



# Monana

THE OFFICIAL PUBLICATION OF THE AUSTRALIAN  
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October 2018

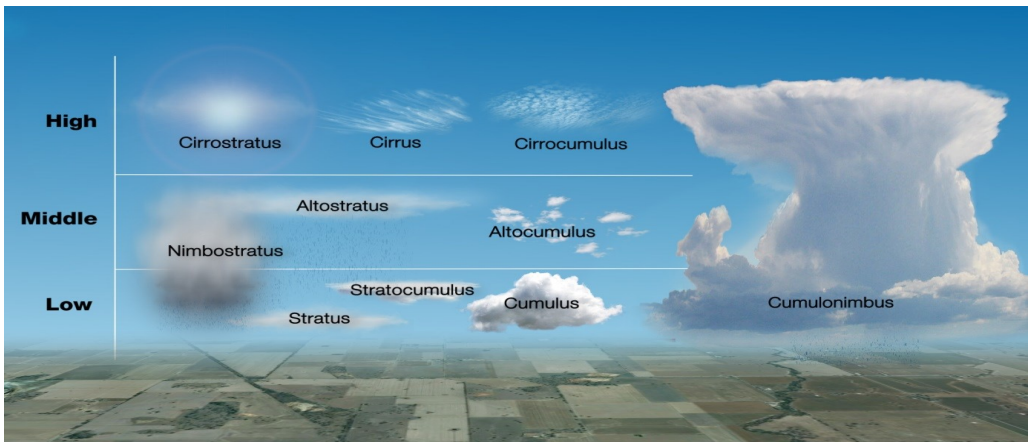


Beth and Rowland

## What Cloud is that?

Rowland Beardswell, a Bureau of Meteorology Observer, stationed at Adelaide Airport, walked us through an entertaining session of cloud identification at the August 2018 meeting of AMeta. Cloud height and type are essential components of a weather report from any airport, not only for visual flying conditions but also to alert pilots of possible hazards of icing and turbulence. Clouds are firstly described by their base as - Low (below ~8,000ft), Middle (~8,000-22,000ft ) or High (above ~22,000ft). Feet (rather than metres) are used to describe height as these are the official aeronautical units of length (and it could be deemed a safety issue – if such an entrenched length unit was to be changed) . Next, clouds are identified as stratiform or cumuliform:

**Stratiform** or layer clouds, such as, cirrostratus or altostratus generally form in stable conditions when moist air is gently forced upwards, often over a broad and long trajectory – eg such as warm air being lifted ahead of colder denser air behind a cold front. Cirrostratus forms a continuous covering of the sky, it is made of ice crystals and produces a halo around the moon. Tufts or wisps of high level cloud are called cirrus. They are often the remnants of powerful cumulonimbus. Alto stratus is often seen as layers of middle level stratiform cloud. When this stratiform cloud becomes thick, its base lowers and it produces precipitation it is known as nimbostratus. Low level stratus can form when say, fog lifts slowly in the morning and an inversion prevents the vertical extent of the lifted fog.



**Cumuliform** clouds form in unstable conditions – when pockets of moist relatively warm air rise and the moisture condenses. In the upper and middle levels, these individual ‘puffs’ of cloud are known as cirrocumulus and altocumulus, respectively.

In the lower levels cumuliform clouds are formed by relatively cool moist air moving over a warmer surface or, especially in summer, when the ground is heated by the sun, warms the air above and it rises in ‘thermals’. As it rises it cools and may reach the condensation level – the base of a cumulus cloud. Condensation causes latent heat to be released – warming the rising air and making it more buoyant. In relatively stable conditions ‘fair weather’ cumulus, just a few thousand feet in depth form, but if unstable conditions exist (ie relatively cool air aloft) towering cumulus – perhaps

10,000 ft in depth are formed and, in very unstable conditions these can quickly become cumulonimbus with accompanying heavy rainshowers and thunderstorms. Because cumulonimbus reach the tropopause – a relatively warm layer of air - anywhere between 15,000ft in cold winter conditions – to above 40,000ft above mean sea level in the tropics, they are often distinguishable by their ‘anvil’. See the flat top on the cumulonimbus in Fig 1.



Fig 2. A growing cumulonimbus. You can see the energy and power in this photo. Severe turbulence in the up- and down-drafts is a feature of cumulonimbus clouds. (Photo by Mac Benoy)

Cumulonimbus are a particular hazard for aviation due to the severe icing and turbulence existing within the cloud. Icing is also a hazard of thick middle level cloud – especially nimbostratus. It occurs when super cooled cloud droplets (ie droplets remaining in the liquid state even though the temperature is below zero) impact on the leading edge of the wings, causing immediate freezing and the accumulation of ice which quickly weakens the aerodynamic features.

While discussion focussed on the main cloud types, a number of photos of interesting and less common cloud formations (eg orographic and wave clouds) were provided by members. We will try to include an explanation of some of these in future Monanas. Thanks to all members who contributed their photo's to make it a successful night.

## **Greater Adelaide in August 2018: wetter than average**

Rainfall for August was above average throughout Adelaide and the Hills, with most rain falling in the first half of the month. Both daytime and night time temperatures were warmer than average, with the warmest conditions arriving late in the month.

### **Wet first half of the month**

- A series of cold fronts brought regular rainfall in the first half of August
- The highest daily rainfall total for the month was 65.2 mm at Lenswood on the 6th, when several other sites in the Hills also recorded more than 50 mm
- Weather conditions were more settled later in the month, until a cold front and low pressure trough brought strong winds and rain on the last day of the month
- Adelaide had 16 rain days for the month, equalling its August long-term average
- August rainfall totals ranged from 103% of average at Rosedale to 149% of average at Noarlunga
- On the 3rd, McLaren Vale had its highest August daily rainfall on record

### **Warmer than average**

- Daytime temperatures were slightly warmer than average at most sites
- After a week of mostly warmer than average days, all sites across Adelaide and Hills had their highest temperatures for the month of the 29th
- The highest temperature for the month was 26.3°C at Adelaide Airport on the 29th
- Mean maximum temperatures for August ranged from 0.1°C cooler than average at Mount Crawford to 1.0°C warmer than average at Mount Lofty
- Night time temperatures were warmer than average at most sites during August
- Warm northerly winds on the 30th resulted in the Adelaide city sites, Adelaide Airport, and Parafield Airport all having their warmest August night on record
- For the city sites on the 30th, Kent Town had an overnight low of 19.4°C and West Terrace / ngayirdapira had 19.2 °C, both of which were warmer than the previous warmest August night in the city of 18.4 °C on 30 August 1993 at Kent Town
- Mean minimum temperatures ranged from 0.1°C cooler than average at Mount Crawford and Rosedale to 1.7°C warmer than average at Adelaide Airport
- Adelaide Airport had its highest August mean daily minimum temperature on record
- Edinburgh RAAF and Parafield Airport had their highest August mean daily minimum temperature since at least 1991

### **Adelaide (West Terrace / ngayirdapira)**

- Total rainfall for Adelaide (West Terrace / ngayirdapira) was 76.8 mm, which is 124% of the long-term average of 61.8 mm
- The mean daily maximum temperature for Adelaide (West Terrace / ngayirdapira) was 17.0 °C, which is 0.9 °C above the long-term average of 16.1 °C. The warmest day was 25.4 °C on the 29th, and the coolest day was on the 11th when the temperature reached 12.3 °C
- The mean daily minimum temperature for Adelaide (West Terrace / ngayirdapira) was 9.5 °C, which is 1.5 °C above the long-term average of 8.0 °C. The coldest morning was 4.1 °C on the 26th, and the warmest morning was on the 30th when the minimum temperature was 19.2 °C

