



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

# Special Climate Statement 50 – Australia’s warmest spring on record

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## 1 Introduction—unusual warmth throughout spring

Spring 2014 was Australia’s warmest on record (Figure 1, Table 1). Seasonal mean temperatures, averaged nationally, were 0.1 °C warmer than the previous record set just 12 months ago, during spring 2013. Temperatures were 1.67 °C above the 1961–1990 average, the largest such departure from the long-term average observed since national records began in 1910. The previous record positive seasonal departure, set during autumn 2005, was 1.64 °C above the average.

While the season started with above-average September temperatures across Australia, the spring warmth was most exceptional for daytime temperatures in October and November. Average maximum temperatures throughout October were Australia’s highest since 1910, when national records began. The warmth continued through much of November with two significant heatwaves resulting in record-high daily maximum and minimum temperatures for many locations across the country. With a very large number of records broken during spring 2014, only a subset of the most significant are reported herein. More extensive lists can be found in the relevant State and Territory summaries and the Monthly Weather Review.

A new Australian early-season<sup>[1]</sup> record of 45.2 °C was observed at Bidyadanga in the west Kimberley of Western Australia on 9 October. The earliest temperature over 45 °C previously observed in Australia was on 21 October 2002 at several sites in the northwest of Western Australia. The day was also Bidyadanga’s hottest October day on record, exceeding the 43.8 °C observed on 14 October 2007. Warm periods persisted across Australia through October. Particularly notable temperatures occurred between the 23<sup>rd</sup> and 30<sup>th</sup> with highest daily maximum temperatures observed at stations in northern New South Wales and southern Queensland. The heat throughout the month culminated in Australia’s warmest October day on record, when the national maximum daily temperature peaked at 36.39 °C on the 25<sup>th</sup>.

Warm conditions in November saw prolonged heatwave conditions through inland Queensland. Longreach, in central Queensland, had 13 consecutive days of 40 °C or above from 13 November to 25 November, surpassing the previous record of 9 days in November 1965. Other locations to set records for consecutive days at or above 40 °C include Julia Creek (21 days), Barcaldine (7 days) and Hughenden (8 days). Following the record set in October, the prolonged heat resulted in the national average mean temperature for November being the highest on record, with an anomaly of + 1.88 °C.

While high temperatures in many areas were prolonged, especially throughout central Queensland and central New South Wales, many locations closer to the New South Wales coast saw extreme temperatures in November over shorter periods. Very hot air was drawn into New South Wales ahead of a low pressure trough on 23 November that saw record maximum temperatures of 45 °C and above at several locations throughout the central districts of New South Wales and western parts of Sydney. The occurrence of such extreme temperatures throughout the spring period is highly significant, breaking a number of station records by large margins. Such high temperatures (in excess of 45 °C) have historically been rare in these locations.

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<sup>[1]</sup> An early-season record is a temperature higher than any previously observed between 1 July and the date in question. The previous highest temperature observed in Australia between 1 July and 9 October was 44.4 °C, at Birdsville Police Station on 4 October 1988.

## 2 Details of the spring warmth

### 2.1 October 2014—the warmest October days on record for Australia

The Australian area-averaged mean maximum temperature was +2.76 °C above average during October, resulting in the largest October maximum temperature anomaly on record and the fourth-largest positive maximum temperature anomaly for any month in 105 years. Maximum temperatures were well above average across all States and Territories, with anomalies ranging between +0.70 °C in Tasmania and +4.14 °C in South Australia. October mean maximum temperatures were highest on record for New South Wales, South Australia and Western Australia, while Victoria and the Northern Territory observed maximum temperatures that were the second warmest on record.

National maximum temperatures were above average for most of the month, with the warmest periods occurring between 8–12 October and 20–30 October with new daily maximum temperature records observed in each period across the country. Notably, large areas of Australia were affected by persistently above-average temperatures that resulted in record-warm October monthly temperatures (Figure 2), earliest warm days and runs of warm days. The heat throughout the month culminated in the warmest October day on record for Australia as a whole, when the national maximum daily temperature peaked at 36.39 °C on 25 October, although individual station records were observed over a greater area on the following day (Figures 3 and 4).

