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## Special Climate Statement 52 (update) – Australia’s warmest October on record

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## 1 Introduction: Australia’s warmest October on record

October 2015 was Australia’s warmest on record for mean temperatures, as well as for daytime maximum and overnight minimum temperatures. Monthly anomalies for both mean and maximum temperature were the largest ever recorded. Extreme heat in the first 10 days of October set new records for early-season warmth across southern Australia.

The heat was concentrated in the southern half of Australia, most of which had its warmest October on record. Mean maximum temperatures in Victoria were 5.94 °C above average<sup>1</sup>; the largest departure from average ever recorded for any Australian State, exceeding the previous record set by South Australia in September 2013 (+5.13 °C). The average maximum for October 2015 for Victoria (25.40 °C), South Australia (33.31 °C) and New South Wales (29.93 °C) were all close to the average for a normal December. South Australia, New South Wales and Western Australia also set new records for area-averaged daily maximum temperature for their respective regions. Conditions in the south were so exceptional that national records were set despite substantial parts of northern Australia being cooler than normal. See Table 4 for a full list of anomalies for mean, maximum and minimum area-averaged October temperatures for Australia, the States, and the Northern Territory.

The most significant daily extremes of October 2015 occurred in the first part of the month. Significantly high daytime maximum temperatures were reported across much of the southwest of Western Australia from 1 October. The heat extended over southern parts of South Australia and into western Victoria by the 3rd. Temperatures peaked between the 4th and 6th, but not before early-season<sup>2</sup> temperature records were set over southern South Australia, large parts of Victoria, the Australian Capital Territory, southern New South Wales and Tasmania (Table 1). There was a further round of extreme heat in the south of Western Australia from 8 to 13 October. State early-season records were set in Victoria and Tasmania, and a southern Australian record at Eucla.

The duration of the early October warmth was also unusual for this time of year. Records for consecutive days with temperatures of 35 °C or more occurred in the first part of October at a number of locations, extending from the South Australian–Western Australian border through to the southern Riverina district of New South Wales (Table 2). Previously, no Victorian location had recorded two or more consecutive days of 35 °C or above so early in spring. Numerous further records were set during the month for consecutive days above particular thresholds.

Although no individual event in the later part of the month surpassed the extremes of the first 10 days, there were numerous further periods when temperatures were well above average,

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<sup>1</sup> Averages are calculated over the standard 1961 to 1990 reference period.

<sup>2</sup> An early-season record is a temperature higher than any previously observed between 1 July and the date in question.

notably around the 15th, 20th and 25th in southeast Australia, and the 17th and 21st in southern Western Australia. With cooler air not penetrating far north into the continent at any stage during the month, and as positive mean sea level pressure anomalies persisted south of Australia, there was very consistent heat in much of the inland subtropics, with parts of the interior of eastern Australia, having above-average maximum temperatures on every day of the month, despite not approaching records on any individual day. October records were set for the greatest number of days in the month above 30 °C or 35 °C at multiple locations (Table 2).

## 2 Antecedent conditions and climate influences

The heat event early in October coincided with very dry conditions for large parts of Australia. September was a very dry month for much of southern Australia. Australia reported the equal-fourth driest September on record, while Western Australia had its third driest, Tasmania had its fifth driest, and Victoria its ninth driest September on record. For the one-, two- and three-month periods ending in September 2015, almost all of Tasmania, most of Victoria, southeastern South Australia and southwest Western Australia recorded below-average rainfall, and soil moisture has also been below average. Significant rainfall deficiencies also exist over large parts of southern Australia at a range of longer timescales. Lower-layer soil moisture for September (Figure 3, upper panels) was below average for much of northern and western Victoria, and across the border region in southeastern agricultural South Australia. Large regions of southwestern Australia and northern Tasmania also had below-average soil moisture. This is also reflected in the Normalised Difference Vegetation Index (NDVI)<sup>3</sup> standardised anomaly for September 2015 (Figure 4, left), where broad areas of dry conditions extend across southern Australia<sup>4</sup>.

For large parts of Australia, dry conditions continued through October (Figure 3, lower panels), particularly so for southeast South Australia, southwest Victoria, and Tasmania, with many locations in these regions recording their driest October on record. Tasmanian area-averaged rainfall was just 20.6 mm, one-sixth of the long-term average and the lowest October value on record. Large parts of the State reported less than 10 mm of rain for the entire month. Victoria had its seventh driest October on record and South Australia had its eighth driest October. The NDVI standardised anomaly for October (Figure 4, right) shows a broadening of dry conditions relative to the September NDVI.

The timing and spatial extent of the event reflect a combination of a strong and well-established El Niño in the Pacific, and a mature positive Indian Ocean Dipole (IOD). El Niño is typically associated with an increased chance of high temperature extremes in southeastern Australia during spring. For example, 12 of the 16 early-season heat events in the historical record during spring at Melbourne have occurred during El Niño years.

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<sup>3</sup> The Normalised Difference Vegetation Index is a measure of the greenness of vegetation. Further details are available at <http://www.bom.gov.au/jsp/awap/ndvi/>.

<sup>4</sup> Further details on current rainfall deficiencies are available in the Bureau of Meteorology’s Drought Statement at <http://www.bom.gov.au/climate/drought>.

### 3 Details of the hot spell of early October

#### 3.1 Development and progression of the heat

A ridge of high pressure became established over southern parts of the continent and saw an easterly airstream flow into northern parts of Western Australia. As the ridge tracked over the Great Australian Bight, winds turned northerly across Western Australia and directed a very warm air mass into the southwest of the State. Temperatures across southwest Western Australia were more than 10 °C above the October average, with several locations observing record early-season daily maximum temperatures. The high pressure ridge slowly tracked across southeast Australia as a pre-frontal trough approached from the west resulting in a northwesterly airstream being directed across southern South Australia. By 3 October, temperature anomalies in excess of 12 °C extended across large areas of South Australia into western Victoria. By the 4th, the high was located over the Tasman Sea and became near stationary, producing a persistent northwesterly flow into southeastern Australia, resulting in an increase and broadening of temperature anomalies across most of Victoria, southern South Australia, southern New South Wales and Tasmania. Many locations across these States reported early-season temperature records, which also included earliest runs of consecutive days above temperature thresholds.

The progression of record heat across Australia (Figure 1) was as follows:

- Western Australia: Starting from the west on 1 October, then extending eastwards through the Goldfields on the 2nd and into the Nullarbor on the 3rd. There was a further round of significant heat from the 8th to the 13th, peaking at most southern locations on the 9th.
- South Australia: Across the southern agricultural areas on the 3rd and 5th, and at a few locations on the 4th.
- Victoria: Southwestern Victoria on the 3rd, extending across much of the north and east on the 4th, and across most of the State on the 5th, then much of the east of the State on the 6th.
- In the Australian Alps on the 2nd, 4th and 5th.
- NSW and ACT: Starting on the southern border with Victoria on the 4th, extending to central districts and the east for the 5th and 6th.
- Tasmania: A few locations reported records on the 3rd and 5th, extending to areas of southern Tasmania and a few locations in the north on the 6th.



