidity', 'Absolute
Humidity'],
      dtype='object')
```

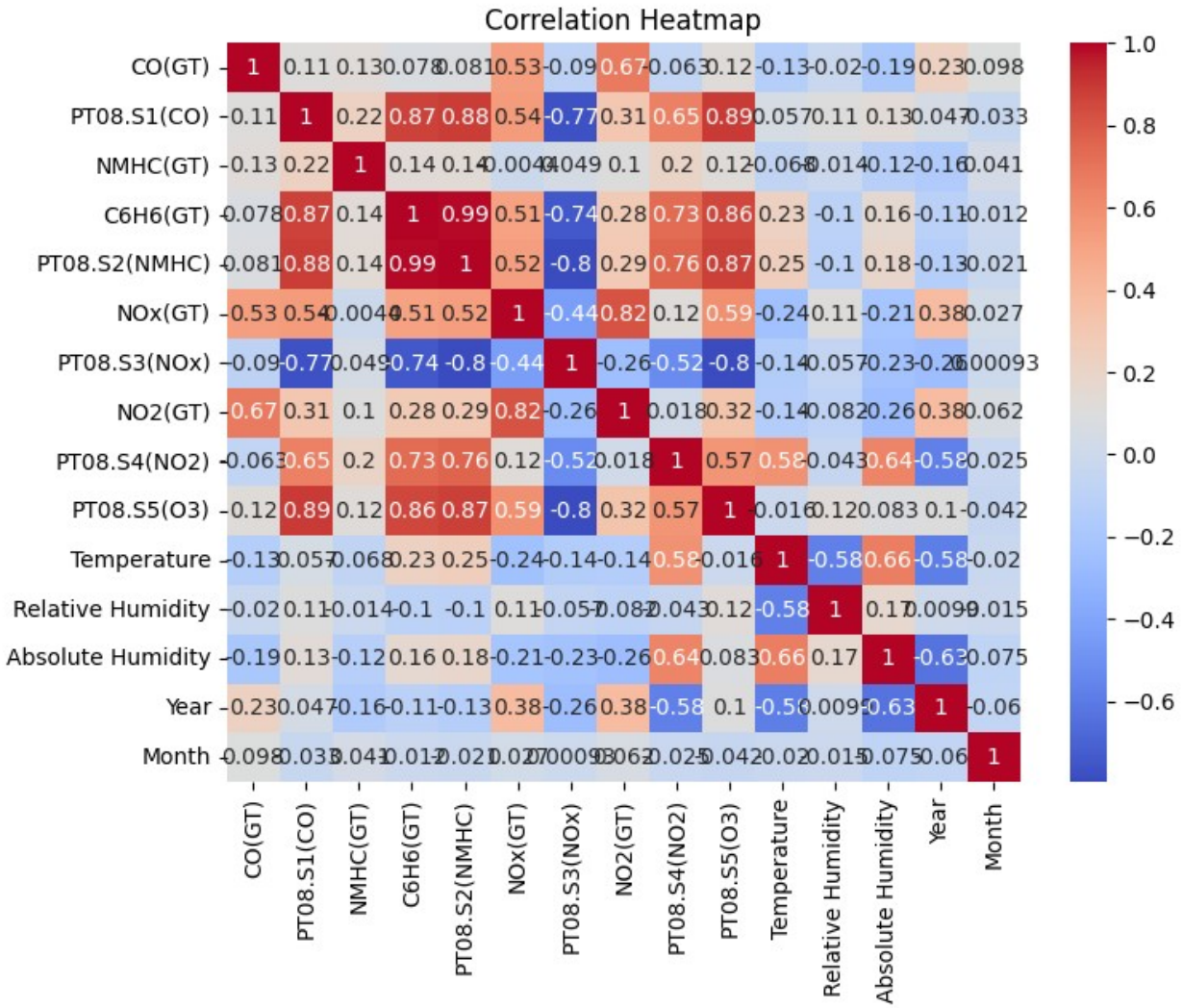
```
# Remove outliers for each column using a loop
col_name = ['Temperature','Relative Humidity','Absolute
Humidity','PT08.S4(NO2)','PT08.S5(O3)','C6H6(GT)',
       'PT08.S2(NMHC)','PT08.S1(CO)']
for col in col_name:
    df[col] = remove_outliers(df[col])

df['Date'] = pd.to_datetime(df['Date'], errors='coerce')

df['Year'] = df['Date'].dt.year
df['Month'] = df['Date'].dt.month

df['yearr']= df.Year.astype(str)
df['month']= df.Month.astype(str)

plt.figure(figsize=(8, 6))
sns.heatmap(df.select_dtypes(include=['number']).corr(), annot=True,
cmap='coolwarm')
plt.title('Correlation Heatmap')
plt.show()
```



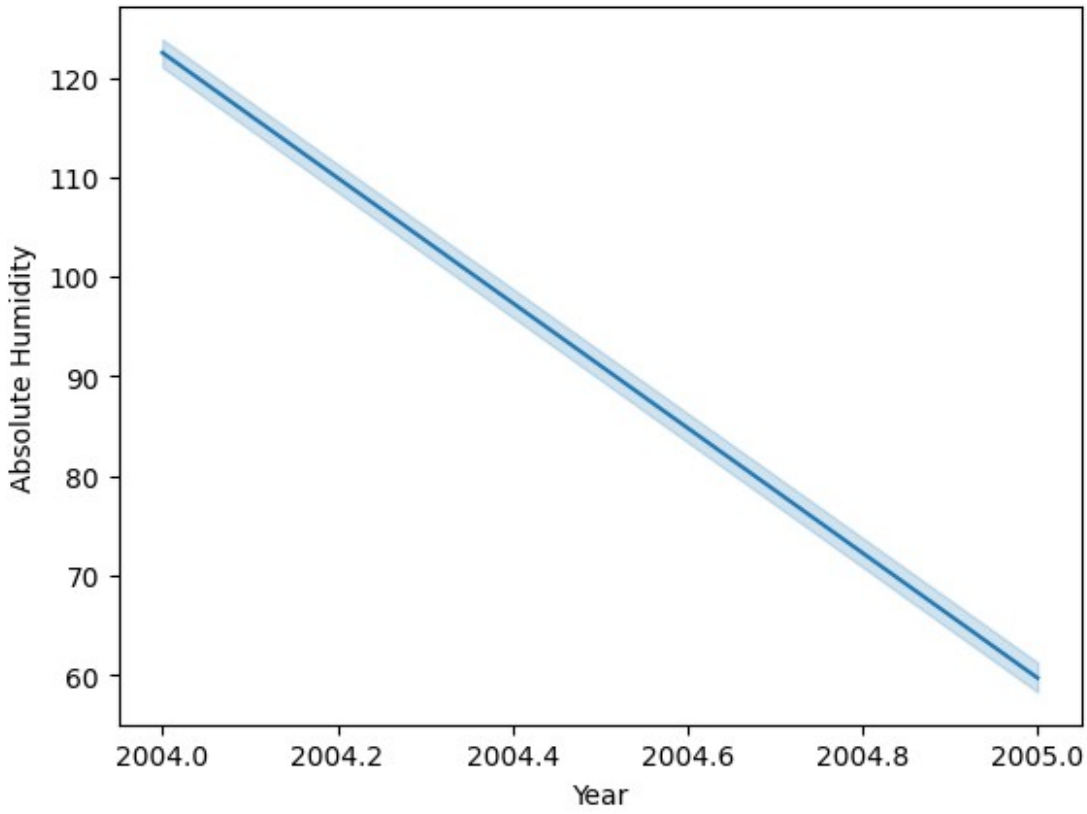

