

EXPLORE WEATHER TRENDS PROJECT

By Ahmed Eweed

DATA EXTRACTION:

Done by using SQL on my workspace

Results:

City level data of “Cairo”

```
SELECT *
```

```
FROM city_data
```

```
WHERE city='Cairo' AND  
country='Egypt';
```

City level data of “Berlin”

```
SELECT *
```

```
FROM city_data
```

```
WHERE city = 'Berlin'
```

```
AND country = 'Germany'
```

```
AND year BETWEEN '1808'
```

```
AND '2013';
```

City level data of “New York”

```
SELECT *
```

```
FROM city_data
```

```
WHERE city = 'New York'
```

```
AND country = 'United States'
```

```
AND year BETWEEN '1808'
```

```
AND '2013';
```

City level data of “London”

```
SELECT *
```

```
FROM city_data
```

```
WHERE city ='London'
```

```
AND country='United Kingdom'
```

```
AND year BETWEEN '1808'
```

```
AND '2013';
```

Global data around the world

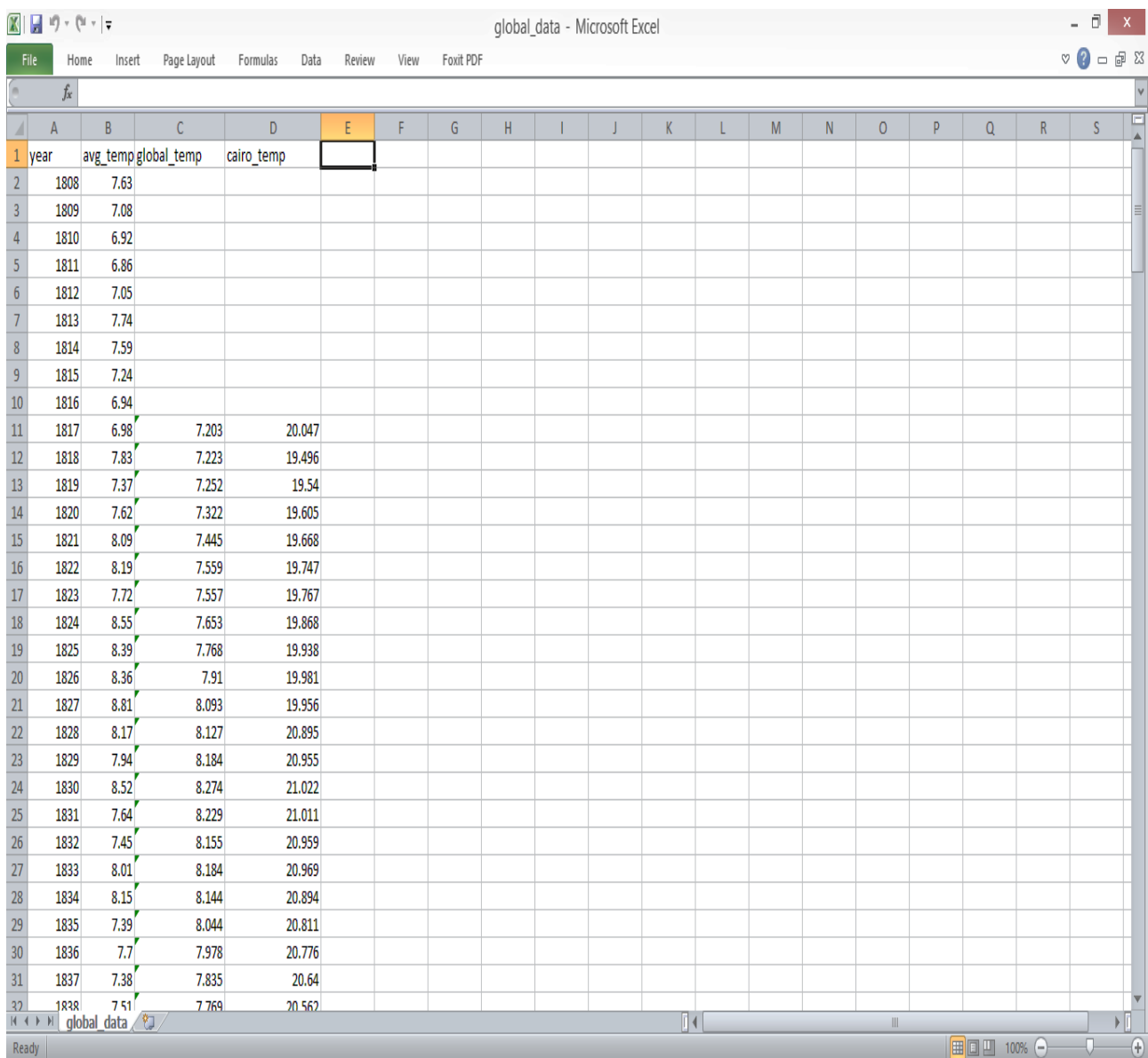
```
SELECT *
```

```
FROM global_data
```

```
WHERE year BETWEEN '1808'  
AND '2013';
```

