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# Special Climate Statement 58 – record September rains continue wet period in much of Australia

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# 1 Introduction

September was an exceptionally wet month over most of the eastern two-thirds of mainland Australia, as a succession of rain-bearing systems affected various parts of the continent. Monthly rainfall was at least double the long-term average over almost all of inland New South Wales and Queensland, most of the Northern Territory and outback South Australia, and parts of northern and western Victoria and eastern South Australia.

Averaged over Australia as a whole, it was the second-wettest September on record, just behind September 2010. It was the wettest September on record for New South Wales and the Northern Territory, as well as for the Murray−Darling Basin, while it ranks second-wettest for Victoria and South Australia, and third-wettest for Queensland.

Areas which had their wettest September on record include most of New South Wales west of the Great Dividing Range; a large area of the eastern outback encompassing the southwest quarter of Queensland, the southeastern Northern Territory and parts of northern and eastern South Australia; the Darling Downs in Queensland and parts of western Victoria.

The heavy rainfall during September continued a sequence of wet months which began in May as the 2015−16 El Niño broke down. The May to September period was Australia's wettest on record, with each of the five individual months ranking in the 15 wettest in the last 117 years. Rainfall over this period was above average over almost all of Australia, except for parts of southwest Western Australia.

A major influence on Australia's climate during this period was a strong negative phase of the Indian Ocean Dipole, with abnormally warm waters in the eastern tropical Indian Ocean between Western Australia and Indonesia. The Indian Ocean Dipole index reached some of its lowest values since reliable records began in 1960.

The heavy September rainfalls, combined with catchments which were already abnormally wet in many places as a result of above-average winter rainfall, resulted in substantial flooding in many regions. Some of the areas most significantly affected included central New South Wales, western Victoria, parts of western Queensland, and areas around Adelaide in South Australia.

September's heavy rainfall also resulted in daytime maximum temperatures which were well below average over many of the affected areas. This contributed to it being the first month since May 2015 (and only the fourth in the last four years) in which national mean temperatures were below the long-term average[1].

[1] The reference period for the long-term average is 1961−1990 unless otherwise stated.

# 2 Rainfall in September

## 2.1 Major rain events

Seven significant rain events occurred during September 2016, all of which brought substantial rain to one or more regions of Australia. Five[2] of the seven events were associated with cutoff lows of some form.[3]

These seven September events were:

2−3 September

A middle to upper level cloud band associated with a trough extended from the Top End of the Northern Territory through to the interior of Queensland. An associated low pressure system over the far north of South Australia produced extensive middle and upper level cloud over northern South Australia, southwest Queensland, and northern inland New South Wales, extending to central and eastern New South Wales and far eastern Victoria on the 3rd. Areas of rain and isolated thunderstorms occurring in the cloud band produced notable daily totals included Coonabarabran (New South Wales) (71.4 mm on the 2nd[4]), Coober Pedy (South Australia) (61.4 mm on the 2nd), Eulo and Rocky (Queensland) (both 59.0 mm on the 2nd) and Mallacoota (Victoria) (73.4 mm on the 3rd).

9−10 September

A cold front and trough tracked across eastern South Australia, and brought heavy rainfall to southwest Victoria, far western New South Wales and northwest Tasmania, extending to southern inland New South Wales on the 10th. Notable daily totals included Kalangadoo (South Australia) (71.0 mm on the 9th), Luncheon Hill (Tasmania) (64.6 mm on the 9th) and Junee (New South Wales) (61.0 mm on the 10th).

14−15 September

A low pressure system centred near the lower southeast of South Australia, deepened as it tracked towards Tasmania, while a low pressure trough extended from northern Australia into northern New South Wales. A southwesterly airstream persisted across central and eastern South Australia (particularly the Adelaide region) on the 15th, as well as over western Victoria and much of Tasmania. Meanwhile, the trough over northern New South Wales produced a rainband that affected much of southern inland Queensland and adjacent areas of New South Wales. Notable daily totals included Uraidla (South Australia) (101.4 mm on the 15th), Ashton (South Australia) (100.2 mm

[2] All except the event of 9−10 September and the Top End event of 19−20 September.
[3] A number of these events, particularly the event which affected South Australia at the end of September, also included various other severe weather phenomena such as strong winds, severe thunderstorms and coastal flooding from storm surges. A separate report on the South Australian storm was published in November 2016.
[4] All daily rainfall totals are for the 24 hours ending at 9am local time on the stated date.

on the 15th), Mount William (Victoria) (78.6 mm on the 14th), Clunes (Victoria) (66.6 mm on the 14th) and Bakers Bend (Queensland) (66.8 mm on the 14th).

17−18 September

A surface trough and associated upper-level trough moved over northern parts of the South Australia and into southern and western inland Queensland and the southern half of the Northern Territory. The system produced an extensive cloudband with embedded thunderstorms resulting in notable daily totals at Biddenham (Queensland) (86.4 mm on the 18th), Mungallala (Queensland) (74.2 mm on the 18th) and Elliott (Northern Territory) (75.0 mm on the 17th).

19−20 September

A trough located over the Top End of the Northern Territory, produced a humid and unstable airmass that generated widespread showers and storms across the region, particularly Arnhem Land. Notable daily totals included Mainoru (168.2 mm on the 19th), Mount Felix (124.8 mm on the 19th) and Bulman (122.8 mm on the 20th and 91.0 mm on the 20th).

20−22 September

A strong upper level trough and an associated surface trough produced a rainband over the southern Northern Territory and southern and western inland Queensland, extending to much of inland New South Wales (especially the southwest) on the 21st and the southeast inland on the 22nd. Notable daily totals included Bedourie (Queensland) (65.0 mm on the 20th), Menindee (New South Wales) (63.0 mm on the 21st) and Yass (New South Wales) (48.2 mm on the 22nd).

28−30 September

A strong cold front and rapidly intensifying low pressure system crossed the Great Australian Bight, generating a large cloud band with embedded thunderstorm activity that began affecting western and central areas of South Australia on the morning of the 28th. Rain and thunderstorms developed over the Eyre Peninsula before moving southeastwards reaching Adelaide in the late morning and early afternoon.

The low pressure system crossed south of Adelaide on the morning of the 29th bringing further rainfall that continued through to the 30th. Notable daily totals in South Australia included Lenswood Research Centre (78.4 mm on the 29th), Bridgewater (78 mm on the 29th), and Wirrabara (74.2 mm on the 30th). As the low tracked across southeast Australia, a very moist northeasterly airstream was directed over Tasmania, resulting in highest on record daily rainfall totals on the 30th, including kunanyi (Mount Wellington Pinnacle) (81.6 mm), Rotherwood (75.6 mm) and Tooms Lake (80.6 mm).

The low was exceptionally intense for its latitude. A mean sea level pressure of 972.7 hPa was observed at 3am local time on 29 September at Neptune Island, between Port Lincoln and Kangaroo Island. This is the lowest pressure known to have been

observed at a standard observation time at a South Australian station, surpassing the previous record of 973.3 hPa at Cape Borda on 1 June 1981.

Rainfall maps for periods covering these events are shown in Figure 1.

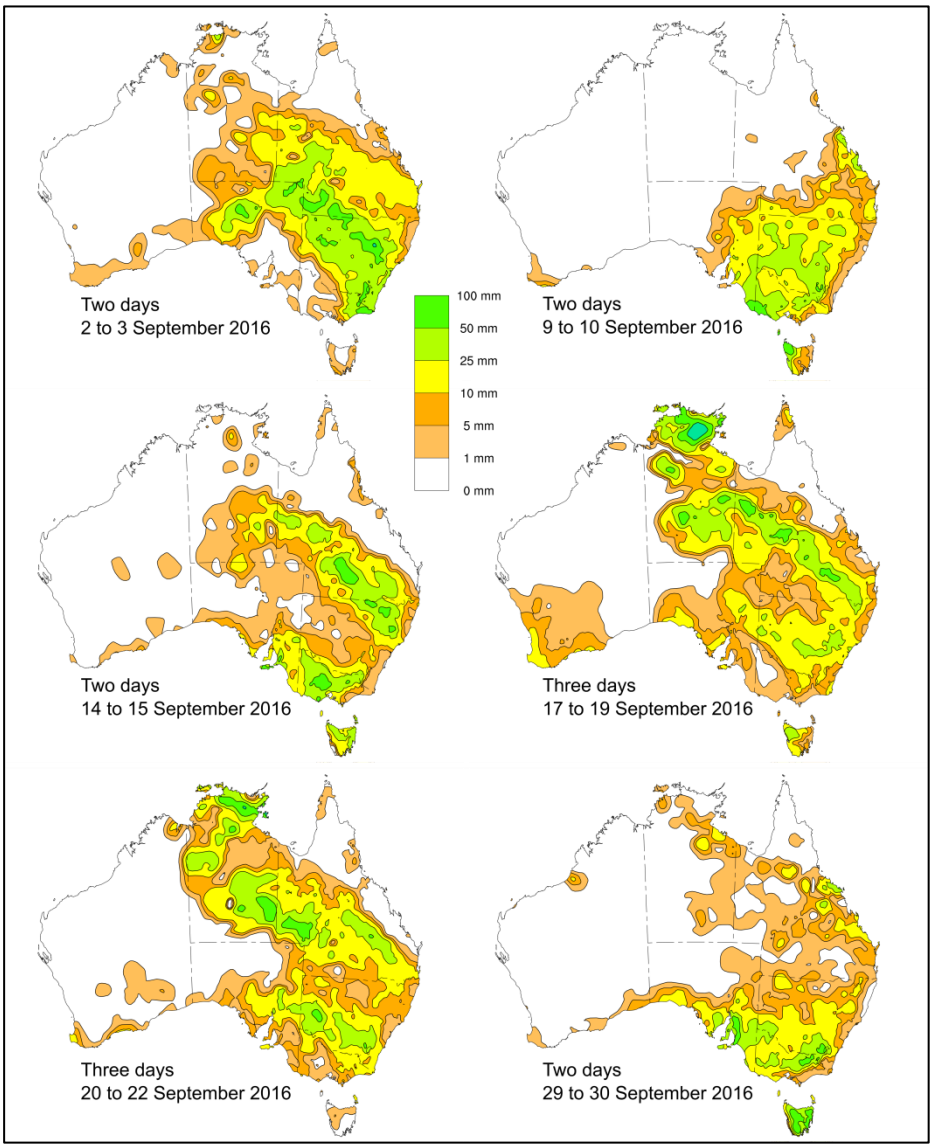


**Figure 1.** Rainfall totals during the main rain events of September 2016.

## 2.2 Extreme daily rainfalls

Over many of the affected areas, September 2016 was noteworthy more for the number of significant rain events than for the extreme nature of any individual event. To illustrate this, in New South Wales, 210 stations with 50 or more years of data had their wettest September on record, but only 19 had their wettest September day on record; in Queensland these figures were 81 and 36 respectively, and in Victoria 98 and 22 respectively.

Two areas which did experience extreme rainfalls at the daily timescale were the Adelaide region and the Top End of the Northern Territory. Prior to 2016, there had only ever been six instances of September daily rainfall totals exceeding 100 mm in the Northern Territory, but six stations observed such rainfalls on 19 September alone. Mainoru's 168.2 mm on this day is the third-wettest September day on record for the Northern Territory, only slightly behind the record of 177.4 mm set at Gorrie on 24 September 1998. The 19 September totals at Mount Felix (124.8 mm) and Bulman (122.8 mm) rank fifth and sixth respectively.

In the Adelaide region, on 15 September, 101.4 mm fell at Uraidla and 100.2 mm at Ashton, with a number of other sites in the Adelaide Hills exceeding 80 mm. Uraidla's total is the highest September daily rainfall on record for the Adelaide region (previously 100.3 mm at Cherry Gardens on 16 September 1935). It ranks as the sixth-highest September fall on record for South Australia, behind the State record of 149.4 mm at Wirrabara Forest on 19 September 1913.

Daily records set at long-term stations during the month are shown in Table 5.

## 2.3 Flooding

### 2.3.1 National flood summary

Major flooding occurred during September at several locations in Queensland, New South Wales, Victoria and South Australia, and at one Tasmanian site (Figure 2). Minor to moderate flooding was also recorded across large parts of New South Wales and Victoria, and also southern inland Queensland, as well as parts of Tasmania and South Australia. With the number of rain-bearing systems moving across Australia throughout winter and the first part of spring, some of these river systems have experienced several floods in recent months.

### 2.3.2 Queensland

Major flood levels were recorded in the Balonne River at St George, the Warrego River at Cunnamulla Bridge and the Macintyre River at Goondiwindi. Whilst these

floods were substantially lower than those which have occurred during summer or autumn on numerous occasions, they are unusual for the winter-spring periods. The flooding in these and neighbouring catchments largely affected the road networks, with many road closures during the month. In the Balonne River at St George, a major flood peak of 6.74 m was recorded on 23 September, and the fourth-highest peak height recorded at this site in the July to October period. In the Paroo River at Eulo a peak of 3.75 m was recorded on 20 September, and ranked the second-highest peak height in the July to October period, following the record highest peak height of 3.81 m on 1 October 1933.

