Exporting data to pandas data frame from SQL database csv files of Udacity for data analysis

Used the following queries for data extraction from the SQL database from workspace:

- select * city_data
- select * city_list
- select * global_data

Further saved them to csv and using python for analysis and plotting the graphs

In [1]:
```
import pandas as pd
from IPython.display import display
```

In [2]:
```
city_data = pd.read_csv("city_data.csv")
city_list = pd.read_csv("city_list.csv")
global_data = pd.read_csv("global_data.csv")
```

In [3]:
```
display(city_data.head())
display(city_list.head())
display(global_data.head())
```

	year	city	country	avg_temp
0	1849	Abidjan	Côte D'Ivoire	25.58
1	1850	Abidjan	Côte D'Ivoire	25.52
2	1851	Abidjan	Côte D'Ivoire	25.67
3	1852	Abidjan	Côte D'Ivoire	NaN
4	1853	Abidjan	Côte D'Ivoire	NaN

	city	country
0	Abidjan	Côte D'Ivoire
1	Abu Dhabi	United Arab Emirates
2	Abuja	Nigeria
3	Accra	Ghana
4	Adana	Turkey

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

Creating a dataframe of cities in India

In [4]:
```
city_india = city_list[city_list['country'].str.contains("India")]
```

```
In [5]: display(city_india)
```

	city	country
6	Agra	India
7	Ahmadabad	India
12	Allahabad	India
14	Amritsar	India
30	Bangalore	India
44	Bhopal	India
85	Delhi	India
117	Haora	India
125	Hyderabad	India
129	Indore	India
135	Jaipur	India
145	Kanpur	India
182	Ludhiana	India
216	Nagpur	India
223	New Delhi	India
239	Patna	India
256	Pune	India
261	Rajkot	India
263	Ranchi	India
299	Surat	India
322	Vadodara	India
325	Varanasi	India

Selecting Bhopal as the city for comparison with global data

```
In [6]: bhopal_data = city_data[city_data['city'].str.contains("Bhopal")]
In [7]: display(bhopal_data.head(5))
```

	year	city	country	avg_temp
9532	1796	Bhopal	India	25.06
9533	1797	Bhopal	India	26.27
9534	1798	Bhopal	India	24.24
9535	1799	Bhopal	India	25.33
9536	1800	Bhopal	India	25.30

```
In [8]: df = pd.concat([bhopal_data,global_data], axis=0, ignore_index=True, sort=True)
```

Bringing all required data into a single dataframe using full outer merge

```
In [9]: df = global_data.merge(bhopal_data, left_on='year', right_on='year', how = 'oute
        df = df.set_index('year')
        df = df.drop(['city','country'], axis = 1)
```

Adding new columns for moving average for temperature

We are using rolling method to find the moving average

```
In [10]: df['rm_global_temp'] = df['avg_temp_global'].rolling(window = 5).mean()
         df['rm_bhopal_temp'] = df['avg_temp_bhopal'].rolling(window = 5).mean()
```

```
In [11]: df_rm = df
         df_rm = df.drop(['avg_temp_global','avg_temp_bhopal'], axis = 1)
         df_rm.tail(10)
```

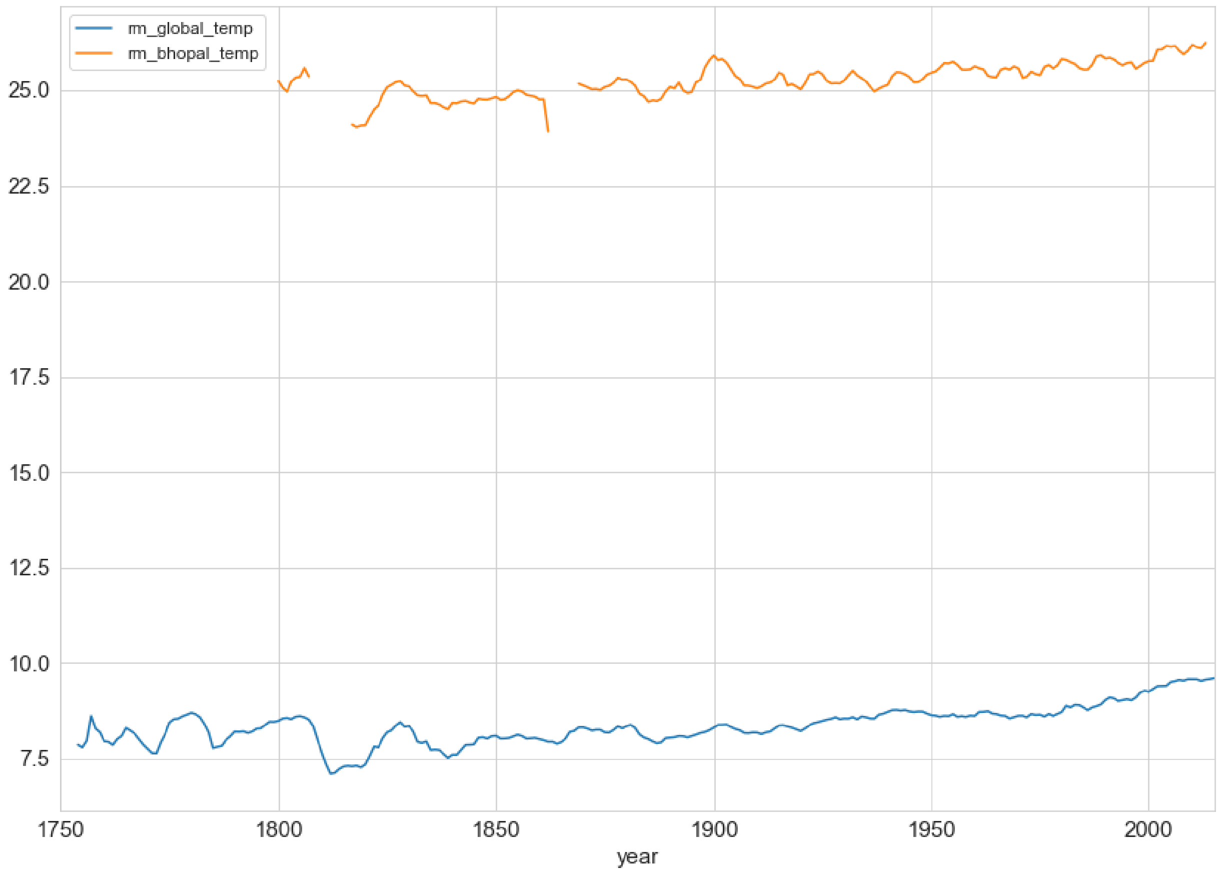
Out[11]:

	rm_global_temp	rm_bhopal_temp
year		
2006	9.530	26.154
2007	9.562	26.034
2008	9.542	25.936
2009	9.580	26.028
2010	9.580	26.186
2011	9.578	26.122
2012	9.534	26.096
2013	9.570	26.240
2014	9.582	NaN
2015	9.608	NaN

```
In [12]: import seaborn as sns
         import matplotlib.pyplot as plt
         from matplotlib import rcParams
         import numpy
         %matplotlib inline
```

In [13]:
```
rcParams['figure.figsize'] = 14,10
sns.set_style('whitegrid')
plt.rc('font', size=15)
plt.rc('legend',fontsize=12)
df_rm.plot()
```

Out[13]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x1b188e7c308>
```



In [14]:
```
display(df.describe())
```

	avg_temp_global	avg_temp_bhopal	rm_global_temp	rm_bhopal_temp
count	266.000000	211.000000	262.000000	199.000000
mean	8.369474	25.235261	8.363260	25.261065
std	0.584747	0.649146	0.490067	0.442238
min	5.780000	20.120000	7.108000	23.918000
25%	8.082500	24.915000	8.045000	24.980000
50%	8.375000	25.230000	8.320000	25.246000
75%	8.707500	25.645000	8.627000	25.572000
max	9.830000	26.680000	9.608000	26.240000

Observations

- Bhopal is hotter than gobal temp in average by about 17 degrees every year

- There are 55 missing values in bhopal average temperature column
- Yearly avg. global temp from 1750 to 2015 varies from 5.78 to 9.83 whereas Bhopal varies from 20.12 to 26.68
- Over the last few years the temperature is steadily rising on the global as well as local level