Project:Exploring Weather Trends

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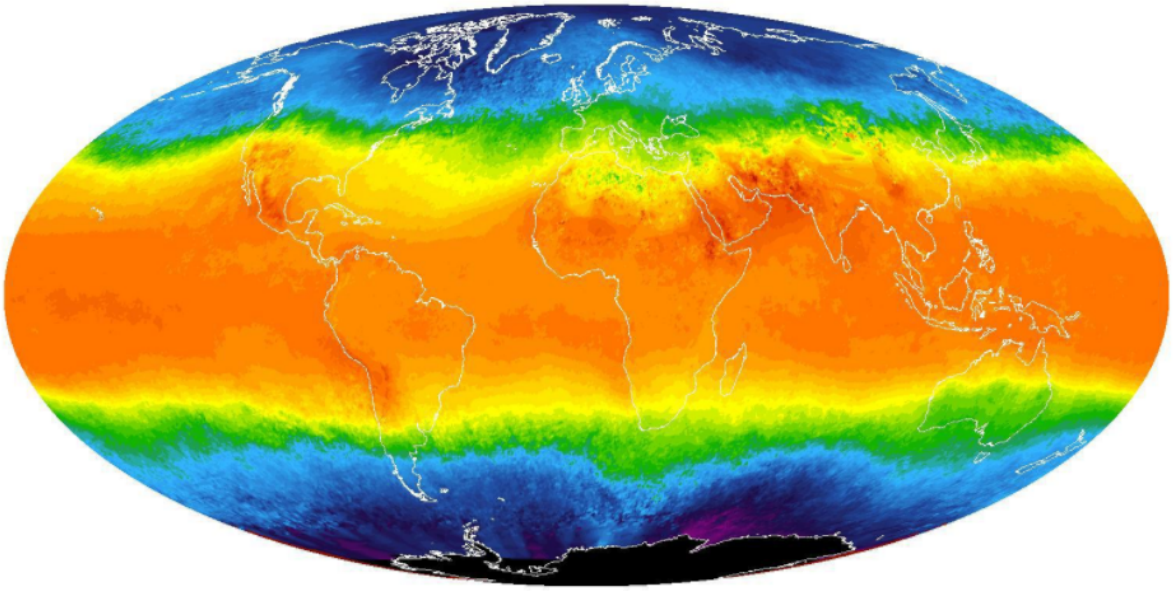


1. What tools did you use for each step? (Python, SQL, Excel, etc)

- I used two SQL queries to extract my data from the database:
  i. Global Data:

```
SELECT *
FROM global_data
```

  ii. Local Data: (for Ibadan)

```
SELECT year, city, avg_temp
FROM city_data
WHERE city = 'Ibadan'
```

- I exported the data to CSV files using the link
- I used google sheet to convert the CSV file to XSLX file, calculate the moving average and create the charts.

2. How did you calculate the moving average? I tried 5, 10, 15, 20-year moving averages to see which average is better to smooth out data. To

calculate the moving average in MS Excel, I used the AVERAGE function (the same approach as in the lesson) as shown below:

