



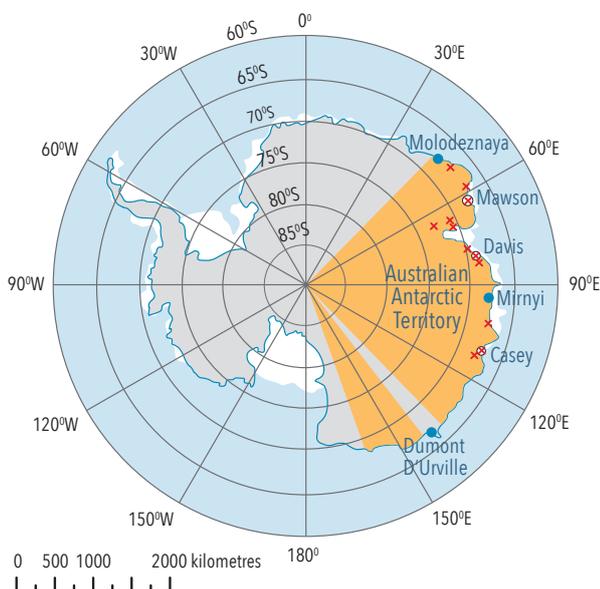
NO EVIDENCE OF WARMING AT MAWSON, ANTARCTICA

HOT TAKES

- 1 Climate models suggest global warming should be amplified in both polar regions, but actual outcomes have been quite different.
- 2 At East Antarctica there has been no statistically significant warming – nor cooling – for two-thirds of a century at three key measurement sites along 3,000 kilometres of coastline. Hypothetical impacts of rising CO₂ have been overwhelmed by more powerful natural climatic forces for at least sixty years.
- 3 This conclusion follows careful statistical analysis of historical temperatures before and after homogenisation by the Bureau of Meteorology (in response to changes in methods of measurement).

Global warming has not been observed everywhere. At the poles, amplified surface warming has occurred in Arctic latitudes but there has been no corresponding warming over the main Antarctic land mass. Antarctica's climate is dominated by the combined influences of the Southern Ocean and the persistent ice sheet¹. While slight warming can be detected along the coastline of West Antarctica, none at all has been detected in surface air temperature measurements spanning two-thirds of a century on the opposite side of the continent, at East Antarctica. This is apparent at the three Australian research stations, Mawson, Davis, and Casey, which are evenly spaced along more than 3,000 kilometres of coastline (see Figure 1).

Figure 1: Weather station locations in the Australian Antarctic Territory²



The Mawson Temperature Record

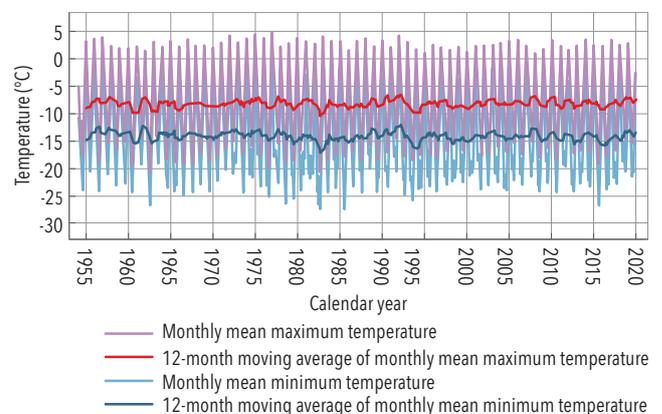
The Australian Bureau of Meteorology (BoM) has measured surface air temperatures at the Mawson research station³ since early 1954. These temperature measurements have been taken at the same location since 1954 with temperature measuring equipment mounted in a standard (Stevenson screen) weather station.

Over the period of the temperature record, different equipment was placed in the Stevenson screen at Mawson and used to measure air temperature.

The historical temperature record for Mawson is shown in Figure 2. This includes monthly mean maximum and minimum temperature plots and corresponding twelve-month moving averages of the monthly mean maximum and minimum temperatures. The twelve-month moving averages are measures of annual change in surface maximum and minimum temperatures. Temperatures oscillate within a relatively narrow band. Maximum temperatures fluctuate between an annual average of -6.7°C and -10.5°C . Minimum temperatures fluctuate between an annual average of -12.2°C and -17.3°C .

The twelve-month moving averages for both the monthly mean maximum and minimum temperatures show no statistically significant long-term warming nor cooling trends. This remains the case for both the actual historical measurements and the temperatures subsequently adjusted by the BoM before incorporation into other databases.

Figure 2: Temperature data measured at the Mawson weather station since March 1954⁴



The monthly mean maximum and minimum temperature series were calculated from historical daily observations.

The Davis, Casey, and Wilkes Temperature Records

The other weather stations with long records are located at the Davis and Casey bases. There is also a discontinued record from the abandoned Wilkes research station. The Wilkes record pre-dates the data from the newer Casey station about two kilometres away⁵. There were also local site relocations, particularly at Casey. At Casey, measurements were initially taken at 'The Tunnel' from February 1969 to December 1988, after which a new weather station was opened nearly a kilometre away.

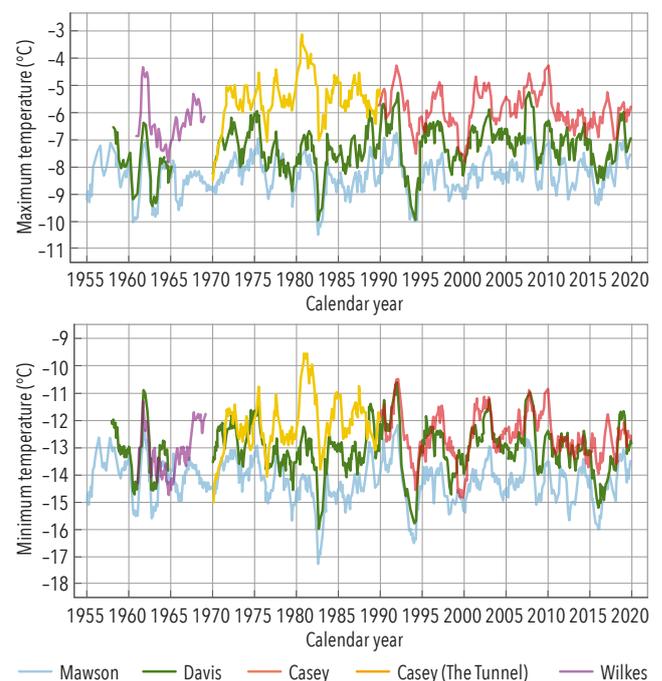
Figure 3 shows the temperature series from all these stations move up and down in synchrony with the temperatures recorded at Mawson, despite Mawson and Casey-Wilkes lying more than 3,000 kilometres apart. As with Mawson, there is no discernable warming nor cooling trend at either Davis or Casey-Wilkes stations.

When analysing these long term temperature records, it is important to note that the temperature series from Mawson, Davis, Casey and Wilkes represent an amalgamation of measurements from different types of thermometers. These include the traditional liquid-in-glass mercury and alcohol thermometers, plus the newest electronic platinum resistance thermometers that have been used to replace them. In an ideal world, to properly assess the equivalence of measurements from the new electronic probes versus mercury and alcohol thermometers, there should be an assessment of values measured at the same time in the same shelter – known as parallel data. However this data has not been made publicly available by the BoM.

Conclusion

Careful statistical analysis has been carried out on the longest time-series temperature series from all three of the Australian research stations. The analysis confirms the initial visual impression gained from the temperature plots shown in Figures 2 and 3, namely that there is neither a statistically significant warming nor a cooling trend in long term surface air temperature measurements spanning two-thirds of a century, from weather stations spaced more than 3,000 kilometres apart, at East Antarctica.

Figure 3: Temperature trends at the BoM's longest-running Antarctic weather stations⁶



These twelve-month moving average series, calculated from the BoM's longest Antarctic records, show similar patterns and they all track together over time. None of them show a clear warming or cooling trend.

SEE ALSO

FACT SHEET #2: Climate Change in the Polar Regions

FACT SHEET #4: Fire and Ice, Volcanoes at Antarctica

FACT SHEET #16: Rewriting Australia's Temperature History

Information in this fact sheet has been drawn from *Climate Change: The Facts 2020* (IPA 2020), Chapter 8, by Dr Jaco Vlok. Fact Sheet series general editor: Dr Arthur Day

- Collins et al. 2013, *Long-term Climate Change: Projections, Commitments and Irreversibility*: https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter12_FINAL.pdf.
- Source data on weather station locations at www.bom.gov.au/climate/data/stations
- Named after Sir Douglas Mawson, an Australian geologist and Antarctic explorer.
- Source: Data from Australian Bureau of Meteorology, March 2020, <http://www.bom.gov.au/climate/data/>
- Casey was constructed to replace Wilkes, which was abandoned in 1969.
- Source: Data from Australian Bureau of Meteorology, March 2020, <http://www.bom.gov.au/climate/data/> (The 1965-70 hiatus in the Davis record was due to a temporary station closure.)

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