



Australian Government
Bureau of Meteorology

NEW SOUTH WALES REGIONAL OFFICE
Bureau of Meteorology
PO Box 413 Darlinghurst NSW 1300 Australia

SPECIAL CLIMATE STATEMENT 39

Exceptional heavy rainfall across southeast Australia

Issued 6 March 2012

*Climate Information Services
Bureau of Meteorology*

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Special Climate Statement 39.

Note: This statement is based on preliminary data available as of 6 March 2012 which
may be subject to change as a result of standard quality control procedures.

Introduction

Widespread, heavy and persistent rainfall was recorded across southeast Australia between 27 February and 5 March 2012 as a result of a slow moving low pressure trough and associated cloud band (Fig 1 – 7). The heaviest falls during the event occurred in an area stretching from the eastern edge of the Northern Territory/South Australia border to southeast New South Wales and the Gippsland region of Victoria, encompassing most of the southern half of the Murray-Darling Basin. This area experienced several consecutive days of heavy rain, with multi-day accumulation rainfall records broken at numerous stations (Table 1 – 5). The highest 7-day accumulated rainfall total during the event was 525.0 mm recorded at Mount Buffalo. The exceptional rainfall caused widespread major, moderate and minor flooding across southeastern New South Wales as well as northern and eastern Victoria.

The main significant feature of this event was the persistence of heavy rainfall over the course of a week, with some areas recording 50 mm or more on several days. Most of inland southeast Australia recorded accumulated rainfall totals in excess of 100 mm, with large areas recording totals in excess of 200 mm for the event (Fig. 8). February and early March are seasonally dry in these areas, and the accumulated rainfall totals are several times the monthly average for the whole of February (or March), see Figure 9. As an example, Ivanhoe Post Office in southern New South Wales recorded a 7-day total of 294.1 mm, equivalent to 10 times the monthly mean of 28 mm and almost equal to its annual mean rainfall (306 mm), i.e., nearly a year's worth of rain. Many stations in the affected region set record high rainfall totals for periods ranging from 3 to 7 days. The Northern Territory also experienced heavy rain from this event. The Todd River, in Alice Springs, began to flow for the first time since March 2011. For a full list of 3-day and 7-day rainfall records please see Tables 4 and 5 below.

The rainfall event is remarkable in that record high daily accumulations (for any month) were recorded over a large area. New South Wales recorded its 2nd, 3rd and 4th highest statewide daily rainfall totals on record for March, with a 7-day statewide rainfall average of 123.9 mm ranking as the equal highest for the state for any month (equal with 123.9mm from 7–13 January 1974). For the Murray-Darling Basin and the southern part of New South Wales, including northern Victoria, this event was the wettest 7-day period on record for any month. The accumulated rainfall in the Murrumbidgee catchment for the 7-days of 202.6 mm was nearly double the previous highest on record (114.7 mm for 1–7/2/2011 followed by 102.1 mm for 7–13/4/1974; Table 6). In this context the event is one of the most extreme multi-day rainfall events in southeast Australia's history.

Daily rainfall records for February and March were also broken at a number of locations, with some sites breaking their all time daily rainfall record for any month (Tables 1 and 2). This includes Tungamah in the northern part of Victoria which recorded 124.4 mm on 29 February beating the previous record of 98.6 mm set on 25 March 1955. Figure 10 shows the daily rainfall percentiles for the period indicating areas of (near) records for daily rainfall during the event.

Synoptic Summary

An extensive cloud band associated with a slow moving low pressure trough with embedded thunderstorms extended from the northwest to the southeast of the country between 27 February and 4 March 2012. The trough directed tropical moisture from the northwest and northeast across South Australia, New South Wales and Victoria leading to very humid conditions. This resulted in unusually widespread and persistent rainfall from 27 February to 4 March.

At the start of the event the trough was positioned over the south, with the heaviest falls in central Victoria and southern New South Wales. Throughout the event the position of the trough and associated rainfall pattern moved back and forth between this area and central and southeastern New South Wales (e.g. 27 and 29 February; Fig. 11). Several low pressure systems also developed along the low pressure trough on 1 March, with the eastern-most low intensifying and moving into the Tasman Sea. This produced very heavy falls of up to 100 mm in areas along and immediately adjacent to its track which was located over southeastern New South Wales and northeastern Victoria before moving offshore on the 2 March.

On 3 March, a complex area of low pressure developed west of Victoria at the southern end of the low pressure trough. The main low centre intensified rapidly moving south over Tasmania on 4 March. The heaviest rain cleared following the passage of the low to the southeast, while a weaker trough remained over New South Wales.

Widespread Severe Flooding in New South Wales and Victoria

The very heavy falls in southeastern New South Wales and northern and Gippsland regions of Victoria were associated with serious flooding. In southern NSW, the Murrumbidgee River peaked at 10.9 meters near Gundagai, with major flooding at Gundagai and Wagga Wagga comparable to the August 1974 flood event, in addition to widespread rural flooding. Major flooding was also recorded along the Lachlan River, with a peak flood level of 11.8 m at Cowra on the 5 March, causing moderate flooding. Minor to moderate flooding was also experienced along the Bega, Bogan, Castlereagh, Hunter, Namoi, Macquarie, and Hawkesbury-Nepean systems, including the evacuation of areas of western Sydney as well as parts of Bega, Goulburn, Cooma, Tumut and Queanbeyan.

In eastern and northern Victoria, the Snowy and Mitta Mitta systems also experienced major flooding, with the Snowy River at Buchan peaking 0.4 m higher than the April 1950 flood. River levels reached 7.9 m at Jingellic on the Upper Murray, causing evacuations in Walwa on 5 March. A record flood occurred on the Broken Creek, resulting in the evacuation of Numurkah, with minor to moderate flooding also experienced in the Wangaratta, Shepparton and Bandiana regions as well as rural areas along the Broken, Ovens, Goulburn, Mitchell, Genoa and Kiewa river systems. Several dams also reached full capacity during this event, including Burrinjuck, Wyangala, Jindabyne and Warragamba in New South Wales and the Tooma Dam in Victoria.

The severity of the riverine flooding coming at the end of summer is testament to the intensity of the rainfall. The two preceding summer months (December 2011 and January 2012) were seasonably dry with rainfall near average.

Further flooding in southern New South Wales and northern Victoria is expected to persist well into March as floodwaters progress through affected rivers, with major centres such as Forbes, Hay and Condobolin likely to be affected before flood waters enter the Murray River.

Unseasonable heavy falls during La Niña events

Historical data reveals a tendency for heavy summer rainfall in southeast Australia to occur while under the influence of La Niña, with similar rainfall events having occurred in the past. Notable events include 24 February to 1 March 1939 and 16 to 20 March 1950 (Figure 12), with widespread heavy rain across northern Victoria and southern New South Wales associated with slow-moving low pressure troughs. The recent rain pattern is also similar to several widespread rain events associated with low pressure troughs during the 2010/2011 La Niña event, most particularly in southern NSW during early February 2011. Comparison with these previous events highlights general similarity, but also underscores that the recent rainfall event is the most extreme for southern New South Wales in terms of extent of heavy rainfall and peak rainfall totals.

Contacts for further information

The following climatologist may be contact for further information about this event:

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General notes

Values in this statement are final values as of 6 March 2012, subject to the Bureau's normal quality control processes.