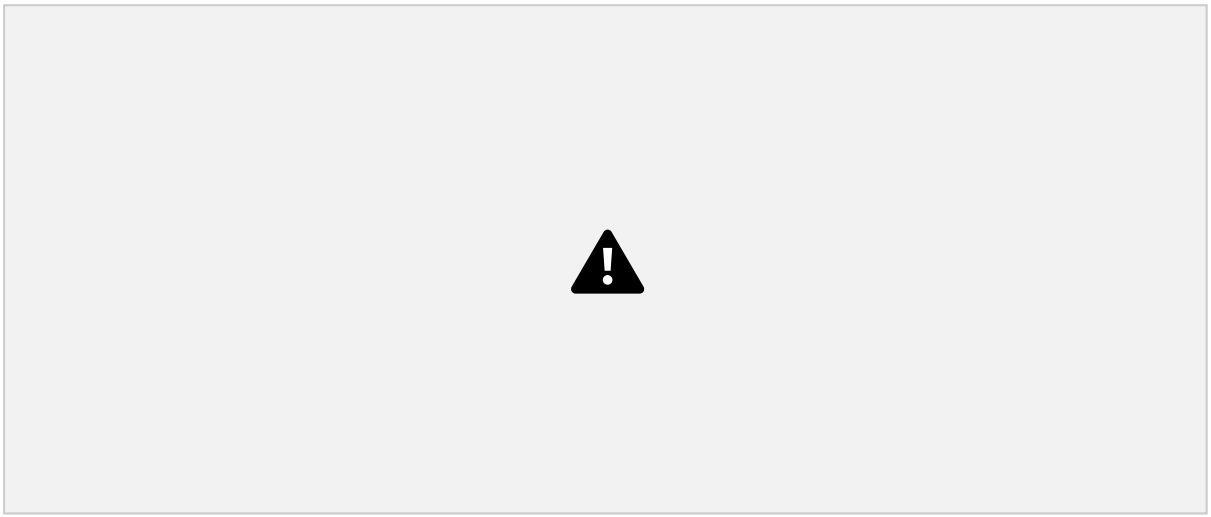


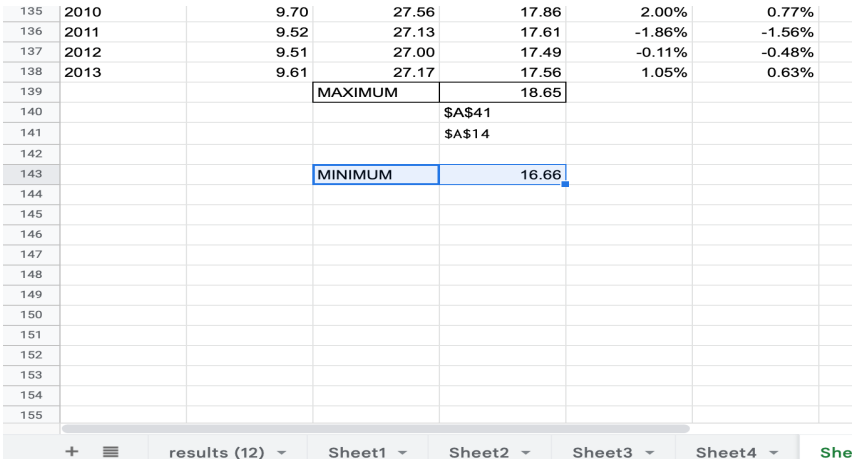
Figure 1.0

3. What were your key considerations when deciding how to visualize the trends? The key consideration was to determine the timeframe for data visualization; Looking at the local temperature data for Ibadan, the data covers the period between 1856 to 2013 (though there was some missing value), where in the global temperature data covers the period between 1750 and 2015. Therefore, the analysis was performed for the range between 1873 to 2013 (I ommitted the part with missing value). To make sure local and global temperature data is mapped correctly, I used VLOOKUP to retrieve the global temperature data worksheet into the local data worksheet. Another consideration was to adjust the starting point for each chart as follows:
    - 5-year moving average starting point: 1855 (1873 + 5)
    - 10-year moving average starting point: 1858 (1873 + 10)
    - 15-year moving average starting point: 1855 (1873 + 15)
    - 20-year moving average starting point: 1868 (1873 + 20)

    To help assess the data variance and frequency of change between global and local temperature levels, I calculated the following:
    - The Global & Local annual change percentage:
    - The Local/Global temp. average difference:

Observations:

- The temperature of Ibadan is hotter than the global temperature.
- The local and global temperature levels are both increasing.
- The global moving average experiences less fluctuations than the local moving average in Ibadan.
- The highest difference between local and global temperature is 18.65. This was recorded in year 1916; where the lowest difference between local and global temperature is 16.66c. this was recorded in year 1890



135	2010	9.70	27.56	17.86	2.00%	0.77%
136	2011	9.52	27.13	17.61	-1.86%	-1.56%
137	2012	9.51	27.00	17.49	-0.11%	-0.48%
138	2013	9.61	27.17	17.56	1.05%	0.63%
139			MAXIMUM	18.65		
140				A41		
141				A14		
142						
143			MINIMUM	16.66		
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Figure 1.1

	A	B	C	D	E	F
1	Year	Global	Ibadan	Difference	Global_increase	Ibadan_increase_%
36	1911	8.18	25.44	17.26	-0.49%	-2.64%
37	1912	8.17	25.55	17.38	-0.12%	0.43%
38	1913	8.30	26.36	18.06	1.59%	3.17%
39	1914	8.59	26.61	18.02	3.49%	0.95%
40	1915	8.59	26.56	17.97	0.00%	-0.19%
41	1916	8.23	26.25	18.02	-4.19%	-1.17%
42	1917	8.02	26.67	18.65	-2.55%	1.60%
43	1918	8.13	26.16	18.03	1.37%	-1.91%
44	1919	8.38	26.67	18.29	3.08%	1.95%
45	1920	8.36	26.38	18.02	-0.24%	-1.09%
46	1921	8.57	26.57	18.00	2.51%	0.72%
47	1922	8.41	26.44	18.03	-1.87%	-0.49%
48	1923	8.42	26.50	18.08	0.12%	0.23%
49	1924	8.51	26.70	18.19	1.07%	0.75%
50	1925	8.53	26.46	17.93	0.24%	-0.90%
51	1926	8.73	26.85	18.12	2.34%	1.47%
52	1927	8.52	26.75	18.23	-2.41%	-0.37%
53	1928	8.63	26.63	18.00	1.29%	-0.45%
54	1929	8.24	26.13	17.89	-4.52%	-1.88%
55	1930	8.63	26.69	18.06	4.73%	2.14%

Figure 1.2

	A	B	C	D	E	F
1	Year	Global	Ibadan	Difference	Global_increase	Ibadan_increase_%
2	1877	8.54	26.15	17.61	0.00%	0.00%
3	1878	8.83	26.10	17.27	3.40%	-0.19%
4	1879	8.17	25.51	17.34	-7.47%	-2.26%
5	1880	8.12	25.91	17.79	-0.61%	1.57%
6	1881	8.27	26.19	17.92	1.85%	1.08%
7	1882	8.13	25.82	17.69	-1.69%	-1.41%
8	1883	7.98	26.21	18.23	-1.85%	1.51%
9	1884	7.77	26.23	18.46	-2.63%	0.08%
10	1885	7.92	26.15	18.23	1.93%	-0.30%
11	1886	7.95	25.63	17.68	0.38%	-1.99%
12	1887	7.91	24.93	17.02	-0.50%	-2.73%
13	1888	8.09	25.28	17.19	2.28%	1.40%
14	1889	8.32	25.11	16.79	2.84%	-0.67%
15	1890	7.97	24.63	16.66	-4.21%	-1.91%
16	1891	8.02	25.11	17.09	0.63%	1.95%
17	1892	8.07	25.34	17.27	0.62%	0.92%
18	1893	8.06	25.46	17.40	-0.12%	0.47%
19	1894	8.16	25.46	17.30	1.24%	0.00%

results (12) | Sheet1 | Sheet2 | Sheet3 | Sheet4 | She

Figure 1.3

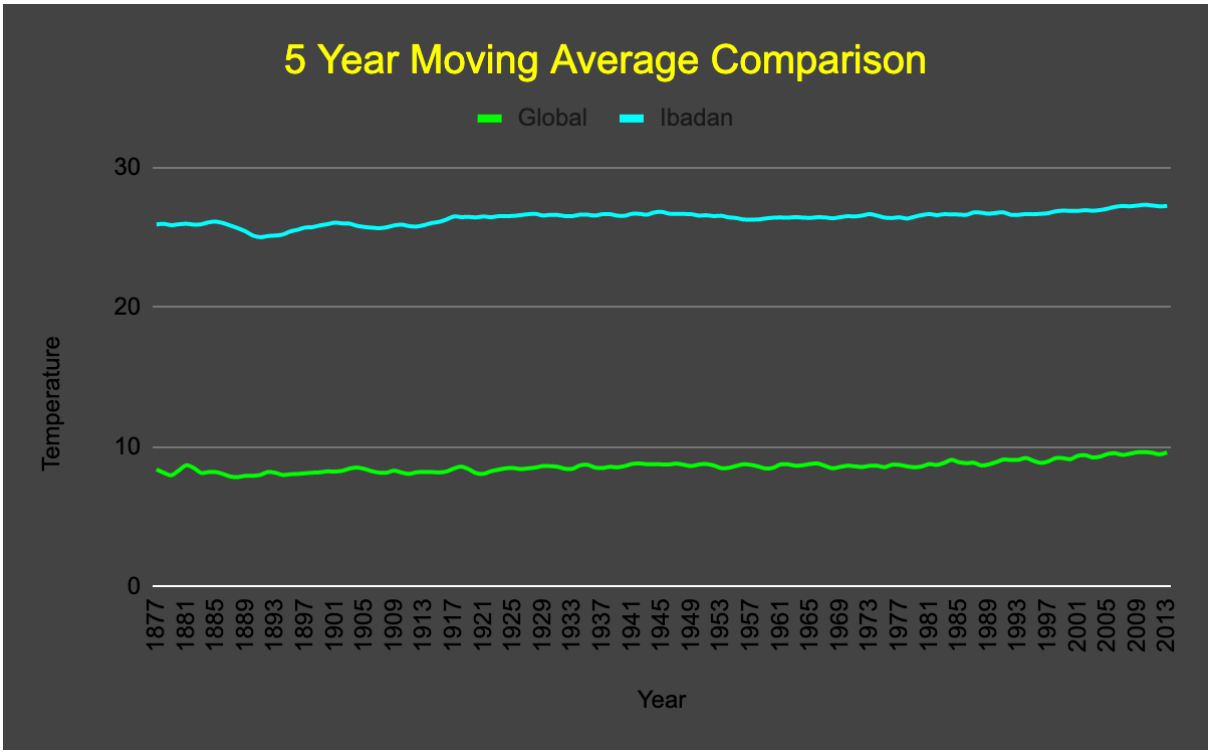

Figure 1.4

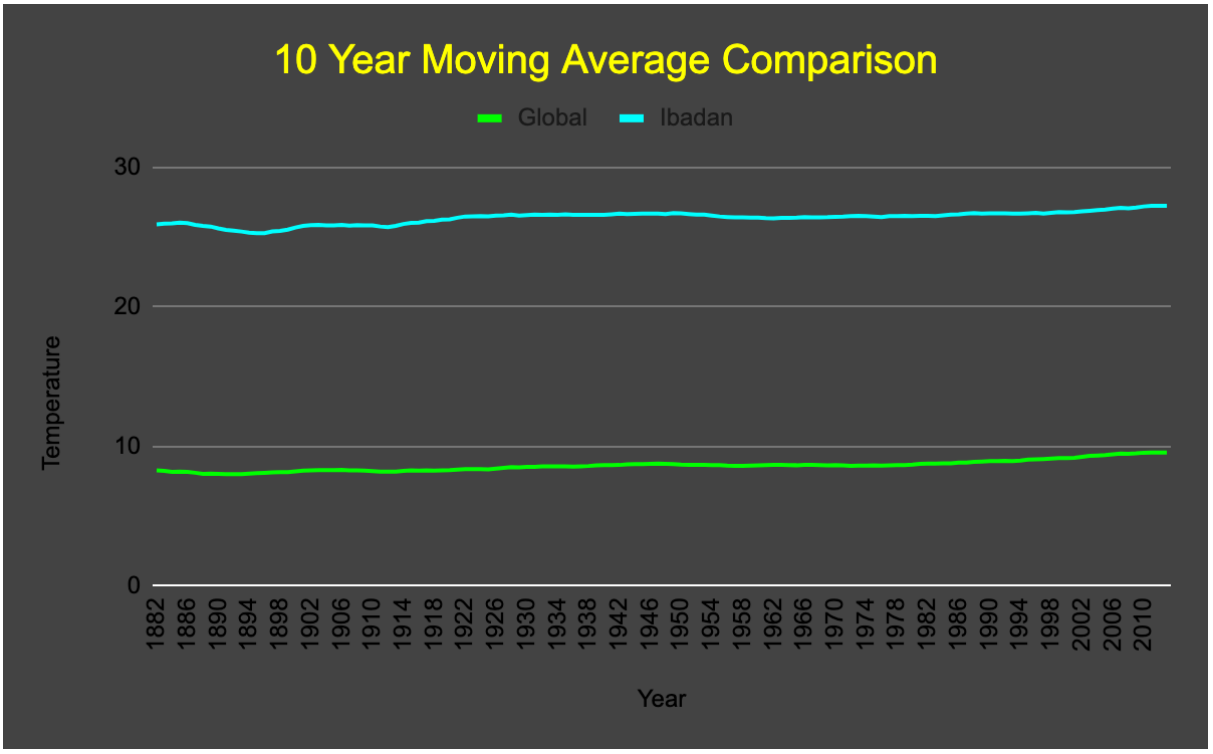

Figure 1.5