```
df.columns
```

```
Index(['Date', 'Time', 'CO(GT)', 'PT08.S1(CO)', 'NMHC(GT)',
'C6H6(GT)',
       'PT08.S2(NMHC)', 'NOx(GT)', 'PT08.S3(NOx)', 'NO2(GT)',
'PT08.S4(NO2)',
       'PT08.S5(O3)', 'Temperature', 'Relative Humidity', 'Absolute
Humidity',
       'Year', 'Month', 'yearr', 'month'],
      dtype='object')
```

LinePlot

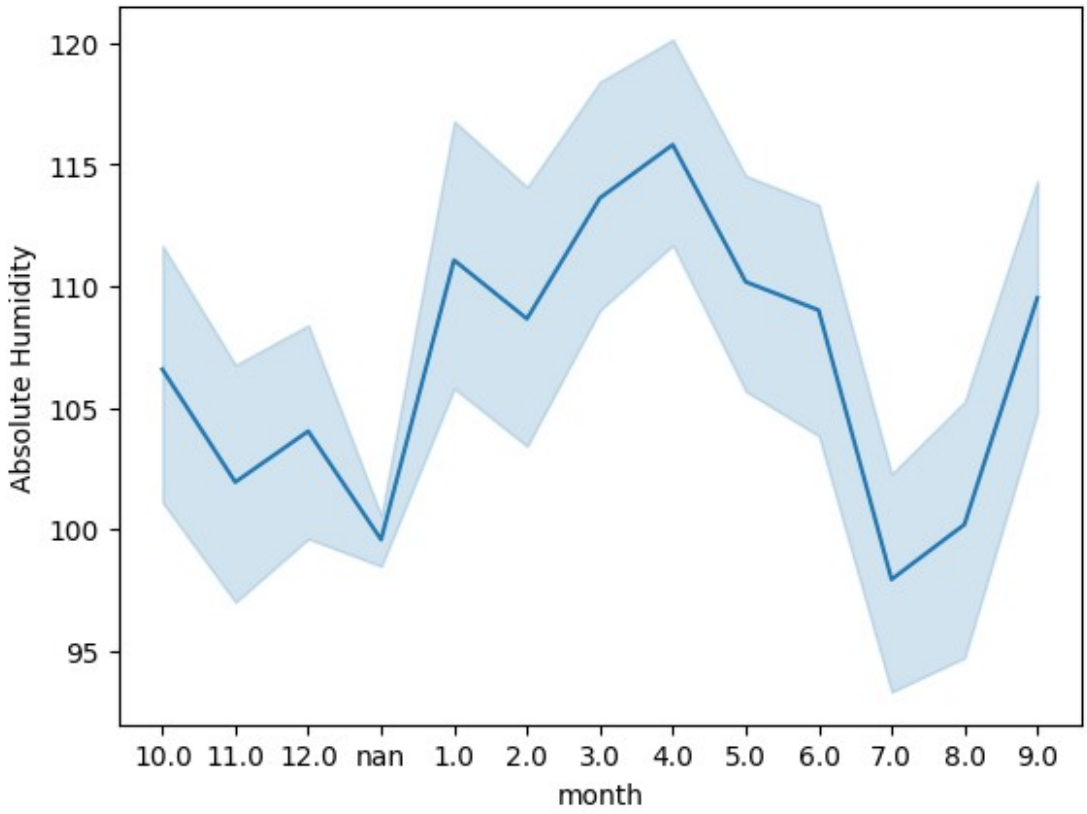
```
sns.lineplot(df,x="Year",y='Absolute Humidity')
```

```
<Axes: xlabel='Year', ylabel='Absolute Humidity'>
```



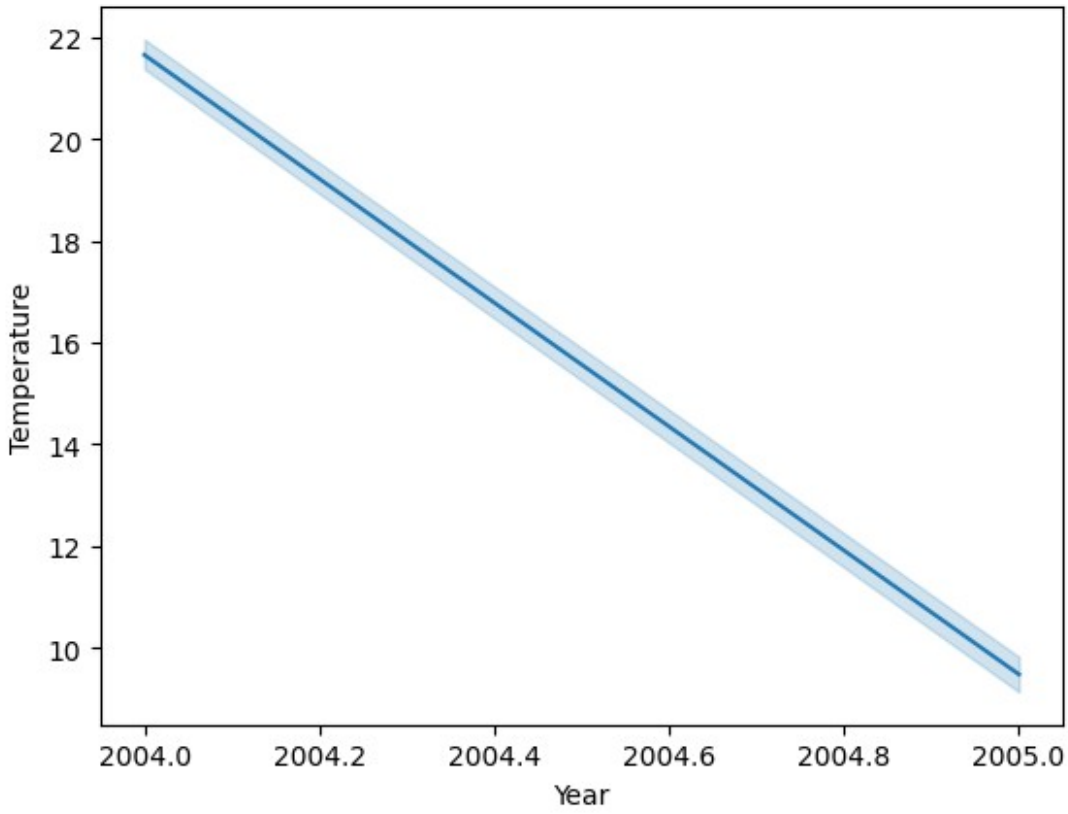

