Project 1: Explore Weather Trends

Rong En

1. Summary

In this project, I will analyze local and global temperature data and compare the temperature trends where I live (Houston, United States) to overall global temperature trends

2. Extract Data from database using SQL query

(1) Explore the city_list table to see what cities and countries are available. The output shows data is available for Houston, United States, where I live.

SQL query 1:

```
SELECT DISTINCT country, city
FROM city_list
order by 1,2
```

(2) Extract the city level data. The output shows there are 194 records available for Houston from year 1820 to 2013.

SQL query 2:

```
SELECT year, city, country, avg_temp
FROM city_data
WHERE city='Houston' and country='United States'
```

(3) Extract the global data. The output shows there are 266 records available for global temperature from year 1750 to 2015.

SQL query 3:

```
SELECT year, avg_temp
FROM global_data
```

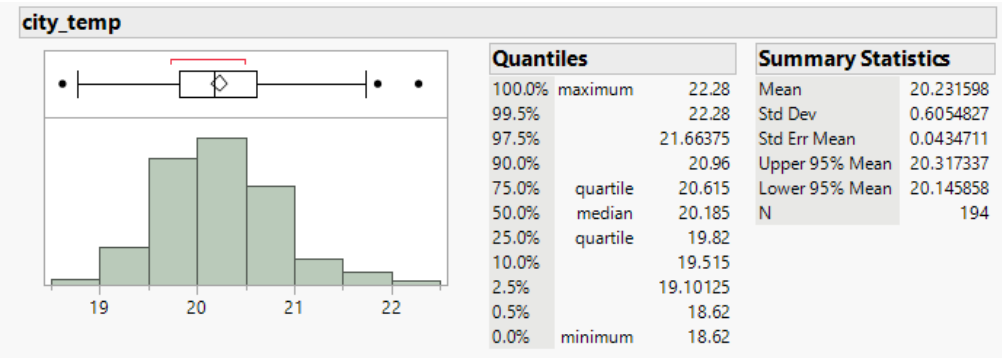
(4) Join local temperature data with global temperature data so that both local and global data are in the same tale. Export to CSV

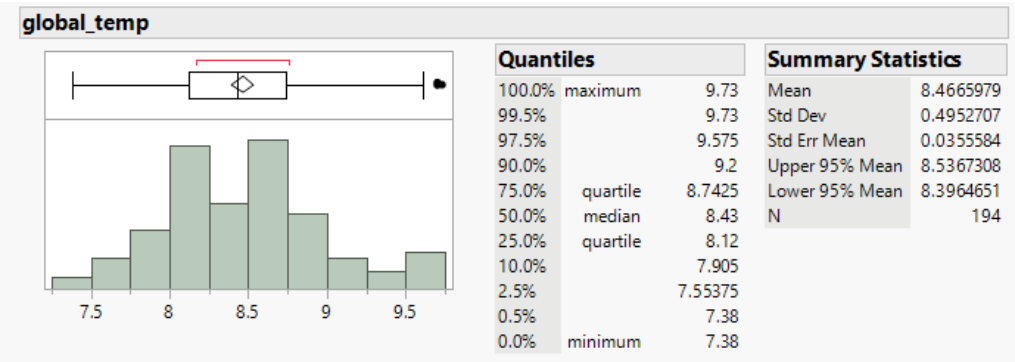
SQL query 4:

```
SELECT c.city, c.country, c.year, c.avg_temp as city_temp, g.avg_temp as
global_temp
FROM city_data c
JOIN global_data g
ON c.year=g.year
WHERE c.city='Houston' and c.country='United States'
```

3. In the CSV file, calculating the 10- year moving average temperature to smooth the data. Then I create line charts to compare the temperature in Houston with global temperatures. I use the statistical software JMP for all the graphs.

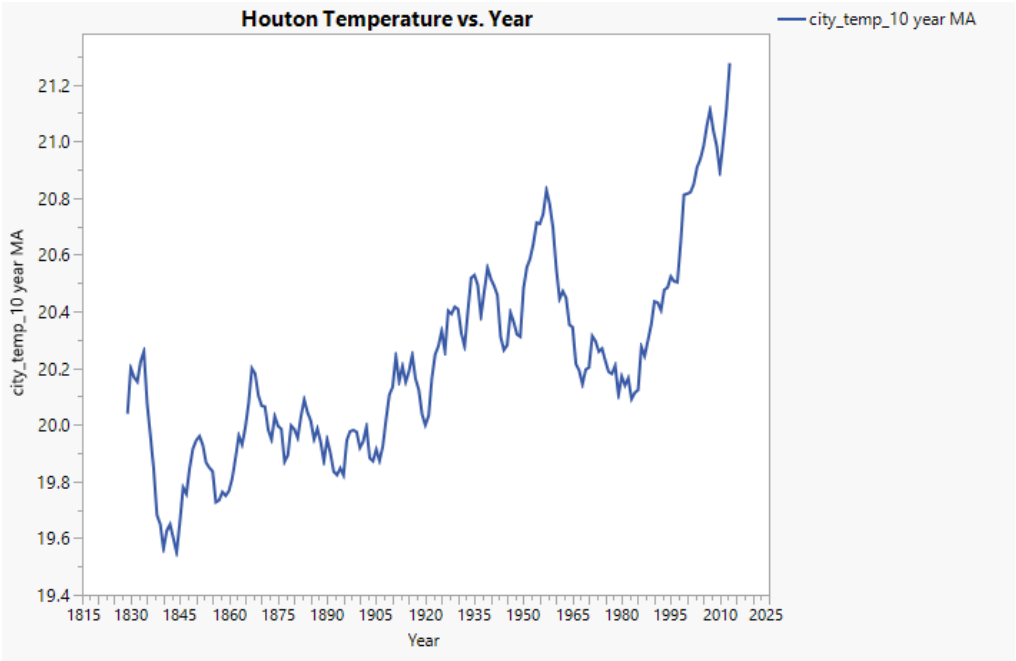
(1) Create histogram and summary statistics:

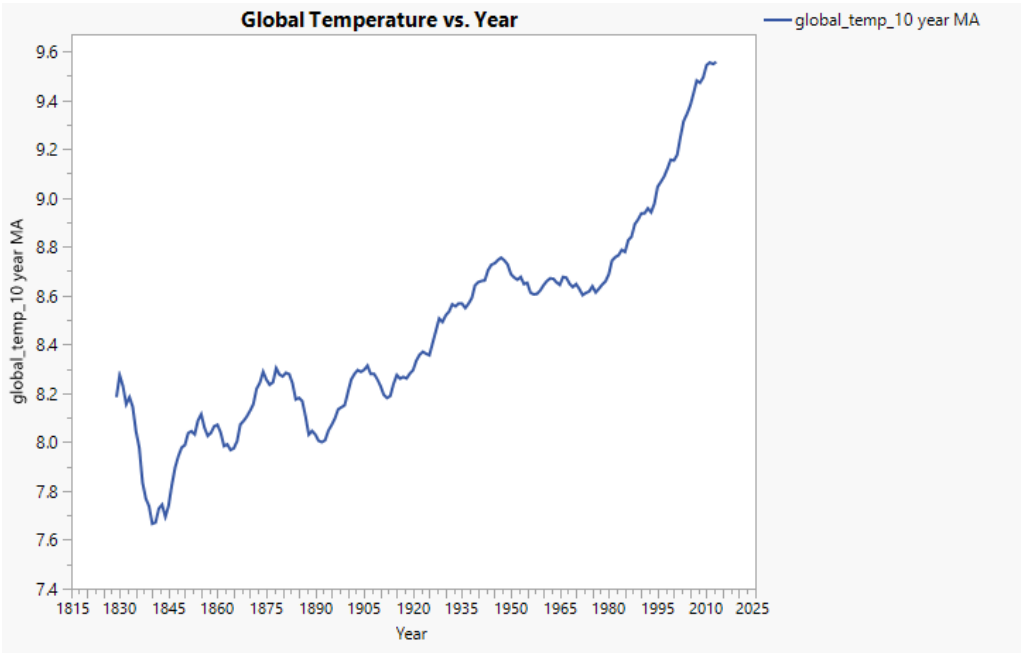


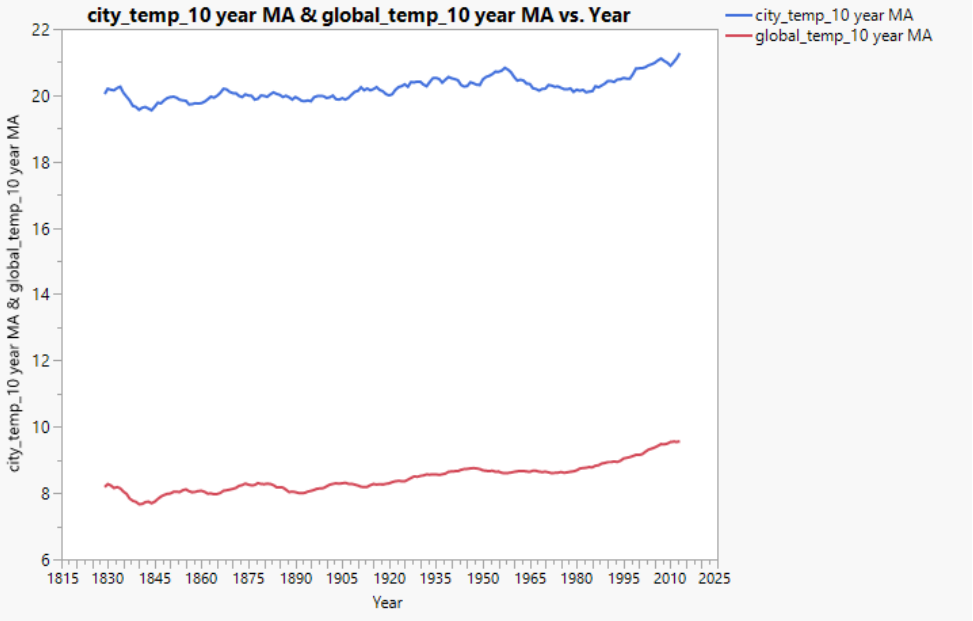


From the summary statistics of the temperatures, we can see the yearly average global temperature is in the range (7.38, 9.73) with mean 8.47. The yearly average temperature for Houston is in the range (18.62, 22.28) with mean 20.23.

(2) Plotting the 10-year moving average temperature for Houston and global separately and combined:







4. Conclusions:
   (1) The yearly average temperature varies in the range 19 and 22. The yearly average global temperature varies between 7 and 10.
   (2) On average, Houston is hotter compared to global temperature. The temperature difference is consistent over the years.
   (3) The yearly average temperature for Houston fluctuates up and down more than global temperature, but overall, both temperatures show upward trending over the years.
   (4) After around year 1990, both global and Houston temperature going up quickly, which shows a sign for global warming.