## Strong winds

- Several sites around Greater Adelaide had their windiest August in at least 10 years; Adelaide Airport, Parafield Airport, Edinburgh RAAF, Mount Crawford, Noarlunga, and Kuitpo Forest Reserve all had the highest mean daily wind run for August in at least 10 years
- The strongest wind gusts recorded in August were 93 km/h at Adelaide Airport, Kuitpo Forest Reserve, and Outer Harbour (Black Pole) on the 30th
- On the 30th, wind gusts in excess of 80 km/h were recorded at many sites around Adelaide, bringing down trees and power lines

## Extremes in August 2018

Hottest day	26.3 °C at Adelaide Airport on the 29th
Warmest days on average	17.3 °C at Adelaide (Kent Town)
Coollest days on average	10.9 °C at Mount Lofty
Coldest day	5.5 °C at Mount Lofty on the 6th
Coldest night	-0.7 °C at Rosedale on the 26th
Coollest nights on average	5.3 °C at Mount Lofty
Warmest nights on average	9.7 °C at Noarlunga
Warmest night	20.0 °C at Noarlunga on the 30th
Warmest on average overall	13.3 °C at both Adelaide sites
Coollest on average overall	8.1 °C at Mount Lofty
Wettest overall	209.9 mm at Uraidla
Driest overall	52.6 mm at Gawler
Wettest day	65.2 mm at Lenswood on the 6th
Strongest wind gust	93 km/h at Adelaide Airport, Kuitpo Forest Reserve, and Outer Harbour on the 30 <sup>th</sup>

## Some notable statistics for August were:

### Record highest August daily rainfall

	New record (mm)	Old record	Duration
McLaren Vale	28.8 on the 3rd	26.2 on the 3rd in 2004	25

### Record highest August total rainfall

	New record (mm)	Old record	Years Held	August Average
Brownhill Creek	114.6	109.2 in 2010	20	66.4

### Record highest August daily minimum temperature

	New record (°C)	Old record	Duration	Average
West Terrace	19.2 on the 30th	16.9 on the 25th in 1935	94	8.0
Adelaide Airport	19.2 on the 30th	18.3 on the 30th in 1993	64	7.6
Parafield Airport	18.4 on the 30th	16.4 on the 25th in 1999	62	6.7
Kent Town	19.4 on the 30th	18.4 on the 30th in 1993	42	8.1

### Record highest August mean daily minimum temperature

	New record (°C)	Old record	Duration	August Average
Adelaide Airport	9.3	9.2 in 2013	63	7.6

# Adelaide (West Terrace / Ngayirdapira), South Australia August 2018 Daily Weather Observations

The official site for Adelaide, having reopened in May 2017.

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am			3pm								
		Min °C	Max °C				Dirn	Spd km/h	Time	Temp °C	RH %	Cid	Dirn	Spd km/h	MSLP hPa	Temp °C	RH %	Cid	Dirn	Spd km/h	MSLP hPa
1	We	9.6	16.9	2.2			NNE	50	11.8	94	N	6	1021.2	15.9	60	NNE	4	1018.7			
2	Th	11.7	22.4	19.2			W	50	16.6	37	NNE	24	1010.8	20.5	26	N	20	1006.0			
3	Fr	8.9	14.2				NNW	49	06.07	95	NNW	9	1004.8	12.1	65	W	28	1007.1			
4	Sa	9.5	17.9	1.2			NNW	58	10.55	66	N	19	1009.7	17.4	43	NNW	28	1006.7			
5	Su	12.3	15.5	0.2			NNW	49	10.21	40	N	13	1000.6	10.9	85	W	26	999.4			
6	Mo	8.0	13.1	15.6			NW	46	02.54	83	WSW	15	1005.6	12.4	70	WSW	19	1006.9			
7	Tu	7.1	14.2	9.4			NW	48	21.45	97	NNE	9	1013.8	13.3	68	NW	22	1012.3			
8	We	9.6	15.7	2.6			NNW	50	00.18	83	W	13	1014.6	14.4	62	WSW	19	1017.2			
9	Th	10.6	19.8	0.4			NNW	48	15.40	60	NNE	15	1019.7	19.3	47	N	20	1014.0			
10	Fr	13.3	17.0	0			NNW	48	10.36	15.2	40	NNE	13	1008.6	11.9	86	SSW	7	1005.4		
11	Sa	7.5	12.3	7.4			W	50	11.03	10.1	69	W	15	1012.9	12.0	57	WSW	24	1014.5		
12	Su	6.9	15.0	3.0			SW	31	00.20	10.9	80	N	7	1025.7	14.2	71	W	17	1026.0		
13	Mo	9.9	15.1	1.6			WSW	24	03.29	11.6	87	WSW	7	1030.3	14.7	66	NW	9	1028.3		
14	Tu	8.5	18.1	0			N	39	16.31	11.9	66	N	17	1024.2	17.6	50	NNW	20	1017.4		
15	We	11.8	16.9	0			WNW	44	12.49	13.6	75	NW	15	1013.2	12.9	73	WSW	22	1012.8		
16	Th	6.9	14.7	2.2			W	28	14.28	10.6	79	N	9	1017.7	11.6	75	WSW	15	1016.6		
17	Fr	7.5	16.3	0			WSW	48	19.50	9.7	84	N	13	1016.1	15.7	61	NW	22	1011.9		
18	Sa	8.8	13.7	4.2			WSW	48	11.24	11.1	72	WSW	20	1017.9	13.1	55	WSW	24	1019.9		
19	Su	7.5	14.0	1.4			SSW	39	01.08	10.9	64	SSW	11	1030.1	12.5	53	S	15	1030.2		
20	Mo	5.2	13.5	0.2			NNW	28	15.01	8.2	70	NE	11	1029.6	12.2	61	NW	15	1025.6		
21	Tu	7.9	15.6	0			NNW	28	11.04	9.3	72	N	9	1022.0	14.4	50	WSW	7	1017.3		
22	We	7.3	20.7	0			N	31	11.04	13.7	43	NE	13	1014.2	20.4	24	N	17	1010.5		
23	Th	13.7	20.8	0			NNW	44	11.29	16.4	24	NE	15	1012.3	18.3	24	NE	11	1013.8		
24	Fr	14.7	20.4	0			ENE	35	00.22	16.4	34	SE	9	1021.9	19.8	25	SE	17	1020.4		
25	Sa	6.0	19.1	0			SW	26	14.33	13.8	54	NW	4	1022.8	17.2	53	WSW	15	1019.1		
26	Su	4.1	15.9	0			WSW	26	13.04	11.5	66	N	2	1022.2	15.1	65	WSW	15	1021.4		
27	Mo	8.5	16.3	0			E	31	09.19	11.9	57	E	15	1026.7	16.1	48	E	4	1024.2		
28	Tu	9.8	19.2	0			ENE	31	08.05	13.2	38	NE	17	1022.4	18.8	36	N	17	1017.7		
29	We	13.1	25.4	0			NE	46	09.51	19.2	27	NNE	20	1015.2	25.0	19	NNE	20	1010.4		
30	Th	19.2	20.1	0			NNW	70	11.35	19.6	24	NNE	24	1004.7	12.9	89	W	6	1002.9		
31	Fr	10.3	16.0	6.0			SW	37	21.29	11.3	91	N	15	999.2	15.5	72	WSW	15	1004.5		
<b>Statistics for August 2018</b>																					
Mean		9.5	17.0							12.6	63			1016.5	15.4	56			16	1014.8	
Lowest		4.1	12.3							8.2	24			999.2	10.9	19		#	4	999.4	
Highest		19.2	25.4	19.2			NNW	70	19.6	95		#	24	1030.3	25.0	89		#	28	1030.2	
Total				76.8																	

Observations were drawn from Adelaide (West Terrace / Ngayirdapira) [station 023000]

This is now the "official" site for Adelaide, having reopened in May 2017. Observations are also available from the Kent Town site (station number 023060).

