Project 1 - Explore weather Trend

By Sylvia Gao

Summary:

I currently live in San Jose, CA, USA. In order to compare the global weather trend and the local city weather trend, I get data using SQL, calculate the moving average and draw trend lines for each category. Then compare the trend line result to see the local and global temperature changes during the past hundreds of years.

Data Explore Steps:

1. From explore city_data and global_data separately, the year range of these two dataset are different. The global_data start from year 1750 to 2015, and the city_data with San Jose start with year 1849 to 2013. In order to better compare two trends with same time range, I join two table select the data range where both tables have data available from year 1849 to year 2013.

2. Extract data using SQL by join the city_data table and global_data table together. Here's the code. And download the data to google sheet.

   ```
   SELECT c.city, c.country, g.year, c.avg_temp city_temp, g.avg_temp global_temp
   FROM city_data c
   JOIN global_data g
   ON c.year = g.year
   WHERE c.city = 'San Jose'
   ```

   The downloaded data have 5 columns, City, Country, Year, City_temp, Global_temp, and 166 observations, from year 1849 to year 2013.

3. Then calculate city temperature and global temperature moving average to get a smoother trend, by creating additional two columns called *City 10-year MA,* and *Global 10-year MA.*
   a. For each additional moving average column, calculate average temperatures for the past 10 years of each year. Using 10 years as a decade to smooth the trend line and keep the trend distinct. For example, the moving average of the San Jose temperature in year 2010 will be calculated by the average from 2001 to 2010.
   b. This calculation will sacrifice 9 years data and start to have moving average data from year 1858, to the year 2013.

4. Then Create a line chart to compare San Jose's temperatures with global temperatures change trend.

   a. A line chart for San Jose moving average temperature trend
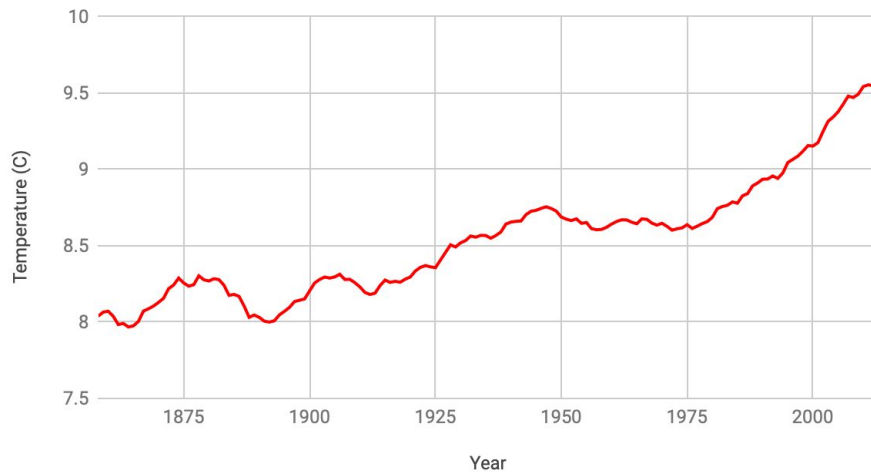
   Weather Trend San Jose

   Insights:
   i.   From graph a. Weather Trend San Jose, the temperature fluctuates between 14 ℃ to 14.5℃ before 1975. Each peak cycle is around 25 years.
   ii. This weather graph shows slight decrease trend before year 1925 and slight increase trend between year 1925 to 1975.
   iii. The San Jose weather start to drastically increase after year 1975, from around 14.5℃ to 15.2℃.
   iv. In general, the weather of San Jose changes from 14℃ to 15℃ for last hundreds of years, showing significant signs of warming.

