

Aim: To analyse the change in summer temperature in the Western Australia suburb of Baldvis over the past 10 years. The variables in this investigation are the year (independent) and average summer temperature (dependent). This was also done to observe and measure the effect of climate change on my home suburb.

Hypothesis: I predict that the average temperature will be higher in the 2023/24 data set, as global warming has increased over the last 10 years. I also predict that the 2013/14 summer will have less variation in temperature due to the lesser advancement of global warming.

Method of data collection: This data was collected from Weather Underground, which is a website that monitors weather stations around the world. Using its history feature I was able to find the temperatures for December 2013 and 2023 and January and February of 2014 and 2024. The temperatures were measured and recorded at Rottnest Island Station. They were also recorded in Fahrenheit and had to be converted to Celsius.

References:
Data sourced from Weather Underground - www.wunderground.com
Box plot created on <https://www.statskingdom.com/advanced-boxplot-maker.html>
El Nino 2023/24 <https://www.theguardian.com/australia-news/2024/apr/21/el-nino-weather-pattern-over-australia-la-nina>
Climate Change Statistics <https://www.climate.gov/news-features/understanding-climate/climate-change-global-temperature>

Exploring the Change in Baldvis Summer Temperature over the Past 10 years

Comparative box plot of the daily summer temperatures of 2023/24 and 2013/14

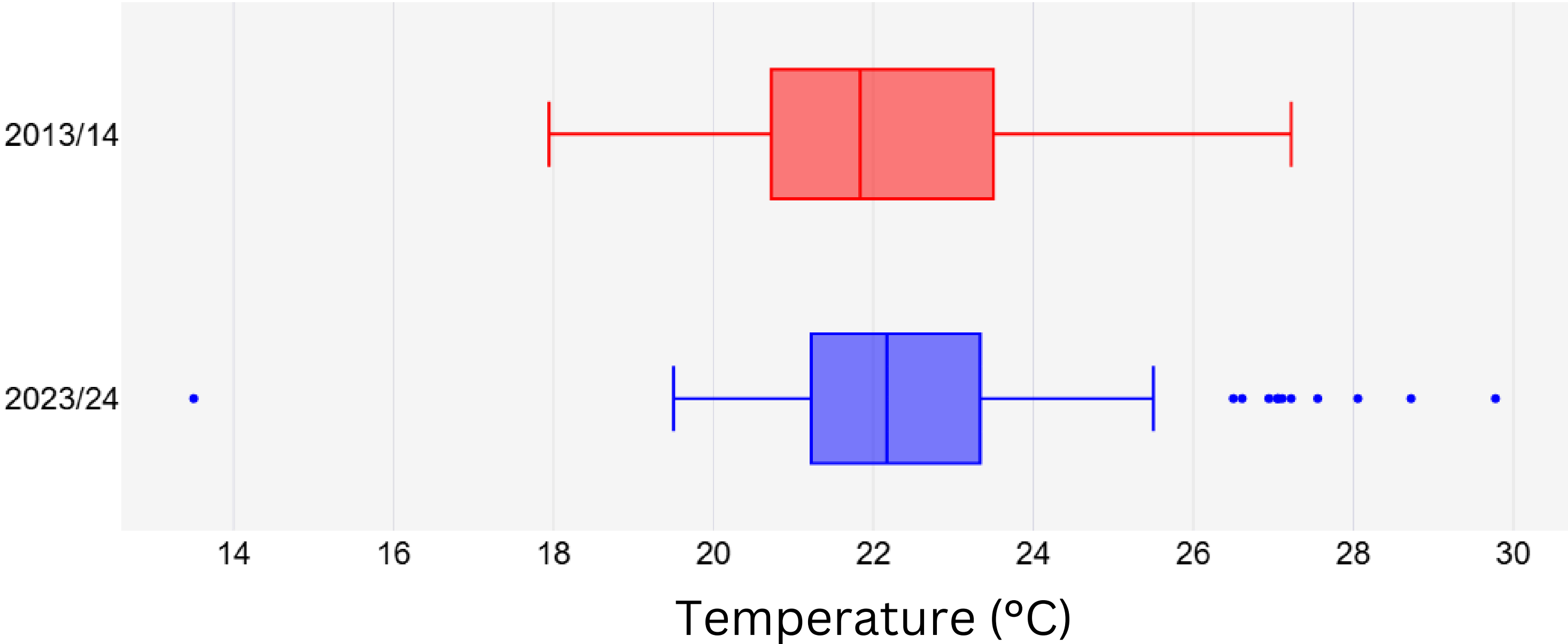
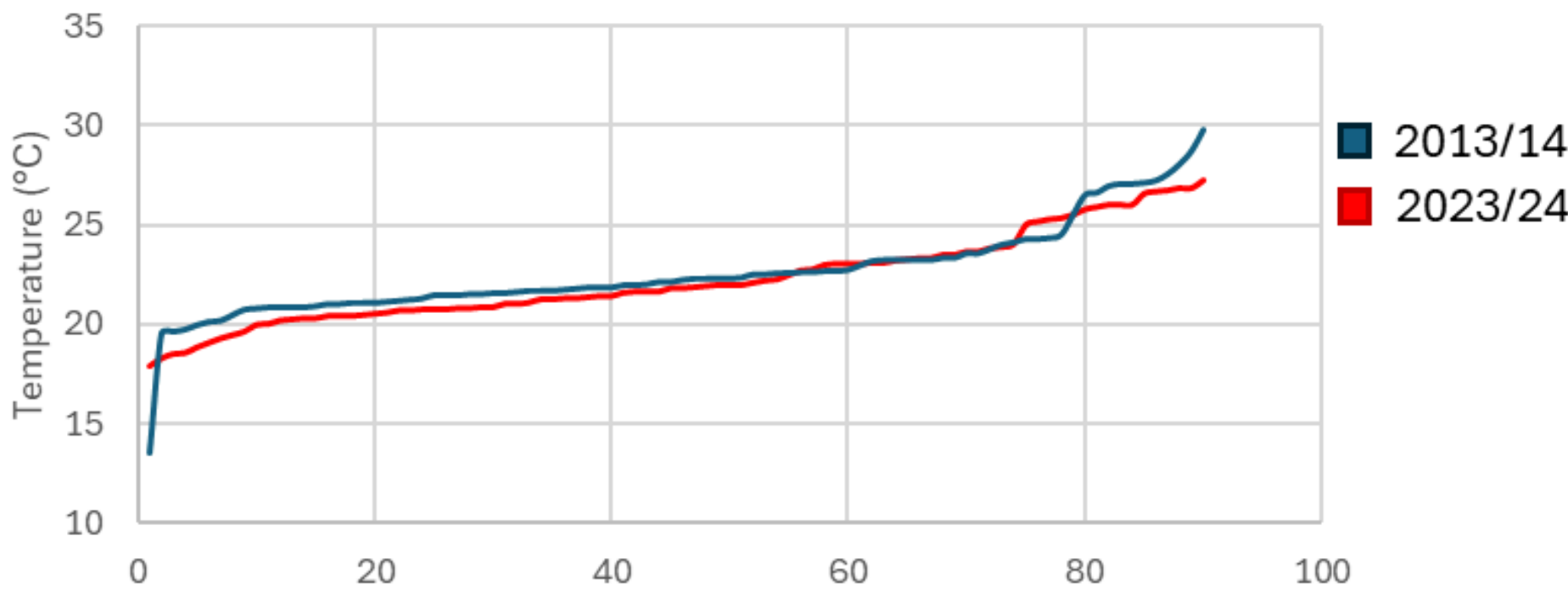