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## South Australia in August 2018

Rainfall in August was above average in many coastal areas of South Australia, but Eastern Eyre Peninsula had another month of drier than average conditions. Daytime temperatures were warmer than average across most of South Australia. Nights were warmer than average in agricultural districts, but clear skies and dry soils meant that night time temperatures were cooler than average in the State's northeast.

### **Wet in many coastal areas**

- Rainfall in August was above average in many coastal areas of South Australia, including the West Coast, Lower Eyre Peninsula, southern Yorke Peninsula, Kangaroo Island, and the Lower South East
- August was drier than average in some agricultural districts including the Eastern Eyre Peninsula and southern parts of the Murraylands, along with isolated patches of the Flinders and Northeast Pastoral districts
- A cold front and low pressure trough brought rainfall to most parts of the State on the 31st, with totals in excess of 10 mm in southern and central districts and accounted for more than half of the monthly total in areas of the Northeast Pastoral district
- With that widespread rain at the end of the month, August rainfall was 20% above average for South Australia as a whole, breaking a run of six consecutive drier than average months
- Early in the month, a few sites had their highest August daily rainfall on record
- Many sites had either their highest total August rainfall on record or their highest total August rainfall for at least 20 years

### **Mild days**

- Daytime temperatures for August were warmer than average across most of South Australia; days were slightly cooler than average in the far southeast corner
- The mean maximum temperature for South Australia as a whole was 1.13 °C warmer than average, continuing a run of 16 consecutive months of above average maximum temperatures for the State
- Night time temperatures were warmer than average across most of the west and south of the State, but were cooler than average in the northeast, where clear skies and dry soils allowed the air to cool overnight
- The mean minimum temperature for South Australia as a whole was 0.46 °C warmer than average
- On the 5th, Stenhouse Bay had its coldest August day on record
- On the 30th, many sites had their warmest August night on record
- Adelaide Airport had its highest August mean daily minimum temperature on record, and Edinburgh RAAF and Parafield Airport had their highest August mean daily minimum temperature for at least 20 years

### **Strong winds at times**

- The first half of August was particularly windy across South Australia
- Most sites away from the southern coast had their windiest August for at least ten years; Adelaide Airport and Woomera Aerodrome had their highest total wind run for August in more than 20 years, up to 35% above average

- The strongest recorded wind gust in the State was 113 km/h at Port Pirie Aerodrome on the 30th, but gusts in excess of 100 km/h were also recorded at Cape Willoughby, Cleve Aerodrome, and Neptune Island during the month

### Extremes in August 2018

Hottest day	31.5 °C at Moomba Airport on the 30th
Warmest days on average	23.4 °C at Oodnadatta Airport
Coollest days on average	10.9 °C at Mount Lofty
Coldest day	5.5 °C at Mount Lofty on the 6th
Coldest night	-4.1 °C at Yunta Airstrip on the 20th
Coollest nights on average	3.8 °C at Yongala
Warmest nights on average	11.1 °C at Neptune Island
Warmest night	20.9 °C at Port Pirie Aerodrome on the 30th
Warmest on average overall	15.4 °C at Oodnadatta Airport
Coollest on average overall	8.1 °C at Mount Lofty
Wettest overall	209.9 mm at Uraidla
Driest overall	2.2 mm at Moomba Airport
Wettest day	65.2 mm at Lenswood on the 6th
Strongest wind gust	113 km/h at Port Pirie Aerodrome on the 30 <sup>th</sup>

### Some notable statistics for August were:

#### Record highest August daily rainfall

	New record (mm)	Old record	Duration
McLaren Vale	28.8 on the 3rd	26.2 on the 3rd in 2004	25
Edithburgh	18.8 on the 6th	17.8 on the 4th in 2004	27
Wudinna Aero	26.8 on the 3rd	17.0 on the 21st in 2015	20

#### Record highest August total rainfall

	New record (mm)	Old record	Duration	August Average
Mount Hope	139.4	117.9 in 1971	105	58.5
Kyancutta	84.6	80.6 in 1939	89	39.2
Minnipa	86.2	84.8 in 2015	23	39.6
Stenhouse Bay	113.2	98.6 in 2005	23	61.1
Brownhill Creek	114.6	109.2 in 2010	20	66.4
Wudinna	80.0	64.8 in 2000	20	36.5

#### Record highest August total rainfall

	New record (mm)	Old record	Duration	August Average
Mount Hope	139.4	117.9 in 1971	105	58.5
Kyancutta	84.6	80.6 in 1939	89	39.2
Minnipa	86.2	84.8 in 2015	23	39.6
Stenhouse Bay	113.2	98.6 in 2005	23	61.1
Brownhill Creek	114.6	109.2 in 2010	20	66.4
Wudinna	80.0	64.8 in 2000	20	36.5

<b>Record highest August daily minimum temperature</b>				
	<b>New record (°C)</b>	<b>Old record</b>	<b>Years Held</b>	<b>Mean</b>
West Terrace	19.2 on the 30th	16.9 on the 25th in 1935	94	8.0
Adelaide Airport	19.2 on the 30th	18.3 on the 30th in 1993	64	7.6
Parafield Airport	18.4 on the 30th	16.4 on the 25th in 1999	62	6.7
Yongala	13.7 on the 30th	12.0 on the 6th in 1973	61	2.5
Kent Town	19.4 on the 30th	18.4 on the 30th in 1993	42	8.1
Maitland	15.0 on the 30th	14.5 on the 15th in 2017	38	7.2
Whyalla	20.6 on the 30th	15.9 on the 21st in 2009	34	5.9
Kingscote	14.9 on the 30th	14.5 on the 3rd in 2005	25	5.7
Parawa	15.1 on the 30th	13.2 on the 28th in 2005	25	7.1
Minnipa	15.5 on the 29th	15.3 on the 27th in 2007	23	6.8
Roxby Downs	18.5 on the 30th	17.0 on the 30th in 2005	21	5.4
Snowtown	16.5 on the 30th	14.0 on the 15th in 2017	21	4.2
Tarcoola	17.6 on the 29th	= 17.6 on the 20th in 2015	20	5.6

**Record lowest August daily maximum temperature**

	<b>New record (°C)</b>	<b>Old record</b>	<b>Duration</b>	<b>Average</b>
Stenhouse Bay	11.1 on the 5th	11.4 on the 20th in 2003	23	16.2

**All the detail you could possibly want and more is available on the BoM website.**

Visit <http://www.bom.gov.au/climate> and wander through the various archived

**Record highest August mean daily minimum temperature**

	<b>New record (°C)</b>	<b>Old record</b>	<b>Duration</b>	<b>August Average</b>
Adelaide Airport	9.3	9.2 in 2013	63	7.6