The earliest above-45 °C day ever recorded in Australia occurred on 9 October when Bidadanga, in the west Kimberley of Western Australia, observed a record high of 45.2 °C, exceeding the previous October record for this site of 43.8 °C observed on 14 October 2007. Prior to this, a temperature greater than 45 °C had not been reported anywhere in Australia before 21 October.

### 2.2 November 2014—heatwaves

With very warm conditions continuing into November, the Australian area-averaged mean maximum temperature was the highest on record with an anomaly of +2.19 °C above average. Maximum temperatures were well above average across all States and Territories, ranging between +0.40 °C in Tasmania and +4.06 °C in New South Wales. November mean maximum temperatures were highest on record for Queensland and third highest for New South Wales.

November was marked by two significant heatwaves that saw record high temperatures in the Northern Territory, South Australia, New South Wales and Queensland. The first heatwave developed from 13 November, when very high temperatures occurred across the interior of the continent (across southern parts of the Northern Territory into South Australia), which included a record high temperature of 44.9 °C at Alice Springs, surpassing the previous November record by nearly 2 °C. Over the next three days the focus of the heat moved into western New South Wales, with several locations having the hottest November

day on record on either 14 or 15 November. The hot air moved east on the northern flank of an elongated trough that extended from northern New South Wales to the Top End of the Northern Territory. On 16 November, the heat moved into southeast Queensland bringing very high temperatures in excess of 40 °C. New records were observed at several locations including Gympie, Mitchell and Archerfield Airport.

Temperatures remained very high through interior Queensland and the central Northern Territory, with record breaking prolonged heat at locations including Longreach, Winton, Julia Creek, Hughenden and Barcaldine, each observing their longest run of days with the maximum temperature at or above 40 °C in spring (Table 2). Several other locations further east, also observed their longest run of days with temperature of at least 35 °C; these included Taroom (13 days), Injune (13 days) and Miles (10 days). While the high temperatures were prolonged in many areas, especially throughout central Queensland and central New South Wales, many locations closer to the New South Wales coast saw extreme temperatures in November for a shorter period. Very warm air was drawn into New South Wales ahead of a low pressure trough on 23 November which saw record maximum temperatures of 45 °C and above at several locations throughout the central districts of New South Wales and western parts of Sydney (Figure 5).

While the heat continued largely unabated across central and northern parts of Queensland and the Northern Territory until the end of November, the most extreme conditions had cleared across southern Queensland and northern New South Wales as a trough moved off the east coast.

### 3 Summary of key temperatures across Australia

#### 3.1 Area-averaged significant temperature anomalies

A number of significant national temperature anomalies have been reported during spring, including:

- Australia's warmest spring for mean (+1.67 °C) and maximum (+2.33 °C) temperatures
- Australia's largest positive mean temperature anomaly for any season (surpassing +1.64 °C set in autumn 2005)
- Australia's largest positive maximum temperature anomaly for any season (surpassing +2.17 °C set in autumn 2005)
- Australia's warmest October for mean (+1.91 °C) and maximum (+2.76 °C) temperatures
- Australia's October maximum temperature anomaly (+2.76 °C) is the fourth-largest positive maximum temperature anomaly for any month
- Australia's warmest November for mean (+1.88 °C) and maximum (+2.19 °C) temperatures
- Australia's third-largest positive 3-month maximum temperature anomaly for any three month period (behind +2.70 °C in July–September 2013 and + 2.51 °C in August–October 2013)
- Australia's third-largest positive 3-month mean temperature anomaly for any three month period (behind +1.94 °C in July–September 2013 and +1.93 °C in August–October 2013)