```
sns.lineplot(df,x="month",y='Absolute Humidity')
```

```
<Axes: xlabel='month', ylabel='Absolute Humidity'>
```



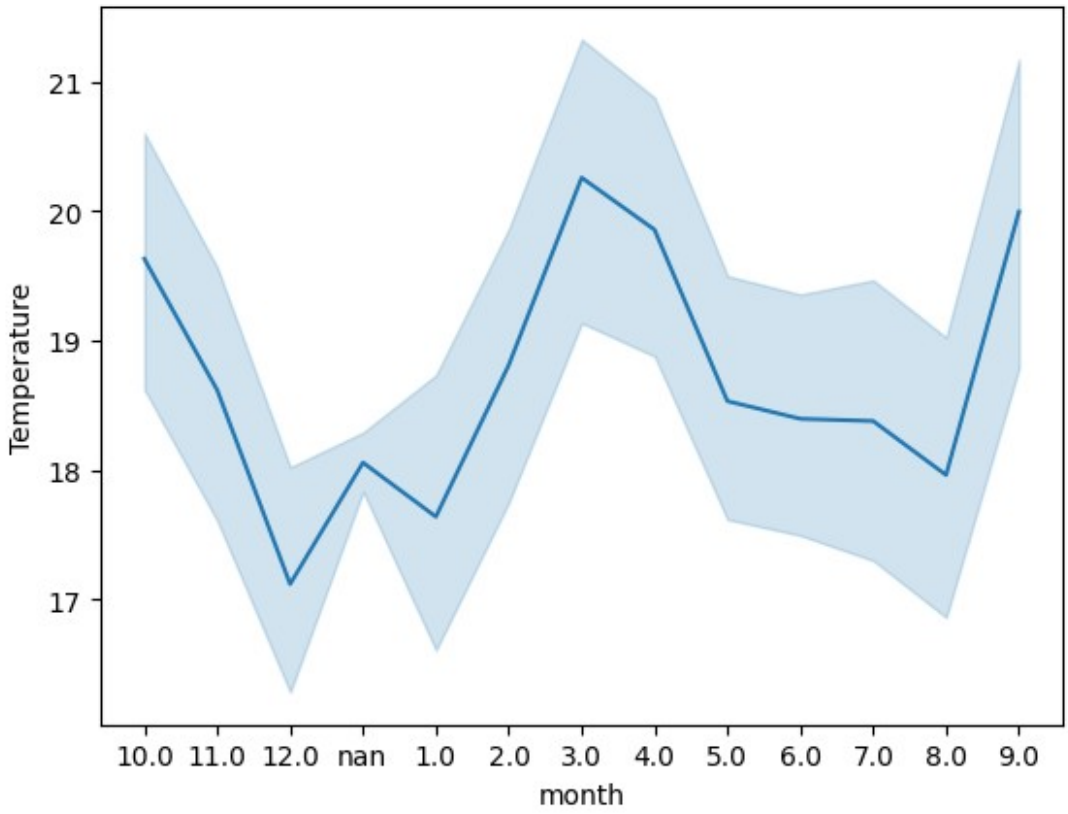

```
sns.lineplot(df,x="Year",y='Temperature')
```

```
<Axes: xlabel='Year', ylabel='Temperature'>
```



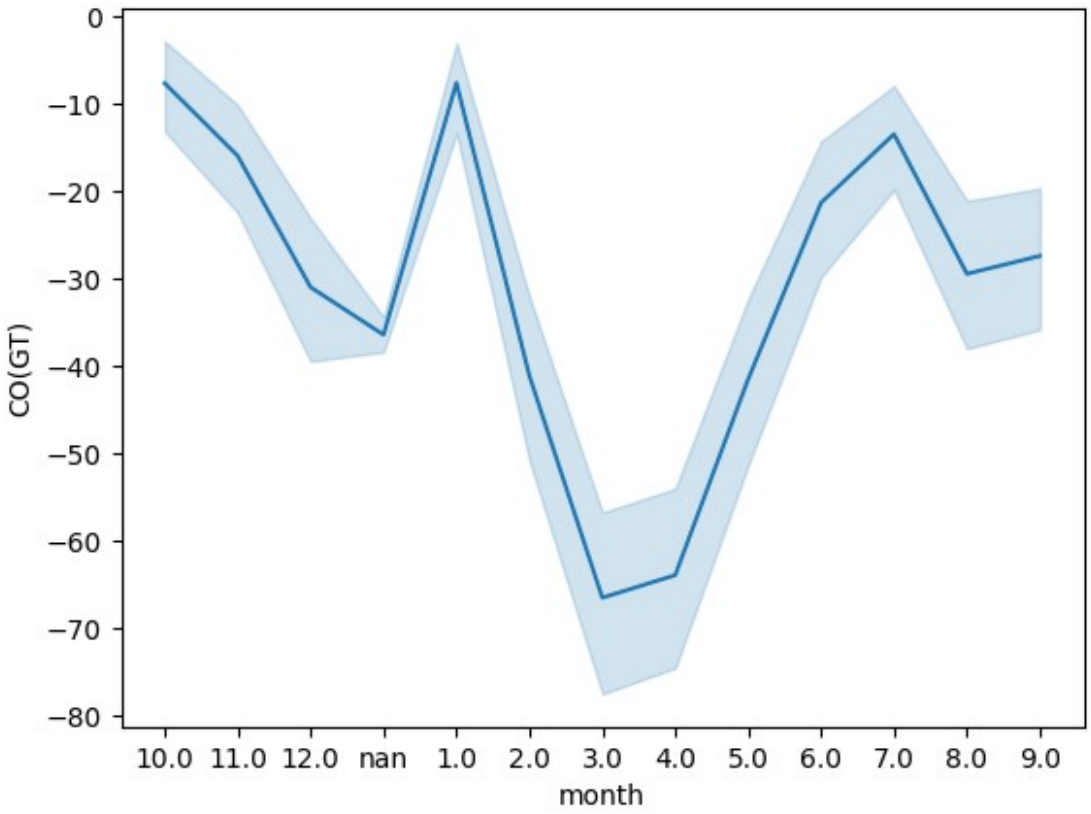

