

Increasing Temperature in Portland, OR, USA and the World

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Executive Summary

Global temperatures are on the rise and Portland, Oregon, United States is no exception. Portland has seen more variation in its average temperature than the world at large, but the temperature is rising less quickly than the rest of the world.

Data Wrangling

The world average temperature data was stored in a database. My first task was to verify that Portland was in the database and so I used this query.

```
SELECT *  
FROM city_list  
WHERE country = 'United States';
```

After verifying that Portland was in the database¹, I collected the data for Portland with this query (note, I used the country in there as I was not sure if there was another Portland elsewhere in the world).

```
SELECT *  
FROM city_data  
WHERE country = 'United States'  
AND city = 'Portland';
```

Then I gathered the global data with this query.

```
SELECT *  
FROM global_data;
```

Looking back on this, I could have gotten all the data in a single query, but I chose to manipulate the data in a spreadsheet instead. I combined both the Portland and the global data into a single spreadsheet lining up the years.

There was no data for Portland before 1828 and there is no data for the years 1830, 1831, and 1846. This makes sense because Portland wasn't founded until 1845 and didn't incorporate until 1851², so records prior to this would not have been recorded. I chose to start my analysis at 1856 so I could use a 10-year moving average.

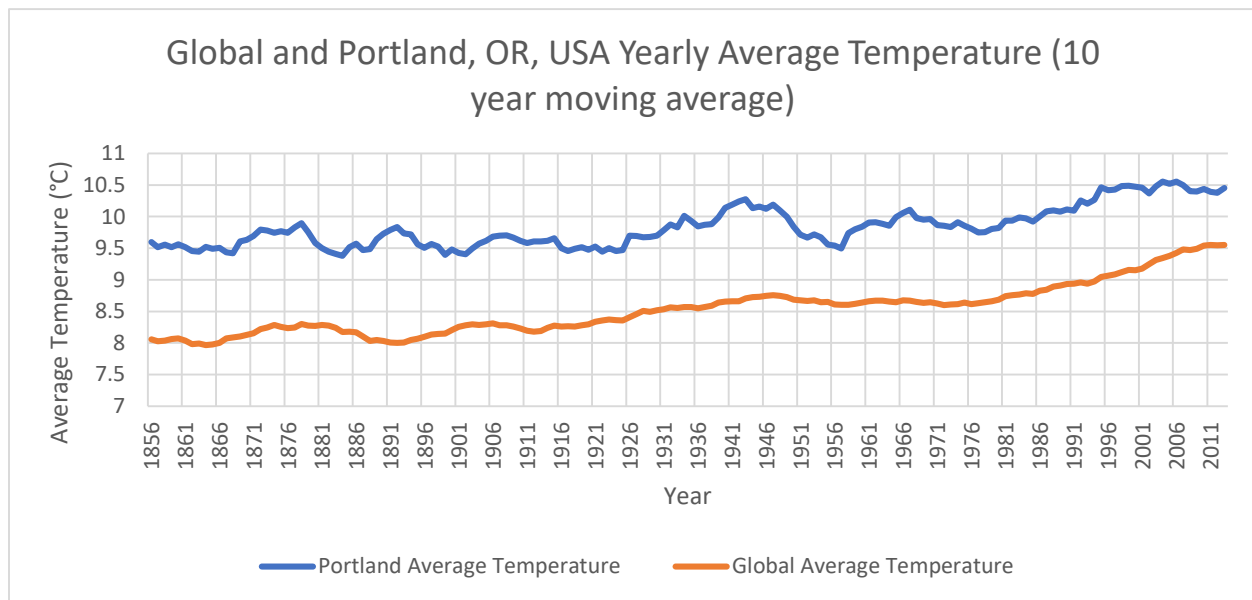
¹ I assume that this is Portland, Oregon. There are other cities named Portland in the US, but as the one in Oregon is the 25th largest city in the US (according to Wikipedia), it's a good assumption to make.

² Per Wikipedia

I found the 10-year moving average for both Portland and the global data starting on 1856. Then I created a line chart using this data. After noticing that Portland's average temperature seemed to be increasing slower than global average temperature.

