Predict Sea Level Project

In [1]:
```
import pandas as pd
import matplotlib.pyplot as plt
from scipy.stats import linregress
```

In [2]:
```
df = pd.read_csv("epa-sea-level.csv")
```

In [3]:
```
df.head()
```

Out[3]:

	Year	CSIRO Adjusted Sea Level	Lower Error Bound	Upper Error Bound	NOAA Adjusted Sea Level
0	1880	0.000000	-0.952756	0.952756	NaN
1	1881	0.220472	-0.732283	1.173228	NaN
2	1882	-0.440945	-1.346457	0.464567	NaN
3	1883	-0.232283	-1.129921	0.665354	NaN
4	1884	0.590551	-0.283465	1.464567	NaN

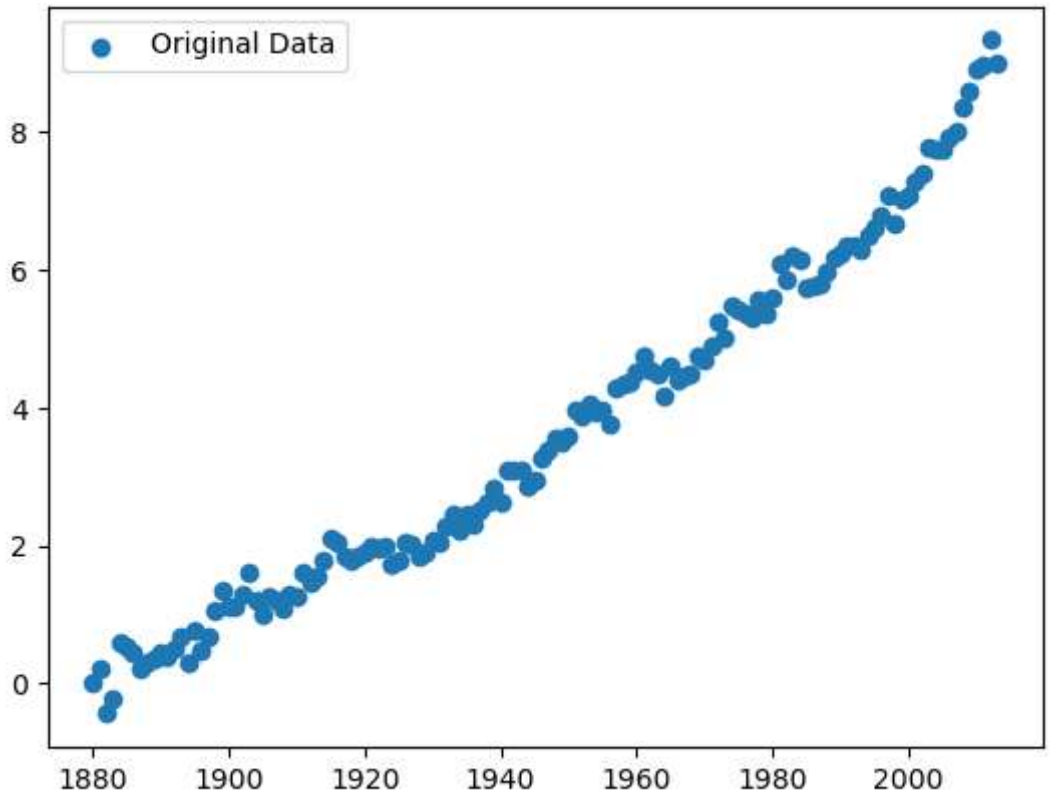
In [ ]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 134 entries, 0 to 133
Data columns (total 5 columns):
 #   Column                   Non-Null Count  Dtype  
---  ------                   --------------  -----  
 0   Year                     134 non-null    int64  
 1   CSIRO Adjusted Sea Level 134 non-null    float64
 2   Lower Error Bound        134 non-null    float64
 3   Upper Error Bound        134 non-null    float64
 4   NOAA Adjusted Sea Level  21 non-null     float64
dtypes: float64(4), int64(1)
memory usage: 5.4 KB
```

Creating a Scatter plot to describe The Original Data

In [ ]:
```
x, y= df['Year'], df["CSIRO Adjusted Sea Level"]
plt.scatter(x,y,label="Original Data")
plt.legend()
```

```
<matplotlib.legend.Legend at 0x1add0766fa0>
<Figure size 640x480 with 1 Axes>
```



In [ ]:
```
#Creating our first line that fits the original data
first_line = linregress(x,y)
first_line
```

```
LinregressResult(slope=0.0630445840121348, intercept=-119.06594196773978, rvalue=0.9847
57131182585, pvalue=3.7886969791131554e-102, stderr=0.000969211871328715, intercept_std
err=1.8869433812425225)
```

In [ ]:
```
last_year = x.max()
df = df.append([{"Year": y} for y in range(last_year + 1, 2051)])
df
```

