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DATA 5100

Weather Project: Communicate The Results

**Introduction**

Utilizing data from NOAA weather stations, this project used data science methodology to determine if it rains more in Québec City or Seattle.

**Description of Data**

The project used precipitation data downloaded from the National Centers for Environmental Education (NOAA). The data used was daily precipitation from January 1, 2018 to December 31, 2022. The variable STATION\_NAME represents the weather stations US1WAKG0225 (Seattle) and CA1PE000010 (“Québec”). The variable DATE indicates the year of record in the format YYYY-MM-DD and PRCP represents precipitation measured in mm.   
 **Analysis Methods**

The Seattle and Québec data frames were combined and variables renamed for ease of analysis. Dates were converted to be in the same format. Data imputation using mean values was implemented to fill in missing precipitation values for both cities. The final data frame used the variables date, city, precipitation, and day\_of\_year and had values for each day over the time period. The variable SEA was used to represent Seattle and YQB used to represent Québec.

The project used a descriptive approach to answer the question. In Seattle the mean precipitation over the four year period was 0.11 and the max precipitation was 2.60. In Québec the mean precipitation was 0.12 and max precipitation was 5.87. The difference in mean precipitation between the two cities was 0.01.

The first part of the analysis viewed precipitation from the daily perspective.**A graph of a number of days with different colors

AI-generated content may be incorrect.A graph with blue bars

AI-generated content may be incorrect.** The mean daily precipitation was viewed in bar plot format. The bar plot demonstrates visually that the average daily precipitation in Québec is more than Seattle, but by an arguably insignificant amount. The analysis also viewed the proportion of days each city receives rain.

**A graph with blue and orange bars

AI-generated content may be incorrect.A graph of different colored bars

AI-generated content may be incorrect.**The second part of the analysis viewed precipitation from a monthly perspective. From the monthly view, Seattle receives more days of rain in the months January through April and then November and December. In contrast, Québec receives more days of rain in June through September.

A similar trend is observed when viewing the mean monthly precipitation. The difference in how much more rain Québec receives than Seattle is more significant in the months June through September. Seattle receives less rain in the summer months.

**Results and Conclusion**

The results indicate there is not a significant difference in rain between Québec and Seattle when viewing daily values. Both cities receive similar daily precipitation, the notable difference being Québec has received a higher maximum amount of precipitation. Seasonal differences can be observed when viewing the cities at monthly intervals. There are more days of precipitation with higher amounts for Seattle in the winter. In Québec, there are more days of rain with higher rates of precipitation in the summer. In conclusion, it tends to rain more in Seattle in the winter while in the summer it tends to rain more in Québec City.