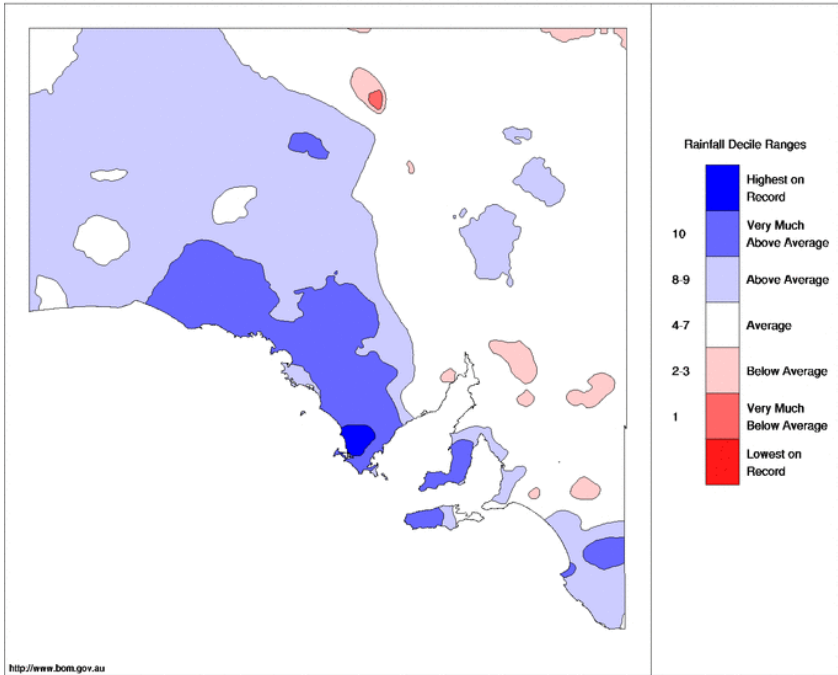
*Many other rainfall & temperature records were also set in August. For more information plus a summary of statistics please see:*

*<http://www.bom.gov.au/climate/current/month/sa/archive/201808.summary.shtml>*



South Australian Rainfall Deciles August 2018

Distribution Based on Gridded Data  
Australian Bureau of Meteorology

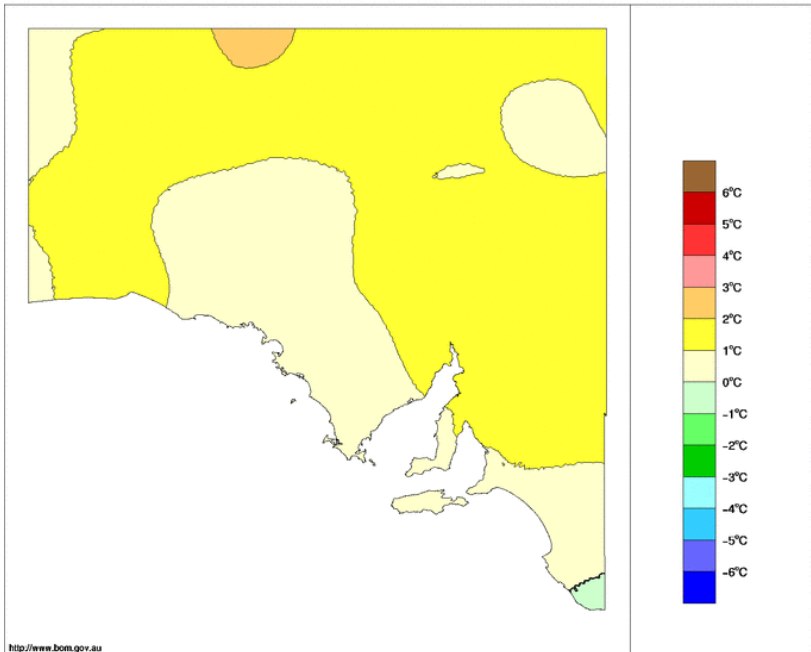


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Maximum Temperature Anomaly (°C) August 2018

Australian Bureau of Meteorology



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## Greater Adelaide in winter 2018: drier than average; mild days

Rainfall totals in winter were average to below average in Adelaide and the Hills. Both daytime and night time temperatures were warmer than average.

### Slightly drier than average

- Rainfall in winter was slightly below average throughout Adelaide and the Hills
- June and July were generally drier than average months for Greater Adelaide, but August rainfall totals were above average
- Winter rainfall totals ranged from 69% of the long-term average at Edinburgh RAAF to 93% at Mount Lofty

### Mild days

- Daytime temperatures were warmer than average across Adelaide and Hills
- Mean maximum temperatures ranged from 0.3 °C warmer than average at Mount Crawford to 1.1 °C warmer than average at Mount Barker and Mount Lofty
- Night time temperatures were closer to average than daytime temperatures, but still above average at most sites
- Warm northerly winds on the 30th resulted in some sites having their warmest winter night on record
- Mean minimum temperatures ranged from 0.6 °C cooler than average at Rosedale to 1.0 °C warmer than average at Mount Barker

### Adelaide (West Terrace / ngayirdapira)

- Total rainfall was 177.0 mm, which is 89% of the long-term average of 199.3 mm
- The mean daily maximum temperature was 16.3 °C, which is 0.7 °C above the long-term average of 15.6 °C. The warmest day was 25.4 °C on 29 Aug, and the coolest day was on 19 Jul when the temperature reached 12.2 °C
- The mean daily minimum temperature was 8.6 °C, which is 0.6 °C above the long-term average of 8.0 °C. The coldest morning was 2.9 °C on 28 Jun, and the warmest morning was on 30 Aug when the minimum temperature was 19.2 °C
- **Strong winds**
- The strongest wind gust recorded around Greater Adelaide in winter was 117 km/h at Mount Crawford on 17 July
- July and August were particularly windy, with Adelaide Airport having its highest total wind run for August in at least 20 years

### Extremes in winter 2018

Hottest day	26.3 °C at Adelaide Airport on 29 Aug
Warmest days on average	16.7 °C at Parafield Airport
Coollest days on average	10.4 °C at Mount Lofty
Coldest day	5.5 °C at Mount Lofty on 6 Aug
Coldest night	-1.5 °C at Mount Barker on 26 Jun
Coollest nights on average	5.2 °C at Rosedale (Turretfield Research Centre)
Warmest nights on average	9.2 °C at Noarlunga
Warmest night	20.0 °C at Noarlunga on 30 Aug
Warmest on average overall	12.5 °C at West Terrace and Noarlunga
Coollest on average overall	7.9 °C at Mount Lofty
Wettest overall	479.1 mm at Uraidla
Driest overall	97.0 mm at Gawler

Wettest day 65.2 mm at Lenswood on 6 Aug  
 Strongest wind gust 117 km/h at Mount Crawford AWS on 17 Jul

