

Explore Weather Trends

Overview

Goal

Analyze local and global temperature data and compare them to temperature trends of my home city Madrid.

Tools Used

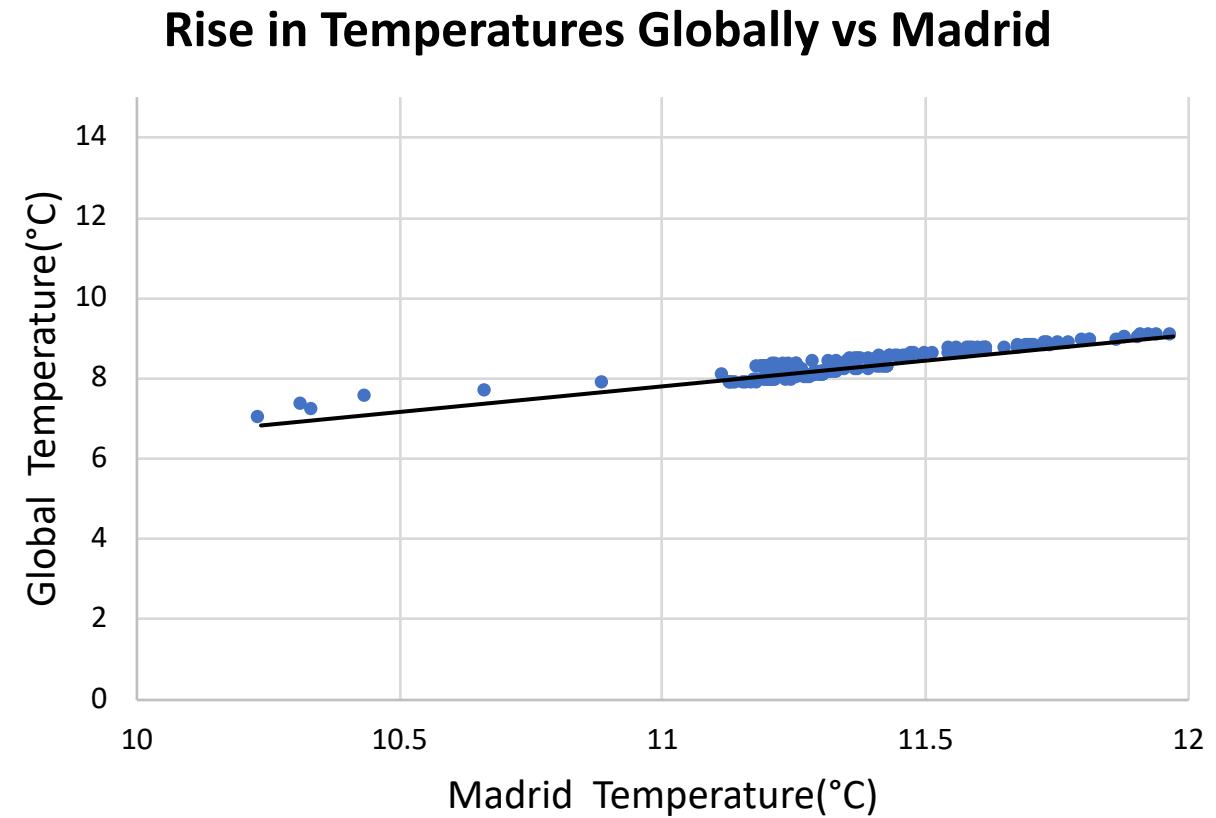
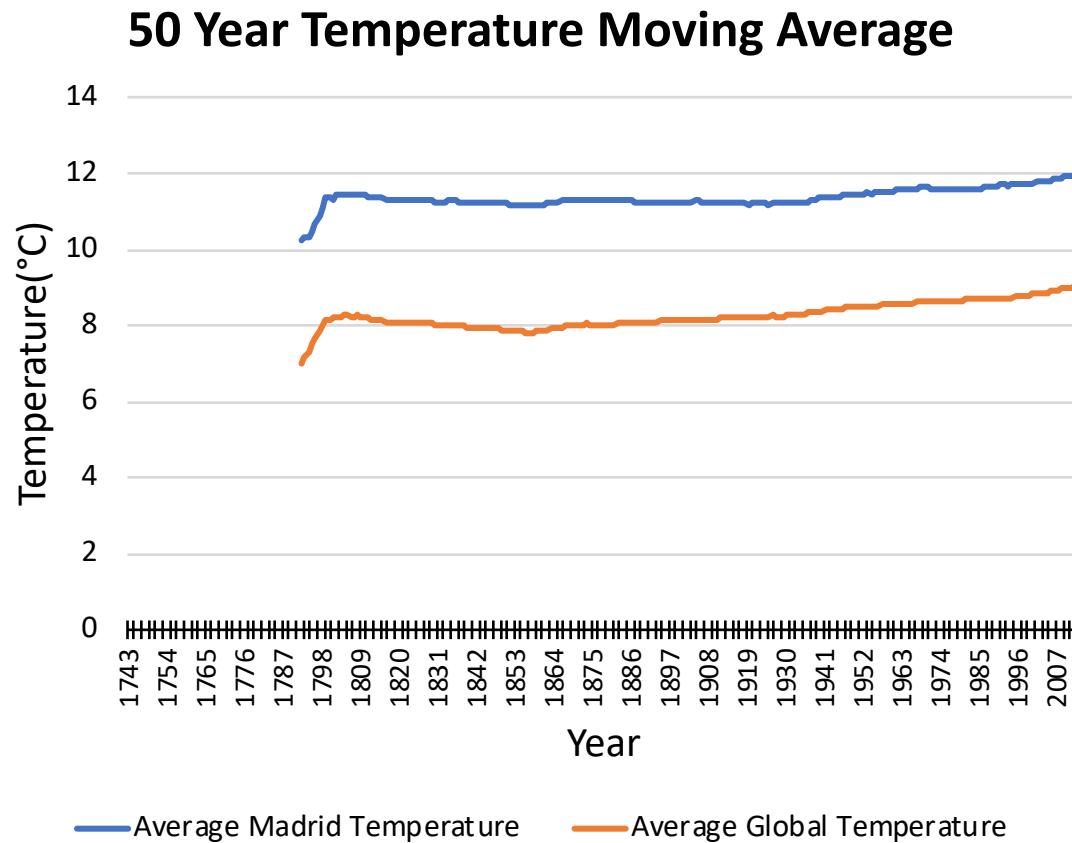
- SQL to extract data
- Excel to create data visualizations
- PowerPoint to create presentation and summarize findings

