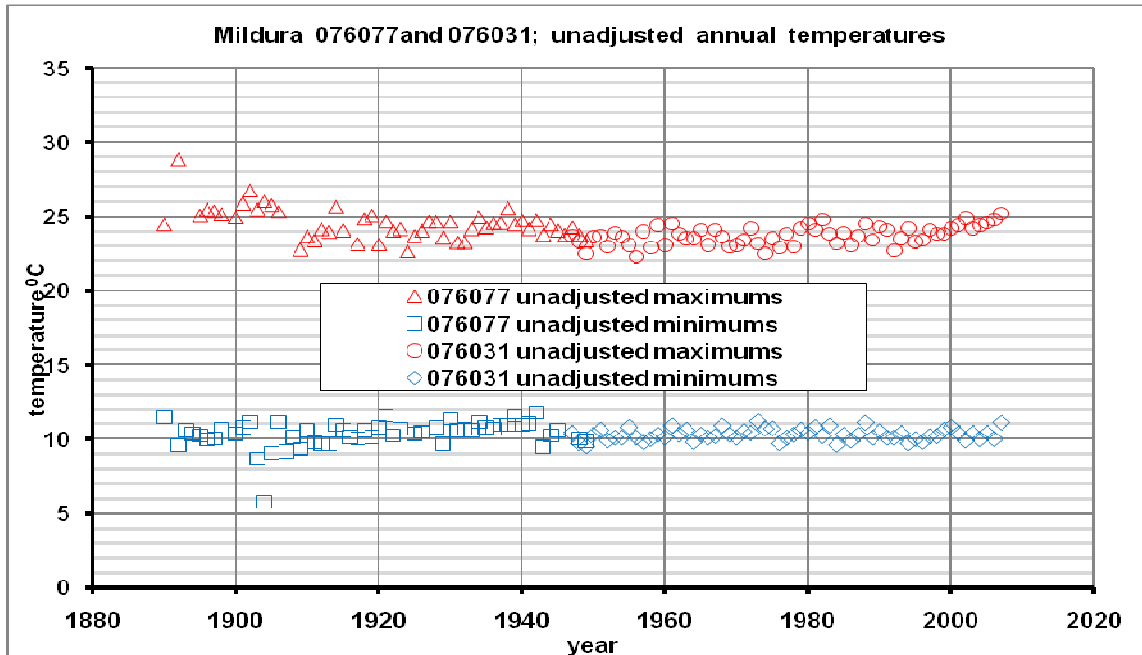


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APPENDIX 4(b): Formation of the Mildura Composite Site High Quality Dataset

Measurements of daily maximum and minimum temperatures were made at Mildura Post Office (BOM No. 076077) from 1889 until 1949 after which time the station was closed owing to the fact that nearby building construction was judged to be a potential source of inaccuracy in meteorological measurements. Measurements had begun at a new site on Mildura aerodrome (BOM No. 076031) in 1946, providing three years of overlapping data for site comparisons (BOM, 2009 b). From this overlap, and checks with other stations with no discontinuities during the change over period, it was shown that the move from the town to the aerodrome site introduced an artificial cooling of up to 1.0 °C in the temperature record.



Over the total period of temperature measurement at Mildura several other changes in instrumentation and circumstances of temperature measurement have occurred from time to time. The **Metadata** for the Mildura temperature record up until 1993 was summarised by *Torok (1996)* from the official station correspondence as follows:

Record of Changes in Circumstances of temperature measurements at the Mildura Post Office (076077)/ Mildura Aerodrome (076031) composite site

1899 Jul: Move from Wentworth 18 miles to Mildura

1903: Some measurements made at another site 1 mile east

1906 Jan: Newspaper report of overhanging trees and public interference with instruments.

1906 Jul: Stevenson Screen supplied

1906 Sep: Move to Post Office

1915 Sep: First official correspondence

1927 Aug: Move from park to Post Office, but screen installed to face northeast.

1933 Jul: Screen reorientated to face south.

1943 Mar: Pile of dirt near screen during construction of air-raid shelter.

1947 Jan: Move for composite site.

1989 Jul: Small move

(*Torok, 1996, Vol.2, p. 263*)



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Based on the above documented metadata and on a combination of objective and subjective analysis techniques described in *Torok and Nicholls (1996)*, the following adjustments to the long term Mildura Temperature record were carried out as documented in *Torok (1996), Vol 1 Table 7.1.1., on p.190.*

Year	Magnitude of this adjustment in °C	Accumulated adjustment in °C	Basis for calculation of correction	Overall description
Changes to the Minimum temperature series				
<1989	-0.6	-0.6	Objective test; Documented move	0.6 °C was subtracted from all annual values prior to 1989 due to a move to higher ,clearer ground; and according to an objective estimation of the extent of discontinuity based on a neighbourhood reference set of stations
<1946	-0.9	-1.5	Objective test; Detect; Documented composite move	0.9 °C was subtracted from all annual values prior to 1946 due to movement of site from the Post Office to the Airport; and according to an objective estimation of the extent of discontinuity based on a neighbourhood reference set of stations
=1943	+1.0	(-0.5)	Objective test; Documented poor site	1.0 °C was added to the individual 1943 value due to poor site conditions (a pile of soil was left at the screen following the construction of an air-raid shelter); and according to an objective estimation of the extent of discontinuity based on a neighbourhood reference set of stations
<1939	+0.4	-1.1	Objective test; Documented new screen	0.4 °C was added to all annual values due to a new Screen; and according to an objective estimation of the extent of discontinuity based on a neighbourhood reference set of stations
<1930	+0.3	-0.8	Objective test; Documented move	0.3 °C was added to all annual values due to a move; and according to an objective estimation of the extent of discontinuity based on a neighbourhood reference set of stations
=1903	+1.5	(+0.7)	Detect; Documented change in site	1.5 °C was added to the individual 1903 value due to a temporary site move one mile east; and detected and estimated by comparison with a nearby stations
=1902	-1.0	(-1.8)	Detect	1.0 °C was subtracted from the individual 1902 value as detected and estimated by comparison with nearby stations
=1901	-0.5	(-1.3)	Detect	0.5 °C was subtracted from the individual 1901 value as detected and estimated by comparison with nearby stations
=1900	-0.5	(-1.3)	Detect	0.5 °C was subtracted from the individual 1900 value as detected and estimated by comparison with nearby stations
=1892	+1.0	(+0.2)	Detect	1.0 °C was added to the individual 1892 value as detected and estimated by comparison with nearby stations
=1890	-1.0	(-1.8)	Detect	1.0 °C was subtracted from the individual 1890 value as detected and estimated by comparison with nearby stations
Changes to the Maximum temperature series				
=1978	+0.4	(+0.4)	Objective test	0.4 °C was added to the individual 1978 value according to an objective estimation of the extent of discontinuity based on a neighbourhood reference set of stations
=1977	+0.4	(+0.4)	Objective test	0.4 °C was added to the individual 1977 value according to an objective estimation of the extent of discontinuity based on a neighbourhood reference set of stations
=1976	+0.4	(+0.4)	Objective test	0.4 °C was added to the individual 1976 value according to an objective estimation of the extent of discontinuity based on a neighbourhood reference set of stations
=1975	+0.4	(+0.4)	Objective test	0.4 °C was added to the individual 1975 value according to an objective estimation of the extent of discontinuity based on a neighbourhood reference set of stations
=1974	+0.4	(+0.4)	Objective test	0.4 °C was added to the individual 1974 value according to an objective estimation of the extent of discontinuity based on a neighbourhood reference set of stations

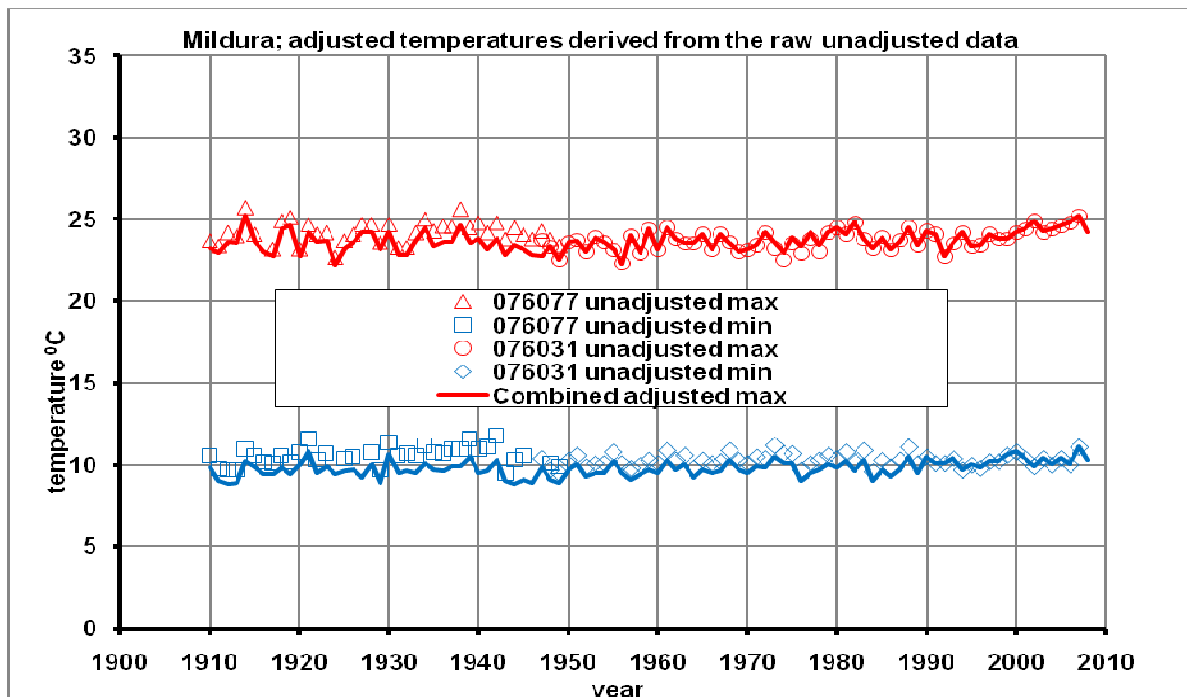
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=1973	+0.4	(+0.4)	Objective test	0.4 °C was added to the individual 1973 value according to an objective estimation of the extent of discontinuity based on a neighbourhood reference set of stations
<1947	-1.0	-1.0	Objective test; Documented composite move	1.0 °C was subtracted from all annual values prior to 1947 due to movement of site from the Post Office to the Airport; and according to an objective estimation of the extent of discontinuity based on a neighbourhood reference set of stations
<1934	+0.5	-0.5	Objective test; Documented screen reoriented	0.5 °C was added to all annual values prior to 1934 due to reorientation of Screen; and according to an objective estimation of the extent of discontinuity based on a neighbourhood reference set of stations
<1906	-1.0	-1.5	Objective test; documented Stevenson Screen supplied	1.0 °C was subtracted from all annual values prior to 1906 due to installation of the Stevenson Screen ; and according to an objective estimation of the extent of discontinuity based on a neighbourhood reference set of stations
<1900	+1.0	-0.5	Detect; Documented move	1.0 °C was added to all annual values due to reorientation of screen; as detected and estimated by comparison with nearby stations

Since the work of *Torok and Nicholls (1996)*, the Mildura temperature data has been scrutinised and adjusted by further rounds of detection and estimation techniques (see, for example *Della-Marta et al. (2004)*).

It has been generally accepted by climatologists that in Australia the temperature record prior to 1910 is significantly less reliable than the subsequent record. So for the purposes of Climate Change research, the High Quality Dataset for Mildura as for the other 133 Australian localities is based on a starting date of 1910.

The figure below shows the current values of the High Quality Temperature Dataset for Mildura superimposed on the original unadjusted raw values for the composite site (*BOM, 2009 b; BOM 2009 c*).



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It should be noted that for similar reasons to those described above for Mildura, quite a number of the early Meteorological Stations used in the Australian High Quality Temperature Dataset were relocated to airport sites during the period from the late 1930s through to the 1960s, each requiring the application of procedures similar to those described above to make the appropriate site-specific adjustments to the temperature record.



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