Moderate to minor flood levels were also recorded across a large part of southern inland Queensland, from the Georgina catchment in the west to the Macintyre, Dumaresq and Weir Rivers in the east.

### 2.3.3 New South Wales

Major flooding was recorded in the Bogan, Macquarie and Lachlan rivers in New South Wales. One of the catchments with the most significant impacts was the Lachlan River. Major flooding was recorded at sites including Forbes Iron Bridge and Condobolin Bridge. At Forbes Iron Bridge, flood levels peaked at 10.67 m on 25 September, with an evacuation order issued for parts of Forbes. This was the highest peak since 1952 and the second highest on record. At Condobolin Bridge, the first major flood peak was 6.76 m on 22 September, with a second peak near 7.1 m on 5 October.

### 2.3.4 Victoria

Major flooding was recorded in a number of catchments in Victoria during September, including the Avoca, Glenelg, Wimmera and Loddon rivers. Major flooding on the Avoca River at Charlton Township peaked at 7.55 m on 17 September, while major flooding on the Glenelg River at Casterton peaked at 6.10 m on 11 September.

### 2.3.5 South Australia

Flash flooding resulted in major flood levels in a number of creeks in South Australia around 14 September. Flood warnings were issued for the Gawler, Onkaparinga, and Angas and Bremer rivers, with minor flood levels recorded. Heavy rain fell over the Yorke Peninsula, Mount Lofty Ranges and Adelaide metropolitan districts at the end of September, with major flood levels reached in the Gawler River. Major flood levels were reached at Nuriootpa, with a peak height of 4.06 m recorded; and also at

Yaldara, with a peak height of 3.96 m, both on 30 September. Substantial flooding continued downstream into the first few days of October.

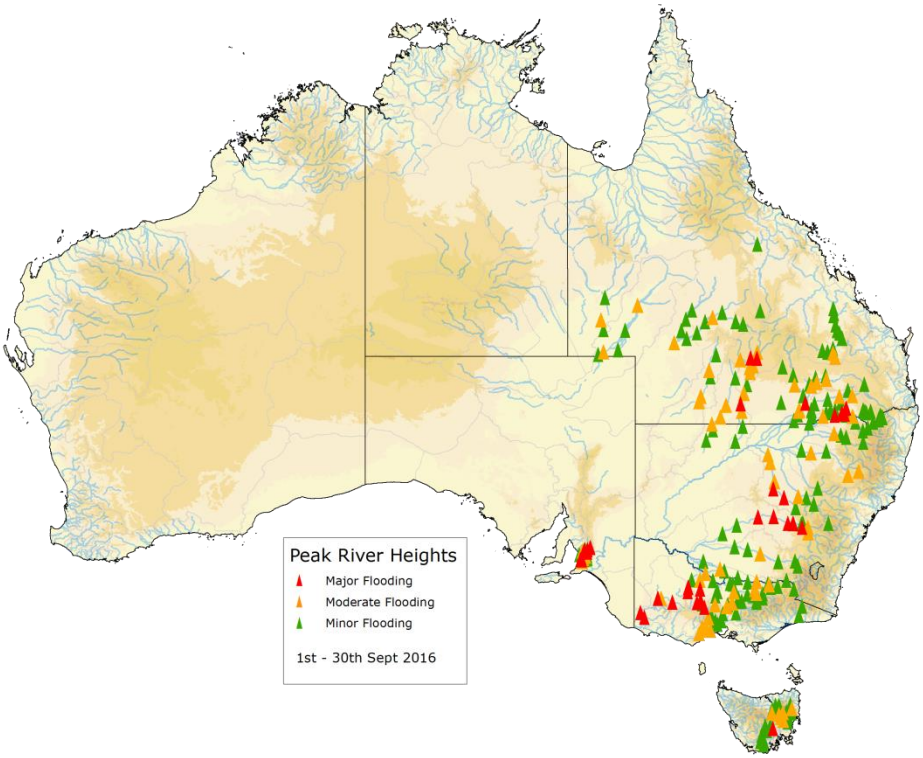


**Figure 2.** River flooding which occurred during September 2016.

# 3 September climate

## 3.1 Rainfall

September monthly rainfall totals (Figure 3) were in the highest 10 per cent of all years over most of the eastern two-thirds of mainland Australia, except for eastern and far northern Queensland, coastal areas of New South Wales, east-central Victoria, and some parts of southern South Australia.

It was the wettest September on record over large parts of inland New South Wales, especially in the State's western half. It was also the wettest September on record over a large area of the eastern interior encompassing far western Queensland, the southeast Northern Territory and eastern areas of South Australia, in much of the Top End of the Northern Territory, and over large parts of western Victoria. Records were also set locally east of Adelaide, north of Hobart, and in the Darling Downs in Queensland.

Nationally, it was the second-wettest September on record with 49.17 mm, just behind the record of 50.83 mm set in 2010. It was the wettest September on record for New South Wales (115.11 mm, previously 90.26 mm in 1903) and the Northern Territory (51.02 mm, previously 41.65 mm in 2010), and ranked second for Victoria and South Australia, and third for Queensland (Table 1).

The Murray−Darling Basin also had its wettest September on record, with a basin-wide average of 123.22 mm (previously 91.69 mm in 1906). This is also the ninth-wettest month on record for the Basin and the wettest since January 1995. Whilst average rainfall in the Murray−Darling Basin is reasonably uniform through the year (the northern parts of the Basin being at their wettest in summer, and the southern parts in winter), extreme rainfalls are historically more likely in the warmer months. Fifteen of the sixteen previous wettest months on record in the Basin (including the wettest, January 1974 with 167.42 mm) have occurred between December and April, and only one of the 50 previous wettest months for the Basin had occurred in August or September. September 2016 is now the wettest month to have occurred in the Basin in winter or spring.

A substantial number of long-term stations had their wettest September on record (Table 6). Only a handful of long-term stations, all but one in South Australia, had their wettest month on record for any month (in most cases further east, the wettest month on record occurred in the warmer months, particularly February 1955, January 1974 or January 2011).

Seven South Australian stations had 300 millimetres or more of rain, led by Mount Lofty Botanic Gardens with 361.4 mm, the highest September monthly total on record for South Australia. There had only been two previous instances in South Australia of a September total above 300 mm, the highest being 319.0 mm, at Uraidla, in September 1979.

As noted in section 2.2, the month was significant for the large number of rain events. There were 11 separate days during the month on which the area-averaged rainfall for the Murray−Darling Basin was 5 mm or more (an indicator of significant rain over a substantial proportion of the Basin), a value only surpassed in January 1974 (13 days) and February 1973 (12 days). A number of locations had their greatest number of rain days for any month, including Cobar (18 days), Manilla (19 days), Junee (24 days, equal with August 1990) and Melbourne Airport (24 days). Wagga Wagga had rain on 22 of the 23 days from 13 September to 5 October, an unprecedented sequence at that location.

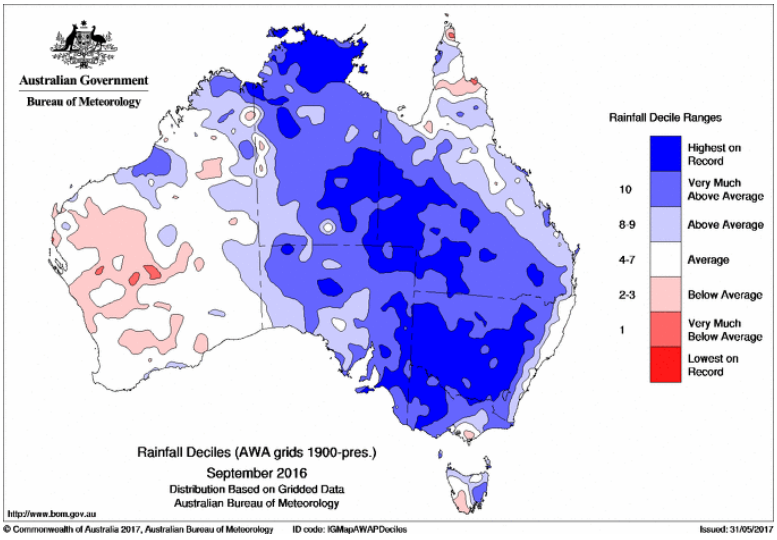


**Figure 3.** Australian rainfall for September 2016.

| Region | Rainfall (mm) | % above/ below average | Rank | Previous record |
|---|---|---|---|---|
| Australia | 49.17 | +196 | 2 | 50.83 (2010) |
| Queensland | 60.76 | +372 | 3 | 80.63 (2010) |
| New South Wales | 115.11 | +231 | 1 | 90.26 (1903) |
| Victoria | 131.07 | +100 | 2 | 134.38 (1916) |
| Tasmania | 144.82 | +5 | 45 | 256.69 (1928) |
| South Australia | 51.62 | +201 | 2 | 54.09 (2010) |
| Western Australia | 7.65 | −27 | 74 | 35.55 (1904) |
| Northern Territory | 51.02 | +629 | 1 | 41.65 (2010) |
| Murray−Darling Basin | 123.22 | +263 | 1 | 91.69 (1906) |

**Table 1.** Area-averaged rainfall for September 2016.

## 3.2 Precipitable water and moisture availability

An estimate of the amount of moisture in the atmosphere is given by precipitable water[5]. For September, the average precipitable water has mostly been the second highest value on record since observations began in 1992 (Table 2). Three of the four New South Wales sites were highest on record, exceeding September 1998.

| Station | State | Sep 2016 average PW (mm) | Rank | Comment |
|---|---|---|---|---|
| Melbourne Airport | VIC | 15.5 | 3 | Highest 15.8 mm in 2013 |
| Adelaide Airport | SA | 15.8 | 5 | Highest 17.3 mm in 2013 |
| Mount Gambier Aero | SA | 15.8 | 3 | Highest 17.3 mm in 2013 |
| Sydney Airport AMO | NSW | 19.1 | 1 | Previous 17.9 mm in 1998 |
| Williamtown RAAF | NSW | 18.0 | 2 | Highest 20.1 mm in 1998 |
| Wagga Wagga AMO | NSW | 15.9 | 1 | Previous 15.6 mm in 1998 |
| Cobar MO | NSW | 17.4 | 1 | Previous 16.7 mm in 1998 |
| Brisbane Aero | QLD | 21.1 | 4 | Highest 28.1 mm in 2010 |
| Mount Isa Aero | QLD | 28.7 | 2 | Highest 30.8 mm in 2010 |
| Charleville Aero | QLD | 20.1 | 2 | Highest 23.8 mm in 2010 |
| Darwin Airport | NT | 43.1 | 2 | Highest 44.0 mm in 2010 |
| Alice Springs Airport | NT | 19.2 | 2 | Highest 20.8 mm in 2010 |
| Broome Airport | WA | 26.2 | 2 | Highest 26.6 mm in 2010 |
| Hobart Airport | TAS | 14.9 | 2 | Highest 15.1 mm in 2001 |

**Table 2.** September average precipitable water (PW) for selected upper-air stations.

One cause of the increased availability of moisture for precipitation has been high sea surface temperatures. Sea surface temperatures have been warmer than normal around the northern and eastern coastlines of Australia throughout the period from May to September (Figure 4). In particular, sea surface temperatures were the highest on record over this period along most of the north and northwest coast, between Port Hedland and the eastern tip of Arnhem Land. Whilst sea surface temperatures had generally dropped below record high levels in this region by September, they were still 0.5 °C to 1.5 °C above the 1961−1990 average along almost all of the northern and eastern coast of Australia.

[5] Precipitable water is the total water vapour contained in an atmospheric column from the surface to the upper atmosphere, expressed in terms of the depth of an equivalent mass of liquid water of the same cross-section.