Number	Station	Years of Record	Rainfall (mm)	Date	Previous Record (mm)	Date
81058	Bridgewater (Post Office)	118	70	27th	63	6th Feb 1890
74081	Mulwala Post Office	105	94	28th	86	20th Jan 1995*
80109	Cobram (Goulburn Murray)	53	108	28th	70.1	20th Feb 1973*
81019	Nagambie (Goulburn Weir)	93	94.6	28th	82.3	17th Feb 1972
81051	Tungamah	122	124.4	28th	89.9	25th Mar 1955*
82109	Molyullah (Killanoola)	43	123.6	28th	86.2	3rd Feb 2005
83033	Woods Point	122	99.4	28th	74.7	5th Feb 1938
83079	Lake Buffalo	42	111.2	28th	88.4	5th Feb 2011
15501	Yambah	43	97	29th	75.6	25th Feb 1974
47048	Broken Hill Airport Aws	53	82.4	29th	69	21st Feb 2000
49063	Ivanhoe (Kilfera)	96	71	29th	66	5th Feb 2001
70043	Gunning Rural Supplies	127	78	29th	66.8	3rd Feb 1941
70220	Boorowa Post Office	130	92.6	29th	55.4	20th Feb 1974
73005	Binalong Post Office	108	102.1	29th	72.1	3rd Feb 1941
74033	Coolamon Post Office	125	123	29th	106.7	11th Jan 1974*
74050	Grong Grong (June St)	112	110.6	29th	65.5	30th May 1978*
74064	Lockhart Bowling Club	114	67.8	29th	67.6	28th Feb 1939
75050	Naradhan (Uralba)	100	74.4	29th	71.9	6th Feb 1950

Table 1: Record daily rainfall for February at stations with at least 30 years of records.

*These stations also recorded their record daily rainfall for any month.

Number	Station	Years of Record	Rainfall (mm)	Date	Previous record (mm)	Previous record
15501	Yambah	43	107.4	1st	98	18th Mar 1983*
72023	Hume Reservoir	90	92.6	1st	62.4	16th Mar 1982
74034	Corowa Airport	122	77.6	1st	72.5	8th Mar 2010
74106	Tocumwal Airport	114	84.6	1st	54.6	30th Mar 1973
75056	Booorooban (Ramsay)	87	67.4	1st	60	14th Mar 2011
80015	Echuca Aerodrome	133	94	1st	90.7	19th Mar 1950*
80091	Kyabram Dpi	48	87.6	1st	35.8	8th Mar 2010
80109	Cobram (Goulburn Murray)	51	82	1st	58.4	30th Mar 1973
81051	Tungamah	121	103.6	1st	98.6	25th Mar 1955
82010	Chiltern (Post Office)	127	117	1st	68.1	1st Mar 1906
82039	Rutherglen Research	99	80.6	1st	60.7	17th Mar 1939
82045	Tallangatta Dcnr	128	103.6	1st	100.8	27th Feb 1939*
82056	Wodonga	87	88.4	1st	83.8	22nd Mar 1926
82058	Yackandandah	124	102.6	1st	94.7	11th Mar 1906
88109	Mangalore Airport	53	71.4	1st	65.3	20th Mar 1970
14857	Suplejack	30	126	2nd	81.4	24th Mar 1982
15503	Mount Riddock	40	98	2nd	91.4	4th Mar 1972
63245	Mandurama Post Office	32	72	2nd	47	15th Mar 1969
84112	Cann River	35	60	2nd	53.2	10th Mar 2000
46043	Wilcannia (Reid St)	133	117.6	3rd	78.5	28th Mar 1881
74000	Ardlethan Post Office	98	106.4	3rd	88.9	20th Mar 1931
71032	Thredbo Aws	30	156.8	4th	96	17th Mar 2001
71041	Thredbo Village	40	165.5	4th	157	5th Sep 2010*
71003	Charlotte Pass	42	186.5	4th	171	31st May 1999
72004	Batlow Post Office	126	128	4th	111.5	11th Mar 1906
74037	Yanco Agricultural Institute	55	175.2	4th	85.2	21th Feb 2003*
74050	Grong Grong (June St)	109	194	4th	110.6	29th Feb 2012*
74064	Lockhart Bowling Club	113	122.6	4th	61.5	16th Mar 1936
74188	Culcairn Bowling Club	100	77.6	4th	58.9	30th Mar 1973
82035	Nariel Creek (Simpson)	126	110.4	4th	98	16th Jan 1984*
82068	Mitta Mitta Forestry	58	90	4th	78.7	31st Mar 1973
82076	Dartmouth Reservoir	59	70.8	4th	68.6	26th Mar 1993
82103	Burrowye Station	43	91.4	4th	71.1	27th Mar 1969

Table 2: Record daily rainfall for March at stations with at least 30 years of records.

*These stations also recorded their record daily rainfall for any month.

Number	Station	Years of Record	Average rainfall (mm)	Rainfall (mm)	Previous Record (mm)	Year
46115	Tilpa (Trevallyn)	38	24.7	157.4	115	1987
49019	Ivanhoe Post Office	127	28.4	189.5	186.8	1989
49103	Ivanhoe (Baden Park)	38	20.9	182	131.6*	1906
63245	Mandurama Post Office	32	47.1	164	143.6	1969
71032	Thredbo Aws	30	106.3	359	246.5	1978
71041	Thredbo Village	40	103.8	382.3	303.2	1978
74037	Yanco Agricultural Institute	55	29.3	200.0	156.4*	1989
74050	Grong Grong (Junee St)	109	36.2	246.6	220.1*	1939
74064	Lockhart Bowling Club	113	33.7	157.8	157.4	1900
74162	Morundah Hotel	28	31.2	133.7	123.5	1939
80091	Kyabram Dpi	48	27.6	104.2	100	2010
80109	Cobram (Goulburn Murray)	51	28.9	130.8	117.1	1969
81051	Tungamah	121	36.8	164.6	155.7	1956
82056	Wodonga	87	49.4	190.8	160.7	1956
82103	Burrowye Station	42	50.5	209.0	175.8	1989
82137	Beechworth Woolshed	25	43.4	155.2	119.9	1989

Table 3: Stations which have already set March monthly rainfall records as of 5 March 2012. * These stations also recorded their wettest month on record.

Station number	Station name	3-day total (mm)	End date	Years of Record	Previous Record (mm)	Date
New South Wales						
71041	Thredbo Village	285.3	4th	41	263	13 – 15 Jul 1975
71032	Thredbo AWS	270.8	4th	42	236	13 – 15 Jul 1975
74050	Grong Grong	210.4	4th	114	107.2	16 – 18 Feb 1928
74033	Coolamon PO	186.6	2nd	126	151.4	21 – 23 Apr 1964
47029	Pooncarie Mail Agency	176.2	1st	130	154.4	04 – 06 Feb 2011
49019	Ivanhoe PO	170.6	1st	128	154.2	09 – 11 Jan 1974
73005	Binalong PO	168.4	2nd	115	140.2	18 – 20 Mar 1950
63293	Oberon	164	3rd	22	148	17 – 19 Jan 2006
63201	Bigga	157.4	2nd	115	124.4	08 – 10 Dec 2010
70083	Tharwa	154.6	2nd	74	138.2	18 – 20 Mar 1950
73142/ 73009	Cootamundra	150.8	2nd	123	148.6	18 – 20 Mar 1950
Victoria						
81051	Tungamah	228.0	1st	123	134.0	18 – 20 Nov 1912
82010	Chiltern	202.6	1st	127	178.9	17 – 19 Feb 1928
82169/ 82011	Corryong	193	4th	121	143.8	27 – 29 Dec 1893
80109	Cobram	190	1st	54	114.6	19 – 21 Feb 1973
81124/ 81057	Yarrawonga	187.8	1st	133	148.1	17 – 19 Nov 1912
88110	Castlemaine Prison	156.8	29th	46	147.6	12 – 14 Jan 2011
South Australia						
17110	Leigh Creek	147.8	1st	30	117.4	26 Dec 1988

Table 4: Selected locations showing the highest-on-record (for any month) 3-day accumulated rainfall totals between 27 February and 4 March.

Station number	Station name	7-day total (mm)	Years of Record	Previous Record (mm)	Date
New South Wales					
71041	Thredbo Village	442.1	41	265	13 – 19 Jul 1975
71032	Thredbo AWS	432.2	42	262.1	16 – 22 Jul 1974
72004	Batlow PO	361.6	126	289.2	30 Oct – 05 Sep 1974
73007	Burrinjuck Dam	329.3	104	318.3	17 – 23 Mar 1950
49019	Ivanhoe PO	294.1	128	178.4	09 – 15 Jan 1974
72161/ 72091	Cabramurra SMHEA	278.6	57	246.6	08 – 14 Aug 1955
74033	Coolamon PO	273.6	125	166.8	11 – 17 Feb 1928
75050	Naradhan	270.6	132	195.6	08 – 14 Mar 1956
70083	Tharwa	262.8	74	253.2	17 – 23 Mar 1950
74037	Yanco	259.8	55	99.8	09 – 15 Mar 1989
72160	Albury	256.4	154	215.4	23 Feb – 01 Mar 1939
46043	Wilcannia	239.8	133	228.5	19 – 25 Jan 1885
72012	Carabost	237.4	126	170.4	10 – 16 Oct 2010
49103	Ivanhoe	237	119	140.3	18 – 24 May 1906
75041	Griffith Airport	214.6	54	178.2	18 – 24 Mar 1985
75031	Hay	189.2	135	168.8	31 Mar – 06 Feb 2011
72150	Wagga Wagga	188.4	71	169	04 – 10 Mar 2010
63293	Oberon	197	22	171	13 – 19 Jul 1975
Victoria					
83073	Mount Buffalo	525.0	102	483	15 – 21 Apr 1956
83084	Falls Creek	353.6	22	270.4	19 – 25 Sep 1998
82010	Chiltern	345.8	127	263.7	13 – 19 Feb 1928
82058	Yackandandah	324.0	126	290.9	23 Feb – 01 Mar 1939
82139	Hunters Hill	317.8	18	211	01 – 07 Feb 2011
82169/ 82011	Corryong	312.1	128	151.4	23 – 29 Dec 1893
82035	Nariel Creek	307.8	128	206	11 – 17 Jul 1964
83085	Mt Hotham	307.4	22	255	13 – 19 Feb 1928
81051	Tungamah	299.8	123	163.8	11 – 17 May 1918
82103/ 82007	Burrowye	290.4	101	194.9	14 – 20 Jul 1964
81124/ 81057	Yarrawonga	277.4	19	160.8	13 – 19 Nov 1912
83010	Eurobin	269.6	100	229.3	23 Feb – 01 Mar 1939
82045	Tallangatta	264.6	132	197.1	23 Feb – 01 Mar 1939
82076	Dartmouth Reservoir	258.4	94	202	23 Feb – 01 Mar 1939
82056	Wodonga	256.1	114	213.4	23 Feb – 01 Mar 1939
82068	Mitta Mitta	253.4	59	177.6	02 – 08 Jul 1986
82137/ 82137/	Beechworth	245.2	139	206.5	11 – 17 May 1918

82001					
82138/ 82053	Wangaratta	241.6	144	210	22 – 28 Feb 1939
82170/ 82002	Benalla	225.0	130	207	30 Sep – 05 Oct 1993
82039	Rutherglen	260.8	99	234.1	13 – 19 Feb 1928
88067	Yea	197.6	127	194	16 – 22 Feb 1973
88110	Castlemaine Prison	195.2	46	191.6	09 – 15 Jan 2011
88109	Mangalore	187.0	39	155.8	16 – 22 Feb 1973
88023	Lake Eildon	185.0	125	183.4	23 Feb – 01 Mar 1939
88158	Strath Creek	175.2	30	159.4	09 – 15 Jan 2011
South Australia					
17110	Leigh Creek	200	30	120.6	09 – 15 Mar 1989

Table 5: Selected locations showing the highest-on-record (for any month) 7-day accumulated rainfall totals between 27 February and 4 March.

River Name	7-day total (mm)	End date	Previous Record (mm)	Date
Murray-Darling	95.36	4th	94.70	07 – 13 Jan 1974
Upper Murray	294.40	4th	162.45	01 – 07 Feb 2011
Kiewa	320.37	4th	215.60	23 Feb – 01 Mar 1939
Ovens	264.11	4th	209.18	11 – 17 May 1918
Broken	215.89	4th	162.25	11 – 17 May 1918
Murrumbidgee	202.56	4th	114.65	01 – 07 Feb 2011
Lake George	207.65	5th	198.05	10 – 16 Mar 1989
Lachlan	180.09	5th	98.99	03 – 09 Feb 1950

Table 6: Selected catchments showing the highest-on-record (for any month) 7-day accumulated rainfall totals. This table is based on AWAP gridded daily rainfall data, which is available back to 1900. Catchment boundaries are available at http://www.bom.gov.au/hydro/wr/basins/basin-hi_grid.jpg

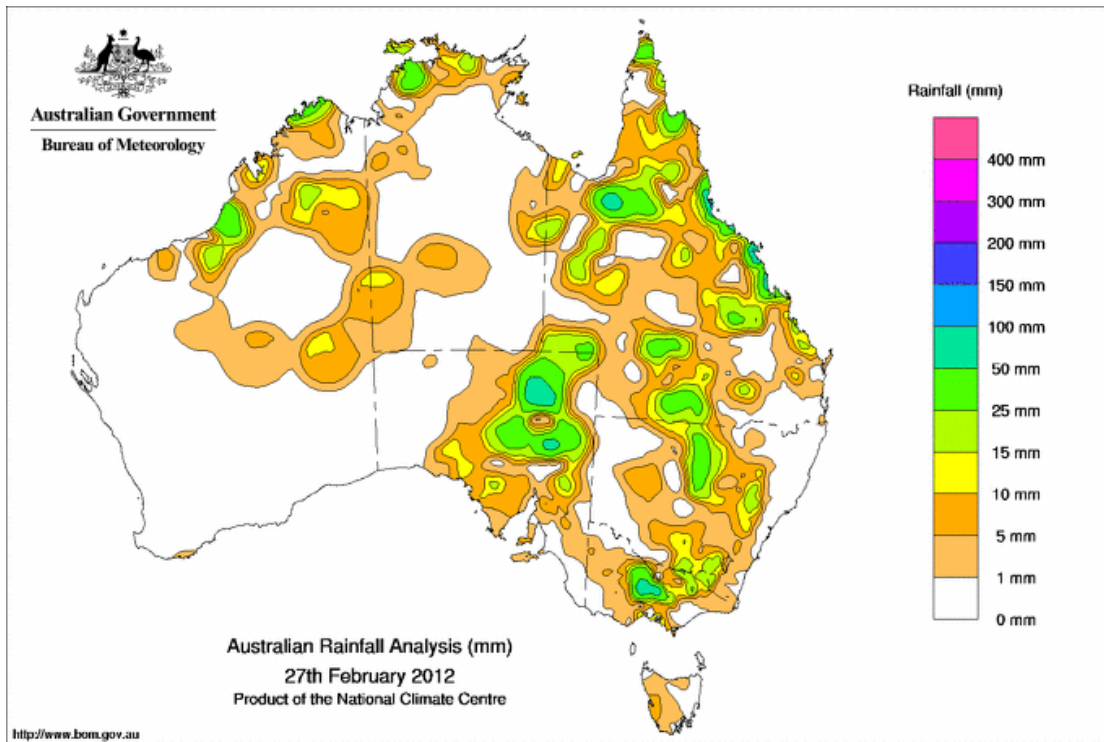


Figure 1: Daily rainfall to 9 am on Monday 27 February 2012 showing totals in excess of 50 mm in parts of central Victoria.

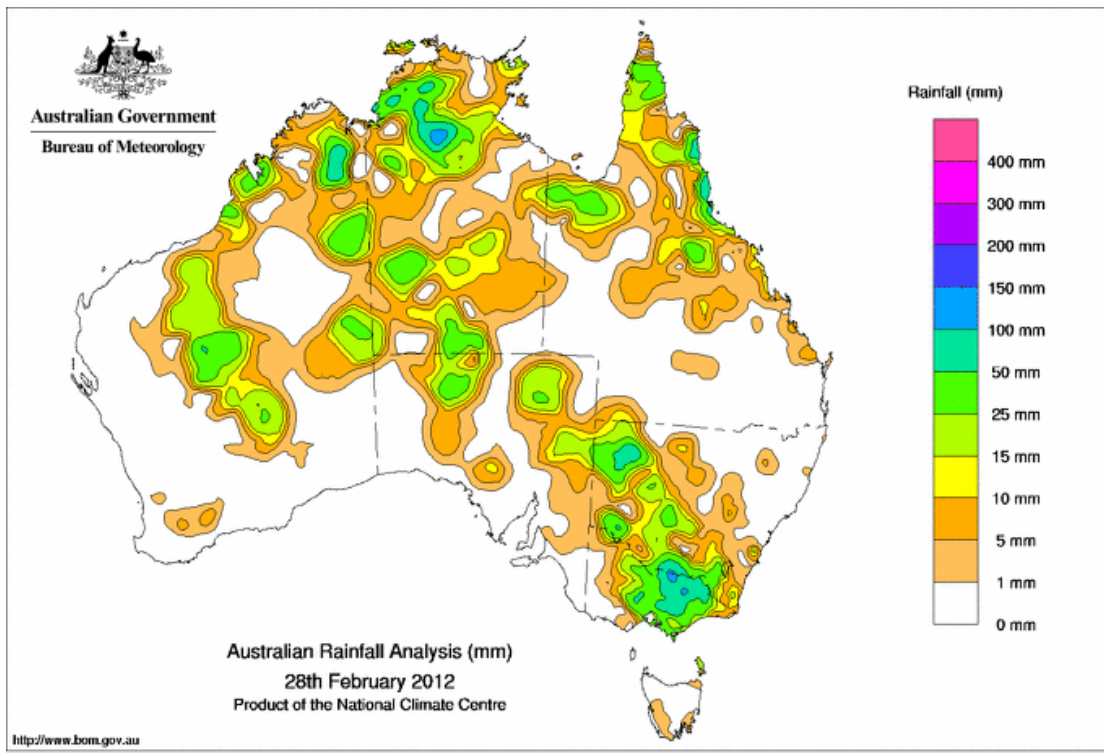


Figure 2: Daily rainfall to 9 am on Tuesday 28 February 2012 showing more widespread totals across large parts of Victoria and parts of southern and western New South Wales.

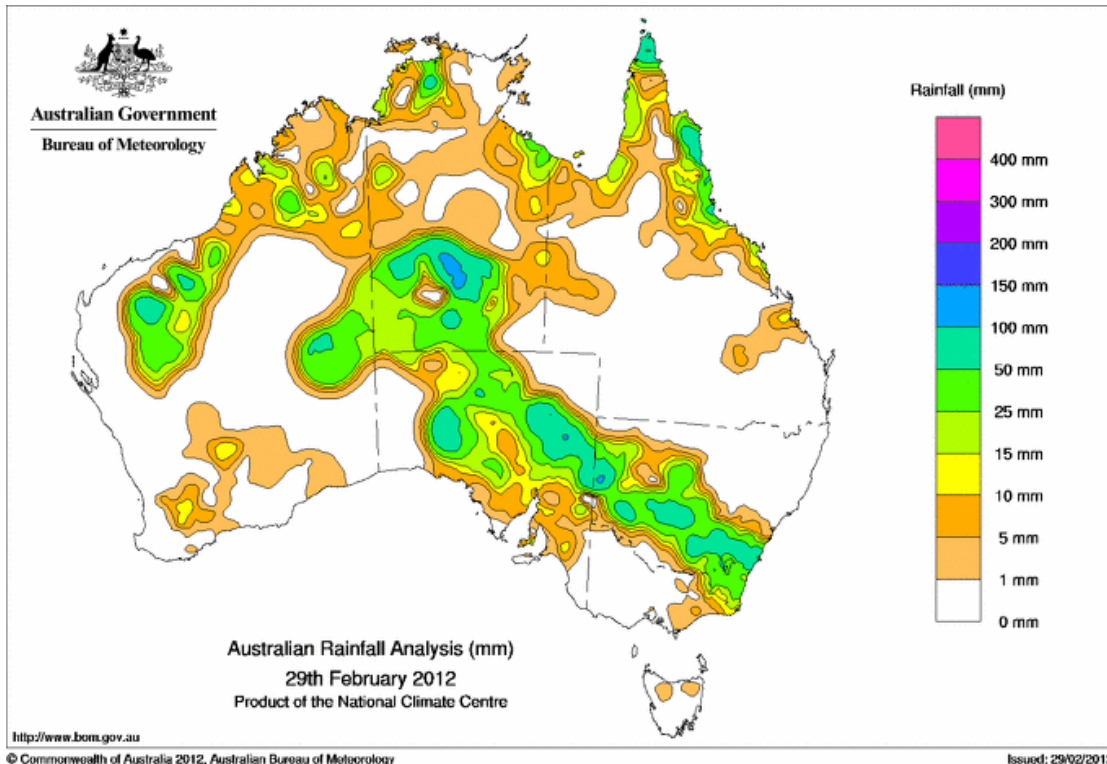


Figure 3: Daily rainfall to 9 am on Wednesday 29 February 2012 showing rainfall associated with the low pressure trough across southern New South Wales, South Australia and southern Northern Territory.

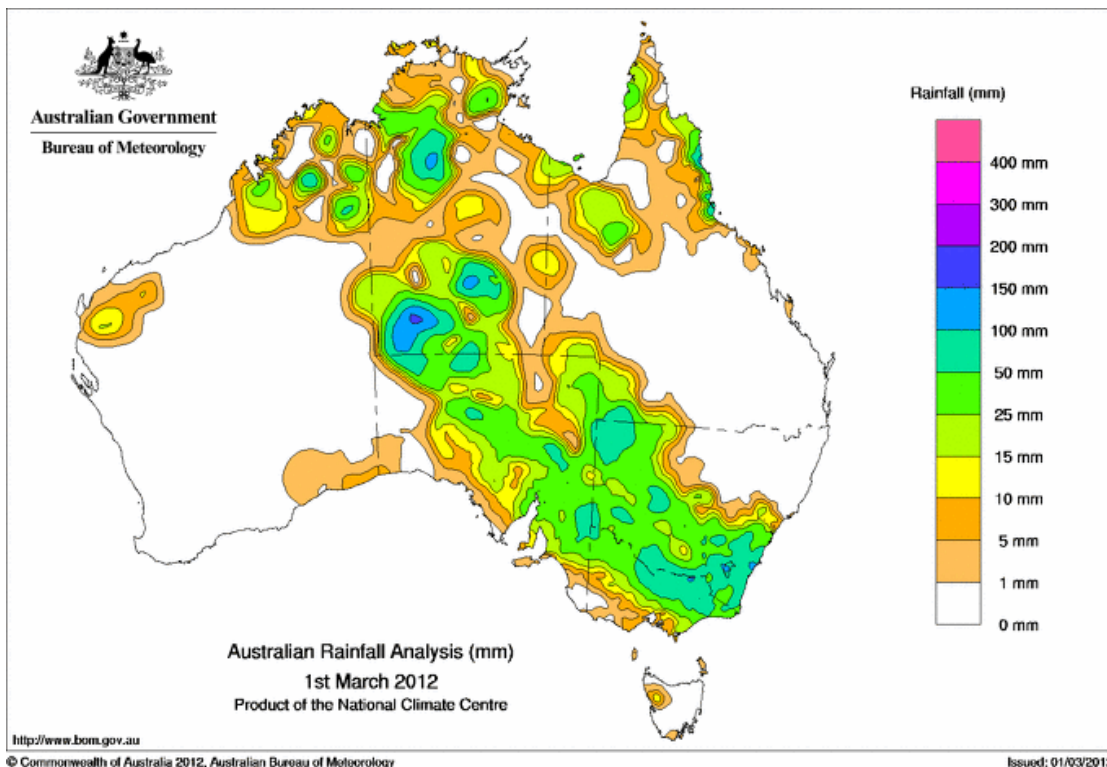


Figure 4: Daily rainfall to 9 am on Thursday 1 March 2012 showing extensive areas with totals in excess of 25 mm in Victoria, southern and western New South Wales, southeast and northwest South Australia as well as southern parts of the Northern Territory.

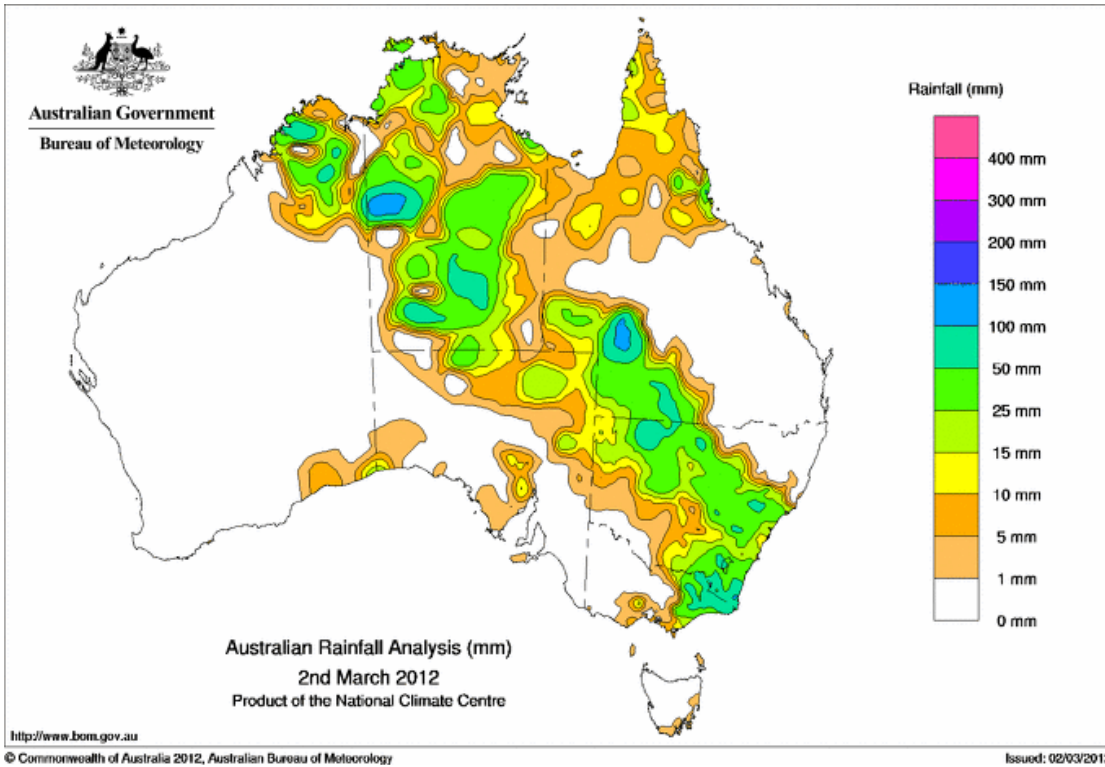


Figure 5: Daily rainfall to 9 am on Friday 2 March 2012 showing high rainfall totals across the Gippsland region and New South Wales south and central coasts, as well as the northwest and southwest Queensland.

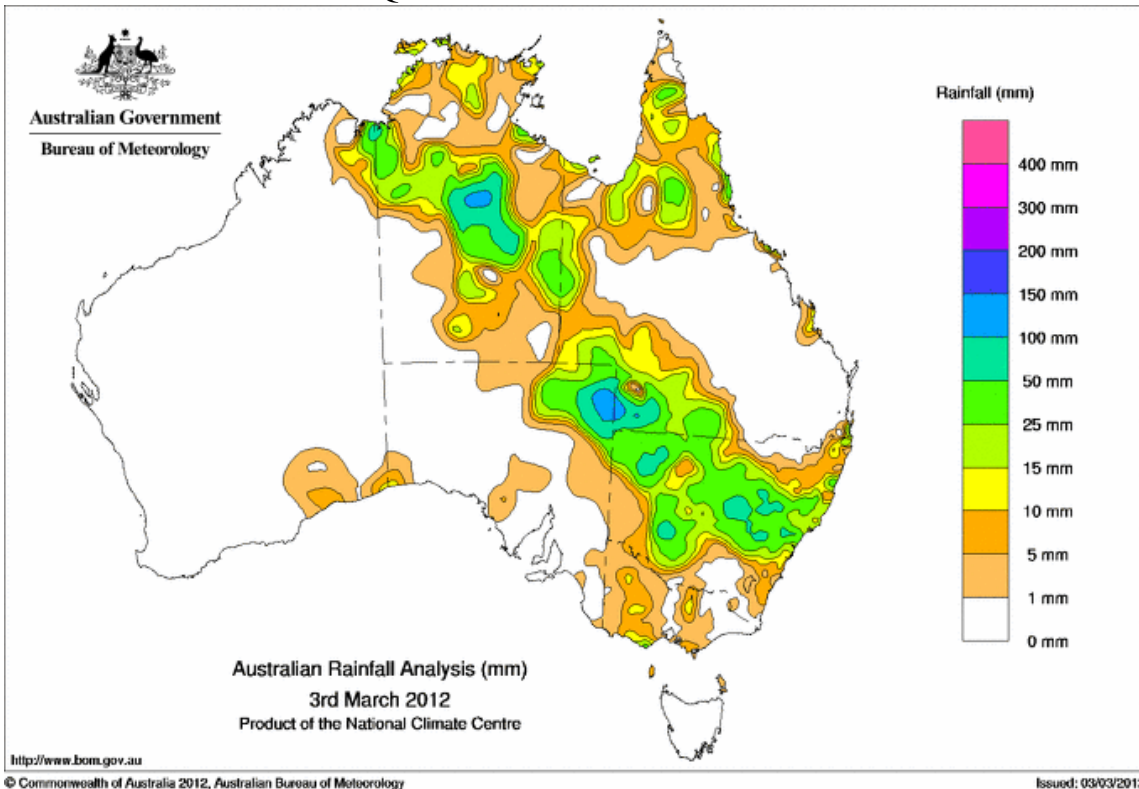


Figure 6: Daily rainfall to 9 am on Saturday 3 March 2012 showing high rainfall totals across the Gippsland region and New South Wales south and central coasts, as well as the northwest and southwest Queensland.

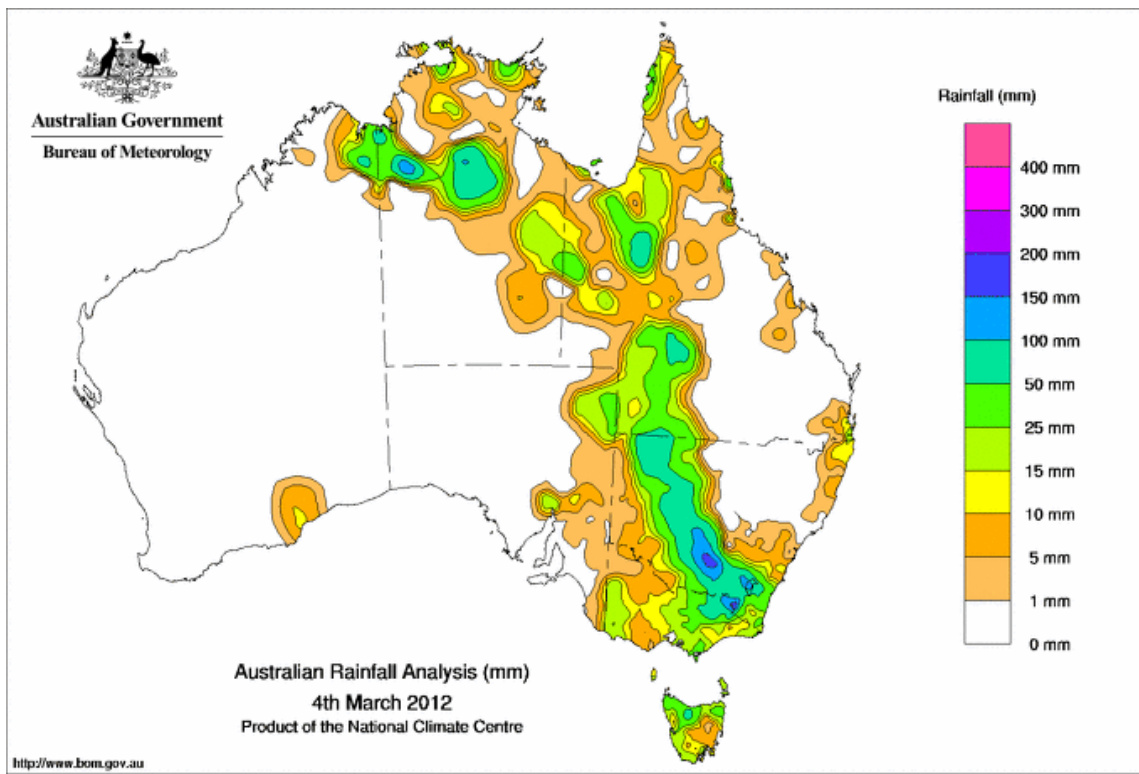


Figure 7: Daily rainfall to 9 am on Sunday 4 March 2012 showing high rainfall totals across the Gippsland region and New South Wales south and central coasts, as well as the northwest and southwest Queensland.

Murray Darling Rainfall Totals (mm) Week Ending 4th March 2012
Product of the National Climate Centre

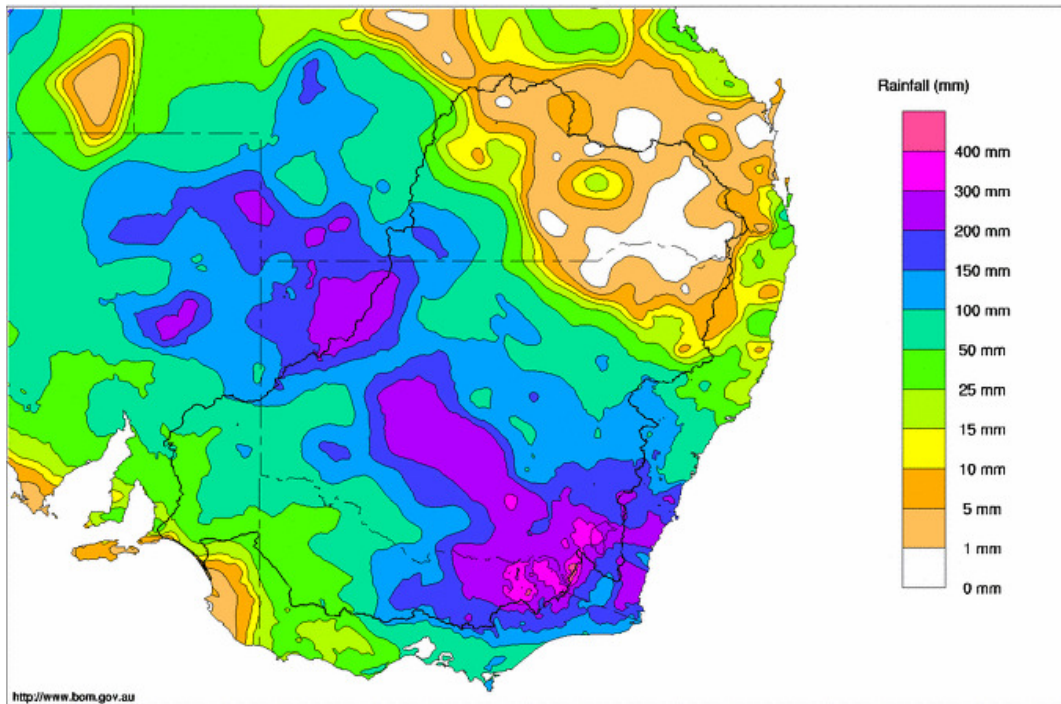


Figure 8: Rainfall totals for the Murray-Darling Basin between 27 February and 4 March 2012 showing widespread areas recording in excess of 100 mm across parts of Victoria, New South Wales and South Australia.

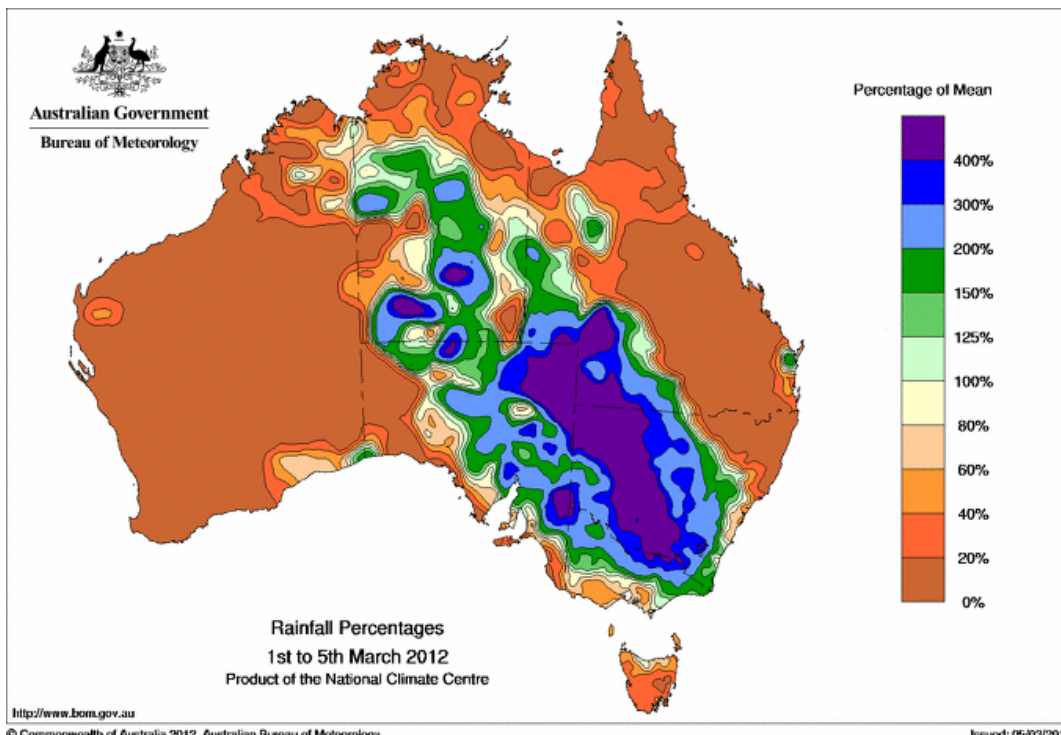


Figure 9: Rainfall percentages from 1 to 5 March showing the totals as a percentage of the March rainfall total average. Areas along the South Australia – New South Wales border recorded over 400% of their average monthly total in 5 days.

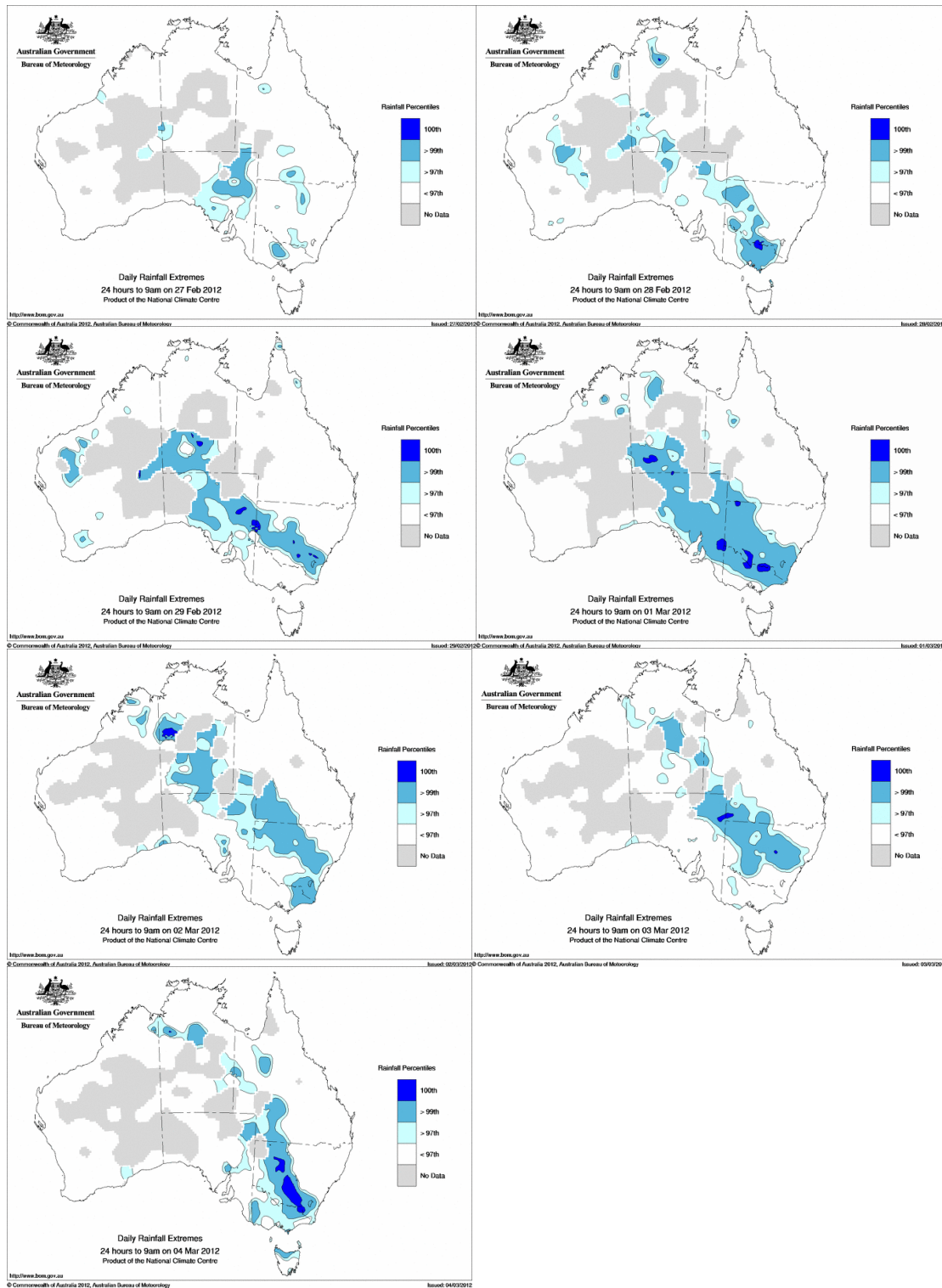
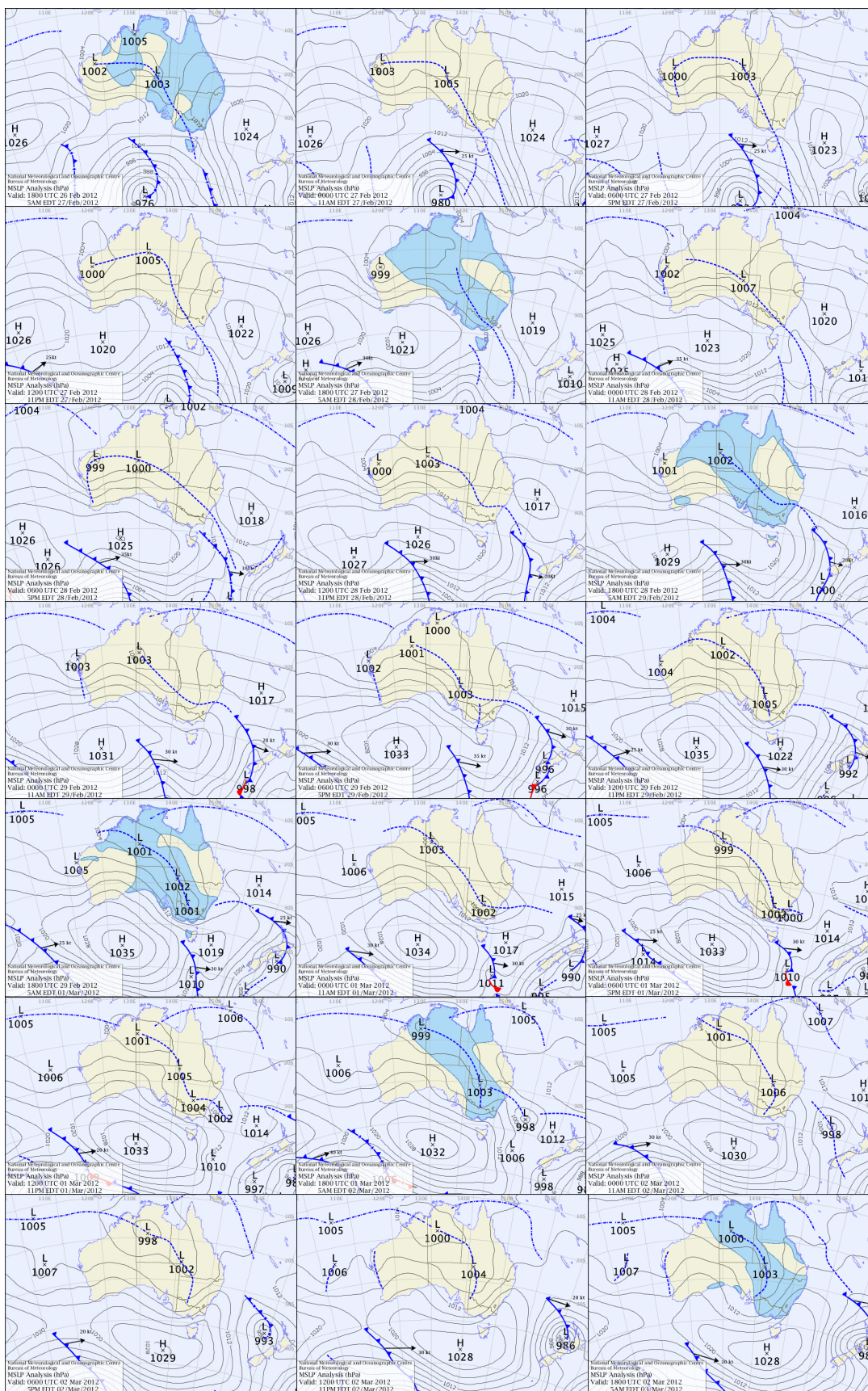


Figure 10: Daily rainfall extremes maps between 27 February and 4 March 2012 showing areas of Australia which experienced remarkably wet conditions on each day. Areas in light blue correspond to areas which are above the 97th percentile, the darker blue to 99th with the darkest blue corresponding to areas which were highest on record daily rainfall for that month.



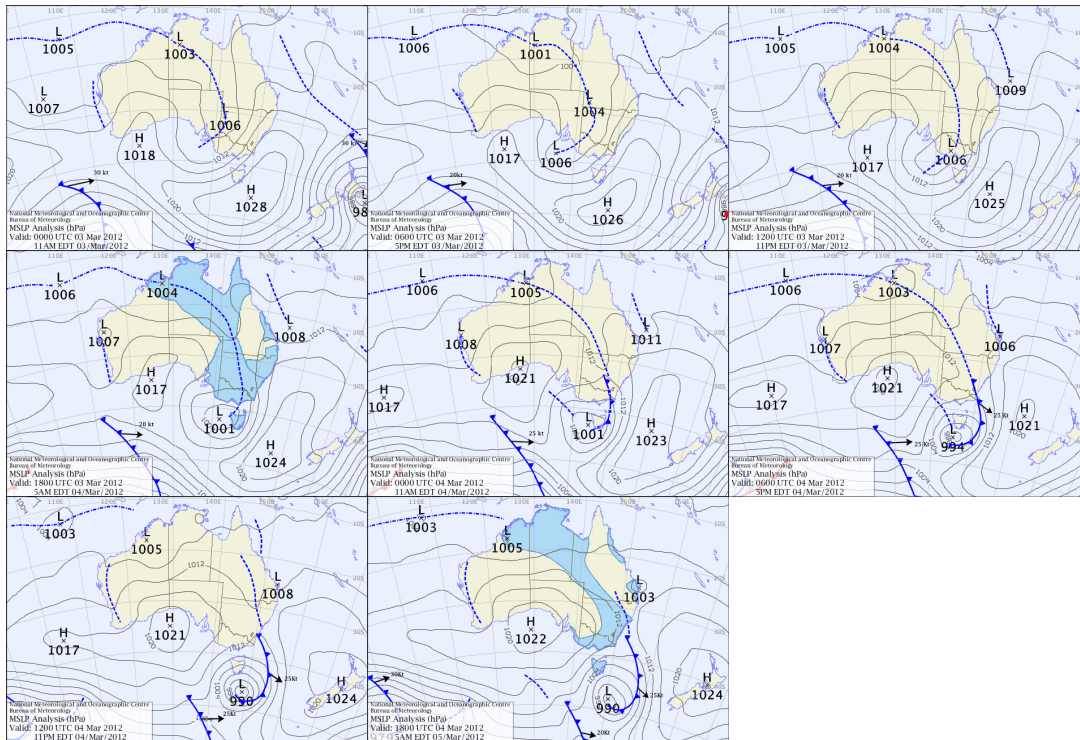


Figure 11: Mean Sea Level Pressure (MSLP) charts every 6 hours from 5 am Monday 27 February to 5 am Monday 5 March, showing the slow moving pressure trough situated across the northwest to the southeast of Australia. The contour interval is 4 hPa. Shading on the 5am EDT charts indicates areas of rain in the previous 24 hours.

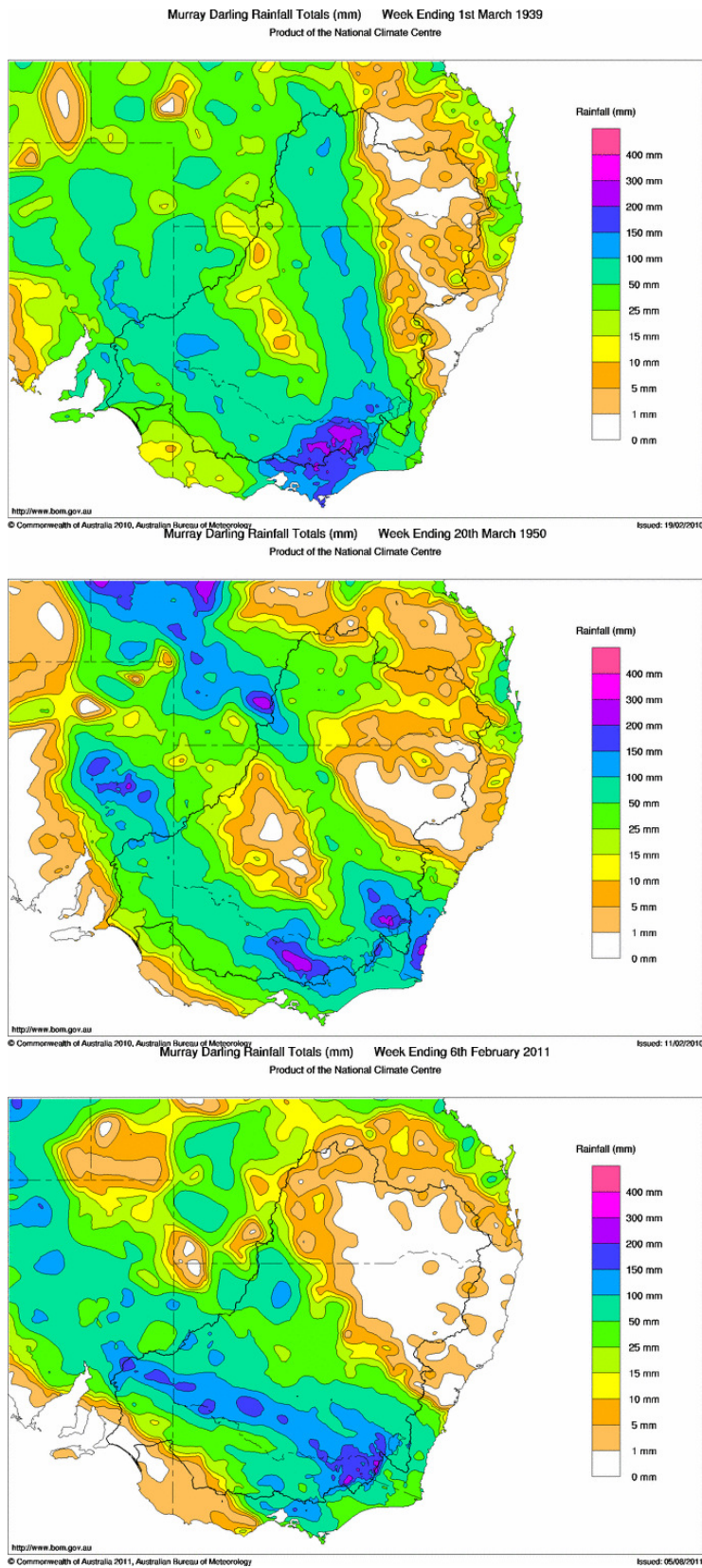


Figure 12: 7-day totals for previous widespread heavy rain events following La Niña years in southern New South Wales: 24 February to 1 March 1939 (top); 14 to 20 March 1950 (middle); 31 January to 6 February 2011 (bottom).