Weather Change

Wellington, Oslo and Global weather changes

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SQL

```
1. select * from city_list
where country like 'New Zealand'
2. select year, avg_temp from city_data
where city like 'Wellington'
3. select * from global_data
4. select year, avg_temp from city_data
where city like 'Oslo'
```

The outline

Tools During this project I used two tools, Excel and Python to analyse data and draw line charts.

Calculate In Excel, I used average() function to calculate the first 5 years average temperature and then copy and past down to calculate the rest of 5-year average. Finally, I used excel built-in line chart function to generate the line graph.

In Jupyter notebook, pandas.dataframe.rolling(n).mean() is the easy way to calculate the n-year moving average, and then use Matplotlib to plot the line charts.

The outline

Key considerations:

The first thing is to compare the data for the same period, even though we are more concerned about the trend of temperature changes.

The second thing is to choose the appropriate time interval to calculate the moving average. If the time interval is too small, the line will fluctuate much, it is very hard to see the trend from the noisy line graph. If the time interval is too big, it will lose the important changing information between years.

In this project, I tested 5-year, 10-year, 30-year, and 50-year moving average. In general, the 10-year moving average is better than other time interval lines.

5 years moving average lines(Excel)

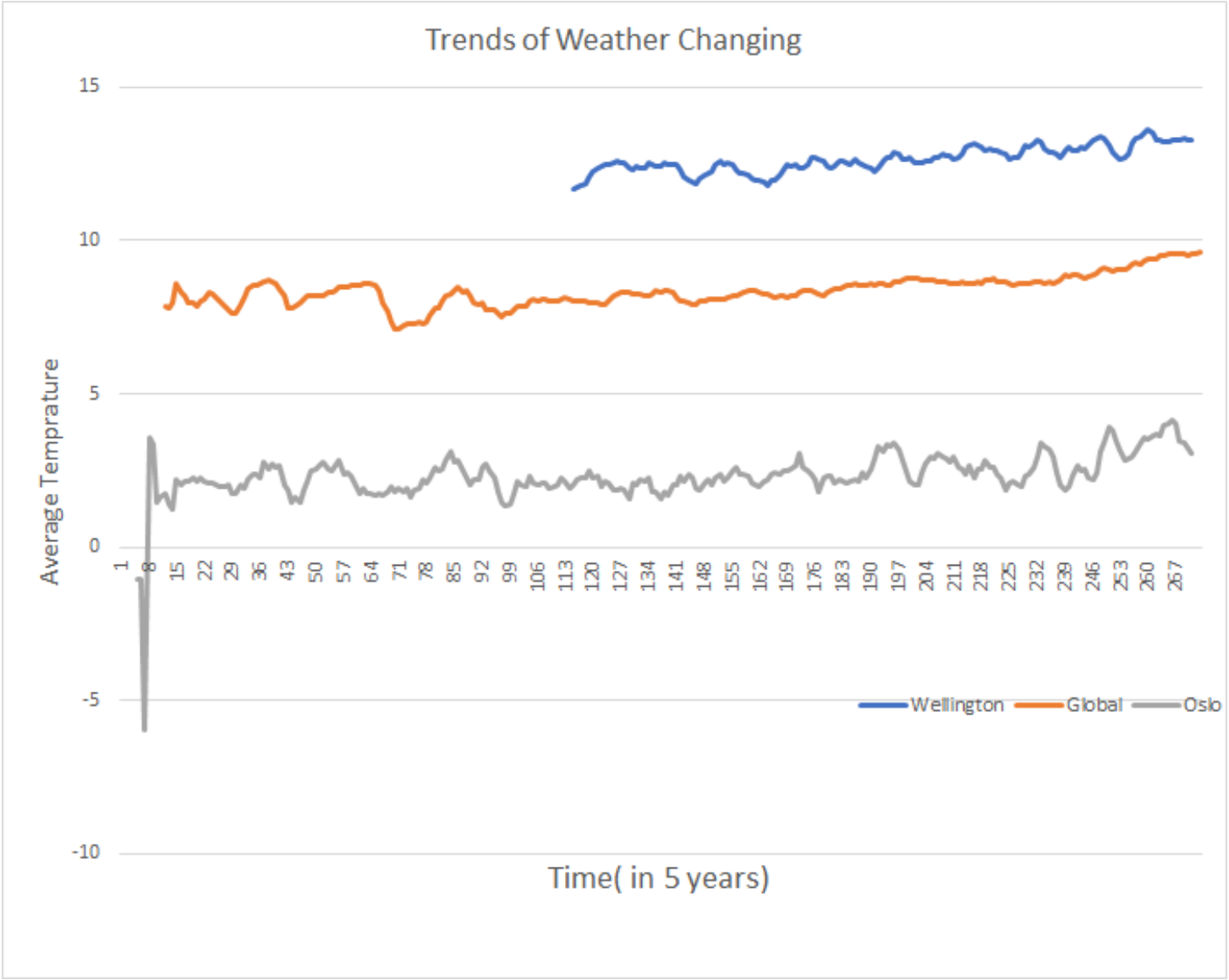
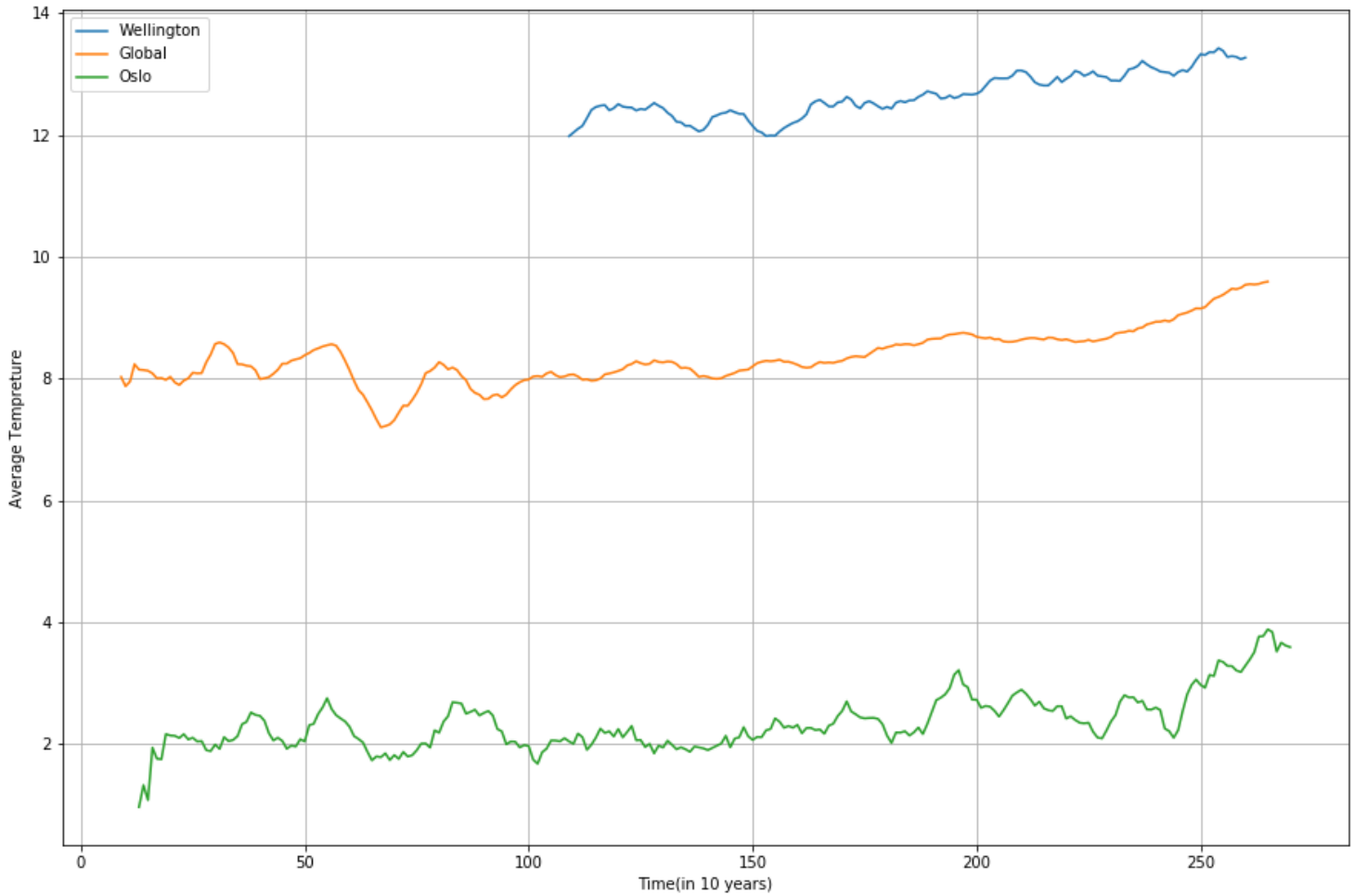
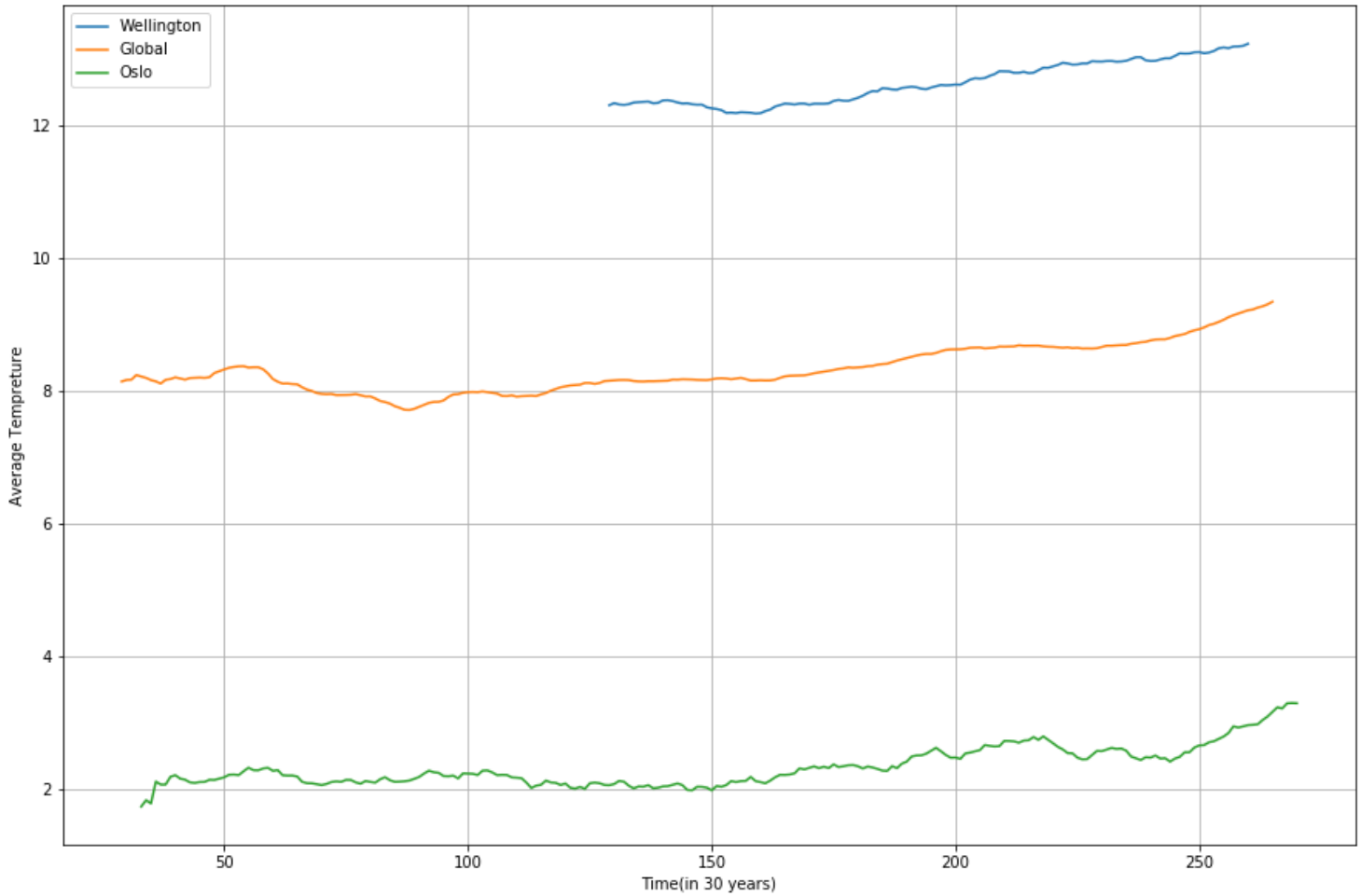