b. A line chart for Global moving average temperature trend
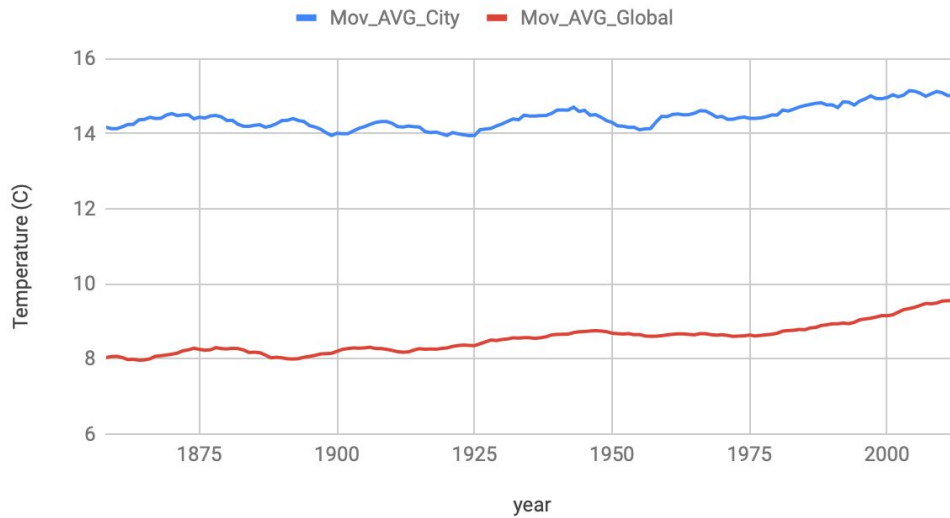
Weather Trend Global

Insights:

i.   From graph b. Weather Trend Global, the temperature increase from 8 ℃ to 9.5℃ through out time frame, showing significant signs of warming.

ii. This weather graph shows slight fluctuate weather trends before year 1900 and significant increase trend after year 1910. The temperature slightly decreased between year 1950 and 1975.

iii. The San Jose weather start to drastically increase after year 1975, from around 8.6℃ to 9.5℃, showing significant signs of warming.

c. A comparison line chart to compare both trends
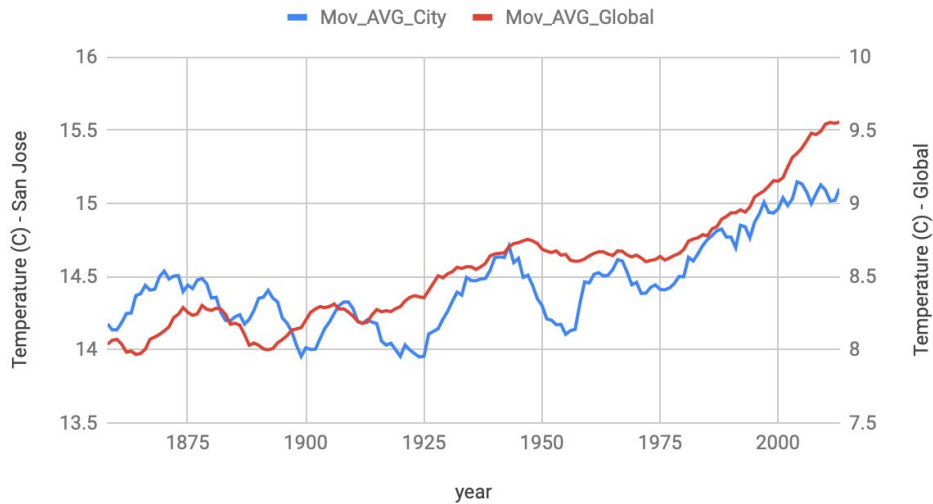
Weather Trend Global vs. San Jose

Insights:

i. From graph c. Weather Trend Global vs.San Jose, both trend line shows an increment of moving average temperature during timeframe.

ii. In general, the San Jose's weather is higher than global weather, average difference is about 6 °C

d. A modified comparison line chart to further identify the trend similarity and difference.

Weather Trend Global vs. San Jose

Insights:

i. After modify each trend line to different axis, and try to overlap temperature trend together. We can see both San Jose and Global temperature shows increase trend of weather.

ii. The increase of weather in both San Jose and Global start to drastically increase from around the year 1975.

iii. San Jose temperature fluctuate more than the global temperature

iv. Before the year 1900, San Jose's temperature change is not same with global weather change trend.