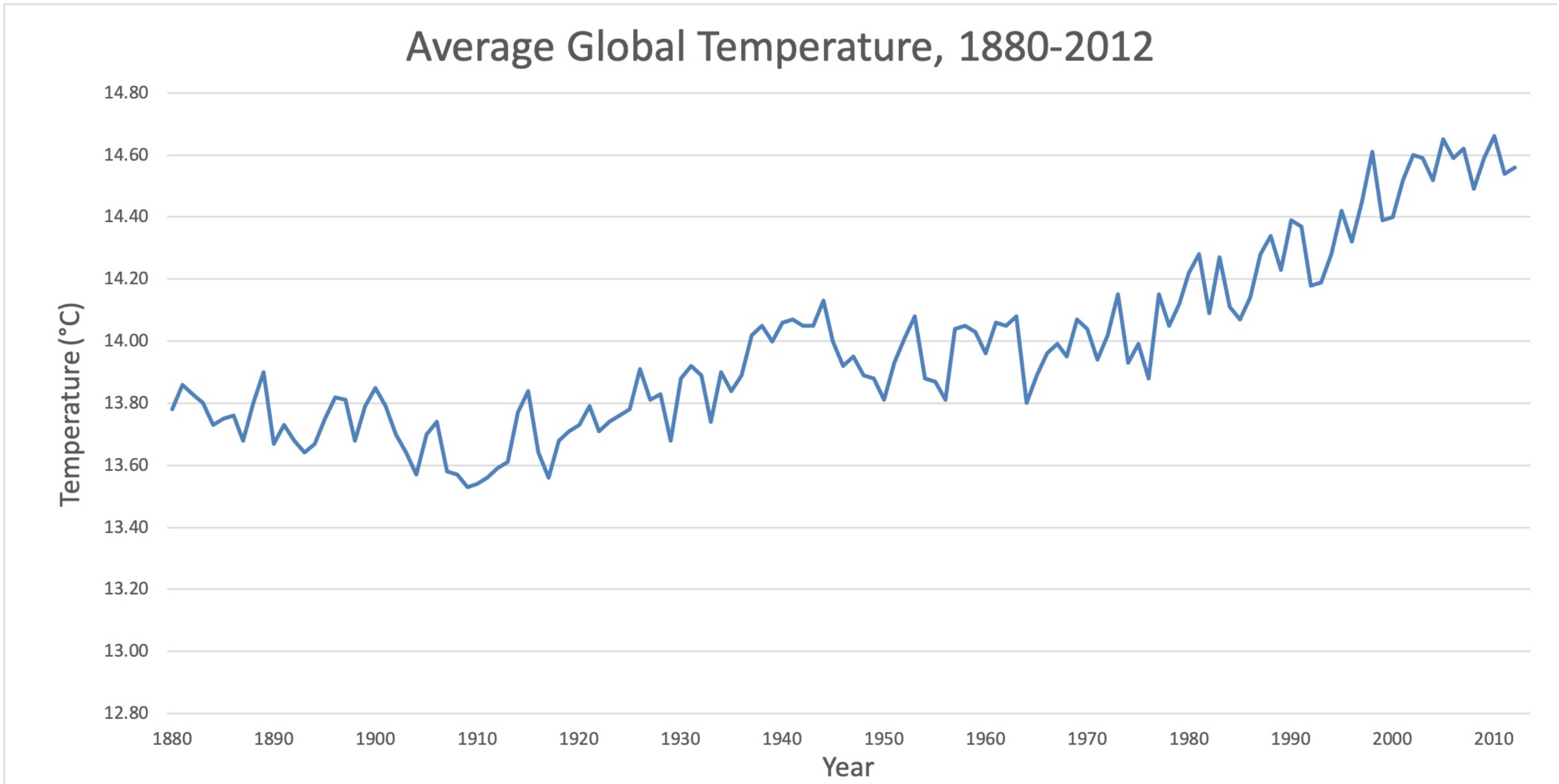
Problem A

Riley and Daniel

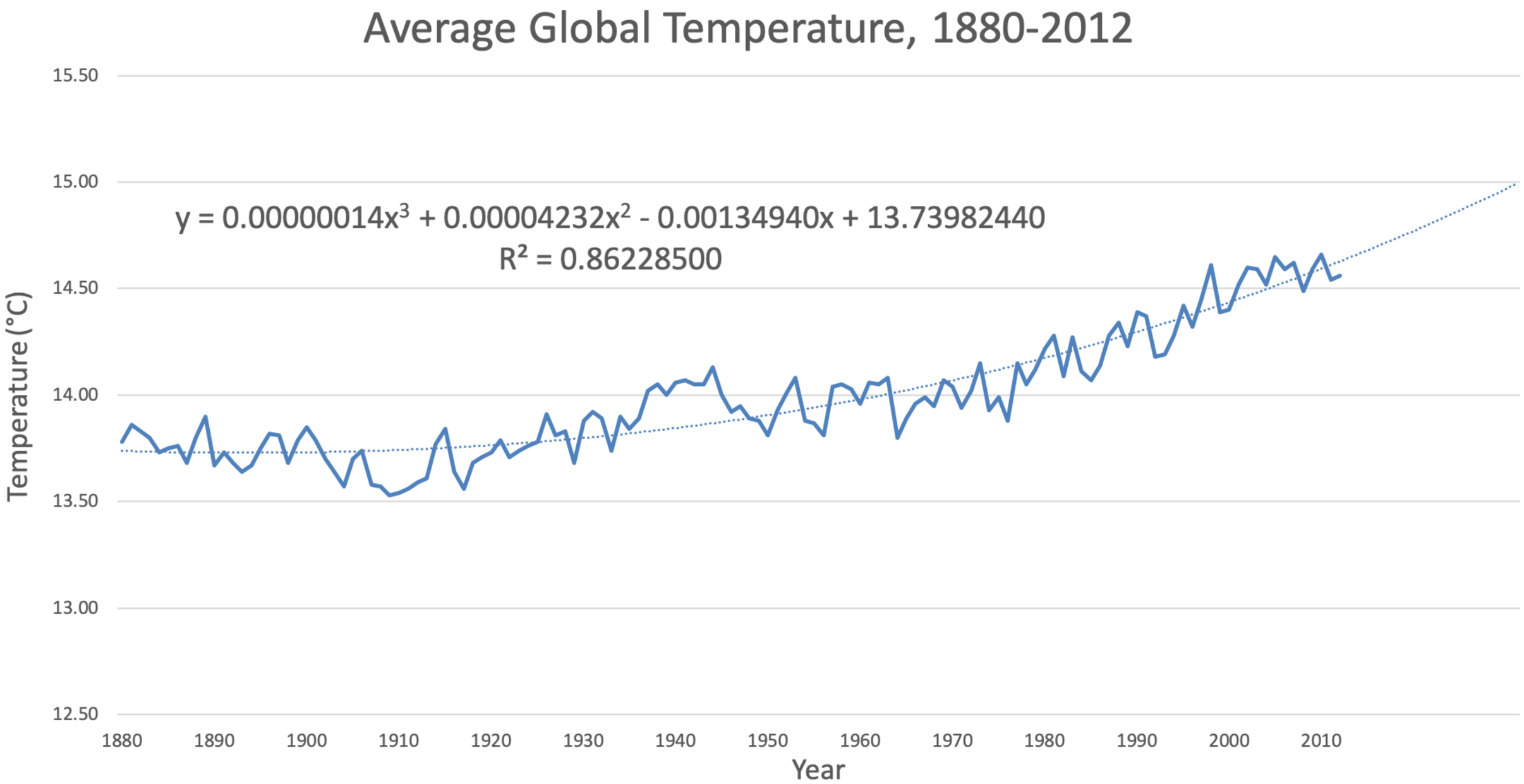
Average Global Temperature

Raw Graph

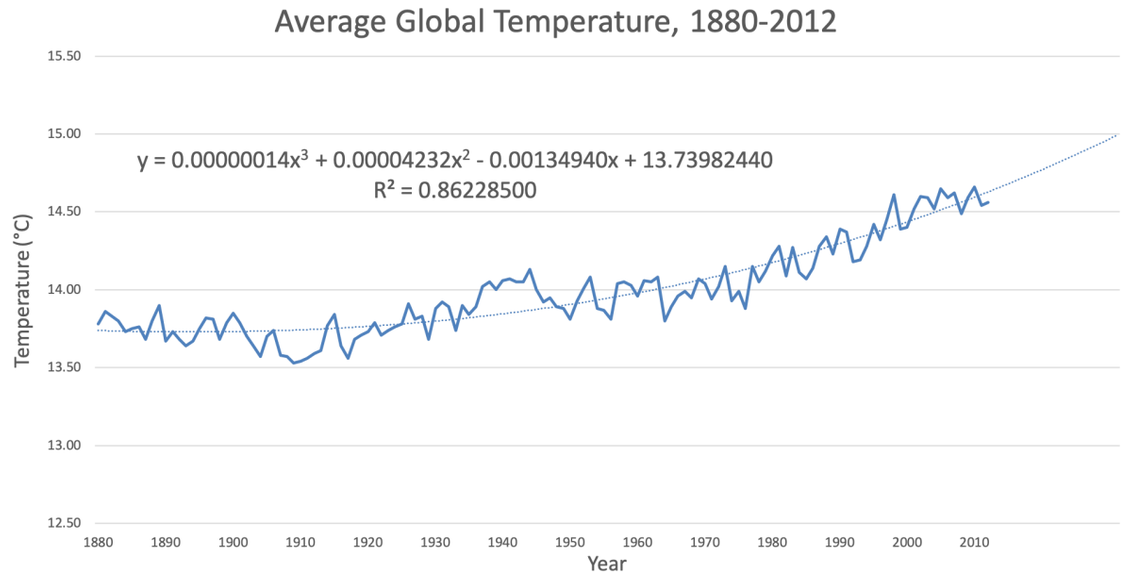

Average Global Temperature, 1880-2012
Temperature (°C)
14.80
14.60
14.40
14.20
14.00
13.80
13.60
13.40
13.20
13.00
12.80
1880
1890
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
Year

Model One

Cubic



The cubic trend line roughly fits the trend of the graph, with an R^2 value of about 0.86. Because this graph is cubic, we know that the average global temperature is not only rising (as a linear function), but the rate at which it is rising is also increasing. This is obviously quite alarming, and will make it challenging for us to reverse climate change.