```
sns.lineplot(df,x="month",y='Temperature',)
```

```
<Axes: xlabel='month', ylabel='Temperature'>
```



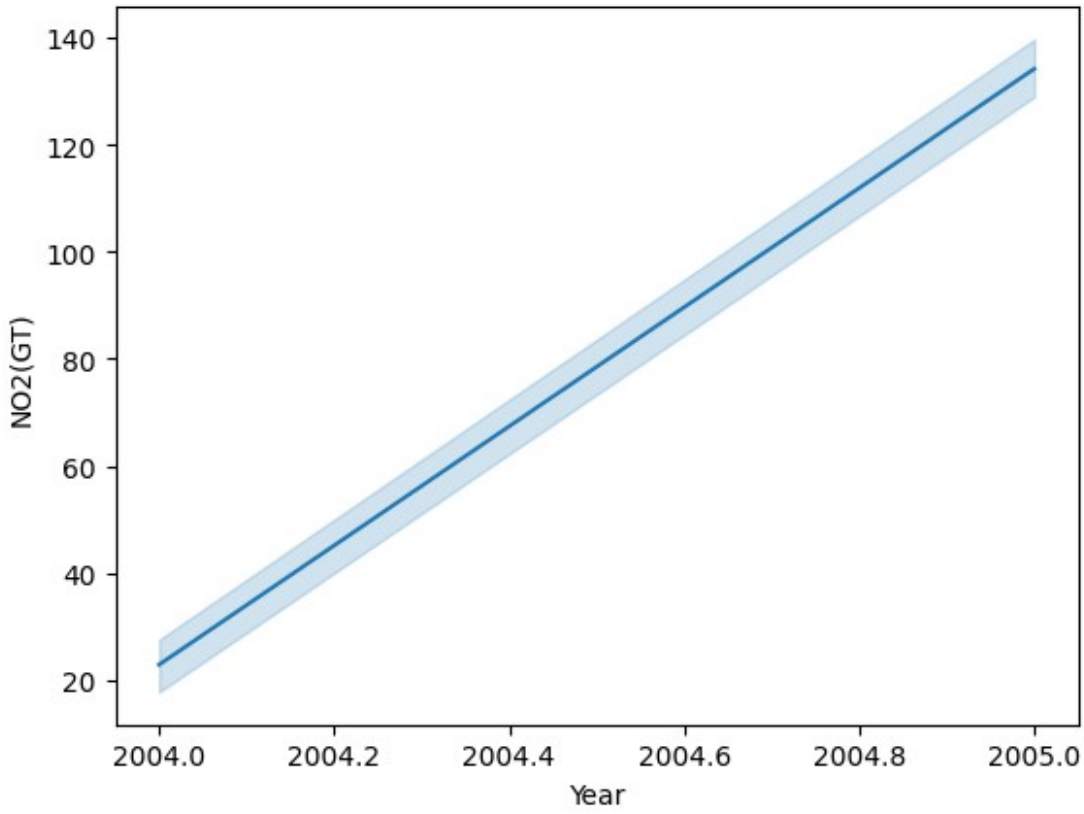

```
sns.lineplot(df,x="month",y='CO(GT)',)
```

```
<Axes: xlabel='month', ylabel='CO(GT)'>
```



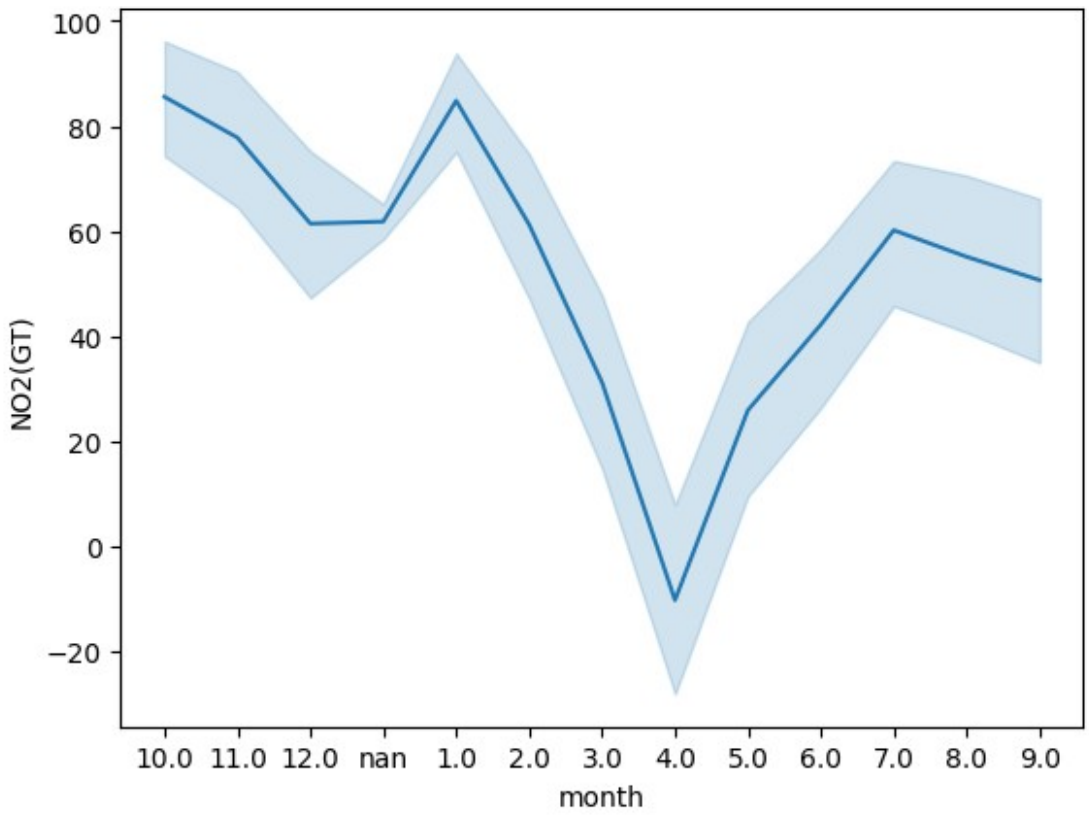

```
sns.lineplot(df,x="Year",y='NO2(GT)')
```

```
<Axes: xlabel='Year', ylabel='NO2(GT)'>
```



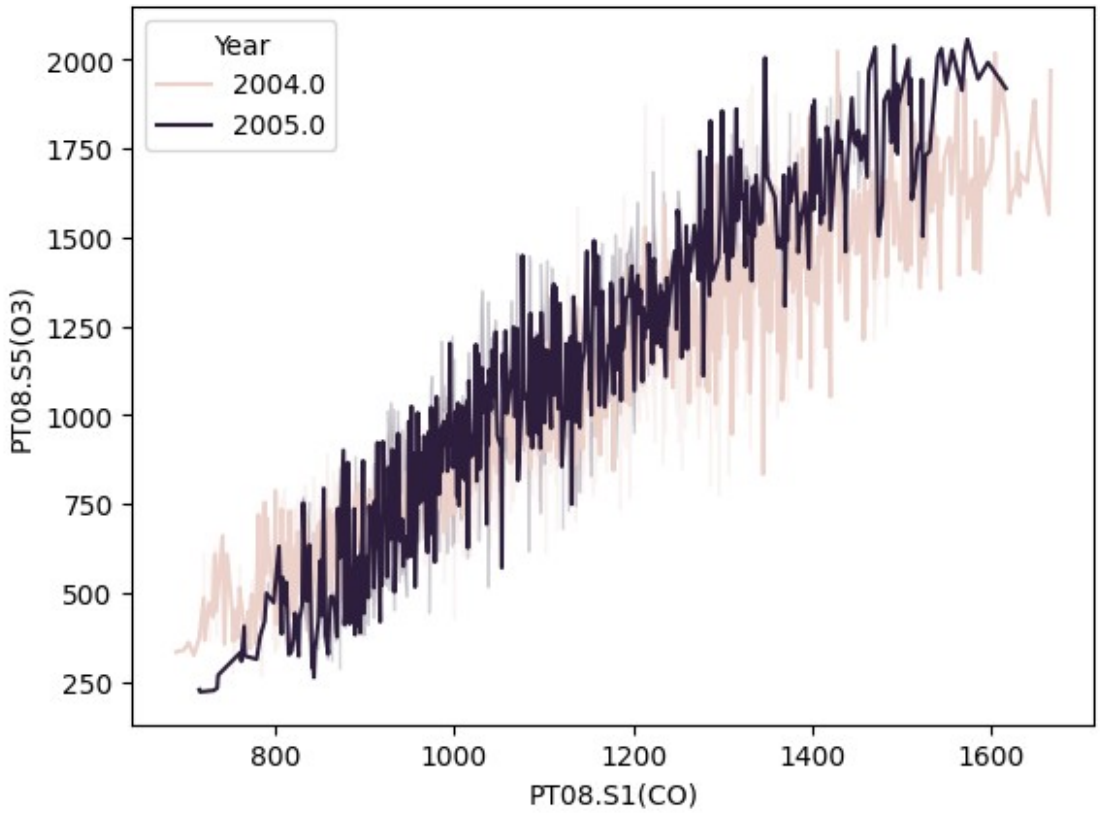

