EXPLORING WEATHER TRENDS

By

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INTRODUCTION

Weather trends are the predicted conditions of the atmosphere for a given location and at a given time. Weather trends are predicted with the use of Science and Technology.

In analyzing the weather trend of a particular place, data concerning the previous and present atmospheric condition about the place is first gathered. In this report, the global weather trend is analyzed and compared against the weather trend of the nearest city to me, which in this case is Lagos City in Nigeria. The temperature throughout this report is measured in degree Celsius.

Some of the questions triggering this analysis are;

- Is my city hotter or cooler on the average compared to the global temperature?
- Has the difference been consistent over time?
- What does the overall trend look like? And has the trend been consistent over the years?
- Is the world getting hotter or cooler?
- How does the changes in my city compare over time to the global average temperature? Etc.

These questions and others not listed will be answered from this analysis.

TOOLS USED IN THE COURSE OF THIS ANALYSIS

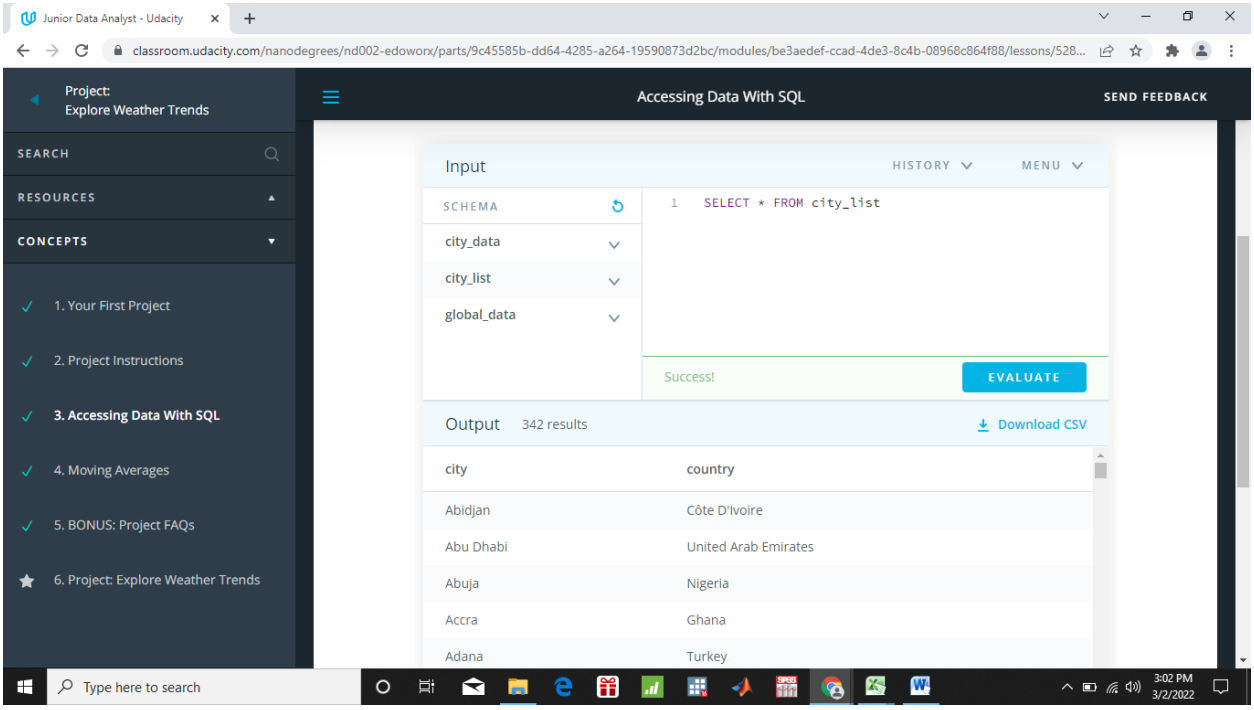
- SQL query
- Microsoft Excel Spreadsheet

ANALYSIS/PROCESS

The data used in this analysis were extracted from the database using SQL queries. In checking the city_list for my city or one closest to me, the SQL query used in achieving this is stated below.

