Exploring Weather Trends - Project Instructions

Data Preparing Stage Outline

1. To investigate what city nearest to me in the database, I write the SQL query to find what cites located in my hometown (Taiwan). The result showed there are three cities Kaohsiung, Taipei and Taichung in Taiwan in the database, I choose Taipei as the nearest city to me.

```
SELECT *
FROM city_list
WHERE country ='Taiwan';
```

2. Export two kinds of data as CSV files. One is the Taipei city data and the other is global data. The exported global data has 267 rows with average temperature data from 1750 to 2015, and there are 174 rows with average temperature data from 1841 to 2003, including column name(one row).

```
SELECT *
FROM city_data
WHERE city='Taipei';
```

```
SELECT *
FROM global_data
```

3. Calculate the moving average. For each Taipei and Global temperature data, I calculate 5-year moving average in Excel as follows:

   MA5(i)=[T(i-4)+T(i-3)+T(i-2)+T(i-1)+T(i)]/5, i= 1845, 1846,...,2013.

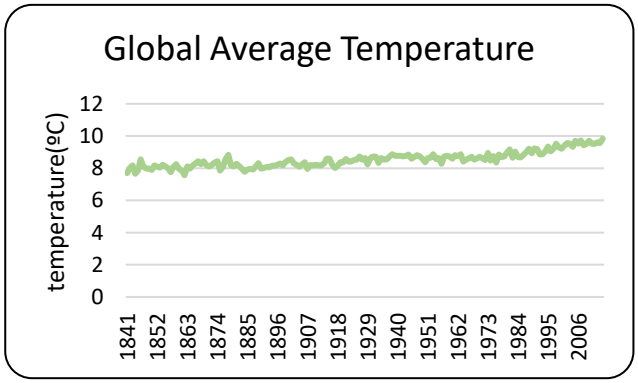
   (The yeardata in Taipei starts from 1841 to 2003 · so i starts from the first 5^{th} year)

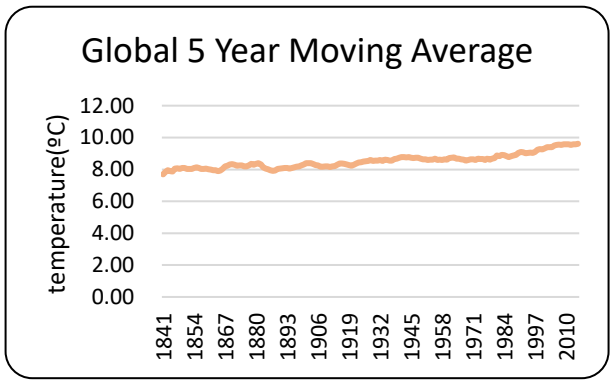
   To compare Taipei and Global data, I use global data start from 1841 to 2013, and delete the other years.

Line Chart- Global vs Taipei

Global

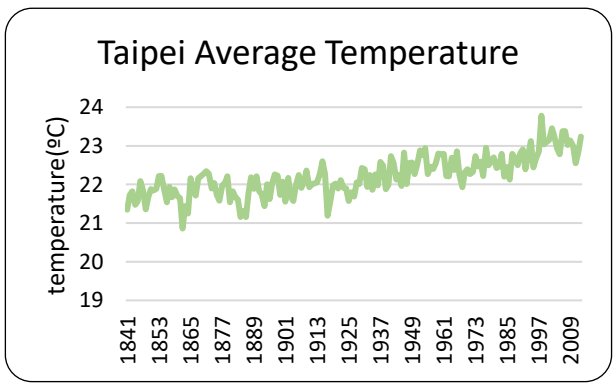
- As the charts shown below, the global average temperature is around 8 ºC to 10ºC, and the global 5 year moving average is also located on the interval. We can see that the global temperature has a rising trend, from 8ºC to 10ºC around past 170 years.
- We can see that the variety of temperature is small, on average it does not change over 0.5ºC in a small period. Hence the 5-year moving average line charts have the same smooth pattern.
- We can see that the rate of temperature change is increasing in recent years. For example, the temperature changed from 8ºC to 10ºC in 1940 to 2006, but in 1841 to 1940 it just changed from 8ºC to 8.5ºC.