```
sns.lineplot(df,x="month",y='NO2(GT)')
```

```
<Axes: xlabel='month', ylabel='NO2(GT)'>
```




```
sns.lineplot(df,x='PT08.S1(CO)',y='PT08.S5(O3)',hue='Year')
```

```
<Axes: xlabel='PT08.S1(CO)', ylabel='PT08.S5(O3)'>
```

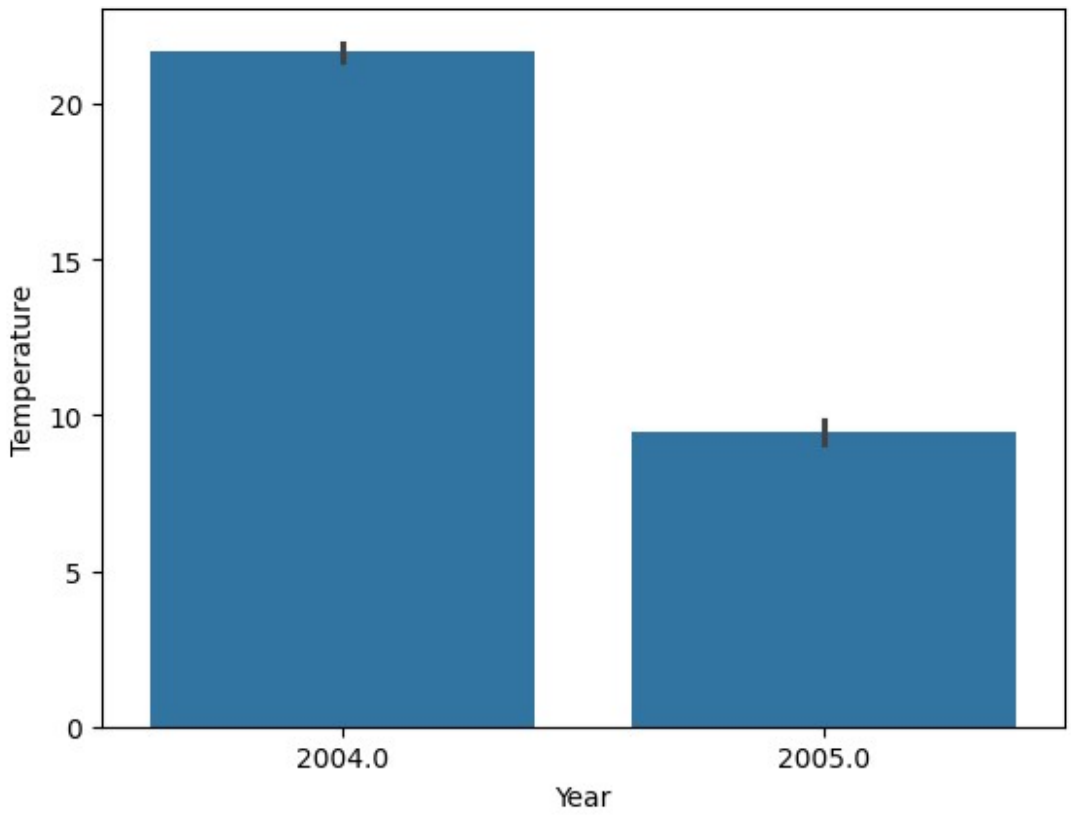



```
# sns.lineplot(df,x='PT08.S1(CO)',y='PT08.S5(O3)',hue='month')
```

Barplot

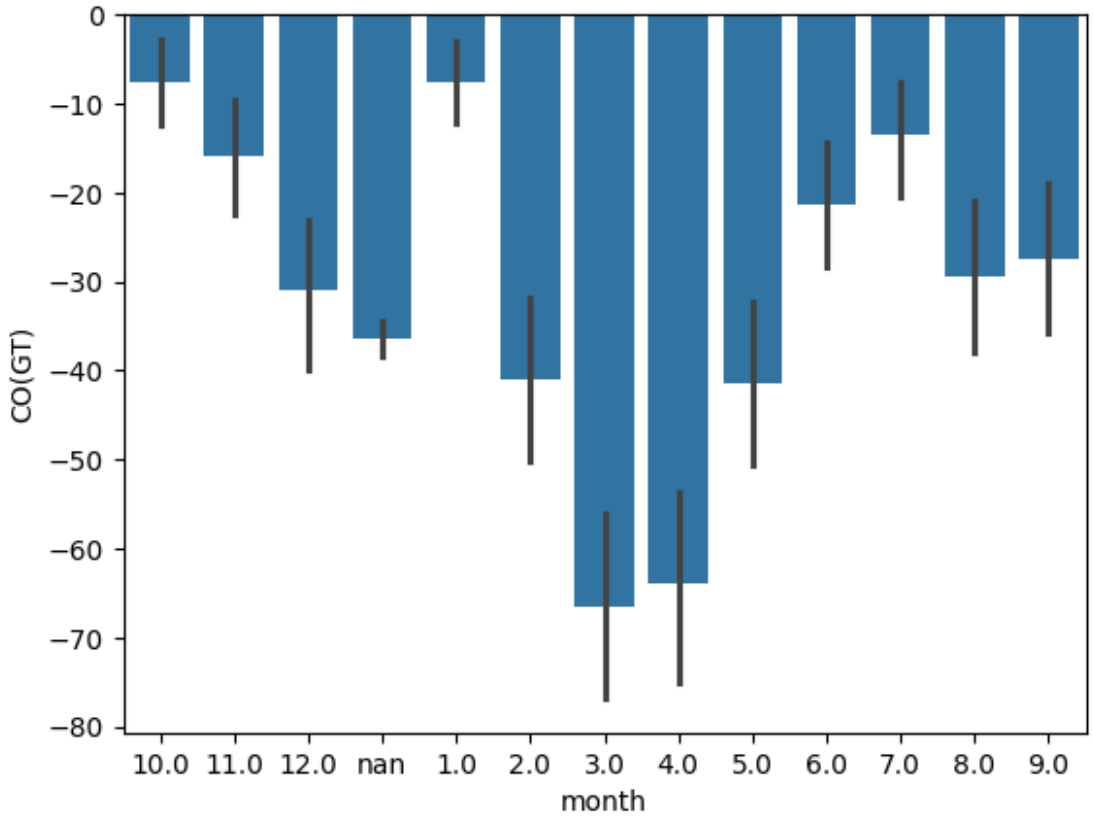
```
sns.barplot(df,x=df.Year,y=df.Temperature)
```

