**Project 1: Explore Weather Trends**

**Seattle Vs. Global Temperature**

Michelle Bleyl

**Goal:**

Compare your city with global temperature. Use Moving average then simply plotting average. Then make observation about the similarities and difference between your city’s average and world average, as well as overall trends.

**Tools Used:**

1. **SQL:** Extract the data from Udacity’s SQL workspace.
2. **Microsoft Excel:** Calculate Moving Average. Graph the moving average for cities and global into line plot.

**Steps:**

1. Extracting the Data (SQL)
2. First I search which city is closest to my hometown.

SELECT \* FROM city\_list

WHERE country=’United States’

ORDER BY city;

1. I found out that “Seattle” is the closest so I used the WHERE to filter only “Seattle”

SELECT \* FROM city\_data

WHERE country='United States' AND

city='Seattle';

1. Second, I connect to global\_data

SELECT \* FROM global\_data;

1. I used JOIN to combine the two table into one table. Download this csv file.

SELECT g.year,c.avg\_temp AS city\_avg,g.avg\_temp AS global\_avg

FROM global\_data AS g

INNER JOIN city\_data AS c

ON c.year=g.year

WHERE city='Seattle';

1. Moving Average (Excel)
2. First, I went from Data>Data Analysis>Moving Average to calculate Moving Average.
3. I calculated 5, 7, and 10 years of moving average for both Seattle and global temperature.
4. Plot
5. I used line plot for each moving average.

5 Year Moving Average

**Graphical user interface, chart, application, line chart

Description automatically generated**

7 Year Moving Average

**Graphical user interface, chart, line chart

Description automatically generated**

10 Year Moving Average

Chart, line chart

Description automatically generated

1. I calculated the average using AVERAGE() for 5,7, and 10 year moving average to see how much difference they have in average. I am going to use 10-year MA for my observation.

Seattle 5 Year MA Average: 7.49189103℃

Global 5 Year MA Average: 8.47823077℃

Seattle 7 Year MA Average: 7.49646693℃

Global 7 Year MA Average: 8.47554762℃

Seattle 10 Year MA Average: 7.5038892℃

Global 10 Year MA Average: 8.47216384℃

1. I calculated the minimum and maximum using MIN() and MAX() for 5,7, and 10 year moving average to see their temperature range. I am going to use 10-year MA for my observation.

Seattle 5 Year MA Range (℃): from 6.26 to 8.40142857

Global 5 Year MA Range (℃): from 7.522 to 9.58

Seattle 7 Year MA Range (℃): from 6.3275 to 8.339

Global 7 Year MA Range (℃): from 7.58571429 to 9.58857143

Seattle 10 Year MA Range (℃): from 6.3275 to 8.339

Global 10 Year MA Range (℃): from 7.666 to 9.556

1. I also calculated the correlation coefficient using CORREL() for 5,7, and 10 year moving average to see how much they are related. From 0 to 1 scale, 0 means they are not related at all and 1 meaning they are same. I used the Seattle’s moving average and global Moving average for each year.

Result:

5 year MA Correlation: 0.80994202

7 Year MA Correlation: 0.85704572

10 Year MA Correlation: 0.90383138

**Observations:**

1. All 3 graphs showed that global temperature is above Seattle’s temperature.
2. By observing the graph, the difference is consistent overtime. Constantly 1 ℃ difference so not a big difference.
3. The change is also similar too. For example, the trend happening from 1972 that both Seattle and global temperature is increasing year by year.
4. Same with average of MA. Seattle’s average for 10-year MA is 7.5038892℃ while the 2000s temperatures are above 8℃. Global average 10-year MA is 8.47216384 ℃ while 2000s temperature is above 9.3℃. Thus, the temperature increased compared to the past. I think this is because of global warming.
5. Observing minimum and maximum of both Seattle and global temperature of moving average. Seattle’s average temperature for 10 year moving average range is between 6.3275 to 8.339℃. Global average temperature for 10 year moving average range is between 7.666 to 9.556℃. Comparing Seattle and global temperature’s minimum and maximum, there is 1.3385℃ difference in minimum and 1.217℃ difference in maximum. Their difference is consistent.
6. Observing the correlation coefficient for 5,7, and 10 year moving average, I found that the more year, Seattle’s average temperature and Global average temperature is related(similar). For example, 10 year MA correlation is 0.90383138 meaning that both graph is about 90% similar.
7. Comparing 5 year MA graph and 10 year MA graph, the graph gets smoother.

Conclusion: Seattle’s temperature is slightly cooler than the global temperature. Their difference and trends are similar that each temperature is increasing year by year due to global warming.

**Reference:**

<https://www.youtube.com/watch?v=zsisAyzLzDs> – How to calculate Moving Average without using AVERAGE()