Data Analysis

Here is a line graph of the average yearly temperature for Portland and the world using a 10-year moving average for the years 1856 to 2013. I used the 10-year moving average because it smoothed out the global temperature nicely and did a decent job at smoothing the Portland temperature



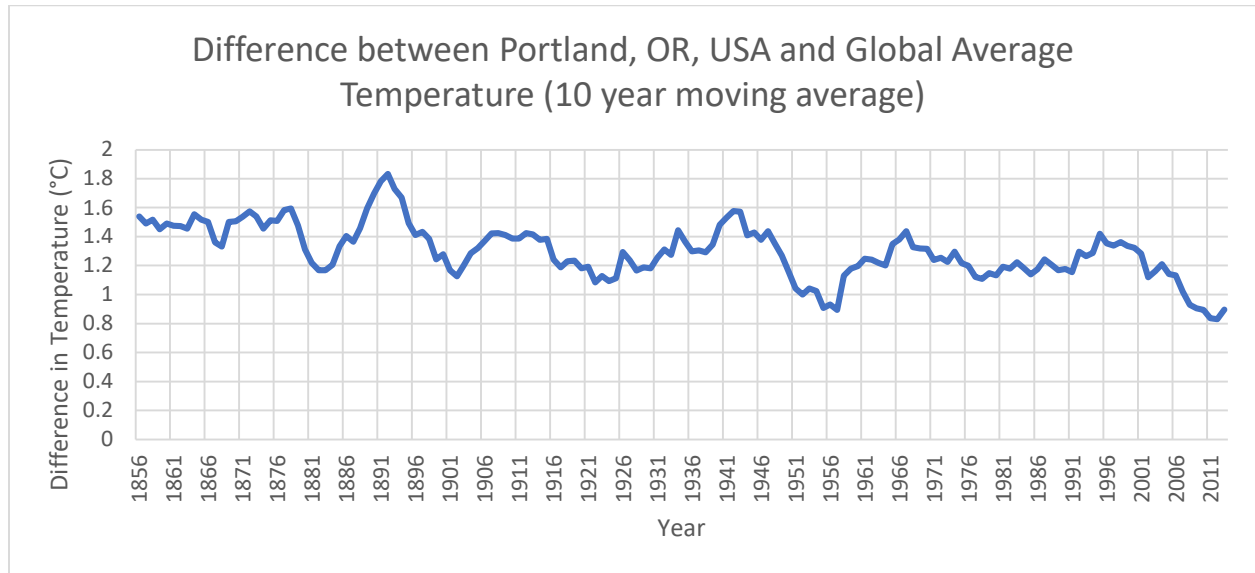
The first thing I noticed was that the Portland temperature varied a lot more than the global temperature. This makes sense because the global temperature with average many locations around the world, with more data the average would be more consistent than if there was only one piece of data.

Second, the temperature is increasing. The global temperature started around 8°C and ended around 9.5°C with a general increase throughout. Portland also has increased starting at around 9.5°C and ending around 10.5°C.

Third, in recent years, the rate of increase has become more rapid. The global temperature increased about 0.5°C from the 1850s to the 1940s. Between the 1940s and the 1970s, the temperature remained about the same. Between the 1980s and the 2010s, the temperature has increased about 1°C. This second increase was about twice as much and about a third of the time of the first increase.

Portland also has seen a more rapid increase in recent years. From the beginning of consistent recording to the 1930s, Portland oscillated between about 9.5°C and 9.75°C. From the 1930s to the 1970s, there was an increase, but the temperature still remained between 9.5°C and 10°C. Between the 1980s and the 2010s, the temperature rose to about 10.5°C and has never dipped below 10°C.

Finally, Portland is increasing at a slower rate than the rest of the world and this has become slower as time passes. I notice that there was a 1.5°C increase in the global temperature for the time I looked at, but a 1°C increase in Portland's temperature. I decided to look at this more closely and so I created a line chart of the difference between Portland's temperature and the global temperature, shown here.



This graph is generally decreasing as the years go by despite some spikes in the graph.

Conclusion

Global and local Portland temperature is not only increasing, it is increasing more quickly than it has previously. The global temperature is increasing more quickly than the Portland temperature.