Figure 1:

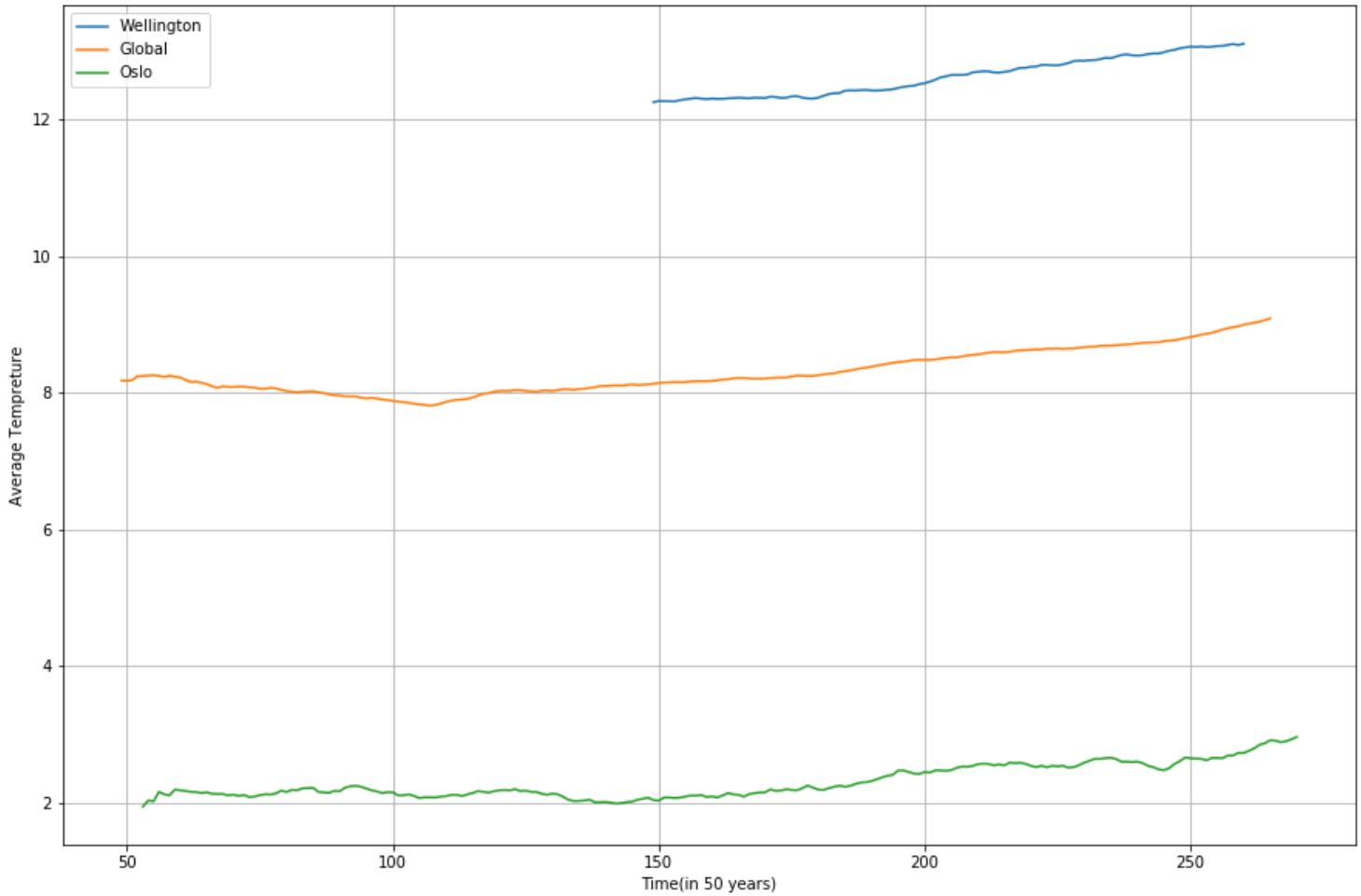
10 years moving average lines



30 years moving average lines



50 years moving average lines



Insights

1. The overall trend of weather changes is constantly heating up. During the last around 260 years, the global average temperature has risen from 8° to 9.8°. In the initial data period of about 150 years, the change is not that obvious. The average temperature fluctuated in the normal area. However, in the past 50 years, the temperature has accelerated.

2. The cities, Wellington(close to South pole) and Oslo(close to North pole) has the same trend as the global temperature changes. The average temperature is rising year by year.

Insights

1. However, the average temperature of Wellington is always much higher than the average temperature of global(around 4° difference). The average temperature of Oslo is much colder than the global(around 6° difference).

2. The weather changes more sharply in cities compared to the world. Especially in Oslo, the temperature fluctuates greatly. The change interval reached 2 °. The average temperature in Wellington has risen steadily.