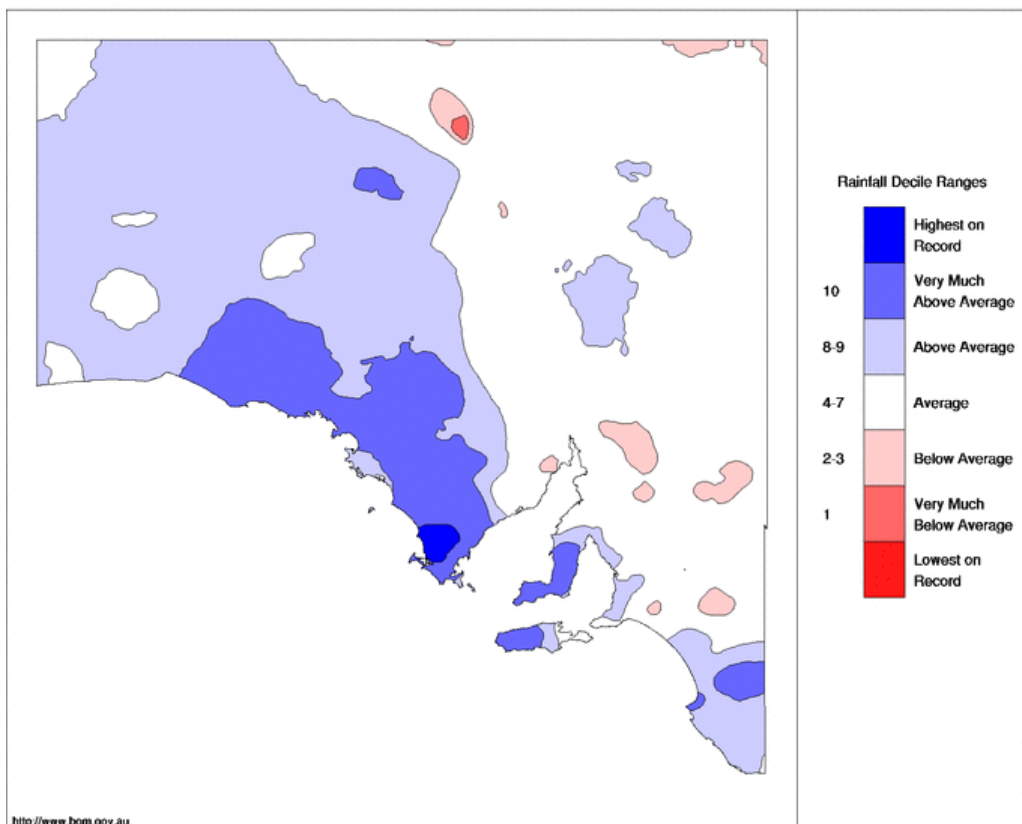
**Some notable statistics for Winter were:**

**Record highest winter daily minimum temperature**

	<b>New record°C)</b>	<b>Old record</b>	<b>Duration</b>	<b>Average</b>
West Terrace	19.2 on 30 Aug	17.3 on 9 Jun 1919	94	8.0
Adelaide Airport	19.2 on 30 Aug	18.3 on 30 Aug 1993	64	7.4
Parafield Airport	18.4 on 30 Aug 1	6.4 on 25 Aug 1999	62	6.7
Kent Town	19.4 on 30 Aug	18.4 on 30 Aug 1993	42	7.9

**For more information on Winter’s temperatures and rainfall plus a summary of**

South Australian Rainfall Deciles August 2018  
 Distribution Based on Gridded Data  
 Australian Bureau of Meteorology



<http://www.bom.gov.au>

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**statistics please see:**

<http://www.bom.gov.au/climate/current/season/sa/archive/201808.adelaide.shtml>

## **South Australia in winter 2018: mild days and cool nights**

Rainfall in winter was below average in many areas, although the Lower South East and West Coast districts had average to above average rainfall. Daytime temperatures were warmer than average for all districts except the Lower South East. Nights were very much cooler than average in eastern parts of the Northeast Pastoral district.

### **Drier than average for most of the State**

- Much of eastern & northern South Australia had below average rainfall for winter
- Some agricultural areas, including eastern parts of Eastern Eyre Peninsula and northern Yorke Peninsula, were very much drier than average
- Winter rainfall was average to above average in the Lower South East, where rainfall totals were above average in each month of the season
- For the State as a whole, winter rainfall was 24% below average
- Cowell had its lowest total winter rainfall since 1982

### **Mild days and cool nights**

- Daytime temperatures were above average across most of South Australia; only the Lower South East had average to cooler than average days for winter
- The mean maximum temperature for South Australia as a whole was 1.29 °C warmer than average; ninth-warmest winter days on record
- Winter 2018 was the seventh consecutive season with a warmer than average mean maximum temperature for South Australia; spring 2016 was the last season with overall cooler than average days for the State
- Night time temperatures were slightly below average for SA as a whole
- Winter nights were particularly cold in the Northeast Pastoral district, with the mean minimum more than 1 °C cooler than average in an area east of Marree
- Nights were warmer than average along the West Coast and in some central agricultural districts
- The mean minimum temperature for South Australia as a whole was just 0.08 °C cooler than average
- On 30 August, numerous sites in central areas of the State, including Adelaide, had their warmest winter night on record
- Arkaroola had its lowest winter mean daily minimum temperature since 1997

### **Extremes in winter 2018**

Hottest day	31.5 °C at Moomba Airport on 30 Aug
Warmest days on average	22.1 °C at Oodnadatta Airport
Coollest days on average	10.4 °C at Mount Lofty
Coldest day	5.5 °C at Mount Lofty on 6 Aug
Coldest night	-5.5 °C at Yunta Airstrip on 21 Jun
Coollest nights on average	2.8 °C at Yongala
Warmest nights on average	11.8 °C at Neptune Island
Warmest night	20.9 °C at Port Pirie Aerodrome AWS on 30 Aug
Warmest on average overall	13.9 °C at Oodnadatta Airport
Coollest on average overall	7.9 °C at Mount Lofty
Wettest overall	479.1 mm at Uraidla
Driest overall	3.2 mm at Oodnadatta Airport

Some notable statistics for Winter were:

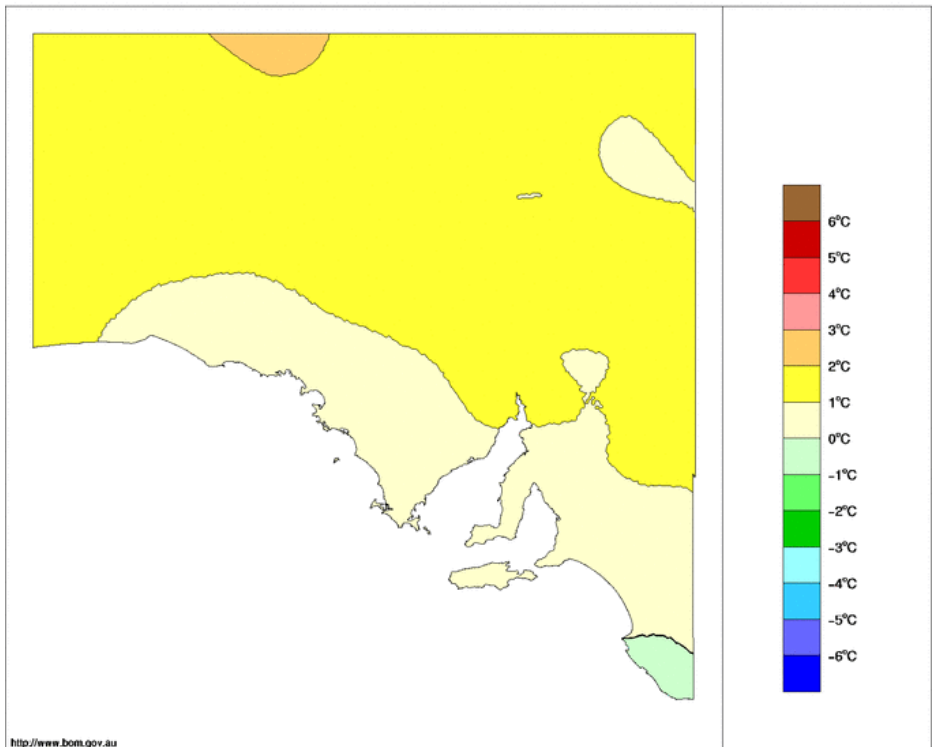
Record highest winter daily minimum temperature				
	New record (°C)	Old record	Duration	Mean
West Terrace	19.2 on 30 Aug	17.3 on 9 Jun 1919	94	8.0
Adelaide Airport	19.2 on 30 Aug	18.3 on 30 Aug 1993	64	7.4
Parafield Airport	18.4 on 30 Aug	16.4 on 25 Aug 1999	62	6.7
Yongala	13.7 on 30 Aug	12.5 on 24 Jun 1991	62	2.5
Kent Town	19.4 on 30 Aug	18.4 on 30 Aug 1993	42	7.9
Whyalla	20.6 on 30 Aug	15.9 on 21 Aug 2009	34	5.7
Kingscote	14.9 on 30 Aug	14.6 on 9 Jun 1995	25	6.1
Roxby Downs	18.5 on 30 Aug	17.0 on 30 Aug 2005	21	4.9
Snowtown	16.5 on 30 Aug	14.8 on 10 Jun 2005	21	4.8
Tarcoola	17.6 on 29 Aug	= 17.6 on 20 Aug 2015	21	5.2

For more information on Winter's temperatures and rainfall plus a summary of statistics please see:

<http://www.bom.gov.au/climate/current/season/sa/archive/201808.summary.shtml>

Maximum Temperature Anomaly (°C) 1 June to 31 August 2018

Australian Bureau of Meteorology



<http://www.bom.gov.au>

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Issued: 21/09/2018

## **Greater Adelaide in September 2018: drier than average**

September was drier than average at all sites across Adelaide and the Hills, with several sites having their driest September for at least 20 years. Nights were cooler than average throughout Adelaide and the Hills, while daytime temperatures were generally close to average.

### **Drier than average**

- September rainfall was below average at all sites across Adelaide and the Hills
- Adelaide (West Terrace / ngayirdapira) had ten rain days during the month, about three less than the site's September average
- Monthly rainfall totals ranged from 21% of average at Noarlunga to 62% of average at Parafield Airport
- Several sites had either their lowest total September rainfall on record or their lowest total September rainfall for at least 20 years

### **Cool nights**

- Night time temperatures were cooler than average throughout Adelaide and the Hills
- Mean minimum temperatures ranged from 2.8 °C cooler than average at Rosedale to 0.9 °C cooler than average at Adelaide (West Terrace / ngayirdapira)
- Daytime temperatures were generally close to average, slightly cooler than average near the city and in the southern suburbs, and slightly warmer than average in the north and in the Hills
- On 14 September, warm northerly winds ahead of a cold front resulted in the city's hottest day since autumn, with 29.3 °C at Edinburgh RAAF the highest temperature recorded in Greater Adelaide for the month
- Mean maximum temperatures ranged from 1.1 °C cooler than average at Kuitpo Forest Reserve to 0.8 °C warmer than average at Mount Lofty
- Parafield Airport, Rosedale, and Mount Crawford had their lowest September mean daily minimum temperature on record
- A few sites had their lowest September mean daily minimum temperature for at least 20 years

### **Adelaide (West Terrace / ngayirdapira)**

- Total rainfall was 21.4 mm, which is 42% of the long-term average of 50.9 mm
- The mean daily maximum temperature for was 18.4 °C, equal to the long-term average.. The warmest day was 26.7 °C on the 14th, and the coolest day was on the 15th when the temperature reached 13.3 °C
- The mean daily minimum temperature for was 8.3 °C, which is 0.9 °C below the long-term average of 9.2 °C. The coldest morning was 3.4 °C on the 3rd, and the warmest morning was on the 11th when the minimum temperature was 15.6 °C

### **Strong winds at times**

- Associated with the passage of cold fronts, wind gusts in excess of 80 km/h were recorded around Greater Adelaide on both the 11th and 15th

The strongest wind gust recorded in Greater Adelaide was 91 km/h at Outer Harbour (Black Pole) on the 15th

## Extremes in September 2018

Hottest day	29.3 °C at Edinburgh RAAF on the 14th
Warmest days on average	19.3 °C at Parafield Airport
Coollest days on average	12.9 °C at Mount Lofty
Coldest day	7.2 °C at Mount Lofty on the 15th
Coldest night	-1.5 °C at Turretfield Research Centre on the 4th
Coollest nights on average	3.8 °C at Rosedale (Turretfield Research Centre)
Warmest nights on average	8.6 °C at Noarlunga
Warmest night	15.6 °C at West Terrace on the 11th
Warmest on average overall	13.5 °C at Adelaide (Kent Town)
Coollest on average overall	8.9 °C at Mount Lofty
Wettest overall	52.0 mm at Cudlee Creek (Millbrook Reservoir)
Driest overall	8.2 mm at Harrogate (Mount Bevor South)
Wettest day	13.6 mm at Inglewood on the 20th
Strongest wind gust	91 km/h at Outer Harbour (Black Pole) on the 15 <sup>th</sup>

### Some notable statistics for September were:

#### Record lowest September total rainfall

	New record (mm)	Old record	Duration	September Average
Lenswood	33.6	41.8 in 1987	49	115.0
Aldgate	36.6	43.0 in 1987	47	120.6
Brownhill Creek	21.6	24.0 in 2008	20	56.4
Kuitpo Forest	27.0	30.0 in 2008	20	75.5

#### Record lowest September mean daily minimum temperature

	New record (°C)	Old record	Duration	September Average
Parafield Airport	6.1	6.6 in 1995	61	8.3
Rosedale	3.8	4.6 in 1969	56	6.6
Mount Crawford	5.6	5.7 in 2008	24	7.4

**For more information on September's temperatures and rainfall plus a summary of statistics please see:**

<http://www.bom.gov.au/climate/current/month/sa/archive/201809.adelaide.shtml>

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### Inter-Governmental Report on Climate Change 2018 Special Report

In early October the IPCC released an update on the impacts of reaching different global warming targets, agreed by Australia, and many other countries in the 2016 Paris Agreement. Also, the report looks at the action on emissions reduction needed to reach the agreed targets.

For a good summary see:

<http://www.realclimate.org/index.php/archives/2018/10/ipcc-special-report-on-1-5oc/>

# Adelaide (West Terrace / Ngayirdapira), South Australia September 2018 Daily Weather Observations

The official site for Adelaide, having reopened in May 2017.



