Sarina Chen

# EXPLORE WEATHER TRENDS

GLOBAL + LOS ANGELES

## EXTRACT DATA

QUERY WITH SQL

OUTLINE

1. Find my closest city in 'United States' in city_list → 'Los Angeles'
2. Query and export Los Angeles average temperature data
3. Query and export global average temperature data

### LOS ANGELES

| year | avg_temp |
|---|---|
| 1849 | 15.71 |
| 1850 | 15.28 |
| 1851 | 15.53 |
| 1852 | 15.61 |
| 1853 | 16.27 |

```
SELECT
    year
    , avg_temp
FROM
    city_data
WHERE
    city = 'Los Angeles'
    AND country = 'United States'
;
```

### GLOBAL

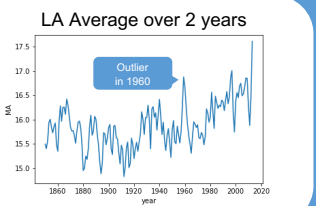
| year | avg_temp |
|---|---|
| 1750 | 8.72 |
| 1751 | 7.98 |
| 1752 | 5.78 |
| 1753 | 8.39 |
| 1754 | 8.47 |

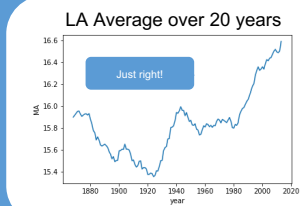
```
SELECT
    year
    , avg_temp
FROM
    global_data
;
```

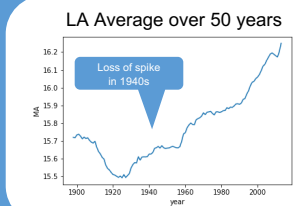
## MOVING AVERAGES

20 YEAR

MANIPULATE WITH PYTHON




OUTLINE

1. Try 2-year window → graph is too noisy
2. Try 20 year window → graph is smoother
3. Try 50 year window → graph is smoother but some trends are lost
4. Make sure this works for both LA and global data

```
[1] import pandas as pd
[2] import seaborn as sns
[3] city_data = pd.read_csv("weather_losangelesUSA.csv")
[4] city_data["MA"]=city_data["avg_temp"].rolling(window=20).mean()
[5] sns.lineplot(x="year",y="MA", data=city_data)
```

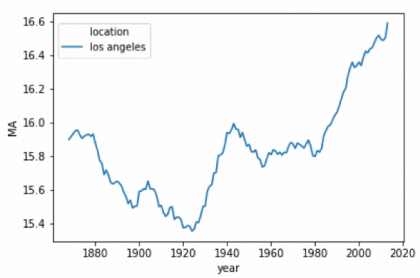
## OBSERVATIONS

VISUALIZE WITH PYTHON

OUTLINE

1. Observe trends in Los Angeles in 1849 to 2013.
2. Observe trends in the world in 1750 to 2015 (larger range than Los Angeles).
3. Compare the temperature of Los Angeles against the average temperature across the globe.
4. Compare how similar the temperatures change (especially with increase in global warming).

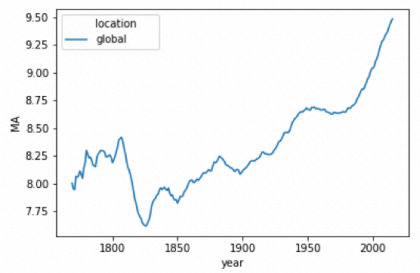
### INFERRING LA AND GLOBAL




**1** How has Los Angeles been doing?

The average temperature between 1849 and 2013 is **15.9 C**. There is a small peak in the 1940s, but temperature has been consistently rising since the 1960s.

```
[4] city_data["MA"]=city_data["avg_temp"].rolling(window=20).mean()
[5] sns.lineplot(x="year",y="MA", data=city_data)
[6] city_data.describe()
```

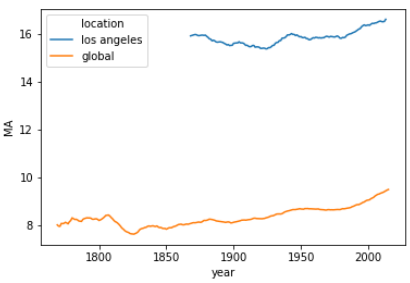



**2** How has the world been doing?

The average temperature between 1750 and 2015 is **8.4 C**. There is a dip in the early 1800s, but overall, temperature has been rising since the 1820s.

```
[7] global_data["MA"]=global_data["avg_temp"].rolling(window=20).mean()
[8] sns.lineplot(x="year",y="MA", data=global_data)
[9] global_data.describe()
```

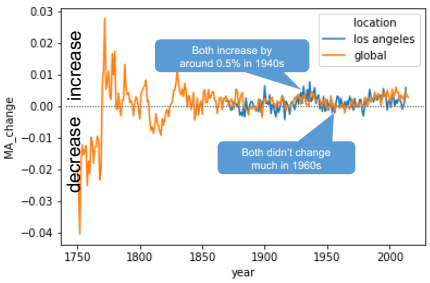
### COMPARING LA WITH GLOBAL




**3** How does Los Angeles compare with the world?

Los Angeles is higher than the average global temperature because it's closer to the equator. Since the 1950s, both Los Angeles and the world are getting hotter.

```
[10] global_data["location"] = "global"
[11] city_data["location"] = "los angeles"
[12] combined = pd.concat([city_data, global_data])
[13] sns.lineplot(x="year", y="MA", hue="location",data=combined)
```




**4** Are temperature fluctuations similar?

By comparing percent changes of the moving averages, both seem to be increasing at similar rates. The world was getting hotter slightly faster than Los Angeles was in 2000 through 2010.

```
[14] combined["MA_change"]=combined["avg_temp_change"]. \
        rolling(window=20).mean()
[15] sns.lineplot(x="year", y="MA_change", hue="location",data=combined)
```