Moving Average:

Done by using Excel and 10-year moving average because a decade is a good measure to observe changes in weather

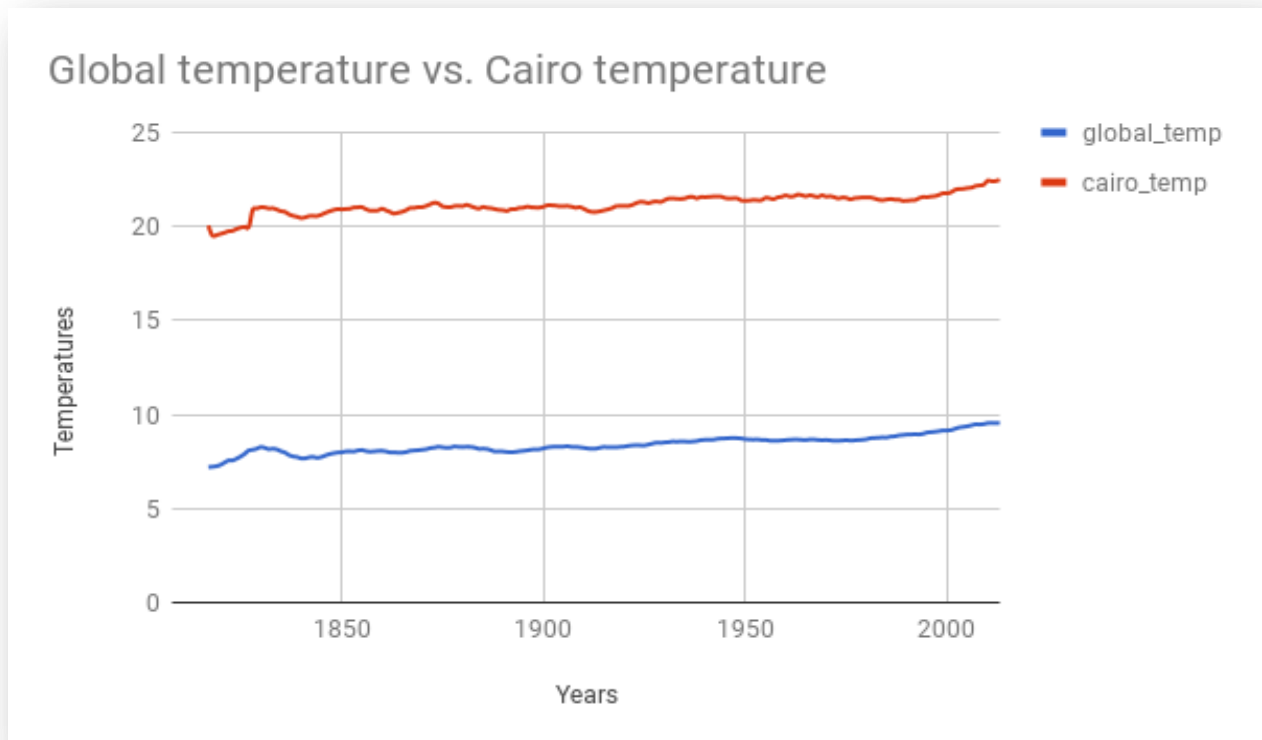


The screenshot shows an Excel spreadsheet titled "global_data - Microsoft Excel". The spreadsheet contains data for global and Cairo temperatures from 1808 to 1837. A 10-year moving average is calculated for the Cairo temperature data, starting from 1817. The formula bar shows the formula for cell E11: $=\text{AVERAGE}(D11:D20)$. The status bar at the bottom indicates "Ready" and "100%".

year	avg_temp	global_temp	cairo_temp
1808	7.63		
1809	7.08		
1810	6.92		
1811	6.86		
1812	7.05		
1813	7.74		
1814	7.59		
1815	7.24		
1816	6.94		
1817	6.98	7.203	20.047
1818	7.83	7.223	19.496
1819	7.37	7.252	19.54
1820	7.62	7.322	19.605
1821	8.09	7.445	19.668
1822	8.19	7.559	19.747
1823	7.72	7.557	19.767
1824	8.55	7.653	19.868
1825	8.39	7.768	19.938
1826	8.36	7.91	19.981
1827	8.81	8.093	19.956
1828	8.17	8.127	20.895
1829	7.94	8.184	20.955
1830	8.52	8.274	21.022
1831	7.64	8.229	21.011
1832	7.45	8.155	20.959
1833	8.01	8.184	20.969
1834	8.15	8.144	20.894
1835	7.39	8.044	20.811
1836	7.7	7.978	20.776
1837	7.38	7.835	20.64
1838	7.51	7.769	20.562

Line chart:

Done by Google Sheets



Observation:

1- Overall temperature in Cairo is higher than the global average with more than 10 degrees on average.

