

## Goals of Research Project

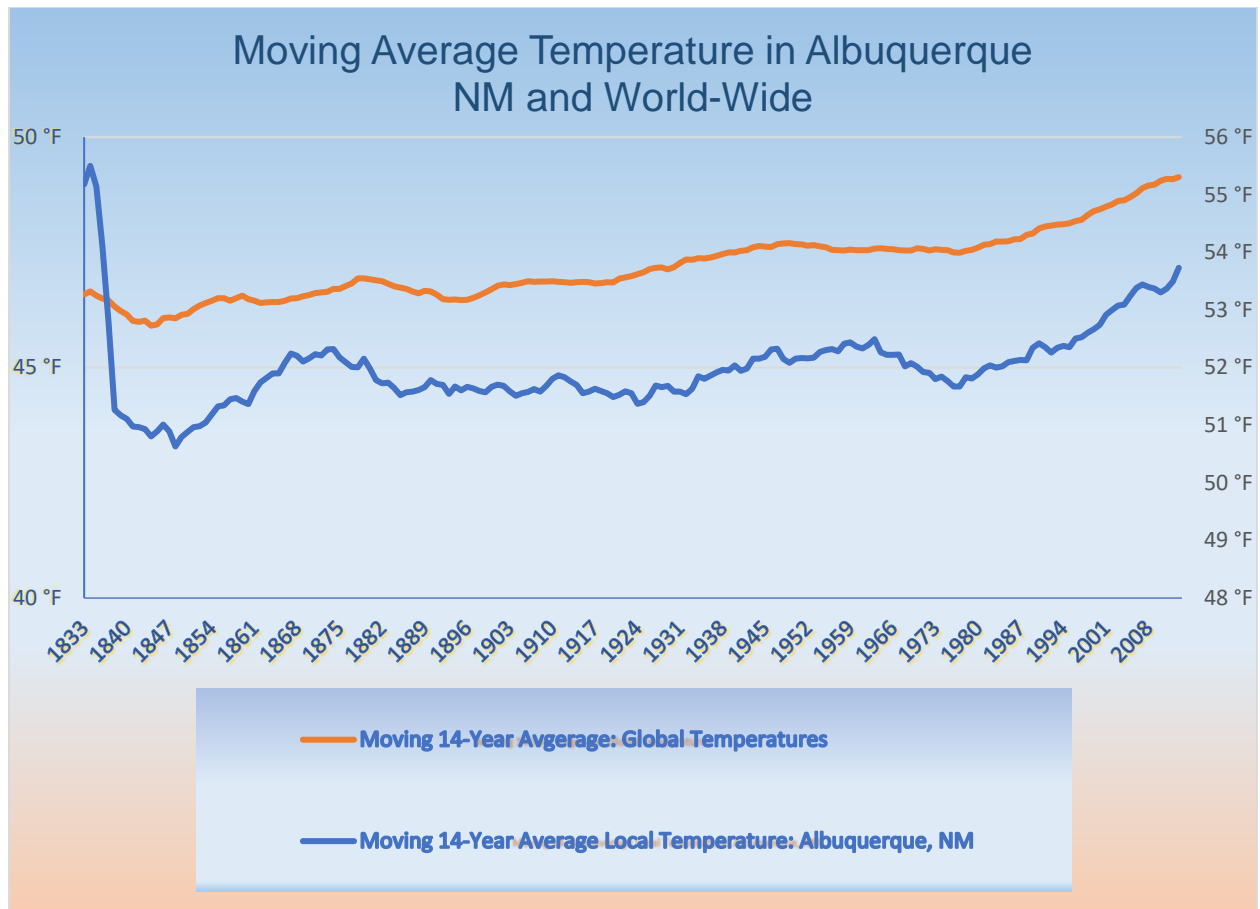
I aim to collect, manipulate, and analyze historical, international temperature trends from the raw data. The process includes calculating a 14-year moving average to smooth year-to-year noise. Output is calculated to Fahrenheit. Overall finding is that global and local temperatures are both trending to higher measurements with moderate correlative explanatory power. The Pearson Correlation is .6376.

## Steps of Data Research

1. I accessed the Udacity database and accessed three tables from which I downloaded all columns of data, with the intention of exploring the data and potential correlating relationships.
  - a. `SELECT * FROM Year_City_Country`
2. Next, I calculated the 14-year moving average temperature from 1833 to 2013.
3. I then merged data from two tables to combine my local city data with global temperatures. I then converted the Celsius to Fahrenheit.

