Project 1: Explore Weather Trends

Introduction: This project explore and compare the weather (temperature) between global and the city Portland in Oregon, United States.

Methods: The following SQL query was used to extract the data and downloaded as CSV file. All calculations and data visualizations were done MS Excel 2016.

```
SELECT c.year, c.avg_temp AS city_temp, g.avg_temp AS global_temp
FROM city_data c
JOIN global_data g
ON g.year = c.year
AND c.avg_temp IS NOT NULL
WHERE c.city = 'Portland' AND c.country = 'United States' AND c.year > 1846;
```

Data were chosen from the year 1847 to 2013 for both Portland and global. Moving averages (10 years per.) were calculated using AVERAGE function in Excel.

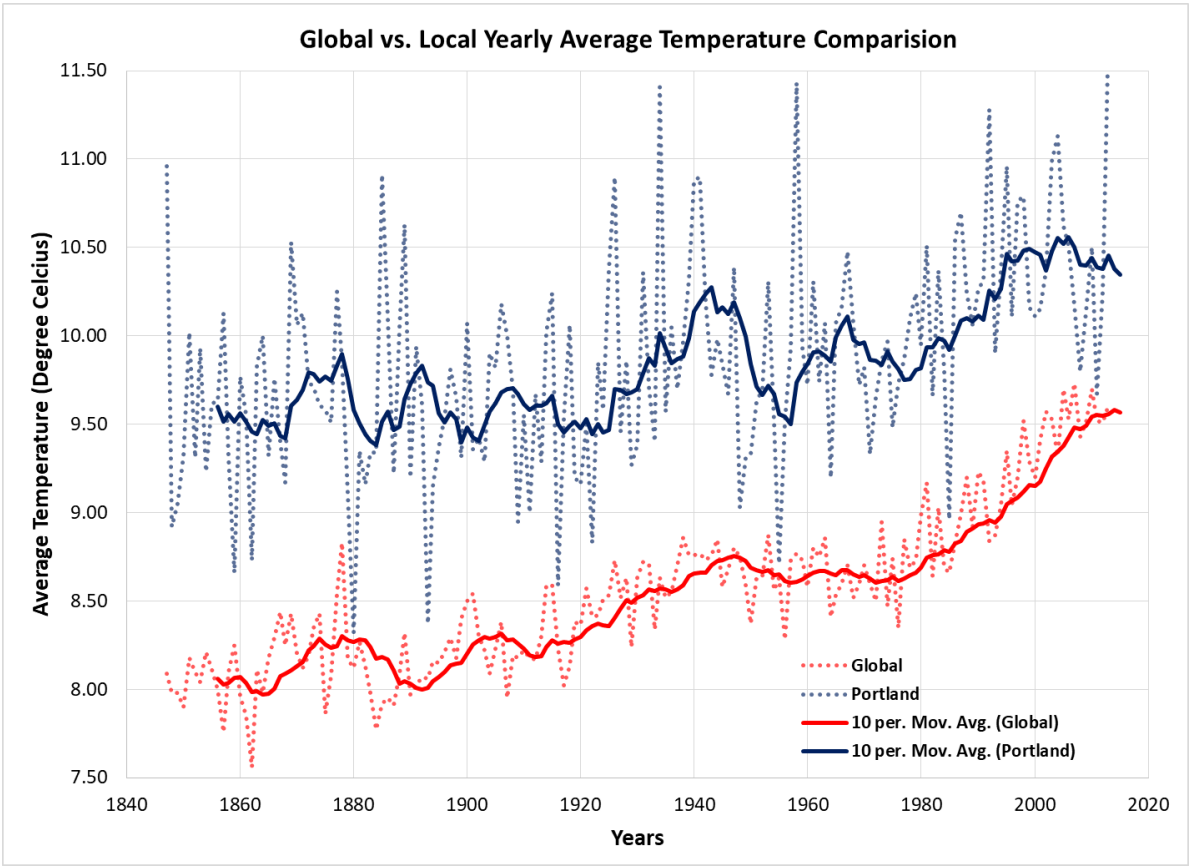

Figure 1: Comparison of yearly average temperatures of city of Portland (Red) vs Global (Blue).

Figure 1 compares the yearly temperature changes in city of Portland to the global since 1847 to 2013. The blue graphs represents the city of Portland while red graphs are for the global. While dotted lines in each case showing the yearly average temperatures, the solid lines shows the moving averages per 10 year span for both cases.

Observations and Discussion:

The key observations are;

1. Portland has always been hotter compared to the global.

On average Portland is 1.30 (± 0.52) degrees hotter than the global when comparing the yearly average data. In year 1885, Portland was 2.99 degrees hotter than the global which is the maximum difference between the two. The minimum difference of 0.08 degrees was observed in year 1955 between the two. The correlation coefficient calculated between the two yearly average temperatures is 0.54 using the CORREL function in Excel. This shows the two data sets have a positive medium relationship between them.

2. Both Portland and global temperature shows increasing trend.
3. Rate of increase of global temperature is higher than that of Portland temperature.

Portland temperature was 9.60 degrees in 1856 and increased by 0.85 degrees to 10.45 in 2013. However, the global temperature increased by 1.50 degrees from 8.06 degrees in 1856 to 9.56 degrees in 2013.

4. An opposite change in temperature observed between years 1884 to 1899.

Overall the two data set show similar changing behavior, when global temperature increase the Portland temperature increase and when global decrease so does Portland. However, this is not true during 1884 – 1899. In 1884, the two temperatures were 9.38 and 8.18 degrees respectively for Portland and global. The Portland temperature increased to 9.83 in 1892 then decreased to 9.40 in 1899. Whereas the global temperature decreased to 8.00 in 1892 and then increased to 8.15 in 1899.