Weather Analysis for Chicago Temperature and Global Temperature

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Introduction

> I chose the weather_chicago and weather_global dataset. As a personal study, I sought out to find the average temperature and rolling temperature for global and local(Chicago). I want to see was that affect globally or locally to greenhouses.

Exploratory Data Analysis

In [31]:
```
# import all functions which would help me to get correct analysis
import pandas as pd
import numpy as np
from IPython.display import Image


%matplotlib inline
import matplotlib.pyplot as plt
```

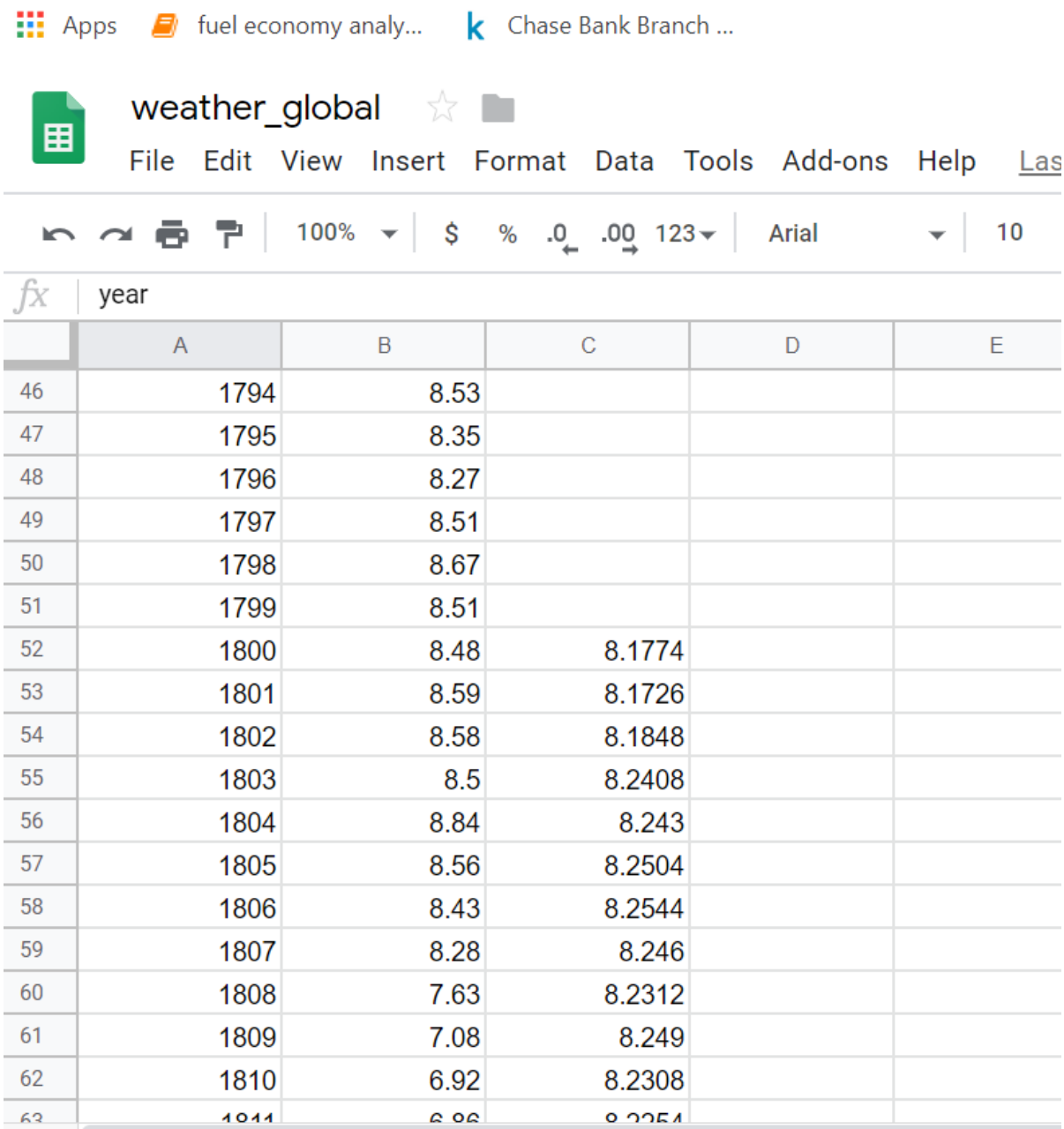
In [2]:
```
#import CSV file
df_g = pd.read_csv("./weather_global.csv")
df_c = pd.read_csv("./weather_chicago.csv")
```