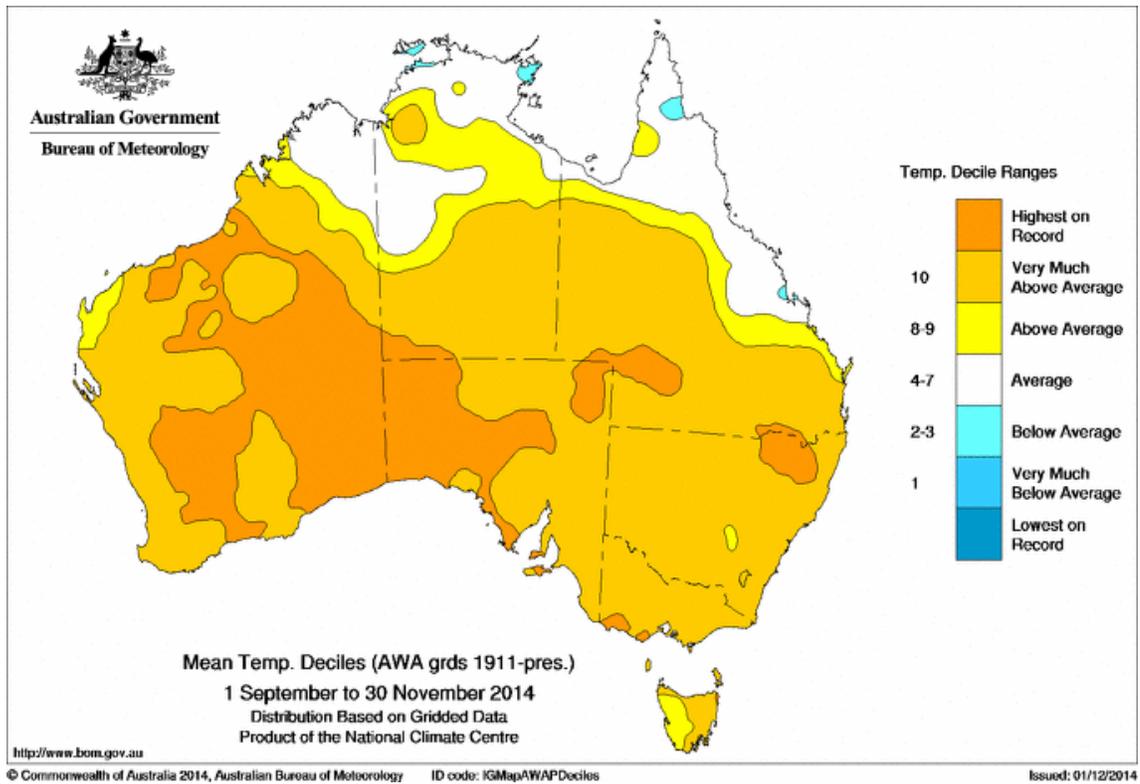
A significant daily maximum temperature record was also set during spring 2014:

- Australia's warmest October day on record (36.39 °C on 25 October)

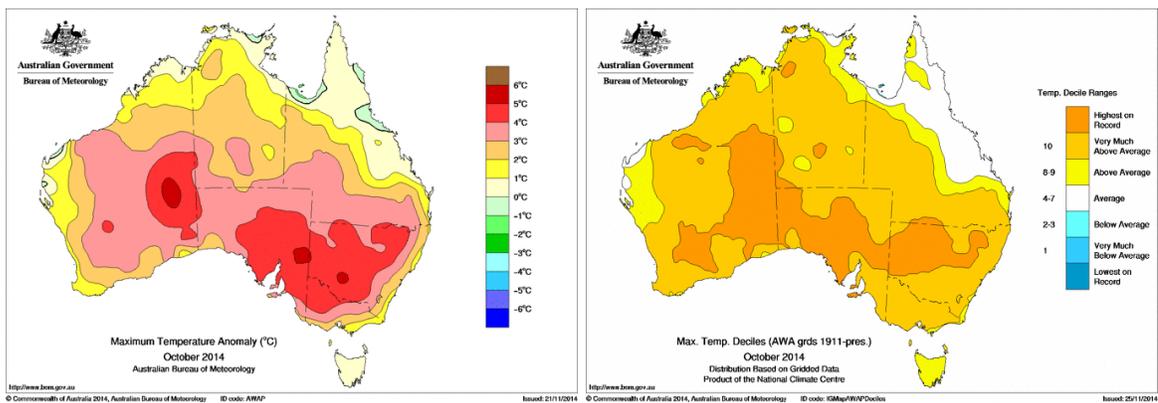
The spring period resulted in numerous State and Territory temperature records including:

- The warmest September maximum temperature for Western Australia (with an anomaly of +2.74 °C)
- The warmest October mean temperature anomalies for New South Wales (+2.58 °C), South Australia (+2.81 °C) and Western Australia (+2.45 °C)
- The warmest October maximum temperature anomalies for New South Wales (+4.06 °C), South Australia (+4.14 °C) and Western Australia (+2.86 °C)
- The warmest October minimum temperature anomaly for Western Australia (+2.05 °C)
- The warmest November maximum (+2.83 °C), minimum (+2.33 °C) and mean temperature (+2.58 °C) anomalies for Queensland

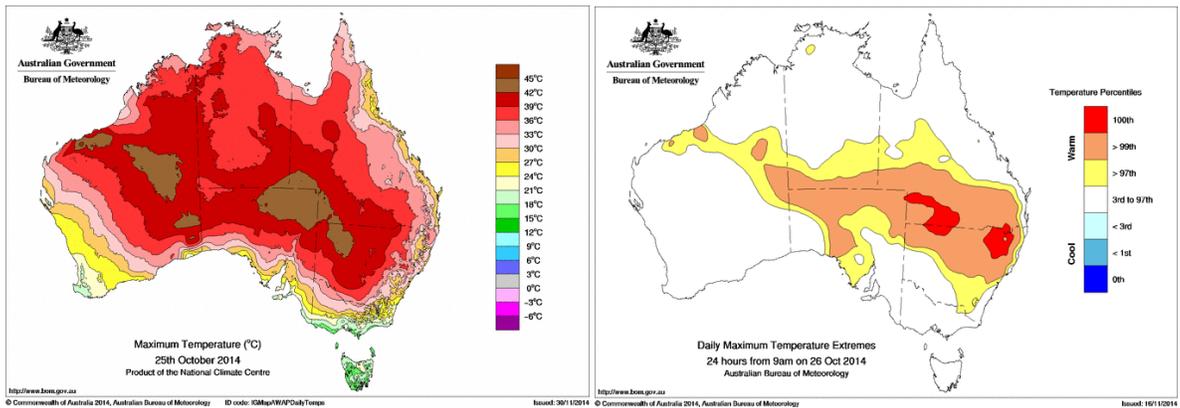
### 3.2 Figures and Tables



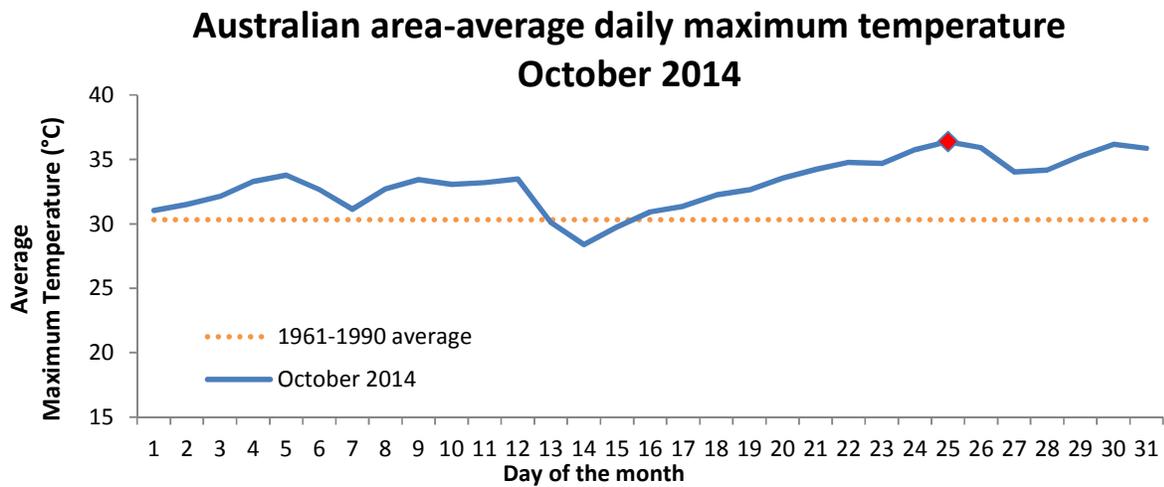
**Figure 1.** Australian mean temperature deciles for spring. Areas which are warmest on record are shown in dark orange.



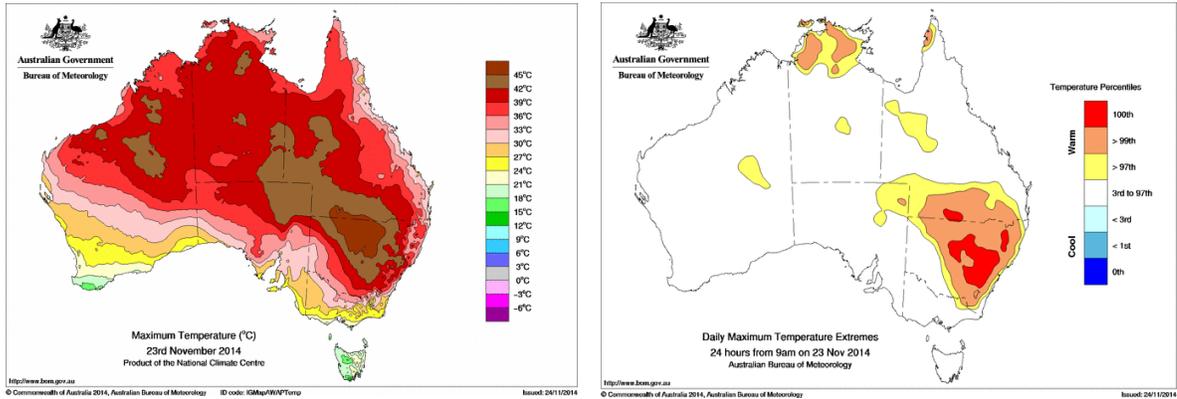
**Figure 2.** Australian maximum temperature anomalies relative to 1961–1990 (left) and maximum temperature deciles for October 2014.



**Figure 3.** Maximum temperature on 25 October (left) and areas which had record highest October maximum temperature on 26 October 2014 (dark red).



**Figure 4.** Australian area-averaged daily maximum temperature through October 2014 (red marker indicates highest October daily maximum temperature on record).



**Figure 5.** Maximum temperature (left) and areas which had highest November maximum temperature on record on 23 November 2014 (dark red).

**Table 1.** National and State and Territory area-averaged temperature anomalies (from 1961–1990 average) for spring 2014.

Element	Region	Anomaly (°C)	Rank	Highest on record (°C)
Maximum temperature	Australia	+2.33	1	2.06 (2013)
	Queensland	+1.88	4	2.41 (2013)
	NSW	+3.20	1	3.04 (2006)
	Victoria	+2.63	2	3.33 (1914)
	Tasmania	+1.01	3	1.89 (1914)
	SA	+3.06	1	2.74 (2006)
	WA	+2.26	1	1.87 (2006)
	NT	+1.94	2	2.01 (2013)
Minimum temperature	Australia	+1.01	6	1.30 (1998)
	Queensland	+0.84	11	1.85 (2005)
	NSW	+1.22	7	2.18 (1914)
	Victoria	+0.43	19	1.47 (2009)
	Tasmania	+0.33	18	1.11 (2000)
	SA	+1.34	6	1.42 (1914/1997)
	WA	+1.38	2	1.54 (2006)
	NT	+0.33	33	2.25 (2005)
Mean temperature	Australia	+1.67	1	1.57 (2013)
	Queensland	+1.36	4	1.81 (2013)
	NSW	+2.21	2	2.42 (1914)
	Victoria	+1.53	3	1.99 (1914)
	Tasmania	+0.66	6	1.03 (2005)
	SA	+2.20	1	2.07 (2006)
	WA	+1.82	1	1.71 (2006)
	NT	+1.13	8	1.80 (2005)

**Table 2.** ACORN-SAT and other long-term stations which have set or equalled records for the greatest number of consecutive spring days reaching at least 35 °C and 40 °C. Names of ACORN-SAT stations are shown in italics.

