

```
In [1]: import pandas as pd
import matplotlib.pyplot as plt

%matplotlib inline

In [6]: # Loading local and global temp data
local_temp_data = pd.read_csv('local_temp_data.csv')
global_temp_data = pd.read_csv('global_temp_data.csv')

In [7]: local_temp_data.head()

Out[7]:
```

	year	city	country	avg_temp
0	1796	Hyderabad	India	26.53
1	1797	Hyderabad	India	27.48
2	1798	Hyderabad	India	26.20
3	1799	Hyderabad	India	26.84
4	1800	Hyderabad	India	26.88

```


In [8]: global_temp_data.head()

Out[8]:
```

	year	avg_temp
0	1750	8.72
1	1751	7.98
2	1752	5.78
3	1753	8.39
4	1754	8.47

```


In [9]: global_temp_data.drop(index = [x for x in range(46)], axis = 0, inplace = True)

In [15]: global_temp_data.index = local_temp_data.index

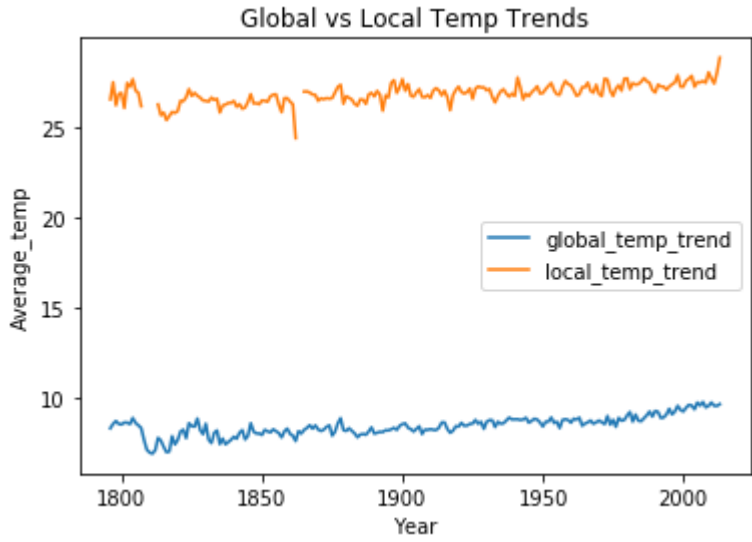
In [16]: global_temp_data.head()

Out[16]:
```

	year	avg_temp
0	1796	8.27
1	1797	8.51
2	1798	8.67
3	1799	8.51
4	1800	8.48

```


In [17]: # Visualize global and local temp trends
plt.plot(global_temp_data['year'], global_temp_data['avg_temp'], label = 'global_temp_trend' )
plt.plot(local_temp_data['year'], local_temp_data['avg_temp'], label = 'local_temp_trend')
plt.xlabel('Year')
plt.ylabel('Average temp')
plt.title('Global vs Local Temp Trends')
plt.legend()
plt.show()
```



Observation:

As we can see there are lot of spikes when we plot temperature trends for avg_temp per year and this makes difficult to analyze temperature trends. Hence we go for moving averages.

```
In [18]: # Calculate moving averages using rolling function
local_temp_data['moving_avg'] = local_temp_data['avg_temp'].rolling(10).mean()
global_temp_data['moving_avg'] = global_temp_data['avg_temp'].rolling(10).mean()

In [19]: local_temp_data.head()

Out[19]:
```

	year	city	country	avg_temp	moving_avg
0	1796	Hyderabad	India	26.53	NaN
1	1797	Hyderabad	India	27.48	NaN
2	1798	Hyderabad	India	26.20	NaN
3	1799	Hyderabad	India	26.84	NaN
4	1800	Hyderabad	India	26.88	NaN

```

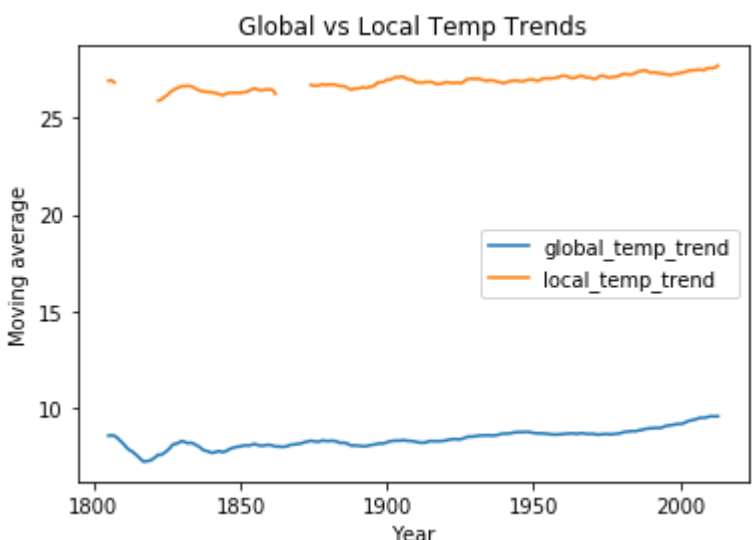

In [20]: global_temp_data.head()

Out[20]:
```

	year	avg_temp	moving_avg
0	1796	8.27	NaN
1	1797	8.51	NaN
2	1798	8.67	NaN
3	1799	8.51	NaN
4	1800	8.48	NaN

```


In [21]: # Visualize global and local temp trends using moving averages
plt.plot(global_temp_data['year'], global_temp_data['moving_avg'], label = 'global_temp_trend' )
plt.plot(local_temp_data['year'], local_temp_data['moving_avg'], label = 'local_temp_trend')
plt.xlabel('Year')
plt.ylabel('Moving average')
plt.title('Global vs Local Temp Trends')
plt.legend()
plt.show()
```