In [3]:
```
# Getting rollinging avg. value for global weather data set
roll_avg = df_g['avg_temp'].rolling(50).mean()
```

In [4]:
```
# inserting new colmun as moving avg.
df_g.insert(2, 'ma', roll_avg)
```

In [29]:
```
# import the screenshot Image for varification
Image(filename='./Global_weather.PNG')
```

Out[29]:



	A	B	C	D	E
46	1794	8.53			
47	1795	8.35			
48	1796	8.27			
49	1797	8.51			
50	1798	8.67			
51	1799	8.51			
52	1800	8.48	8.1774		
53	1801	8.59	8.1726		
54	1802	8.58	8.1848		
55	1803	8.5	8.2408		
56	1804	8.84	8.243		
57	1805	8.56	8.2504		
58	1806	8.43	8.2544		
59	1807	8.28	8.246		
60	1808	7.63	8.2312		
61	1809	7.08	8.249		
62	1810	6.92	8.2308		
63	1811	6.86	8.2254		

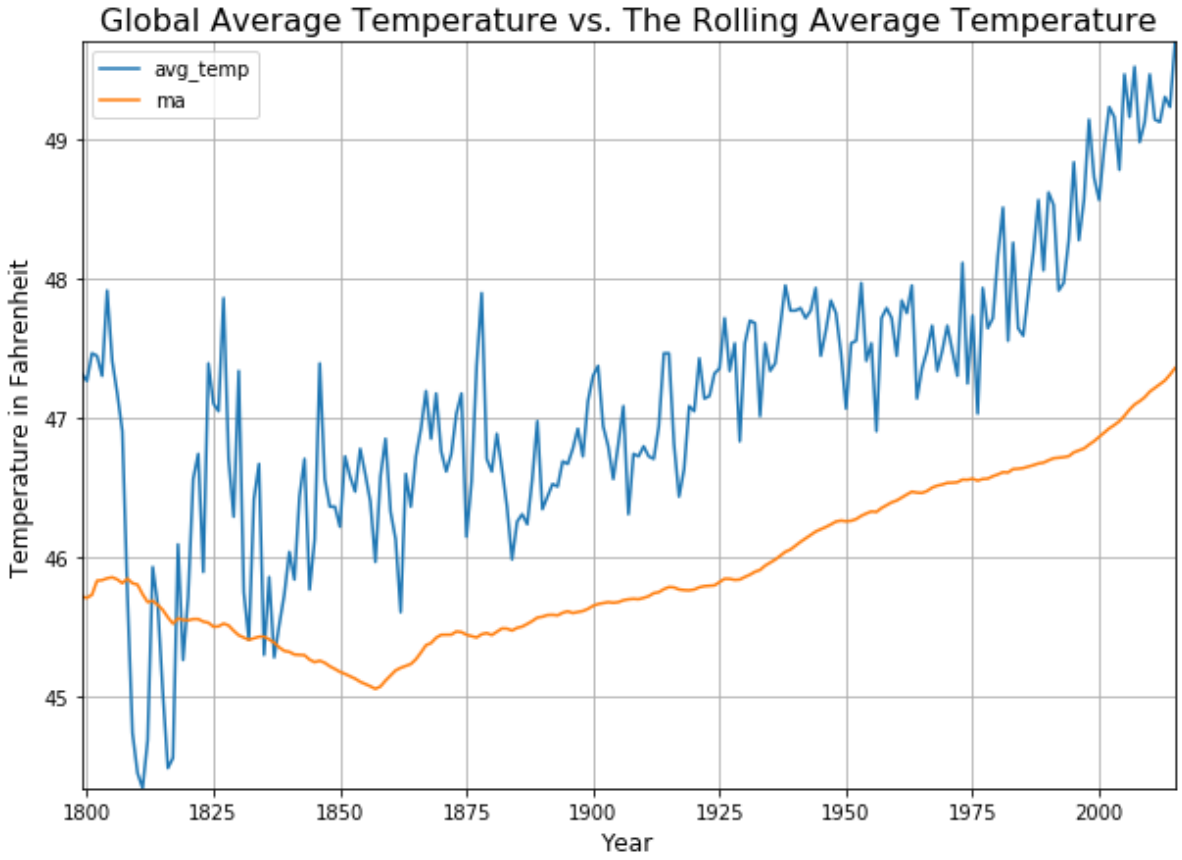
In [5]:
```
# Cleaning Data and droping null value from updated dataframe
df_1 = df_g.dropna()
```