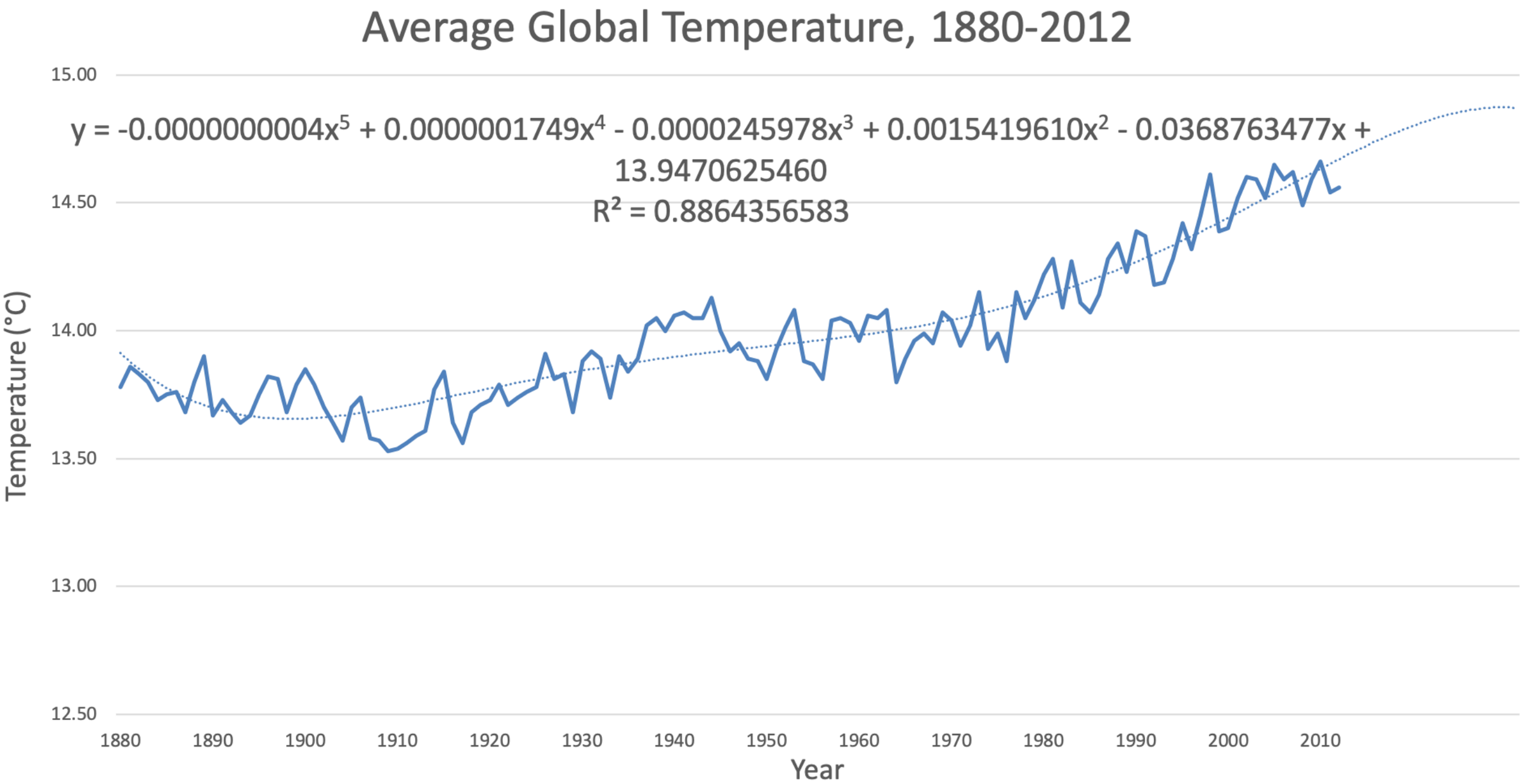


Model One

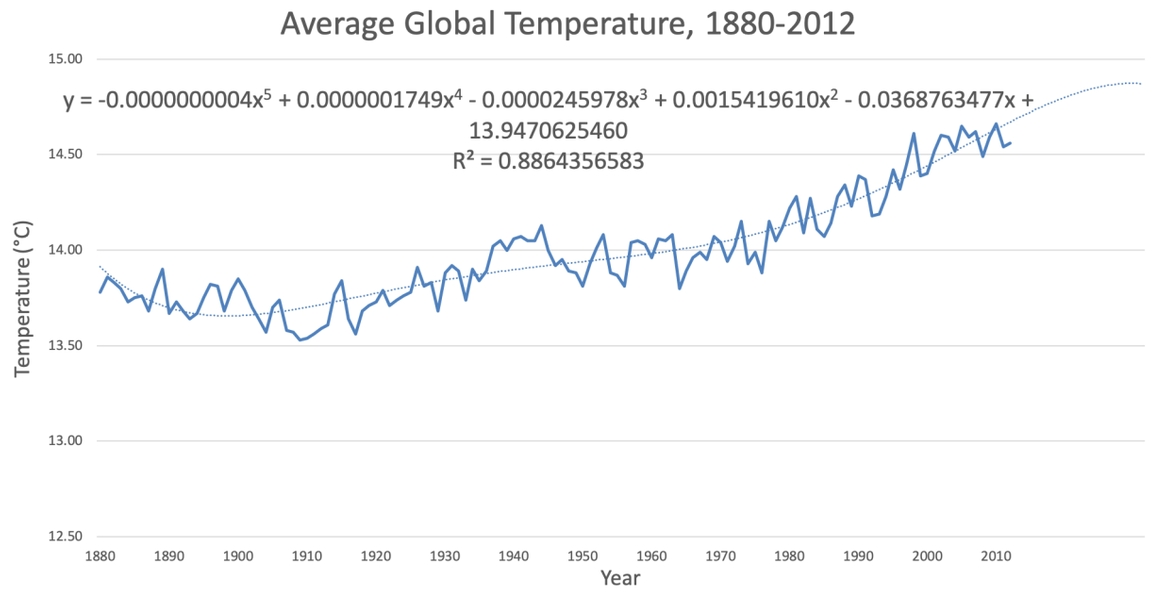
Cubic

Model Two

Order of 5 - “Quintic”



I chose this ‘Quintic' trend line because it visually fits the data much better and reveals an interesting oscillation every 40-50 years. The increased detail is supported by the slightly higher R^2 value of about 0.89, which is 0.024 more than the cubic.

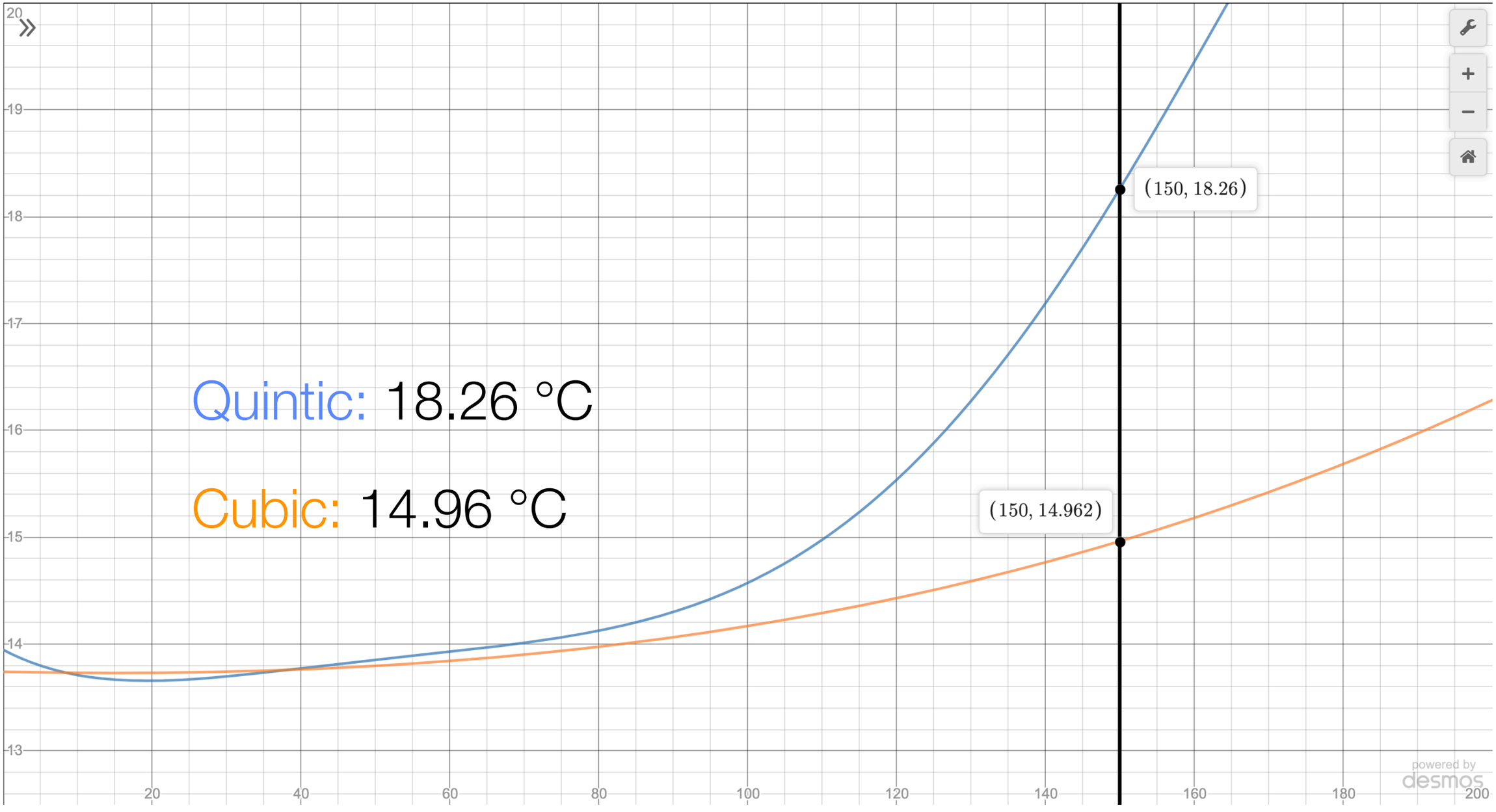


Model Two

Order of 5 - “Quintic”

Comparing the two graphs' predictions

What temperature will it be in 2030?



What the predictions tell us

These predictions:

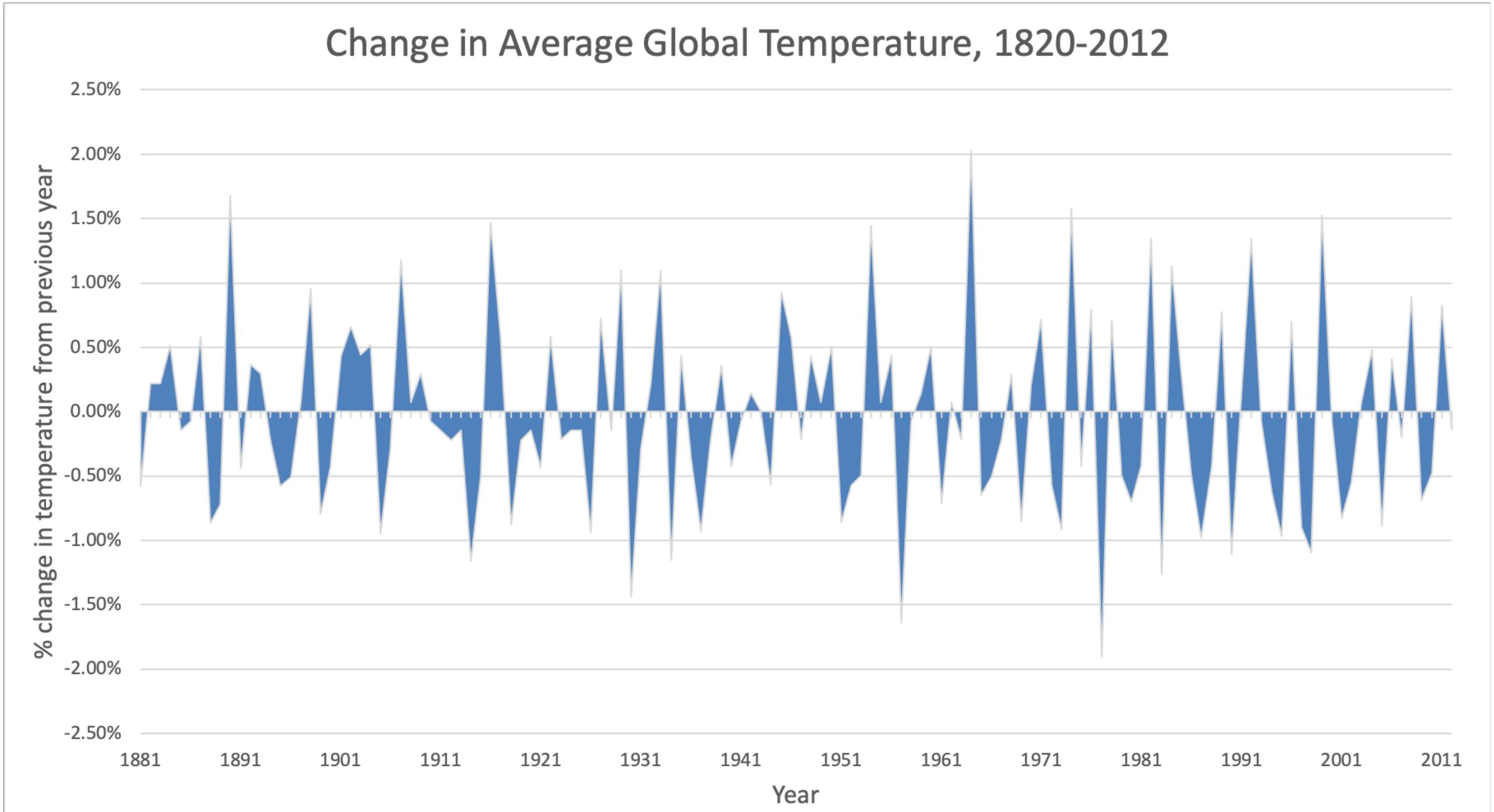
Quintic: 18.26 °C

Cubic: 14.96 °C

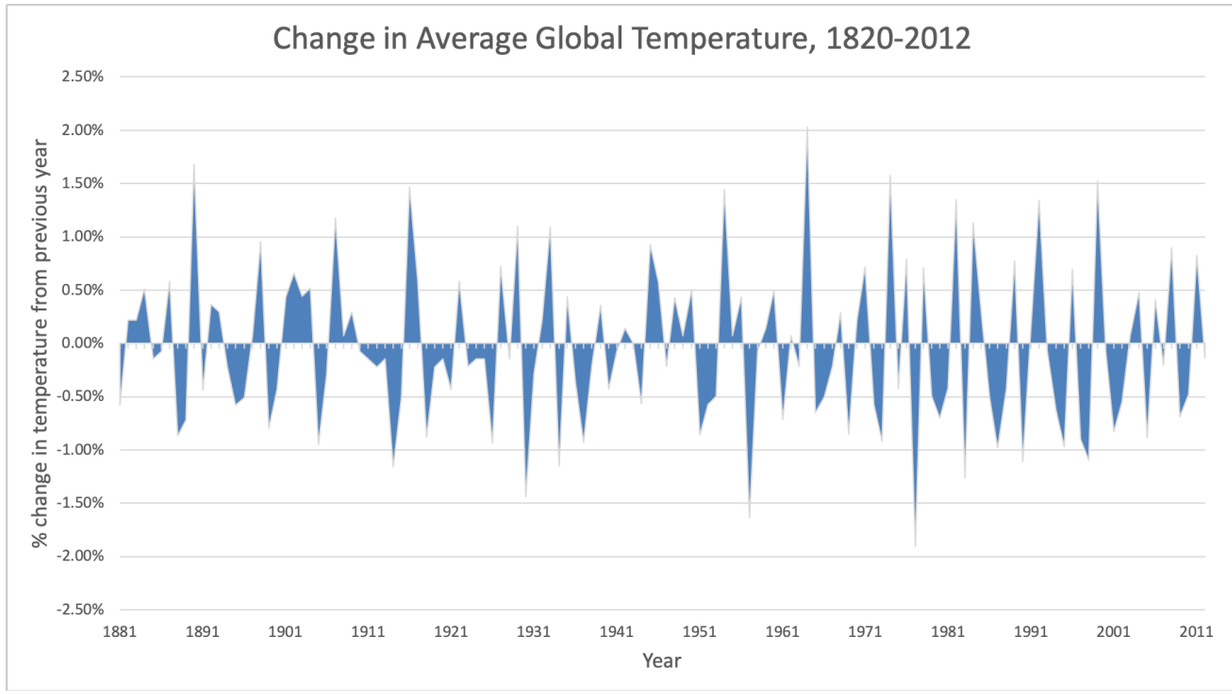
are quite different. The quintic shows a very drastic change from the 14.56 recorded in 2012. The cubic, however, predicts that the temperature won't even rise a full degree. Humans stop being able to sweat at around 35 °C, and therefore cannot survive in a climate past that temperature. Scientists at MIT predicted back in 2012 that "this limit could be reached globally if our planet warms by around 12°C". Thankfully, even the quintic prediction shows that the world is only going to warm by 3.3 °C by 2030. This does not mean that global warming is not a threat. Even a slight increase can force many species to relocate, and the ocean's expansion due to warming will also have a negative effect on many coastal cities and habitats.

Additional Observations

Year by Year



This graph shows how the temperature changes from the previous year. Interestingly, the temperature is not continuously rising, rather it fluctuates. The temperature is often less than the year before. However, ‘global warming’ is the result of the temperature rising more than it decreases.



Year by year

How does the temp change each year?

The End

Matthews, Robert. “How Hot Could Earth Get before It's Uninhabitable for Humans?” *BBC Science Focus Magazine*, www.sciencefocus.com/planet-earth/how-hot-could-earth-get-before-its-uninhabitable-for-humans/.

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