Date	Temps		Rain		Evap		Sun		Max wind gust			9am			3pm								
	Day	Min °C	Max °C	mm	mm	hours	Sun	Dirn	Spd km/h	Time local	Temp °C	RH %	Cld eighths	Dirn	Spd km/h	MSLP hPa	Temp °C	RH %	Cld eighths	Dirn	Spd km/h	MSLP hPa	
1	Sa	10.2	15.9	8.2				WSW	37	04:01	11.7	91	WSW	9	1016.7	14.5	62	WSW	13	1016.9			
2	Su	7.8	14.8	0.4				S	28	14:29	12.3	63	NE	11	1023.7	12.4	58	S	17	1023.5			
3	Mo	3.4	15.9	0				ESE	26	09:54	11.9	56	E	13	1029.8	13.6	41	N	9	1026.8			
4	Tu	5.1	17.5	0				NNE	30	12:47	12.9	46	NE	11	1026.2	16.9	33	NNW	13	1021.6			
5	We	9.6	20.5	0				N	41	11:52	16.4	25	NNE	19	1015.7	19.9	29	N	15	1010.2			
6	Th	11.4	16.1	1.0				W	39	13:28	12.9	72	WNW	17	1011.1	14.1	55	WSW	22	1011.7			
7	Fr	4.2	15.8	0.2				W	27	12:43	11.1	72	N	9	1019.9	14.8	45	SW	13	1017.7			
8	Sa	7.8	18.2	0				WNW	37	12:17	12.4	59	N	11	1019.6	17.4	43	WNW	20	1017.9			
9	Su	9.5	19.6	0				W	30	13:20	13.6	58	N	9	1024.0	17.7	61	W	19	1023.7			
10	Mo	7.7	25.2	0				NNW	28	12:12	15.6	70	NE	11	1026.1	24.1	25	NNW	15	1021.3			
11	Tu	15.6	23.1	0				NNW	63	12:09	21.0	22	NNE	22	1009.9	16.2	57	WNW	22	1009.8			
12	We	9.7	15.8	0.2				W	35	10:41	13.2	67	W	22	1018.9	13.8	54	W	13	1018.9			
13	Th	7.9	19.1	0				NNW	30	12:23	12.1	68	N	13	1021.6	18.0	39	NW	15	1017.4			
14	Fr	12.1	26.7	0				NNW	48	09:36	17.9	33	N	19	1012.8	26.5	21	NNW	22	1005.0			
15	Sa	7.5	13.3	4.0				W	61	03:48	10.3	64	SW	24	1015.7	11.6	53	SW	20	1019.5			
16	Su	5.5	15.5	0.2				SW	30	00:07	10.9	64	N	9	1026.7	15.4	48	NW	9	1023.8			
17	Mo	6.3	20.1	0				NW	50	14:48	14.9	40	N	15	1019.7	19.5	28	NW	30	1013.1			
18	Tu	11.8	16.6	0				W	48	19:10	12.9	61	W	13	1013.5	13.9	74	WSW	17	1012.9			
19	We	9.0	14.8	2.0				WSW	35	11:45	13.0	55	SW	19	1019.0	14.4	56	W	13	1018.7			
20	Th	8.5	15.9	5.0				WSW	24	12:22	13.5	74	W	11	1024.2	14.6	66	WSW	15	1024.4			
21	Fr	11.0	19.7	0				W	20	11:14	13.0	77	N	6	1029.1	18.7	54	NNW	9	1026.1			
22	Sa	7.6	21.7	0				SSW	33	16:11	17.6	52	NNE	7	1028.3	21.3	45	SW	15	1026.5			
23	Su	7.4	19.7	0				SE	30	18:42	15.1	67	S	4	1032.0	18.8	45	SSE	11	1029.5			
24	Mo	5.1	17.6	0				NE	28	08:07	11.7	51	ESE	13	1032.7	17.1	38	ESE	9	1028.0			
25	Tu	4.9	19.3	0				W	26	14:31	12.8	49	SSE	4	1028.6	17.0	50	WSW	17	1023.7			
26	We	8.0	25.3	0				NNE	28	08:37	15.5	41	NNE	17	1020.5	24.3	19	NW	15	1016.0			
27	Th	9.7	18.0	0				WSW	28	09:27	14.2	70	WSW	15	1018.3	17.2	55	SW	15	1016.6			
28	Fr	11.2	16.4	0				WSW	43	12:55	13.6	61	SSW	20	1020.8	14.8	52	SW	24	1021.5			
29	Sa	5.9	16.0	0.2				WSW	33	15:10	12.6	52	SSE	9	1029.6	14.6	52	SW	20	1028.0			
30	Su	6.2	19.7	0				NNE	31	09:49	14.5	48	NNE	17	1029.7	21.9	26	NE	11	1024.7			
<b>Statistics for September 2018</b>																							
Mean		8.3	18.4								13.7	57		13	1022.1	17.2	46			15	1019.8		
Lowest		3.4	13.3								10.3	22	#	4	1009.9	11.6	19		#	9	1005.0		
Highest		15.6	26.7	8.2				NNW	63		21.0	91	SW	24	1032.7	26.5	74	NW	30	1029.5			
Total				21.4																			

Observations were drawn from Adelaide (West Terrace / Ngayirdapira) [station 0230000]  
This is now the "official" site for Adelaide, having reopened in May 2017. Observations are also available from the Kent Town site [station number 023090].  
IDC/DW5081.201809 Prepared at 01:15 UTC on 1 Oct 2018  
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## South Australia in September 2018: drier than average

September rainfall was below average across most of South Australia, making it the State's fourth-driest September on record and driest since 2006. Night time temperatures were cooler than average across most of South Australia, including a large area of lowest on record that covered many central and eastern districts. Daytime temperatures were generally close to average, although above average in western parts of the West Coast district and below average in a small area of the Northeast Pastoral district.

### Fourth-driest September

- For South Australia as a whole, September rainfall was 83% below average, making it the State's fourth-driest September on record and driest since 2006
- September was drier than average throughout South Australia, with very much below average rainfall in most agricultural districts
- Little or no rain was recorded in Pastoral districts
- Most of the State had less than 20% of its September average rainfall, although some southern areas had more than half of their long-term average
- The highest monthly totals were recorded in the Lower South East and the Adelaide Hills, with Cudlee Creek recording the State's highest total of 52.0 mm
- Many sites had either their lowest total September rainfall on record or their lowest total September rainfall for at least 20 years

### Coolest September nights since 1985

- Night time temperatures were very much below average across most of eastern South Australia
- A large area covering central and eastern South Australia had its lowest mean minimum temperature for September on record
- For South Australia as a whole, the mean minimum temperature was 1.05 °C below average, the coolest for September since 1985
- For daytime temperatures, September continued a run of 17 consecutive months of warmer than average days for South Australia as a whole
- The State's mean maximum temperature was 0.75 °C warmer than average
- Daytime temperatures were generally close to average, but were above average in western parts of the West Coast district and below average in a small area of the Northeast Pastoral district
- Several sites with less than 30 years of data had their lowest September temperature on record
- Numerous sites had either their lowest September mean daily minimum temperature on record or their lowest September mean daily minimum temperature for at least 20 years
- A few sites had their lowest September mean temperature on record or their lowest September mean temperature since at least 1994

### Extremes in September 2018

Hottest day	35.9 °C at Oodnadatta Airport on the 14th
Warmest days on average	26.5 °C at Oodnadatta Airport
Coolest days on average	12.9 °C at Mount Lofty
Coldest day	7.2 °C at Mount Lofty on the 15th

Coldest night	-3.3 °C at Keith (Munkora) on the 24th
Coollest nights on average	2.2 °C at Snowtown (Rayville Park)
Warmest nights on average	9.9 °C at Moomba Airport
Warmest night	17.1 °C at Moomba Airport on the 15th
Warmest on average overall	18.0 °C at Oodnadatta Airport
Coollest on average overall	8.9 °C at Mount Lofty
Wettest overall	52.0 mm at Cudlee Creek (Millbrook Reservoir)
Driest overall	0 mm at several sites in Pastoral districts