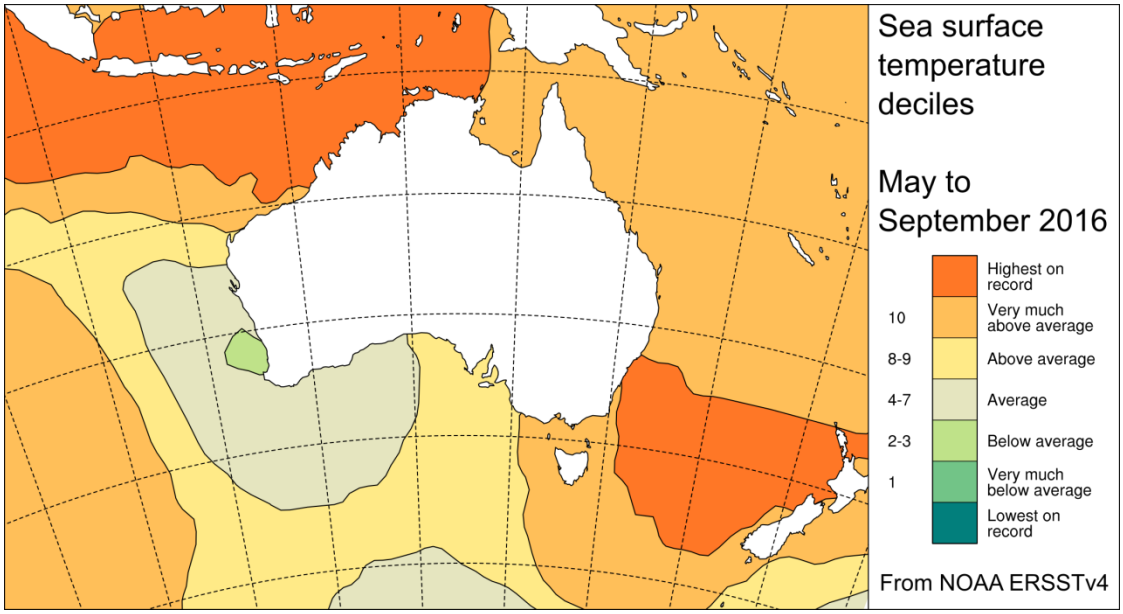


**Figure 4.** Sea surface temperature deciles for the Australian region for the period from May to September 2016.

## 3.3 Temperature

The persistent wet and cloudy conditions resulted in mean maximum temperatures for September being well below average over large parts of the continent (Figure 5). In particular, a substantial area of the eastern interior had its lowest September maximum temperatures on record, with mean monthly maxima 4 to 6 °C below average in places. New South Wales and Queensland both had their lowest September mean maxima since 1984. As an indicator of the lack of warm conditions, it failed to reach 30 °C at any New South Wales location in September, something which has only previously occurred once, in 1976.[6]

Despite temperatures well above average in far northern Australia and in Tasmania, and warmer-than-normal nights over much of the continent, the mean national temperature for the month was still slightly below the 1961−1990 average. September

[6] For these purposes data from 1957 onwards are used, as many locations do not have digitised daily temperature data prior to 1957. The first temperature of 30 °C or above in New South Wales occurred on 7 October, making it the latest date on record of the first 30 °C in spring (in 1976 it reached 30 °C on 1 October).

2016 is the first below-average month nationally since May 2015, and only the fourth below-average month in the last four years.

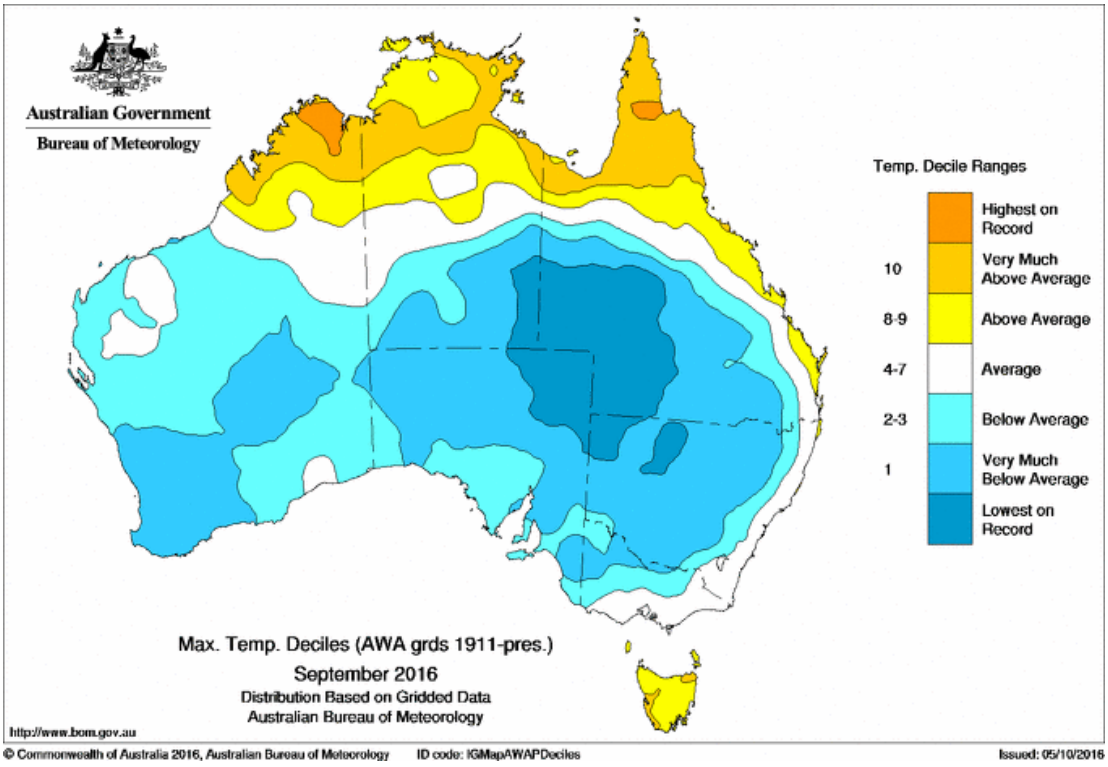


**Figure 5.** Australian maximum temperature deciles for September 2016.

## 3.4 Catchment average rainfalls

A number of major river catchments in Queensland, New South Wales and Victoria had their wettest September on record, including 15 of the 26 major catchments within the Murray−Darling Basin (Table 3). An indicator of just how widespread the heavy rains were was that 25 of the 26 catchments within the Basin had an area-averaged rainfall greater than the previous Basin-wide September record of 91.69 mm. Most of these catchments experienced substantial flooding on one or more occasions during the month (see Section 2.3 for more information on flooding). As was generally the case for individual stations, all catchments have experienced wetter months at other times of year.

In some catchments, September rainfall, while not record-breaking in its own right, occurred after sustained above-average rainfall in previous months (Section 4), exacerbating the subsequent flooding. One example of this is the Glenelg catchment in southwest Victoria, which had catchment average rainfall of 80 millimetres or more in each of the months from May to September, the first time this has occurred in five successive months since 1992. Catchments which experienced their wettest May to September period on record included the Lachlan (where the May to September total of 448.44 mm was more than 100 millimetres above the previous record of 334.18 mm, set in 1956), Murrumbidgee, Loddon, Macquarie-Bogan, Paroo, lower Darling and lower Murray.

The Loddon catchment in northwest Victoria had a monthly total exceeding 100 millimetres for the first time since 2011. Historically, Loddon catchment monthly totals exceed 100 millimetres in about 3 per cent of months. There was no month exceeding 100 millimetres at all during the 15 years from August 1995 to July 2010 (encompassing the period of the ‘Millennium Drought’), then five occurred in the space of seven months between August 2010 and February 2011. There had been none since.

In addition to flooding (as described in Section 2.3), the heavy rains of recent months have led to a substantial increase in many water storages. Total storage levels in the Murray-Darling Basin, which were between 30 and 40 per cent of capacity for most of the first half of 2016, rose strongly from June and reached 79.3 per cent by 8 October. They went on to peak at 84 per cent in December, the highest level since 2012.

| Catchment | Rainfall (mm) | % above/ below average | Previous record |
|---|---|---|---|
| Upper Murray | 205.95 | +92 | 215.81 (1992) |
| Kiewa | 202.42 | +79 | 231.48 (1998) |
| Ovens | 190.89 | +82 | 216.43 (1979) |
| Broken | 126.97 | +133 | 130.93 (1916) |
| Goulburn | 141.01 | +79 | 200.08 (1916) |
| Campaspe | 149.28 | +149 | 170.50 (1916) |
| **Loddon** | **141.86** | **+202** | **121.90 (1916)** |
| **Avoca** | **119.99** | **+225** | **96.29 (1964)** |
| **Murray−Riverina** | **104.26** | **+176** | **90.40 (1906)** |
| **Murrumbidgee** | **147.68** | **+193** | **122.12 (1970)** |
| Lake George | 129.68 | +109 | 133.93 (1978) |
| **Lachlan** | **145.18** | **+285** | **96.94 (1970)** |
| **Benanee** | **116.74** | **+349** | **75.59 (1978)** |
| **Mallee** | **105.35** | **+237** | **92.95 (1964)** |
| **Wimmera−Avon** | **128.38** | **+194** | **101.51 (1915)** |
| Border Rivers | 117.87 | +199 | 138.69 (1970) |
| Moonie | 115.06 | +278 | 115.62 (1970) |
| **Gwydir** | **142.37** | **+256** | **139.21 (1970)** |
| **Namoi** | **140.46** | **+238** | **123.56 (1949)** |
| **Castlereagh** | **145.76** | **+296** | **125.35 (1906)** |
| **Macquarie−Bogan** | **138.12** | **+283** | **101.54 (1906)** |
| Condamine−Culgoa | 109.18 | +330 | 125.02 (1906) |
| Warrego | 116.26 | +496 | 132.27 (1906) |
| **Paroo** | **90.35** | **+545** | **76.05 (1906)** |
| **Lower Darling** | **109.58** | **+432** | **70.48 (1998)** |
| **Lower Murray** | **97.70** | **+266** | **84.04 (1964)** |

**Table 3.** Area-averaged rainfalls for the catchments within the Murray−Darling Basin. Catchments for which September 2016 was the wettest on record are shown in bold.

# 4 May to September rainfall

The heavy rains of September 2016 followed a period of sustained above-average rainfall in many parts of Australia. There was a marked transition, from generally drier than average conditions up until April, to very wet conditions from May onwards.

Winter 2016 was Australia's second-wettest on record, and each of the five months from May to September ranked in the 15 wettest on record for that respective month (6th for May, 2nd for June, 13th for July, 10th for August, 2nd for September). This is an abnormally long sequence of consecutive wet months, although there was an eight-month sequence of consecutive top-10 months from August 2010 to March 2011.

The full May to September period was the wettest on record for Australia by a substantial margin, with the national average of 212.42 mm easily surpassing the previous record of 191.87 mm, set in 1978. It was also the wettest May to September period on record for Queensland, New South Wales, South Australia, Tasmania, Victoria and the Murray−Darling Basin. Rainfall for the May to September period was above average almost throughout Australia (Figure 6), except for parts of southwest Western Australia. Although Western Australia had a relatively dry September, heavy rainfall in earlier months resulted in above-average rainfall over the full May to September period.

Rainfall for the five-month period was in the top 10 per cent of recorded years over almost all of the eastern two-thirds of Australia, except for some areas near the coast, particularly in New South Wales and South Australia. It was the wettest May to September period on record over large areas of eastern inland Australia, including most of New South Wales west of the Great Dividing Range, and most of the southwest quarter of Queensland.

A number of stations, particularly in inland Queensland and New South Wales, exceeded their previous wettest May to September on record by 100 millimetres or more, with two sites (Chatsworth, in northwest Queensland, and Dandaloo, west of Narromine in central New South Wales) more than 200 millimetres above previous records. Of larger centres, Hillston (464.9 mm) broke its previous record, from 1988, by 186.1 mm, whilst Longreach (see below) was 165 millimetres above its previous record. Selected long-term sites which have set records for the May to September period are shown in Table 7.

Records were also set for numerous other time periods ending in September. Despite below average rainfall during April, the wettest April to September period on record was reported in Australia, New South Wales, Tasmania and the Murray−Darling Basin. Eastern Australia[7], along with the Murray−Darling Basin, set records for the period ending in September for every duration from one to six months (Table 4).

[7] For these purposes, Eastern Australia is defined as Queensland, New South Wales, Victoria and Tasmania.

Prior to May 2016, many parts of eastern Australia were experiencing significant drought. Long-term drought since early 2012 had affected much of inland Queensland and adjacent border areas of northern New South Wales, as well as the western half of Victoria and southeast South Australia, while medium-term drought since mid- to late 2014 had been especially significant in Victoria (except Gippsland), Tasmania and eastern South Australia. The rains since May have eliminated most of the areas of medium-term rainfall deficiencies. They have also largely eliminated the long-term deficiencies in Queensland, except for some northern areas, and have significantly eased long-term deficiencies in western Victoria (Figure 7).

An example of the turnaround in rainfall is Longreach, where rainfall averaged only 255 mm per year in the four years from May 2012 to April 2016, which is just over half its long-term average of 440 mm. In June 2016 alone Longreach recorded 173.8 mm, greater than the 168.0 mm it received for all of 2014, and the 165.4 mm it received for all of 2015. In the period from May to September 2016, Longreach received 402.6 mm, far exceeding the previous May to September total of 237.4 mm in 1955[8]. This is made even more remarkable because that May to September is normally the driest time of the year in Longreach, with a long-term average for this period of only 85 mm.

