Exploring weather trends analysis

This project aims to compare USA city weather temperature with global ones. First of all, we need to find out which city in USA that has the highest and lowest average temperature over the year. Then we will use these both cities for our comparison and we will find out what is the correlation coefficients

1) SQL part

SQL query for extracting highest and lowest weather temperature city:

```
select country, city, avg(avg_temp)
from city_data
group by 1,2
having avg (avg_temp) in
                        ((select max(avg_temp)
                          from (select city, avg(avg_Temp) avg_temp
                          from city_data
                          where country like 'United States%'
                          group by 1) t1), (select min(avg_temp)
                          from (select city, avg(avg_Temp) avg_temp
                          from city_data where country like 'United States%'
                          group by 1) t2));
```

country	city	avg
United States	Minneapolis	4.8846816479400749
United States	Miami	23.0406967213114754

2) **We find out** Miami and Minneapolis are the cities with highest and lowest average weather temperature in USA. We will use them in our further comparison analysis. Now we need to extract all data related with these cities

SQL query for extracting Miami's weather data by date, country, city and weather temperature:

```
select ct.country, ct.city, ct.year, ct.avg_temp, g.avg_temp as global
from city_data ct
join global_data g
on ct.year = g.year
where country like 'United States%' and city like 'Miami'
order by ct.year asc;
```

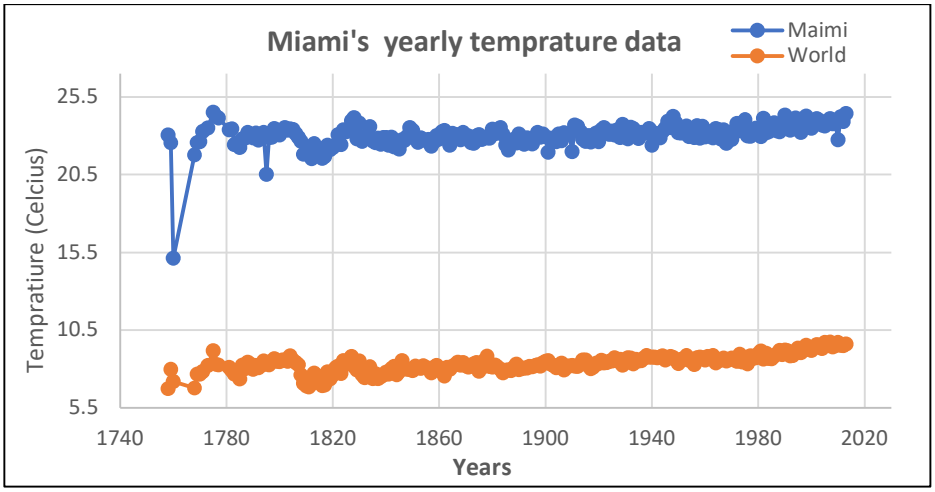
SQL query for extracting Minneapolis's weather data by date, country, city and weather temperature:

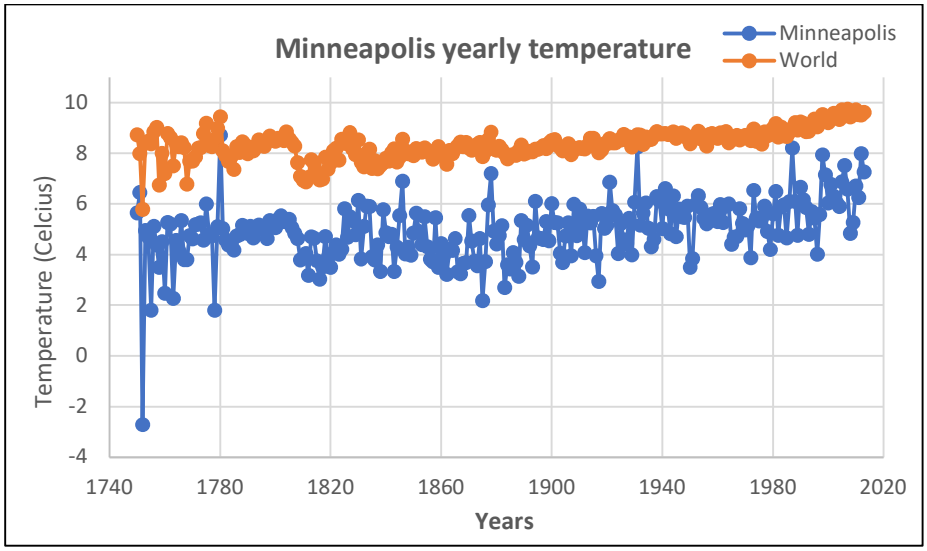
```
select ct.country, ct.city, ct.year, ct.avg_temp, g.avg_temp as global
from city_data ct
join global_data g
on ct.year = g.year
where country like 'United States%' and city like 'Minneapolis'
order by ct.year asc;
```

SQL query for extracting city and country names:

```
select country, city
from city_list
order by country;
```

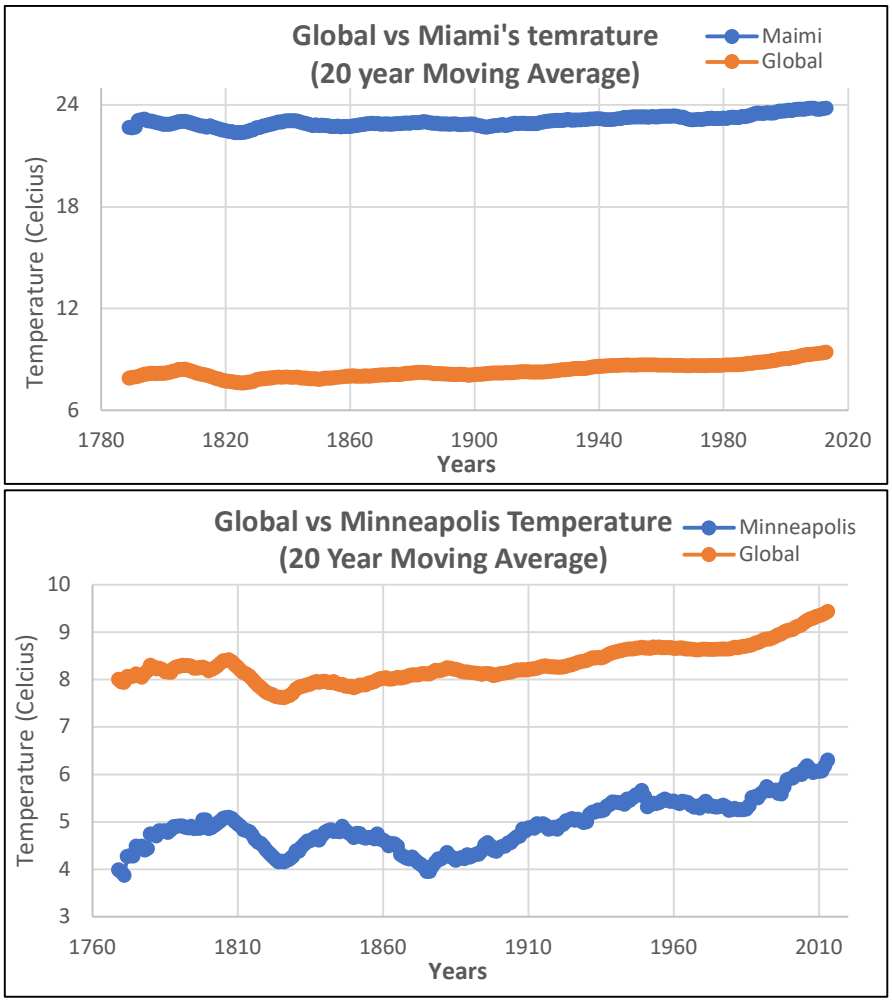
3) Next, we will use Excel for our comparative analysis:





We compared the lowest and highest temperature cities in USA with global temperatures. We find out that the temperature in both cities is going up as well as in the world. Moreover, the average world temperature for indicated period accounts for about 8º Celsius which almost 3 times lower than the Miami's average temperature and about two times higher than Minneapolis'.

Next, we used Moving Average analysis in order to see the exact trend for taken nearest 20-year period. So, we have taken the average of previous 20-year temperature for particular city and displayed it for each year. We could see the same picture as it was in previous graphs. The overall temperature is going up year by year. The interesting point is that Minneapolis' 20 Year Moving average Temperature trend is almost identical to the globes.



4) Insights taken from the analysis

1) We have found out that correlation coefficient for Miami is almost 0.95 which indicates strong correlation between global weather and Miami's weather. Moreover, correlation for Minneapolis and global weather trend also shows strong correlation hitting 0.89
2) Miami's weather almost 5 times hotter in average that global weather and this trend stays the same for almost all periods indicated in the date. On the other hand, Minneapolis tends to be the coldest city in USA and this trend is same when compared with global weather.
3) In overall the world is getting hotter by each year and this trend can be seen in both cities' temperature and
4) The correlation coefficient for both cities demonstrates that the world temperature is strongly correlated with Miami's and Minneapolis' temperature.