Early season records were set at 33 of the 112 ACORN-SAT locations<sup>5</sup> (Table 1, Figure 5), including 10 of the 11 in Victoria and all 9 in southern New South Wales and the Australian Capital Territory. This includes the capital cities:

- Melbourne (Olympic Park): 35.8 °C on 6th, also the earliest 35 °C day (previously 12 October 2006).
- Adelaide (Kent Town): 35.6 °C on the 5th.
- Canberra Airport: 31.8 °C on the 5th; also the earliest 30 °C day (previously 9 October 1944).
- Hobart (Ellerslie Road): 31.7 °C on the 6th.

Sydney narrowly missed an early-season record, with 37.0 °C on the 5th being the city’s second-earliest 35 °C day after 4 October 1942. A record was set at Perth Airport on the 9th, but not at the Perth Metro site.

The heat was very widespread through southern Australia, with most of the region experiencing at least one day with temperatures at least 12 °C above normal (Figure 2). The heat was accompanied by strong winds and low humidity during the latter part of the period, and severe or higher fire danger ratings occurred on the 5th or 6th in many parts of South Australia, Victoria and Tasmania.

Despite the early heat, only a few stations reported records for the highest monthly October daily maximum temperatures (Table 3). At most southern Australian locations, average maximum temperatures increase by 2 °C to 4 °C between the first and last week of October, making it extremely difficult to set monthly records in the month’s first week.

The hot air’s trajectory across the southern part of the continent was somewhat in contrast with many historical heatwaves in southeastern Australia, in which the extreme heat originates in the continental interior. Temperatures in central Australia were relatively modest during this event (Figure 2); in the period from 1 to 6 October, Alice Springs had a highest temperature of 34.3 °C and Birdsville 37.6 °C, both about 6 °C below record levels for the time of year, and 40 °C was not reached at any location in Queensland or the Northern Territory.

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<sup>5</sup> In addition to this, Merredin (Western Australia) had a temperature at 3pm local time on 1 October of 34.7 °C, in excess of its early-season record of 34.6 °C, but no maximum temperature was recorded because of a broken thermometer.

State area-averages during the event were most notable in Victoria. The five-day period from 2 to 6 October had a statewide mean maximum temperature of 30.69 °C. This is the second highest five-day mean maximum temperature for Victoria for any period in October (after 21 to 25 October 1914), and is an early-season record by a substantial margin. The hottest individual day of the period, 5 October (33.72 °C), ranks as the fifth-hottest October day on record for Victoria, and is also an early-season record.

The highest temperature of the event was 42.3 °C at Eucla on 3 October. This is the highest temperature on record so early in the season for any location in southern Australia, surpassing the existing record of 41.5 °C at Moomba (South Australia) on 22 September 2003.

State early-season records were also set in Victoria and Tasmania. Mildura reached 38.0 °C on 6 October, compared with the existing record of 37.4 °C, also at Mildura, on 22 September 2003; while in Tasmania, Friendly Beaches reached 33.6 °C on 6 October, surpassing the previous record of 31.1 °C from Hobart Airport on 27 September 1987.

## 4 Record monthly mean temperatures

### 4.1 Record monthly mean temperatures at the national and State level

With above average temperatures persisting through the month, large areas of southern Australia experienced mean temperature anomalies for October more than 3 °C above the long-term average (Figure 6). The Australian area-averaged daily mean temperature was above average every day through October; this was the first time that every day in October has been warmer than average. Across other regions, looking at area-average mean daily temperatures:

- Victoria reported 27 days above average; previous record was 25 days in October 1914
- South Australia reported 31 days above average; previous record was 24 days in October 1967
- New South Wales reported 30 days above average; previous record was 25 days in October 1914.

The area of Australia observing highest-on-record maximum temperatures was the largest for any October. Highest-on-record maximum temperatures covered 54.7% of the country; the previous record area was 22.3% in 1988 (Figure 7).

The national October mean temperature anomaly of +2.89 °C was the highest on record for any month of the year, surpassing the record of +2.75 °C set in September 2013. The national mean maximum temperature anomaly was also the warmest on record at +3.44 °C, surpassing +3.41 °C observed in September 2013 to become the largest positive anomaly for any month. The national mean minimum temperature anomaly was an October record at +2.34 °C and ranks fourth-largest positive anomaly on record for any month.

All States and the Northern Territory ranked in the top ten maximum temperature records for October; with New South Wales, Victoria, South Australia, and Western Australia having their warmest October on record. All regions except Tasmania and the Northern Territory placed in the top ten minimum temperature records for October. Table 4 shows other regions that also reported their highest temperature anomalies for any month of the year, as indicated by bold text.

### 4.2 Record monthly mean temperatures at individual locations

At the station level, in excess of 350 stations reported record monthly mean temperature anomalies, most in the southern half of the country. Individual monthly records are listed in the relevant State summaries at [www.bom.gov.au/climate/current/](http://www.bom.gov.au/climate/current/), and include:

- Daytime maximum temperatures at Adelaide (Kent Town) averaged 27.1 °C, resulting in the warmest October days for the city since observations began in 1887.

- Warmest daytime temperatures in October on record for Perth coastal plain and hills sites, including Perth Metro.
- Hobart's mean maximum temperature for October was 19.7 °C, equalling the record set in 1963.
- In Sydney, overnight temperatures were particularly warm, with the average minimum temperature at Observatory Hill 3.3 °C above the historical average and 1.0 °C above the previous record.
- Canberra recorded its warmest October on record for maximum temperatures, and its second warmest October on record for minimum temperatures.
- Melbourne recorded its warmest October days and nights on record, surpassing the previous records set in 2014 and 1963 respectively.

Along with the highest monthly temperatures on record, many locations reported record counts of days above specific temperature thresholds (See Table 5).

Figures 7 and 8 show maximum and minimum temperature anomalies and the corresponding deciles maps of the month of October 2015. Spatially, maximum temperatures anomalies were largest across eastern South Australia, much of northern and western Victoria and much of the western half of New South Wales. Maximum temperature anomalies were in excess of 6 °C above average across these regions. The largest monthly maximum temperature anomaly was observed in western Victoria, where Longerenong reported an anomaly of +7.8 °C. Monthly mean minimum temperatures were also well above average and warmest on record across the southern half of the continent; New South Wales, Victoria, South Australia and Western Australia all reported their warmest October nights on record.