In [6]:
```
# Export new data to ".csv" file
df_1.to_csv('./global_final.csv', index=False)
```

In [7]:
```
# callback upadated dataframe
df = pd.read_csv('./global_final.csv')
```

In [8]:
```
# Convert Celsius to Fahrenheit and
# formula is (0°C × 9/5) + 32 = 32°F
df.avg_temp = df.avg_temp.apply(lambda x: x*(9/5) + 32)
df.ma = df.ma.apply(lambda x: x*(9/5) + 31)
```

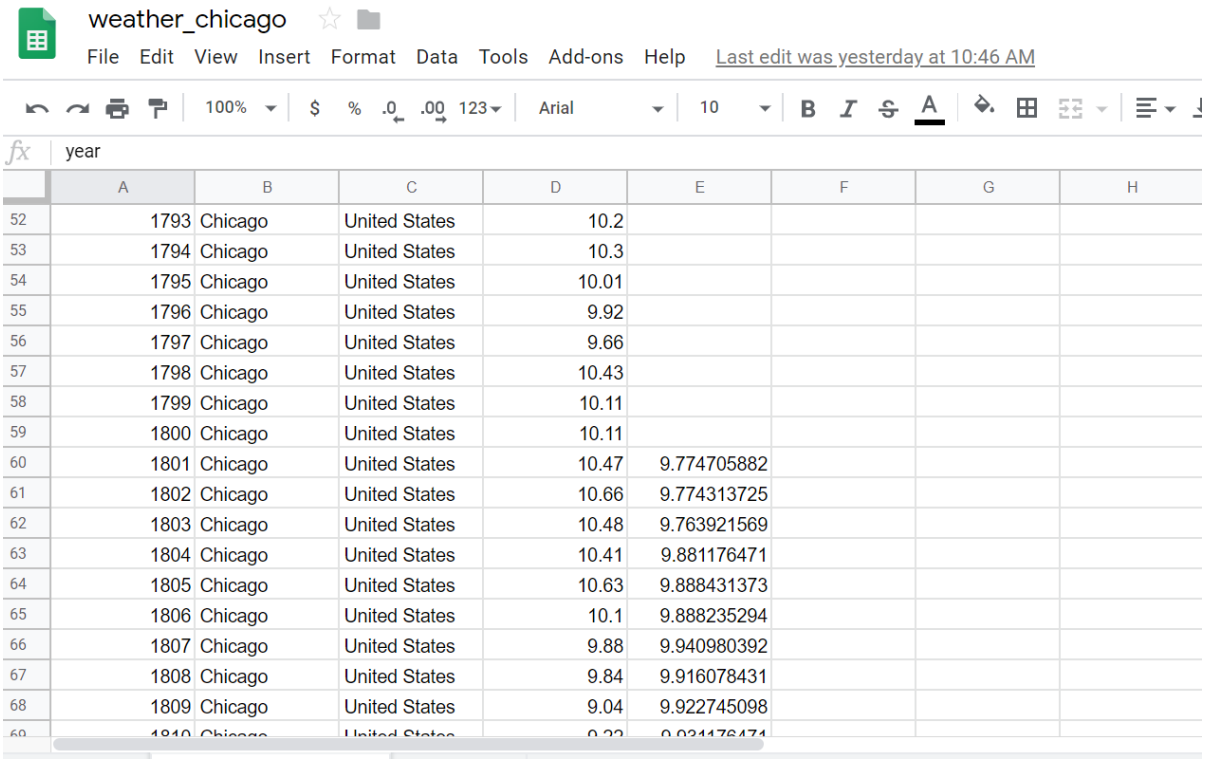
In [9]:
```
# visualisation for global avg. temp. and moving temp.
plt.subplots = True
df.plot.line(x='year', y=['avg_temp', 'ma'], figsize=(10,7), grid=True)
plt.title("Global Average Temperature vs. The Rolling Average Temperature", fo
ntsize=16)
plt.xlabel('Year', fontsize=12)
plt.ylabel('Temperature in Fahrenheit', fontsize=12)
plt.margins(0)
plt.show()
```



