The tools i used :

SQL, JupyterLab, Python

The SQL query to find the right data :

SELECT * FROM city_list WHERE country='FRANCE'

SELECT * FROM city_list WHERE country='JAPAN'

SELECT * FROM city_list WHERE country='UNITED STATES'

SELECT * FROM city_data WHERE city= 'Paris'

SELECT * FROM city_data WHERE city= 'Kobe'

SELECT * FROM city_data WHERE city= 'Los Angeles' AND country='United States'

SELECT * FROM global_data

Work with the CSV Data and Python

In [46]:

```python
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

In [191]:

```python
global_temperature = pd.read_csv("results global.csv")
kobe_temperature = pd.read_csv("results_kobe.csv")
paris_temperature = pd.read_csv("results_paris.csv")
la_temperature = pd.read_csv("results_los_angeles.csv")
```

In [192]:

```python
#check the min and max year to be sure that we compare the same period
print('Global Min year : ', global_temperature['year'].min(),' and Max year : ', global_temperature['year'].max())
print('Kobe Min temp : ', kobe_temperature['year'].min(),' and Max year : ', kobe_temperature['year'].max())
print('Paris Min year : ', paris_temperature['year'].min(),' and Max year : ', paris_temperature['year'].max())
print('Los Angeles Min year : ', la_temperature['year'].min(),' and Max year : ', la_temperature['year'].max())
```

```
Global Min year :  1750  and Max year :  2015
Kobe Min temp :  1841  and Max year :  2013
Paris Min year :  1743  and Max year :  2013
Los Angeles Min year :  1849  and Max year :  2013
```

Observation for the period from 1849 to 2013

In [193]:

```python
#filtered the dataframe to have the same start year and the same end year
global_filtered= global_temperature.query('year >= 1849 & year <=2013')
kobe_filtered= kobe_temperature.query('year >= 1849 & year <=2013')
paris_filtered= paris_temperature.query('year >= 1849 & year <=2013')
```

In [195]:

```python
#calculate the moving average to make it easier to observe long term trends and not get
lost in daily fluctuations
global_moving_avg=global_filtered['avg_temp'].rolling(window=6).mean()
kobe_moving_avg=kobe_filtered['avg_temp'].rolling(window=6).mean()
paris_moving_avg=paris_filtered['avg_temp'].rolling(window=6).mean()
la_moving_avg=la_temperature['avg_temp'].rolling(window=6).mean()


#Calculate simple average to global and cities temperatures

global_simple_avg = np.mean(global_filtered['avg_temp'])
paris_simple_avg = np.mean(paris_filtered['avg_temp'])
kobe_simple_avg = np.mean(kobe_filtered['avg_temp'])
la_simple_avg = np.mean(la_temperature['avg_temp'])

print("For the period from 1849 to 2013, the average temperatur globally in the world w
as : {}°C".format(str(round(global_simple_avg,2))))
print("the average temperatur for Paris was : {}°C".format(str(round(paris_simple_avg,2
))))
print("the average temperatur for Kobe was : {}°C".format(str(round(kobe_simple_avg,2
))))
print("the average temperatur for Los Angeles was : {}°C".format(str(round(la_simple_av
g,2))))