### 4.3 November and spring 2015

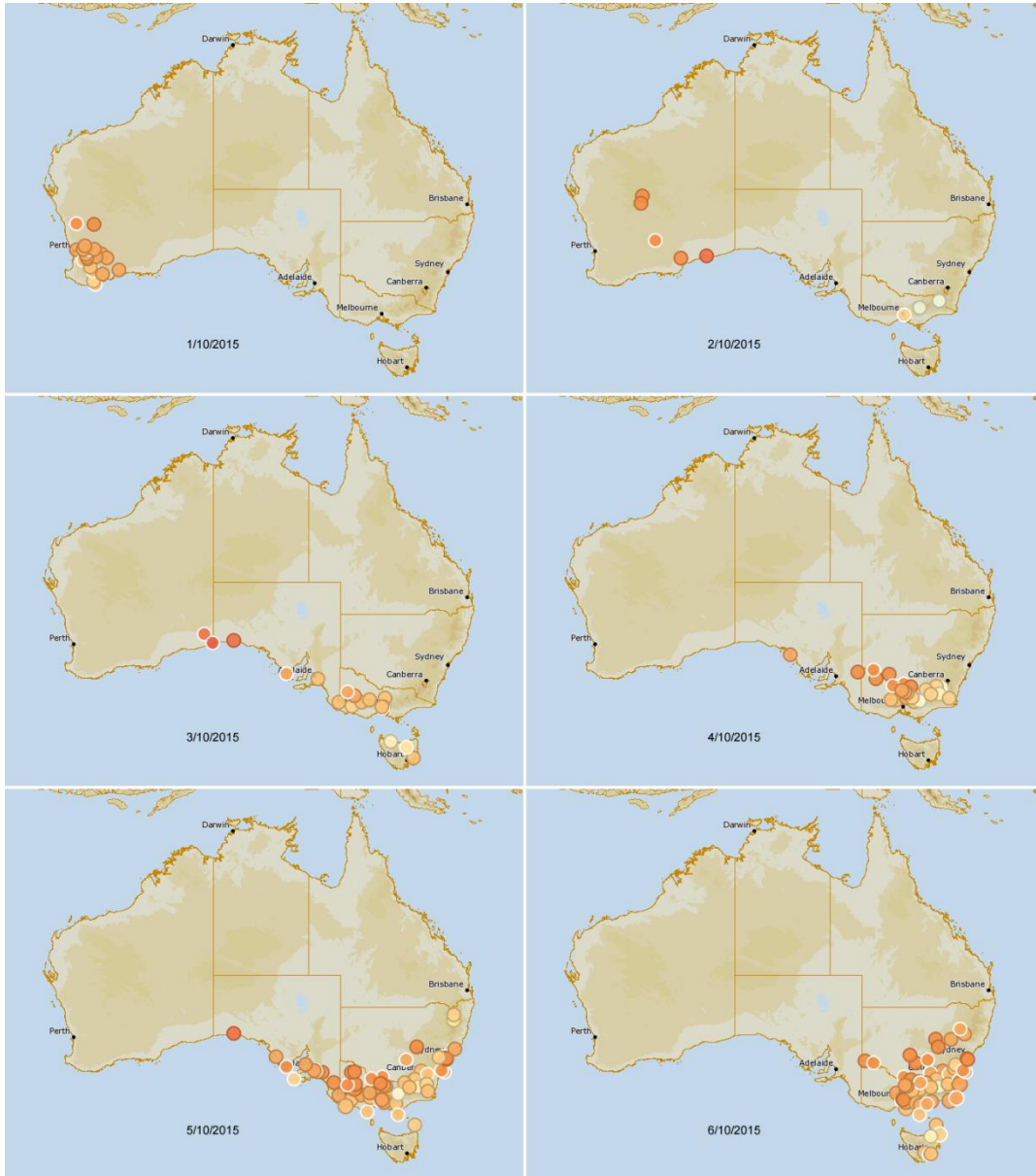
Warmer than usual days and nights continued through [November](#), with both maximum and minimum temperatures tending very much above average over much of Australia. For mean temperatures, November ranked as the third warmest on record for Australia (anomaly +1.86 °C) against a record of +1.88 °C in 2014. Nationally, maximum temperatures were the fifth warmest on record for November (anomaly +1.98 °C) and minimum temperatures were the equal warmest on record (anomaly +1.74 °C). A general lack of cool conditions, rather than periods of extreme heat, account for November’s exceptional warmth.

With the extreme warmth recorded in both October and November, the mean national maximum temperature for [spring](#) came in as the second highest on record, at 2.08 °C warmer than average. Similarly, the national mean temperature for spring was near record warm with an anomaly of +1.67 °C (just 0.02 °C cooler than 2014). This means that the three warmest springs on record have occurred in the past three years. Spring 2015 is unique relative to the springs of 2013 and 2014. From 27 September to 30 November 2015, there were 65 consecutive days where the national mean temperature was greater than the long-

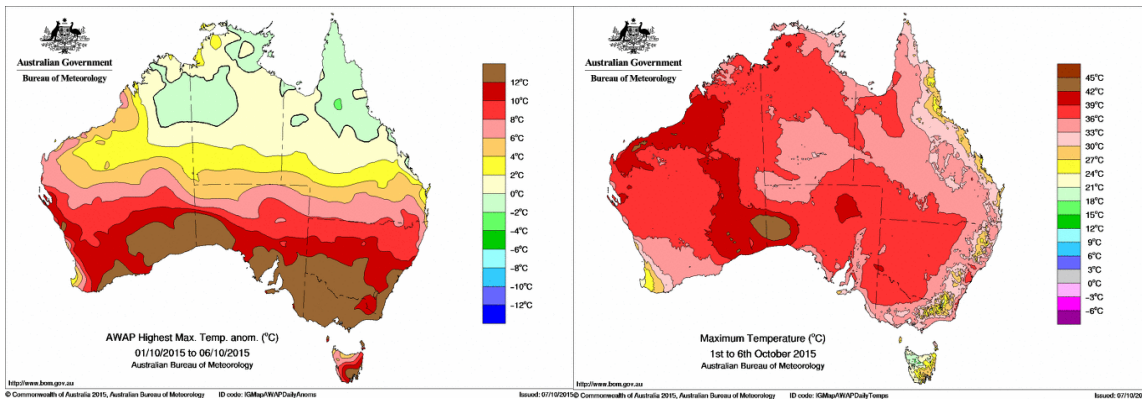
term average (Figure 9), before this run ended on 1 December. This is the longest run of days where this has occurred; the previous longest run of such days was 50 days, ending 18 March 1983.

