

The Australian Temperature Anomaly, 1910 - 2000

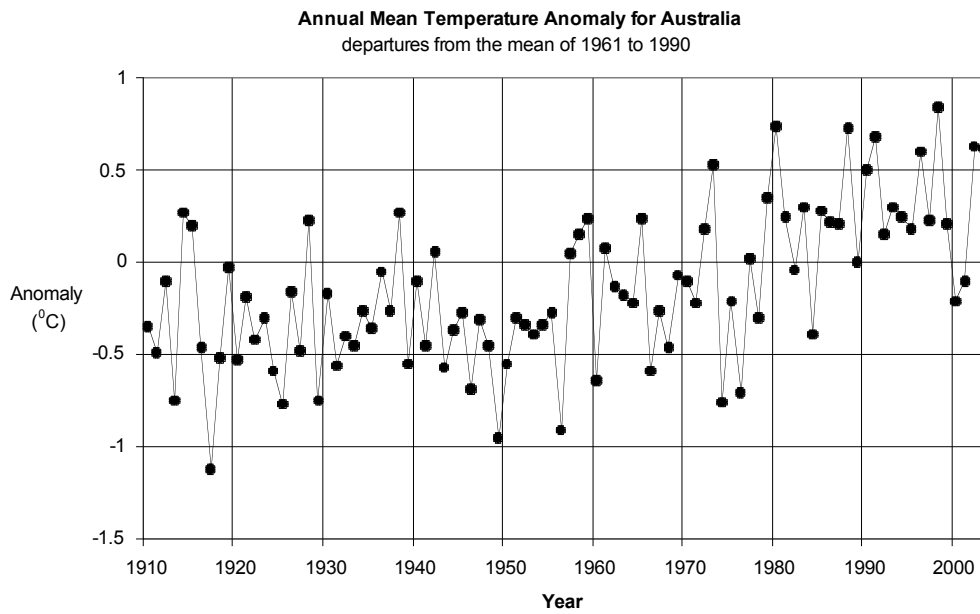
Tom Quirk

The increase in the mean temperature for Australia is often quoted as 1°C per century.

This is an overall figure that simplifies what has actually happened.

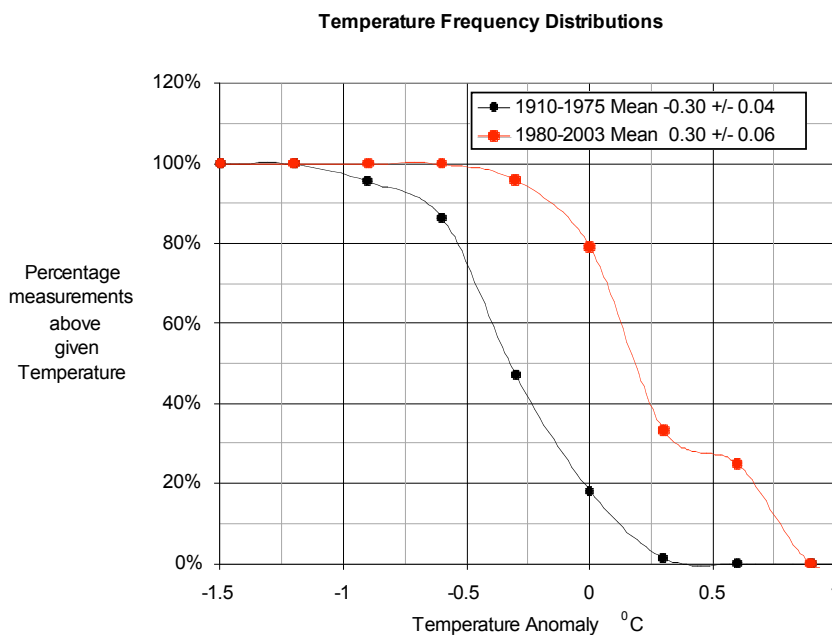
The measurements reported by the Bureau of Meteorology are presented in Figure 1 as an anomaly against departures from the mean of temperatures from 1961 to 1990.

Figure 1



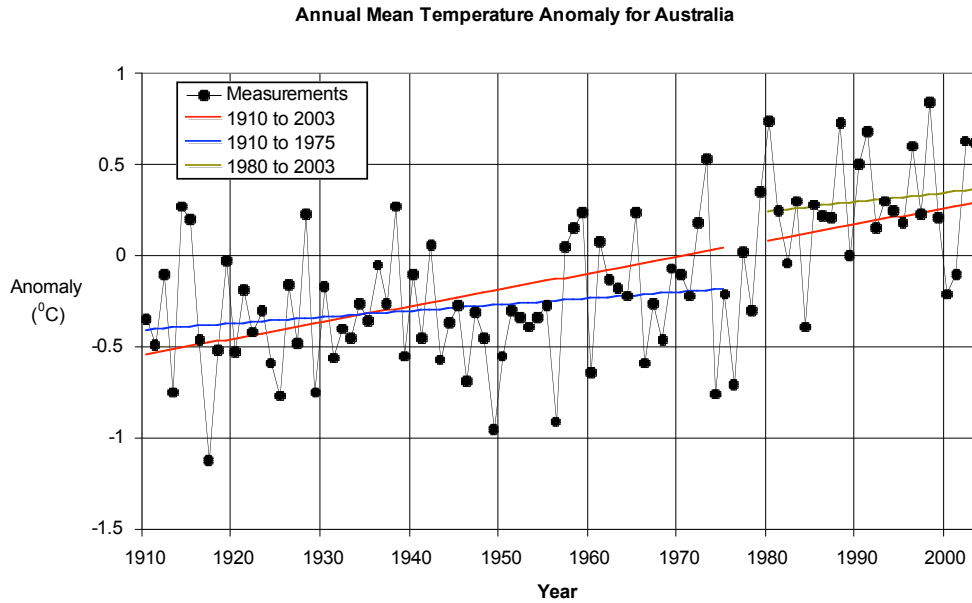
However it is clear that around 1975 to 1980 there was a shift, a step in the temperature. This can be seen by looking at a frequency distribution of the measurements in Figure 2

Figure 2



By breaking the temperature series into two parts the differences can be clearly displayed.

Figure 3



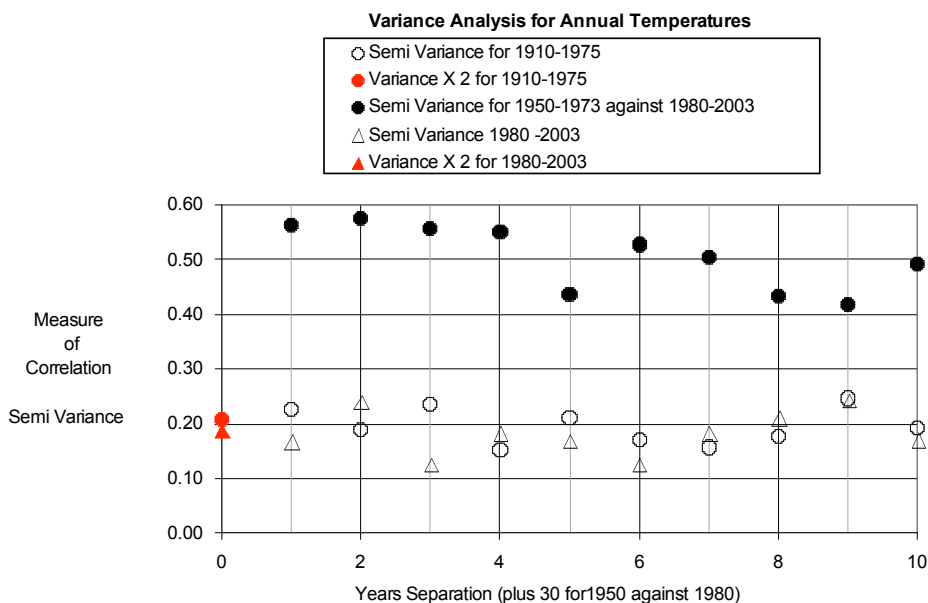
The resulting temperature movements are summarized below

Period	Temperature change °C per century	Error on Temperature change °C per century
1910-2003	0.90	+/-0.13
1910-1975	0.34	+/-0.17
1980-2003	0.50	+/-0.94

This data is often presented as a rise of 1 °C over the last century.

The appropriate conclusion is that there may be three different temperature regimes. 1910 to 1975 with a 0.34 °C warming per century, followed by a step rise in the period 1976 to 1979 and finally no significant increase since 1980 within the limits of the measurements.

Figure 4



One of the concerns in dividing the data is that the distribution of measurements has an unusual frequency distribution and errors difficult to estimate... However the temperature distribution in Figure 2 shows that this is not the case given the limited number of measurements.

A correlation analysis has been made looking for other trends in the temperature measurements. This analysis looks at the sum of squares of nearby temperature differences while increasing their separation. It can be related to the variance of the temperatures over their time series. Constant values with increasing separation are an indication that there are no correlated trends.

The analysis shows that year on year measurements are not correlated as the semi variance values (Figure 4) do not move away from the variance. On the other hand there is a step change in comparing measurements before and after the 1975-1980.gap.

The conclusion is that the year on year changes in temperature are random with the exception of 1975 to 1980.

The temperature step is connected with the Great Pacific Climate Shift of 1976. An event whose origins are uncertain but widely acknowledged, even in IPCC reports, and are often discussed as a possible source of Australia's temperature change. The warming is supposed to be related to a reduction in the up-welling of cold waters to the surface of the tropical Pacific Ocean.

So the proper description of the temperature behaviour is a warming of 0.3 °C per century along with a step of 0.5 °C in 1976 to 1979. There is no evidence to indicate that either of these changes have anything to do with rising concentrations of atmospheric carbon dioxide. Further, since no modelling of the climate currently includes the complicated ocean-atmosphere interactions in the Pacific Ocean, no reliance should be placed on any climate predictions dependent on that modelling.

The situation is thus exposed as more complicated than a simple warming trend and illustrates the complexities involved in interpreting climate changes.

About the Author

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Dr Thomas W. Quirk is a principal of Quirk Partners which has interests in venture capital, investment management and business advisory work. He is on the Board of the Institute of Public Affairs. He has been Chairman of the Victorian Rail Track Corporation, Deputy Chairman of Victorian Energy Networks and Peptech Limited as well as a director of Biota Holdings Limited, Swanston Trams and Geo2 Limited.

Dr Quirk worked in CRA Ltd setting up new businesses and also for James D. Wolfensohn in a New York based venture capital fund. He spent 15 years as a nuclear research physicist and university lecturer at Oxford and Chicago.