



**Australian Government**  
**Bureau of Meteorology**

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## **SPECIAL CLIMATE STATEMENT 18**

### **Exceptional winter heat over large parts of Australia**

*First Issued 26<sup>th</sup> August 2009*

*National Climate Centre*

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## Introduction

August 2009 has seen highly abnormal heat over large parts of Australia, especially in the subtropical areas of Queensland, the southern Northern Territory and northern New South Wales. August record high temperatures have been set in many areas and the month as a whole is set to be Australia's warmest August on record by a substantial margin.

Above-average daytime temperatures have persisted over the subtropics for almost the entire month, due to a lack of cold outbreaks bringing air of Southern Ocean origin northwards, as well as a lack of moisture and consequent persistent clear skies. As of 26 August there have been two major episodes of extreme heat which have seen significant numbers of records broken, from the 14<sup>th</sup> to the 16<sup>th</sup>, and then, after a brief moderation, from the 21<sup>st</sup> to the 25<sup>th</sup>.

## Record August daily temperatures over many areas

August record high maximum temperatures have been set over a large area (Figure 1), comprising 20% of the total area of the continent, including 48% of Queensland, 21% of New South Wales and 20% of the Northern Territory. This includes the southern half of Queensland except for parts of the coastal fringe, much of the southern Northern Territory, and northern New South Wales north of a Taree-Tamworth-Bourke line. The bulk of the records were set on 22-24 August, initially over inland areas on 22-23 August before extending to the east coast on the 24<sup>th</sup>. Some records were also set over the period 14-16 August, although most of these were broken the following week; for example, Windorah (Queensland) setting a new August record on five separate occasions.

The most dramatic extremes occurred on 23-24 August as the hottest air approached the coast. A new NSW state record high temperature for August was set on the 23<sup>rd</sup> when Mungindi reached 36.3°C, breaking the record of 36.1°C set at Yamba on 13 August 1946. This record only lasted one day, with Mungindi rising further to 37.8°C on the 24<sup>th</sup>. Evans Head reached 37.6 on the same day, and nine stations in total passed the previous record from 1946. Queensland narrowly missed its state August record<sup>1</sup> (38.3°C at Normanton on 26 August 1968), with the highest temperatures being 38.1 at Bedourie on the 22<sup>nd</sup> and 37.9 at Gatton on the 24<sup>th</sup>. There remains a possibility that this, and other records, will be broken later in the week with further high temperatures expected.

August records were broken by 3°C or more in many parts of southern Queensland and northern NSW. The largest margin by which a record was broken at a long-term station<sup>2</sup> was 5.1°C at Murwillumbah (Table 1), and other stations which set records by 4°C or more included Mungindi (5.0), Alstonville (5.0), Gatton (5.0), Moree (4.8), Collarenebri (4.2), Taroom (4.2), Pindari Dam (4.1), Inverell (4.0), and Miles (4.0). At Alstonville, Pindari Dam and Inverell, the temperatures observed on the 24<sup>th</sup> also exceeded September records. Brisbane set a new August record high by 2.6°C on the 24<sup>th</sup>, reaching 35.4°C.

At a number of coastal and near-coastal locations, including Brisbane Airport, Yamba, Murwillumbah, Alstonville, Coffs Harbour, Kempsey, Port Macquarie and Evans Head, the hottest day of 2009 so far has occurred during this event, surpassing anything reached in January, February or March.

For most of the month, over mainland Australia, overnight minimum temperatures have been less extreme than daytime maxima, as a result of persistent clear skies allowing overnight cooling. However, some exceptionally high minimum temperatures were observed as the heatwave peaked,

<sup>1</sup> A value of 38.8°C was reported from Thargomindah on the 23<sup>rd</sup> but this has been discounted because of a suspected instrument fault.

<sup>2</sup> For the purposes of this statement, a "long-term" station is one with 30 or more years of data.

culminating on the 25<sup>th</sup> when state record high minimum temperatures for August were set in NSW and Queensland. In NSW, Lismore's 23.3°C broke the existing record (20.1°C at Broken Hill on 30 August 2005) by more than three degrees, while Urandangi (26.5) also broke the existing Queensland record of 25.4°C at Thursday Island (10 August 1956).

In total, August record highs have been set at 74 long-term stations for maximum temperature, and 43 for minimum temperature. These are listed in Table 1.

#### August set to be Australia's warmest on record

August 2009 is almost certain to be Australia's warmest August on record. National maximum temperatures have averaged 3.14°C above the long-term average<sup>3</sup> for the month so far, more than a degree above the previous record of +2.06°C set in 2006 (Table 2). It is also possible that August 2009 will break the record set in April 2005 (+3.11) for the largest monthly maximum temperature anomaly ever recorded for any month. Despite the less extreme overnight temperatures, daily mean temperatures (day and night combined) are also running well above record levels.

Maximum temperatures for the month have been the warmest on record through much of the subtropics (Figure 2), reaching 6-7°C above normal in places, and are above average almost throughout Australia. State averages are running at record levels in Queensland and the Northern Territory, with Queensland (3.80°C above average) running more than two degrees above the previous August record. In both cases the maximum temperature anomalies also exceed the record for any month<sup>4</sup>.

Average minimum temperatures have been above normal in all states, and have reached record levels in South Australia. Tasmania, which has missed out on most of the abnormal daytime heat, has experienced persistently mild overnight minimum temperatures, resulting in a monthly mean well above the previous August record. This is associated with persistent cloud cover during a wet month, with the state likely to experience one of its five wettest Augusts on record. Combining day and night temperatures, it will be the warmest August on record for South Australia, Queensland, Tasmania and the Northern Territory.

The exceptional August anomalies in combination with above average temperatures in June and July have also been sufficient to lift average winter temperatures to record or near-record levels (Table 3). Average winter maximum temperatures over Australia are likely to be the highest on record, with an anomaly of +1.62°C exceeding the current record of +1.41 set in 2002, and Queensland and the Northern Territory will also almost certainly set records.

Seasonal mean (day and night combined) temperatures for Australia for winter are likely to be the warmest or second warmest on record (the current record is from 1996). Records will almost certainly be set in all four south-eastern states, with NSW, Victoria and Tasmania surpassing marks from 2005 and South Australia from 1991.

#### Persistence of warm conditions

The warm conditions have been very persistent in many areas, especially inland (Table 5). Alice Springs set a new record with seven consecutive days above 30°C from 10-16 August, then after one day's break equalled it from 18-24 August, giving them a total of 14 days out of 15 above 30°C. They had never previously experienced more than eight days over 30°C in a single August (Table 4). Numerous other stations, especially in inland Queensland, have set records for the most

<sup>3</sup> Long-term averages are taken over the standard 30-year reference period from 1961-90, unless otherwise stated.

<sup>4</sup> Existing records are +3.52°C for the Northern Territory (April 2005) and +3.26°C for Queensland (February 1983).

consecutive August days above 30°C, while Windorah, which had never reached 35°C in August prior to 2009, has reached that mark five times so far this month.

The persistence of relatively mild conditions has also been notable in parts of the south, especially in Tasmania. Neither Grove nor Launceston Airport has yet fallen below 0°C this month; neither station has ever experienced an August in which the temperature has failed to fall below zero. (At Grove the coldest night so far this month is 2.6°C).

### Very dry conditions in Queensland

The last two months have been very dry in Queensland. While July-August is the peak of the dry season in the state and low rainfall is normal, this year has been very dry even by normal standards. The state-averaged rainfall for July-August to date is 1.65 mm, and it is likely that the record low from 1946 (2.81 mm) will be broken.

### Status and updates

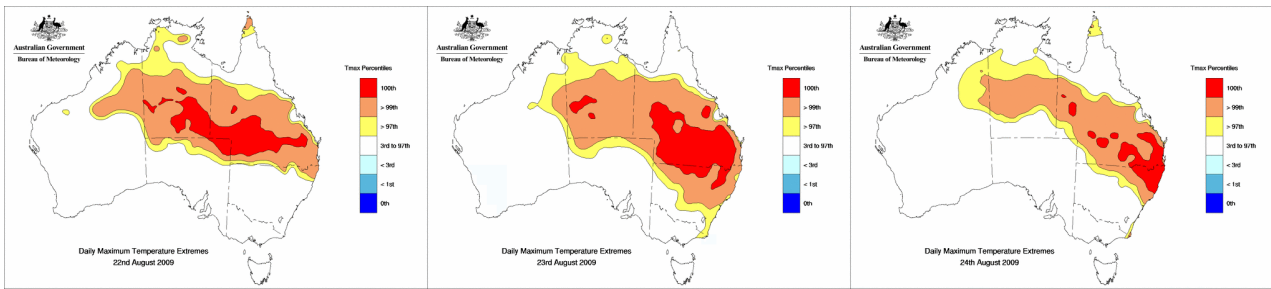
Values in this statement, unless otherwise stated, are current as of 26 August (minimum temperature and rainfall) or 25 August (maximum temperature). An update to this statement, including final monthly and seasonal figures, is expected to be released in early September.

### Contacts for further information

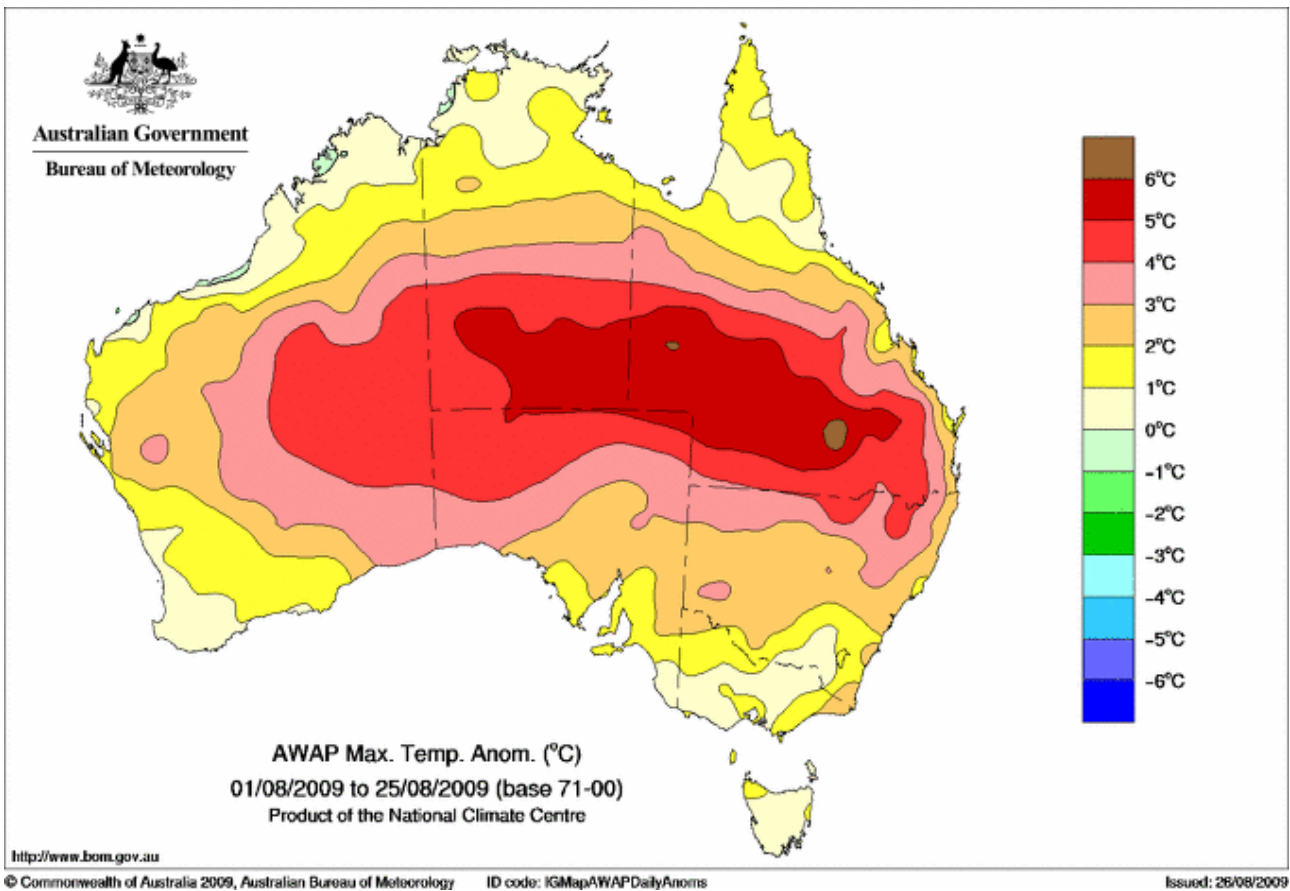
The following climate meteorologists may be contacted for further information about this event:

National: Blair Trewin (03-9669 4623), David Jones (03-9669 4085), Dean Collins (03-9669 4780).

State: NSW – Agata Imielska and Shannon Symons (02-9296 1555); Tasmania – Ian Barnes-Keoghan (03-6221 2042); Queensland – Jeff Sabburg (07-3239 8660); WA – Glenn Cook (08-9263 2237); SA – Darren Ray (08-8366 2664); Victoria – Harvey Stern (03-9669 4949); NT – Sam Cleland (08-8920 3813).



**Figure 1. Extent of August maximum temperature records (red) on 22 (left), 23 (middle) and 24 (right) August 2009. (Orange areas denote regions above the 99<sup>th</sup> percentile for August.)**



**Figure 2. Maximum temperature anomaly from long-term August average (1971-2000 base) for period 1-25 August 2009**

Station number <sup>5</sup>	Location	Value	Date	Previous record	Date	Years of data
<b>Maximum temperature</b>						
	<u>Northern Territory</u>					
15528	Yuendumu	35.0	22/8	33.8	31/8/2002	43
15590	Alice Springs AP	35.2	22/8	34.0	26/8/1970	68
15602	Jervois	36.8	22/8	36.1	27/8/1985	41
	<u>South Australia</u>					
16098/16044	Tarcoola	33.5	15/8	33.4	26/8/1970	48
	<u>Queensland</u>					
33119	Mackay MO	29.8	14/8	29.3	12/8/1970	50
35019	Clermont	34.5	23/8	34.4	27/8/1970	48
35069	Tambo	34.7	23/8, 24/8	33.6	27/8/1970	52
35070	Taroom	37.0	23/8	32.8	27/8/1970	53
35149	Brigalow Res. Stn	34.2	24/8	32.5	29/8/1991	40
36026	Isisford	36.8	23/8	36.4	27/8/1970	52
36031/36030	Longreach	37.5	22/8	36.5	29/8/1992	100
38003	Boulia	37.6	24/8	37.4	28/8/1916	100
38024	Windorah	37.8	24/8	34.9	28/8/1985	42
38026/38002	Birdsville	37.7	22/8	36.2	4/8/1991	53
39004	Baralaba	35.3	23/8	33.0	29/8/1991	43
39066/39039	Gayndah	35.8	23/8	33.6	28/8/1926	100
39083	Rockhampton	34.2	23/8	33.3	21/8/1979	70
39085	Sandy Cape	27.2	14/8	26.9	22/8/1988	53
39104	Monto	35.6	24/8	31.7	27/8/1970	36
39128	Bundaberg AP	29.8	14/8	29.1	21/8/1991	31
40004	Amberley	36.4	24/8	33.3	13/8/1946	68
40068	Double Island Point	28.2	24/8	27.8	17/8/2001	49
40082	Gatton	37.9	24/8	32.9	23/8/1995	45
40093	Gympie	34.3	24/8	31.8	25/8/2006	44
40211	Archerfield	35.7	24/8	32.2	14/8/1946	34
40265	Redlands	31.6	25/8	28.0	29/8/1989	44
40842/40223	Brisbane Airport	33.7	25/8	28.7	10/8/1993	61
40908/40264	Tewantin	33.9	24/8	31.6	25/8/1928	100
40913/40214	Brisbane City	35.4	24/8	32.8	14/8/1946	86
41095	Stanthorpe	30.7	24/8	28.5	23/8/1995	47
41100	Texas	35.0	24/8	32.2	23/8/1995	40
41175	Applethorpe	29.9	24/8	27.2	14/8/1970	40
41359	Oakey	34.4	24/8	30.9	23/8/1995	36
42112/42023	Miles	36.2	23/8	32.2	27/8/1970	53
43015	Injune	36.1	23/8	33.9	27/8/1970	42
43020	Mitchell	36.1	24/8	32.5	23/8/1995	40
43035	Surat	36.7	24/8	34.4	27/8/1970	47
43109/43034	St. George	37.1	23/8	34.4	23/8/1995	48
44010	Bollon	37.1	24/8	33.7	24/8/1995	52
44021/44022	Charleville	35.7	23/8	33.5	24/8/1995	67
44026	Cunnamulla	36.8	23/8	33.3	24/8/1995	52
45015	Quilpie	37.0	24/8	33.6	31/8/2002	53
	<u>New South Wales</u>					
48015	Brewarrina	34.5	23/8	31.8	31/8/2002	43
48031	Collarenebri	35.4	23/8	31.2	13/8/2003	41
48245/48239/ 48013	Bourke	34.8	23/8	34.4	13/8/1946	100
51010	Coonamble	30.4	23/8	30.2	21/8/1995	44
52020	Mungindi	37.8	24/8	32.8	22/8/1995	44
52088/52026	Walgett	34.8	23/8	34.4	13/8/1946	100
53002	Baradine	31.5	23/8	30.0	24/8/1995	44

<sup>5</sup> Where two or more station numbers are given, two or more neighbouring, climatically comparable stations are combined for the purposes of this table.

53115/53048/ 53027	Moree	36.1	24/8	31.3	24/8/1995	53
54003	Barraba	32.1	24/8	29.3	22/8/1995	43
54104	Pindari Dam	33.6	24/8	29.5	24/8/1995	38
55023	Gunnedah Pool	31.7	23/8	30.2	22/8/1995	100
55024	Gunnedah Res. Ctr	31.2	23/8	30.2	26/8/1995	61
55049	Quirindi	28.0	23/8	27.0	24/8/1995	44
55136	Woolbrook	26.5	24/8	25.0	19/8/1995	40
56011	Glen Innes PO	27.4	24/8	26.3	19/8/1995	48
56013	Glen Innes Ag. Res.	27.2	24/8	25.0	19/8/1995	39
56018	Inverell Res. Stn	31.1	24/8	27.9	24/8/1995	44
56032	Tenterfield	30.0	24/8	27.6	23/8/1995	44
56242/56017	Inverell	32.4	24/8	29.4	13/8/1946	100
57095	Tabulam	32.2	24/8	30.6	23/8/1995	39
58012	Yamba	36.1 (=)	24/8	36.1	13/8/1946	89
58063	Casino	36.4	24/8	34.2	23/8/1995	44
58130	Grafton	36.3	24/8	34.5	23/8/1995	43
58131	Alstonville	34.7	24/8	29.7	23/8/1995	36
58158	Murwillumbah	35.9	24/8	30.8	16/8/1996	37
59017	Kempsey	34.5	24/8	32.5	22/8/1995	41
59030	Smoky Cape	31.5	24/8	27.8	29/8/1962	53
59040	Coffs Harbour	34.0	24/8	30.6	27/8/1970	59
60085	Mt. Seaview	34.1	24/8	32.0	22/8/1995	41
60139/60026	Port Macquarie	34.6	24/8	32.9	13/8/1946	89
61089	Scone Soil Cons.	29.8	23/8	28.5	23/8/1995	45
64008	Coonabarabran	29.0	23/8	28.5	31/8/1982	52

<b>Minimum temperature</b>						
	<u>Western Australia</u>					
13030	Telfer	22.4	21/8	21.1	29/8/2000	36
	<u>Northern Territory</u>					
15590	Alice Springs	23.1	16/8	22.1	26/8/1972	68
	<u>South Australia</u>					
18115	Neptune Island	15.7	15/8	15.6	28/8/2005	48
	<u>Queensland</u>					
35070	Taroom	18.5	24/8	17.8	29/8/1968	52
37043	Urandangi	26.5	25/8	22.6	23/8/2003	52
38024	Windorah	24.1	24/8	20.0	22/8/1998	43
39059	Lady Elliot Island	22.3	26/8	21.7	22/8/1988	52
39123	Gladstone	20.2	26/8	20.0	22/8/1988	52
39128	Bundaberg AP	20.0	26/8	19.6	29/8/1968	32
40004	Amberley	19.8	25/8	17.1	21/8/1957	69
40082	Gatton	16.5	26/8	16.4	27/8/1969	44
40842/40223	Brisbane Airport	18.7	25/8	17.6	26/8/1969	61
41095	Stanthorpe	18.0	25/8	14.7	6/8/1991	47
41100	Texas	20.4	25/8	15.7	31/8/2008	41
41175	Applethorpe	17.3	25/8	13.9	6/8/1991	41
41359	Oakey	17.2	25/8	15.6	23/8/1980	37
42112/42023	Miles	20.5	24/8	17.2	29/8/1968	53
43035	Surat	18.3	24/8	16.6	16/8/2007	48
43109/43034	St. George	20.6	24/8	18.4	25/8/1995	48
44026	Cunnamulla	21.8	24/8	20.0	29/8/1972	52
	<u>New South Wales</u>					
52020	Mungindi	19.7	25/8	19.0	29/8/1972	43
53115/53048/ 53027	Moree	18.3	24/8	16.3	29/8/1972	53
54003	Barraba	16.1	25/8	13.1	23/8/1998	44
54104	Pindari Dam	15.5	22/8	14.7	23/8/1988	37
55024	Gunnedah Res. Ctr	18.8	24/8	16.5	31/8/1995	62
55049	Quirindi	16.4	25/8	14.0	30/8/2004	44
56011	Glen Innes PO	15.1	25/8	11.1	23/8/1988	48
56018	Inverell Res. Stn	16.9	25/8	13.4	23/8/1988	43
56032	Tenterfield	18.2	25/8	13.9	6/8/1991	45
57095	Tabulam	20.1	25/8	16.4	14/8/2003	39
58012	Yamba	20.6	25/8	18.3	25/8/1936	89
58130	Grafton	17.6	25/8	16.5	31/8/2004	43
58131	Alstonville	22.2	25/8	18.6	22/8/1995	37
59030	Smoky Cape	19.0	25/8	18.3	16/8/1965	53
61055	Nobbys Head	17.8	25/8	17.2	24/8/1995	52
62013	Gulgong	15.2	24/8	13.5	26/8/1995	40
64009	Dunedoo	16.0	24/8	15.0	14/8/1965	45
68102	Bowral	13.6	24/8	12.4	31/8/1980	43
70080	Taralga	11.7	24/8	10.1	31/8/1969	53
70263	Goulburn	12.5	24/8	11.6	31/8/2007	35
73032	Quandialla	14.0	24/8	13.8	7/8/1973	42
	<u>ACT</u>					
70014	Canberra	12.0	24/8	11.4	18/8/1988	71
	<u>Tasmania</u>					
92027	Orford	11.6	7/8	11.5	30/8/2005	42

**Table 1. Daily high maximum and minimum temperature records set during August 2009**



Region	Maximum temperature			Mean temperature			Minimum temperature		
	Anomaly	Rank	Current record	Anomaly	Rank	Current record	Anomaly	Rank	Current record
Australia	+3.14	1	+2.06 (2006)	+2.26	1	+1.49 (1998)	+1.37	3	+1.78 (1998)
WA	+2.26	2	+3.00 (2006)	+1.63	3	+2.05 (2006)	+1.00	7=	+1.81 (1998)
NT	+3.74	1	+2.13 (1985)	+2.74	1	+2.31 (1955)	+1.74	5	+2.96 (1955)
SA	+3.85	3	+4.38 (1982)	+3.14	1	+2.69 (1982)	+2.44	1	+1.77 (1955)
Queensland	+3.80	1	+1.27 (1969)	+2.53	1	+1.60 (1998)	+1.25	7=	+2.23 (1998)
NSW	+3.11	3	+4.12 (1982)	+2.02	4	+2.22 (1982)	+0.93	6	+2.26 (1998)
Victoria	+1.78	5	+3.48 (1982)	+1.40	3	+1.48 (1977)	+1.02	3=	+1.15 (1958)
Tasmania	+1.17	5	+1.90 (1982)	+1.84	1	+1.66 (1982)	+2.51	1	+1.84 (1980)

**Table 2. National and state temperature anomalies for August 2009 (as of 25-26 August)**

Region	Maximum temperature			Mean temperature			Minimum temperature		
	Anomaly	Rank	Current record	Anomaly	Rank	Current record	Anomaly	Rank	Current record
Australia	+1.62	1	+1.41 (2002)	+1.26	2	+1.34 (1996)	+0.89	7	+1.87 (1973)
WA	+1.03	7	+1.53 (2002)	+0.86	4	+1.32 (1996)	+0.68	10	+1.79 (1996)
NT	+1.99	1	+1.83 (1996)	+1.44	4	+2.10 (1996)	+0.89	12	+2.71 (1973)
SA	+1.79	2	+1.89 (2002)	+1.79	1	+1.36 (1991)	+1.78	2	+1.81 (1996)
Queensland	+2.18	1	+1.27 (2003)	+1.34	4	+1.90 (1973)	+0.50	16	+2.53 (1973)
NSW	+1.57	2	+1.96 (2002)	+1.42	1	+1.14 (2005)	+1.26	5=	+1.52 (1973)
Victoria	+1.10	3	+1.29 (2005)	+0.97	1	+0.93 (2005)	+0.85	4	+1.38 (1991)
Tasmania	+0.86	8	+1.32 (1988)	+1.19	1	+1.11 (2005)	+1.52	1	+1.10 (2005)

**Table 3. National and state temperature anomalies for winter 2009 (as of 25-26 August)**

Station number	Name	State	Threshold (°C)	Number of days	Previous record
	<u>Maximum temperature</u>				
13017	Giles	WA	30	6	5 (1995)
15590	Alice Springs	NT	30	14	8 (1942, 1995)
36007	Barcaldine	QLD	30	12	7 (1964)
38003	Boulia	QLD	35	7	6 (1942)
38024	Windorah	QLD	35	5	0
39083	Rockhampton	QLD	30	7	5 (1945, 2006)

**Table 4. Selected records set in August 2009 for the greatest number of days above thresholds in a given August (as at 25 August)**

Station number	Name	State	Threshold (°C)	Number of days	Dates	Previous record (* : set on more than one occasion; most recent occurrence shown)
14825	Victoria River Downs	NT	35	9	16-24 Aug	8 (19-26/8/1988)*
15666/15548	Rabbit Flat	NT	30	18	7-24 Aug	16 (9-24/8/1971)
15590	Alice Springs	NT	30	7	10-16 Aug 18-24 Aug	6 (20-25/8/1995)*
36007	Barcaldine	QLD	32	6	12-17 Aug	3 (20-22/8/1979)
37010	Camooweal	QLD	30	20	6-25 Aug	19 (12-30/8/1942)
38003	Boulia	QLD	35	5	20-24 Aug	3 (17-19/8/1942)
40004	Amberley	QLD	30	4	22-25 Aug	3 (12-14/8/1946)
42112/42023	Miles	QLD	30	5	21-25 Aug	3 (22-24/8/1995)
44021	Charleville	QLD	30	4	21-24 Aug	3 (22-24/8/1995)

**Table 5. Selected records set in August 2009 for the most consecutive days with maximum temperatures above thresholds in August**