Every State and the Northern Territory observed spring maxima in the warmest eight on record. For Western Australia spring mean temperature was the warmest on record at 1.93 °C above average, 0.1 °C above the record set last year, whilst Victoria also set a record at 2.05 °C above average, 0.06 °C above the previous record set in 1914. New South Wales, Tasmania and South Australia all observed their second warmest springs. A number of stations in the southeastern States (particularly [Victoria](#) and [Tasmania](#)) observed record-high mean temperatures for the season, as did a number of [Western Australian](#) sites.

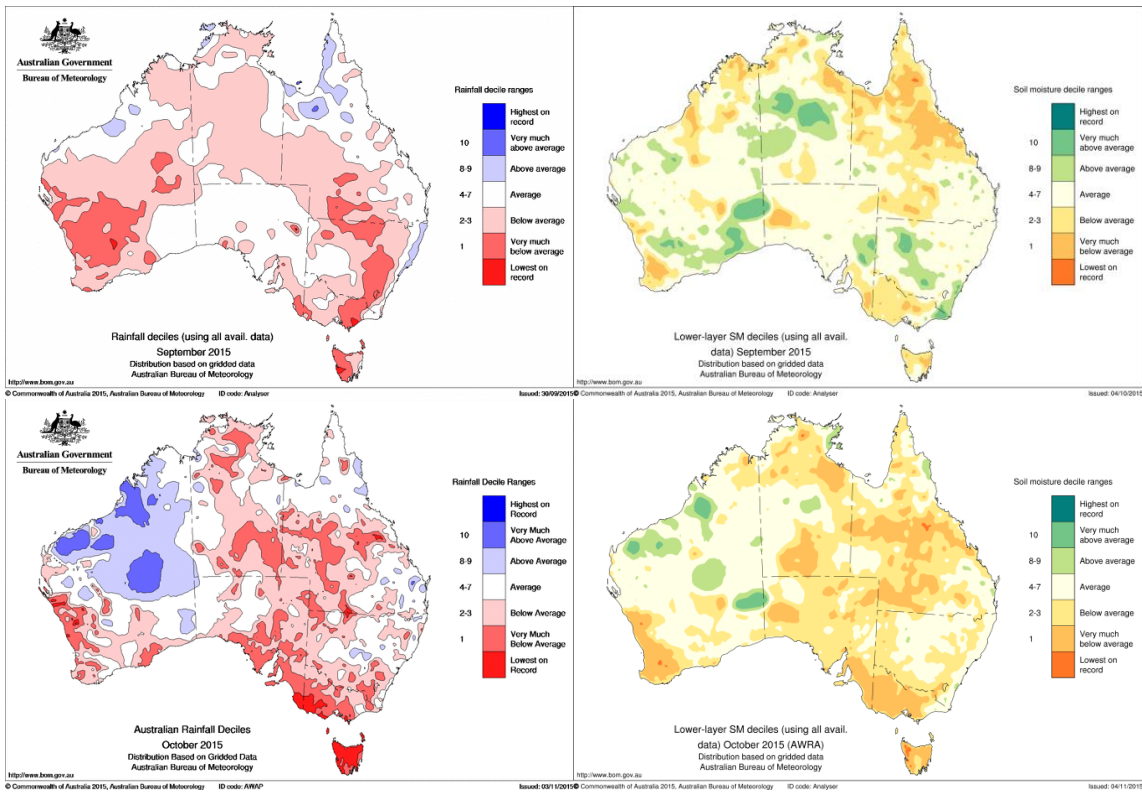
## 5 Figures and Tables



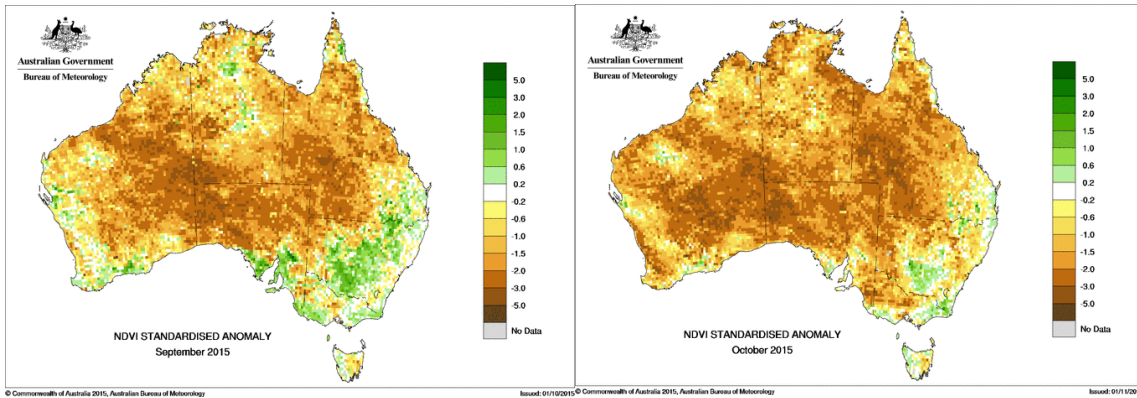
**Figure 1.** Early-season records set during each day of the event at sites with 30 or more years of data. ACORN-SAT locations are identified with white circles.