Calculate and plot the average temperature vs. the rolling average temperature for Chicago across a period of 200 years

In [30]:
```
# import the screenshot Image for varification
Image(filename='./chicago_weather.PNG')
```

Out[30]:



weather_chicago

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	A	B	C	D	E	F	G	H
52	1793	Chicago	United States	10.2				
53	1794	Chicago	United States	10.3				
54	1795	Chicago	United States	10.01				
55	1796	Chicago	United States	9.92				
56	1797	Chicago	United States	9.66				
57	1798	Chicago	United States	10.43				
58	1799	Chicago	United States	10.11				
59	1800	Chicago	United States	10.11				
60	1801	Chicago	United States	10.47	9.774705882			
61	1802	Chicago	United States	10.66	9.774313725			
62	1803	Chicago	United States	10.48	9.763921569			
63	1804	Chicago	United States	10.41	9.881176471			
64	1805	Chicago	United States	10.63	9.888431373			
65	1806	Chicago	United States	10.1	9.888235294			
66	1807	Chicago	United States	9.88	9.940980392			
67	1808	Chicago	United States	9.84	9.916078431			
68	1809	Chicago	United States	9.04	9.922745098			

In [10]:
```
# Clean the data with null values
df_c.dropna(inplace=True)
```

In [11]:
```
# as I want to start my calculation from year 1750, I drop all data before tha
t year
df_c.drop(df_c.query('year < 1750').index, inplace=True)
df_c.reset_index(drop=True, inplace=True)
df_c.head()
```

In [13]:
```
# Getting rollinging avg. value for local(Chicago) weather data set
roll_avg_chicago = df_c['avg_temp'].rolling(50).mean()
```

In [14]:
```
# inserting new colmun as moving avg.
df_c.insert(2, 'ma', roll_avg_chicago)
```