SELECT * FROM city_list

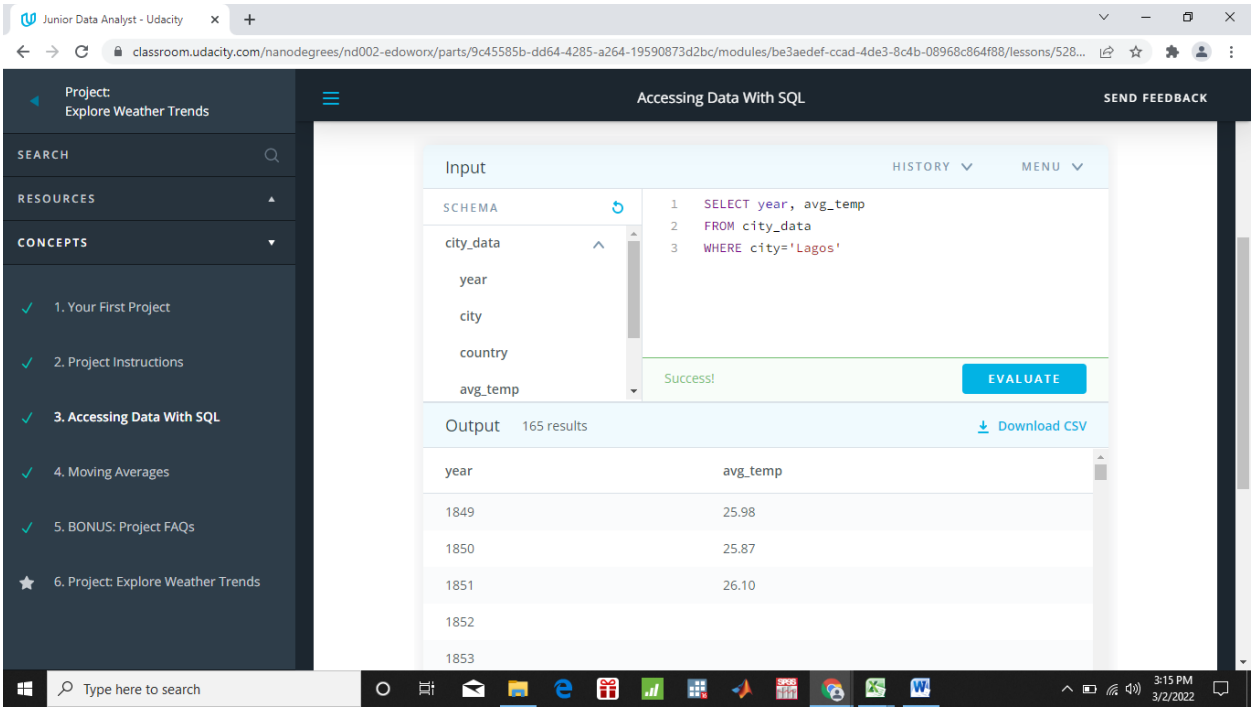
The query above brings out all the cities in the database. After scanning through, the list the city closest to me was found to be Lagos city in Nigeria. Below is a visual presentation of the SQL data extraction process.



Next, in getting my local city (Lagos) average temperature data from the database, the SQL query below was used and there after exported to csv file by clicking the download csv button.

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

Below is a visual presentation of the process



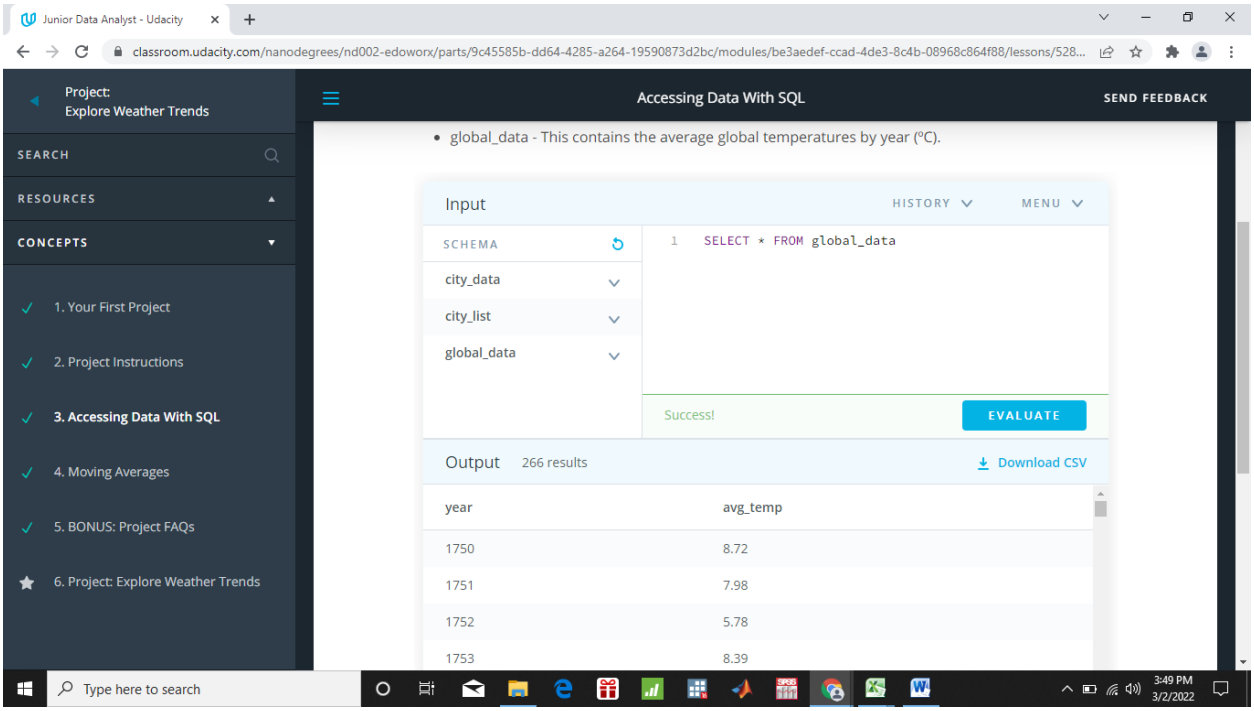
The data gotten from the database was analyzed and cleaned of all null and incorrect data. The initial 165 outputs gotten from the dataset extracted was reduced to a data of 141 outputs. The final data selected to be used after thorough screening ran from the year 1873 – 2013. This gave a total of 141 years data to be analyzed.

Having analyzed the data I decided to use a 10 year moving average in calculating the average of the temperature data. The 10 year moving average is calculated using the Microsoft Excel Spreadsheet using the formula " =AVERAGE(B2:B11) "

To get the Global average temperature from the database, the SQL query below was used and then exported to csv file by clicking the download csv button.

SELECT * FROM global_data

Below is a visual presentation of the process



After extracting the data, 266 outputs were realized. And after analyzing, cleaning and extracting the number of data needed for the analysis we reached a final number of 141 outputs, with years running from 1873 – 2013.

Using the previously decided moving average (the 10 year moving average), the moving average of the dataset is calculated using the same formula and software used previously.

Below is the global and local city(Lagos) data containing the YEAR, AVERAGE TEMPERATURE from the extracted dataset and the calculated 10 YEAR MOVING AVERAGE respectively.

Year	global_avg_temp	gobal_10yr_ma	city_avg_temp	city_10yr_ma
1873	8.35		26.46	
1874	8.43		26.08	
1875	7.86		25.82	
1876	8.08		25.82	
1877	8.54		26.35	
1878	8.83		26.26	
1879	8.17		25.67	
1880	8.12		26.14	
1881	8.27		26.39	
1882	8.13	8.278	26.01	26.1
1883	7.98	8.241	26.42	26.096
1884	7.77	8.175	26.43	26.131

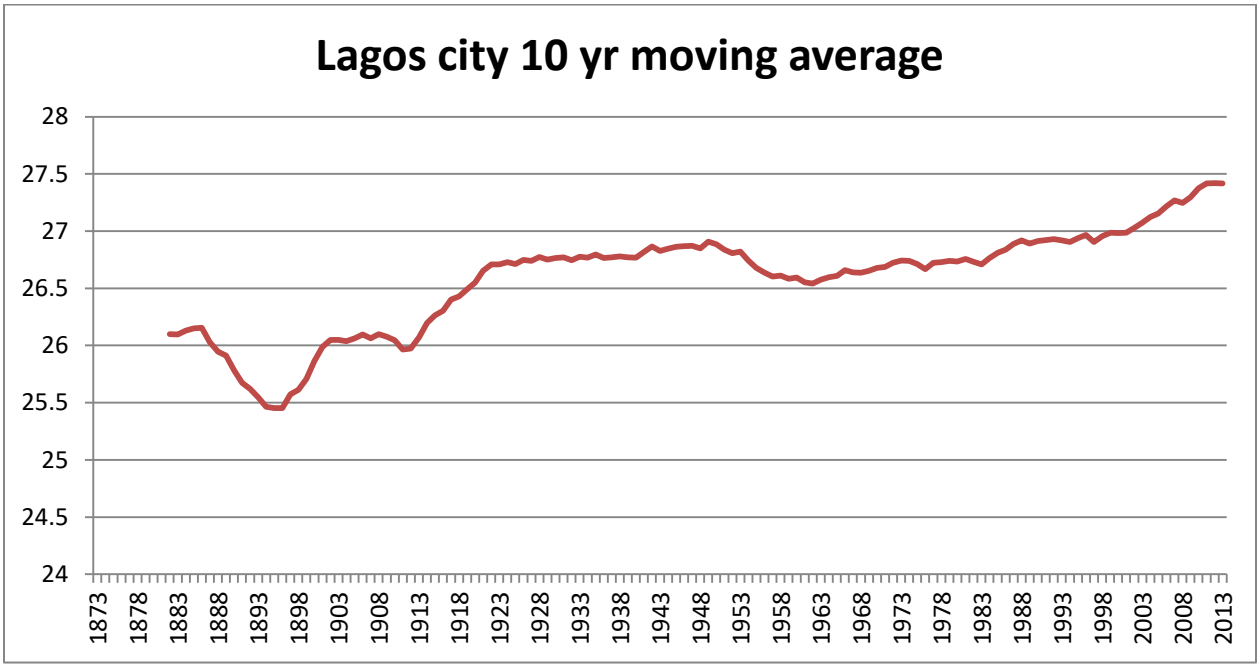
1885	7.92	8.181	26.01	26.15
1886	7.95	8.168	25.87	26.155
1887	7.91	8.105	25.09	26.029
1888	8.09	8.031	25.42	25.945
1889	8.32	8.046	25.34	25.912
1890	7.97	8.031	24.86	25.784
1891	8.02	8.006	25.29	25.674
1892	8.07	8	25.49	25.622
1893	8.06	8.008	25.67	25.547
1894	8.16	8.047	25.59	25.463
1895	8.15	8.07	25.92	25.454
1896	8.21	8.096	25.87	25.454
1897	8.29	8.134	26.29	25.574
1898	8.18	8.143	25.79	25.611
1899	8.4	8.151	26.31	25.708
1900	8.5	8.204	26.42	25.864
1901	8.54	8.256	26.53	25.988
1902	8.3	8.279	26.09	26.048
1903	8.22	8.295	25.68	26.049
1904	8.09	8.288	25.48	26.038
1905	8.23	8.296	26.16	26.062
1906	8.38	8.313	26.21	26.096
1907	7.95	8.279	25.96	26.063
1908	8.19	8.28	26.15	26.099
1909	8.18	8.258	26.08	26.076
1910	8.22	8.23	26.13	26.047
1911	8.18	8.194	25.72	25.966
1912	8.17	8.181	26.17	25.974
1913	8.3	8.189	26.65	26.071
1914	8.59	8.239	26.75	26.198
1915	8.59	8.275	26.81	26.263
1916	8.23	8.26	26.6	26.302
1917	8.02	8.267	26.96	26.402
1918	8.13	8.261	26.41	26.428
1919	8.38	8.281	26.7	26.49
1920	8.36	8.295	26.72	26.549
1921	8.57	8.334	26.77	26.654
1922	8.41	8.358	26.73	26.71
1923	8.42	8.37	26.63	26.708
1924	8.51	8.362	26.95	26.728
1925	8.53	8.356	26.64	26.711
1926	8.73	8.406	26.97	26.748
1927	8.52	8.456	26.88	26.74

1928	8.63	8.506	26.75	26.774
1929	8.24	8.492	26.48	26.752
1930	8.63	8.519	26.84	26.764
1931	8.72	8.534	26.85	26.772
1932	8.71	8.564	26.46	26.745
1933	8.34	8.556	26.93	26.775
1934	8.63	8.568	26.89	26.769
1935	8.52	8.567	26.9	26.795
1936	8.55	8.549	26.66	26.764
1937	8.7	8.567	26.96	26.772
1938	8.86	8.59	26.82	26.779
1939	8.76	8.642	26.39	26.77
1940	8.76	8.655	26.81	26.767
1941	8.77	8.66	27.36	26.818
1942	8.73	8.662	26.95	26.867
1943	8.76	8.704	26.53	26.827
1944	8.85	8.726	27.07	26.845
1945	8.58	8.732	27.07	26.862
1946	8.68	8.745	26.72	26.868
1947	8.8	8.755	26.98	26.87
1948	8.75	8.744	26.61	26.849
1949	8.59	8.727	26.98	26.908
1950	8.37	8.688	26.57	26.884
1951	8.63	8.674	26.89	26.837
1952	8.64	8.665	26.66	26.808
1953	8.87	8.676	26.66	26.821
1954	8.56	8.647	26.28	26.742
1955	8.63	8.652	26.42	26.677
1956	8.28	8.612	26.31	26.636
1957	8.73	8.605	26.65	26.603
1958	8.77	8.607	26.68	26.61
1959	8.73	8.621	26.72	26.584
1960	8.58	8.642	26.68	26.595
1961	8.8	8.659	26.46	26.552
1962	8.75	8.67	26.55	26.541
1963	8.86	8.669	27.01	26.576
1964	8.41	8.654	26.48	26.596
1965	8.53	8.644	26.53	26.607
1966	8.6	8.676	26.84	26.66
1967	8.7	8.673	26.43	26.638
1968	8.52	8.648	26.67	26.637
1969	8.6	8.635	26.89	26.654
1970	8.7	8.647	26.92	26.678

1971	8.6	8.627	26.56	26.688
1972	8.5	8.602	26.91	26.724
1973	8.95	8.611	27.2	26.743
1974	8.47	8.617	26.44	26.739
1975	8.74	8.638	26.27	26.713
1976	8.35	8.613	26.37	26.666
1977	8.85	8.628	27.01	26.724
1978	8.69	8.645	26.73	26.73
1979	8.73	8.658	26.99	26.74
1980	8.98	8.686	26.85	26.733
1981	9.17	8.743	26.79	26.756
1982	8.64	8.757	26.66	26.731
1983	9.03	8.765	26.99	26.71
1984	8.69	8.787	26.98	26.764
1985	8.66	8.779	26.74	26.811
1986	8.83	8.827	26.65	26.839
1987	8.99	8.841	27.51	26.889
1988	9.2	8.892	27.04	26.92
1989	8.92	8.911	26.71	26.892
1990	9.23	8.936	27.06	26.913
1991	9.18	8.937	26.88	26.922
1992	8.84	8.957	26.73	26.929
1993	8.87	8.941	26.9	26.92
1994	9.04	8.976	26.84	26.906
1995	9.35	9.045	27.07	26.939
1996	9.04	9.066	26.92	26.966
1997	9.2	9.087	26.91	26.906
1998	9.52	9.119	27.53	26.955
1999	9.29	9.156	27.03	26.987
2000	9.2	9.153	27.02	26.983
2001	9.41	9.176	26.92	26.987
2002	9.57	9.249	27.13	27.027
2003	9.53	9.315	27.37	27.074
2004	9.32	9.343	27.32	27.122
2005	9.7	9.378	27.39	27.154
2006	9.53	9.427	27.53	27.215
2007	9.73	9.48	27.46	27.27
2008	9.43	9.471	27.3	27.247
2009	9.51	9.493	27.53	27.297
2010	9.7	9.543	27.79	27.374
2011	9.52	9.554	27.35	27.417
2012	9.51	9.548	27.15	27.419
2013	9.61	9.556	27.36	27.418

The next step to be taken in the analysis is plotting a line graph comparing my local city's (Lagos) moving average temperature against the global moving average temperature using Microsoft Excel Spreadsheet software. A line graph is chosen to visualize the trends because line graphs are generally used to track changes over a short or long period of time. The moving average we used will help to smooth out this line graph so that it will be more meaningful and easier to analyze. Below are the line graphs plotted;

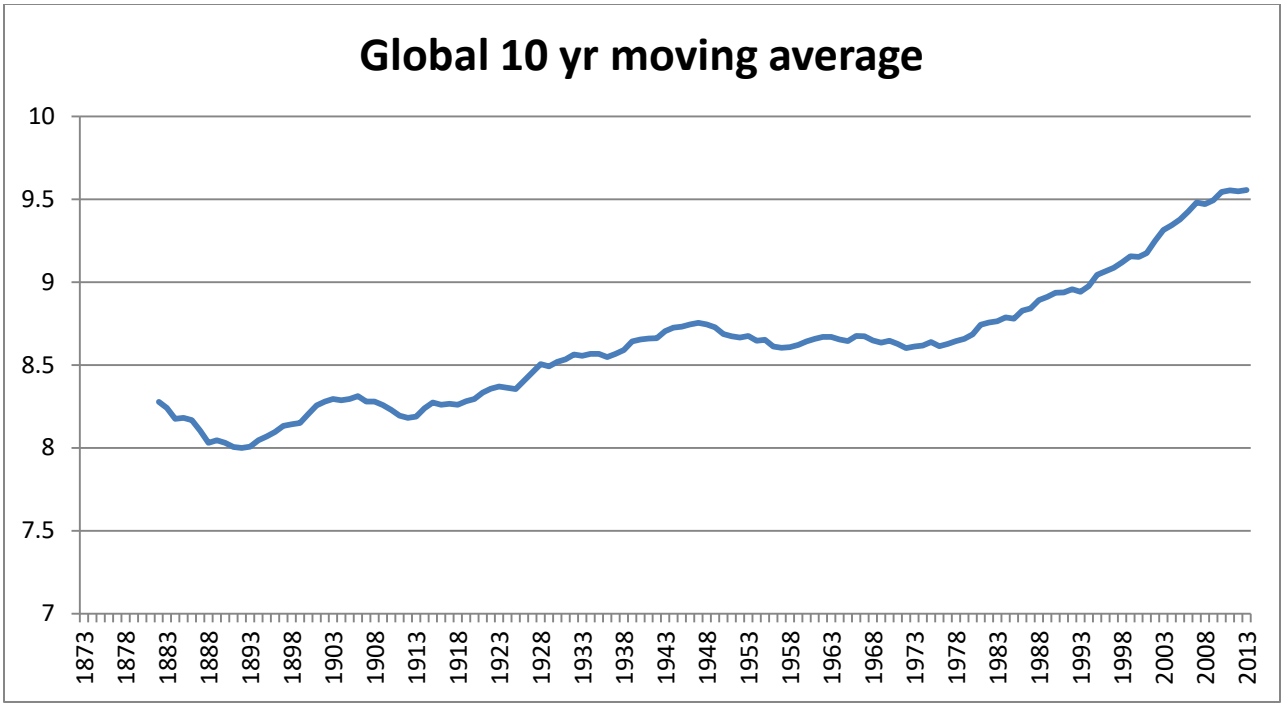
1. The line graph of my city's (Lagos) moving average temperature



Graph 1

From this graph it can be seen that throughout the years the temperature has been on the rise, in other words, the city has been getting hotter over time. As at 2013, it is currently at the highest/hottest temperature ever to be recorded.