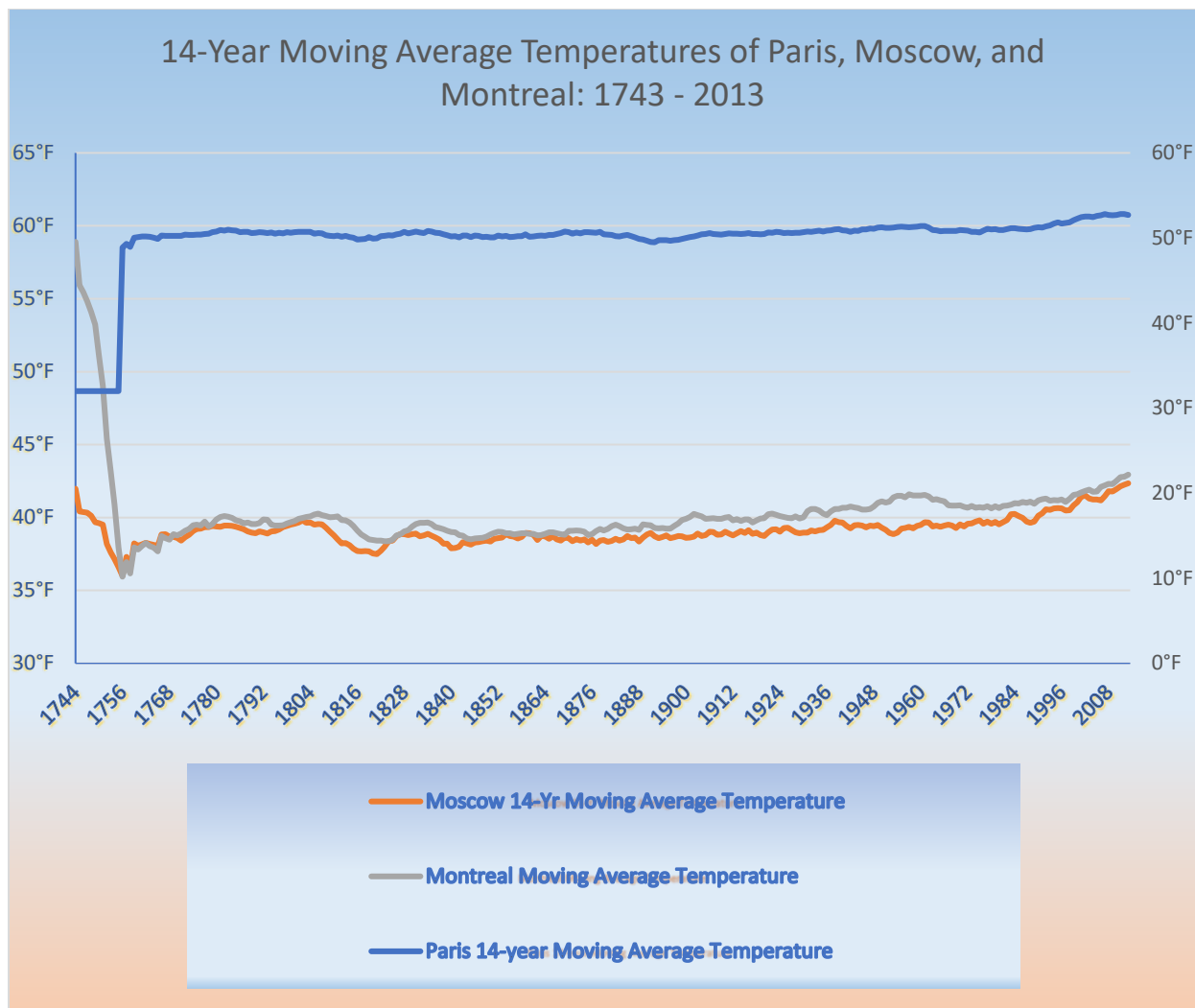
## Correlation Coefficient

- A. I calculated the Correlation Coefficient between the two arrays of historical temperature data of Albuquerque and Global Moving Averages, using this formula:
  - a. `=CORREL(I2:I181,J2:J181)`
  - b. The correlation coefficient between Albuquerque and Global moving averages is **.6376**.



## Observations

1. The above data reveal the overall correlation between Albuquerque and Global temperatures. (I ignored the spurious, early data before 1840.) The correlation is .637.
2. Both local and global sources are trending toward warmer temperatures, especially since 1970. This is particularly interesting because Albuquerque is very land-locked and the city's altitude is one vertical mile high at 5,000'.
3. I also notice a sharp rise in global temperature directly after the start of the industrial revolution in the early 1830's to the 1840's.
4. There are three pronounced humps in the global averages, while the local temperatures are less variable.



### Steps of Data Research

4. I then inquired about various cities. I grew up in Paris, and I recently lived in Montreal for a doctoral program. I put three tables together to find correlating relationships.
5. I then merged data from three tables to combine three city temperatures. I then converted the Celsius to Fahrenheit.

## Observations

- A. The city averages are very correlated, and Montreal shares a similar average as Moscow. I calculated a correlation coefficient of .525 between Montreal and Moscow (This seems very low, since I would have imagined closer to 1).
- B. All cities are trending toward warmer temperatures, especially since 1980's.
- C. The cities all have an increasing rate of growth over time.
- D. The pronounced humps of 1827 are shared by Montreal and Moscow—I surmise a global temperature swing.

## Conclusion

World, historical average temperatures are on the rise. The explanations, both scientific and political, are controversial subject matters and beyond the scope of this research.