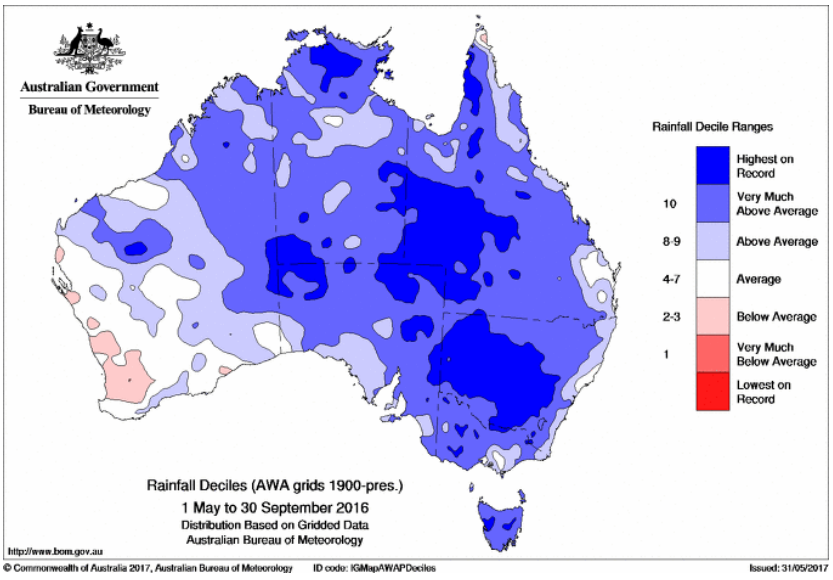


**Figure 6.** Australian rainfall deciles for May to September 2016.

[8] The 1955 total was recorded at the Post Office. The current site, Longreach Airport, became the principal Longreach site in 1966.

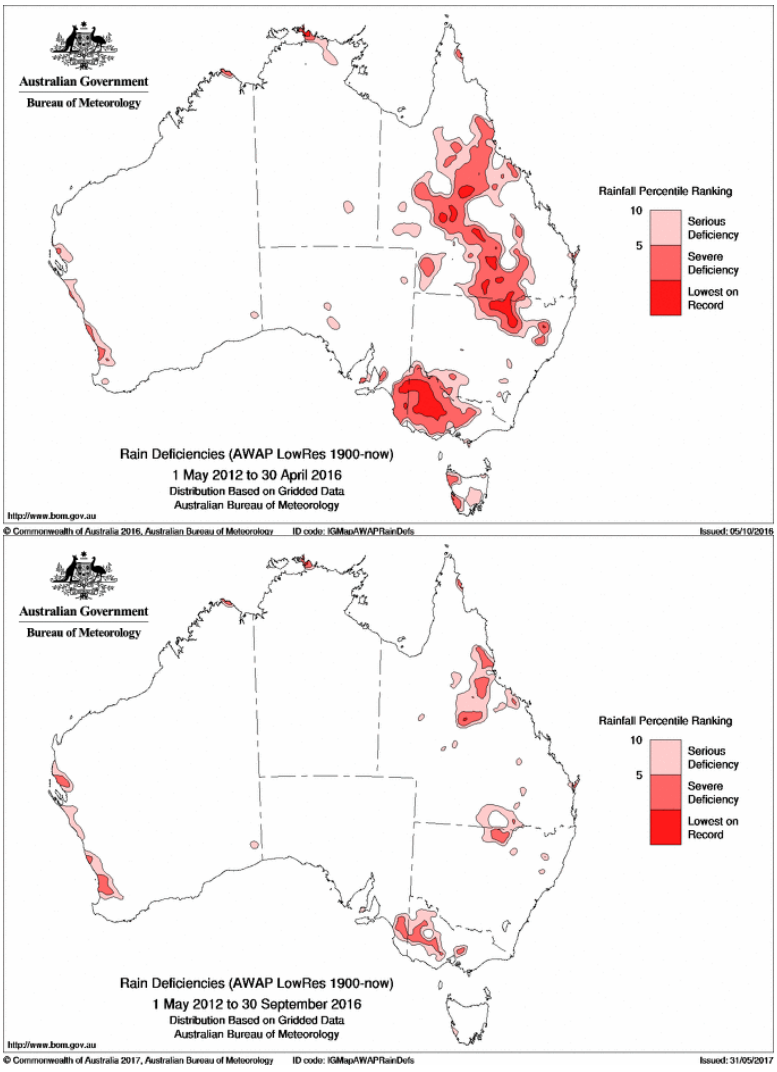


**Figure 7.** Australian rainfall deficiences for the period beginning May 2012 - as of April 2016 (top) and September 2016 (bottom).

| Region | Rainfall (mm) | % above/ below average | Previous record |
|---|---|---|---|
| **September** | | | |
| New South Wales | 115.11 | +231 | 90.26 (1903) |
| Northern Territory | 51.02 | +629 | 41.65 (2010) |
| Murray–Darling Basin | 123.22 | +263 | 91.69 (1906) |
| Eastern Australia | 83.96 | +220 | 75.09 (1906) |
| **August to September** | | | |
| New South Wales | 172.68 | +138 | 148.27 (1906) |
| Murray–Darling Basin | 178.06 | +148 | 145.04 (1906) |
| Eastern Australia | 125.71 | +130 | 121.19 (2010) |
| **July to September** | | | |
| Queensland | 144.42 | +217 | 144.18 (2010) |
| Murray–Darling Basin | 226.15 | +103 | 215.26 (1998) |
| Eastern Australia | 186.52 | +115 | 165.98 (1998) |
| **June to September** | | | |
| Australia | 166.08 | +106 | 151.35 (1978) |
| New South Wales | 333.70 | +121 | 298.85 (1998) |
| Queensland | 202.95 | +216 | 157.91 (1921) |
| Murray–Darling Basin | 316.20 | +118 | 290.19 (1920) |
| Eastern Australia | 268.23 | +129 | 211.86 (1998) |
| **May to September** | | | |
| Australia | 212.42 | +95 | 191.87 (1978) |
| New South Wales | 393.43 | +99 | 339.28 (1998) |
| Queensland | 237.72 | +151 | 203.29 (1978) |
| South Australia | 184.57 | +96 | 171.50 (1973) |
| Tasmania | 1072.30 | +50 | 1042.55 (1931) |
| Victoria | 472.44 | +42 | 470.19 (1956) |
| Murray–Darling Basin | 374.02 | +100 | 311.84 (1978) |
| Eastern Australia | 320.20 | +103 | 262.40 (1978) |
| **April to September** | | | |
| Australia | 223.10 | +60 | 213.90 (1955) |
| New South Wales | 413.06 | +69 | 395.55 (1998) |
| Tasmania | 1138.34 | +38 | 1131.12 (1931) |
| Murray–Darling Basin | 387.92 | +72 | 360.01 (1998) |
| Eastern Australia | 334.66 | +65 | 331.68 (1983) |

**Table 4.** Records for area-averaged rainfall for periods ending in September 2016.

# 5 Broadscale climate drivers

The heavy rains of May to September 2016 have taken place against the background of substantial movements in two major modes of climate variability affecting the Australian region. These broadscale climate drivers are the El Niño−Southern Oscillation (ENSO) and the Indian Ocean Dipole (IOD).

An El Niño occurred in the Pacific Ocean in 2015 and early 2016. This was a very strong event, with sea surface temperatures in the central and eastern equatorial Pacific Ocean more than 2 °C above average, and ranks with the El Niños of 1982-83 and 1997-98 as one of the three strongest of the last 60 years.

The El Niño weakened through the early months of 2016 before breaking down in May. Whilst sea surface temperatures fell slightly below average in the central and eastern equatorial Pacific in the second half of 2016, they were not sufficiently below normal for the Pacific to be considered to be in a La Niña state.[9]

Heavy rainfall through the middle months of the year is characteristic of the breakdown phase of strong El Niños, whether or not there is a subsequent transition to La Niña, and irrespective of the status of the IOD. For example, in 1998, there was a rapid transition from El Niño to La Niña, and a negative phase of the IOD; in 1983, the Pacific Ocean reverted to near-normal (neutral) conditions, and the IOD was in the positive phase; while following the strong 1972-1973 El Niño a strong La Niña developed but the IOD was only in weakly negative phase.

The consistent heavy rainfall is shown in the composite map for the winter-spring (June-November) period for 1973, 1983 and 1998 (Figure 8). Typically in these years, almost all of Australia has above-average (decile 7 or higher) rainfall, despite the different phases of ENSO and the IOD during winter-spring. For much of inland New South Wales and Queensland, and parts of the Northern Territory, the rainfall averaged over these years is in decile 10.

The IOD also has a major influence on Australia rainfall in winter and spring. The monthly IOD index used by the Bureau had a monthly value of −0.9 °C in July 2016. This is the lowest on record for July and the fourth lowest for any month since reliable records began in 1960. It remained strongly negative until October.

When the IOD is in the negative phase, waters in the eastern tropical Indian Ocean, between Western Australia and Indonesia, are warmer than normal while those in the western tropical Indian Ocean, off the east coast of Africa, are cooler than normal. This is a highly favourable pattern for above-average rainfall in large parts of Australia. Figure 9 shows the composite winter-spring rainfall for three strong negative IOD phase years (1981, 1992 and 1996) which are independent of the breakdown of strong

[9] Further information about the El Niño-Southern Oscillation and the Indian Ocean Dipole, their current status and latest outlooks, is available at http://www.bom.gov.au/climate/enso/.

El Niños. While much of Australia typically has above-average rainfall in such years, the heaviest rainfall is generally restricted to the southeast.

It is notable that many of the wettest Australian May to September years have neither the breakdown of a strong El Niño or a strong IOD negative phase (although 1978, the second wettest May to September on record, had the breakdown of a much weaker El Niño). Also, the heavy rains of 2016 have been both more extensive and more sustained over a period of several months than in 1973, 1983 or 1998, or in negative IOD phase years.

However, what the El Niño breakdown phase and negative IOD phase share is that the underlying trade winds and ocean currents generate a build-up of relative warm waters in winter-spring months in waters to the north of Australia. The 2016 manifestation of this is apparent in the large area of warm sea surface temperatures north and northwest of Australia in September (Figure 10).

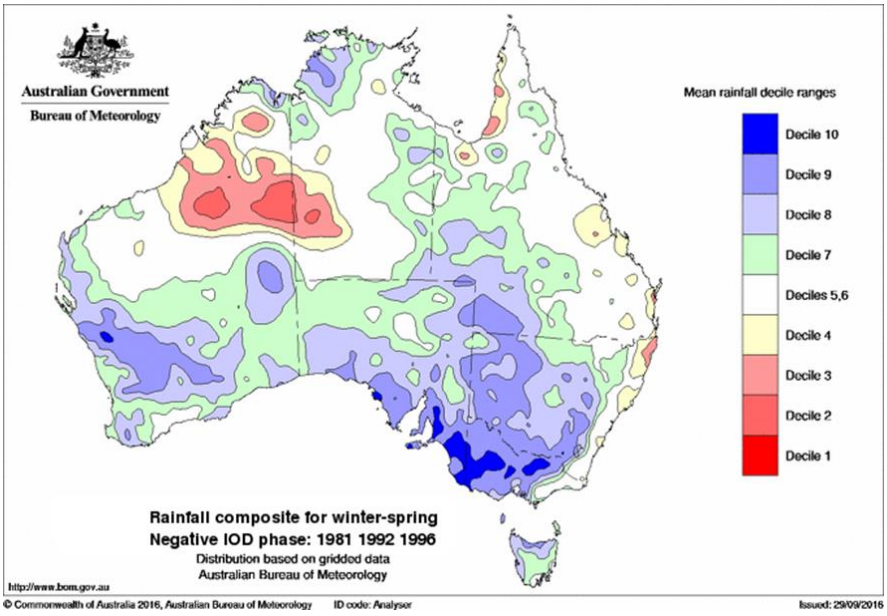


**Figure 8.** Composite winter-spring rainfall deciles for strong negative phase IOD years (1981, 1992, 1996).

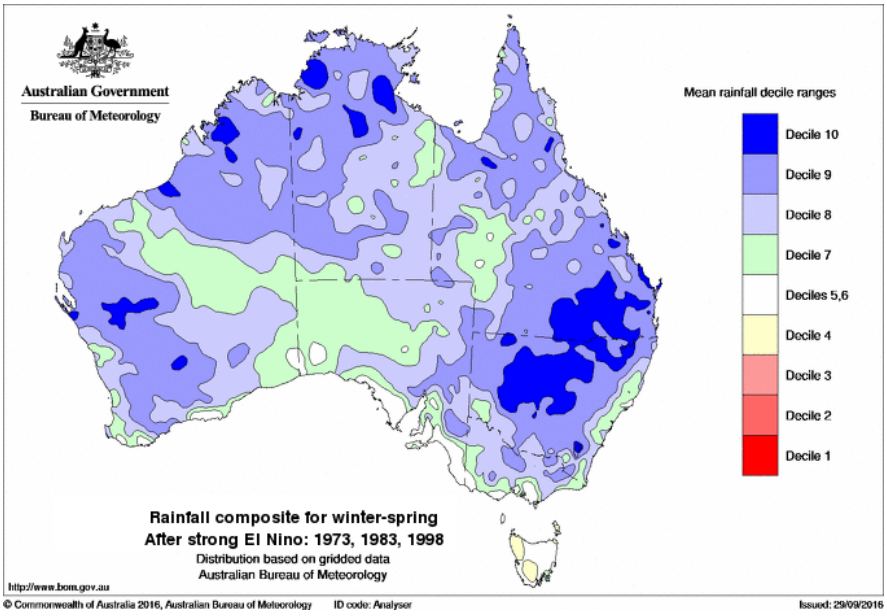


**Figure 9.** Composite winter-spring rainfall deciles for the year following the breakdown of 3 strong El Niños (1973, 1978, 1998).