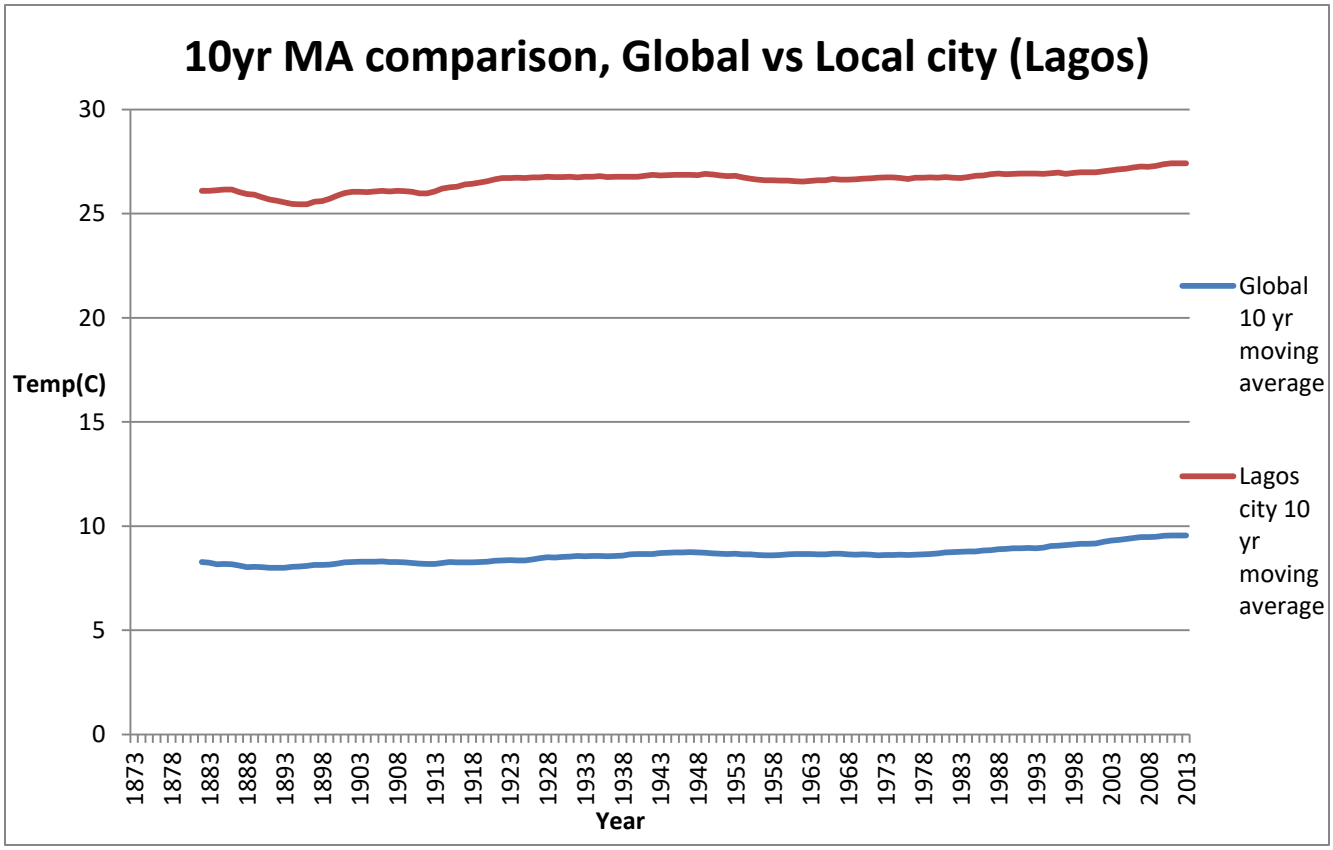
2. The line graph of the Global moving average temperature



Graph 2

From the graph above the global temperature is seen to be on the rise over time. In other words, the world is getting hotter. As at 2013, it is currently the hottest/highest temperature ever to be recorded.

3. The line graph of both



Graph 3

CONCLUSION/OBSERVATIONS

Recall the questions from the introduction passage, the observation from the analysis regarding those questions and more are discussed below.

1. Is my city hotter or cooler on the average compared to the global temperature?

From the Graph 3, which contains both the local city temperature line graph and the global temperature line we can clearly see that my local city (Lagos) is a lot hotter on average as compared to the global average temperature.

2. Has the difference been consistent over time?

From Graph 3, it can be seen that my local city (Lagos) has always been significantly hotter as compared to the global temperature.

3. What does the overall trend look like? And has the trend been consistent over the years?

The overall city and global temperature trend is currently in an uptrend, which from the graphs we can see that the trend has been consistent. And by uptrend it means the temperature is getting hotter.

4. Is the world getting hotter or cooler?

From the Graph 2, we can clearly see that the global temperature trend is in an uptrend, which means the world is getting hotter.

5. How does the changes in my city compare over time to the global average temperature?

From the Graph 3, we can see a clear comparison between both temperature trends. The temperature changes in my city has been at least 15 degree Celsius higher/hotter than the global temperature over time.

Other observations include:

- SIMILARITY

1. Both global and city trends are moving in the same direction, which is upward and which translates to that they are both getting hotter.
2. There seem to have always been an approximate constant difference overtime between both temperature trends as they move in the same direction.

- DIFFERENCE

1. Over the years the city temperature has been a lot hotter than the global temperature.
2. There is at least a difference of about 15 degree Celsius between the city and global temperature at every point in time.