```
<Axes: xlabel='Year', ylabel='Temperature'>
```



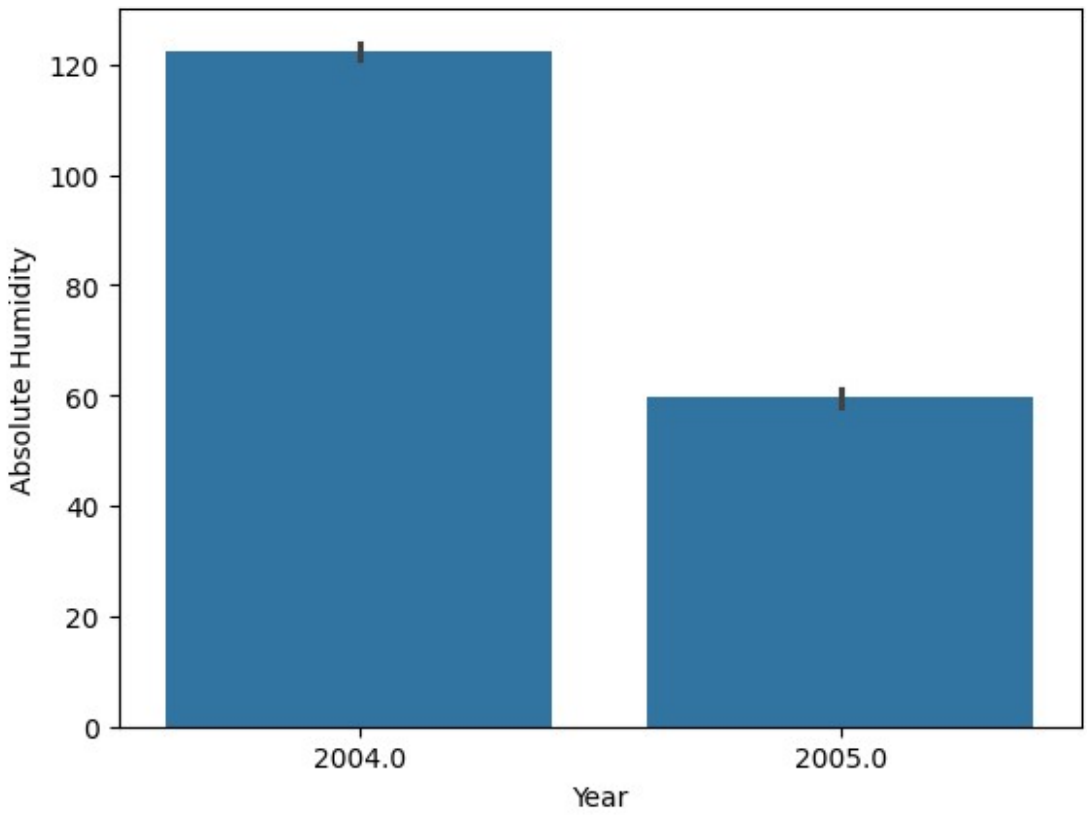

```
sns.barplot(df,x=df.month,y=df['CO(GT)'])
```

```
<Axes: xlabel='month', ylabel='CO(GT)'>
```



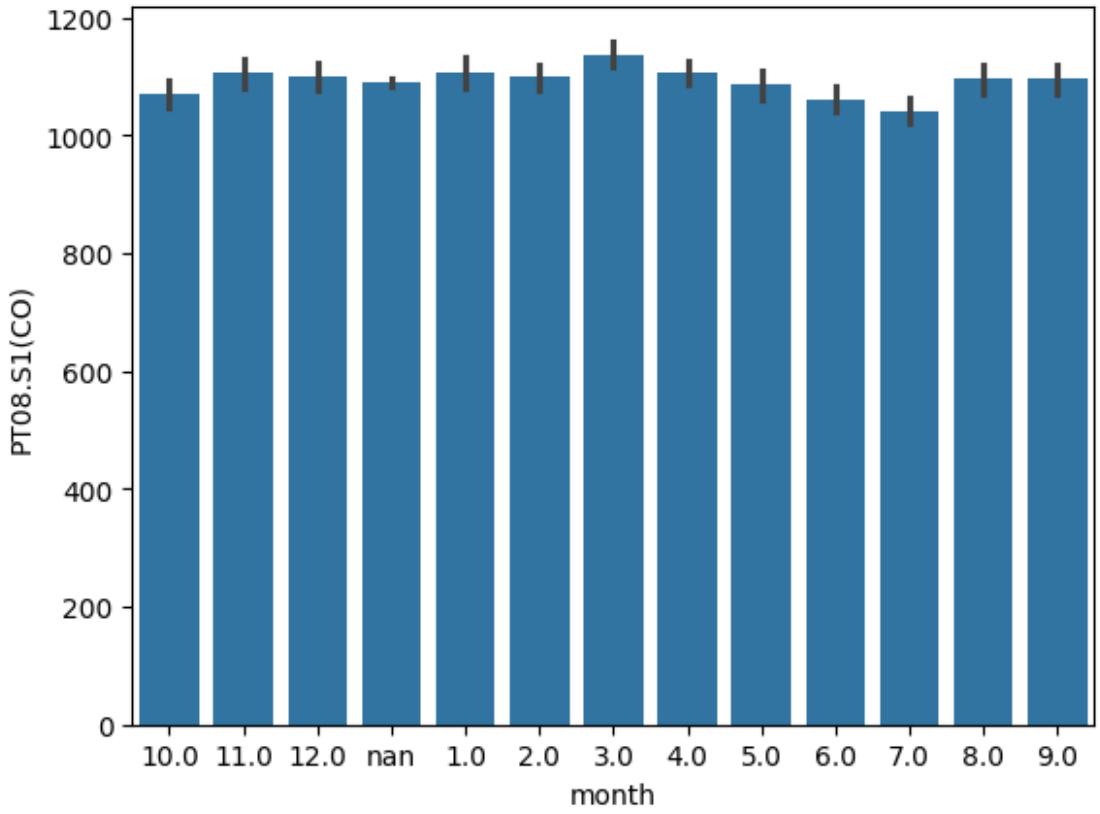