```
C:\Users\SharQ\AppData\Local\Temp\ipykernel_6292\1956425223.py:2: FutureWarning: The fr
ame.append method is deprecated and will be removed from pandas in a future version. Us
e pandas.concat instead.
  df = df.append([{"Year": y} for y in range(last_year + 1, 2051)])
```

```
    Year  CSIRO Adjusted Sea Level  Lower Error Bound  Upper Error Bound  \
0   1880                  0.000000          -0.952756           0.952756
1   1881                  0.220472          -0.732283           1.173228
2   1882                 -0.440945          -1.346457           0.464567
3   1883                 -0.232283          -1.129921           0.665354
4   1884                  0.590551          -0.283465           1.464567
..   ...                       ...                ...                ...
32  2046                       NaN                NaN                NaN
33  2047                       NaN                NaN                NaN
34  2048                       NaN                NaN                NaN
35  2049                       NaN                NaN                NaN
36  2050                       NaN                NaN                NaN

    NOAA Adjusted Sea Level
0                       NaN
1                       NaN
2                       NaN
3                       NaN
4                       NaN
..                      ...
32                      NaN
33                      NaN
34                      NaN
35                      NaN
36                      NaN

[171 rows x 5 columns]
```

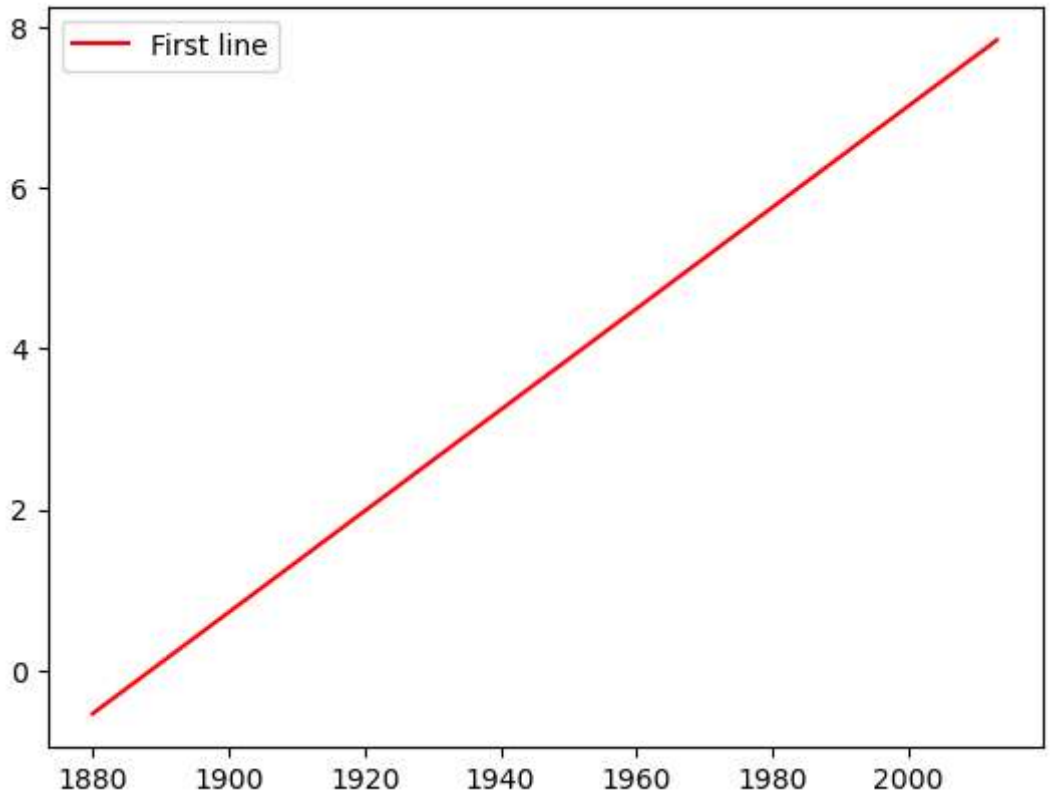
	Year	CSIRO Adjusted Sea Level	Lower Error Bound	Upper Error Bound	NOAA Adjusted Sea Level
0	1880	0.000000	-0.952756	0.952756	NaN
1	1881	0.220472	-0.732283	1.173228	NaN
2	1882	-0.440945	-1.346457	0.464567	NaN
3	1883	-0.232283	-1.129921	0.665354	NaN
4	1884	0.590551	-0.283465	1.464567	NaN
...	...	...	...	...	...
32	2046	NaN	NaN	NaN	NaN
33	2047	NaN	NaN	NaN	NaN
34	2048	NaN	NaN	NaN	NaN
35	2049	NaN	NaN	NaN	NaN
36	2050	NaN	NaN	NaN	NaN

171 rows × 5 columns

Plotting the line that fits the data

In [ ]:
```
plt.plot(x, first_line.intercept + first_line.slope*x, 'r', label='First line')
plt.legend()
```

