SELECT *
FROM global_data;

SELECT *
FROM city_data
WHERE city='Kiev';

SELECT *
FROM city_data
WHERE city='New York';

I'm going to use Jupyter notebook and pandas. The data was derived by SQL.
The moving average will be calculated by pd.rolling().mean()
The goal is to show the trends for Kiev, New York and compare them to the global trend.

In [1]:

```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
kiev_data=pd.read_csv('Kiev.csv',index_col='year')
new_york_data=pd.read_csv('new_york.csv',index_col='year')
global_data=pd.read_csv('global_data.csv',index_col='year')
global_data=global_data.rename(columns={'avg_temp': 'world_avg_temp'})
```

In [2]:

```
kiev_data=kiev_data.dropna()
global_data=global_data.dropna()
new_york_data=new_york_data.dropna()
```

In [3]:

```
kiev_data.head()
```

Out[3]:

	city	country	avg_temp
year			
1743	Kiev	Ukraine	0.90
1744	Kiev	Ukraine	9.50
1745	Kiev	Ukraine	-2.48
1750	Kiev	Ukraine	7.85
1751	Kiev	Ukraine	8.11

In [4]:

```
kiev_data['MA'] = kiev_data['avg_temp'].rolling(window=10).mean()
global_data['MA']=global_data['world_avg_temp'].rolling(window=10).mean()
new_york_data['MA'] = new_york_data['avg_temp'].rolling(window=10).mean()
```

In [5]:

```
kiev_data.head(20)
```

Out[5]:

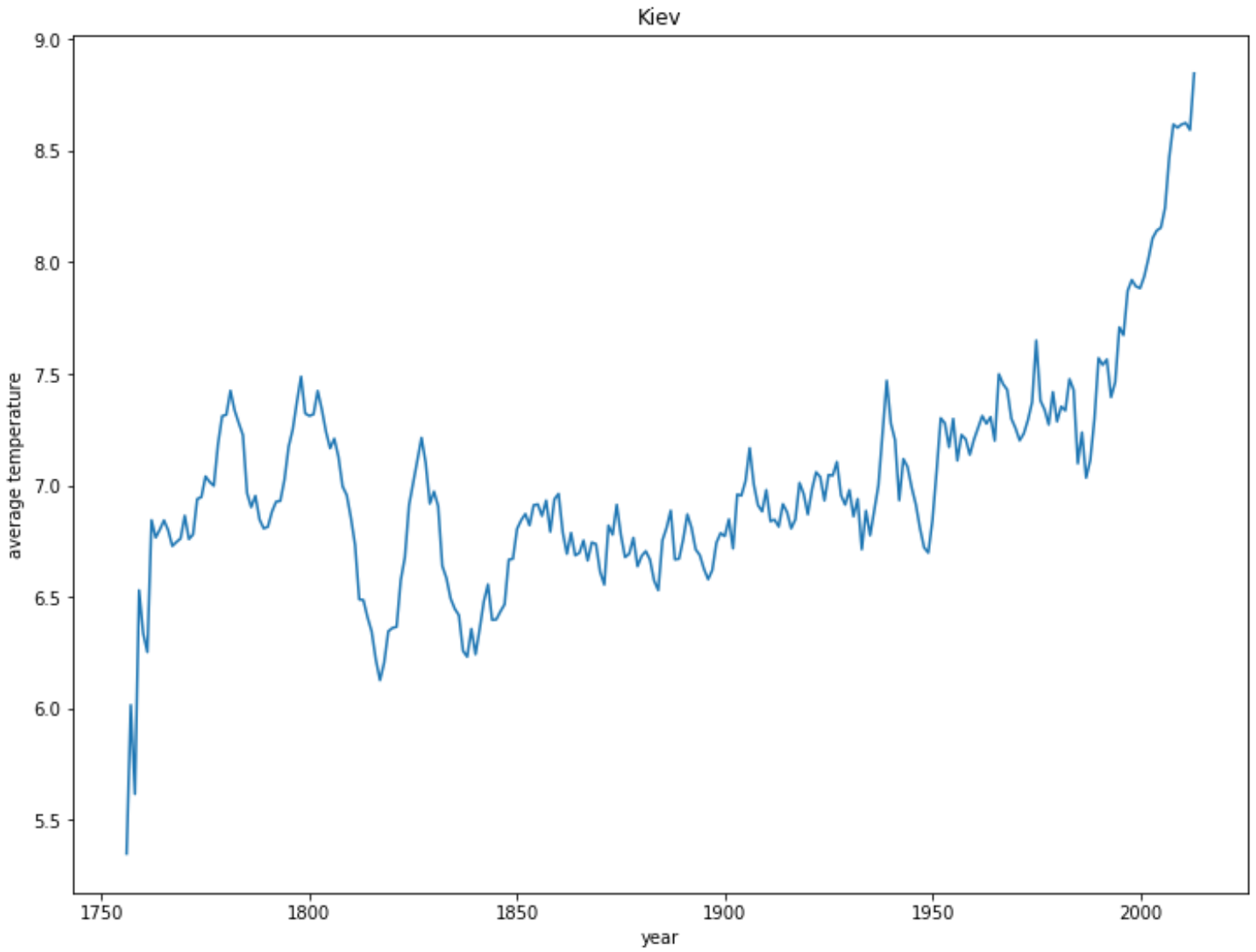
	city	country	avg_temp	MA
year				
1743	Kiev	Ukraine	0.90	NaN
1744	Kiev	Ukraine	9.50	NaN
1745	Kiev	Ukraine	-2.48	NaN
1750	Kiev	Ukraine	7.85	NaN
1751	Kiev	Ukraine	8.11	NaN
1752	Kiev	Ukraine	1.21	NaN
1753	Kiev	Ukraine	6.90	NaN
1754	Kiev	Ukraine	7.02	NaN
1755	Kiev	Ukraine	6.88	NaN
1756	Kiev	Ukraine	7.61	5.350
1757	Kiev	Ukraine	7.56	6.016
1758	Kiev	Ukraine	5.51	5.617
1759	Kiev	Ukraine	6.65	6.530
1760	Kiev	Ukraine	5.91	6.336
1761	Kiev	Ukraine	7.28	6.253
1762	Kiev	Ukraine	7.12	6.844
1763	Kiev	Ukraine	6.12	6.766
1764	Kiev	Ukraine	7.38	6.802
1765	Kiev	Ukraine	7.29	6.843
1766	Kiev	Ukraine	7.17	6.799

In [6]:

```
def plot_data(input_data,name):
    ax=input_data['MA'].dropna().plot(figsize=(12, 9),title=name)
    ax.set(ylabel='average temperature')
```

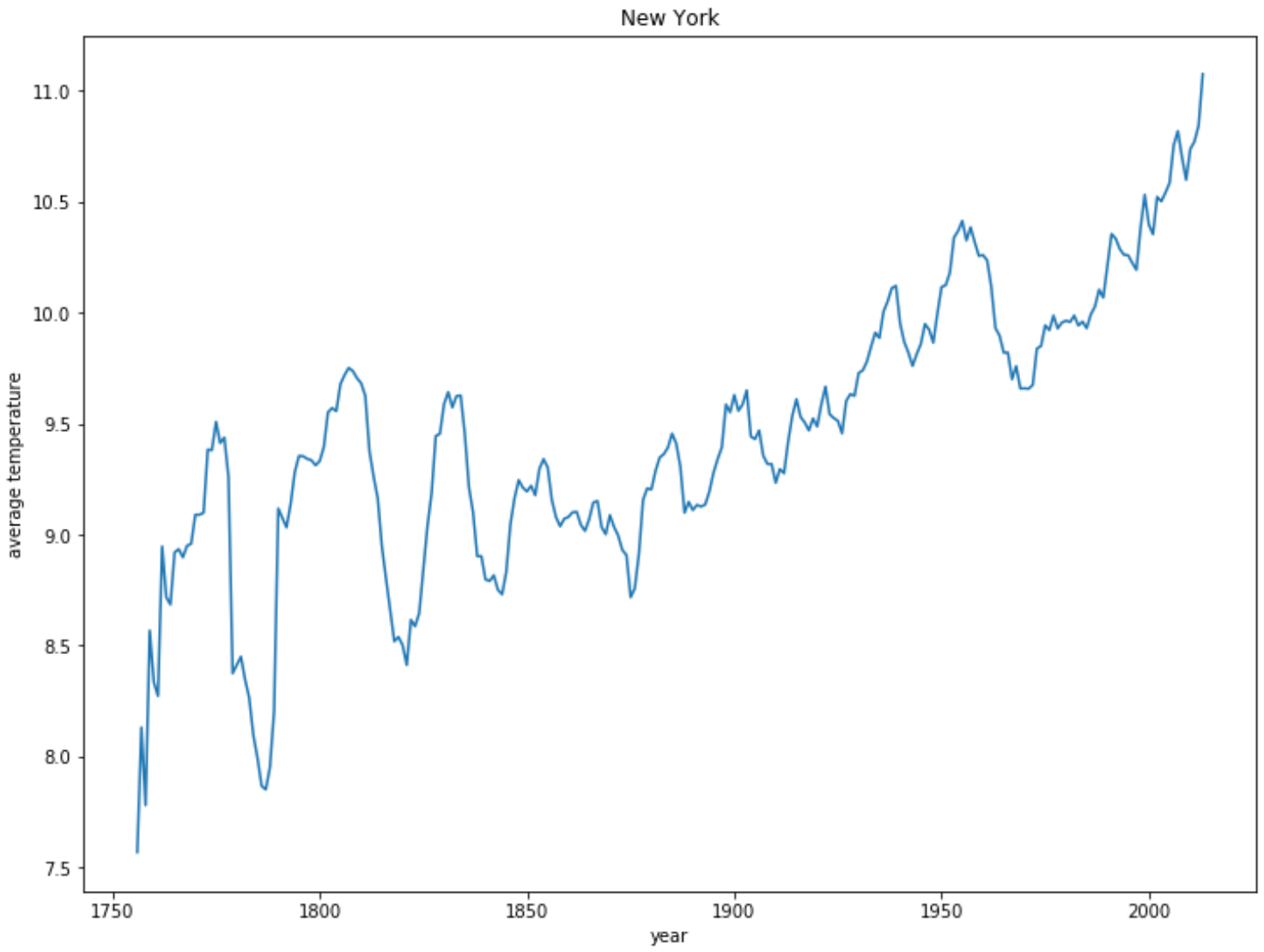
In [7]:

```
plot_data(kiev_data,'Kiev')
```



