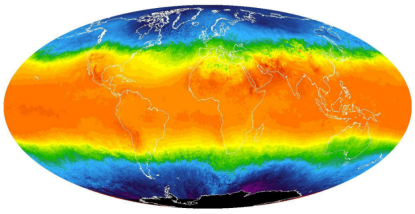
Project 1 - Explore weather trends

Summary
This project is a comparison of the global temperature over the years with the data of de capital of New Zealand, Wellington.

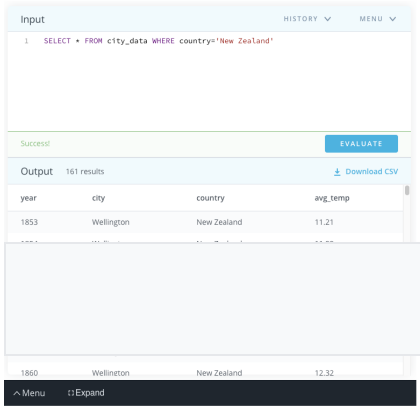


Key considerations:
Show clear data, the data has to be accurate as much as possible, has to be easy to read and show relevant information that can help to shape action plans.

1-Extracting

I downloaded all Udacity's database available by executing the followings commands in the SQL workspace.

```
SELECT * FROM global_data
SELECT * FROM city_list
SELECT * FROM city_data
```



Udacity's SQL Workspace

In addition, in the SQL workspace, I ran the following code to visualise all available data in the New Zealand and I saved this into a new spreadsheet called “**city_data_where_nz":**

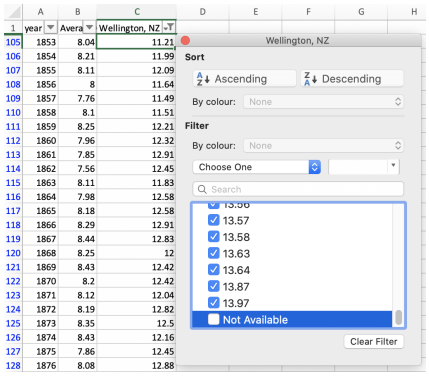
```
SELECT * FROM city_data WHERE country
='New Zealand'
```

The only city found in their database in New Zealand was Wellington.

2-Merging information

Then I opened the spreadsheet **global_data** and then created **city_data_where_nz** with Excel.
In the spreadsheet **global_data,** I created a new column called "Wellington, NZ" and I used the VLOOKUP in order to get all values from the another spreadsheet:

```
=IFERROR(VLOOKUP(A105,city_data_where_nz.csv!$A:$D,4,FALSE),"Not Available")
```

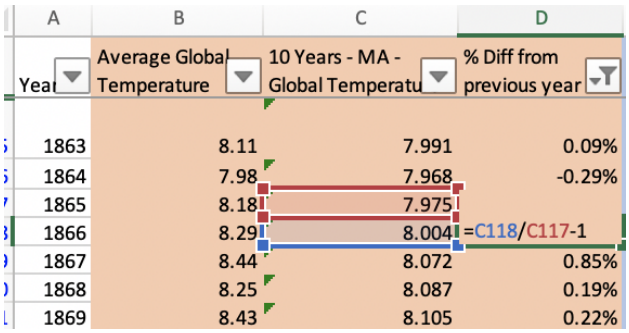


Filtering only available data

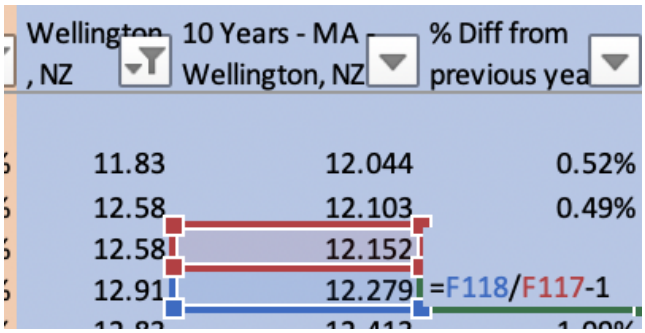
The ifError formula was needed because for some years the database had no data for Wellington, therefore, I decided to leave the cells as "not available", which means that the data could not be found in the **city_data_where_nz** spreadsheet . Then I applied a filter in order to keep only the years where I could find data in both compared spreadsheets.