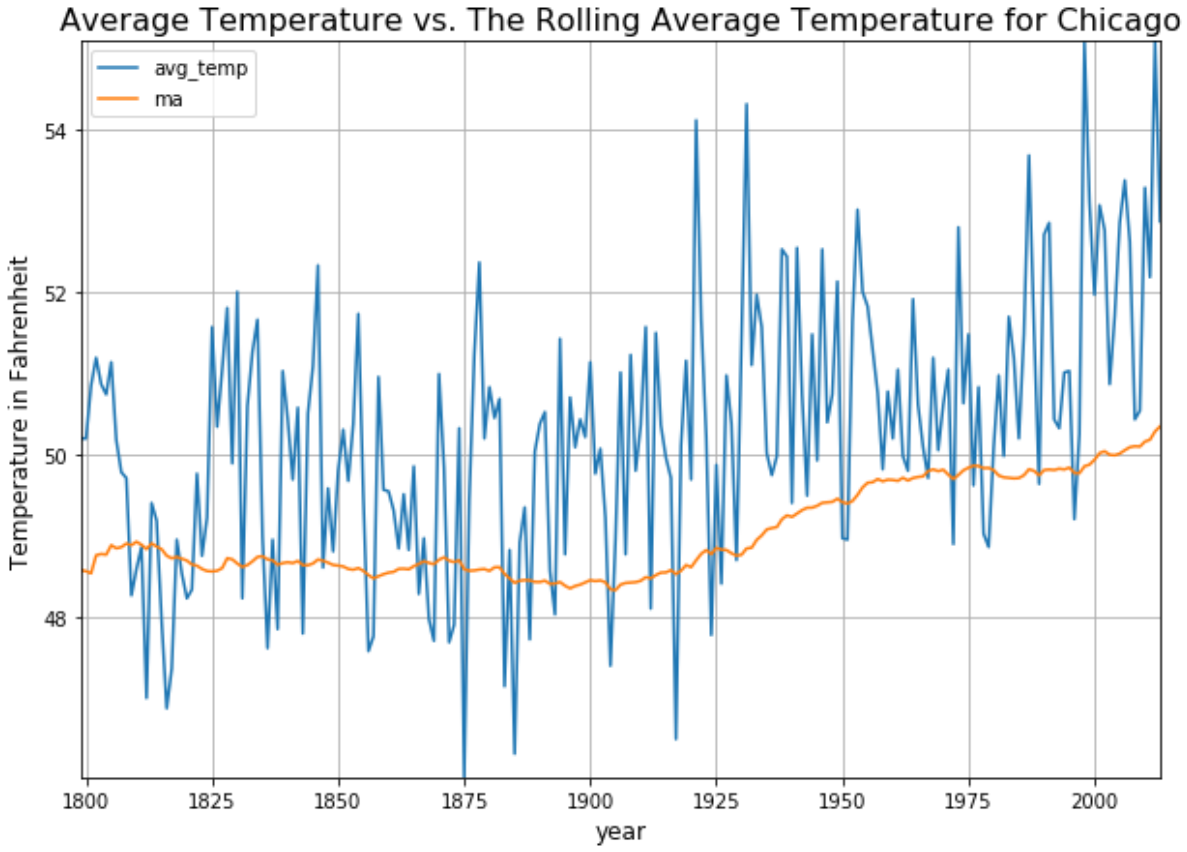
In [15]:
```
# Cleaning Data and droping null value from updated dataframe
df_2 = df_c.dropna()
```

In [16]:
```
# Export new data to ".csv" file
df_2.to_csv('./chicago_final.csv', index=False)
```

In [17]:
```
# callback upadated dataframe
df_chicago = pd.read_csv('./chicago_final.csv')
```

In [18]:
```
# Convert Celsius to Fahrenheit and
# formula is (0°C × 9/5) + 32 = 32°F
df_chicago.avg_temp = df_chicago.avg_temp.apply(lambda x: x*(9/5) + 32)
df_chicago.ma = df_chicago.ma.apply(lambda x: x*(9/5) + 31)
```

In [19]:
```
# visualisation for local(Chicago) avg. temp. and moving temp.
plt.subplots = True
df_chicago.plot.line(x='year', y=['avg_temp', 'ma'], figsize=(10,7), grid=True
)
plt.title("Average Temperature vs. The Rolling Average Temperature for Chicag
o", fontsize=16)
plt.xlabel('year', fontsize=12)
plt.ylabel('Temperature in Fahrenheit', fontsize=12)
plt.margins(0)
plt.show()
```