Key Considerations

Due to the nature of the data being spread out through time I decided to use a line chart to best represent the evolution of the data and a scatterplot to analyze whether a relationship exists between global and local temperatures.

A 50 year moving average was used to smooth out the data and make it easier to observe the long term trends without getting lost in yearly fluctuations.

Madrid vs Rest of the World



Observations

#1

There is a positive relationship between the rise in global temperatures and those of Madrid. With a correlation coefficient of 0.93 between moves in global and local temperatures.

#2

Given such a high positive correlation, we can use the trendline in the scatterplot to predict the temperature in Madrid by looking at the global temperature and vice versa.

#3

The overall trend shows the world is getting hotter as time goes by, with an acceleration on this phenomenon occurring at the beginning of the 20th century.

#4

Madrid's temperature has always been hotter than the average global temperature. With Madrid having a historic temperature average of 11.4 °C against 8.3 °C globally.

#5

The average percentage change over time in Madrid is consistent with the global trend, with the historical average change in temperatures from year to year being 0.1% for both.

Appendix

SQL code used to extract data

```
SELECT c.year,  
       COALESCE(c.avg_temp, '0') AS city_temp,  
       COALESCE(g.avg_temp, '0') AS global_temp  
  FROM city_data AS c  
 FULL OUTER JOIN global_data AS g  
    ON c.year = g.year  
   WHERE city = 'Madrid'  
 ORDER BY 1
```

Calculations used to obtain moving average

The moving average was calculated using a built in function in Excel called “AVERAGE”.

E	H	I
1 50-Year City Temperature MA	50-Year Global Temperature MA	
51 10.236	8.1774	
52 10.3344	8.1726	
53 10.3154	8.1848	
54 10.4374	8.2408	
55 10.6646	8.243	
56 10.8884	8.2504	
57 11.1119	8.2544	
58 11.3394	8.246	
59 11.3382	8.2312	
60 11.3188	8.249	
61 11.4154	8.2308	
62 11.4182	8.2254	
63 11.4296	8.1872	
64 11.4282	8.156	
65 11.433	8.1608	
66 11.4288	8.1446	
67 11.4334	8.1244	
68 11.4194	8.095	
69 11.409	8.0702	
70 11.3952	8.0912	
71 11.3752	8.0848	
72 11.3726	8.0834	
73 11.3486	8.0882	
74 11.336	8.0882	
75 11.3132	8.0782	
76 11.3116	8.0738	
77 11.3296	8.058	
78 11.3254	8.0592	
79 11.3204	8.0702	
80 11.3224	8.0628	
81 11.3122	8.042	
82 11.3108	8.0238	
83 11.3036	8.0146	
84 11.2974	8.0056	
85 11.2956	8.0122	
86 11.2946	8.018	
87 11.2952	8.0186	
88 11.2746	8.0074	
89 11.2566	7.9944	
90 11.2526	7.9756	
91 11.2588	7.9616	
92 11.2522	7.958	
93 11.271	7.9472	
94 11.2716	7.9458	