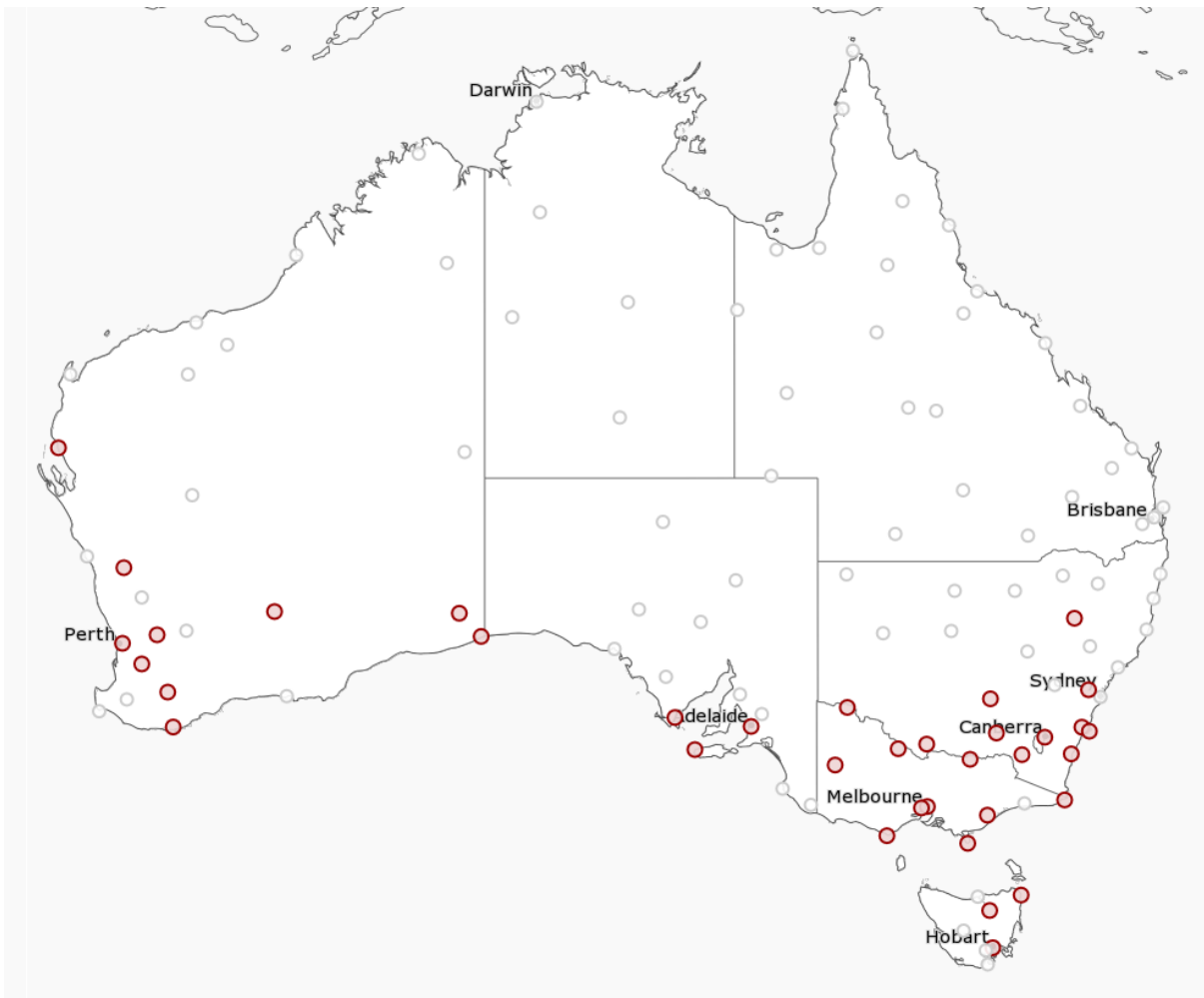
**Figure 2.** (Left) Maximum temperature anomalies of hottest day in the period 1 to 6 October 2015. (Right) Highest daily maximum temperatures during this period.



**Figure 3.** Rainfall and lower-layer soil moisture deciles for September 2015 (upper Panels) and October 2015 (lower Panels).

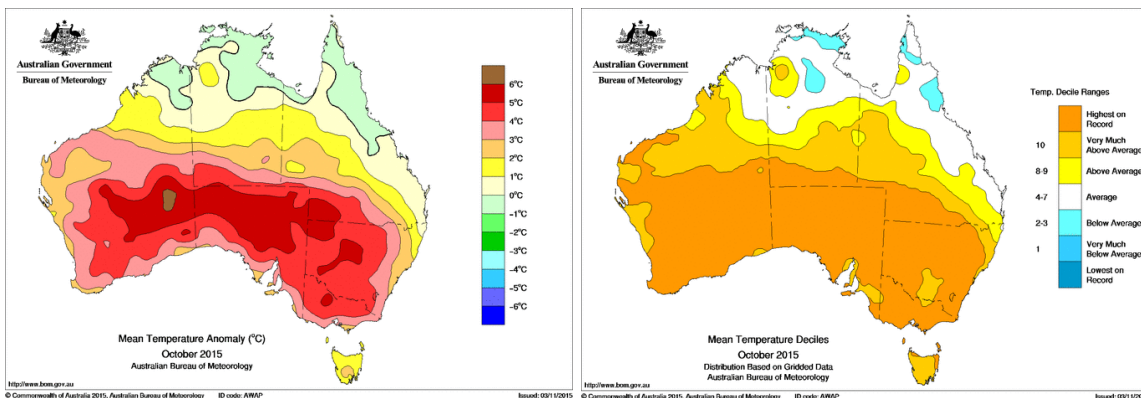


**Figure 4.** Normalised Difference Vegetation Index (NDVI) standardised anomaly for September (Left) and October (Right) 2015.