Observation

```
In [22]: # Calculate difference in moving averages
global_temp_data['diff_moving_avg'] = local_temp_data['moving_avg'] - global_temp_data['moving_avg']

In [23]: global_temp_data

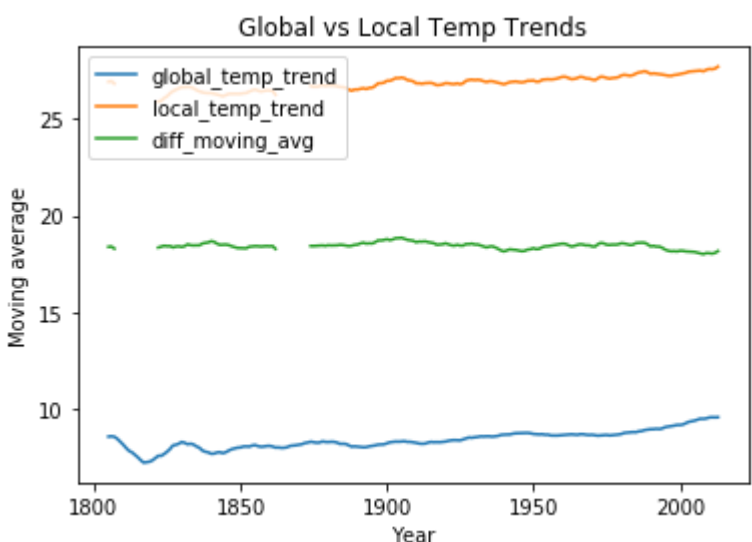
Out[23]:
```

	year	avg_temp	moving_avg	diff_moving_avg
0	1796	8.27	NaN	NaN
1	1797	8.51	NaN	NaN
2	1798	8.67	NaN	NaN
3	1799	8.51	NaN	NaN
4	1800	8.48	NaN	NaN
...
213	2009	9.51	9.493	18.059
214	2010	9.70	9.543	18.055
215	2011	9.52	9.554	18.029
216	2012	9.51	9.548	18.070
217	2013	9.61	9.556	18.163

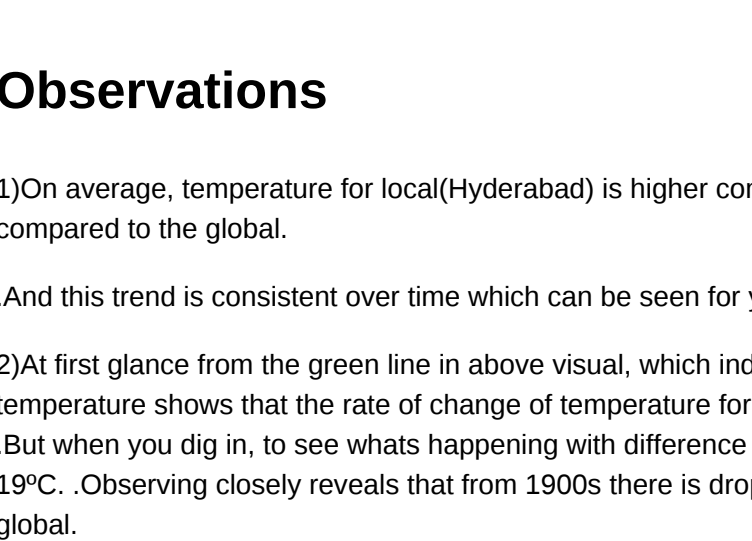
218 rows x 4 columns

```


In [24]: # Visualize global, local temp trends and diff_moving_avg
plt.plot(global_temp_data['year'], global_temp_data['moving_avg'], label = 'global_temp_trend' )
plt.plot(local_temp_data['year'], local_temp_data['moving_avg'], label = 'local_temp_trend')
plt.plot(global_temp_data['year'], global_temp_data['diff_moving_avg'], label = 'diff_moving_avg')
plt.xlabel('Year')
plt.ylabel('Moving average')
plt.title('Global vs Local Temp Trends')
plt.legend()
plt.show()
```



```
In [25]: # Visualize diff_moving_avg
plt.plot(global_temp_data['year'], global_temp_data['diff_moving_avg'])
plt.xlabel('Year')
plt.ylabel('Moving average')
plt.title('Difference in moving average')
plt.show()
```



Observations

- 1)On average, temperature for local(Hyderabad) is higher compared to the global, which means the city I live in is hotter compared to the global.

And this trend is consistent over time which can be seen for years 1800s - 2000s
- 2)At first glance from the green line in above visual, which indicates the difference in moving average for local and global temperature shows that the rate of change of temperature for Hyderabad compared with global is almost same for all years. But when you dig in, to see whats happening with difference in moving averages closely .It fluctuates between 18°C and 19°C. Observing closely reveals that from 1900s there is drop in rate of change of temperature of Hyderabad compared with global.
- 3)Looking at the overall trend it looks like world is getting hotter because the curves keep on rising as years progressing.

And this trend is consistent for the last few hundred years.