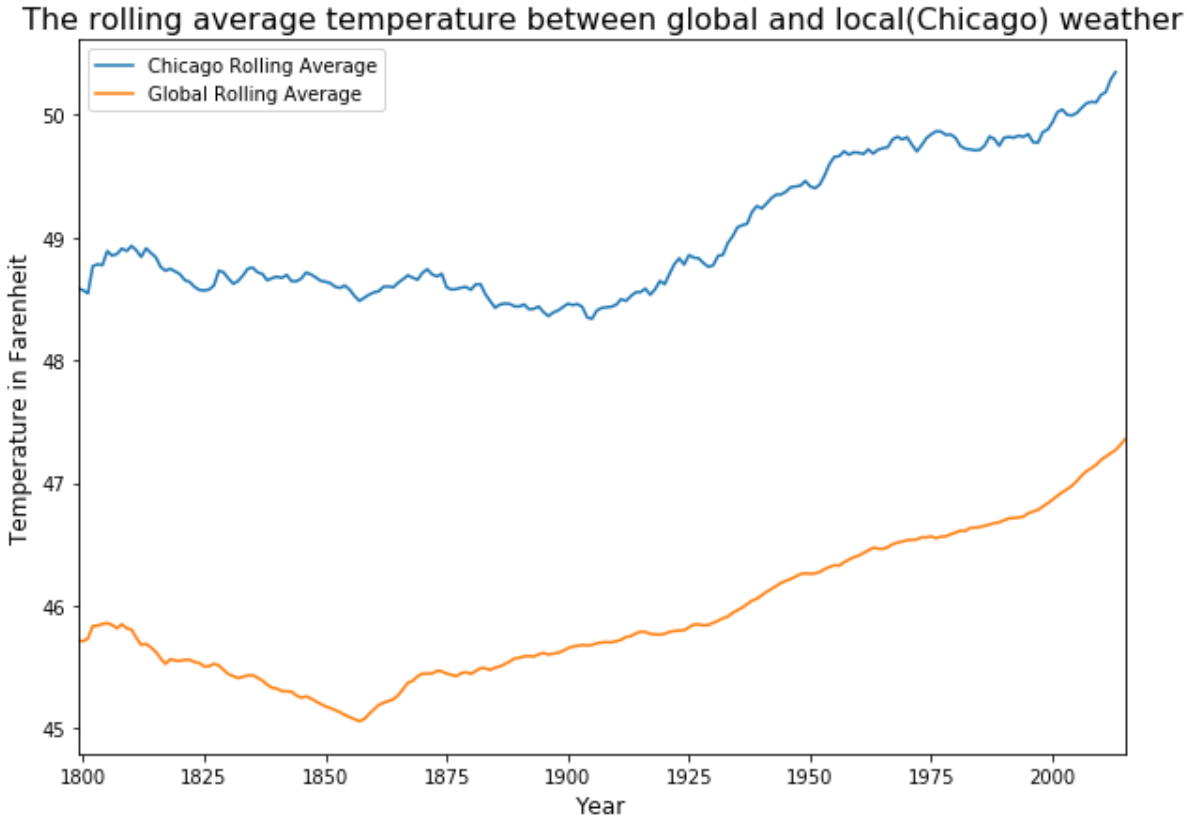
Calculate and plot the difference between the pure average temperature over a period of 200 years vs. the rolling average temperature over a period of 200 years between global and local(Chicago) weather.

