In [33]:
```
import pandas as pd
import numpy as np
from IPython.display import display
```

In [35]:
```
data = pd.read_excel('results.xlsx') # all the records after the join
display(data.head(10))

data=pd.DataFrame(data)
```

	year	city	global_avg_temp	city_avg_temp
0	1849	Abidjan	7.98	25.58
1	1850	Abidjan	7.90	25.52
2	1851	Abidjan	8.18	25.67
3	1852	Abidjan	8.10	NaN
4	1853	Abidjan	8.04	NaN
5	1854	Abidjan	8.21	NaN
6	1855	Abidjan	8.11	NaN
7	1856	Abidjan	8.00	26.28
8	1857	Abidjan	7.76	25.17
9	1858	Abidjan	8.10	25.49

In [ ]:
```
```

In [36]:
```
data1 = data[data.city=='New York'] # removing all the data of other cit
ies
```

In [37]:
```
import matplotlib.pyplot as plt # package that helps in plotting
```

Calculating moving average for both global and city temperatures

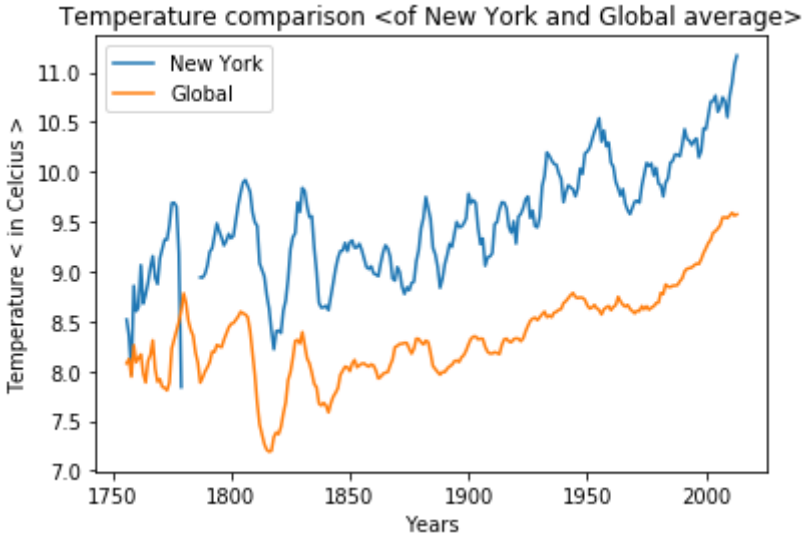
In [38]:
```
global_mv_avg = data1['global_avg_temp'].rolling(7).mean()  # rolling(7)
because we are considering 7-year MA
city_mv_avg = data1['city_avg_temp'].rolling(7).mean()
```

In [39]:
```
display(city_mv_avg.head(10))
```

```
45825         NaN
45826         NaN
45827         NaN
45828         NaN
45829         NaN
45830         NaN
45831    8.517143
45832    8.348571
45833    7.971429
45834    8.857143
Name: city_avg_temp, dtype: float64
```

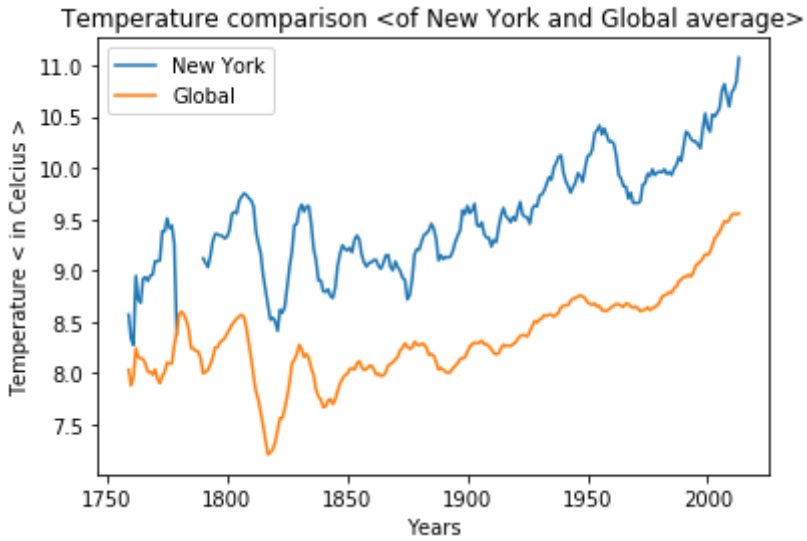
Comparing the data using line chart

In [34]:
```
plt.plot(data1['year'], city_mv_avg, label = 'New York')
plt.plot(data1['year'], global_mv_avg, label='Global')
plt.legend()
plt.xlabel("Years")
plt.ylabel("Temperature < in Celcius >")
plt.title("Temperature comparison <of New York and Global average>")
plt.show()
```



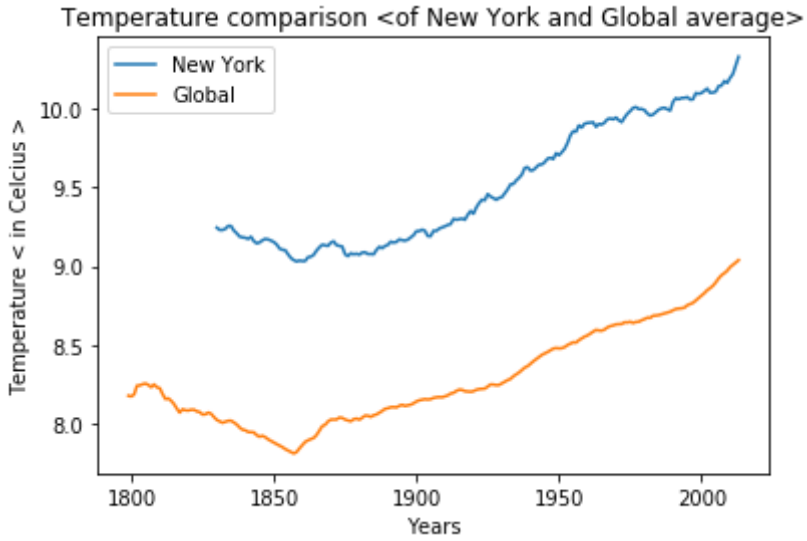
In [40]:
```
global_mv_avg_10 = data1['global_avg_temp'].rolling(10).mean()  # rollin
g(10) because we are considering 10-year MA
city_mv_avg_10 = data1['city_avg_temp'].rolling(10).mean()
```

In [41]:
```
plt.plot(data1['year'], city_mv_avg_10, label = 'New York')
plt.plot(data1['year'], global_mv_avg_10, label='Global')
plt.legend()
plt.xlabel("Years")
plt.ylabel("Temperature < in Celcius >")
plt.title("Temperature comparison <of New York and Global average>")
plt.show()
```



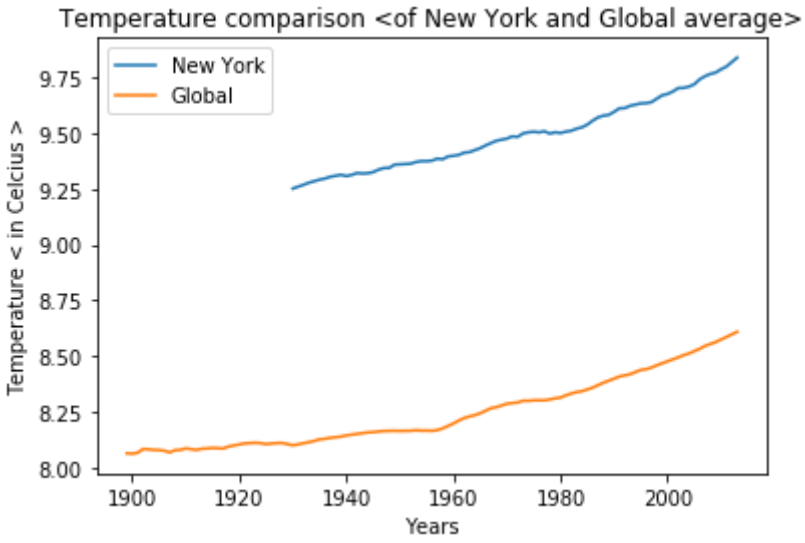
In [42]:
```
global_mv_avg_50 = data1['global_avg_temp'].rolling(50).mean()  # rollin
g(50) because we are considering 50-year MA
city_mv_avg_50 = data1['city_avg_temp'].rolling(50).mean()
```

In [43]:
```
plt.plot(data1['year'], city_mv_avg_50, label = 'New York')
plt.plot(data1['year'], global_mv_avg_50, label='Global')
plt.legend()
plt.xlabel("Years")
plt.ylabel("Temperature < in Celcius >")
plt.title("Temperature comparison <of New York and Global average>")
plt.show()
```



In [44]:
```
global_mv_avg_150 = data1['global_avg_temp'].rolling(150).mean()  # roll
ing(150) because we are considering 150-year MA
city_mv_avg_150 = data1['city_avg_temp'].rolling(150).mean()
```

In [45]:
```
plt.plot(data1['year'], city_mv_avg_150, label = 'New York')
plt.plot(data1['year'], global_mv_avg_150, label='Global')
plt.legend()
plt.xlabel("Years")
plt.ylabel("Temperature < in Celcius >")
plt.title("Temperature comparison <of New York and Global average>")
plt.show()
```



In [ ]: