



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

**HEAD OFFICE**  
Bureau of Meteorology  
GPO Box 1289 Melbourne VIC 3001 Australia

## **SPECIAL CLIMATE STATEMENT 18**

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

*First Issued 26<sup>th</sup> August 2009*  
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*National Climate Centre*

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Australia's National Meteorological Service

700 Collins Street Docklands Tel: +61 3 9669 4000 Fax: +61 3 9669 4699 [www.bom.gov.au](http://www.bom.gov.au)

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## Introduction

August 2009 has been Australia's warmest on record. The month 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. In August record daily maximum and minimum temperatures have been set in many areas.

Above-average daytime temperatures have persisted over the subtropics for almost the entire month, due to a lack of cold outbreaks (that would normally bring air of Southern Ocean origin northwards) until the final two days of the month, as well as a lack of moisture and consequent persistent clear skies, allowing greater warming from the sun. This has had the greatest effect on the daytime temperatures; however, night-time temperatures have also been well above average, most likely due to the very warm air-mass which accumulated over the period. There were three 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> and again on the 29<sup>th</sup> and 30<sup>th</sup>.

Mean temperatures for the winter of 2009 have been the second highest on record, with the extremely warm August combining with generally above-average temperatures in June and July to fall just short of the previous record set in 1996. Daytime maximum temperatures for the winter have been the highest on record. New South Wales, Victoria and South Australia have all had their warmest winters on record.

## Record August daily temperatures over many areas

August record high maximum temperatures have been set over a large area (Figure 1), comprising 25% of the total area of the continent, including 55% of Queensland, 39% of the Northern Territory and 23% of New South Wales. The first period of widespread record-breaking was 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 had previously been set over the period 14-16 August, although most of these were broken the following week; for example, Windorah (Queensland) set a new August record on six separate occasions. The last record-breaking period occurred on 29-31 August, primarily affecting Queensland and the Northern Territory.

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 then set a state August record<sup>1</sup> when it reached 38.5°C<sup>2</sup> at Bedourie on the 29<sup>th</sup> (previously 38.3°C at Normanton on 26 August 1968). The highest temperature for the month was 39.7°C at Wyndham Airport (WA) on the 31<sup>st</sup>, short of the Australian record by 0.3°C, while the Northern Territory record also was almost broken on the 31<sup>st</sup> when Bradshaw's 39.1°C fell 0.1°C short<sup>3</sup>.

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>4</sup> was 5.4°C at

<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. This does not affect Thargomindah values later in the week which are recorded in Table 1.

<sup>2</sup> This was a maximum for the six hours from 9 a.m. to 3 p.m. on the 29<sup>th</sup>. The maximum for the full 24-hour period was not available at the time of writing.

<sup>3</sup> The Australian (and WA) record is 40.0°C at Kalumburu on 27 August 1970, while the NT record is 39.2°C at Victoria River Downs on 28 August 1970 and Mango Farm on 25 August 1998.

<sup>4</sup> For the purposes of this statement, a "long-term" station is one with 30 or more years of data. Only post-1910 data are considered as most pre-1910 instrument shelters are not compatible with current standards.

Collarenebri (Table 1), and other stations which set records by 4°C or more included Murwillumbah (5.1), Mungindi (5.0), Alstonville (5.0), Gatton (5.0), Moree (4.8), 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, 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 87 long-term stations for maximum temperature, including all but three of the stations in Queensland south of the Tropic of Capricorn<sup>5</sup>, and 57 for minimum temperature. These are listed in Table 1.

#### Australia's warmest August on record

August 2009 was Australia's warmest on record. National maximum temperatures averaged 3.20°C above the long-term average<sup>6</sup> for the month, more than a degree above the previous record of +2.06°C set in 2006 (Table 2). August 2009 also broke the record set in April 2005 (+3.11) for the largest monthly maximum temperature anomaly ever recorded for any month. Overnight minimum temperatures were less extreme but still rank as the second highest on record (1.75°C above average), resulting in a monthly mean (day and night combined) well above the previous record.

Maximum temperatures for the month have been the warmest on record in almost all of the Northern Territory and Queensland apart from the Top End and Cape York Peninsula, along with parts of northern New South Wales, northern South Australia and eastern border areas of Western Australia (Figure 2), covering in total 49% of Australia. They reached 6-7°C above normal in places, and were above average almost throughout Australia. Some locations in Queensland, such as Barcaldine and Charleville, set records by more than three degrees (Table 6). State averages set records in Queensland and the Northern Territory, with Queensland (4.29°C above average) running nearly three degrees above the previous August record. In both cases the maximum temperature anomalies also exceed the record for any month<sup>7</sup>.

Average minimum temperatures have been above normal in all states. Statewide averages have reached record levels in South Australia and Tasmania, and average minimum temperatures have also set records in south-western Queensland, the southern Northern Territory and around Melbourne. In particular, Tasmania, which has missed out on most of the abnormal daytime heat, has experienced persistently mild overnight minimum temperatures. This is associated with persistent cloud cover during a wet month, with the state experiencing its third-wettest August on record.

<sup>5</sup> The only three stations in this region to miss records were Barcaldine, Springsure and Lady Elliot Island.

<sup>6</sup> Long-term averages are taken over the standard 30-year reference period from 1961-90, unless otherwise stated.

<sup>7</sup> Existing records are +3.52°C for the Northern Territory (April 2005) and +3.26°C for Queensland (February 1983).

### Winter national mean temperature record almost broken

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 in many regions (Table 3). Average winter maximum temperatures over Australia were the highest on record, with an anomaly of +1.64°C exceeding the current record of +1.41 set in 2002, and Queensland and the Northern Territory have also set state-wide records. At the station level, winter maximum temperatures have set records over large parts of Queensland and the Northern Territory (Figure 3), as well as in north-eastern New South Wales, southern Victoria from Melbourne eastwards and the far south-east of New South Wales, comprising in total 35% of Australia's land area.

Seasonal mean (day and night combined) temperatures for Australia for winter fell just short of the record set in 1996, with an anomaly of +1.35°C. Records were set in three south-eastern states, with NSW and Victoria surpassing marks from 2005 and South Australia from 1991. Tasmania narrowly missed out on a record for mean temperature but did set a record for minimum temperatures, with most of the state having its warmest winter nights on record.

### 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 consecutive August days above 30°C, while Windorah, which had never reached 35°C in August prior to 2009, has reached that mark seven times 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 fell below 0°C during the month, the first time either location has experienced an August in which the temperature has failed to fall below zero.

### Very dry in Queensland and very wet in Tasmania

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 average of 2.01 mm for the two-month period is the lowest on record, breaking the previous record of 2.81 mm set in 1946. The dry conditions also extended into much of New South Wales.

Conversely, August was a very wet month in most of Tasmania. The August state-wide average of 300.18 mm was the third-highest on record and the highest since 1939, while the winter total of 639.57 mm ranked fourth, and made it the state's wettest winter since 1970<sup>8</sup>. The wet conditions were extremely persistent in almost unbroken westerly flow. Many northern and western stations had three or fewer dry days during the month, and a number of locations, including Marrawah and Butlers Gorge, had measurable precipitation on every day of August.

While winter rainfall in Victoria was unexceptional, the near-average conditions, combined with the extremely dry start to the year, have been sufficient to give Melbourne its driest January-August on record, with a total of 207.8 mm just surpassing the record of 208.2 mm set in 1997.

<sup>8</sup> Tasmania's wettest winter was in 1947 with 708.27 mm, while its wettest August was in 1936 with 352.86 mm.

### Status and updates

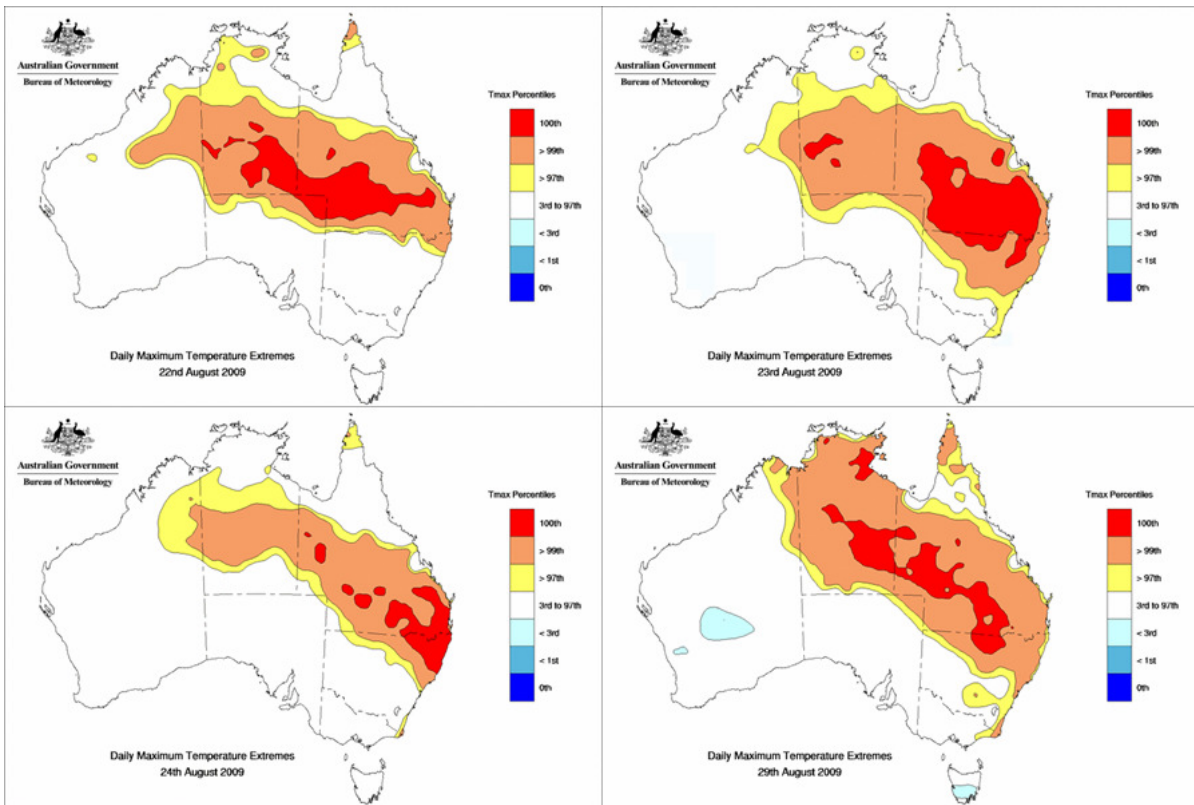
Values in this statement are expected to be final values for August and winter 2009, although there may be some minor amendments as a result of routine quality control procedures.

### Contacts for further information

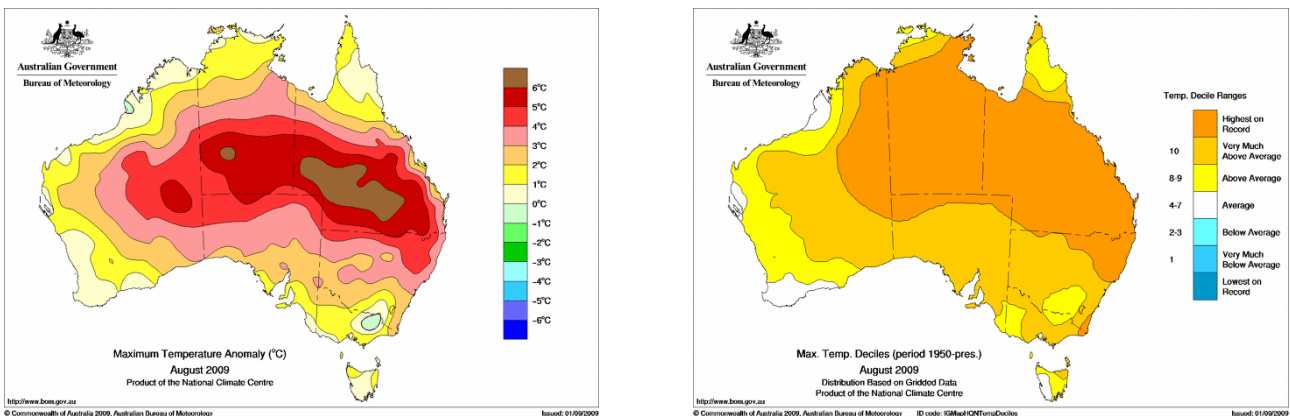
The following climate meteorologists may be contacted for further information about this event:

National: Blair Trewin (03-9669 4623), David Walland (03-9669 4086), Dean Collins (03-9669 4780).

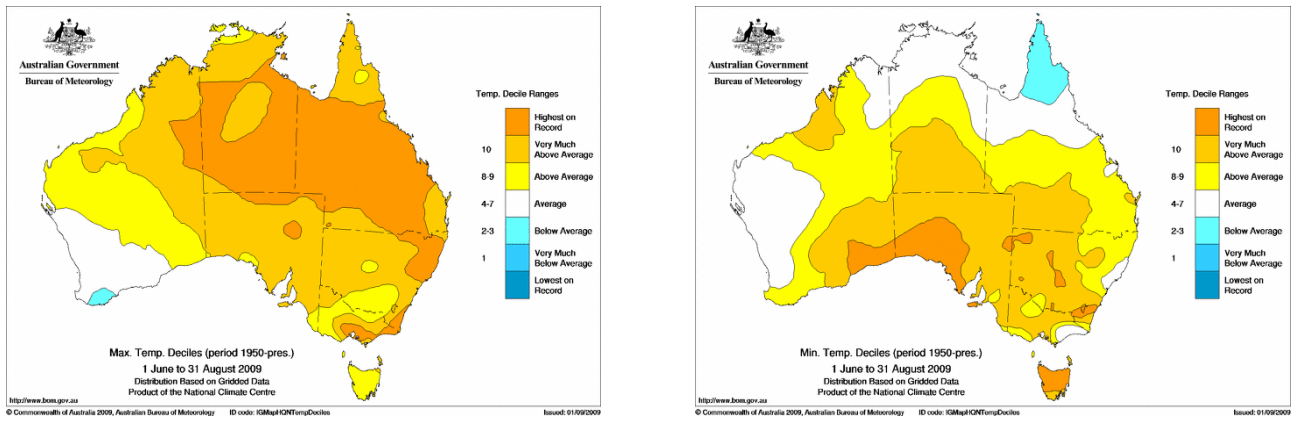
State: NSW – Agata Imielska and Shannon Symons (02-9296 1555); Tasmania – Ian Barnes-Keoghan (03-6221 2042); Queensland – Jeff Sabburg (07-3239 8660); WA – Glenn Cook (08-9263 2237); SA – Darren Ray (08-8366 2664); Victoria – Harvey Stern (03-9669 4949); NT – Sam Cleland (08-8920 3813).



**Figure 1. Extent of August maximum temperature records (red) on 22 (top left), 23 (top right), 24 (bottom left) and 29 (bottom right) August 2009. In some of these areas, records were broken on consecutive days. Orange areas denote temperatures above the 99th percentile.**



**Figure 2. Maximum temperature anomaly from long-term August average (left) and maximum temperature deciles (right) for August 2009. The darkest shade of orange denotes areas that have had their highest August values on record.**



**Figure 3. Maximum (left) and minimum (right) temperature deciles for winter 2009.**

| Station number <sup>9</sup> | Location                  | Value    | Date        | Previous record | Date      | Years of data |
|-----------------------------|---------------------------|----------|-------------|-----------------|-----------|---------------|
| <b>Maximum temperature</b>  |                           |          |             |                 |           |               |
|                             | <u>Western Australia</u>  |          |             |                 |           |               |
| 2012                        | Halls Creek               | 37.2     | 31/8        | 36.8            | 28/8/1996 | 62            |
| 2032                        | Warmun                    | 39.0     | 31/8        | 38.8            | 27/8/1968 | 48            |
|                             | <u>Northern Territory</u> |          |             |                 |           |               |
| 14198                       | Jabiru                    | 38.0     | 31/8        | 37.5            | 31/8/2008 | 34            |
| 14626                       | Daly Waters               | 37.2     | 31/8        | 37.1            | 31/8/2008 | 40            |
| 14704                       | McArthur River            | 37.9     | 30/8        | 37.8            | 30/8/1970 | 31            |
| 14840                       | Wave Hill                 | 38.0     | 30/8        | 37.8            | 31/8/2000 | 36            |
| 15135                       | Tennant Creek             | 35.7     | 28/8 + 29/8 | 35.5            | 29/8/1992 | 40            |
| 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>         |          |             |                 |           |               |
| 29077/29004                 | Burketown                 | 37.8     | 31/8        | 35.8            | 20/8/1983 | 100           |
| 29127                       | Mount Isa AP              | 36.4     | 29/8        | 36.1            | 27/8/1970 | 43            |
| 30045                       | Richmond PO               | 37.0 (=) | 30/8        | 37.0            | 21/8/1988 | 100           |
| 33119                       | Mackay MO                 | 30.0     | 26/8        | 29.3            | 12/8/1970 | 50            |
| 35019                       | Clermont                  | 36.0     | 30/8        | 34.4            | 27/8/1970 | 48            |
| 35069                       | Tambo                     | 35.0     | 29/8        | 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 + 29/8 | 36.4            | 27/8/1970 | 52            |
| 36031/36030                 | Longreach                 | 37.5     | 22/8 + 29/8 | 36.5            | 29/8/1992 | 100           |
| 38003                       | Boulia                    | 37.9     | 29/8        | 37.4            | 28/8/1916 | 100           |
| 38024                       | Windorah                  | 38.0     | 29/8        | 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                   | 36.0     | 24/8        | 33.6            | 28/8/1926 | 100           |
| 39083                       | Rockhampton               | 35.1     | 30/8        | 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            |
| 39123                       | Gladstone Radar           | 31.6     | 30/8        | 30.9            | 31/8/2000 | 52            |
| 39128/39015                 | Bundaberg AP              | 31.1     | 30/8        | 30.7            | 31/8/1926 | 100           |
| 40004                       | Amberley                  | 36.4     | 24/8        | 33.3            | 13/8/1946 | 68            |
| 40043                       | Cape Moreton              | 27.3     | 30/8        | 24.6            | 17/8/2001 | 53            |
| 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            |
| 40126                       | Maryborough               | 33.1     | 30/8        | 30.5            | 21/8/1979 | 52            |
| 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                  | 36.2     | 29/8        | 32.5            | 23/8/1995 | 40            |
| 43035                       | Surat                     | 36.8     | 29/8        | 34.4            | 27/8/1970 | 47            |
| 43109/43034                 | St. George                | 37.6     | 29/8        | 34.4            | 23/8/1995 | 48            |

<sup>9</sup> Where two or more station numbers are given, two or more neighbouring, climatically comparable stations are combined for the purposes of this table.



|                       |                        |          |             |      |           |     |
|-----------------------|------------------------|----------|-------------|------|-----------|-----|
| 44010                 | Bollon                 | 37.1     | 24/8        | 33.7 | 24/8/1995 | 52  |
| 44021/44022           | Charleville            | 35.8     | 29/8        | 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             | 35.6     | 29/8        | 31.8 | 31/8/2002 | 43  |
| 48031                 | Collarenebri           | 36.6     | 29/8        | 31.2 | 13/8/2003 | 41  |
| 48245/48239/<br>48013 | Bourke                 | 34.8     | 23/8        | 34.4 | 13/8/1946 | 100 |
| 51010                 | Coonamble              | 30.4     | 23/8 + 29/8 | 30.2 | 21/8/1995 | 44  |
| 52020                 | Mungindi               | 37.8     | 24/8        | 32.8 | 22/8/1995 | 44  |
| 52088/52026           | Walgett                | 36.1     | 29/8        | 34.4 | 13/8/1946 | 100 |
| 53002                 | Baradine               | 31.5     | 23/8        | 30.0 | 24/8/1995 | 44  |
| 53115/53048/<br>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 |
| 15602                      | Jervois                   | 23.7 | 29/8 | 22.6 | 29/8/2004 | 41 |
|                            | <u>South Australia</u>    |      |      |      |           |    |
| 18115                      | Neptune Island            | 15.7 | 15/8 | 15.6 | 28/8/2005 | 48 |
|                            | <u>Queensland</u>         |      |      |      |           |    |
| 29039                      | Mornington Island         | 23.7 | 29/8 | 23.5 | 26/8/1983 | 36 |
| 35065                      | Springsure                | 17.8 | 31/8 | 17.2 | 28/8/2000 | 45 |
| 35069                      | Tambo                     | 19.0 | 30/8 | 18.6 | 23/8/2003 | 52 |
| 35070                      | Taroom                    | 18.7 | 29/8 | 17.8 | 29/8/1968 | 52 |
| 36026                      | Isisford                  | 20.6 | 29/8 | 20.1 | 23/8/1980 | 53 |
| 37043                      | Urandangi                 | 26.5 | 25/8 | 22.6 | 23/8/2003 | 52 |
| 38024                      | Windorah                  | 24.1 | 24/8 | 20.0 | 22/8/1998 | 43 |
| 38026/38002                | Birdsville                | 24.1 | 29/8 | 22.2 | 29/8/2004 | 53 |
| 39059                      | Lady Elliot Island        | 22.3 | 26/8 | 21.7 | 22/8/1988 | 52 |
| 39123                      | Gladstone Radar           | 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                    | 18.1 | 30/8 | 16.4 | 27/8/1969 | 44 |

|                       |                        |      |      |      |           |     |
|-----------------------|------------------------|------|------|------|-----------|-----|
| 40211                 | Archerfield            | 18.6 | 29/8 | 17.3 | 30/8/1996 | 35  |
| 40842/40223           | Brisbane Airport       | 18.7 | 25/8 | 17.6 | 26/8/1969 | 61  |
| 40908/40264           | Tewantin               | 19.1 | 26/8 | 18.9 | 15/8/1958 | 100 |
| 40913/40214           | Brisbane City          | 19.2 | 29/8 | 17.8 | 13/8/1950 | 86  |
| 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  |
| 43020                 | Mitchell               | 20.0 | 30/8 | 17.5 | 27/8/1973 | 40  |
| 43035                 | Surat                  | 19.6 | 30/8 | 16.6 | 16/8/2007 | 48  |
| 43109/43034           | St. George             | 20.6 | 24/8 | 18.4 | 25/8/1995 | 48  |
| 44021/44022           | Charleville            | 20.7 | 29/8 | 18.9 | 11/8/1947 | 68  |
| 44026                 | Cunnamulla             | 21.8 | 24/8 | 20.0 | 29/8/1972 | 52  |
| 45015                 | Quilpie                | 21.4 | 30/8 | 20.4 | 29/8/1972 | 53  |
|                       | <u>New South Wales</u> |      |      |      |           |     |
| 52020                 | Mungindi               | 19.7 | 25/8 | 19.0 | 29/8/1972 | 43  |
| 53115/53048/<br>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  |
| 58158                 | Murwillumbah           | 18.4 | 30/8 | 17.5 | 17/8/2007 | 37  |
| 59030                 | Smoky Cape             | 19.0 | 25/8 | 18.3 | 16/8/1965 | 53  |
| 59040                 | Coffs Harbour          | 19.3 | 30/8 | 17.9 | 24/8/2003 | 59  |
| 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 <sup>10</sup> | Current record  | Anomaly          | Rank | Current record  | Anomaly             | Rank | Current record  |
| Australia  | +3.20               | 1                  | +2.06<br>(2006) | +2.47            | 1    | +1.49<br>(1998) | +1.75               | 2    | +1.78<br>(1998) |
| WA         | +2.15               | 2                  | +3.00<br>(2006) | +1.68            | 2    | +2.05<br>(2006) | +1.21               | 5    | +1.81<br>(1998) |
| NT         | +3.91               | 1                  | +2.13<br>(1985) | +3.17            | 1    | +2.31<br>(1955) | +2.43               | 2    | +2.96<br>(1955) |
| SA         | +3.54               | 3                  | +4.38<br>(1982) | +3.06            | 1    | +2.69<br>(1982) | +2.57               | 1    | +1.77<br>(1955) |
| Queensland | +4.24               | 1                  | +1.27<br>(1969) | +3.07            | 1    | +1.60<br>(1998) | +1.89               | 2    | +2.23<br>(1998) |
| NSW        | +3.23               | 3                  | +4.12<br>(1982) | +2.19            | 2    | +2.22<br>(1982) | +1.15               | 5    | +2.26<br>(1998) |
| Victoria   | +1.82               | 5                  | +3.48<br>(1982) | +1.47            | 2    | +1.48<br>(1977) | +1.11               | 2    | +1.15<br>(1958) |
| Tasmania   | +0.69               | 15                 | +1.90<br>(1982) | +1.45            | 3    | +1.66<br>(1982) | +2.21               | 1    | +1.84<br>(1980) |

**Table 2. National and state temperature anomalies for August 2009.**

| Region     | Maximum temperature |      |                 | Mean temperature |      |                 | Minimum temperature |      |                 |
|------------|---------------------|------|-----------------|------------------|------|-----------------|---------------------|------|-----------------|
|            | Anomaly             | Rank | Current record  | Anomaly          | Rank | Current record  | Anomaly             | Rank | Current record  |
| Australia  | +1.64               | 1    | +1.41<br>(2002) | +1.33            | 2    | +1.34<br>(1996) | +1.02               | 5    | +1.87<br>(1973) |
| WA         | +1.00               | 7    | +1.53<br>(2002) | +0.87            | 4    | +1.32<br>(1996) | +0.75               | 8    | +1.79<br>(1996) |
| NT         | +2.04               | 1    | +1.83<br>(1996) | +1.58            | 3    | +2.10<br>(1996) | +1.12               | 7    | +2.71<br>(1973) |
| SA         | +1.69               | 2    | +1.89<br>(2002) | +1.76            | 1    | +1.36<br>(1991) | +1.83               | 1    | +1.81<br>(1996) |
| Queensland | +2.33               | 1    | +1.27<br>(2003) | +1.52            | 2    | +1.90<br>(1973) | +0.72               | 14   | +2.53<br>(1973) |
| NSW        | +1.61               | 2    | +1.96<br>(2002) | +1.48            | 1    | +1.14<br>(2005) | +1.34               | 4    | +1.52<br>(1973) |
| Victoria   | +1.12               | 3    | +1.29<br>(2005) | +1.00            | 1    | +0.93<br>(2005) | +0.88               | 4    | +1.38<br>(1991) |
| Tasmania   | +0.70               | 9    | +1.32<br>(1988) | +1.06            | 3    | +1.11<br>(2005) | +1.42               | 1    | +1.10<br>(2005) |