3- Calculations

I used this way to find out what was the percentage difference between every year.



Yearly increase rate global



Yearly increase rate local

And the following formulas to create this table:

Local	Globally	Wellington	Diff
Mean temperature increase rate	=AVERAGE(D:D)	=AVERAGE(G:G)	=[@Wellington]-Table5[@Globally]
Standard Error	=STDEV(D:D)/SQRT(COUNT(D:D))	=STDEV(G:G)/SQRT(COUNT(G:G))	=[@Wellington]-Table5[@Globally]
1883 Temperature	=MIN(B:B)	=MIN(F:F)	=[@Wellington]-Table5[@Globally]
2013 Temperature	=MAX(B:B)	=MAX(F:F)	=[@Wellington]-Table5[@Globally]
Difference in 130 years (C°)	=K118-K117	=L118-L117	=[@Wellington]-Table5[@Globally]
Difference in 130 years %	=K118/K117-1	=L118/L117-1	=[@Wellington]-Table5[@Globally]

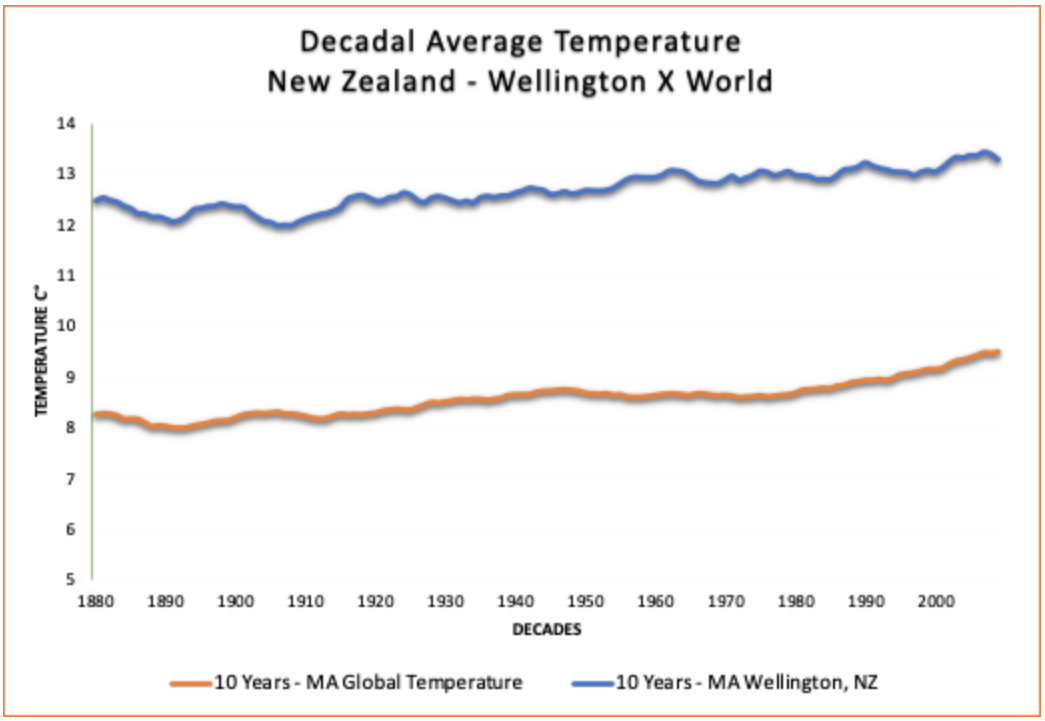
Data summary, formulas taken.

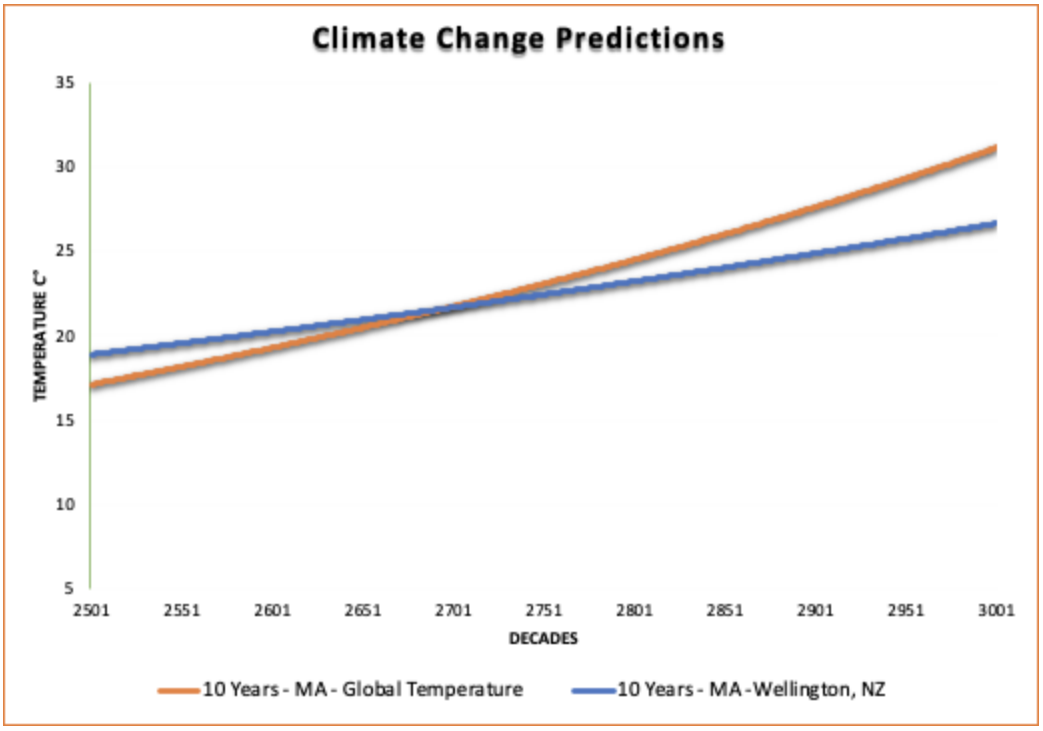
The moving average used to smooth the data was taken by 10 years time.

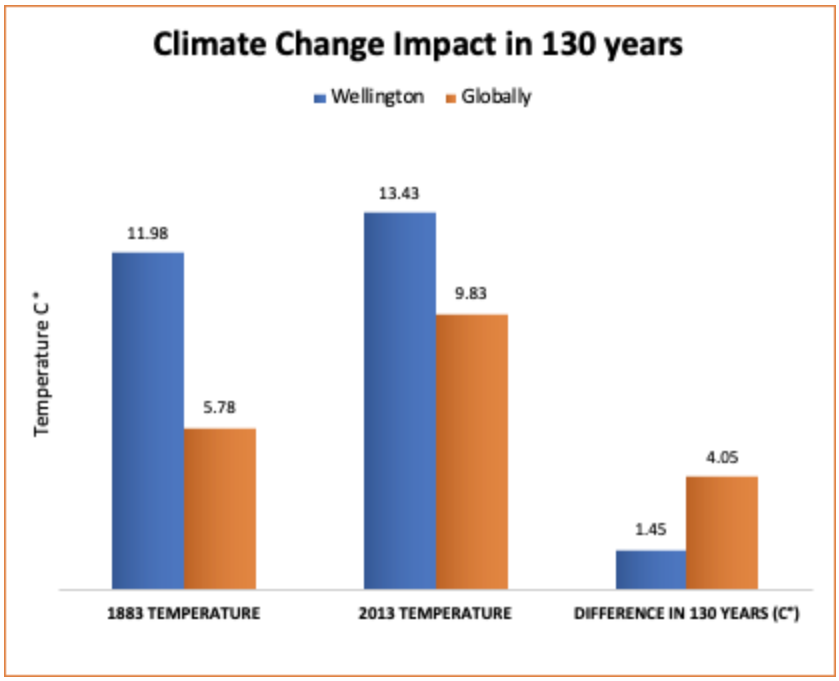
	A	B	C
	Year	Average Global Temperatu	10 Years - MA Global Temperatu
	1863	8.11	7.991
	1864	7.98	7.968
	1865	8.18	7.975
	1866	8.29	8.004
	1867	8.44	8.072
	1868	8.25	8.087
	1869	8.43	8.105
	1870	8.2	8.129
	1871	8.12	8.156
	1872	8.19	8.219
	1873	8.35	
	1874	43	=AVERAGE(B117:B126)

10 years - moving average

4- Charts


Decadal Average Temperature
New Zealand - Wellington X World
TEMPERATURE C°
14
13
12
11
10
9
8
7
6
5
1880
1890
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
DECADES
10 Years - MA Global Temperature
10 Years - MA Wellington, NZ

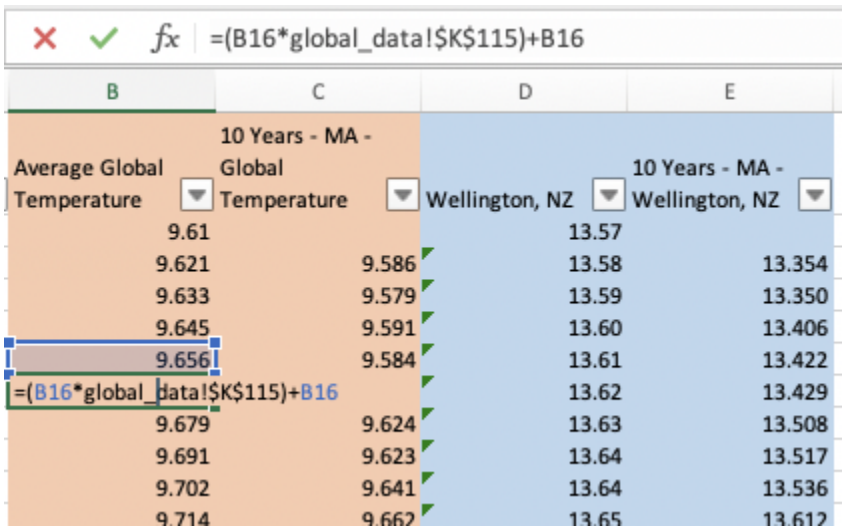

Climate Change Predictions
TEMPERATURE C°
35
30
25
20
15
10
5
2501
2551
2601
2651
2701
2751
2801
2851
2901
2951
3001
DECADES
10 Years - MA - Global Temperature
10 Years - MA - Wellington, NZ



5- Predictions

This is a rough predictions of what would be the next years temperature globally and locally.
I have got the global and local average temperature and I used its rate as a constant to find what would be the next year temperature.

```
Logic: (Previous year temperature X Average temperature increase rate)+ Previous year temperature
Formula:(B12*global_data!$K$115)+B12
```



formulas taken

Final considerations:

- Both average temperatures have been increasing over time.
- Both have a higher average temperature now comparing with the past.
- Over 130 years, the Wellington temperature has increased 1.45 C° and the global temperature 4.05 C°
- The Wellington temperature has not been increasing as the global is.
- The global temperature increase rate is higher than in Wellington, which means the world itself has a more climate impact than Wellington.
- The global data has a lower standard error, which means fewer fluctuations, more data reliability.
- The global average temperature has been approaching the Wellington temperature over the years.
- The global temperature would match with the Wellington around the year 2696.
- The Wellington city in New Zealand apparently do more effective environmental protective actions than other countries.

References:

Accessed at 03/05/2020:
https://www.usatoday.com/story/money/2019/07/14/climate-change-countries-doing-most-least-to-protect-environment/39534413/