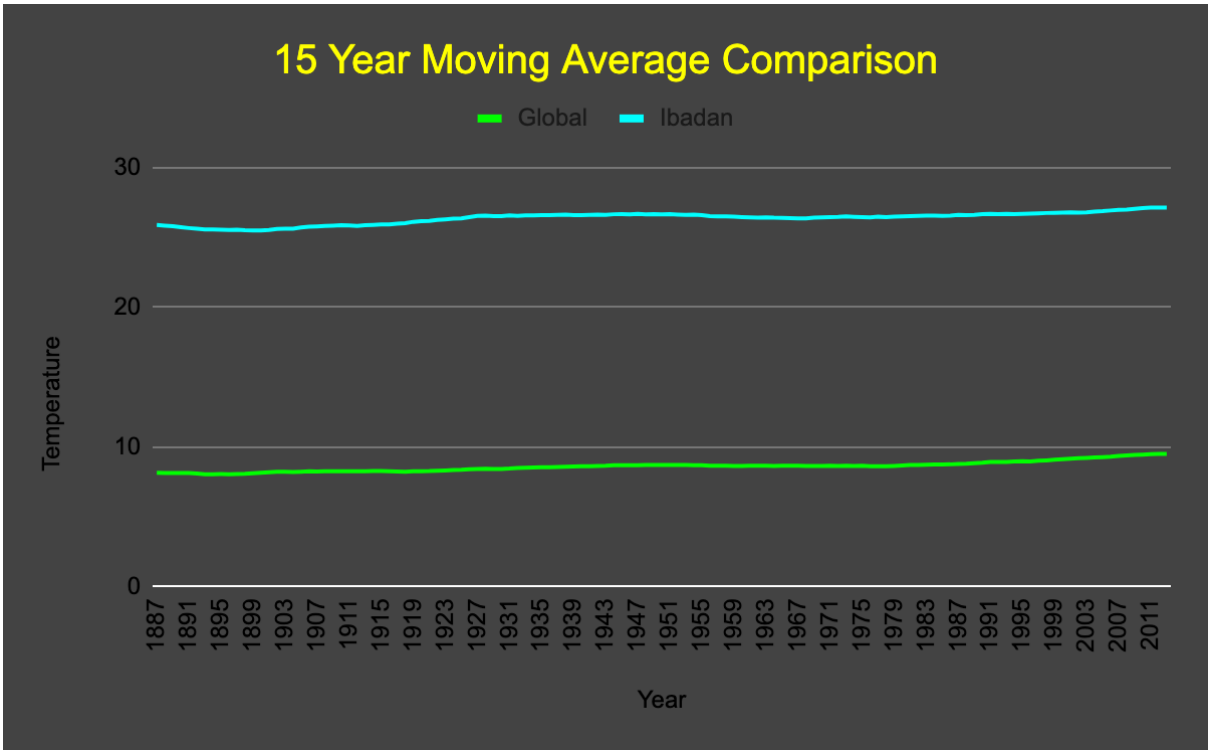

Figure 1.6

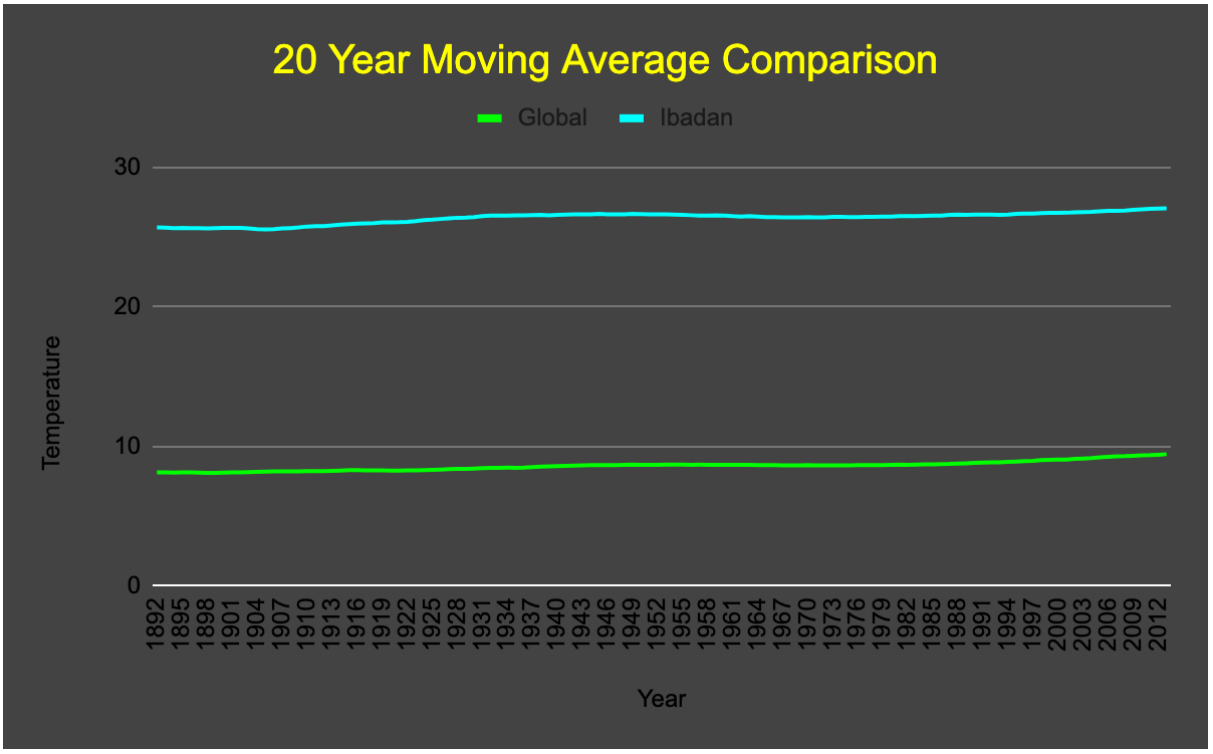

Figure 1.7