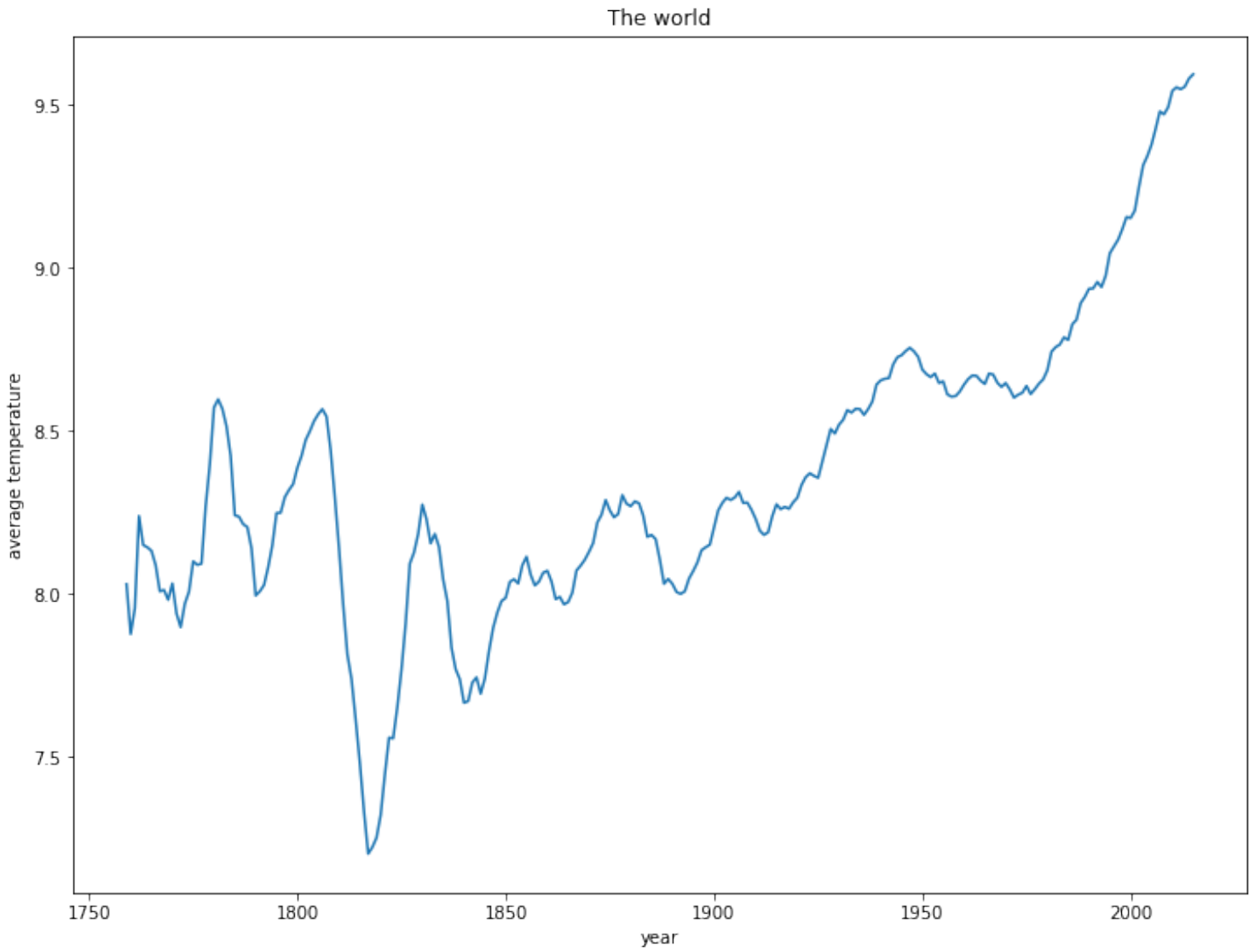
In [8]:

```
plot_data(new_york_data,'New York')
```