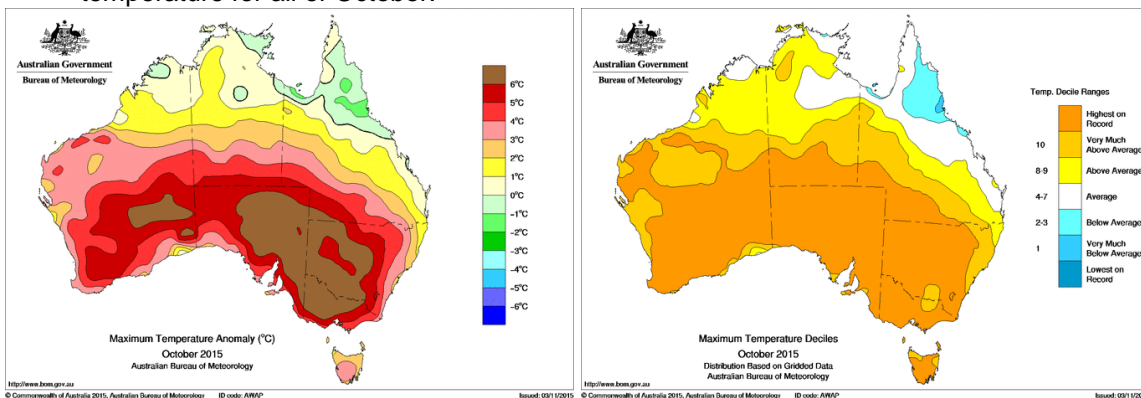


**Figure 5.** ACORN-SAT locations which set early-season records between 1 and 9 October 2015.

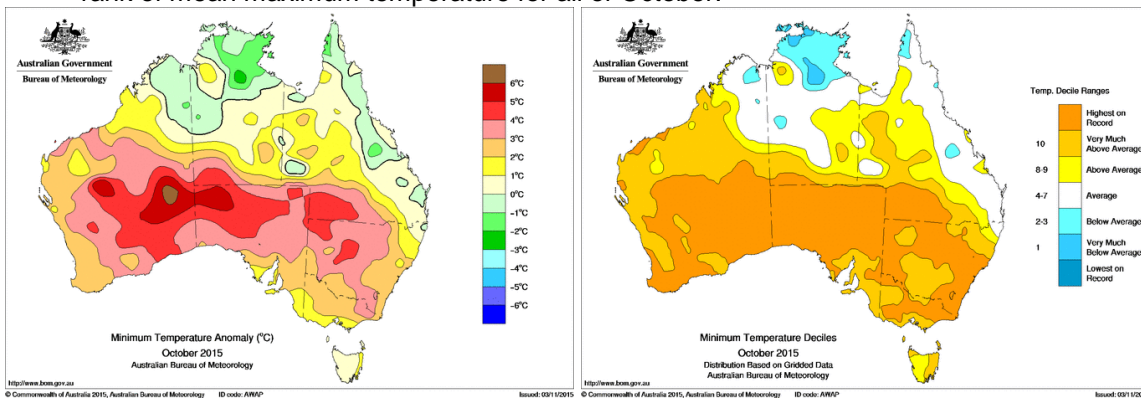




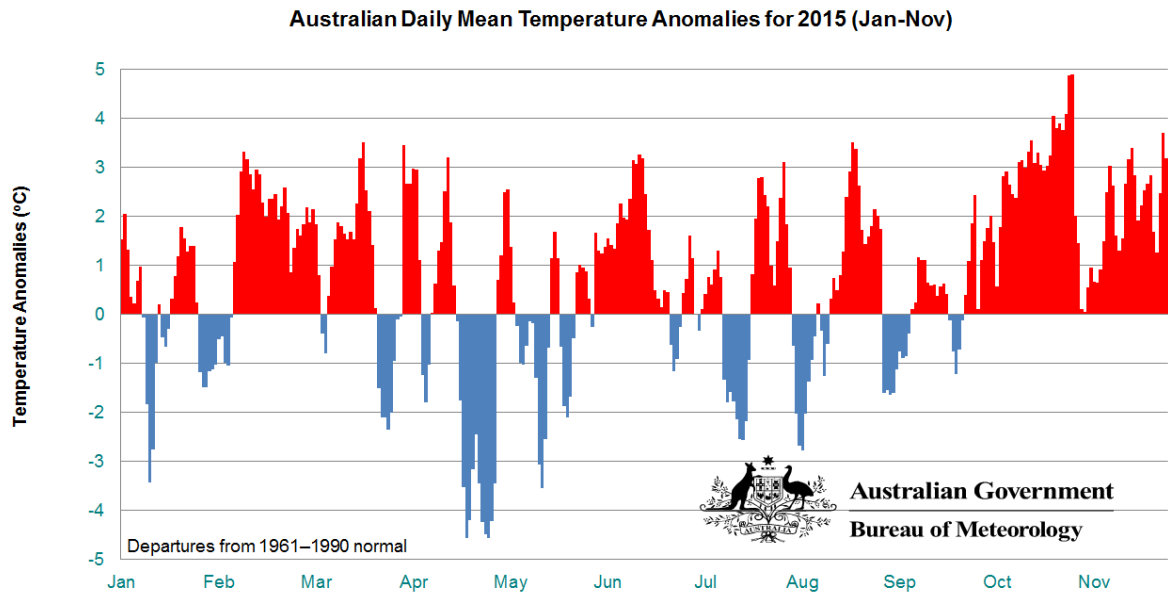
**Figure 6.** (Left) mean temperature anomaly in °C for all of October. (Right) decile rank of mean temperature for all of October.



**Figure 7.** (Left) mean maximum temperature anomaly in °C for all of October. (Right) decile rank of mean maximum temperature for all of October.



**Figure 8.** (Left) mean minimum temperature anomaly in °C for all of October. (Right) decile rank of mean minimum temperature for all of October.



**Figure 9.** Australian daily mean temperature anomalies from 1 January to 30 November 2015.

**Table 1.** Early-season record-high maximum temperatures at sites that provide data for ACORN-SAT.

Site number	Name	State	New record (°C)	Previous record	Earliest date of higher temperature
006011	Carnarvon	WA	39.6 (9 Oct)	38.4 (29/9/1967)	10 Oct (2012)
008296/008093	Morawa	WA	37.3 (1 Oct)	37.2 (30/9/1967)	15 Oct (1938, 2014)
009021	Perth Airport	WA	34.7 (9 Oct)	34.5 (20/9/2014)	15 Oct (2014)
009999/009741	Albany Airport	WA	31.3 (1 Oct)	29.6 (1/10/2012)	13 Oct (1991)
010286/010035	Cunderdin	WA	38.0 (9 Oct)	36.0 (3/10/2013)	15 Oct (2014)
010916/010579	Katanning	WA	32.0 (1 Oct)	31.3 (29/9/2006)	3 Oct (1914)
010917/010648	Wandering	WA	35.3 (9 Oct)	35.0 (5/10/1914)	26 Oct (1961)
011003	Eucla	WA	42.3 (3 Oct)	40.0 (29/9/1961)	8 Oct (2013)
011052/011004	Forrest	WA	41.2 (3 Oct)	39.5 (3/10/2006)	8 Oct (2013)
012038	Kalgoorlie-Boulder	WA	37.8 (2 Oct)	36.8 (28/9/1980)	14 Oct (2007)
018192/018070	Port Lincoln	SA	37.2 (5 Oct)	36.2 (29/9/1980)	21 Oct (1922)
022823/022801	Cape Borda	SA	28.4 (5 Oct)	26.5 (26/9/1987)	12 Oct (1977)
023090/023000	Adelaide	SA	35.6 (5 Oct)	35.4 (4/10/2006)	9 Oct (1913)
050017/073054	West Wyalong	NSW	36.1 (6 Oct)	34.9 (6/10/2000)	13 Oct (2004)
055024	Gunnedah Research	NSW	34.7 (6 Oct)	34.6 (3/10/1980)	10 Oct (1972)
067105/067033	Richmond	NSW	37.5 (5, 6 Oct)	37.1 (6/10/1980)	13 Oct (2004)
068072/068076	Nowra	NSW	36.5 (6 Oct)	35.7 (5/10/1970)	13 Oct (2004)
068151/068034	Point Perpendicular	NSW	35.0 (6 Oct)	33.9 (3/10/2008)	13 Oct (2004)
069018	Moruya Heads	NSW	36.0 (6 Oct)	34.7 (30/9/1980)	13 Oct (2004)
070351/070014	Canberra	ACT	31.8 (6 Oct)	29.6 (2/10/1980)	13 Oct (1946)
072150/072151	Wagga Wagga	NSW	34.7 (6 Oct)	32.8 (28/9/1928)	11 Oct (1913)
072161/072091	Cabramurra	NSW	23.3 (5 Oct)	20.5 (1/10/1998)	13 Oct (2006)
074258/074128	Deniliquin	NSW	37.4 (6 Oct)	35.0 (28/9/1928, 30/9/2001)	12 Oct (1977, 2004)
076031	Mildura	VIC	38.0 (6 Oct)	37.4 (22/9/2003)	12 Oct (2004)
078015/078031	Nhill	VIC	37.6 (5 Oct)	35.3 (4/10/2006)	12 Oct (2006)
080023	Kerang	VIC	37.8 (5 Oct)	35.4 (1/10/1998)	21 Oct (2007)
082039	Rutherglen	VIC	33.9 (6 Oct)	32.2 (28/9/1928)	12 Oct (2006)
084016	Gabo Island	VIC	35.6 (6 Oct)	33.6 (2/10/1981)	18 Nov (1980)
085072	East Sale	VIC	33.8 (6 Oct)	33.0 (30/9/1980)	12 Oct (2006)
085096	Wilsons Promontory	VIC	32.3 (6 Oct)	30.0 (27/9/1987)	14 Oct (1940)