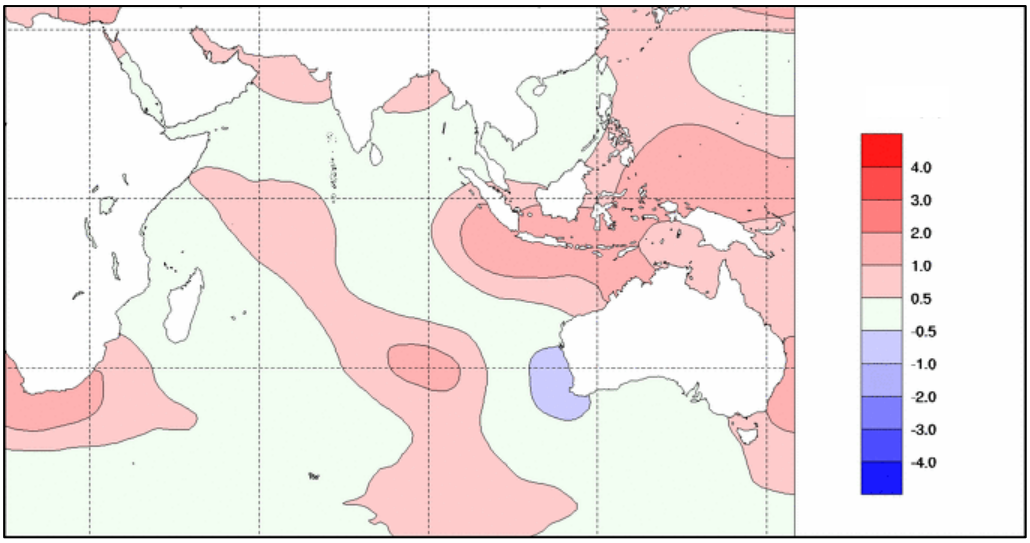


**Figure 10.** Sea surface temperature anomalies (° C) for September 2016, showing the warm waters in the eastern tropical Indian Ocean and the less warm waters off the African coast.

| Station number | Station name | State | Value (mm) | Date | Previous record |
|---|---|---|---|---|---|
| 14198* | Jabiru | NT | 107.8 | 19th | 62.0 (14/9/1984) |
| 14401* | Warruwi | NT | 26.6 | 20th | 15.8 (15/9/1993) |
| 15602* | Jervois | NT | 43.0 | 20th | 42.6 (18/9/2010) |
| 16007* | Coober Pedy | SA | 57.6 | 2nd | 29.7 (21/9/1970) |
| 17028 | Innamincka Station | SA | 69.0 | 2nd | 53.5 (23/9/1998) |
| 18014 | Cleve | SA | 38.8 | 29th | 37.1 (21/9/1916) |
| 19052 | Wirrabara | SA | 74.2 | 30th | 72.4 (23/9/2009) |
| 21003 | Blyth | SA | 42.4 | 30th | 38.9 (1/9/1908) |
| 21034 | Mount Bryan | SA | 72.0 | 30th | 62.4 (27/9/1979) |
| 22806 | Murrays Lagoon | SA | 45.2 | 14th | 37.4 (23/9/1991) |
| 23034* | Adelaide Airport | SA | 35.0 | 29th | 30.7 (7/9/1960) |
| 23305 | Greenock | SA | 47.0 | 30th | 42.9 (2/9/1937) |
| 23704 | Belair | SA | 59.0 | 15th | 52.1 (12/9/1917) |
| 23707 | Bridgewater | SA | 78.0 | 29th | 71.1 (1/9/1933) |
| 23710 | Clarendon | SA | 57.0 | 29th | 54.4 (20/9/1923) |
| 23714 | Finniss | SA | 43.0 | 29th | 37.4 (4/9/2010) |
| 23718 | Goolwa | SA | 60.6 | 14th | 38.1 (25/9/1893) |
| 23719 | Gumeracha | SA | 54.4 | 29th | 53.6 (4/9/2010) |
| 23720 | Hahndorf | SA | 68.0 | 29th | 61.0 (11/9/1958) |
| 23722 | Harrogate | SA | 54.0 | 29th | 46.4 (4/9/2010) |
| 23728 | Macclesfield | SA | 58.2 | 29th | 56.1 (25/9/1893) |
| 23731# | Millbrook Reservoir | SA | 73.0 | 15th | 58.8 (4/9/2010) |
| 23739 | Nairne | SA | 58.6 | 29th | 53.8 (16/9/1935) |
| 23747# | Strathalbyn | SA | 37.4 | 29th | 32.7 (4/9/2010) |
| 23750 | Uraidla | SA | 101.4 | 15th | 85.6 (30/9/1996) |
| 23752# | Williamstown | SA | 58.7 | 30th | 47.2 (2/9/1937) |
| 23829 | Woodside | SA | 65.6 | 29th | 59.7 (25/9/1893) |
| 24573 | Truro | SA | 45.0 | 30th | 43.4 (19/9/1913) |
| 25502 | Cooke Plains | SA | 48.0 | 30th | 42.2 (20/9/1923) |
| 26009 | Kalangadoo | SA | 71.0 | 9th | 42.0 (8/9/1983) |
| 26014 | Lake Leake (Kooeeyong) | SA | 72.0 | 9th | 42.2 (10/9/1910) |
| 26018 | Millicent | SA | 52.0 | 9th | 35.6 (3/9/1947) |
| 26025 | Penola | SA | 59.0 | 9th | 51.2 (17/9/2013) |
| 29127* | Mount Isa Airport | QLD | 61.0 | 18th | 40.2 (24/9/1998) |
| 33035 | Kalamia Estate | QLD | 50.8 | 30th | 49.8 (27/9/1947) |
| 36022 | Evesham | QLD | 51.3 | 18th | 46.2 (4/9/1943) |

| | | | | | |
|---|---|---|---|---|---|
| 37013 | Chatsworth | QLD | 52.8 | 18th | 32.3 (22/9/1915) |
| 37015 | Corona Downs | QLD | 30.0 | 15th | 27.9 (27/9/1927) |
| 37046 | Elderslie | QLD | 55.6 | 18th | 37.3 (27/9/1964) |
| 37049 | Warnambool Downs | QLD | 54.4 | 18th | 34.3 (4/9/1936) |
| 38020 | Roseberth | QLD | 44.4 | 2nd | 32.5 (4/9/2010) |
| 42002 | Belah Park | QLD | 62.4 | 15th | 40.6 (20/9/1946) |
| 43038 | Wallumbilla | QLD | 64.0 | 15th | 59.2 (17/9/1903) |
| 44042 | Hebel | QLD | 56.0 | 14th | 45.2 (28/9/1906) |
| 44057 | Nive Downs | QLD | 56.0 | 18th | 53.0 (19/9/2010) |
| 45015* | Quilpie | QLD | 44.0 | 14th | 33.3 (26/9/1950) |
| 46043 | Wilcannia (Reid St) | NSW | 41.4 | 3rd | 38.1 (24/9/1915) |
| 47013 | Pooncarie (Karpa Kora) | NSW | 51.8 | 21st | 44.7 (2/9/1947) |
| 47019 | Menindee | NSW | 63.0 | 21st | 47.0 (19/9/1932) |
| 50020 | Warroo | NSW | 64.4 | 10th | 50.0 (17/9/2013) |
| 65019 | Gooloogong | NSW | 90.0 | 19th | 56.6 (5/9/1974) |
| 73022 | Cootamundra (Landgrove) | NSW | 52.0 | 10th | 47.0 (2/9/1993) |
| 73025 | Old Junee | NSW | 58.6 | 10th | 47.0 (29/9/1929) |
| 73029 | Murrumburrah | NSW | 57.2 | 3rd | 54.4 (17/9/1917) |
| 73100 | Bumbaldry | NSW | 63.4 | 3rd | 55.4 (5/9/1974) |
| 81038 | Natte Yallock | VIC | 60.0 | 14th | 51.0 (2/9/1988) |
| **81047** | **Tarnagulla** | **VIC** | **76.6** | **14th** | **57.9 (23/9/1916) (Sep) 76.2 (18/2/1919) (all)** |
| 88015 | Clunes | VIC | 66.6 | 14th | 64.0 (4/9/2010) |
| 89009 | Cavendish | VIC | 54.0 | 9th | 48.8 (23/9/1998) |
| 89034 | Willaura | VIC | 42.0 | 14th | 41.9 (25/9/1950) |
| 89085/89000 | Ararat | VIC | 51.8 | 14th | 51.6 (8/9/1870) |
| 90010 | Branxholme (Bassett) | VIC | 47.4 | 9th | 46.0 (24/9/1893) |
| 90013 | Cape Bridgewater | VIC | 48.6 | 9th | 46.4 (23/9/1998) |
| 90042 | Gellibrand River West | VIC | 54.8 | 14th | 53.8 (25/9/1950) |
| 90057 | Merino | VIC | 43.0 | 9th | 40.2 (28/9/1979) |
| 90059 | Nelson | VIC | 56.8 | 9th | 37.0 (23/9/1998) |
| 90147 | Colac | VIC | 65.0 | 14th | 47.2 (22/9/1916) |
| 92012 | Fingal | TAS | 67.8 | 30th | 63.5 (21/9/1959) |
| 92029 | Ormley | TAS | 70.2 | 30th | 50.8 (20/9/1913) |
| 95003 | Bushy Park | TAS | 35.0 | 30th | 29.2 (21/9/1923) |
| 95005 | Bothwell (Cluny) | TAS | 56.4 | 30th | 32.3 (26/9/1971) |

**Table 5.** Daily rainfall records set during September 2016 at locations with more than 100 years of data and selected other locations (shown *). Locations marked # set a record twice during the month; the highest value is shown. Locations which set a record for any month are shown in bold.

| Station number | Station name | State | Value (mm) | Previous record |
|---|---|---|---|---|
| 14401* | Warruwi | NT | 41.6 | 15.8 (1993) |
| 14902 | Katherine Council | NT | 111.2 | 90.9 (1895) |
| 15005 | Avon Downs | NT | 99.6 | 73.7 (1947) |
| 16007* | Coober Pedy | SA | 59.6 | 44.2 (1979) |
| 19001 | Appila | SA | 136.0 | 128.0 (1992) |
| 19006 | Booleroo Centre | SA | 126.4 | 121.6 (1979) |
| 19025 | Morchard (The Rocks) | SA | 111.6 | 109.3 (1960) |
| 19052 | Wirrabara | SA | 185.6 | 150.2 (1979) |
| 20000 | Bimbowrie | SA | 76.2 | 76.1 (1964) |
| 20001 | Boolcoomatta | SA | 102.3 | 99.2 (1964) |
| 20002 | Cockburn | SA | 108.2 | 83.3 (1964) |
| 20005 | Erudina | SA | 66.4 | 64.7 (1964) |
| 20017 | Mutooroo | SA | 119.0 | 73.2 (1920) |
| 20024 | Yunta (Winninninnie Station) | SA | 86.6 | 71.9 (1964) |
| 21013 | Caltowie | SA | 165.4 | 146.6 (1979) |
| 21015 | Snowtown (Condowie) | SA | 125.4 | 117.3 (1920) |
| 21021 | Gladstone | SA | 138.4 | 128.6 (1979) |
| 21025 | Clare (Hill River) | SA | 272.5 | 217.8 (1979) |
| **21027** | **Jamestown** | **SA** | **216.2** | **145.2 (1979) (Sep) 175.6 (Aug 1985) (all)** |
| 21033 | Mintaro | SA | 220.6 | 197.4 (1979) |
| **21034** | **Mount Bryan** | **SA** | **194.2** | **155.6 (1979) (Sep)(all)** |
| 21131/21014 | Clare | SA | 198.8 | 197.2 (1979) |
| 22003 | Curramulka | SA | 102.0 | 101.0 (1946) |
| 22008 | Maitland | SA | 125.6 | 122.2 (1917) |
| 22800 | American River | SA | 133.8 | 125.2 (1997) |
| 22803 | Cape Willoughby | SA | 156.6 | 119.5 (1937) |
| 22809 | Penneshaw | SA | 141.4 | 138.0 (1979) |
| 23305 | Greenock | SA | 181.6 | 155.6 (1992) |
| 23307 | Kapunda | SA | 173.6 | 137.7 (1867) |
| 23309 | Lyndoch | SA | 177.4 | 170.1 (1923) |
| 23310 | Manoora | SA | 173.5 | 154.0 (1979) |
| 23314 | Riverton | SA | 165.4 | 156.6 (1979) |
| 23318 | Tanunda | SA | 184.6 | 164.6 (1912) |
| 23319 | Tarlee | SA | 141.1 | 131.2 (1992) |
| 23704 | Belair | SA | 225.4 | 225.1 (1979) |

| | | | | |
|---|---|---|---|---|
| 23705 | Birdwood | SA | 199.8 | 192.0 (1915) |
| 23707 | Bridgewater | SA | 289.3 | 277.2 (1923) |
| 23709 | Cherry Gardens | SA | 251.2 | 229.2 (1931) |
| 23713 | Echunga | SA | 266.8 | 190.9 (1915) |
| 23714 | Finniss | SA | 146.2 | 110.9 (1917) |
| **23718** | **Goolwa** | **SA** | **174.8** | **112.8 (1992) (Sep)<br>174.8 (Jun 1981) (all)** |
| 23719 | Gumeracha | SA | 240.2 | 208.8 (1923) |
| 23720 | Hahndorf | SA | 257.8 | 223.9 (1941) |
| 23722 | Harrogate | SA | 172.4 | 154.4 (1923) |
| 23725 | Keyneton | SA | 163.1 | 155.9 (1915) |
| 23728 | Macclesfield | SA | 215.4 | 179.3 (1923) |
| 23731 | Millbrook Reservoir | SA | 254.6 | 222.4 (1992) |
| 23733 | Mount Barker | SA | 227.8 | 194.2 (1915) |
| 23739 | Nairne | SA | 183.0 | 172.9 (1912) |
| 23741 | Normanville | SA | 146.6 | 121.7 (1923) |
| 23742 | Port Elliot | SA | 170.5 | 152.7 (1877) |
| 23743 | Victor Harbor (Rivington Grange) | SA | 209.4 | 151.2 (1941) |
| 23744 | Second Valley (Poolamacca) | SA | 179.4 | 145.9 (1917) |
| 23750 | Uraidla | SA | 360.9 | 319.0 (1979) |
| 23752 | Williamstown | SA | 230.1 | 184.8 (1992) |
| 23754 | Yankalilla | SA | 142.0 | 138.4 (1941) |
| 24008 | Lyrup | SA | 113.0 | 105.6 (1964) |
| 24012 | Overland Corner | SA | 112.0 | 96.7 (1908) |
| 24508 | Callington | SA | 106.0 | 99.4 (2010) |
| 24509 | Dutton | SA | 144.0 | 127.6 (1992) |
| 24511 | Eudunda | SA | 137.2 | 125.7 (1979) |
| 24513 | Cambrai (Kongolia) | SA | 83.2 | 72.5 (1992) |
| 24515 | Langhorne Creek | SA | 131.4 | 103.5 (1893) |
| 24519 | Milang | SA | 146.6 | 92.0 (1992) |
| 24521 | Murray Bridge | SA | 132.0 | 93.0 (1893) |
| 24530 | Sedan (Sandleton) | SA | 88.8 | 73.6 (1992) |
| 24531 | Sedan | SA | 85.6 | 83.4 (1992) |
| 24536 | Tailem Bend | SA | 107.7 | 98.8 (1923) |
| 24573 | Truro | SA | 170.9 | 151.2 (1992) |
| 25006 | Karoonda | SA | 119.3 | 96.8 (1992) |
| 25010 | Mindarie | SA | 127.5 | 89.9 (1913) |
| 25013 | Parilla | SA | 118.0 | 106.5 (1964) |
| 25015 | Pinnaroo | SA | 114.9 | 105.4 (1964) |
| 25018 | Alawoona (Schells Well) | SA | 114.2 | 98.1 (1964) |

| | | | | |
|---|---|---|---|---|
| **25502** | **Cooke Plains** | **SA** | **151.0** | **124.2 (1923) (Sep)<br>139.2 (Jun 1916) (all)** |
| 25503 | Coomandook | SA | 109.2 | 100.6 (1925) |
| 25506 | Geranium | SA | 122.4 | 103.2 (1992) |
| 25512 | Parrakie | SA | 122.2 | 111.8 (1979) |
| 25519 | Wolseley | SA | 133.2 | 125.4 (1979) |
| 29127* | Mount Isa Airport | QLD | 103.0 | 68.6 (1978) |
| 29129 | Devoncourt | QLD | 77.8 | 45.7 (1971) |
| 36022 | Evesham | QLD | 133.8 | 91.7 (1906) |
| 36031/36030 | Longreach | QLD | 131.2 | 122.4 (1926) |
| 36054 | Evora | QLD | 164.0 | 89.9 (1906) |
| 36066 | Beaconsfield | QLD | 147.8 | 101.8 (2010) |
| 37002 | Baratria | QLD | 98.6 | 66.0 (1943) |
| 37007 | Brighton Downs | QLD | 87.8 | 86.9 (1906) |
| 37010 | Camooweal | QLD | 92.8 | 80.2 (1947) |
| 37013 | Chatsworth | QLD | 146.7 | 56.2 (2010) |
| 37039/37051 | Winton | QLD | 93.2 | 62.8 (1947) |
| 37046 | Elderslie | QLD | 133.6 | 51.6 (1890) |
| 37049 | Warnambool Downs | QLD | 134.4 | 93.2 (1906) |
| 37098 | Noonbah | QLD | 119.0 | 113.4 (1926) |
| 38003 | Boulia | QLD | 88.8 | 88.1 (2010) |
| 38014 | Marion Downs | QLD | 105.0 | 74.0 (2010) |
| 38015 | Monkira | QLD | 129.8 | 86.8 (2010) |
| 38020 | Roseberth | QLD | 73.4 | 57.9 (2010) |
| 42002 | Belah Park | QLD | 155.2 | 125.5 (1917) |
| 42023 | Miles PO | QLD | 165.9 | 150.6 (1917) |
| 43052 | Warkon | QLD | 146.6 | 126.2 (1917) |
| 44001 | Angellala Downs | QLD | 168.5 | 143.4 (1917) |
| 44021/44022 | Charleville | QLD | 128.4 | 126.6 (1906) |
| 44040 | Gumbardo | QLD | 149.6 | 135.7 (1926) |
| 44042 | Hebel | QLD | 140.0 | 113.3 (1906) |
| 44044 | Ivanhoe Downs | QLD | 123.0 | 118.1 (1964) |
| 44050 | Morven | QLD | 156.8 | 146.6 (1921) |
| 44062 | Perola Park | QLD | 189.8 | 145.0 (2010) |
| 44070 | Victoria Downs | QLD | 154.0 | 145.0 (1921) |
| 44181 | Hungerford | QLD | 87.7 | 84.8 (1998) |
| 45003 | South Comingin | QLD | 108.1 | 100.1 (1964) |
| 45006 | Eromanga | QLD | 79.0 | 71.4 (1964) |
| 45015* | Quilpie | QLD | 102.5 | 70.9 (1943) |
| 46012/46043 | Wilcannia | NSW | 124.2 | 86.4 (1903) |

| | | | | |
|---|---|---|---|---|
| 46015 | Broken Hill (Langawirra) | NSW | 119.2 | 101.3 (1964) |
| 46022 | Wilcannia (Mount Murchison) | NSW | 118.0 | 71.6 (1915) |
| 46043 | Wilcannia (Reid St) | NSW | 130.9 | 86.4 (1903) |
| 46126/46042 | White Cliffs | NSW | 94.6 | 91.5 (1935) |
| 47000 | Gum Lake (Albemarle) | NSW | 128.0 | 78.8 (1998) |
| 47013 | Pooncarie (Karpa Kora) | NSW | 161.2 | 102.8 (1978) |
| 47019 | Menindee | NSW | 143.7 | 79.3 (1964) |
| 47029 | Pooncarie | NSW | 114.8 | 101.9 (1964) |
| 47031 | Stephens Creek Reservoir | NSW | 132.0 | 107.8 (1978) |
| 47033 | Pooncarie (Tarcoola) | NSW | 118.4 | 84.8 (1916) |
| 47053 | Wentworth | NSW | 109.6 | 109.3 (1903) |
| 48020 | Mungindi (Burrenbah) | NSW | 119.8 | 105.2 (1906) |
| 48027/48030 | Cobar | NSW | 106.6 | 104.6 (1998) |
| 48047 | Collarenebri (Goondoobluie) | NSW | 112.6 | 109.1 (1906) |
| 48079 | Wanaaring | NSW | 90.5 | 90.2 (1998) |
| 48168 | Angledool | NSW | 135.3 | 119.7 (1906) |
| 49002 | Balranald | NSW | 106.6 | 99.0 (1975) |
| 49049 | Hatfield (Benilkie) | NSW | 133.5 | 126.2 (1978) |
| 50004 | Bogan Gate | NSW | 134.6 | 109.2 (1988) |
| 50008 | Peak Hill (Bruie Plains) | NSW | 135.0 | 113.6 (1997) |
| 50014 | Condobolin | NSW | 123.6 | 120.8 (1997) |
| 50016 | Goonumbla (Coradgery) | NSW | 189.8 | 122.3 (1906) |
| 50018 | Dandaloo | NSW | 188.3 | 126.2 (1975) |
| 50020 | Warroo | NSW | 160.0 | 130.4 (1892) |
| 50031 | Peak Hill | NSW | 187.9 | 116.6 (1892) |
| 50034 | Nevertire (Beverley) | NSW | 123.6 | 120.0 (1993) |
| 50037 | Tullamore | NSW | 144.0 | 103.0 (1993) |
| 50039 | Dandaloo | NSW | 152.0 | 129.9 (1975) |
| 50040 | Ungarie | NSW | 129.0 | 127.4 (1975) |
| 50045 | Yalgogrin North | NSW | 174.6 | 124.2 (1970) |
| 51004 | Trangie (Old Bundemar) | NSW | 155.2 | 128.5 (1978) |
| 51008 | Wyanga (Barcoo) | NSW | 154.8 | 110.0 (2005) |
| 51018 | Gilgandra | NSW | 195.6 | 121.9 (1970) |
| 51031 | Nyngan (Canonbar) | NSW | 142.4 | 104.6 (1997) |
| 51034 | Warren (Mumblebone) | NSW | 134.6 | 116.0 (1906) |
| 51038 | Nevertire | NSW | 172.0 | 98.4 (1906) |
| 51042 | Quambone Station | NSW | 139.0 | 134.0 (1906) |
| 51054 | Warren | NSW | 145.0 | 104.0 (2011) |
| 52023 | Pilliga | NSW | 115.6 | 111.4 (1903) |
| 52033 | Pilliga (Nirvana) | NSW | 117.5 | 113.8 (1949) |

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|---|---|---|---|---|
| 53001 | Baradine | NSW | 198.6 | 122.0 (1903) |
| 53003 | Bellata | NSW | 143.2 | 133.2 (1986) |
| 53011 | Garah | NSW | 114.0 | 112.5 (1970) |
| 53034 | Wee Waa (Pendennis) | NSW | 147.2 | 141.4 (1998) |
| 53115/53048/53027 | Moree | NSW | 137.8 | 130.7 (1879) |
| 54005 | Upper Bingara (Emohta) | NSW | 203.4 | 168.9 (1970) |
| 54039 | Bingara (Keera) | NSW | 158.2 | 146.5 (1917) |
| 54090 | Bingara (Pallal) | NSW | 176.4 | 165.4 (1947) |
| 55002 | Mullaley (Bando) | NSW | 145.2 | 127.2 (1903) |
| 55014 | Curlewis | NSW | 139.8 | 116.5 (1997) |
| 55017 | Premer (Eden Moor) | NSW | 169.0 | 165.4 (1903) |
| 55023 | Gunnedah Pool | NSW | 141.8 | 128.0 (1997) |
| 55041 | Nundle | NSW | 188.4 | 168.9 (1949) |
| 55045 | Curlewis (Pine Cliff) | NSW | 135.6 | 122.1 (1970) |
| 55057 | Willow Tree (Valais) | NSW | 199.0 | 186.1 (1903) |
| 55058 | Turrawan | NSW | 136.5 | 134.0 (1998) |
| 55062 | Werris Creek | NSW | 131.8 | 131.3 (1949) |
| 55065 | Breeza (The Park) | NSW | 125.6 | 125.2 (1917) |
| 55066 | Wallabadah | NSW | 181.6 | 170.9 (1892) |
| 62013 | Gulgong | NSW | 198.7 | 176.7 (1892) |
| 62014 | Hargraves | NSW | 265.2 | 187.9 (1970) |
| 62021 | Mudgee (George St) | NSW | 213.0 | 188.1 (1879) |
| 62032 | Wollar | NSW | 181.2 | 135.9 (1949) |
| 63012 | Running Stream (Brooklyn) | NSW | 217.5 | 176.1 (1970) |
| 63022 | Cowra Agricultural Research | NSW | 153.2 | 143.4 (2005) |
| 63029 | Mandurama (Gallymont) | NSW | 198.0 | 176.8 (1923) |
| 63035 | Hill End | NSW | 183.2 | 181.5 (1903) |
| 63073 | Rockley | NSW | 135.8 | 133.7 (1970) |
| 64004 | Binnaway | NSW | 155.8 | 144.6 (1903) |
| 64008 | Coonabarabran | NSW | 218.0 | 152.4 (1903) |
| 64009 | Dunedoo | NSW | 168.5 | 105.0 (1970) |
| 64024 | Gilgandra (Wallumburrawang) | NSW | 143.8 | 121.7 (1903) |
| 65000 | Arthurville (Cramond) | NSW | 179.2 | 155.6 (1978) |
| 65013 | Eugowra | NSW | 171.4 | 135.6 (1996) |
| 65019 | Gooloogong | NSW | 248.5 | 161.3 (1892) |
| 65020 | Manildra | NSW | 161.0 | 124.8 (2005) |
| 65022 | Manildra (Hazeldale) | NSW | 192.6 | 179.3 (1892) |
| 65023 | Molong | NSW | 207.2 | 164.7 (1892) |
| 65036 | Yeoval | NSW | 184.4 | 123.5 (1978) |

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|---|---|---|---|---|
| 65068/65026 | Parkes | NSW | 187.4 | 127.8 (2005) |
| 70025 | Crookwell | NSW | 177.2 | 162.4 (1960) |
| 70043 | Gunning | NSW | 141.6 | 133.2 (1996) |
| 70067 | Nimmitabel | NSW | 164.7 | 150.6 (1961) |
| 70071 | Goulburn (Pomeroy) | NSW | 147.0 | 142.3 (1970) |
| 72000 | Adelong | NSW | 206.6 | 190.1 (1970) |
| 72008 | Tarcutta (Wollumbi) | NSW | 170.7 | 147.3 (1970) |
| 72042 | Tarcutta | NSW | 176.2 | 157.9 (1960) |
| 72044 | Tumut | NSW | 191.2 | 181.0 (1960) |
| 72050 | Wymah (Gwandallen) | NSW | 167.0 | 161.0 (1992) |
| 72150/72151 | Wagga Wagga | NSW | 167.8 | 153.4 (1871) |
| 73007 | Burrinjuck Dam | NSW | 245.7 | 212.0 (1970) |
| 73014 | Grenfell | NSW | 233.8 | 160.2 (1906) |
| 73017 | Greenethorpe | NSW | 172.4 | 143.6 (1906) |
| 73019 | Junee | NSW | 185.8 | 128.2 (1993) |
| 73022 | Cootamundra (Landgrove) | NSW | 215.0 | 158.9 (1970) |
| 73025 | Old Junee | NSW | 193.8 | 107.8 (1978) |
| 73029 | Murrumburrah | NSW | 185.2 | 139.2 (1970) |
| 73036 | Stockinbingal | NSW | 214.4 | 160.4 (1978) |
| 73037 | Temora | NSW | 226.2 | 138.4 (1970) |
| 73043 | Wallendbeen (Corang) | NSW | 235.6 | 150.0 (1978) |
| 73044 | Wantabadgery | NSW | 177.2 | 152.5 (1970) |
| 73051 | Murringo | NSW | 207.0 | 159.3 (1960) |
| 73054 | Wyalong | NSW | 164.7 | 128.6 (1993) |
| 73100 | Bumbaldry | NSW | 242.2 | 160.0 (1960) |
| 73124 | Eurongilly (Bundaleer) | NSW | 163.2 | 121.5 (1960) |
| 73127 | Wagga Wagga Ag Institute | NSW | 178.0 | 137.9 (1985) |
| 73138/73056 | Young | NSW | 216.2 | 165.5 (1970) |
| 73142/73009 | Cootamundra | NSW | 204.6 | 146.4 (1978) |
| 74002 | Ariah Park | NSW | 202.1 | 136.1 (1970) |
| 74005 | Barellan | NSW | 147.5 | 126.6 (1993) |
| 74008 | Grong Grong (Berembed) | NSW | 151.6 | 123.2 (1970) |
| 74033 | Coolamon | NSW | 165.8 | 117.7 (1970) |
| 74034 | Corowa | NSW | 127.4 | 122.5 (1966) |
| 74042 | Finley | NSW | 139.1 | 112.2 (1992) |
| 74050 | Grong Grong | NSW | 145.0 | 131.3 (1916) |
| 74053 | Henty | NSW | 165.1 | 153.7 (1970) |
| 74064 | Lockhart | NSW | 162.2 | 153.6 (1970) |
| 74081 | Mulwala | NSW | 123.5 | 103.0 (1992) |
| 74106 | Tocumwal | NSW | 121.5 | 113.0 (1993) |

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|---|---|---|---|---|
| 74110 | Urana | NSW | 124.7 | 122.0 (1970) |
| 74115 | Walbundrie | NSW | 182.6 | 145.0 (1916) |
| 74188 | Culcairn | NSW | 170.6 | 157.2 (1960) |
| 75006 | Binya | NSW | 144.8 | 109.5 (1970) |
| 75018 | Hay (Corrong) | NSW | 118.8 | 97.8 (1998) |
| 75032 | Hillston | NSW | 177.8 | 151.1 (1998) |
| 75039 | Lake Cargelligo | NSW | 109.8 | 107.1 (1975) |
| 75047 | Hay (Mulberrygong) | NSW | 117.0 | 106.0 (1970) |
| 75049 | Maude (Nap Nap) | NSW | 107.4 | 104.7 (1970) |
| 75069 | Booligal (Ulonga) | NSW | 139.5 | 91.0 (1978) |
| 76015 | Irymple (Arlington) | VIC | 107.6 | 90.5 (1953) |
| 76038 | Murrayville | VIC | 104.4 | 103.0 (1964) |
| 76047 | Ouyen | VIC | 131.9 | 121.8 (1964) |
| 76050 | Pira Wild Horse Plains | VIC | 110.6 | 95.7 (1964) |
| 76065 | Walpeup (town) | VIC | 131.8 | 129.7 (1964) |
| 77001 | Quambatook (Barraport North) | VIC | 142.0 | 102.2 (1993) |
| 77004 | Beulah | VIC | 170.5 | 124.2 (1915) |
| 77005 | Berriwillock | VIC | 133.8 | 108.3 (1964) |
| 77008 | Birchip (Woodlands) | VIC | 118.6 | 107.0 (1916) |
| 77014 | Culgoa | VIC | 141.8 | 108.6 (1964) |
| 77016 | Boort (Gredgwin) | VIC | 152.2 | 98.8 (1993) |
| 77028 | Birchip (Marlbed) | VIC | 117.5 | 107.3 (1960) |
| 77034 | Quambatook | VIC | 162.4 | 110.5 (1916) |
| 77036 | Rainbow (Pella) | VIC | 113.5 | 110.1 (1964) |
| 77039 | Sea Lake | VIC | 124.1 | 123.0 (1992) |
| 77040 | Sea Lake (Marston Downs) | VIC | 141.0 | 112.2 (1992) |
| 77051 | Rainbow (Werrap) | VIC | 104.4 | 95.6 (1908) |
| 77052 | Woomelang | VIC | 113.0 | 108.5 (1964) |
| 77079 | Ninyeunook | VIC | 121.8 | 112.7 (1921) |
| 78000 | Warracknabeal (Ailsa) | VIC | 144.5 | 116.5 (1915) |
| 78029 | Minyip | VIC | 142.9 | 142.6 (1915) |
| **78038** | **Warracknabeal (Earlstan)** | **VIC** | **142.4** | **112.2 (1979) (Sep)<br>141.4 (Mar 1910) (all)** |
| 78042 | Wycheproof | VIC | 118.8 | 105.0 (1960) |
| 79003 | Beazleys Bridge | VIC | 134.4 | 117.6 (1988) |
| 79032 | Morrl Morrl | VIC | 135.8 | 130.1 (1912) |
| 79035 | Murtoa | VIC | 127.2 | 112.1 (1979) |
| 79036 | Natimuk | VIC | 117.8 | 117.0 (1908) |
| 79075 | Rupanyup | VIC | 144.0 | 117.2 (1979) |
| 80002 | Boort | VIC | 148.8 | 135.8 (1921) |

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|---|---|---|---|---|
| 80004 | Canary Island | VIC | 110.9 | 98.6 (1916) |
| 80009 | Coonooer Bridge | VIC | 136.4 | 115.2 (1975) |
| 80017 | Gladfield (Hopefield Estate) | VIC | 103.6 | 102.2 (1916) |
| 80024 | Kerang (Meran Downs) | VIC | 119.8 | 111.2 (1916) |
| 80029 | Lake Marmal | VIC | 120.0 | 117.5 (1916) |
| 80061 | Wedderburn | VIC | 130.5 | 130.2 (1916) |
| 80065 | Yarroweyah | VIC | 115.8 | 114.9 (1916) |
| 81000 | Avoca | VIC | 185.9 | 145.8 (1975) |
| 81002 | Bealiba | VIC | 171.7 | 139.8 (1916) |
| 81006 | Burkes Flat | VIC | 140.6 | 124.6 (1916) |
| 81020 | Inglewood | VIC | 169.6 | 153.9 (1916) |
| 81038 | Natte Yallock | VIC | 164.8 | 120.0 (1960) |
| 81041 | Raywood | VIC | 134.2 | 128.4 (1916) |
| 81047 | Tarnagulla | VIC | 187.8 | 172.7 (1916) |
| 81123/81003 | Bendigo | VIC | 153.4 | 153.0 (1916) |
| 82015 | Eldorado | VIC | 164.9 | 148.6 (1966) |
| 82047 | Tallangatta (Bullioh) | VIC | 196.8 | 195.8 (1992) |
| 82058 | Yackandandah | VIC | 216.6 | 204.4 (1998) |
| 87014 | Bungaree (Kirks Reservoir) | VIC | 212.2 | 209.9 (1916) |
| 88015 | Clunes | VIC | 195.6 | 129.0 (1993) |
| 88042 | Malmsbury Reservoir | VIC | 178.0 | 177.4 (1993) |
| 88043 | Maryborough | VIC | 166.5 | 148.0 (1912) |
| 88056 | Talbot | VIC | 188.4 | 140.1 (1993) |
| 89002 | Ballarat | VIC | 178.2 | 162.9 (1916) |
| 89005 | Beaufort | VIC | 191.2 | 142.3 (1912) |
| 89009 | Cavendish | VIC | 153.4 | 146.6 (1992) |
| 89016 | Lake Bolac | VIC | 138.2 | 117.6 (1984) |
| 89022 | Moutajup | VIC | 148.4 | 143.2 (1908) |
| 89030 | Trawalla | VIC | 192.6 | 143.5 (1964) |
| 89034 | Willaura | VIC | 137.8 | 119.1 (1916) |
| 90173/90103/90044 | Hamilton | VIC | 158.6 | 146.1 (1870) |
| 93014 | Oatlands | TAS | 117.0 | 116.8 (2009) |

**Table 6.** Monthly rainfall records set during September 2016 at locations with more than 100 years of data and selected other locations (shown *). Locations which set records for any month are shown in bold.