```
sns.barplot(df,x=df.Year,y='Absolute Humidity')
```

```
<Axes: xlabel='Year', ylabel='Absolute Humidity'>
```




```
sns.barplot(df,x=df.month,y='PT08.S1(CO)')
```

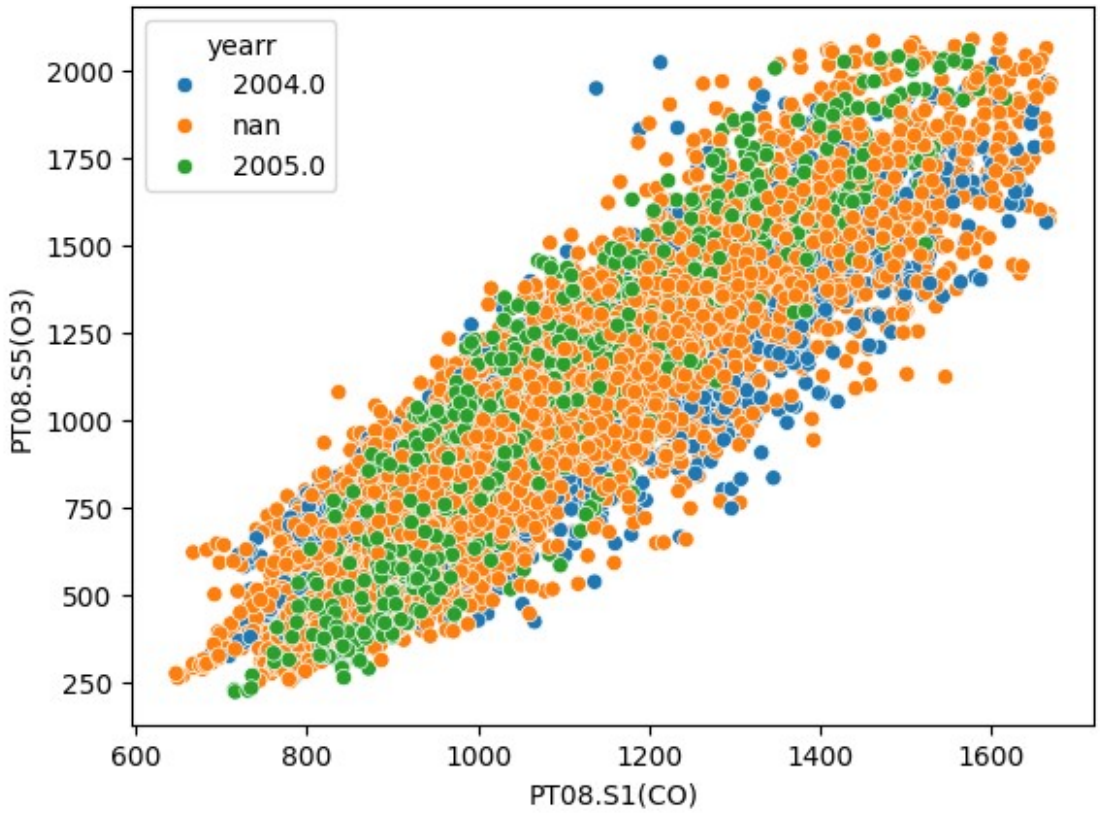
```
<Axes: xlabel='month', ylabel='PT08.S1(CO)'>
```



Scatter Plot

```
sns.scatterplot(df,x='PT08.S1(CO)',y='PT08.S5(O3)', hue='yearr')
```

```
<Axes: xlabel='PT08.S1(CO)', ylabel='PT08.S5(O3)'>
```

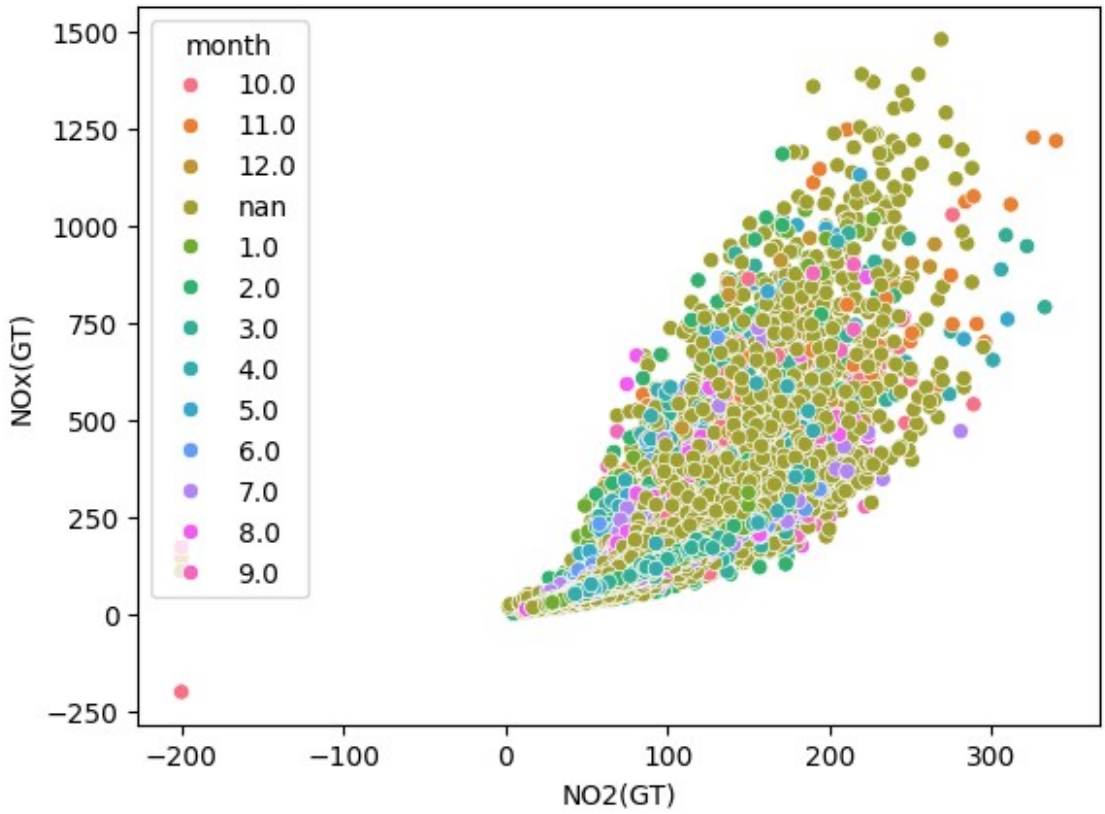