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086338/086071	Melbourne	VIC	35.8 (6 Oct)	32.5 (5/10/1991)	12 Oct (2006)
087031	Laverton	VIC	36.4 (6 Oct)	33.0 (1/10/1998)	12 Oct (2006)
090015	Cape Otway	VIC	32.7 (5 Oct)	31.0 (26/9/1987)	12 Oct (2006)
091311/091104	Launceston Airport	TAS	24.1 (3 Oct)	23.9 (27/9/1987)	10 Oct (1963)
092045	Larapuna (Eddystone Point)	TAS	28.8 (6 Oct)	26.7 (27/9/1987)	2 Nov (1987)
094029	Hobart	TAS	31.7 (6 Oct)	31.0 (27/9/1987)	12 Oct (2006)

**Table 2.** Selected other long-term stations that have set early-season records for the greatest number of consecutive days reaching at least 30°C and 35 °C. Sites that provide data for ACORN-SAT are shown in bold.

Site number	Name	State	Consecutive days with temperature $\geq 30$ °C	Previous earliest spell of same or greater length
009534	Donnybrook	WA	2 (11-12 October 2015)	2 (17-18 October 1969)
010622	Ongerup	WA	2 (1-2 October 2015)	2 (1-2 October 2012)
010626	Pingelly	WA	3 (8-10 October 2015)	5 (19-23 October 2008)
010536	Corrigin	WA	3 (8-10 October 2015)	5 (9-13 October 1991)
009538	Dwellingup	WA	4 (9-12 October 2015)	None previous in October
010111	Northam	WA	6 (8-13 October 2015)	6 (19-24 October 1992)
<b>012038</b>	<b>Kalgoorlie-Boulder</b>	<b>WA</b>	<b>6 (29 Sept – 4 Oct 2015)</b>	<b>6 (9-14 October 1991)</b>
<b>010286</b>	<b>Cunderdin</b>	<b>WA</b>	<b>6 (8-13 October 2015)</b>	<b>None previous in October</b>
<b>009021</b>	<b>Perth Airport</b>	<b>WA</b>	<b>6 (8-13 October 2015)</b>	<b>None previous in October</b>
019062	Yongala	SA	3 (3-5 October 2015)	3 (4-6 October 2014)
023013	Parafield Airport	SA	3 (8-10 October 2015)	3 (11-13 October 1940)
018079	Streaky Bay	SA	4 (2-5 October 2015)	4 (7-10 October 1963)
024511	Eudunda	SA	4 (2-5 October 2015)	4 (26-29 October 1990)
072023	Hume Reservoir	NSW	2 (5-6 October 2015)	2 (12-13 October 2006)
061055	Newcastle	NSW	4 (3-6 October 2015)	None previous in October
074106	Tocumwal	NSW	4 (3-6 October 2015)	4 (22-25 October 2014)
050031	Peak Hill	NSW	6 (2-7 October 2015)	6 (22-27 October 2014)
<b>085096</b>	<b>Wilsons Promontory</b>	<b>VIC</b>	<b>2 (5-6 October 2015)</b>	<b>None previous in October</b>
<b>082039</b>	<b>Rutherglen</b>	<b>VIC</b>	<b>2 (5-6 October 2015)</b>	<b>2 (9-10 October 1944)</b>
<b>087031</b>	<b>Laverton</b>	<b>VIC</b>	<b>2 (5-6 October 2015)</b>	<b>2 (11-12 October 2006)</b>
089085	Ararat	VIC	2 (5-6 October 2015)	2 (27-28 October 1977)
086282	Melbourne Airport	VIC	2 (5-6 October 2015)	3 (11-13 October 1977)
088043	Maryborough	VIC	4 (3-6 October 2015)	None previous in October
080015	Echuca	VIC	4 (3-6 October 2015)	4 (22-25 October 2014)
080091	Kyabram	VIC	4 (3-6 October 2015)	4 (22-25 October 2014)
088110	Castlemaine	VIC	4 (3-6 October 2015)	None previous in October
<b>080023</b>	<b>Kerang</b>	<b>VIC</b>	<b>5 (2-6 October 2015)</b>	<b>5 (21-25 October 2014)</b>
076064	Walpeup	VIC	5 (2-6 October 2015)	8 (18-25 October 2014)
078077	Warracknabeal	VIC	5 (2-6 October 2015)	5 (21-25 October 2014)

Site number	Name	State	Consecutive days with temperature $\geq 35^{\circ}\text{C}$	Previous earliest spell of same or greater length
<b>011004/011052</b>	<b>Forrest</b>	<b>WA</b>	<b>4 (2–5 October 2015)</b>	<b>4 (21–24 October 2008)</b>
<b>012038</b>	<b>Kalgoorlie-Boulder</b>	<b>WA</b>	<b>2 (1–2 October 2015)</b>	<b>2 (10–11 October 1994)</b>
010111	Northam	WA	2 (9–10 October 2015)	2 (21–22 October 1977)
<b>016001</b>	<b>Woomera</b>	<b>SA</b>	<b>4 (3–6 October 2015)</b>	<b>4 (19–22 October 2014)</b>
<b>018012</b>	<b>Ceduna</b>	<b>SA</b>	<b>4 (2–5 October 2015)</b>	<b>4 (12–15 October 1994)</b>
024024	Loxton	SA	4 (3–6 October 2015)	4 (27–30 October 1990)
024048	Renmark	SA	4 (3–6 October 2015)	None previous in October
<b>048027</b>	<b>Cobar MO</b>	<b>NSW</b>	<b>3 (4–6 October 2015)</b>	<b>3 (20–22 October 1994)</b>
<b>067033/067105</b>	<b>Richmond</b>	<b>NSW</b>	<b>2 (5–6 October 2015)</b>	<b>2 (9–10 October 2004)</b>
074106	Tocumwal	NSW	3 (4–6 October 2015)	3 (11–13 October 1977)
074148	Narrandera Airport	NSW	2 (5–6 October 2015)	3 (20–22 October 2007)
075032	Hillston	NSW	3 (4–6 October 2015)	3 (20–22 October 2007)
<b>076031</b>	<b>Mildura</b>	<b>VIC</b>	<b>3 (4–6 October 2015)</b>	<b>3 (11–13 October 1977)</b>
076047	Ouyen	VIC	3 (4–6 October 2015)	3 (11–13 October 1977)
076064	Walpeup	VIC	3 (4–6 October 2015)	3 (11–13 October 1977)
080015	Echuca	VIC	2 (5–6 October 2015)	2 (12–13 October 1977)
<b>080023</b>	<b>Kerang</b>	<b>VIC</b>	<b>3 (4–6 October 2015)</b>	<b>4 (28–31 October 1990)</b>
080091	Kyabram	VIC	2 (5–6 October 2015)	None previous in October
<b>087031</b>	<b>Laverton</b>	<b>VIC</b>	<b>2 (5–6 October 2015)</b>	<b>None previous in October</b>