<b>Record lowest September total rainfall (mm)</b>				
	<b>New record</b>	<b>Old record</b>	<b>Years Held</b>	<b>Average</b>
Parawa	31.6	32.3 in 1972	77	93.2
Cleve	5.0	8.2 in 2006	55	35.6
Lenswood	33.6	41.8 in 1987	49	115.0
Aldgate	36.6	43.0 in 1987	47	120.6
Whyalla	1.0	= 1.0 in 2017	37	25.6
Loxton	1.4	5.5 in 2017	35	27.3
North Shields	8.0	10.0 in 1994	25	39.2
Renmark	2.4	2.6 in 2017	24	24.3
Strathalbyn	15.4	17.0 in 2015	23	47.7
Snowtown	11.2	12.8 in 2008	21	39.0
Brownhill Creek	21.6	24.0 in 2008	20	56.4
Kuitpo Forest	27.0	30.0 in 2008	20	75.5
Roseworthy	17.2	22.0 in 2014	20	47.0

<b>Record lowest September temperature</b>				
	<b>New record (°C)</b>	<b>Old record</b>	<b>Years Held</b>	<b>Sept. Mean</b>
Edithburgh	1.4 on the 17th	1.6 on the 13th in 2011	26	8.7
Nuriootpa	-2.1 on the 29th	-1.0 on the 1st in 2007	23	6.7
Strathalbyn	0.2 on the 25th	0.4 on the 5th in 2007	23	7.7
Tarcoola	0.3 on the 16th	0.4 on the 15th in 2016	21	9.0
Gluepot	-3.2 on the 4th	-2.2 on the 11th in 2002	20	6.8
Wudinna	-1.8 on the 29th	= -1.8 on the 24th in 2015	20	7.2

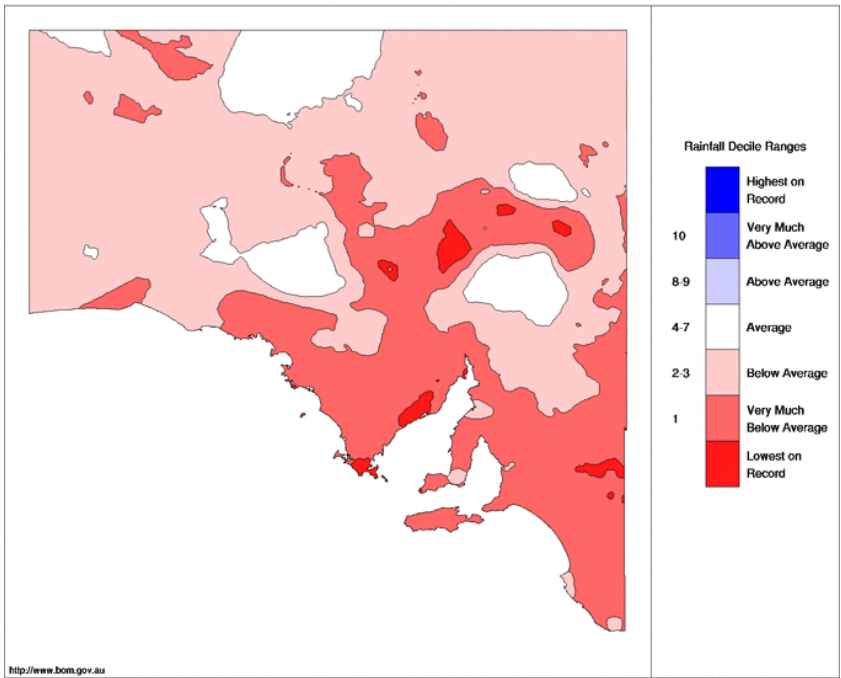
Wettest day 21.4 mm at Sevenhill on the 1st  
 Strongest wind gust 115 km/h at Neptune Island on the 15<sup>th</sup>

**Some notable statistics for September were:**

***Many other rainfall & temperature records were also set in September. For more information plus a summary of statistics please see:***

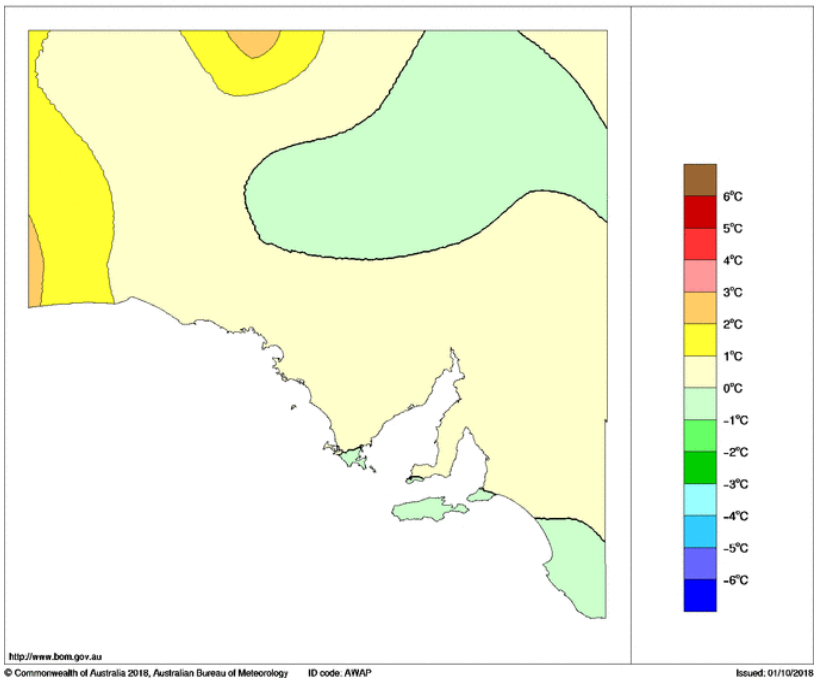
<http://www.bom.gov.au/climate/current/month/sa/archive/201809.summary.shtml>

Distribution Based on Gridded Data  
Australian Bureau of Meteorology



Maximum Temperature Anomaly (°C) September 2018

Australian Bureau of Meteorology





Australian Meteorological Association Inc (AMetA)  
www.ameta.org.au

## **NEXT MEETING**

**Please note the change of place, day and time:**

**An event organized by AMetA, Flinders Uni. and AMOS.**

**From 7:00 PM to 8:30 PM Thursday, October 18, 2018**

**Flinders University (City), room 10.2, Level 10, 182 Victoria Square, Adelaide**

### **Topic: Thunderstorm Asthma**

#### **Could it happen in our South Australia?**

**In November 2016, a large outbreak of asthma attacks in Melbourne coincided with intense thunderstorm activity. The emergency services were overwhelmed and about 9 fatalities ensued. This session will look at that event, consider some of the background issues, discuss whether such an event could occur in South Australia, and look at what is being done to mitigate a future outbreak.**

**A panel discussion with Assoc Prof. Andrew MacKinnon, University of Adelaide (moderator), Professor Paddy Phillips, Flinders University and Chief Medical Officer, SA Health, John Nairn, State Manager S.A., Bureau of Meteorology, Dr William Smith, AllergySA and RAH, Assoc. Prof Janet Davies, Queensland Uni. of Technology and Auspollen**

**Please also note that subscriptions for 2018/2019 (\$15) are now due**

Secretary:	Darren Ray
Phone:	8366 2664
Fax:	8366 2693

*Inquiries or suggestions, please contact the Secretary on the phone number listed above.*