```
df.columns
```

```
Index(['Date', 'Time', 'CO(GT)', 'PT08.S1(CO)', 'NMHC(GT)',
'C6H6(GT)',
       'PT08.S2(NMHC)', 'NOx(GT)', 'PT08.S3(NOx)', 'NO2(GT)',
'PT08.S4(NO2)',
       'PT08.S5(O3)', 'Temperature', 'Relative Humidity', 'Absolute
Humidity',
       'Year', 'Month', 'yearr', 'month'],
      dtype='object')
```

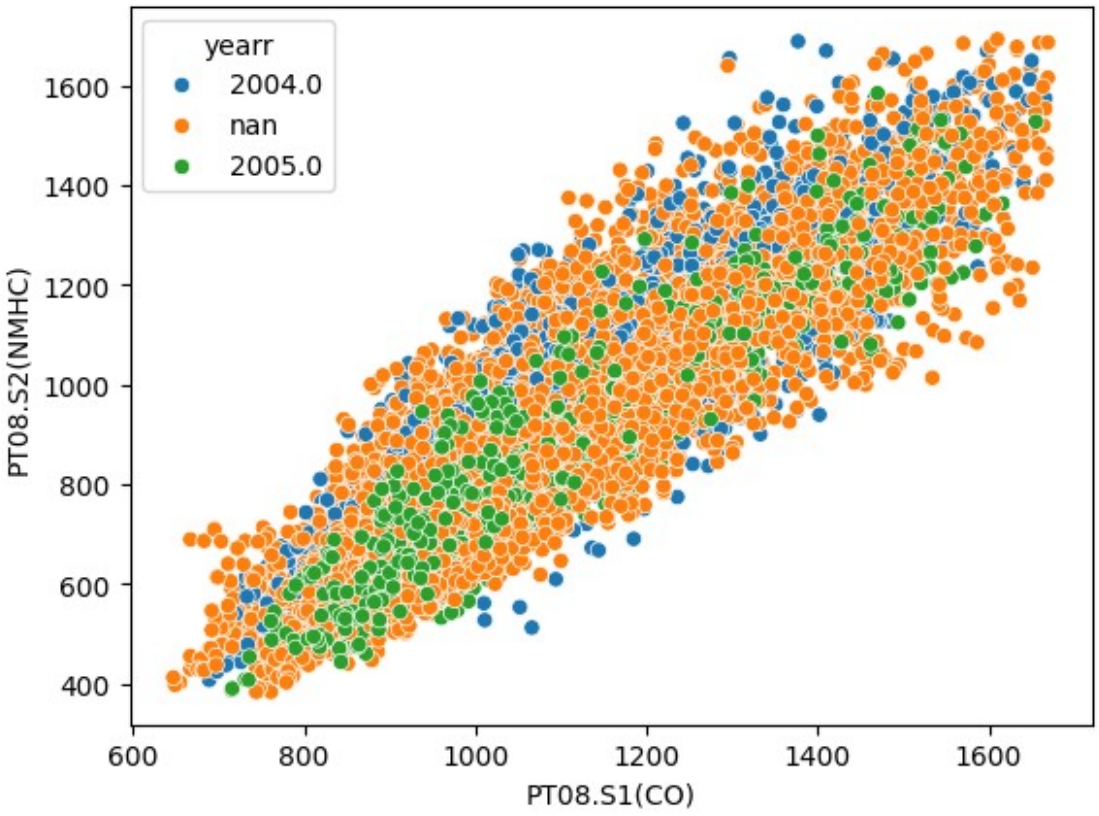
```
sns.scatterplot(df,x='NO2(GT)',y='NOx(GT)', hue='month')
```

```
<Axes: xlabel='NO2(GT)', ylabel='NOx(GT)'>
```



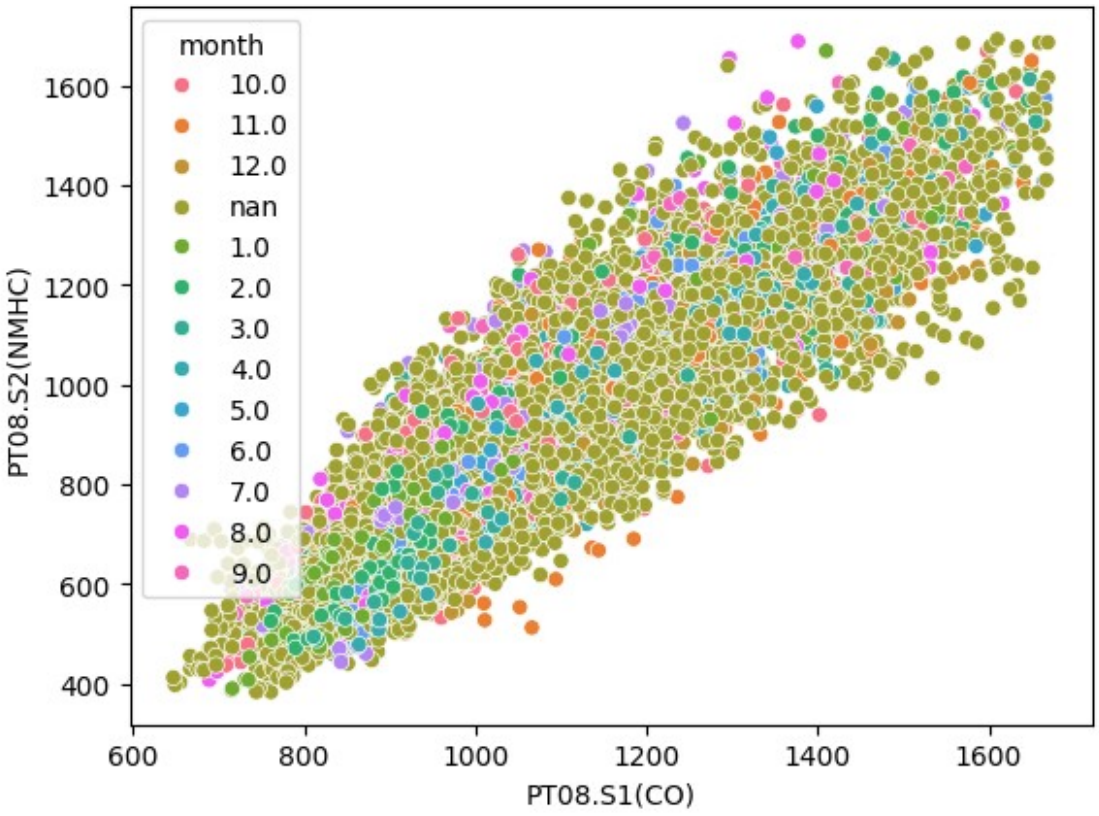

```
sns.scatterplot(df,y='PT08.S2(NMHC)',x='PT08.S1(CO)', hue='yearr')
```

```
<Axes: xlabel='PT08.S1(CO)', ylabel='PT08.S2(NMHC)'>
```




```
sns.scatterplot(df,y='PT08.S2(NMHC)',x='PT08.S1(CO)', hue='month')
```

```
<Axes: xlabel='PT08.S1(CO)', ylabel='PT08.S2(NMHC)'>
```


month
10.0
11.0
12.0
nan
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
PT08.S2(NMHC)
PT08.S1(CO)
400
600
800
1000
1200
1400
1600
600
800
1000
1200
1400
1600