In [9]:

```
plot_data(global_data,'The world')
```

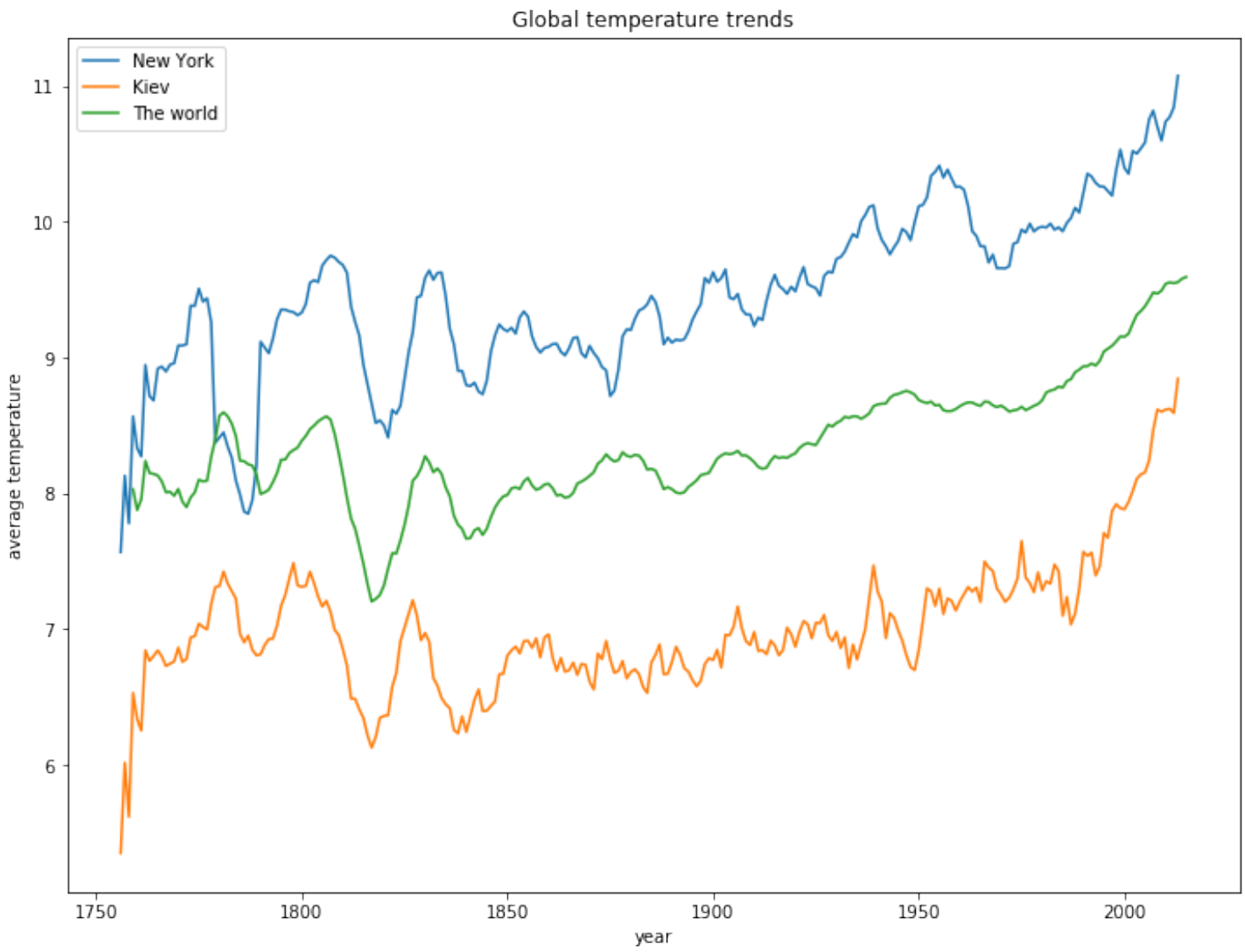


In [10]:

```
plot_data(new_york_data,'New York')
plot_data(kiev_data,'Kiev')
plot_data(global_data,'Global temperature trends')
plt.legend(['New York', 'Kiev','The world'])
```

Out[10]:

```
<matplotlib.legend.Legend at 0x1182ac750>
```



Correlation

In [11]:

```
kiev_correlation_data = pd.concat([kiev_data['avg_temp'], global_data['world_a
vg_temp']], axis=1)
kiev_correlation_data.corr()
```

Out[11]:

	avg_temp	world_avg_temp
avg_temp	1.000000	0.639127
world_avg_temp	0.639127	1.000000

Correlation coefficient 0.639127 or 63.91%.(Kiev)

In [12]:

```
new_york_correlation_data = pd.concat([new_york_data['avg_temp'], global_data[
'world_avg_temp']], axis=1)
new_york_correlation_data.corr()
```

Out[12]:

	avg_temp	world_avg_temp
avg_temp	1.000000	0.563413
world_avg_temp	0.563413	1.000000

Correlation coefficient 0.563413 or 56.34%.(New York)

1.We've compared 3 trends:Kiev, New York, the world. As we can see the trend is positive for each data. Our cities are getting hotter and it means that global warming is not a myth.
2.There are no doubts that the trends of cities are related to the global trend.
3.Correlation between Kiev/the world is 63.91% and New York/the world is 56.34%.
4.The temperature on the Earth from 1811 to 1819 decreased. After 1820 the temperature has started rising.
5.The overall trend is positive, the world is getting hotter. The trend is consistent since 1820.
6.We can estimate the average temperature in a city(based on the average global temperature) due to regression line.
7.I've noticed that after 1820 the Industrial Revolution happened and it was the transition to new manufacturing processes in the period from about 1760 to sometime between 1820 and 1840. (https://en.wikipedia.org/wiki/Industrial_Revolution (https://en.wikipedia.org/wiki/Industrial_Revolution)).