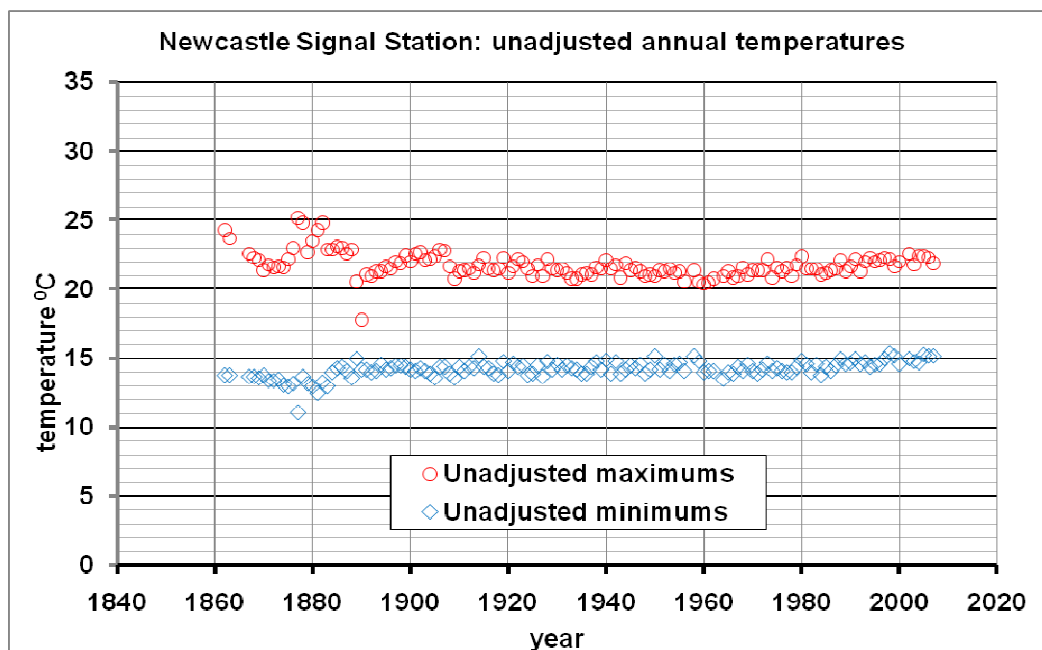


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## APPENDIX 9: Formation of the Newcastle High Quality Dataset

Nobbys Signal Station (No. 061055) in Newcastle has been recording temperatures since 1862 (BOM, 2009 b).



The **Metadata** for the Newcastle temperature record up until 1993 was summarised by *Torok (1996)* from the official station correspondence as follows:

### Record of Changes in temperature measurement at Boulia (BOM No. 061055)

**1922 Dec:** First official correspondence.

**1943 Dec:** Building to occur.

**1955 Dec:** Screen moved 40 feet west due to construction of tower.

**1965 Aug:** Screen stand is 6 inches too low and painted black.

**1975 Oct:** Building has rendered site poor.

**1989 Feb:** Screen recently moved out of enclosed position.

(*Torok, 1996, Vol 2 p. 255*).

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 Boulia temperature record were carried out as reported below in *Torok (1996) Vol 1 Table 7.1.1., on p.185*.

Year	Magnitude of this adjustment in °C	Accumulated adjustment in °C	Basis for calculation of correction	Overall description
<b>Changes to the Minimum temperature series</b>				
<1991	+0.5	+0.5	Median; Detect;; Documented move	0.5 °C was added to <b>all</b> annual values prior to 1991 due to shift of site and as detected and estimated by comparison with nearby stations
<1973	-0.6	-0.1	Objective test; Detect;	0.6 °C was subtracted from <b>all</b> annual values prior to 1973 due to influence of building; and according to an objective

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			Documented building	estimation of the extent of discontinuity based on a neighbourhood reference set of stations
<1963	-0.7	-0.8	Objective test; Detect; Documented old poor screen repaired	0.7°C was subtracted from <b>all</b> annual values prior to 1963 due to replacement or repairs to the Screen; and according to an objective estimation of the extent of discontinuity based on a neighbourhood reference set of stations
<1884	+0.8	0.0	Range; Detect;	0.8°C was added to <b>all</b> annual values prior to 1884 values as detected and estimated by scrutiny of this station's temperatures.
=1877	+2.0	(+2.0)	Detect;	2.0°C was added to the <b>individual</b> 1877 value as detected and estimated by scrutiny of this station's temperatures.
<b>Changes to the Maximum temperature series</b>				
<1991	+0.5	+0.5	Range; Detect; Documented move	0.5°C was added to <b>all</b> annual values prior to 1991 due to shift of site and as detected and estimated by comparison with nearby stations
<1982	+0.5	+1.0	Objective test; Documented poor site	0.5°C was added to <b>all</b> annual values prior to 1982 due to documented poor site conditions; and according to an objective estimation of the extent of discontinuity based on a neighbourhood reference set of stations
<1977	-0.8	0.2	Objective test; Detect; Documented building	0.8°C was subtracted from <b>all</b> annual values prior to 1977 due to influence of building; and according to an objective estimation of the extent of discontinuity based on a neighbourhood reference set of stations
<1966	+0.6	+0.8	Objective test; Documented probable new Screen	0.6°C was added to <b>all</b> annual values prior to 1966 due to probable new screen and according to an objective estimation of the extent of discontinuity based on a neighbourhood reference set of stations
<1947	+0.5	+1.3	Objective test; Detect; Documented building	0.5°C was added to <b>all</b> annual values prior to 1947 due to influence of building; and according to an objective estimation of the extent of discontinuity based on a neighbourhood reference set of stations
=1917	-0.5	(+0.8)	Objective test; Detect;	0.5°C was subtracted from the <b>individual</b> 1917 according to an objective estimation of the extent of discontinuity based on a neighbourhood reference set of stations
=1916	-0.5	(+0.8)	Objective test; Detect;	0.5°C was subtracted from the <b>individual</b> 1916 according to an objective estimation of the extent of discontinuity based on a neighbourhood reference set of stations
=1915	-0.5	(+0.8)	Objective test; Detect;	0.5°C was subtracted from the <b>individual</b> 1915 according to an objective estimation of the extent of discontinuity based on a neighbourhood reference set of stations
>1908	-1.5	(-0.2)	Range; Detect;	1.5°C was subtracted from <b>all</b> annual values prior to 1908 as detected and estimated by scrutiny of this station's temperatures
=1899	+0.7	+0.5	Detect;	0.7°C was added to <b>all</b> annual values prior to 1899 as detected and estimated by scrutiny of this station's temperatures
=1890	+3.0	(+3.5)	Detect;	3.0°C was added to the <b>individual</b> 1890 value as detected and estimated by scrutiny of this station's temperatures
=1889	+0.8	(+1.3)	Detect;	1.0°C was added to the <b>individual</b> 1889 value as detected and estimated by scrutiny of this station's temperatures
etc	etc	etc	etc	Changes made earlier to this are not relevant to our focus of interest (i.e. post 1910)

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

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It has been generally accepted by climatologists that, for 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 temperature Dataset for Newcastle as for the other 133 Australian locations is based on a starting date of 1910.

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

