OUTLINE – Eric Zhou

1. GOAL: USE SQL to extract San Francisco temperature data and global data from the database to excel.

1. **Search city list to see if there is data for my city. I live in the United States to filter out more data.**

   SELECT city, country

   FROM city_list

   WHERE country = 'United States';

2. **Found San Francisco in the city list.**

   SELECT *

   FROM city_data

   WHERE country = 'United States' AND city = 'San Francisco'

   ORDER BY year;

3. **Exported temperature data from SF, ordered from early years to most recent. See there is only data from 1849 to 2013 for SF so I use those parameters for the SQL query for the global data.**

   SELECT *

   FROM global_data

   WHERE year BETWEEN 1849 AND 2013

   ORDER BY year;

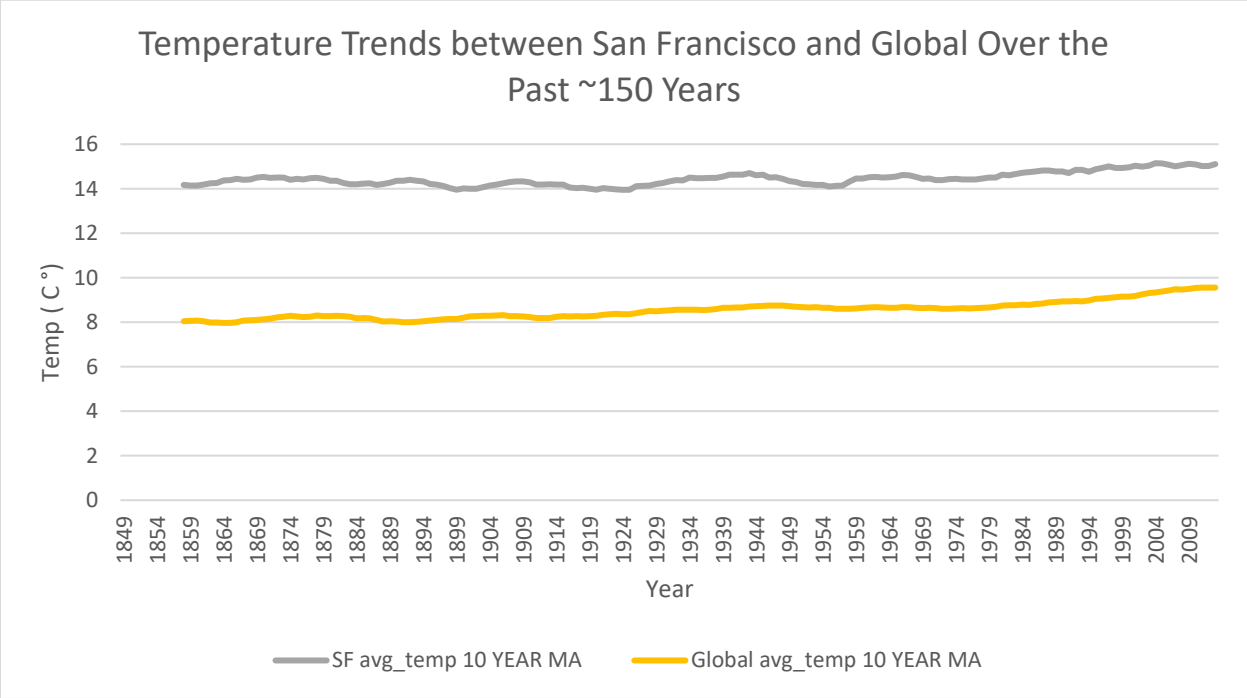
4. **Exported, and combined with SF data.**

2. GOAL: Use Excel to find the moving average for the extracted data and graph them in a line graph showing temperature over the years.

1. **Calculate 10 year moving averages via excel and graphed them into a line graph. I chose 10 year moving averages because I tested out 5 year moving averages and the graph was still fluctuating to the point where a conclusion could not be made that well. To do the 10 year moving averages, I averaged subsequent 10-year periods.**

SF avg_temp	Global avg_temp	SF avg_temp 10 YEAR MA
14.12	7.98	
13.8	7.9	
14.39	8.18	
13.81	8.1	
14.4	8.04	
13.98	8.21	
14.2	8.11	
14.1	8	
14.78	7.76	
14.19	8.1	=AVERAGE(D2:D11)
13.71	8.25	14.136
13.81	7.96	14.137
14.88	7.85	14.186
14.43	7.56	14.248
14.43	8.11	14.251
15.18	7.98	14.371
14.32	8.18	14.383
14.67	8.29	14.44

2. Since I wanted to compare the temperature trends between two different entities and I had the time variable, a line graph would be a suitable graph to show similarities and differences easily.



Observations

- On average, San Francisco is 6 degrees C warmer than the global temperature.
- However, recently the global trendline has a higher slope which means that the gap is closing to around 5 C. This means that the world is warming up at a faster rate than San Francisco's temperature.
- The temperature trend for SF fluctuates more than the global temperature and the global temperature is more consistent. For example, around the 1950s, there is a temperature drop for SF but globally the temperature did not seem to change. This makes it seem like SF temperature is more consistent and just recently had a warmer trend up (1980s) while globally, this warm trend had started around the 1910s.
- 150 years ago, between 1850s and 1900s , the temperatures in both SF and globally stayed consistent and had a slope close to 0.
- As a whole, the temperature trend for SF and the world has been getting warmer especially in the past ~40 years, which seems like the slopes for both lines increased compared to previous years. Faster rates, perhaps due to industrialization in SF and the world.