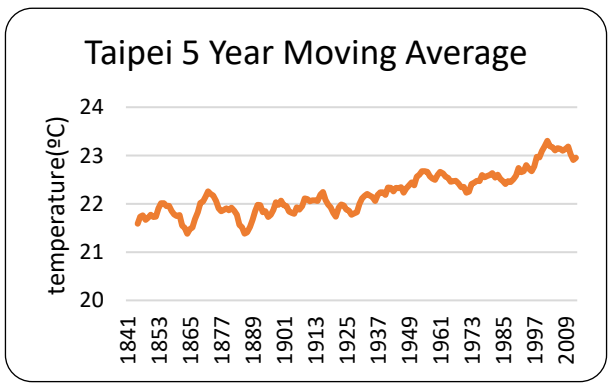




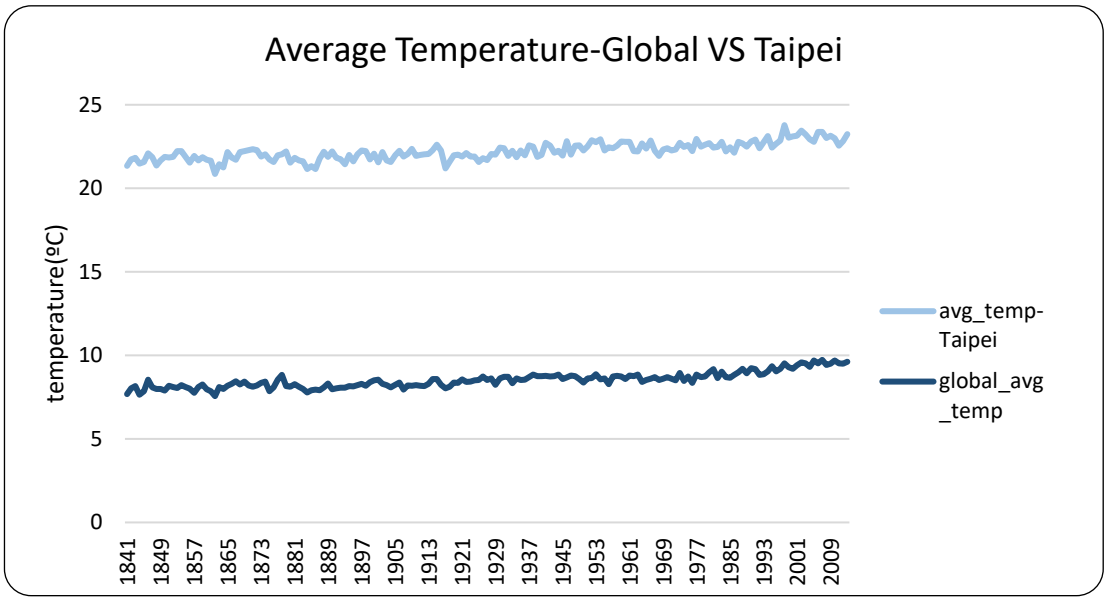
Taipei

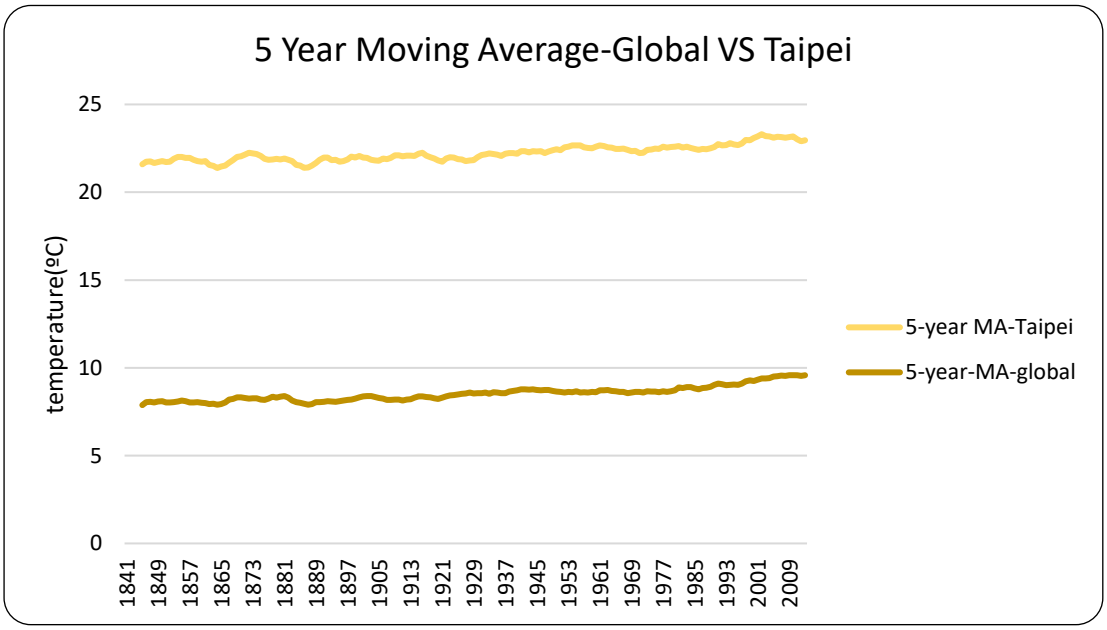
- As charts shown below, the Taipei average temperature is around 20ºC to 24ºC, and the 5 year moving average is located on 21ºC to 23.5ºC. We can see that the Taipei temperature has a rising trend, from 20ºC to 23.5 ºC.
- We can see that the variety of temperature is high. It can change over 1 ºC in a small period(for example, 10 year).
- We can see that the rate of temperature change is increasing in recent years, for example, the temperature changed from 22ºC to 23ºC in 1940 to 2006, but in 1841 to 1940 it just changed from 21.5ºC to 22ºC.





Global V.S. Taipei





- As charts shown above, we can see that the global average temperature is higher than Taipei's.
- Both trends have the same pattern, with slowly rising in the first and then the rate of temperature change increase more faster in recent years
- We can see that the variety of temperature in Taipei is higher in a small period compared to Global temperature.
- Using Excel CORREL function, I calculate the correlation coefficient of average temperature of Taipei and Global, and the result shows 0.82, which means there is a strong positive linear relationship between global temperature and Taipei temperature.