2- Cairo temperature has fallen approximately between 1815-1825 under 20 degree on average and then rose again and that's the only drop in temperature in the recorded temperature since then. At the same time global temperature was rising

3- Earth's overall temperature along with Cairo is rising by 1-2 degrees every

50 years until the last 50 years when it rose over 3 degrees in less than 20 years

4- it's expected that the global temperature will continue to rise in the coming years by 2 or more degrees above the average temperature now

Correlation coefficient:

Equations from

“<https://www.investopedia.com/terms/c/correlationcoefficient.asp>”

$$= \text{Covariance}(x, y) / \text{STD}(x) * \text{STD}(y)$$

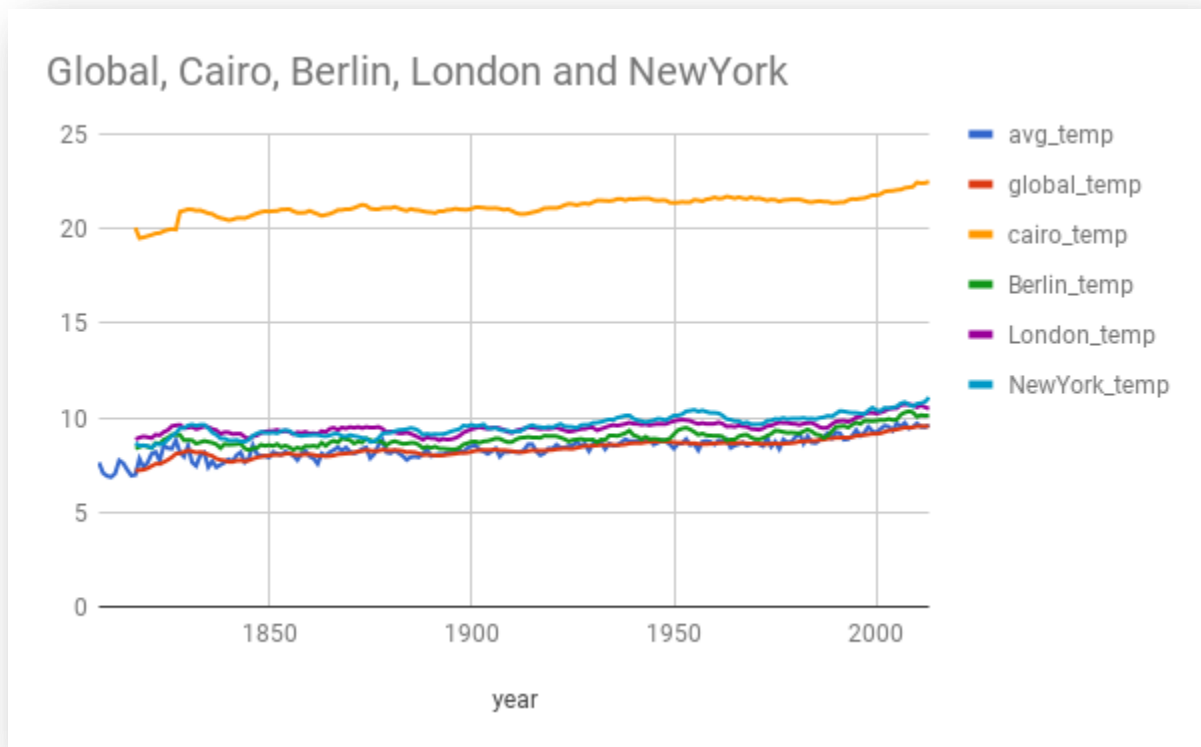
$$\text{cov}(x, y) = \sum_{i=1}^N \frac{(x_i - x')(y_i - y')}{N - 1}$$

$$\text{STD}(x) = \sqrt{\frac{\sum (x - x')^2}{n - 1}}$$

And for the sample provided it will be 0.932544

Which means they are positively correlated meaning that if one object value is raised the other will rise accordingly

Cities around the world:



It's really ambiguous because cities temperatures are similar

But they all share the rising up behavior and the consistent steady margin around the global average and not beneath it

It was fun observing and playing with these numbers and visualizations!

I hope to learn more so I can understand more about things I see every day.