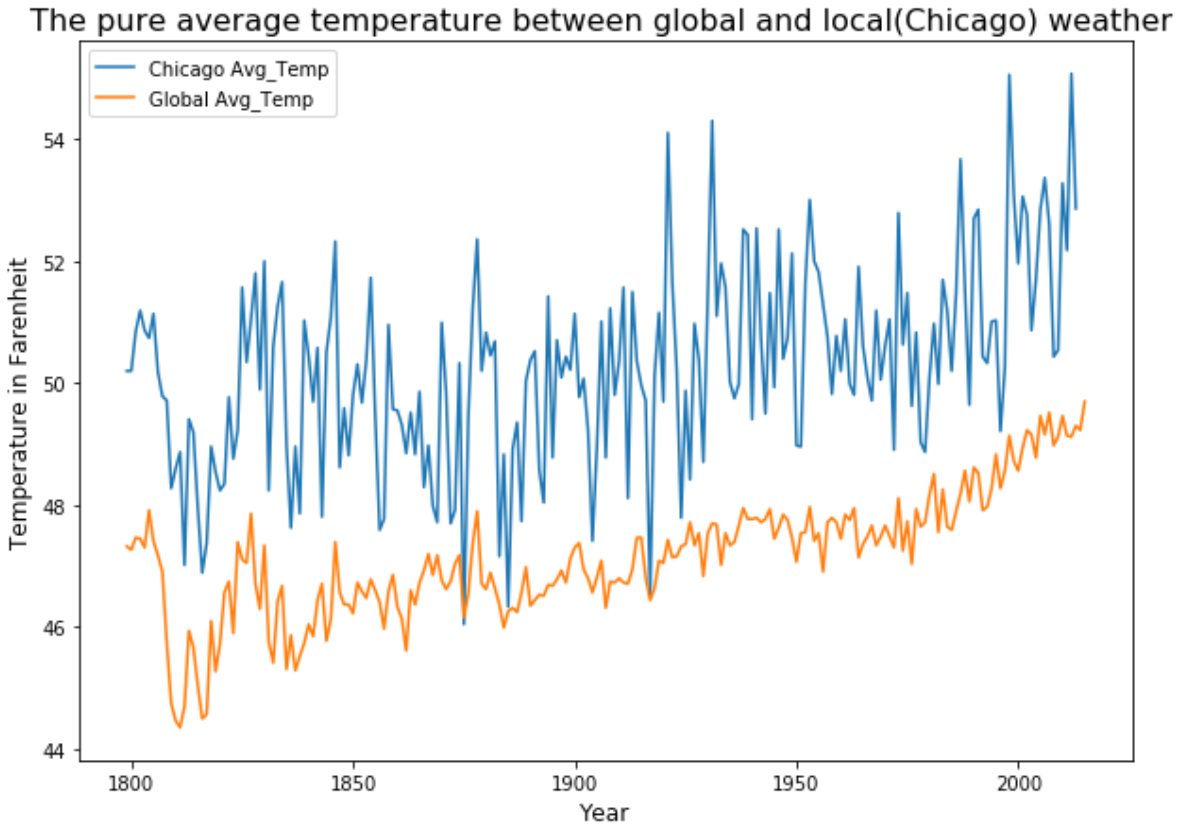
In [22]:
```
ax = df_chicago.plot(x='year', y='ma', figsize=(10,7))
df.plot(x='year', y='ma',ax=ax)

plt.subplots =True
plt.title('The rolling average temperature between global and local(Chicago) w
eather', fontsize=16)
plt.xlabel('Year', fontsize = 12)
plt.ylabel('Temperature in Farenheit', fontsize = 12)

ax2 = df_chicago.plot(x='year', y='avg_temp', figsize=(10,7), sharex=ax, label
='Chicago Avg_Temp' )
df.plot(x='year', y='avg_temp',ax=ax2, label='Global Avg_Temp')

ax.legend(labels=['Chicago Rolling Average', 'Global Rolling Average'])
ax.margins(x=0)
plt.title("The pure average temperature between global and local(Chicago) weat
her ", fontsize=16)
plt.xlabel("Year", fontsize=12)
plt.ylabel("Temperature in Farenheit", fontsize=12)
plt.show()
```


The rolling average temperature between global and local(Chicago) weather
Chicago Rolling Average
Global Rolling Average
Temperature in Farenheit
Year
45
46
47
48
49
50
1800
1825
1850
1875
1900
1925
1950
1975
2000


The pure average temperature between global and local(Chicago) weather
Chicago Avg_Temp
Global Avg_Temp
Temperature in Farenheit
Year
44
46
48
50
52
54
1800
1850
1900
1950
2000

Conclusion

1. According to data, the Greenhouse effect is there, as we can see in this data the moving average temperature for Chicago or Global it is increasing in every 50 years of time span.
2. According to data Chicago's average temperature is very fluctuating and since 1925 it's smoothly increasing as a moving average temperature.
3. As per data Global average temperature is gradually increasing over the 50 years od time span.

In [ ]: