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THE OFFICIAL PUBLICATION OF THE AUSTRALIAN
METEOROLOGICAL ASSOCIATION INC
February 2017

An Operational Heatwave Warning Service for Australia

***John Nairn, Regional Director - SA Office of the
BOM***

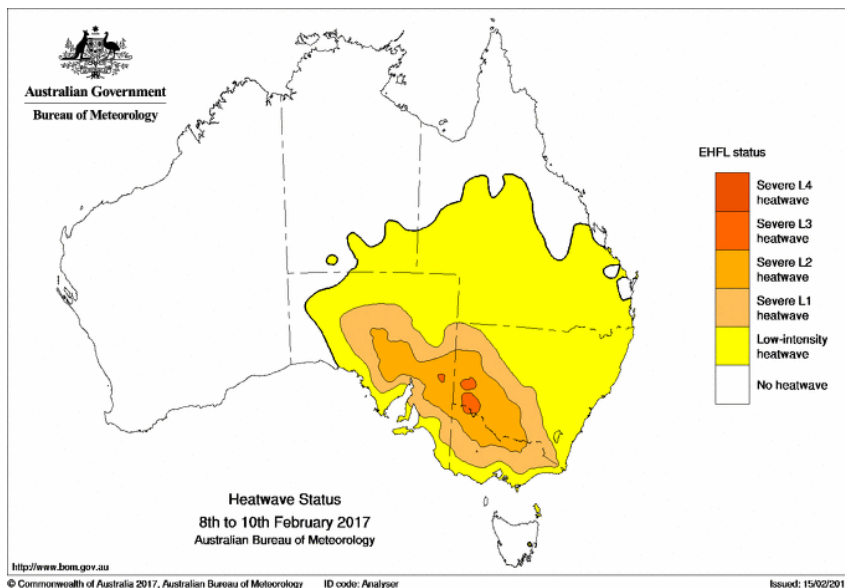


With recent record heat during February 2017 across Australia, heatwaves have been in the news. John Nairn, Regional Director of the South Australian Bureau of Meteorology office, also manages the National Heatwave Warning project in the Bureau. At the October 2016 meeting he presented on his work and the move to a new National Heatwave Warning System.

In the past there has been no one single way used to measure the occurrence of heatwave events. John has in recent years developed the Excessive Heat Factor (EHF). This uses both maximum and minimum temperature, looking at how extreme these are across rolling 3 day periods. This takes into hot nights and the impact of prolonged heat on human systems and infrastructure.

The Bureau of Meteorology has been trialling a heatwave mapping service over the last 3 summers using forecast EHF values out to 7 days ahead across Australia. This is available on the 'Australia' link on the Bureau website www.bom.gov.au. This is being linked in state government health department's services to reduce the impact of events, and also is informing international guidelines on heatwave monitoring and early warning services.

An example is shown on the next page:



Heatwave intensity during recent heatwave conditions across Australia in February 2017

2017 AMetA Annual Dinner

Last November, a number of AMetA members gathered at the Feathers Hotel for our Annual Dinner to celebrate the end of another year’s activity. The highlight of the dinner was a talk given to us by Brigid Bruer. Brigid recently edited and published a diary written in 1950-1951 by her late husband, Michael Bruer, during a year-long assignment as a meteorological observer on Heard Island. Michael was a member of a 14-man team of scientific observers, and some of the breadth of their interests were captured in his diary. The informal talk was largely in the form of Q&A and dealt mainly with the more light-hearted aspects of Michael’s tour of duty. The book’s title is “A Year on Heard Island 1950-1951” and is in the form of a photocopy of the diary.

Adelaide in October 2016: heavy rain, cold days and nights

Adelaide had a cool, wet and windy October. Rainfall was very much above average at most locations, daytime temperatures were generally very cool, and several cold fronts brought strong and gusty winds across the region.

A wet month for the Adelaide region

- Wet conditions observed through September continued in October, with particularly heavy rain days in the first and third weeks of the month
- In first week of October, a vigorous westerly airstream with an embedded front brought squally showers and thunderstorms to the region
- Moderate to heavy rainfall about Adelaide and the Mount Lofty Ranges saw further river rises with Flood Warnings issued
- Uraidla, in the Adelaide Hills, was the wettest overall with 182.5 mm, the wettest October since 2005
- Adelaide (Kent Town) had 14 days with rainfall, resulting in monthly total of 81.0 mm, nearly double the long term October average, and the wettest October for the city since 2005
- Adelaide (Kent Town) recorded 27.6 mm in the 24 hours to 9am on the 4th, the wettest October day for the city since 18 October 2000

Cold days and nights throughout the month

- The passage of several cold fronts throughout the month resulted in well below average temperatures for most locations
- In the city, the mean maximum and minimum temperatures were about 1 °C below average
- Both the mean October maximum and minimum temperatures were the coolest since 2003 for Adelaide
- A particularly cold night on the 19th saw a minimum of 4.9 °C, Adelaide's coldest October night in four years

Strong and gusty winds

- The Adelaide region experienced strong and gusty winds on many days during the month owing to the passage of several vigorous cold fronts
- Wind gusts were particularly strong about elevated areas, with the strongest gust of 109 km/h, recorded on the 9th at Kuitpo Forest Reserve

Extremes in October 2016

Hottest day	31.1 °C at Adelaide Airport on the 20th
Warmest days on average	21.1 °C at Parafield Airport
Coolest days on average	15.0 °C at Mount Lofty
Coldest day	7.8 °C at Mount Lofty on the 16th
Coldest night	1.5 °C at Mount Barker on the 19th
Coolest nights on average	6.0 °C at Mount Lofty
Warmest nights on average	10.6 °C at Adelaide (Kent Town)
Warmest night	16.8 °C at Adelaide (Kent Town) on the 15th
Warmest on average overall	15.8 °C at Adelaide (Kent Town)
Coolest on average overall	10.5 °C at Mount Lofty
Wettest overall	182.5 mm at Uraidla
Wettest day	48.8 mm at Nairne on the 4th
Strongest wind gust	109 km/h at Kuitpo Forest Reserve on the 9th

Adelaide, South Australia

October 2016 Daily Weather Observations

Observations are from Kent Town, about 2 km east of the city centre.

Date	Temps			Rain	Evap	Sun	Max wind gust			9am					3pm								
	Min	Max	°C				mm	mm	hours	Dirn	Spd	Time	Temp	RH	Cid	Dirn	Spd	MSLP	Temp	RH	Cid	Dirn	Spd
	°C	°C						km/h	local	°C	%	eghtths		km/h	hPa	°C	%	eghtths		km/h	hPa		
1	Sa	10.3	21.8	4.2			NNE	56	23:20	13.4	55		NW	11	1008.2	19.16	42		NNW	13	1004.6		
2	Su	12.9	20.7	0			N	44	00:47	19.8	35		NNW	11	996.1	17.7	56		WSW	15	996.7		
3	Mo	7.7	15.0	27.6			W	54	11:46	9.1	95		W	15	1001.4	12.0	76		WSW	24	1004.8		
4	Tu	9.1	16.4	11.8			W	65	11:17	12.2	93		W	15	1008.3	15.3	54		WSW	26	1013.6		
5	We	8.1	20.6	0			W	35	12:35	11.3	75		N	9	1019.6	20.0	43		W	24	1019.3		
6	Th	11.2	28.8	0			NNE	46	12:59	20.6	39		NNE	13	1017.9	28.0	24		NNW	24	1014.6		
7	Fr	16.5	24.0	0			N	30	23:14	20.6	35		N	11	1016.0	23.0	42		NW	7	1015.6		
8	Sa	10.0	26.1	0			N	30	16:12	14.8	54		ENE	9	1021.8	23.5	35		NE	11	1017.3		
9	Su	14.8	26.4	0			NNE	54	08:03	25.5	30		N	22	1002.3	17.5	89		W	19	1009.4		
10	Mo	11.8	16.5	2.0			W	50	14:58	12.7	70		WSW	15	1015.5	14.9	46		WSW	28	1017.3		
11	Tu	10.8	16.8	0.4			SW	37	01:29	12.5	62		SSW	9	1023.4	15.4	50		SW	20	1023.5		
12	We	10.2	17.2	0.8			WSW	30	12:13	12.9	76		S	9	1023.3	16.1	59		SW	17	1023.3		
13	Th	6.4	19.6	0.6			WSW	28	15:40	13.0	67		SSW	6	1026.5	18.3	48		WSW	15	1023.9		
14	Fr	11.7	25.5	0			N	31	11:06	18.3	31		NNE	13	1022.4	24.9	34		W	24	1018.3		
15	Sa	16.8	28.3	0			N	54	12:05	20.3	20		NNE	19	1012.8	27.4	16		N	30	1006.8		
16	Su	12.5	15.4	1.2			SW	44	19:15	12.5	85		NW	13	1005.4	11.7	90		WSW	17	1005.1		
17	Mo	8.5	16.2	14.2			NW	43	13:30	14.4	56		W	17	1014.4	14.2	67		W	17	1014.4		
18	Tu	10.0	15.4	4.2			WSW	59	12:12	12.6	72		W	17	1015.3	13.3	67		WSW	19	1017.5		
19	We	4.9	20.0	3.8			N	28	12:10	10.7	64		NNE	7	1022.6	17.7	37		NNW	13	1019.3		
20	Th	9.1	30.8	0			NNE	57	14:51	20.0	38		NE	9	1013.2	29.7	23		N	28	1006.5		
21	Fr	10.6	16.5	9.4			WSW	43	12:23	11.9	88		SW	9	1016.1	15.5	46		WSW	22	1017.5		
22	Sa	6.5	15.8	0.2			SSW	35	13:33	11.5	54		SSE	13	1027.3	14.2	44		SE	13	1027.2		
23	Su	7.2	17.6	0			ESE	28	16:41	11.3	54		ESE	6	1029.8	17.2	39		S	7	1026.5		
24	Mo	8.0	23.1	0			N	35	10:16	15.6	43		NNE	11	1022.1	22.3	24		NNW	11	1017.4		
25	Tu	15.6	27.8	0			N	37	02:03	21.0	22		NNE	15	1011.5	27.3	16		NNW	17	1009.0		
26	We	14.2	19.0	0			SSW	35	14:01	15.4	77		SSW	13	1015.3	18.1	49		SW	20	1017.1		
27	Th	9.5	20.8	0			SSE	26	08:06	15.0	53		E	11	1022.5	20.2	38		S	7	1019.2		
28	Fr	8.6	22.1	0			WSW	26	15:10	16.1	58		SSW	7	1020.2	21.6	35		SW	15	1017.8		
29	Sa	8.8	30.0	0			NE	46	13:31	21.3	31		NE	11	1014.0	29.6	16		NNE	17	1006.7		
30	Su	15.4	18.2	0			WSW	59	12:16	17.1	65		W	22	1008.5	15.4	45		WSW	30	1011.9		
31	Mo	10.5	18.4	0.6			W	41	00:45	13.3	47		WSW	15	1018.5	17.2	46		W	13	1017.2		
Statistics for October 2016																							
Mean		10.6	21.0							15.4	56				12	1015.9	19.3	45			17	1014.8	
Lowest		4.9	15.0							9.1	20		#	6	996.1	11.7	16		#	7	996.7		
Highest		16.8	30.8	27.6			W	65		25.5	95		#	22	1029.8	29.7	90		#	30	1027.2		
Total				81.0																			

Observations were drawn from Adelaide (Kent Town) (station 023090)

BOCM002.201610 Prepared at 13:06 GMT on 4 Feb 2017
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South Australia in October 2016

South Australia as a whole had below average October rainfall, although some coastal locations saw above average rainfall as strong and vigorous cold fronts brought periods of heavy rain. Both maximum and minimum temperatures were generally below average, with very much below average overnight temperatures across eastern districts.

Above average rainfall on southern coasts, below average in the pastoral areas

- Wet conditions observed through September continued in October about southern districts, with particularly heavy rain days in the first and third weeks of the month
- A vigorous westerly airstream with an embedded front brought squally showers and thunderstorms to the southern agricultural areas on the 4th
- Statewide rainfall was 36% below average, but still the wettest October since 2011
- Vigorous cold fronts that crossed the southern parts of State on the 16th and 21st brought further periods of heavy rainfall with daily totals mostly between 10 and 30 mm
- Mount Pleasant reported its wettest October with 152.2 mm for the month, with a few other sites having their wettest October for several decades.

Cooler than average days and nights

- Mean maximum temperatures were cooler than average throughout much of South Australia, particularly across the far north and eastern districts where days were 1 to 2 °C cooler than average.
- Overnight temperatures were below average throughout much of South Australia, excluding parts of the far western agricultural areas where night time temperatures were closer to average
- For the State as a whole, maximum temperatures were 0.31°C below the average (lowest since 2010), while minimum temperatures were 0.80°C below the average (lowest since 2003); this is in marked contrast to record warm October 2015

Strong and squally winds at times

- Southern coasts and elevated regions across the agricultural area experienced persistent and strong westerly winds on many days during the month, which intensified when squally and vigorous cold fronts crossed the State
- The strongest wind gust was 113 km/h, recorded on the 4th on Neptune Island

Extremes in October 2016

Hottest day	41.4 °C at Ceduna AMO on the 29th
Warmest days on average	29.9 °C at Oodnadatta Airport
Coollest days on average	15.0 °C at Mount Lofty
Coldest day	7.8 °C at Mount Lofty on the 16th
Coldest night -	1.3 °C at Yongala on the 19th
Coollest nights on average	5.5 °C at Yongala
Warmest nights on average	14.1 °C at Oodnadatta Airport
Warmest night	24.5 °C at Marree Aero on the 30th
Warmest on average overall	22.0 °C at Oodnadatta Airport
Coollest on average overall	10.5 °C at Mount Lofty
Wettest overall	189.4 mm at Aldgate
Wettest day	47.0 mm at Lobethal on the 4th
Strongest wind gust	113 km/h at Neptune Island on the 4th

Some notable statistics for Adelaide for October were:

Highest October total rainfall for at least 20 years

	Observed (mm)	Most recent higher	October Average
Hahndorf	150.1	153.8 in 1974*	72.4
Woodside	125.4	135.1 in 1975*	67.5

* *note: there are gaps in the historical record at this site, so it is possible a higher value has gone unreported.*

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

<http://www.bom.gov.au/climate/current/month/sa/archive/201610.adelaide.shtml>

Some notable statistics for South Australia for October were:

Record highest October total rainfall				
	New record (mm)	Old record	Years of record	October Average
Mount Pleasant	154.8	147.0 in 1975	142	57.0

Highest October total rainfall for at least 20 years			
	Observed (mm)	Most recent higher	October
Hahndorf	150.1	153.8 in 1974*	72.4
Spalding	98.9	141.2 in 1975	42.2
Prospect Hill	146.2	182.6 in 1975*	66.3
Woodside	125.4	135.1 in 1975*	67.5
Lucindale	85.0	94.0 in 1986	48.6

* *note: there are gaps in the historical record at this site, so it is possible a higher value has gone unreported.*

Record lowest October mean daily minimum temperature				
	New record (°C)	Old record	Years of record	October Average
Moomba	12.9	13.8 in 2001	21	15.8

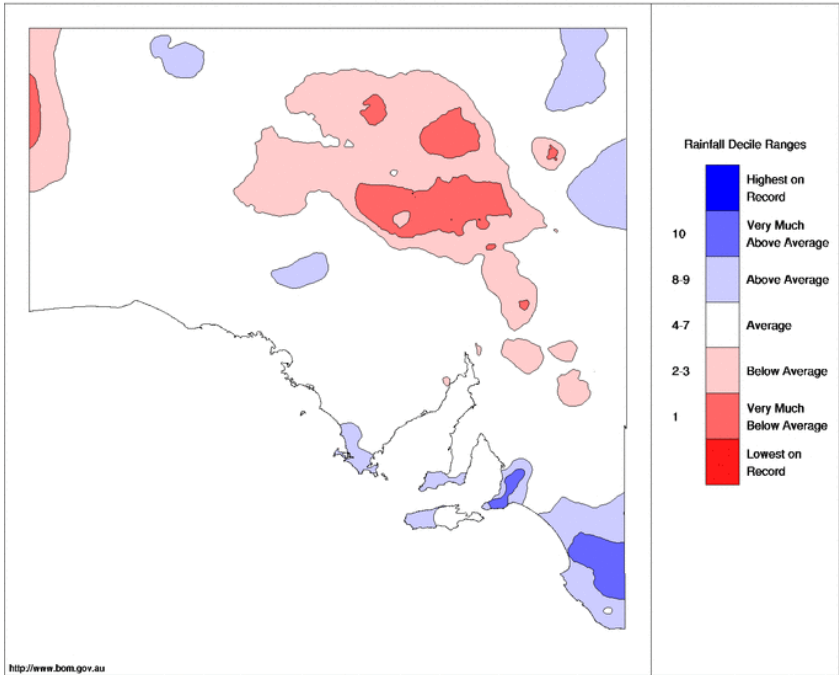
The record at the previous site at Moomba, which ran from 1973 until 1998, was a cooler 12.1 °C in October 1986

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

<http://www.bom.gov.au/climate/current/month/sa/archive/201610.summary.shtml>

South Australian Rainfall Deciles October 2016

Distribution Based on Gridded Data
Australian Bureau of Meteorology

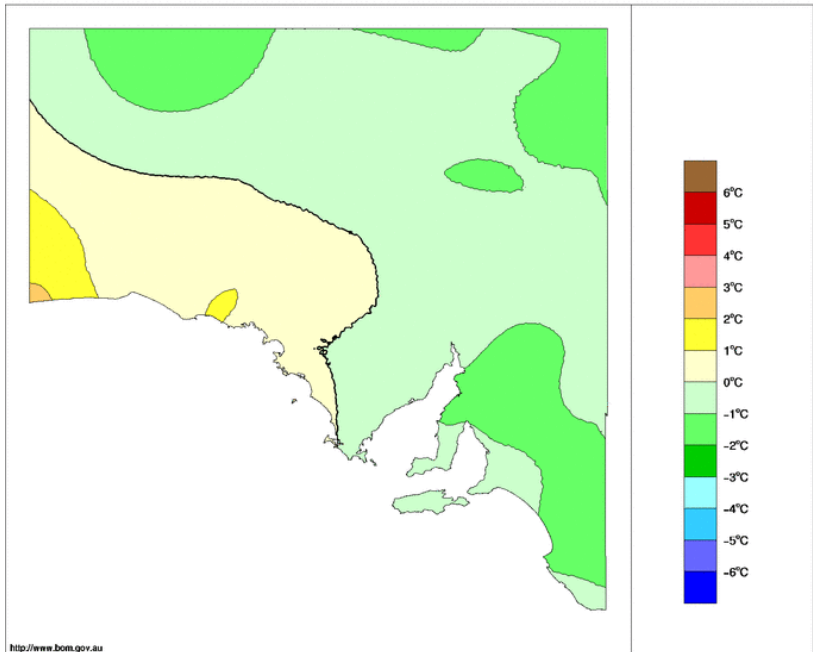


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Issued: 22/12/2016

Maximum Temperature Anomaly (°C) October 2016

Australian Bureau of Meteorology



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Issued: 21/11/2016

Adelaide in November 2016: Cool days and nights, mostly dry

November rainfall was close to average across the Adelaide metropolitan area, with most of the monthly total being recorded in the middle of the month. Both daytime and night time temperatures were cooler than average, with some locations recording their coolest November nights in several years.

Heavy rainfall in the middle of month

- November was mostly dry, with most of the monthly total rainfall being recorded between the 11th and 14th as a low pressure system tracked south of Adelaide bringing showers and thunderstorms to the region
- Mount Crawford recorded its wettest November day in several years on the 13th with 28.2mm
- Adelaide (Kent Town) recorded its wettest November since 2009 with 33.2 mm

Cool days and nights throughout most of the month

- Daytime temperatures were more than one degree below average for November for most locations
- Nights were particularly cool, with the November mean minimum temperature more than two degrees below average across most suburbs
- Adelaide recorded its coolest November nights since 1968 and other locations had their coolest November nights for at least 20 years

Extremes in November 2016

Hottest day	36.3 °C at Parafield Airport on the 20th
Warmest days on average	25.1 °C at Parafield Airport
Coolest days on average	18.7 °C at Mount Lofty
Coldest day	10.4 °C at Mount Lofty on the 13th
Coldest night	3.9 °C at Parafield Airport on the 24th
Coolest nights on average	8.0 °C at Mount Lofty
Warmest nights on average	12.2 °C at Adelaide Airport
Warmest night	23.9 °C at Mount Lofty on the 21st
Warmest on average overall	18.4 °C at Adelaide (Kent Town)
Coolest on average overall	13.4 °C at Mount Lofty
Wettest overall	71.6 mm at Verdun
Wettest day	48.4 mm at Cudlee Creek on the 13th
Strongest wind gust	93 km/h at Noarlunga on the 11th

Some notable statistics for Adelaide for November were:

Record highest November daily rainfall

	New record (mm)	Old record	Years held
Mount Crawford	28.2 on the 13th	=28.2 on the 12th in 2006	23

Record lowest November mean daily minimum temperature

	New	Old	Years held	November Average
Adelaide (Kent Town)	12.1	12.3 in 2001	39	14.1

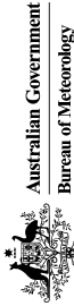
- **note: Adelaide (Kent Town) observations commence in 1977, The previous West Terrace location reported a monthly mean minimum temperature of 12.1°C in November 1968**

For more see:

<http://www.bom.gov.au/climate/current/month/sa/archive/201611.adelaide.shtml>

Adelaide, South Australia November 2016 Daily Weather Observations

Observations are from Kent Town, about 2 km east of the city centre.



Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am			3pm									
		Min °C	Max °C				Dirn	Spd km/h	Time local	Temp °C	RH %	Cid eighths	Dirn	Spd km/h	MSLP hPa	Dirn	Spd km/h	MSLP hPa				
1	Tu	11.8	18.8	0			W	37	04:47	14.0	66	13	W	13	1016.2	WSW	17	1016.3				
2	We	10.2	19.5	0			SW	28	12:24	14.6	54	11	WSW	11	1019.9	W	11	1019.6				
3	Th	8.1	25.3	0			W	26	12:47	15.2	59	9	NNE	9	1020.8	WSW	11	1017.9				
4	Fr	9.7	28.2	0			SSW	46	16:47	18.3	47	9	NNE	9	1014.2	WSW	22	1012.8				
5	Sa	11.0	19.3	0			SW	39	01:49	14.9	53	15	SSW	15	1020.0	SW	17	1020.0				
6	Su	11.1	25.1	0			N	26	15:18	16.0	66	11	WNW	11	1018.0	WNW	7	1013.2				
7	Mo	15.3	26.2	0			WSW	44	04:59	20.6	44	11	SW	11	1005.4	WSW	19	1004.5				
8	Tu	9.7	19.3	0			WSW	39	15:49	13.8	44	11	SSE	11	1014.2	SW	20	1012.6				
9	We	9.0	23.1	0			WSW	33	16:05	14.9	58	6	N	6	1014.9	SW	19	1010.8				
10	Th	9.8	25.1	0			SW	22	15:32	17.3	51	13	Caltn	1013.0	SW	13	1009.9					
11	Fr	13.9	32.0	0			SW	63	16:00	25.1	29	11	E	11	1004.4	NE	13	997.8				
12	Sa	14.4	20.2	14.0			WSW	54	11:21	16.9	71	11	W	20	1003.2	W	24	1004.2				
13	Su	11.6	17.1	16.4			SSW	57	08:12	13.4	70	26	SW	26	1009.0	SW	28	1011.8				
14	Mo	11.4	18.5	1.8			SW	37	15:24	14.4	58	19	SW	19	1019.5	SW	19	1020.2				
15	Tu	10.3	19.5	0			WSW	28	12:41	14.1	65	7	SW	7	1024.0	WSW	15	1022.4				
16	We	8.8	29.4	0			N	24	08:18	18.1	53	6	NNE	6	1022.9	W	13	1019.1				
17	Th	17.0	35.2	0			NW	44	11:23	27.5	23	17	N	17	1015.1	NW	20	1012.6				
18	Fr	17.1	25.9	0			ENE	22	15:16	18.8	64	4	NNE	4	1018.0	WNW	11	1016.4				
19	Sa	15.0	29.3	0			W	28	15:32	19.2	41	4	SSW	4	1019.4	WNW	11	1016.0				
20	Su	16.9	36.1	0			WSW	28	12:19	26.0	45	2	WNW	2	1013.3	WNW	11	1010.0				
21	Mo	21.9	32.0	0			SE	39	14:27	29.7	27	13	NNW	13	1006.1	WSW	20	1008.2				
22	Tu	14.4	17.8	0.8			SE	22	11:41	16.4	62	4	E	4	1017.1	SSE	11	1017.5				
23	We	9.3	21.2	0.2			SW	33	15:10	15.0	43	13	SSW	13	1022.3	S	19	1020.7				
24	Th	8.1	21.0	0			WSW	37	15:16	15.4	49	7	SW	7	1022.9	WSW	17	1020.5				
25	Fr	11.3	23.2	0			SW	30	14:38	16.2	56	11	SSW	11	1022.7	SSW	20	1021.4				
26	Sa	9.3	24.8	0			WSW	28	13:44	16.1	52	6	SE	6	1024.6	ENE	9	1021.0				
27	Su	9.2	27.9	0			WNW	26	14:26	17.6	49	6	S	6	1020.8	WSW	11	1017.2				
28	Mo	12.2	29.5	0			WSW	31	15:15	22.2	29	2	NNE	2	1014.4	SW	17	1012.9				
29	Tu	12.8	27.3	0			SW	30	14:30	21.2	32	4	SW	4	1012.5	SW	17	1011.5				
30	We	13.0	23.4	0			WSW	43	14:18	16.4	64	2	NW	2	1012.5	SW	22	1010.4				
Statistics for November 2016																						
Mean		12.1	24.7							18.0	50	9		1016.0	23.3	39		16	1014.3			
Lowest		8.1	17.1							13.4	23			Caltn	1003.2	15.6	12		WNW	7	997.8	
Highest		21.9	36.1	16.4			SW	63		29.7	71		SW	26	1024.6	35.1	70		SW	28	1022.4	
Total																						
Total																						

Observations were drawn from Adelaide (Kent Town) (station 023090)

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South Australia in November 2016

South Australia had a mostly dry November with mild day time temperatures and cool nights in the south-central district. Rainfall was below average, particularly in the west, with eastern districts recording closer to average rainfall totals.

Below average rainfall in the west

- A lack of rain-bearing systems throughout the month resulted in below average for most of the State, resulting in the driest November since 1996
- November rainfall for South Australia was 52% below average, with large areas of the western districts recording less than 40% of the long term November average
- Little rainfall across western districts, saw some locations have their driest November for at least 20 years
- During the middle of the month, a low pressure system and an associated trough brought widespread rain with daily totals mostly in the 10 to 30 mm range across southern districts; Mount Crawford reported its wettest November day since November 2006.

Mild days, cool nights

- Daytime temperatures were mild for most of South Australia, with southern parts of the state experiencing mostly cooler than average nights
- Several coastal and central locations reported their coolest November nights in more than 20 years

Intense thunderstorms in pastoral district

- Severe thunderstorms developed over northern districts on the 10th, producing a wind gust of 124 km/hr at Moomba Airport

Extremes in November 2016

Hottest day	43.8 °C at Marree Aero on the 11th
Warmest days on average	34.7 °C at Oodnadatta Airport
Coollest days on average	18.1 °C at Parawa (Second Valley Forest)
Coldest day	10.4 °C at Mount Lofty on the 13th
Coldest night -	1.1 °C at Keith (Munkora) on the 24th
Coollest nights on average	6.4 °C at Keith (Munkora)
Warmest nights on average	18.0 °C at Oodnadatta Airport
Warmest night	26.9 °C at Oodnadatta Airport on the 11th 26.9 °C at Oodnadatta Airport on the 21st
Warmest on average overall	26.4 °C at Oodnadatta Airport
Coollest on average overall	13.4 °C at Mount Lofty
Wettest overall	71.6 mm at Verdun
Wettest day	48.6 mm at Palmer on the 12th
Strongest wind gust	124 km/h at Moomba Airport on the 10th

Some notable statistics for South Australia for November were:

Record highest November daily rainfall

	New record (mm)	Old record	Years of record
Mount Crawford	28.2 on the 13th	=28.2 on the 12th in 2006	23

Highest November total rainfall for at least 20 years

	Observed (mm)	Most recent higher	November Average
Palmer	60.0	77.0 in 1992*	25.3

- **note:** there are gaps in the historical record at this site, so it is possible a higher value has gone unreported

Record lowest November total rainfall

	New record	Old record	Years of record	November Average
Coober Pedy	1.2	= 1.2 in 1994	23	11.8

Record lowest November mean temperature

	New record (°C)	Old record	Years of record	November Average
Coulta	16.4	= 16.4 in 1996	24	18.3

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

<http://www.bom.gov.au/climate/current/month/sa/archive/201611.summary.shtml>

Record lowest November temperature				
	New record	Old record	Years of record	November Average
Arkaroola	4.8 on the 1st	6.5 on the 3rd in 2014	39	15.5
Cleve	4.1 on the 2nd	4.9 on the 3rd in 2003	21	12.4

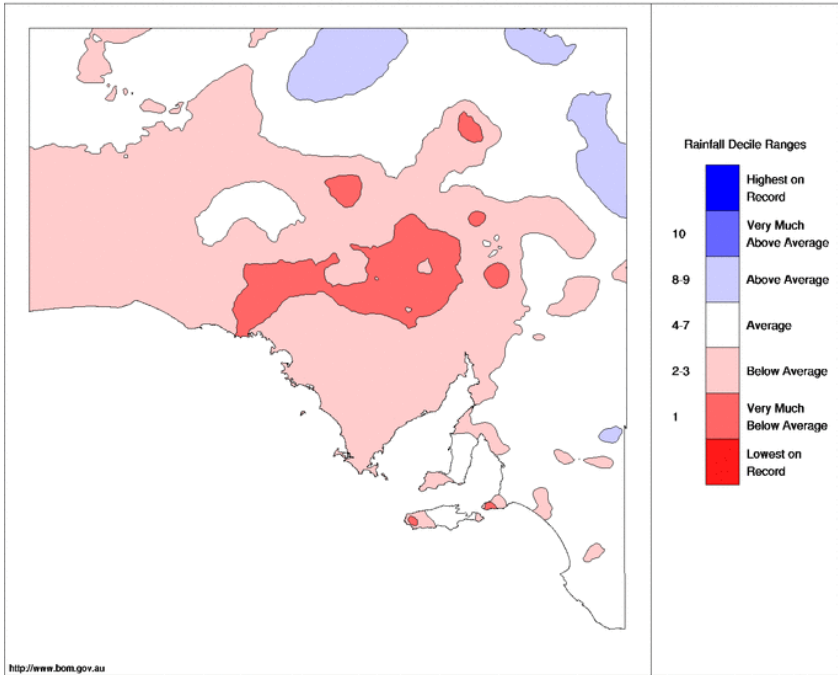
Record lowest November mean daily minimum temperature				
	New record (°C)	Old record	Years of record	November Average
Rosedale	8.6	8.8 in 1996	54	11.3
Adelaide	12.1	12.3 in 2001	39	14.1
Coulta	10.0	10.1 in 1999	24	12.2
Edithburgh	11.8	12.0 in 1994	23	13.4
Kingscote	8.3	8.5 in 1999	22	9.7
Cleve	10.1	10.9 in 1999	20	12.4
Stenhouse Bay	12.5	12.6 in 2001	20	13.8

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

South Australian Rainfall Deciles November 2016

Distribution Based on Gridded Data
Australian Bureau of Meteorology

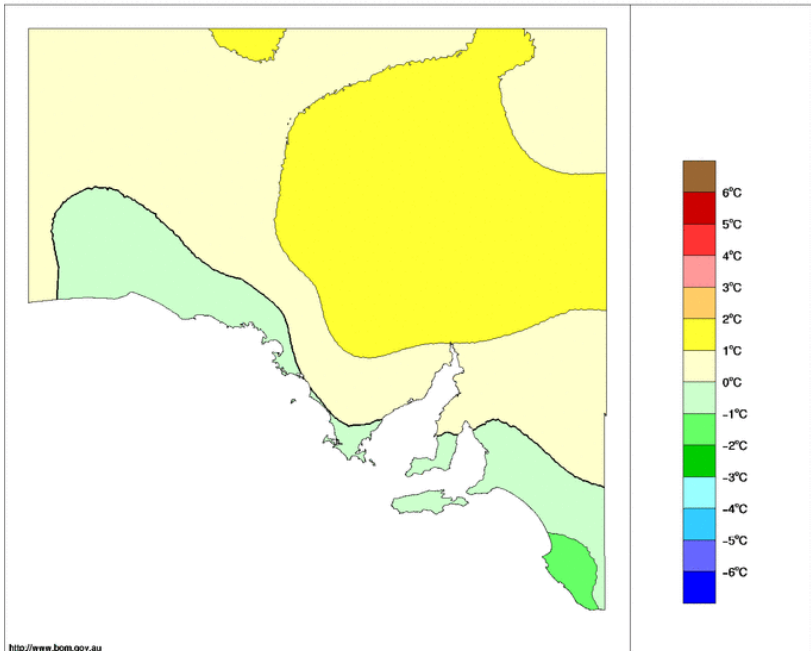


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Issued: 21/12/2016

Maximum Temperature Anomaly (°C) November 2016

Australian Bureau of Meteorology



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Issued: 21/12/2016

Adelaide in spring 2016

Adelaide had a cool, wet and windy spring. Rainfall was very much above average for most locations, with several periods of heavy rainfall and strong winds. Temperatures were mostly below average, owing to predominantly southwesterly winds and the passage of frequent cold fronts.

Wetter than average spring

- Wet conditions observed through September and October, saw particularly heavy rain days about Adelaide and the Mount Lofty Ranges and resulted in river rises with Flood Warnings issued on several occasions
- The heavy rainfall throughout the season resulted in several locations recording nearly double the long term average for spring with some other locations in the Hills reporting their wettest spring on record
- Adelaide (Kent Town) recorded its wettest spring since 2001 with 245.4 mm, more than half of which was recorded in September
- An intense low pressure system in late September brought heavy rainfall that saw some locations record their wettest spring day on record

Cool days and nights

- Both daily maximum and daily minimum temperatures were more than one degree below average for spring for most locations
- Much cooler than average in the northern suburbs with both Edinburgh RAAF and Parafield Airport reporting their coolest days and coolest nights for at least 20 years
- The mean minimum temperature for spring at Adelaide (Kent Town) was 10.6°C, the coolest spring nights for the city since 1986

Strong and gusty winds and heavy rain

- Strong, gusty and damaging winds occurred several times through the season, particularly during September and October
- In the Adelaide region, flash flooding occurred on 15 September as 101.4 mm of rainfall was recorded at Uraidla and 100.2 mm at Ashton, with a number of other sites in the Adelaide Hills exceeding 80 mm

Extremes in spring 2016

Hottest day	36.3 °C at Parafield Airport on 20 Nov
Warmest days on average	21.2 °C at Parafield Airport
Coolest days on average	15.0 °C at Mount Lofty
Coldest day	7.7 °C at Mount Lofty on 30 Sep
Coldest night	1.5 °C at Mount Barker on 19 Oct
Coolest nights on average	6.5 °C at Mount Lofty
Warmest nights on average	10.8 °C at Adelaide Airport
Warmest night	23.9 °C at Mount Lofty on 21 Nov
Warmest on average overall	15.8 °C at Adelaide (Kent Town)
Coolest on average overall	10.8 °C at Mount Lofty
Wettest overall	604.1 mm at Piccadilly (Woodhouse)
Wettest day	105.2 mm at Lobethal on 30 Sep
Strongest wind gust	109 km/h at Kuitpo Forest Reserve on 9 Oct

	New record (mm)	Old record	Years of record
McLaren Vale	43.2 on 29 Sep	34.4 on 31 Oct 1997	24
Mount Crawford	54.0 on 30 Sep	50.0 on 31 Oct 1997	23
Lobethal	105.2 on 30 Sep	84.4 on 8 Nov 2005	133

Record highest spring total rainfall				
	New record	Old record	Years held	Spring Average
Mount Barker	401.6	372.8 in 1992	156	191.5
Hahndorf	476.8	428.6 in 1992	132	211.9
Uraidla	596.0	575.4 in 1992	126	256.3
Mount Bold	391.8	387.0 in 1992	79	182.0
Burnside	296.4	266.8 in 2005	37	135.0
Heathfield	548.5	486.8 in 1992	30	244.9

Some notable statistics for spring were:

Highest spring total rainfall for at least 20 years			
	Observed	Most recent higher	Spring Average
Woodside	359.4	366.5 in 1964*	199.2
Nairne	319.8	338.4 in 1992	170.9
Cudlee Creek	451.8	477.8 in 1992*	213.2
Edinburgh RAAF	186.4	288.6 in 1992*	110.4
Lenswood	513.4	545.0 in 1992*	240.8
Lobethal	406.4	485.0 in 1992*	213.7
Seaton	194.0	288.2 in 1992*	110.4
Williamstown	332.0	491.2 in 1992*	167.9

Record highest spring daily rainfall

Lowest spring mean daily maximum temperature for at least 20 years			
	Observed	Most recent lower	Spring Average
Edinburgh RAAF	20.7	19.4 in 1992	22.4
Parafield Airport	21.2	20.3 in 1992	22.1

Record lowest spring mean daily minimum temperature

	New record (°C)	Old record	Years of record	Spring Average
Adelaide	10.6	= 10.6 in 1986	39	11.8

* **note:** there are gaps in the historical record at this site, so it is possible a higher value has gone unreported.

South Australia in spring 2016

It was a wet, windy and cool spring for South Australia, particularly through September and October when several vigorous frontal systems brought heavy rain and damaging winds to central and eastern districts. Temperatures were cooler than average for most areas with particularly cold nights in central districts

Heavy early season rainfall

- Rainfall during spring was above average, owing to a particularly wet September
- A vigorous frontal system, in mid-September and an intense low pressure system in late September brought heavy rainfall, resulting in some locations having their wettest spring day on record
- The wet conditions observed through September and October resulted in several locations having their wettest spring on record
- Overall, Rainfall for spring was above average for South Australia, and the highest since 2011

Cooler than average, cold nights in central districts

- Vigorous frontal systems saw some locations have their coldest spring day (lowest maximum temperature) on record
- Some locations around Adelaide and in the lower southeast reported their coolest spring mean daily maximum temperature for at least 20 years
- Night time temperatures were particularly cool with several locations reporting their coolest spring nights on record and several other locations having their coolest spring nights for at least 20 years

Flash flooding, severe thunderstorms, damaging winds and tornados

- Strong, gusty and damaging winds occurred several times through the season, particularly during September and October
- In the Adelaide region, flash flooding occurred on 15 September as 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
- Central and eastern districts were impacted by severe thunderstorms and a tornado outbreak in late September
- Severe thunderstorms developed over northern districts on 10 November that produced a wind gust of 124 km/hr at Moomba Airport

Extremes in spring 2016

Hottest day	43.8 °C at Marree Aero on 11 Nov
Warmest days on average	29.4 °C at Oodnadatta Airport
Coollest days on average	15.0 °C at Mount Lofty
Coldest day	7.7 °C at Mount Lofty on 30 Sep
Coldest night -	1.3 °C at Yongala on 19 Oct
Coollest nights on average	5.7 °C at Yongala
Warmest nights on average	14.4 °C at Oodnadatta Airport
Warmest night	26.9 °C at Oodnadatta Airport on 11 Nov 26.9 °C at Oodnadatta Airport on 21 Nov
Warmest on average overall	21.9 °C at Oodnadatta Airport
Coollest on average overall	10.8 °C at Mount Lofty
Wettest overall	604.1 mm at Piccadilly (Woodhouse)

Some notable statistics for South Australia for spring were:

Record highest spring daily rainfall			
	New record (mm)	Old record	Years held
Hindmarsh Valle	67.0 on 29 Sep	64.4 on 24 Oct 1975	52
Mount Bryan	72.0 on 30 Sep	62.4 on 27 Sep 1979	120
Murray Lagoon	67.6 on 14 Sep	55.5 on 14 Nov 1979	95
Cooper Pedy	57.6 on 2 Sep	43.0 on 8 Oct 1992	87
Cooper Pedy Airport	61.4 on 2 Sep	31.0 on 19 Nov 1995	23
Mount Pleasant	71.8 on 30 Sep	58.2 on 31 Oct 1997	133
Narrung	56.2 on 30 Sep	52.0 on 31 Oct 1997	97
McLaren Vale	43.2 on 29 Sep	34.4 on 31 Oct 1997	24
Mount Crawford	54.0 on 30 Sep	50.0 on 31 Oct 1997	23
Innamincka Station	69.0 on 1 Sep	53.5 on 23 Sep 1998	130
Nangwarry	66.8 on 9 Sep	44.2 on 1 Nov 2000	23
Lobethal	105.2 on 30 Sep	84.4 on 8 Nov 2005	133
Aldgate	80.2 on 29 Sep	76.0 on 8 Nov 2005	48
Mount Wilson	50.4 on 29 Sep	49.4 on 8 Nov 2005	27
Wirrabara	74.2 on 30 Sep	72.4 on 23 Sep 2009	133
Pelican Lagoon	46.8 on 14 Sep	39.0 on 4 Sep 2010	33
Kalamurina	53.4 on 2 Sep	48.4 on 22 Nov 2011	32
Pelican Point	56.0 on 9 Sep	55.2 on 5 Nov 2015	33

Record highest spring total rainfall				
	New (mm)	Old (mm)	Years held	Spring Average
Mount Barker	401.6	372.8 in 1992	156	191.5
Goolwa	242.8	239.0 in 1992	154	115.3
Gumeracha	409.0	405.7 in 1992	142	199.1
Milang	215.6	215.0 in 1992	134	99.1
Hahndorf	476.8	428.6 in 1992	132	211.9
Macclesfield	354.2	334.1 in 1887	131	186.6
Uraidla	596.0	575.4 in 1992	126	256.3
Finniss	238.4	232.2 in 1934	103	125.1
Inman Valley	351.7	315.6 in 1979	82	173.9
Mount Bold	391.8	387.0 in 1992	79	182.0
Aldgate	551.5	521.0 in 1992	45	255.7
Prospect Hill	386.8	362.2 in 1992	44	197.7
Burnside	296.4	266.8 in 2005	37	135.0
Heathfield	548.5	486.8 in 1992	30	244.9
Goolwa Barrage	242.2	224.0 in 1992	25	112.2
Cape Jaffa	182.6	162.6 in 2001	23	107.0
Clare	265.2	254.4 in 1997	23	144.3
Nangwarry	259.8	252.6 in 2000	21	156.3
Strathalbyn	222.2	177.8 in 1997	21	109.5

Record lowest spring temperature

	New record	Old record	Years held	Spring Average
Tarcoola	0.4 on 15 Sep	0.5 on 13 Sep 2004	20	12.2

Record lowest spring mean daily maximum temperature

	New record (°C)	Old record	Years of record	Spring Average
Cape Jaffa	17.2	17.6 in 1994	24	18.8

Record lowest spring daily maximum temperature

	New (°C)	Old record	Years held	Spring Average
Warooka	11.2 on 12 Sep	= 11.2 on 26 Sep 1970	52	20.7
Meningie	11.2 on 12 Sep	= 11.2 on 26 Sep 1970	51	20.7
Hawker	11.5 on 29 Sep	11.6 on 30 Sep 2003	45	25.8
North Shields	12.1 on 29 Sep	12.4 on 30 Sep 2003	25	20.9
Kingscote Aero	11.2 on 12 Sep	12.3 on 28 Sep 1996	23	20.4
Parawa	8.3 on 12 Sep	= 8.3 on 5 Sep 1995	23	17.0
Cleve	10.6 on 29 Sep	11.7 on 1 Sep 1997	21	23.1
Minnipa	11.2 on 29 Sep	13.0 on 16 Sep 1999	21	25.3
Stenhouse Bay	11.4 on 12 Sep	12.0 on 11 Sep 2004	21	20.1
Ernabella	10.3 on 13 Sep	11.0 on 18 Sep 2010	20	29.1
Roseworthy	11.7 on 14 Sep	12.0 on 11 Sep 2004	20	23.8

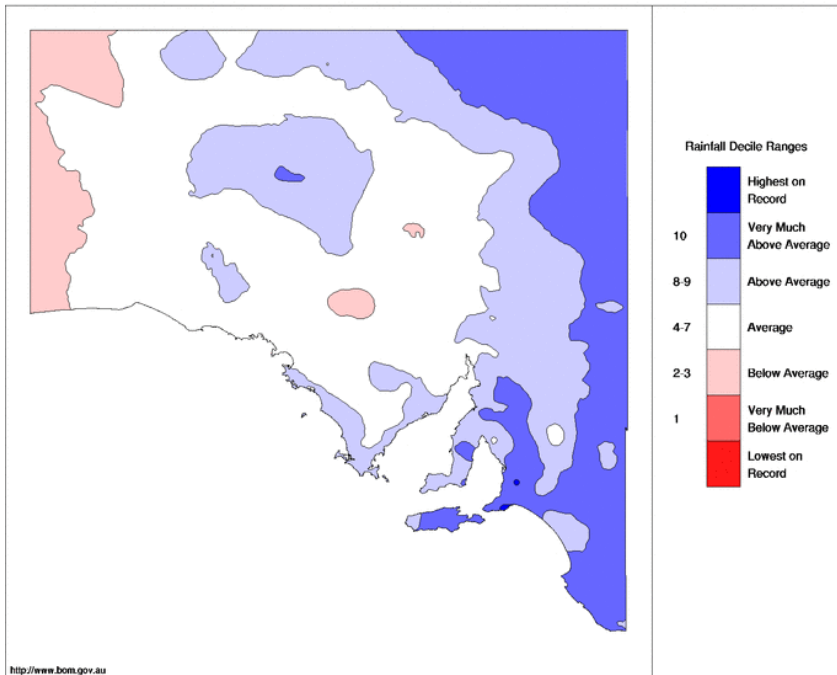
Record lowest spring mean daily minimum temperature

	New (°C)	Old record	Years held	Spring Average
Rosedale	7.4	7.6 in 1996	54	8.7
Kent Town	10.6	= 10.6 in 1986	39	11.8
Nullarbor	9.2	= 9.2 in 1992	28	10.3
Coulta	9.2	9.8 in 1994	24	10.4
North Shields	8.6	= 8.6 in 1994	24	9.9
Edithburgh	10.0	10.2 in 2003	23	10.9
Clare	7.0	7.1 in 1996	22	8.3
Parawa	8.3	= 8.3 in 2003	22	9.2
Moomba	13.8	14.3 in 2010	21	15.9
Cleve	8.7	9.3 in 1996	20	10.3
Nuriootpa	7.1	7.6 in 1996	20	8.6
Stenhouse Bay	10.9	11.3 in 2003	20	12.0

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

<http://www.bom.gov.au/climate/current/season/sa/archive/201611.summary.shtml>

Distribution Based on Gridded Data
Australian Bureau of Meteorology

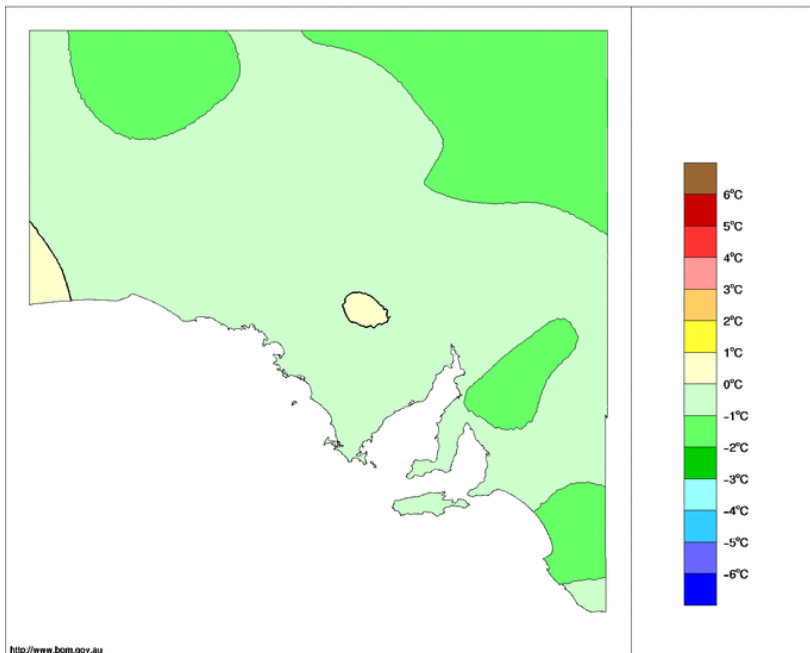


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Issued: 21/12/2016

Maximum Temperature Anomaly (°C) 1 September to 30 November 2016

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Issued: 21/12/2016

Adelaide in December 2016: Heavy rain and above average temperatures

It was a wet finish to 2016 for Adelaide in December, with heavy rainfall reported between the 8th and 9th, and particularly heavy rainfall leading to localised flash flooding between the 27th and 29th across the Adelaide metropolitan and Hills region. Both day and night temperatures started off cooler than average at the beginning of December, but the last few days saw well above average temperatures.

Heavy rainfall leads to very wet month

- Heavy rainfall was reported between the 8th and 9th and between the 27th and 29th across the Adelaide metropolitan and Hills region with several locations reporting their wettest December day on record in the latter period
- In the 24 hours to 9am on the 28th, 110.0 mm of rainfall was recorded at Uraidla, in the Adelaide Hills, marking the sixth-highest December daily rainfall total on record for the Adelaide region
- With the monthly total rainfall up to three times the long term average across the region, several sites reported their wettest December in several decades
- With a monthly total of 86.8 mm for the city, it was the sixth-wettest December to be recorded in Adelaide since records began in 1839
- Adelaide received 61.2mm on 28th; the third-highest December daily rainfall for the city (comparing observations from both Kent Town and West Terrace)

A cooler than average start and then a warmer than average finish

- The month started with cooler than average temperatures for both maximum and minimum temperatures, but finished with well above average temperatures
- With heatwave conditions experienced at the end of the month, daytime temperatures were in excess of 12 °C warmer than average around the Christmas period

Damaging winds and flash flooding

- A deep low pressure system brought record high humidity, heavy rainfall and destructive winds on the 27th-28th, with flash flooding occurring through the Mount Lofty Ranges and Adelaide Metropolitan area
- A wind gust of 120 km/h was recorded in the early morning at Mount Crawford on the 28th

Extremes in December 2016

Hottest day	41.3 °C at Adelaide (Kent Town) on the 25th 41.3 °C at Parafield Airport on the 25th
Warmest days on average	28.9 °C at Parafield Airport
Coollest days on average	22.7 °C at Mount Lofty
Coldest day	13.4 °C at Mount Lofty on the 8th
Coldest night	5.2 °C at Mount Lofty on the 18th
Coollest nights on average	10.9 °C at Mount Lofty
Warmest nights on average	15.4 °C at Adelaide (Kent Town)
Warmest night	26.5 °C at Noarlunga on the 13th
Warmest on average overall	22.0 °C at Adelaide (Kent Town)
Coollest on average overall	16.8 °C at Mount Lofty
Wettest overall	163.0 mm at Uraidla
Wettest day	110.0 mm at Uraidla on the 28th

Some notable statistics for Adelaide for December were:

Record highest December total rainfall

	New record (mm)	Old record	Years of record	Average
McLaren Vale	59.4	51.6 in 2010	22	23.3

Record highest December daily rainfall

	New record (mm)	Old record	Years held
Cudlee Creek	92.0on the 28th	65.5on the 28th in 1929	103
Uraidla	110.0on the 28th	77.2on the 26th in 1959	126
Happy Valley	58.0on the 28th	56.4on the 4th in 1966	125
Mount Barker	76.0on the 28th	63.0on the 7th in 1986	133
Mount Bold	66.2on the 28th	48.6on the 14th in 1993	66
Hahndorf	77.4on the 28th	49.4on the 22nd in 2007	131
Parafield Airport	61.2on the 28th	51.2on the 8th in 2010	69
Edinburgh RAAF	70.0on the 28th	58.8on the 8th in 2010	45
Hope Valley	66.4on the 28th	49.2on the 8th in 2010	38
Blackwood	55.4on the 28th	54.0on the 8th in 2010	38

Highest December total rainfall for at least 20 years

	Observed (mm)	Most recent	December Average
Cudlee Creek	133.2	147.4in 1922*	38.6
North Adelaide	85.8	97.1in 1936*	27.8
Morphett Vale	64.4	66.9in 1951*	25.7
Nairne	118.8	167.4in 1992	32.3
Uraidla	163.0	168.2in 1992	47.0
Willunga	59.0	112.4in 1992	25.4
Lobethal	143.3	168.4in 1992*	36.8
Hahndorf	119.5	163.0in 1992*	37.5
Adelaide Airport	70.6	89.8in 1993	24.0
Happy Valley	75.2	91.2in 1993	29.3
Seaton	77.2	86.6in 1993*	25.6

* **note:** there are gaps in the historical record at this site, so it is possible a higher value has gone unreported

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

<http://www.bom.gov.au/climate/current/month/sa/archive/201612.adelaide.shtml>

Adelaide, South Australia December 2016 Daily Weather Observations

Observations are from Kent Town, about 2 km east of the city centre.



Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am					3pm								
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP		
		°C	°C	mm	mm	hours	mmh	local	°C	%	eighths	km/h	°C	%	eighths	km/h	hPa	°C	%	eighths	km/h	hPa	
1	Th	11.7	24.1	0			SW	28	16:19	16.8	58	ENE	6	1010.2	20.9	55	SW	7	1008.6		SW	7	1008.6
2	Fr	11.4	24.9	0			WSW	35	13:44	17.5	64	S	11	1014.6	22.5	46	SW	20	1013.3		SW	20	1013.3
3	Sa	11.4	32.2	0			WSW	26	14:35	20.1	38	ENE	9	1014.4	31.9	23	WSW	13	1011.1		WSW	13	1011.1
4	Su	18.4	29.0	0			SW	48	19:17	23.5	66	N	22	1010.2	25.2	66	NNE	13	1004.9		NNE	13	1004.9
5	Mo	13.5	22.7	4.6			WSW	33	14:58	16.9	58	S	7	1014.3	21.4	45	SW	15	1013.5		SW	15	1013.5
6	Tu	12.8	23.6	0			WSW	26	11:13	18.4	48	NNW	6	1016.4	22.5	44	W	11	1016.3		W	11	1016.3
7	We	12.7	31.3	0			WSW	39	21:15	21.2	45	NE	11	1014.2	28.0	40	WNNW	17	1008.4		WNNW	17	1008.4
8	Th	15.0	20.7	8.0			SW	57	11:02	16.2	66	WSW	24	1008.3	18.4	55	SW	19	1011.3		SW	19	1011.3
9	Fr	11.6	21.5	0.8			WSW	37	14:51	15.0	48	ENE	9	1022.7	20.5	41	SW	17	1021.8		SW	17	1021.8
10	Sa	9.7	26.0	0			WSW	26	16:30	17.9	48	ENE	7	1024.2	25.1	31	SW	13	1022.3		SW	13	1022.3
11	Su	12.3	31.2	0			WSW	28	14:42	20.6	46	E	7	1022.7	30.2	23	WNNW	13	1019.3		WNNW	13	1019.3
12	Mo	16.1	36.9	0			NNW	35	10:45	27.6	27	N	9	1017.0	36.2	10	WNNW	15	1014.1		WNNW	15	1014.1
13	Tu	20.3	35.6	0			NNW	54	10:02	29.8	19	N	13	1008.5	34.7	20	SW	13	1006.7		SW	13	1006.7
14	We	16.0	24.4	0.4			SE	39	18:21	16.6	73	SSE	7	1015.1	22.4	42	ESE	9	1014.0		ESE	9	1014.0
15	Th	12.5	23.3	0			SE	31	03:49	16.1	40	ESE	15	1018.6	21.9	26	NE	6	1015.5		NE	6	1015.5
16	Fr	10.3	27.6	0			WSW	30	12:39	18.1	52	Calm	15	1011.8	26.5	25	WNNW	15	1009.0		WNNW	15	1009.0
17	Sa	14.4	21.7	0.4			WSW	46	15:35	16.7	75	SW	15	1015.7	20.3	36	SW	24	1018.2		SW	24	1018.2
18	Su	9.6	27.4	0			SSW	28	14:31	17.3	42	E	9	1023.1	24.3	30	WSW	13	1018.5		WSW	13	1018.5
19	Mo	17.2	37.1	0			WSW	41	17:24	26.7	16	N	13	1011.7	36.1	12	W	19	1007.1		W	19	1007.1
20	Tu	14.6	22.8	2.2			WSW	35	10:41	16.9	56	SW	19	1014.3	22.1	42	WSW	15	1014.1		WSW	15	1014.1
21	We	13.1	26.9	0			WSW	31	11:43	18.8	50	SSE	7	1020.0	24.8	42	WSW	19	1017.5		WSW	19	1017.5
22	Th	15.1	32.9	0			SSW	26	14:21	22.5	44	ENE	13	1018.1	30.4	32	WSW	15	1014.1		WSW	15	1014.1
23	Fr	22.5	38.3	0			WSW	46	14:06	29.9	21	NNE	9	1011.2	36.9	17	WSW	20	1008.1		WSW	20	1008.1
24	Sa	19.1	36.2	0			WSW	26	14:06	26.9	41	E	4	1013.5	35.6	24	WSW	13	1011.1		WSW	13	1011.1
25	Su	16.9	41.3	0			SW	33	21:25	30.7	26	E	7	1009.7	39.2	15	WSW	15	1006.1		WSW	15	1006.1
26	Mo	22.2	28.4	0.2			SE	48	01:37	22.3	76	NNE	7	1010.0	28.1	61	W	13	1007.8		W	13	1007.8
27	Tu	21.1	29.9	5.8			NNE	54	22:35	22.8	81	NNE	13	1005.7	25.0	78	E	9	1000.6		E	9	1000.6
28	We	22.5	30.1	61.2			NNE	63	01:42	24.4	89	NNW	13	998.5	28.8	60	SSW	9	1000.5		SSW	9	1000.5
29	Th	17.2	30.8	3.0			SSW	37	18:17	22.9	51	N	7	1004.2	30.7	26	WNNW	17	1003.0		WNNW	17	1003.0
30	Fr	17.9	24.3	0.2			WSW	33	10:42	19.1	75	W	15	1005.5	22.6	64	SW	11	1006.1		SW	11	1006.1
31	Sa	18.1	25.3	0			SW	33	17:59	18.7	70	WSW	15	1009.1	23.5	54	W	11	1007.7		W	11	1007.7
Statistics for December 2016																							
Mean		15.4	28.7																				
Lowest		9.6	20.7							20.9	51			1013.3	27.0	38					14	1011.3	
Highest		22.5	41.3	61.2			NNE	63	30.7	89				998.5	18.4	10				NE	6	1000.5	
Total				86.8										1024.2	39.2	78					SW	24	1022.3

Observations were drawn from Adelaide (Kent Town) (Station 023090)

ICD:DM5002.201612 - Prepared at 16:06 GMT on 2 Feb 2017

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http://www.bom.gov.au/climate/dvo/IDC_IDW000.pdf

South Australia in December 2016

It was a wet finish to an overall wet year for South Australia with particularly heavy rainfall recorded between 27th and 29th. Both day and night temperatures started off generally near average at the beginning of the month, but heatwave conditions at the end of the month saw temperatures well above average during the Christmas period.

Heavy rainfall results in record wet December

- The passage of a deep low pressure system brought record high daily rainfall for many locations across the State between the 27th and 29th
- With much of the State reporting more than double the monthly average, many sites had their wettest December on record and the wettest December in several decades for many other locations
- For the State as whole, it was the wettest December on record, surpassing the previous wettest December set in 1988

Warmer than average days across much of the State; mild nights in the south

- Daytime temperatures were more than one degree above average across southern districts, extending into the northeast of the State, with the far northwest experiencing cooler than average maximum temperatures
- Minimum temperatures were generally mild and tending near average across south-central districts and in the southeast
- The northeast pastoral reported minimum temperatures up to three degrees above average
- Overall, the statewide December mean minimum temperature is sixth-warmest on record

Heatwave conditions, damaging winds, high humidity and flash flooding

- On the 7th, a wind gust of 141 km/h was observed at Moonta (Warburto Point) as thunderstorms crossed the State, this is the highest wind speed to be recorded in the State since 31 December 2009
- A high pressure system centred over the Tasman Sea and a low pressure system to the west of South Australia directed a very hot northerly airstream over the State, bringing temperatures in excess of 8 °C above average during the Christmas period
- As the low pressure system tracked eastwards record high humidity, heavy rainfall and destructive winds were brought to many parts of the State on the 27th and 28th
- Mount Crawford recorded the strongest winds and a gust of 120 km/h in the early hours of the 28th

Extremes in December 2016

Hottest day	45.9 °C at Oodnadatta Airport on the 1st
Warmest days on average	37.3 °C at Moomba Airport
Coollest days on average	21.0 °C at Neptune Island
Coldest day	13.4 °C at Mount Lofty on the 8th
Coldest night	1.1 °C at Keith (Munkora) on the 18th
Coollest nights on average	9.8 °C at Keith (Munkora)
Warmest nights on average	24.3 °C at Moomba Airport
Warmest night	31.8 °C at Moomba Airport on the 27th
Warmest on average overall	30.8 °C at Moomba Airport

Coollest on average overall

16.8 °C at Mount Lofty

Wettest overall

217.0 mm at Ernabella (Pukatja)

Wettest day

117.2 mm at Ernabella (Pukatja) on the 27th

Strongest wind gust

141 km/h at Moonta (Warburto Point) on the 7th

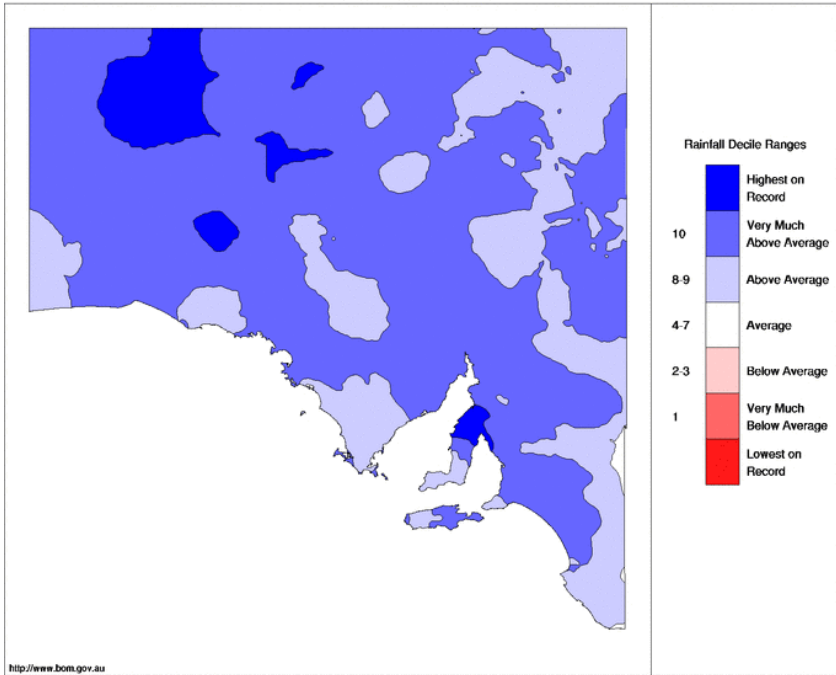
Record highest December daily rainfall			
	New record (mm)	Old record	Years held
Port Clinton	69.6 on the 28th	59.9 on the 27th in 1929	130
Cudlee Creek	92.0 on the 28th	65.5 on the 28th in 1929	103
Moonta	60.4 on the 28th	48.8 on the 25th in 1946	134
Finniss	56.0 on the 28th	45.7 on the 26th in 1946	103
Uraidla	110.0 on the 28th	77.2 on the 26th in 1959	126
Happy Valley	58.0 on the 28th	56.4 on the 4th in 1966	125
Mount Barker	76.0 on the 28th	63.0 on the 7th in 1986	133
Bridgewater	105.0 on the 28th	84.6 on the 8th in 1986	130
Cowell	60.2 on the 28th	44.0 on the 6th in 1990	131
Mount Bold	66.2 on the 28th	48.6 on the 14th in 1993	66
Two Wells	71.4 on the 28th	59.4 on the 31st in 1995	133
Port Parham	86.2 on the 28th	39.0 on the 18th in 1997	46
Cooper Pedy	33.6 on the 27th	31.0 on the 30th in 2003	23
Hahndorf	77.4 on the 28th	49.4 on the 22nd in 2007	131
Roseworthy	36.2 on the 28th	26.6 on the 13th in 2008	20
Mintabie	83.0 on the 27th	59.0 on the 24th in 2009	25
Parafield Airport	61.2 on the 28th	51.2 on the 8th in 2010	69
Prospect Hill	62.6 on the 28th	45.8 on the 8th in 2010	50
Aldgate	100.6 on the 28th	61.2 on the 8th in 2010	48
Upper Hermitage	68.0 on the 28th	45.0 on the 8th in 2010	47
Edinburgh RAAF	70.0 on the 28th	58.8 on the 8th in 2010	45
Hope Valley	66.4 on the 28th	49.2 on the 8th in 2010	38
Blackwood	55.4 on the 28th	54.0 on the 8th in 2010	38
Strathalbyn	53.6 on the 28th	26.0 on the 8th in 2010	21

Record lowest December daily maximum temperature				
	New record (°C)	Old record	Years held	December Average
Whyalla	18.7 on the 14th	= 18.7 on the 7th in 1983	33	28.3

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

<http://www.bom.gov.au/climate/current/month/sa/archive/201612.summary.shtml>

Distribution Based on Gridded Data
Australian Bureau of Meteorology

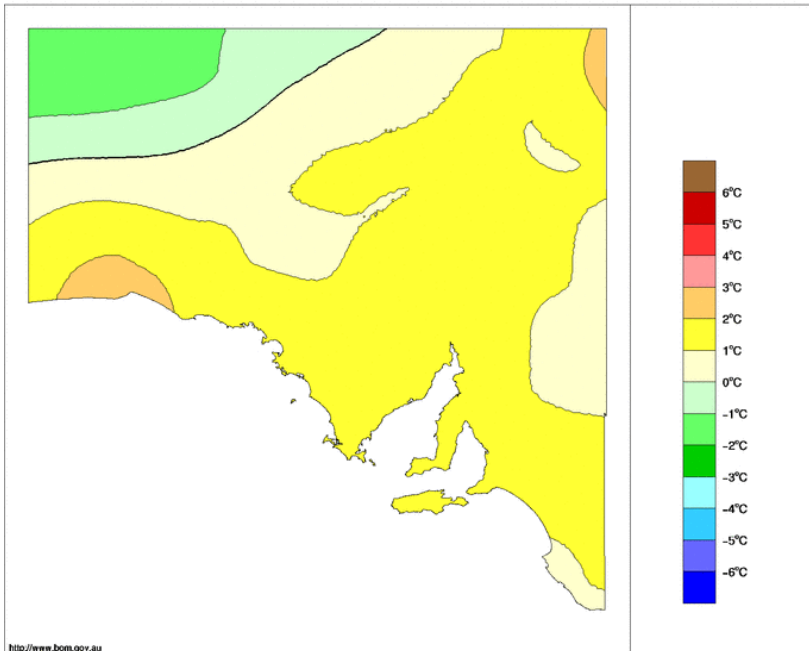


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Maximum Temperature Anomaly (°C) December 2016

Australian Bureau of Meteorology



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Issued: 21/01/2017

South Australia in 2016: a wet year, variable temperatures

Several heavy rain events brought flooding to parts of South Australia during the year. Temperatures were above average overall, though strong southwesterly winds and several vigorous cold frontal systems brought much cooler days and nights for many districts during winter and spring.

Heavy rain and flooding, and a wet year overall

- There were numerous occasions when severe thunderstorms resulted in very heavy rainfall that led to flooding across parts of the State
- Heavy rain resulted in some sites reporting their wettest day on record and several locations reported their wettest year on record or their wettest year for many decades
- Total rain for South Australia was 63% above average, the fourth-wettest calendar year on record, and the wettest year since 2010
- Uraidla in the Adelaide Hills, registered 1790.6 mm, the highest annual total recorded at any South Australian station since 1917
- During September, major flood levels were reached in number of catchments as heavy rain fell over the Yorke Peninsula, Mount Lofty Ranges and Adelaide metropolitan districts
- The year finished with storms and record breaking heavy rainfall at the end December

A warm autumn, cool spring, warm overall

- Temperatures varied markedly during 2016, with a warm first half of the year that included the State's fifth-warmest autumn on record, then a near-average winter but a cool spring that included the ninth-coolest September days on record
- Northern and eastern districts were affected by an extended period of heat that resulted in several locations having their warmest March nights on record
- South Australia's mean temperature for 2016 was 0.58 °C above average, but the coolest year overall since 2012
- Despite cooler nights during spring, the State's mean minimum for 2016 was equal seventh warmest at 0.73 °C above average
- The mean maximum for 2016 was 0.43 °C above average, but after several exceptionally warm years, it was the the coolest days overall since 2011

Severe thunderstorms, flooding and strong winds

- In early May a significant storm surge occurred in Gulf waters as a deep low pressure system affected southern parts of South Australia
- Central and eastern districts were impacted by severe thunderstorms and a tornado outbreak that caused widespread damage in late September
- Southern coasts and elevated regions across agricultural areas experienced per-

sistent and strong westerly winds on many days during October, intensified by several squally and vigorous cold fronts that crossed the State.

- Storms at the end of December caused widespread power outages and damage to properties across the Adelaide Hills as well as flash flooding in the hills and metropolitan region.
- On 7 December, a wind gust of 141 km/h was observed at Moonta (Warburto Point) as thunderstorms crossed the State, this is the highest wind speed to be recorded in the State since 31 December 2009.

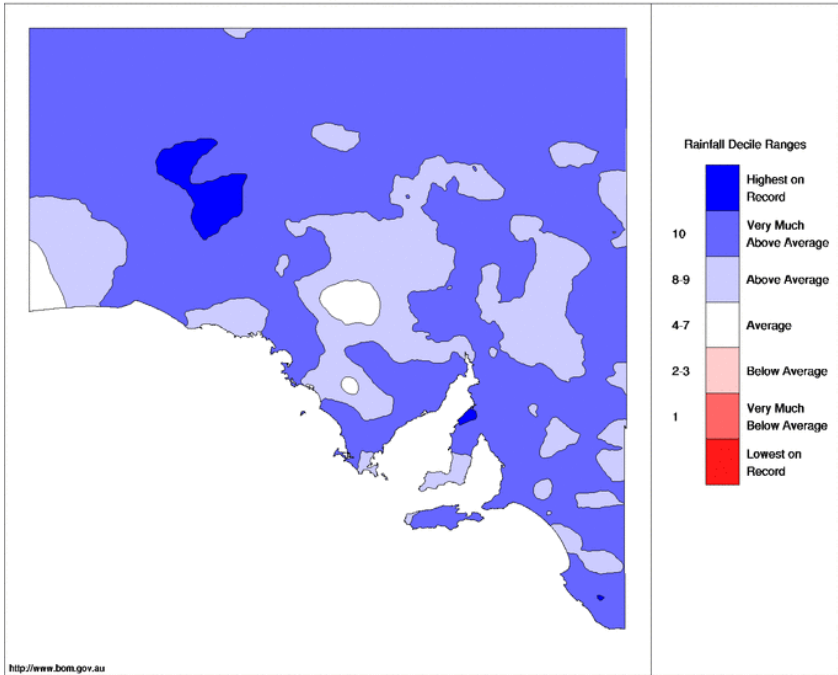
Adelaide: plenty of rain, mild temperatures

- April and November were relatively dry but most other months were quite wet, especially in winter and early spring
- With a total of 820.8 mm of rainfall for 2016, Adelaide recorded its second-wettest year on record and the wettest since 1992 (883.2 mm) for the city (including observations from both Kent Town and West Terrace)
- Adelaide's mean temperature for the year was 17.6 °C, just 0.3 °C above the long-term average
- Nights were generally mild in Adelaide, with a mean daily minimum temperature of 12.4 °C, just 0.1 °C above average
- Daytime temperatures were also mild in Adelaide, with a mean daily maximum of 22.9 °C coming in 0.5 °C above average, but overall, days were the coolest since 2012.

Extremes in 2016

Hottest day	45.9 °C at Oodnadatta Airport on 1 Dec
Warmest days on average	29.2 °C at Moomba Airport 29.2 °C at Oodnadatta Airport
Coollest days on average	17.0 °C at Mount Lofty
Coldest day	4.6 °C at Mount Lofty on 12 Jul
Coldest night	-5.0 °C at Yunta Airstrip on 16 Jul
Coollest nights on average	8.6 °C at Keith (Munkora)
Warmest nights on average	16.1 °C at Moomba Airport
Warmest night	31.8 °C at Roxby Downs on 13 Jan 31.8 °C at Moomba Airport on 27 Dec
Warmest on average overall	22.6 °C at Moomba Airport
Coollest on average overall	12.9 °C at Mount Lofty
Wettest overall	1790.6 mm at Uraidla
Wettest day	130.8 mm at Kalamurina on 1 Jan
Strongest wind gust	141 km/h at Moonta on 7 Dec.

Distribution Based on Gridded Data
Australian Bureau of Meteorology

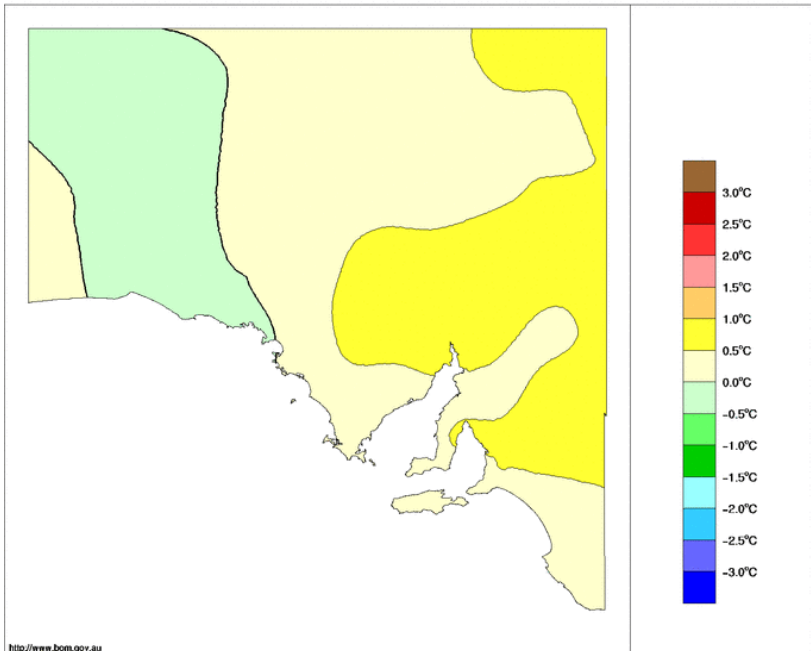


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Issued: 21/01/2017

Maximum Temperature Anomaly (°C) 1 January to 31 December 2016

Australian Bureau of Meteorology



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

NEXT MEETING

6.00 PM TUESDAY 21 February 2017

**Bureau of Meteorology offices, Level 4, corner of South Terrace & King
William Street , Adelaide**

Please note that subscriptions for 2016/2017 (\$15) are now due

Speakers: *Darren Ray – Senior Climatologist Bureau of Meteorology
Mike Leane- Power Supply Engineer*

Subject: *Why did South Australia blackout in September 2016?*

Abstract: SA blacked out in late Sept 2016 during an intense storm event. Darren will cover meteorological impacts, with Mike Leane examining what happened to the power network in response, and how a state-wide blackout occurred, and implications for the future.

Convenient free street parking is usually available nearby (e.g. South Tce.)

We look forward to seeing you.

For further information contact

<i>Secretary:</i>	<i>Darren Ray</i>
<i>Phone:</i>	<i>8366 2664</i>
<i>Fax:</i>	<i>8366 2693</i>

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