



Part 1: Temperature after European settlement in Sydney

European settlement of Sydney started in 1788. The data in the accompanying Excel document ([download here](#)) presents the average temperature in Sydney from 1788 – 2015. Create an X-Y graph of the data and answer the following questions. *Hint – you may wish to make your Y axis minimum value 15.0.*

1. The slope of the trendline of your graph of 1788 – 2015 temperature provides the rate of temperature change. What is the average change in temperature per year? _____
2. Are all time periods of data between 1788 – 2015 reliable? Explain your answer. _____

3. Evaluate the statement “European Settlement has affected the temperature in the Sydney region”. Do you have enough information to make this statement? _____



Sydney Cove Port Jackson 1788 (W 5
Bradley, public domain)

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Part 2: Extreme weather in Australia

In 1910, standardised instrument shelters (Stevenson Screens) were introduced and since collection of temperature data is comparable with the current standards. Since 1910, the mean surface air temperature of Australia has increased by 1.1°C (Gergis, Ashcroft and Whetton, 2020).

Using the data in the *Sydney Temperature* spreadsheet, create a graph for the period between 1910 and 2015.

1. According to the 1910 – 2015 graph, what was the rate of temperature increase in Sydney per year? _____
2. What year on the graph has the highest average temperature? (*Hint – place your cursor over the point to read the year and value.*) _____



Automatic Weather Station with Stevenson Screen at Wagga Wagga (Bidgee 2011, Creative Commons 3.0)

For the remaining questions, refer to these readings:

BBC – Australia heatwave: Nation endures hottest day on records (available online from <https://www.bbc.com/news/world-australia-50817963>)

BOM – Summer 2012–2013 heat records (available online from <http://www.bom.gov.au/climate/updates/summer-heatwave-2013.shtml>)

BOM – Temperature data methodologies at the Bureau of Meteorology (available online from <http://www.bom.gov.au/climate/current/events/january-heatwave-methods.shtml>)

3. What was the highest recorded temperature in Australia during the 2013 heatwave? _____

4. Search record high temperatures in Sydney to see if the 2013 record has been broken. What did you find? _____



5. The heatwave in January 2013 was measured using both ACORN-SAT data and AWAP data.

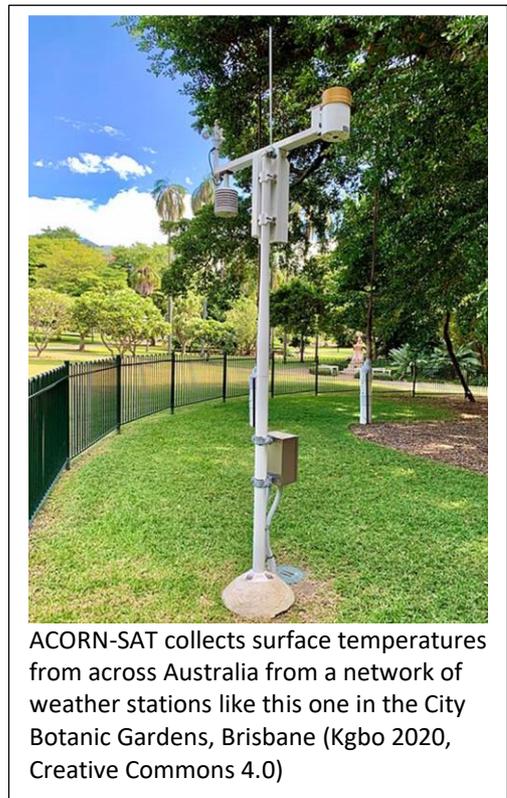
What is the advantage of using different types of temperature measurement? _____

6. What are the two datasets (ACORN-SAT and AWAP)

used to study? _____

7. Australia suffered through another heatwave in 2019.

Did the 2013 and 2019 heatwaves have the same immediate cause? _____



List of Abbreviations:

ACORN-SAT: Australian Climate Observations Reference Network – Surface Air Temperature

AWAP: Australian Water Availability Project

BOM: Bureau of Meteorology

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References:

- ABC, 2018, Sydney hits its highest temperature recorded since 1939 with Penrith reaching 47.3C, viewed 19 May 2021, <<https://www.abc.net.au/news/2018-01-07/sydney-hits-its-highest-temperature-recorded-in-79-years/9309552>>
- BBC, 2019, Australia heatwave: Nation endures hottest day on record, viewed 19 May, 2021, <<https://www.bbc.com/news/world-australia-50817963>>
- Bureau of Meteorology, n.d., Early weather data. Historical observations for southeastern Australia, 1788-1859, viewed 10 March 2021, <<http://www.bom.gov.au/climate/early-data/>>
- Bureau of Meteorology, 2021, Monthly mean maximum temperature, viewed 20 March 2021, <http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_nccObsCode=36&p_display_type=dataFile&p_startYear=&p_c=&p_stn_num=066062>
- Bureau of Meteorology, n.d., Summer 2012-2013 heat records, viewed 19 May 2021, <<http://www.bom.gov.au/climate/updates/summer-heatwave-2013.shtml>>
- Bureau of Meteorology, n.d., Temperature data methodologies at the Bureau of Meteorology, viewed 19 May 2021, <<http://www.bom.gov.au/climate/current/events/january-heatwave-methods.shtml>>
- Gergis, J., Ashcroft, L. and Whetton, P., 2020. A historical perspective on Australian temperature extremes. *Climate Dynamics*, 55, pp.843-868.

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