Table showing the 5 number summary, range, IQR, no. of outliers and standard distribution of the data

	Summer 2023/24	Summer 2013/14
Minimum	13.5	17.94
1st Quartile	21.2	20.72
Median	21.167	21.83
3rd Quartile	23.3	26.5
Maximum	29.78	27.22
Mean	22.61	22.26
Range	16.278	9.46
IQR	2.1	2.78
Standard Deviation	2.36	2.22
Amount of outliers	12	0

Comparative line graph of the daily temperature in ascending order during the summers of 2023/24 and 2013/14



Discussion: The reason for the lower variance in the 2013/14 season may be because that time period was a neutral El Nino period, which would cause more stable temperatures. However, the 2023/24 season was recorded as one of the strongest El Nino periods on record. The increase in temperature may also be due to global warming, which is an average increase of 0.20 degrees Celsius per decade, however, for this data set, this would not be fitting as the mean rose by 0.35 degrees Celsius.

Analysis: The sample size for each summer was 90 days, and was sorted in ascending order to see the trends in change of average temperature. The comparative box plot shows that the the medians of each graph were very similar, each having a similar location. Also, the 2013/14 season had a wide spread of data and zero outliers, while the 2023/24 season had a large amount of variance in the data, having 12 outliers. This variance is also seen in the ranges and interquartile ranges, being 2.1 and 16.278 for 2023/24 and 2.78 and 9.46 for 2013/14. This data further proves the variation in temperature, especially shown in the 7~ degree difference in ranges. The 2013/14 box plot seems to be slightly positively skewed, but the 2023/24 box plot is symmetrical, excluding outliers. Both seasons had a similar mean, being 22.61 and 22.26, showing a small increase in average temperature. This data shows that the 2013/14 season had a slightly lower average temperature, while having less variation. Otherwise, the 2023/24 season had a higher mean, while also having a high amount of variance, which is shown through its 12 outliers and high range.

Conclusion: The data collected for this experiment proves the hypothesis that the average temperature would increase. Sources for this increase may vary, it may be the predicted global warming but may also be due to the extreme El Nino event that happened in the latter season but not the former. The aim for this investigation was met, with the hypothesis proven correct, however, it may not be due to the originally predicted reason. Some weaknesses of this experiment are that not analysing every year's data between 2013 and present will decrease the ability to see the rising trend in the data, but is a trade off for the conciseness needed for this poster. A way that could improve the accuracy of the experiment would be to analyse the data from multiple weather stations and take the average of them for each day of summer to more accurately observe the trends in rising temperature over a wider area e.g. all of the suburb's weather stations rather than just one.