plt.figure(figsize=(18,10))
plt.grid(True)
plt.xlim((1849,2013))
plt.ylim((5,18))
plt.plot(global_filtered['year'],global_moving_avg,label='Global')
plt.plot(kobe_filtered['year'],kobe_moving_avg,label='Kobe')
plt.plot(paris_filtered['year'],paris_moving_avg,label='Paris')
plt.plot(la_temperature['year'],la_moving_avg,label='Los Angeles')
plt.legend()
plt.xlabel("Years")
plt.ylabel("Temperature (°C)")
plt.title("Weather Trends Temperature (Moving Period= 6 years)")
plt.show()
```
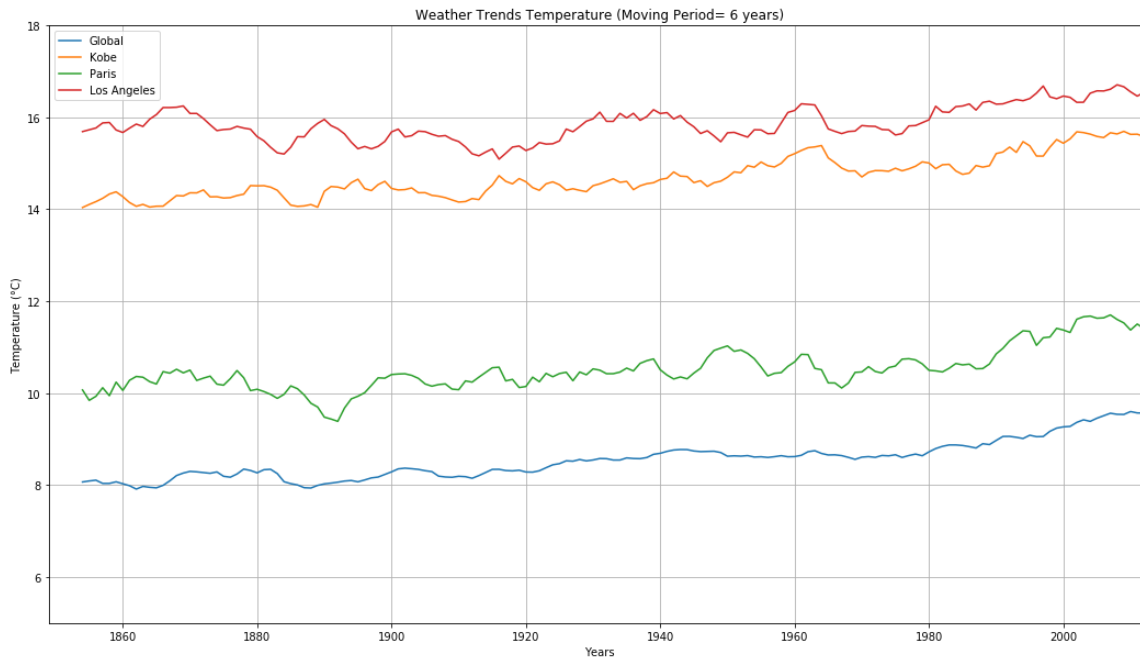
```
For the period from 1849 to 2013, the average temperatur globally in the w
orld was : 8.55°C
the average temperatur for Paris was : 10.51°C
the average temperatur for Kobe was : 14.7°C
the average temperatur for Los Angeles was : 15.88°C
```


Analysis

I choose to show the data from Los Angeles, Kobe and Paris. So we can compare the data from 3 Continents.

As we can see on the graphic, the average temperatures from Los Angeles,Kobe and Paris are hotter than the world globally. We can also observe that the temperatures between Kobe and Los Angeles are approximately the same, there are between 1 and 2 degrees of difference over the whole period and the evolution is similar. If the temperature rise, in Los Angeles, it's rise too in Kobe. We have one exception, shortly before 1920. The temperatures in Los Angeles dropped to almost the same level as those in Kobe. But in general it can be said that when temperatures rise in one city, they also rise in the others, regardless of the continent.

The temperatures are rising everywhere. Even if we can see that over the last few years, temperatures in Paris are falling, while those in Los Angeles seem to be rising more significantly. Globally, global temperatures are rising consistently.

Observation for the period from 2000 to 2013

In [107]:

```python
#filtered the data frame for the desired period
global_filtered2= global_temperature.query('year >= 2000 & year <=2013')
kobe_filtered2= kobe_temperature.query('year >= 2000 & year <=2013')
paris_filtered2= paris_temperature.query('year >= 2000 & year <=2013')
la_filtered2= la_temperature.query('year >= 2000 & year <=2013')
```

In [201]:

```python
#Calculate simple average to global and cities temperatures

global_simple_avg2 = np.mean(global_filtered2['avg_temp'])
paris_simple_avg2 = np.mean(paris_filtered2['avg_temp'])
kobe_simple_avg2 = np.mean(kobe_filtered2['avg_temp'])
la_simple_avg2 = np.mean(la_filtered2['avg_temp'])

print("For the period from 2000 to 2013, the average temperatur globally in the world w
as : {}°C".format(str(round(global_simple_avg2,2))))
print("the average temperatur for Paris was : {}°C".format(str(round(paris_simple_avg2,
2))))
print("the average temperatur for Kobe was : {}°C".format(str(round(kobe_simple_avg2,2
))))
print("the average temperatur for Los Angeles was : {}°C".format(str(round(la_simple_av
g2,2))))

plt.figure(figsize=(18,10))
plt.grid(True)
plt.ylim((5,18))
plt.plot(global_filtered2['year'],global_filtered2['avg_temp'],label='Global')
plt.plot(kobe_filtered2['year'],kobe_filtered2['avg_temp'],label='Kobe')
plt.plot(paris_filtered2['year'],paris_filtered2['avg_temp'],label='Paris')
plt.plot(la_filtered2['year'],la_filtered2['avg_temp'],label='Los Angeles')
plt.legend()
plt.xlabel("Years")
plt.ylabel("Temperature (°C)")
plt.title("Weather Trends Temperature(Average Temperature for each years)")
plt.show()
```
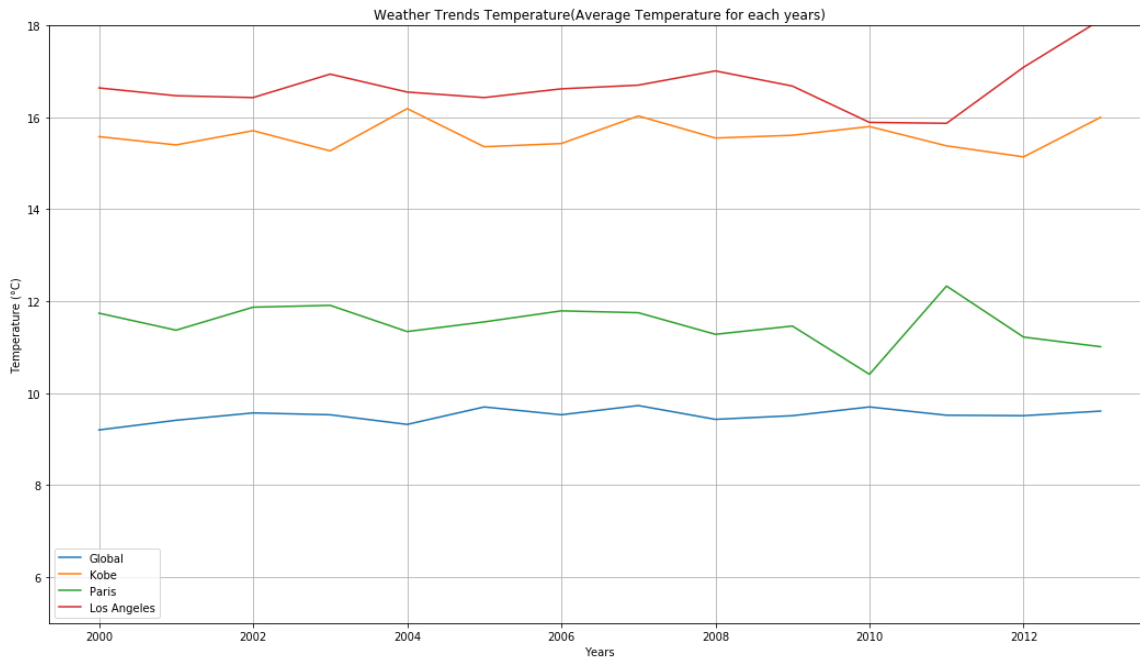
For the period from 2000 to 2013, the average temperatur globally in the w
orld was : 9.52°C
the average temperatur for Paris was : 11.5°C
the average temperatur for Kobe was : 15.6°C
the average temperatur for Los Angeles was : 16.67°C

Weather Trends Temperature(Average Temperature for each years)

Analysis

We are now showing on the average temperature from 2000 to 2013. As we can see,the lowest point for Los Angeles and Paris has been reached in 2010. After this year,in Paris, temperatures have risen significantly to reach their highest point in 2011 and then dropped over the last two years.

In Los Angeles, we had to wait until 2011 to see the average temperature rise and since then it has continued to rise.

In Kobe, temperatures continue to rise and fall from one year to the next.

Globally, temperatures seem to be rising slowly over the period but surely.

In [ ]: