# Explore Weather Trends Project

1. To find the nearest city to where I live from the database, I executed the below SQL query in the Udacity workspace:

```
SELECT DISTINCT city
                FROM city_list
           ORDER BY city;
```

As I live in New York city, and 'New York' is in the returned query result, I will use New York city data to analyze local temperature trend.

2. Next step is to extract the local (New York) and global average temperature data (by year) from the database. I executed the below SQL query in the Udacity workspace:

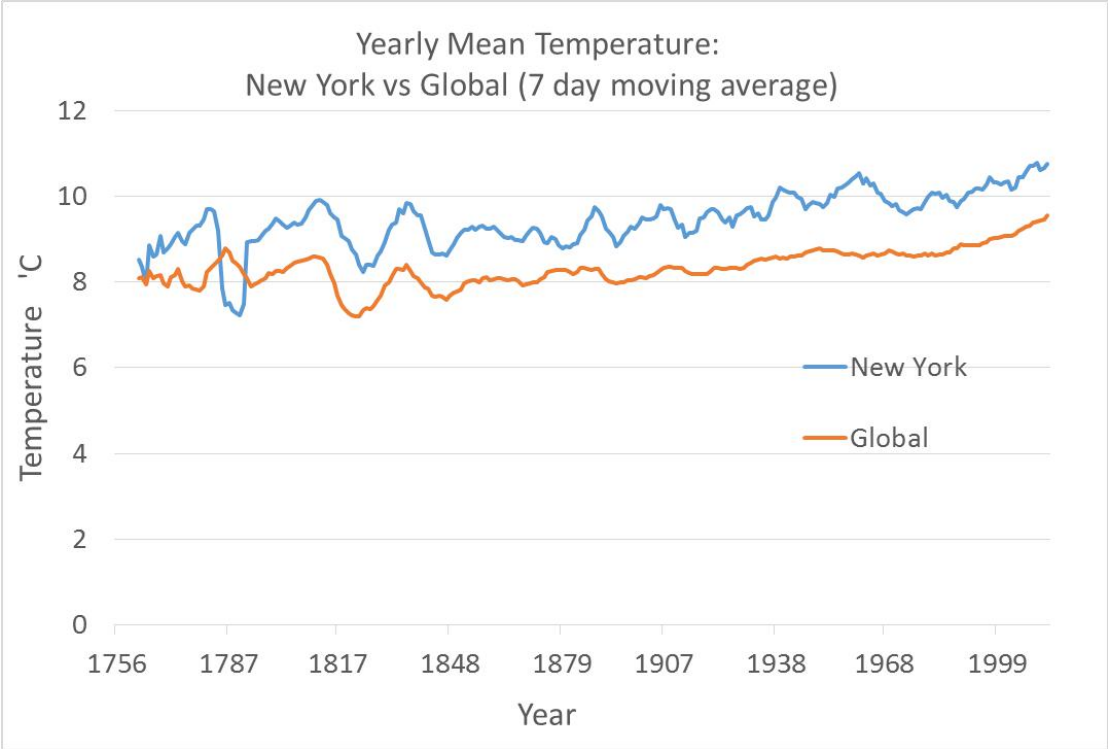
```
SELECT c.year new_york_year,
            c.avg_temp new_york_avg_temp,
            g.year global_year,
            g.avg_temp global_avg_temp
    FROM city_data c
     JOIN global_data g
       ON g.year = c.year
     AND c.city = 'New York'
ORDER BY 1;
```

The idea is to INNER JOIN the 'global_data' table and 'city_data' table by the 'year' column in each table, so both the city year and global year will have same values (for making the later graph). Within the JOIN ON clause, I added: AND c.city = 'New York' to filter the city where I live. And finally, I selected four columns which represents: the city year, city average temperature, global year, global average temperature.

After the query was successfully executed, I downloaded the result query data from Udacity workplace into a local csv file and opened the csv file with Microsoft Excel on my computer.

3. Next step is to prepare a line chart to visualize the weather trend. To smooth out the data to make it easier to observe long term trends, I calculated the 7-day moving average of both the yearly average temperature for New York and Global using the Excel function: Average(). For example, to calculate the 7-day moving average for New York yearly average temperature year 1756, I averaged the average yearly temperature of New York from year 1750 to 1756. Using the similar method, I was able to calculate the 7-day moving average of both New York and Global yearly average temperature for the years from 1756 to 2013.

4. To make visual comparison of the local and global temperature changes, I constructed a line chart (using Excel) with a shared x-axis: year (from 1750 to 2013), and the y-axis: 7-day moving average of New York's yearly average temperature and 7-day moving average of global yearly average temperature. I then added the chart title, the axis labels, adjusted the legends and font sizes (please see below chart).




5. As we can see from the line chart, the overall trend for mean temperature is increasing for both New York and global between the year 1756-2013. However, it seems that the mean temperature for New York has increased more than globally between the year 1756-2013.

More interestingly, although the overall temperature trend is going up for New York, there is a notable big drop in temperature around the year 1787. Also, we can see from the chart that overall, New York is usually hotter than the global average with the exception around year 1787. The global temperature fluctuated between the year 1756-1848 and staring from year 1848, we see a obvious up trend of global warming.