**Table 3. National and state temperature anomalies for winter 2009.**

<sup>10</sup> Rankings in Tables 2 and 3 cover the period from 1950 to 2009 (60 years).

| Station number | Name                       | State | Threshold (°C) | Number of days | Previous record |
|----------------|----------------------------|-------|----------------|----------------|-----------------|
|                | <u>Maximum temperature</u> |       |                |                |                 |
| 13017          | Giles                      | WA    | 30             | 8              | 5 (1995)        |
| 15590          | Alice Springs              | NT    | 30             | 16             | 8 (1942, 1995)  |
| 36007          | Barcaldine                 | QLD   | 30             | 17             | 7 (1964)        |
| 38026/38002    | Birdsville                 | QLD   | 30             | 15             | 14 (1995)       |
| 38003          | Boulia                     | QLD   | 35             | 9              | 6 (1942)        |
| 38024          | Windorah                   | QLD   | 35             | 7              | 0               |
| 39083          | Rockhampton                | QLD   | 30             | 12             | 5 (1945, 2006)  |

**Table 4. Selected records set in August 2009 for the greatest number of days above thresholds in a given 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             | 16               | 16-31 Aug              | 8 (19-26/8/1988)*   |
| 15666/15548    | Rabbit Flat          | NT    | 30             | 18 <sup>11</sup> | 7-24 Aug               | 16 (9-24/8/1971)  |
| 15590          | Alice Springs        | NT    | 30             | 7                | 10-16 Aug<br>18-24 Aug | 6 (20-25/8/1995)*   |
| 36007          | Barcaldine           | QLD   | 32             | 6                | 12-17 Aug              | 3 (20-22/8/1979)  |
| 36031/36030    | Longreach            | QLD   | 30             | 20               | 11-30 Aug              | 17 (12-28/8/1942)   |
| 37010          | Camooweal            | QLD   | 30             | 26               | 6-31 Aug               | 19 (12-30/8/1942)   |
| 38003          | Boulia               | QLD   | 35             | 5                | 20-24 Aug              | 3 (17-19/8/1942)  |
| 39039          | Rockhampton          | QLD   | 30             | 9                | 22-30 Aug              | 5 (22-26/8/2006)  |
| 40004          | Amberley             | QLD   | 30             | 5                | 22-26 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.**

<sup>11</sup> Run broken by a missing observation on 25 August.

| Station number | Name                       | State | Value (°C) | Previous record   | Difference from long-term average (°C) |
|----------------|----------------------------|-------|------------|-------------------|--|
|                | <u>Maximum temperature</u> |       |            |                   |  |
| 2012           | Halls Creek                | WA    | 33.0       | 32.6 (1945)       | +3.1                                   |
| 13017          | Giles                      | WA    | 26.9       | 25.9 (1977)       | +4.6                                   |
| 15590          | Alice Springs              | NT    | 28.1       | 26.5 (1977)       | +5.7                                   |
| 15666/15548    | Rabbit Flat                | NT    | 33.1       | 31.4 (1985)       | +4.2                                   |
| 27045/27042    | Weipa                      | QLD   | 33.3       | 32.9 (1971)       | +1.7                                   |
| 29077/29004    | Burketown                  | QLD   | 32.2       | 32.0 (1973, 1981) | +2.1                                   |
| 30045          | Richmond PO                | QLD   | 32.5       | 31.4 (1945)       | +3.7                                   |
| 32040          | Townsville                 | QLD   | 27.5       | 27.4 (2001)       | +1.6                                   |
| 33119          | Mackay                     | QLD   | 25.3       | 24.1 (2004)       | +2.9                                   |
| 34084/34002    | Charters Towers            | QLD   | 29.8       | 29.6 (1945)       | +3.1                                   |
| 36007          | Barcaldine                 | QLD   | 30.4       | 27.1 (1926, 1936) | +5.5                                   |
| 36031/36030    | Longreach                  | QLD   | 31.8       | 30.3 (1942)       | +6.3                                   |
| 37010          | Camooweal                  | QLD   | 33.0       | 31.5 (1945)       | +4.3                                   |
| 38003          | Boulia                     | QLD   | 31.8       | 29.3 (1942)       | +6.1                                   |
| 38026/38002    | Birdsville                 | QLD   | 29.4       | 27.5 (1982)       | +6.2                                   |
| 39066/39039    | Gayndah                    | QLD   | 28.0       | 27.2 (1926)       | +4.5                                   |
| 39083          | Rockhampton                | QLD   | 29.1       | 26.8 (1946)       | +4.5                                   |
| 39128/39015    | Bundaberg                  | QLD   | 25.7       | 25.4 (1946)       | +2.5                                   |
| 40004          | Amberley                   | QLD   | 26.6       | 25.5 (1946)       | +4.4                                   |
| 40908/40264    | Tewantin                   | QLD   | 24.5       | 23.0 (1969)       | +2.5                                   |
| 40913/40214    | Brisbane City              | QLD   | 25.5       | 24.4 (1946)       | +3.5                                   |
| 42112/42023    | Miles                      | QLD   | 26.9       | 24.8 (1928)       | +6.0                                   |
| 43109/43034    | St. George                 | QLD   | 26.5       | 24.6 (1995)       | +5.5                                   |
| 44021          | Charleville                | QLD   | 27.7       | 24.2 (1942, 1982) | +6.2                                   |
| 45025/45017    | Thargomindah               | QLD   | 26.1       | 25.6 (1982)       | +4.7                                   |
| 55024          | Gunnedah Res. Ctr          | NSW   | 21.8       | 21.6 (1982)       | +4.2                                   |
| 56242/56017    | Inverell                   | NSW   | 21.9       | 21.0 (1982)       | +4.5                                   |
| 58012          | Yamba                      | NSW   | 22.8       | 22.1 (1946)       | +3.0                                   |
| 59040          | Coffs Harbour              | NSW   | 22.7       | 21.2 (1980, 1995) | +3.1                                   |
| 60139/60026    | Port Macquarie             | NSW   | 22.0       | 21.1 (1995)       | +3.1                                   |
| 61089          | Scone Soil Cons.           | NSW   | 22.5       | 21.5 (1982)       | +4.6                                   |
| 68151/68034    | Point Perpendicular        | NSW   | 19.0       | 18.8 (1995)       | +2.9                                   |
| 68072/68076    | Nowra                      | NSW   | 20.8       | 20.5 (1995)       | +3.7                                   |
| 69018          | Moruya Heads               | NSW   | 19.9       | 19.4 (1980)       | +3.1                                   |
| 84016          | Gabo Island                | VIC   | 17.3       | 16.9 (1927, 2007) | +3.0                                   |
|                | <u>Minimum temperature</u> |       |            |                   |  |
| 11052/11004    | Forrest                    | WA    | 7.0 (=)    | 7.0 (1985, 2006)  | +1.9                                   |
| 13017          | Giles                      | WA    | 12.1       | 10.8 (1998)       | +3.7                                   |
| 15135/15087    | Tennant Creek              | NT    | 17.7       | 16.8 (1945)       | +3.3                                   |
| 16001          | Woomera                    | SA    | 8.7        | 8.6 (1982)        | +2.0                                   |
| 16098/16044    | Tarcoola                   | SA    | 7.8        | 7.6 (1955, 1985)  | +2.3                                   |
| 17043/17114    | Oodnadatta                 | SA    | 10.8       | 9.7 (1973)        | +3.4                                   |
| 36007          | Barcaldine                 | QLD   | 14.0       | 12.7 (1988)       | +4.2                                   |
| 38003          | Boulia                     | QLD   | 13.2       | 12.4 (1998)       | +3.6                                   |
| 38026/38002    | Birdsville                 | QLD   | 11.7       | 10.8 (1998)       | +3.6                                   |
| 45025/45017    | Thargomindah               | QLD   | 10.7       | 10.0 (1998)       | +2.8                                   |
| 46037          | Tibooburra                 | NSW   | 9.4        | 9.2 (1998)        | +2.7                                   |
| 87031          | Laverton                   | VIC   | 7.7        | 7.1 (1999)        | +2.1                                   |
| 91293/91057    | Low Head                   | TAS   | 9.2        | 8.2 (1993, 2005)  | +2.8                                   |
| 91311/91104    | Launceston Airport         | TAS   | 5.0        | 4.7 (1969)        | +2.0                                   |
| 92045          | Eddystone Point            | TAS   | 8.6        | 8.5 (1969)        | +1.5                                   |
| 94029          | Hobart                     | TAS   | 7.2        | 7.1 (1980)        | +1.8                                   |
| 94069          | Grove                      | TAS   | 5.6        | 5.2 (1983, 2005)  | +3.0                                   |
| 96003          | Butlers Gorge              | TAS   | 2.2 (=)    | 2.2 (1945)        | +2.2                                   |

**Table 6. Selected long-term stations which have set records for the highest average monthly maximum or minimum temperature for August.**