```
<matplotlib.legend.Legend at 0x1add04e5f70>
<Figure size 640x480 with 1 Axes>
```



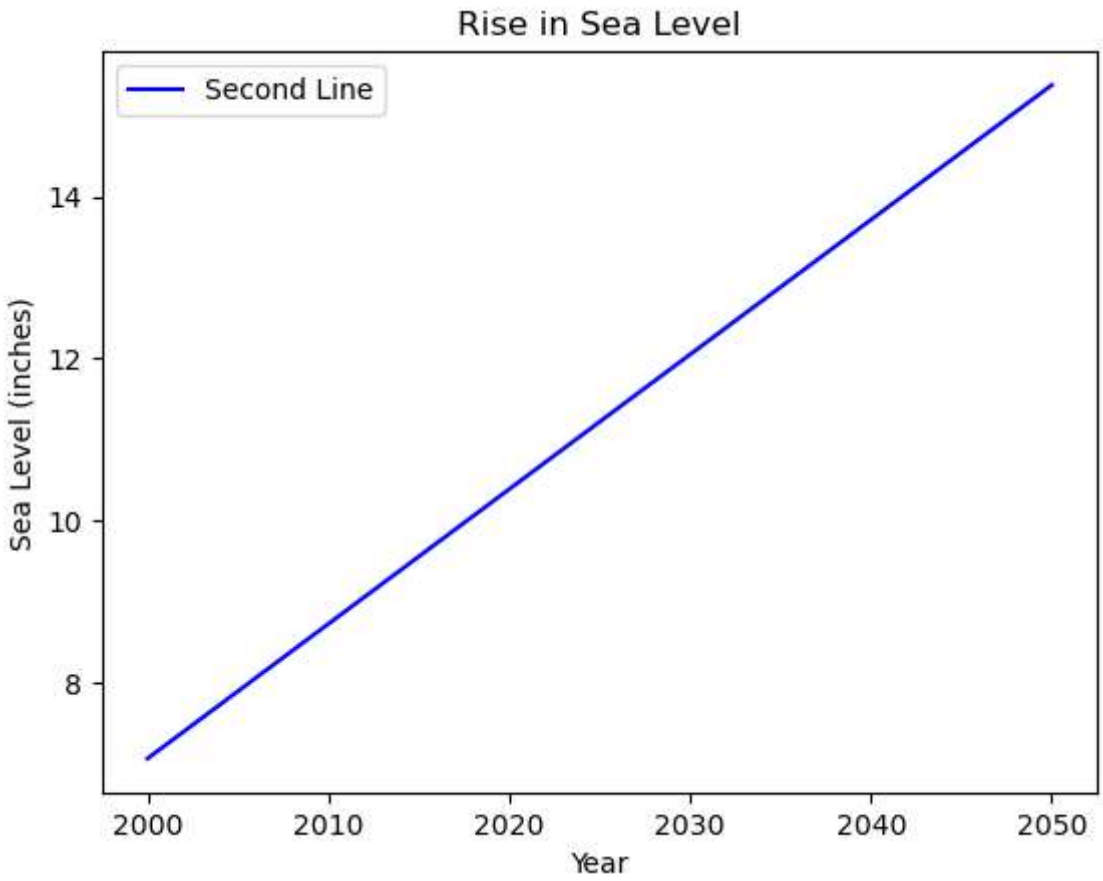
In [ ]:
```
df_recent = df.loc[(df["Year"] >= 2000) & (df["Year"] <= x.max())]
bestfit = linregress(df_recent["Year"], df_recent["CSIRO Adjusted Sea Level"])
df_recent = df_recent.append([{"Year": y} for y in range(last_year + 1, 2051)])
```

```
C:\Users\SharQ\AppData\Local\Temp\ipykernel_6292\1020971322.py:3: FutureWarning: The fr
ame.append method is deprecated and will be removed from pandas in a future version. Us
e pandas.concat instead.
  df_recent = df_recent.append([{"Year": y} for y in range(last_year + 1, 2051)])
```

Creating a second line to predict the sea level from year 2000 ---> 2050

In [ ]:
```
plt.plot(
        df_recent["Year"],
        bestfit.intercept + bestfit.slope * df_recent["Year"],
        c="b",
        label="Second Line",
    )
# Add labels and title
plt.xlabel("Year")
plt.ylabel("Sea Level (inches)")
plt.title("Rise in Sea Level")
plt.legend()
```

```
<matplotlib.legend.Legend at 0x1adcee9cac0>
<Figure size 640x480 with 1 Axes>
```


Rise in Sea Level
Second Line
Sea Level (inches)
14
12
10
8
2000
2010
2020
2030
2040
2050
Year