**Table 3.** Locations across eastern Australia reporting highest October daily maximum temperature. Sites that provide data for ACORN-SAT are indicated in bold.

Site number	Location	State	Maximum temperature ( $^{\circ}\text{C}$ )	Previous record ( $^{\circ}\text{C}$ )
010911/010592	Lake Grace	WA	37.5 (22 Oct)	37.2 (27 October 1961)
069017	Montague Island	NSW	34.1 (6 Oct)	34.0 (10 October 2013)
079028	Longerenong	VIC	37.9 (5 Oct)	37.6 (12 October 2004)
<b>084016</b>	<b>Gabo Island</b>	<b>VIC</b>	<b>35.6 (6 Oct)</b>	<b>33.6 (2 October 1981)</b>
084070	Point Hicks	VIC	35.5 (6 Oct)	34.8 (24 October 1987)
086104	Scoresby	VIC	35.0 (6 Oct)	34.8 (12 October 2006)
<b>092045</b>	<b>Larapuna (Eddystone Point)</b>	<b>TAS</b>	<b>28.8 (6 Oct)</b>	<b>27.2 (12 October 2006)</b>

**Table 4.** National and State/Territory area-averaged temperature anomalies (from 1961–1990 averages) for October 2015. Record highest anomalies for all months are highlighted in bold.

Element	Region	Anomaly (°C)	Rank	Highest on record (°C)
<b>Maximum temperature</b>	<b>Australia</b>	<b>3.44</b>	<b>1</b>	<b>prev. high 2.76 (2014)</b>
	Queensland	1.60	=9	high 3.1 (1988)
	<b>NSW</b>	<b>5.49</b>	<b>1</b>	<b>prev. high 4.06 (2014)</b>
	<b>Victoria</b>	<b>5.94</b>	<b>1</b>	<b>prev. high 4.98 (1914)</b>
	Tasmania	2.16	3	high 3.2 (1914)
	<b>SA</b>	<b>5.60</b>	<b>1</b>	<b>prev. high 4.14 (2014)</b>
	<b>WA</b>	<b>3.73</b>	<b>1</b>	<b>prev. high 2.86 (2014)</b>
	NT	2.05	2	high 2.58 (1988)
<b>Minimum temperature</b>	Australia	2.34	1	prev. high 1.64 (1988)
	Queensland	1.42	6	high 2.41 (2005)
	NSW	3.54	1	prev. high 1.86 (1965)
	Victoria	2.33	1	prev. high 1.66 (1963)
	Tasmania	0.48	16	high 1.91 (2005)
	SA	3.62	1	prev. high 1.92 (1940)
	<b>WA</b>	<b>2.81</b>	<b>1</b>	<b>prev. high 2.05 (2014)</b>
	NT	1.00	=16	high 2.76 (2005)
<b>Mean temperature</b>	<b>Australia</b>	<b>2.89</b>	<b>1</b>	<b>prev. high 2.14 (1988)</b>
	Queensland	1.51	6	high 2.68 (1988)
	NSW	4.52	1	prev. high 2.58 (2014)
	Victoria	4.14	1	prev. high 2.99 (1914)
	Tasmania	1.32	4	high 1.91 (1963)
	<b>SA</b>	<b>4.61</b>	<b>1</b>	<b>prev. high 2.80 (2014)</b>
	<b>WA</b>	<b>3.27</b>	<b>1</b>	<b>prev. high 2.46 (2014)</b>
	NT	1.53	9	high 2.41 (1988)

**Table 5.** Selected stations that set records for the greatest number of October days reaching at least 30 °C and 35 °C. These sites supply data to ACORN-SAT.

Site number	Name	State	Count of days $\geq 30$ °C	Previous record
9021	Perth Airport	WA	9	7 (1969)
9789	Esperance	WA	7	6 (1981)
10092	Merredin	WA	13	10 (2009)
12038	Kalgoorlie-Boulder Airport	WA	21	14 (2004)
16001	Woomera Aerodrome	SA	23	17 (2014)
17043	Oodnadatta Airport	SA	31	27 (1967)
18044	Kyancutta	SA	18	17 (2014)
44021	Charleville Aero	QLD	31	29 (2006)
76031	Mildura Airport	VIC	19	16 (2014)
80023	Kerang	VIC	16	11 (2014)
85096	Wilson's Promontory Lighthouse	VIC	3	1 (2006)
87031	Laverton RAAF	VIC	7	6 (1977)
90015	Cape Otway Lighthouse	VIC	4	3 (1873)
94029	Hobart (Ellerslie Road)	TAS	2	1 (2008)

Site number	Name	State	Count of days $\geq 35$ °C	Previous record
18044	Kyancutta	SA	8	6 (2014, 1940)
17043	Oodnadatta Airport	SA	24	14 (2014, 2012)
16001	Woomera Aerodrome	SA	12	9 (2014)
84016	Gabo Island Lighthouse	VIC	1	0 (2014)
76031	Mildura Airport	VIC	6	4 (2014, 1977 and 1965)
87031	Laverton RAAF	VIC	2	1 (2007 and 4 earlier years)
80023	Kerang	VIC	6	4 (1990)
10092	Merredin	WA	4	3 (2013, 1981 and 1979)
5007	Learmonth Airport	WA	22	16 (2006, 2004 and 1991)
7045	Meekatharra Airport	WA	16	15 (1967)
13017	Giles Meteorological Office	WA	23	22 (1967)



## 6 Notes and contacts

Values in this statement are current at 5 November 2015, 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/>.