| Station number | Station name | State | Value (mm) | Previous record |
|---|---|---|---|---|
| 3027 | Fossil Downs | WA | 246.9 | 205.5 (1978) |
| 14902 | Katherine Council | NT | 155.4 | 93.4 (1882) |
| 15005 | Avon Downs | NT | 217.2 | 161.0 (1978) |
| 17014 | Blinman | SA | 345.3 | 308.5 (1955) |
| 17024 | Farina | SA | 190.5 | 188.0 (1973) |
| 20001 | Boolcoomatta | SA | 216.3 | 209.6 (1890) |
| 20002 | Cockburn | SA | 285.4 | 189.0 (1920) |
| 20017 | Mutooroo | SA | 242.4 | 169.6 (1978) |
| 21025 | Clare (Hill River) | SA | 705.7 | 677.7 (1956) |
| 21027 | Jamestown | SA | 501.6 | 459.6 (1960) |
| 23743 | Victor Harbor (Rivington Grange) | SA | 707.0 | 662.0 (1983) |
| 24008 | Lyrup | SA | 225.6 | 213.8 (1963) |
| 24509 | Dutton | SA | 438.2 | 416.6 (1923) |
| 25010 | Mindarie | SA | 306.0 | 251.9 (1932) |
| 26026 | Robe | SA | 649.2 | 630.6 (2000) |
| 29037 | Miranda Downs | QLD | 186.0 | 149.9 (1920) |
| 29129 | Devoncourt | QLD | 189.8 | 158.0 (1978) |
| 36004 | Aramac | QLD | 326.3 | 323.0 (1886) |
| 36007 | Barcaldine | QLD | 389.5 | 338.7 (1950) |
| 36016 | Coreena | QLD | 353.0 | 324.0 (1983) |
| 36022 | Evesham | QLD | 369.9 | 338.1 (1955) |
| **36031/36030** | **Longreach** | **QLD** | **402.6** | **237.4 (1955)** |
| 36066 | Beaconsfield | QLD | 390.8 | 340.7 (1950) |
| 37001 | Ayrshire Downs | QLD | 318.4 | 257.3 (1955) |
| **37002** | **Baratria** | **QLD** | **433.3** | **282.1 (1978)** |
| 37003 | Barkly Downs | QLD | 227.0 | 193.3 (1968) |
| 37010 | Camooweal | QLD | 200.4 | 182.6 (1978) |
| **37013** | **Chatsworth** | **QLD** | **382.0** | **141.6 (1978)** |
| **37015** | **Corona Downs** | **QLD** | **384.5** | **268.1 (1989)** |
| **37046** | **Elderslie** | **QLD** | **347.2** | **231.5 (1920)** |
| **37049** | **Warnambool Downs** | **QLD** | **442.8** | **313.7 (1920)** |
| 37098 | Noonbah | QLD | 354.7 | 261.0 (1920) |
| 38003 | Boulia | QLD | 244.0 | 193.6 (1978) |
| 38014 | Marion Downs | QLD | 246.9 | 217.3 (1978) |
| 38015 | Monkira | QLD | 236.3 | 232.1 (1916) |
| 38020 | Roseberth | QLD | 183.0 | 179.4 (1916) |
| 38024 | Windorah | QLD | 270.0 | 244.7 (1978) |
| 44042 | Hebel | QLD | 376.6 | 360.3 (1920) |

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|---|---|---|---|---|
| 45003 | South Comingin | QLD | 265.4 | 249.4 (1920) |
| 46015 | Broken Hill (Langawirra) | NSW | 279.2 | 232.4 (1978) |
| 46022 | Wilcannia (Mount Murchison) | NSW | 298.0 | 217.1 (1890) |
| 46043 | Wilcannia (Reid St) | NSW | 318.3 | 227.4 (1956) |
| 47013 | Pooncarie (Karpa Kora) | NSW | 302.9 | 251.8 (1978) |
| 47019 | Menindee | NSW | 302.9 | 253.4 (1886) |
| 47031 | Stephens Creek Reservoir | NSW | 270.6 | 248.3 (1978) |
| 48027/48030 | Cobar | NSW | 383.0 | 292.6 (1998) |
| **48034** | **Cobar (Double Gates)** | **NSW** | **427.5** | **294.4 (1921)** |
| 48057 | Louth | NSW | 314.9 | 286.4 (1886) |
| 48074 | Tilpa | NSW | 313.4 | 248.4 (1956) |
| 48079 | Wanaaring | NSW | 349.8 | 305.9 (1998) |
| 49008 | Hatfield (Clare) | NSW | 298.5 | 271.0 (1978) |
| 49049 | Hatfield (Benilkie) | NSW | 334.5 | 321.6 (1978) |
| **50011** | **Tottenham (Burdenda)** | **NSW** | **489.8** | **382.9 (1998)** |
| 50014 | Condobolin | NSW | 448.8 | 361.1 (1998) |
| 50016 | Goonumbla (Coradgery) | NSW | 466.8 | 416.9 (1891) |
| **50018** | **Dandaloo** | **NSW** | **551.7** | **445.8 (1998)** |
| 50020 | Warroo (Geeron) | NSW | 440.5 | 358.9 (1891) |
| **50031** | **Peak Hill** | **NSW** | **572.6** | **460.7 (1916)** |
| **50034** | **Nevertire (Beverley)** | **NSW** | **539.0** | **374.8 (1998)** |
| 50037 | Tullamore | NSW | 468.4 | 438.4 (1998) |
| **50039** | **Dandaloo (Tyrie Homestead)** | **NSW** | **569.0** | **338.7 (1897)** |
| **50040** | **Ungarie** | **NSW** | **453.0** | **341.9 (1956)** |
| 50045 | Yalgogrin North | NSW | 446.0 | 445.3 (1931) |
| 51004 | Trangie (Old Bundemar) | NSW | 443.3 | 436.5 (1998) |
| **51008** | **Wyanga (Barcoo)** | **NSW** | **516.6** | **392.2 (1998)** |
| 51026 | Hermidale Tank | NSW | 383.4 | 286.7 (1998) |
| 51031 | Nyngan (Canonbar) | NSW | 460.6 | 377.0 (1996) |
| 51033 | Nyngan (Mudall) | NSW | 418.4 | 362.2 (1998) |
| 51038 | Nevertire | NSW | 512.1 | 428.2 (1998) |
| 51039 | Nyngan | NSW | 412.4 | 390.3 (1996) |
| 55058 | Turrawan (Wallah) | NSW | 455.5 | 453.4 (1920) |
| 56007 | Tingha (Crystal Hill) | NSW | 687.2 | 641.4 91978) |
| 62013 | Gulgong | NSW | 511.7 | 489.4 (1998) |
| 62014 | Hargraves | NSW | 769.0 | 724.3 (1998) |
| 62021 | Mudgee (George St) | NSW | 556.2 | 537.5 (1879) |
| 62032 | Wollar | NSW | 488.8 | 461.0 (1998) |
| 63005 | Bathurst Agricultural Research | NSW | 480.0 | 468.2 (1950) |
| 63022 | Cowra Agricultural Research | NSW | 468.2 | 448.5 (1998) |

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|---|---|---|---|---|
| 63029 | Mandurama (Gallymont) | NSW | 799.6 | 663.2 (1981) |
| 63073 | Rockley | NSW | 555.8 | 513.6 (1952) |
| 65000 | Arthurville (Cramond) | NSW | 550.4 | 467.4 (1998) |
| 65013 | Eugowra | NSW | 468.0 | 457.7 (1998) |
| 65020 | Manildra | NSW | 521.6 | 424.4 (1998) |
| 65022 | Manildra (Hazeldale) | NSW | 601.4 | 539.1 (1916) |
| 65023 | Molong | NSW | 607.8 | 550.2 (1950) |
| 65034 | Wellington | NSW | 550.0 | 522.0 (1916) |
| 65036 | Yeoval | NSW | 542.9 | 452.4 (1998) |
| 65068/65026 | Parkes | NSW | 502.8 | 488.2 (1998) |
| 70025 | Crookwell | NSW | 690.6 | 687.0 (1923) |
| 72000 | Adelong | NSW | 710.2 | 708.9 (1931) |
| 72008 | Tarcutta (Wollumbi) | NSW | 606.8 | 560.8 (1916) |
| 72150/72151 | Wagga Wagga | NSW | 514.4 | 488.8 (1978) |
| **73000** | **Barmedman** | **NSW** | **500.3** | **335.4 (1931)** |
| 73007 | Burrinjuck Dam | NSW | 894.5 | 872.5 (1956) |
| **73014** | **Grenfell** | **NSW** | **639.0** | **515.8 (1931)** |
| 73017 | Greenethorpe | NSW | 525.0 | 465.2 (1960) |
| 73019 | Junee | NSW | 527.6 | 448.9 (1931) |
| **73025** | **Old Junee** | **NSW** | **579.9** | **439.6 (1931)** |
| **73036** | **Stockinbingal** | **NSW** | **640.5** | **469.0 (1931)** |
| **73037** | **Temora** | **NSW** | **612.4** | **465.6 (1993)** |
| **73043** | **Wallendbeen (Corang)** | **NSW** | **701.5** | **562.5 (1923)** |
| 73044 | Wantabadgery | NSW | 535.6 | 467.7 (1923) |
| **73054** | **Wyalong** | **NSW** | **484.2** | **357.3 (1931)** |
| 73100 | Bumbaldry | NSW | 640.7 | 563.4 (1956) |
| 73124 | Eurongilly (Bundaleer) | NSW | 479.4 | 409.1 (1931) |
| 73127 | Wagga Wagga Ag Institute | NSW | 534.7 | 464.7 (1931) |
| **73138/73056** | **Young** | **NSW** | **644.0** | **542.0 (1931)** |
| 73142/73009 | Cootamundra | NSW | 583.1 | 500.6 (1923) |
| 74002 | Ariah Park | NSW | 505.7 | 408.9 (1931) |
| **74005** | **Barellan** | **NSW** | **497.3** | **348.6 (1889)** |
| **74008** | **Grong Grong (Berembed)** | **NSW** | **488.4** | **384.3 (1916)** |
| 74033 | Coolamon | NSW | 486.2 | 414.7 (1916) |
| 74034 | Corowa | NSW | 492.3 | 472.6 (1981) |
| 74040 | Jerilderie (Pooginook) | NSW | 417.7 | 362.2 (1956) |
| 74050 | Grong Grong | NSW | 484.0 | 414.3 (1916) |
| 74064 | Lockhart | NSW | 485.6 | 455.6 (1978) |
| 74081 | Mulwala | NSW | 462.6 | 403.6 (1917) |
| 74087 | Urana (Nowranie) | NSW | 409.6 | 383.4 (1956) |

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|---|---|---|---|---|
| 74106 | Tocumwal | NSW | 417.3 | 394.5 (1956) |
| 74110 | Urana | NSW | 430.7 | 387.5 (1956) |
| 74129 | Mathoura Station | NSW | 342.3 | 324.4 (1889) |
| **74179** | **Tootool (Toronto)** | **NSW** | **525.3** | **412.8 (1960)** |
| **75006** | **Binya** | **NSW** | **476.0** | **352.0 (1889)** |
| **75007** | **Booligal (Belmont)** | **NSW** | **330.6** | **326.8 (1956)** |
| **75032** | **Hillston** | **NSW** | **464.9** | **278.8 (1988)** |
| 75039 | Lake Cargelligo | NSW | 399.9 | 321.2 (1978) |
| 75047 | Hay (Mulberrygong) | NSW | 370.6 | 320.1 (1956) |
| 75049 | Maude (Nap Nap) | NSW | 304.7 | 296.1 (1906) |
| 76047 | Ouyen | VIC | 287.0 | 283.6 (1923) |
| 78000 | Warracknabeal (Ailsa) | VIC | 342.9 | 342.4 (1996) |
| 79016 | Warranooke (Glenorchy) | VIC | 399.8 | 395.6 (1981) |
| 79075 | Rupanyup | VIC | 401.2 | 365.6 (1915) |
| 80002 | Boort | VIC | 370.4 | 352.7 (1921) |
| 80029 | Lake Marmal | VIC | 360.5 | 355.5 (1917) |
| 81000 | Avoca | VIC | 489.1 | 476.3 (1956) |
| 81002 | Bealiba | VIC | 417.2 | 406.6 (1909) |
| 81020 | Inglewood | VIC | 435.8 | 407.8 (1956) |
| 82000 | Barnawartha | VIC | 571.8 | 536.0 (1974) |
| 82010 | Chiltern | VIC | 665.9 | 628.0 (1981) |
| 82029 | Milawa | VIC | 537.8 | 530.7 (1917) |
| 82047 | Tallangatta (Bullioh) | VIC | 768.2 | 767.7 (1917) |
| 88020 | Daylesford | VIC | 846.8 | 799.3 (1956) |
| 88043 | Maryborough | VIC | 433.9 | 430.8 (1909) |
| 89009 | Cavendish | VIC | 517.1 | 510.4 (1923) |
| 89016 | Lake Bolac | VIC | 407.2 | 392.6 (1942) |
| 89022 | Moutajup | VIC | 502.6 | 490.6 (1923) |
| 89034 | Willaura | VIC | 407.6 | 398.6 (1983) |
| 89085/89000 | Ararat | VIC | 503.9 | 493.2 (1960) |
| **91109** | **Yolla** | **TAS** | **1417.1** | **1252.5 (1906)** |
| 92002 | Avoca | TAS | 507.0 | 505.5 (1923) |
| 92006 | Buckland (Brockley) | TAS | 593.0 | 570.7 (1956) |
| 92029 | Ormley | TAS | 501.1 | 487.7 (1905) |
| 93014 | Oatlands | TAS | 488.5 | 434.8 (1956) |
| 96046 | Miena Dam | TAS | 731.4 | 653.3 (1917) |

**Table 7.** Locations with 100 years or more of data which have set records for the highest May to September rainfall. Locations which have exceeded the previous record by 100 millimetres or more are shown in bold.

# References and further information

This statement is based on information available as of 31 May 2017. These data are subject to further Bureau quality control processes. This edition of the statement incorporates substantial additional rainfall data received since October. A small number of observations in Tables 6 and 7 of the original edition have been removed following quality control processes.