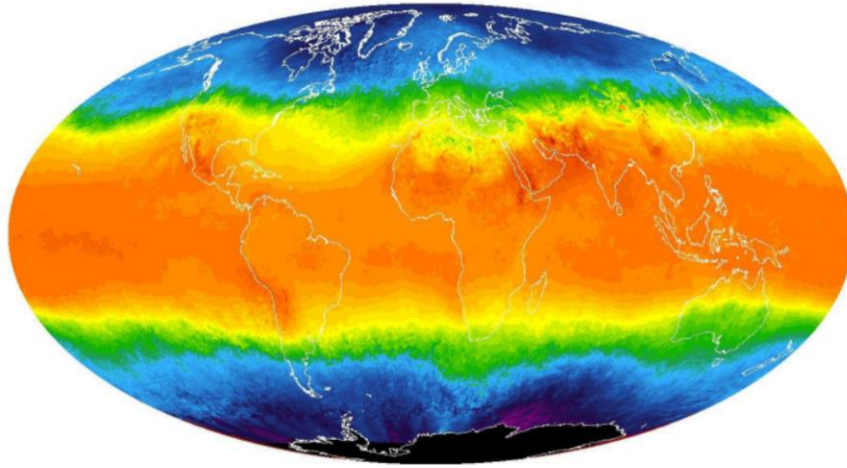

Project (01) Explore Weather Trends



Udacity - Data Analyst Nanodegree

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By Brahim Bergougui

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1. Extract the data from the database

In order to pull out the city level and global data, I followed the next steps

Step 01: I looked for the city which is closest to where I live with the following SQL query:

Fig1. SQL query for city name

The screenshot shows a SQL query interface. On the left, under 'Input', there is a 'SCHEMA' section with a refresh icon and a list of tables: 'city_data', 'city_list', and 'global_data', each with a dropdown arrow. The main area displays a SQL query:

```
1 SELECT *
2 FROM city_list
3 where country='Algeria'
4
5
```

 Below the query is a green 'Success!' message and a blue 'EVALUATE' button. The 'Output' section shows '1 results' and a 'Download CSV' link. The resulting table has two columns: 'city' and 'country', with one row: 'Algiers' and 'Algeria'.

city	country
Algiers	Algeria

Apparently, only one city has appeared which is Algiers.

Step 2 I pulled out Algiers data from **city_data** data set. To do this, I used the SQL query bellow:

Fig2. SQL query for Algiers temperature data

The screenshot shows a SQL query interface. On the left, under 'Input', there is a 'SCHEMA' section with a refresh icon and a list of tables: 'city', 'country', 'global_data', 'year', and 'avg_temp', each with a dropdown arrow. The main area displays a SQL query:

```
1 SELECT year, avg_temp
2 FROM city_data
3 WHERE city='Algiers'
4 ORDER BY year
5
6
```

 Below the query is a green 'Success!' message and a blue 'EVALUATE' button. The 'Output' section shows '261 results' (highlighted with a yellow circle) and a 'Download CSV' link.

Note: I pulled out only year and avg_temp columns. I added **ORDER BY** clause to make sure that the year is ordered ascending

Step 3: I pulled out Algiers data from **city_data** data set. To do this, I used the SQL query bellow:

Fig3. SQL query for globe temperature data

SCHEMA

- city
- country
- global_data
- year
- avg_temp

```

1  SELECT *
2  FROM global_data
3  ORDER BY year
4
5

```

Success!

EVALUATE

Output 266 results

Download CSV

Note: I added **ORDER BY** clause to make sure that the year is ordered ascending

After I extracted the Algiers and global data from two different datasets, I have noticed that Algiers data output has 261 rows, while the Globe data output has 266 rows. This indicate that Algiers has 5 missing observations ($266-261=5$). In order to make sure that the year column match for Algiers and global data, I have used the following SQL query:

Fig4. SQL query for Algiers and globe temperature data

Input

HISTORY

MENU

SCHEMA

- city_data
- city_list
- global_data

```

1  SELECT c.year, c.avg_temp Algiers_temp,
2         g.avg_temp Globe_temp
3  FROM city_data c
4  join global_data g
5  on c.year=g.year
6  where c.city='Algiers'
7  order by c.year

```

Success!

EVALUATE

Output 261 results

Download CSV

year	algiers_temp	globe_temp
1753	16.44	8.39
1754	16.48	8.47
1755	16.19	8.36
1756	16.58	8.85

Note: I added **ORDER BY** clause to make sure that the year is ordered ascending

As can be seen from **fig4** Algiers and globe data for temperature have finally matched. As last step I clicked on download CSV option to download the file as [result.csv](#)

2. Outline

2.1. Tools

Before we visualize the line chart, there are several steps are taken to prepare the data:

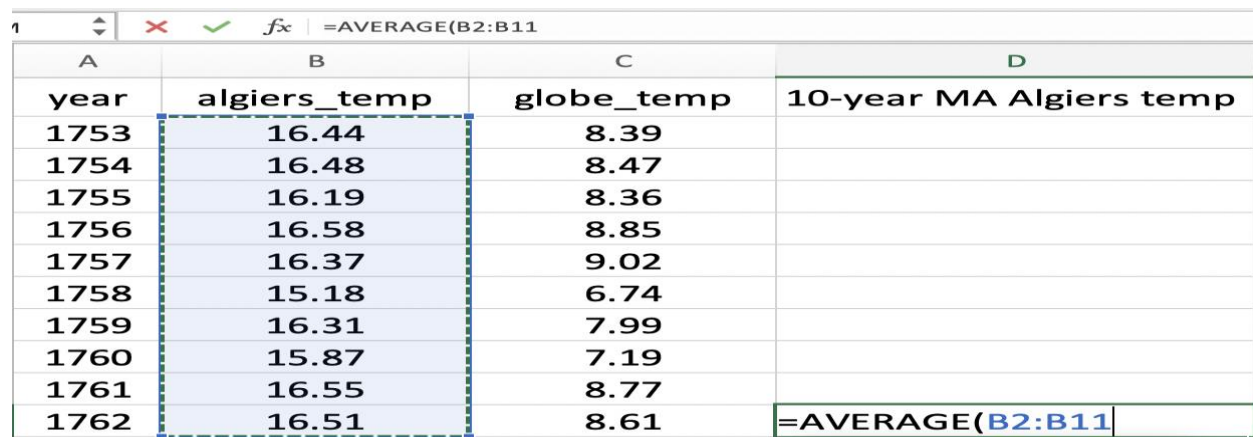
Step 01 : I have used SQL to extract the temperature data from the database for Algiers and the globe

Step 02: Once I extracted the data from SQL and export CSV file, I used Excel to calculate Moving Averages of global and Algiers temperatures and to plot their Line Chart.

2.2. Calculating the moving average:

After I got the CSV file for our data, I Import the data to Excel first, then as a start I create a two columns called 10-year MA Algiers temp and 10-year MA Globe temp, which is where the moving average field will be saved. Go down to the 10 year (1762) and use the **AVERAGE()** function to calculate the average temperature in Algiers for the first 10 years of temperatures, as seen in the image below.

Fig.5. 10-year moving average



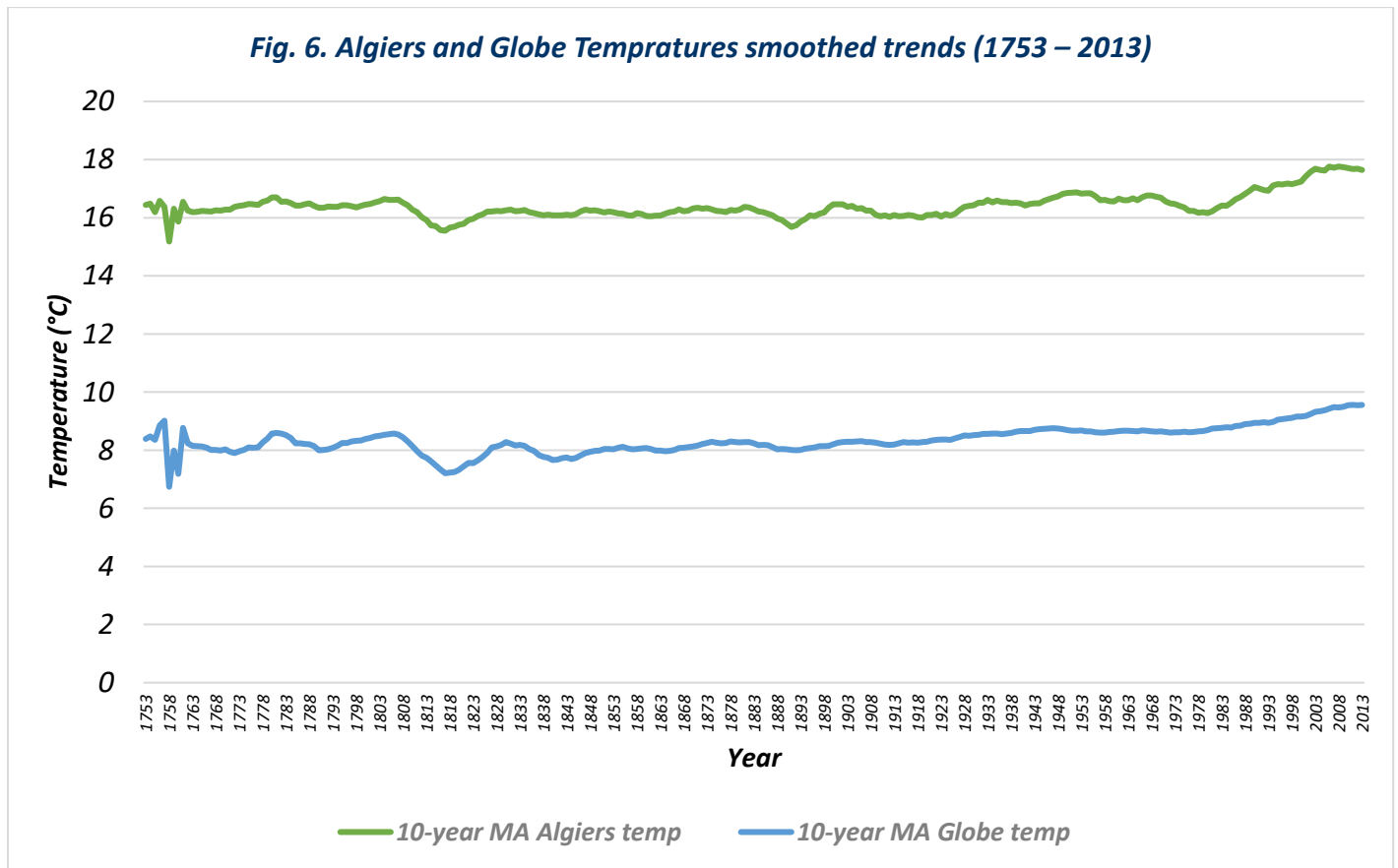
A	B	C	D
year	algiers_temp	globe_temp	10-year MA Algiers temp
1753	16.44	8.39	
1754	16.48	8.47	
1755	16.19	8.36	
1756	16.58	8.85	
1757	16.37	9.02	
1758	15.18	6.74	
1759	16.31	7.99	
1760	15.87	7.19	
1761	16.55	8.77	
1762	16.51	8.61	=AVERAGE(B2:B11)

Then I dragged the formula down till the last cell. The same process to calculate the moving average for the globe temperature

2.3 key considerations

- > Applying moving average for Algiers and globe temperature to smooth out data to make it easier to observe long term trends and not get lost in yearly fluctuations
- > Using the same temperature unit (C) for Algiers and the globe on Y-axis.
- > Using the same period unit (YEAR) for Algiers and the globe on X-axis.
- > Since I am going to plot two lines in on graph, I will use two different colors of lines for Algiers and global average.

3. Line chart with Algiers and global temperature trends



4. Obsevatons

According to line charts, the following observations may be deduced:

- 1) As can be seen from Fig. 6. There is very big difference between the average temperature of Algiers and the globe, and it is constantly over the entire period. While approximately the average of Algiers temperature was around 16 °c, the globe temperature was around 8 °c. This indicate that Algiers weather is warmer twice than the global.
- 2) In both series, we can clearly see that the average temperature is increasing quiet constantly.
- 3) In both series, the hottest degree was between 2008 and 2013, while the coolest degree was between 1758 and 1763.
- 4) In Algiers case, a substantial rise in the average temperature can be observed in the last two decades starting from the year 1978 upwards.
- 5) In overall, from Fig. 6. the temperature of the world is getting hotter.