State	Site name	Site number	Consecutive days with temperature $\geq 35$ °C	Previous spring record
NT	<i>Victoria River Downs</i>	14825	88 (4 Sep – 30 Nov 2014)	77 (7 Sep – 22 Nov 1970)
NSW	Yarras	60085	4 (21–24 Nov 2014)	4 (24–27 Nov 2002)
NSW	Tenterfield	56032	2 (22–23 Nov 2014)	2 (19–20 Nov 1968)
NSW	Tabulam (Muirne)	57095	2 (26–27 Oct 2014)	2 (28–29 Nov 1996)
QLD	Isisford	36026	39 (23 Oct – 30 Nov 2014)	21 (2–22 Nov 2011)
QLD	Archerfield	40211	2 (15–16 Nov 2014)	3 times previously
QLD	<i>Amberley</i>	40004	5 (21–25 Nov 2014)	2 times previously
QLD	<i>Miles</i>	42112/42023	10 (9–18 Nov 2014)	9 (15–23 Nov 2009)
QLD	<i>Burketown</i>	29004/29077	36 (26 Oct – 30 Nov 2014)	21 (1–21 Nov 2002)
QLD	Surat	43035	10 (7–16 Nov 2014)	10 (15–24 Nov 1980)
QLD	Tambo	35069	20 (6–25 Nov 2014)	14 (17–30 Nov 1979)
QLD	Taroom	35070	13 (6–18 Nov 2014)	11 (30 Oct – 9 Nov 1965)
QLD	Springsure	35065	9 (15–23 Nov 2014)	9 (1–9 Nov 1965)
QLD	Winton	37039/37051	40 (22 Oct – 30 Nov 2014)	35 (11 Oct – 14 Nov 1988)
QLD	Injune	43015	13 (6–18 Nov 2014)	9 (15–23 Nov 2009)
QLD	Urandangi	37058/37043	44 (18 Oct – 30 Nov 2014)	35 (26 Sep – 30 Oct 2006)
WA	<i>Port Headland</i>	4032	33 (29 Oct – 30 Nov 2014)	29 (230 Sep – 28 Oct 2006)

State	Site name	Site number	Consecutive days with temperature $\geq 40$ °C	Previous spring record
NT	<i>Victoria River Downs</i>	14825	23 (3–25 Nov 2014)	21 (2–22 Nov 2009)
QLD	<i>Barcardine</i>	36007	7 (16–22 Nov 2014)	6 (4–9 Nov 1965)
QLD	<i>Longreach</i>	36031	13 (13–25 Nov 2014)	9 (1–9 Nov 1965)
QLD	Winton	37039/37051	15 (12–26 Nov 2014)	9 (1–9 Nov 1965)
QLD	Hughenden	30024/30022	8 (16–23 Nov 2014)	6 (4–9 Nov 1965)
QLD	Julia Creek	29058/29025	21 (8–28 Nov 2014)	12 (2–13 Nov 2002)
NSW	Barraba	54003	2 (22–23 Nov 2014)	1 (19 Nov 1968)
NSW	Quirindi	55049	3 (22–24 Nov 2014)	3 (19–21 Nov 2009)
WA	Bidyadanga	3030	5 (7–11 Oct 2014)	5 (20–24 Nov 1978)

## 4 Notes and contacts

Values in this statement are current at 1 December 2014, and subject to the Bureau’s quality control processes.

The dataset from which area averages are drawn (ACORN-SAT) commences in 1910, while that which mapped spatial analyses are drawn from commences in 1911. Station data prior to national introduction of standardised instrument shelters in 1910 are used only if they are known to have been measured using standard equipment comparable with current standards. This matter is discussed further at <http://www.bom.gov.au/climate/change/acorn-sat/#tabs=Early-data>.

Further information is available from <http://www.bom.gov.au/climate/>.

The following climatologists may be contacted for further information:

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