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SPECIAL CLIMATE STATEMENT 12

Warmest May and autumn on record in eastern Australia

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Warmest May and autumn on record in eastern Australia

May 2007 was the warmest on record in all four eastern states of Australia (Queensland, NSW, Victoria and Tasmania). This was the culmination of an autumn which also saw record mean temperatures over the four eastern states.

Over Australia as a whole, it was the second-warmest May, and the fifth-warmest autumn, on record. The autumn in Western Australia, whilst warmer than normal, was cooler than in the exceptional year of 2005 (Australia's warmest year on record), preventing a national record from being set. The May national mean temperature anomaly of +1.70°C was only behind the record of +2.03°C, set in 1958, whilst the autumn anomaly of +1.03°C ranks behind 2005's +1.62°C. Monthly area-averaged records for temperature commenced in 1950.

Extremely warm in the east

Record high mean temperatures for May and for autumn were concentrated in eastern Australia (Figure 1). For May, records were set over almost all of Victoria and Tasmania, much of New South Wales except for the northern border, parts of eastern South Australia, and most of Queensland except for Cape York Peninsula and the far north-west. The area of autumn records was slightly smaller but broadly similar.

In most parts of this region both daytime and overnight temperatures made similar contributions to the exceptional temperature anomalies. For autumn, the areas where maximum and minimum temperatures set records in their own right were relatively limited, but the occurrence of very warm conditions in both simultaneously is rare and ensured that overall mean temperatures were at record-breaking levels. This was also true to some extent for May monthly temperatures, although daytime maximum temperatures were still high enough to set records in many parts of eastern Australia and over all four eastern states on an area-averaged basis. The warm overnight temperatures were consistent with a return to normal to above-normal rainfall in many areas, with Australian area-averaged rainfall 15% above normal for autumn.

A summary of statewide temperature anomalies for May and autumn is shown in Table 1, showing the records set in the eastern states. The Tasmanian mean temperature anomaly for May is particularly exceptional, and is the largest mean temperature anomaly on record for any month, breaking the previous record, set in February 2007, by 0.13°C.

A major heatwave in the tropics in early May

The season was, in general, marked by consistent warmth rather than individual extreme heatwaves. The most significant exception to this came during the first week of May when exceptional heat affected much of tropical Australia, extending to parts of southern Queensland and northern New South Wales.

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New state high temperature records for May were set for Queensland (39.3°C on 4 May at Julia Creek Airport) and the Northern Territory (38.6°C at Timber Creek on 4 May and Daly Waters on 5 May), breaking the previous records of 38.6°C (Boulia, 5 and 6 May 1942) and 38.5°C (Elliott, 23 May 1988) respectively. The highest temperature in Australia for the month was 40.0°C at Fitzroy Crossing (WA) on 5 May. 1990 is the only other year in which 40°C has been reached at any Australian station in May.

New site records for May were set between 3 and 8 May at a large number of locations in the Northern Territory, Queensland and northern New South Wales. These are listed in more detail in Table 2. Records were set on a number of occasions at some of these stations. At Yuendumu (NT), the previous May record of 33.0°C was broken on seven of the first eight days of the month (peaking at 34.8°C on the 4th), whilst Tennant Creek, Mount Isa, Longreach and Camooweal are among other locations where records were set on three or more days.

A more localised extreme heatwave affected the west coast of Western Australia in early March. During this event Carnarvon reached 47.8°C on 6 March, an all-time site record and equalling the Australian record high for March (also set at Roebourne on 4 March 1998).

Lack of cold days and nights in many locations

The most notable feature of the autumn in eastern Australia was the almost complete lack of any significant cold weather, either by day or by night. Canberra had only its second autumn, after 1989, with no nights below 0°C, and with no sub-zero nights recorded as of 4 June, broke the 1989 record (1 June) for the latest date of the year's first sub-zero night. Hobart failed to go below 5°C, and Launceston 1°C, during autumn for the first time ever. Melbourne had only 21 days with maxima below 20°C during autumn, easily breaking the previous record of 31, and Broken Hill's 12 nights below 10°C broke the previous record of 15, whilst the only locations below 1000 metres elevation in Victoria to have recorded minima below 0°C in autumn 2007 were Omeo and East Sale, something only previously matched in 1989. Further north, Georgetown (Queensland) reached 30°C on every day of autumn, the first time this has occurred there. At higher elevations, the lack of cold air masses was also indicated by Cabramurra (the only alpine site with long-term high-quality temperature observations), which only fell below 0°C on four days during autumn, also a record.

Abnormal warmth elsewhere in the region

It was also a very warm May in New Zealand and at Australia's Antarctic stations. New Zealand's provisional May temperature anomaly was +2.0°C, a new record for May. It is unusual for eastern Australia and New Zealand to be very warm simultaneously, as very warm months in eastern Australia are normally associated with high pressure in the Tasman Sea, which usually places New Zealand in cool southwesterlies. In May 2007 a ridge of high pressure extended all the way across the Tasman to east of New Zealand.

Of Australia's three mainland Antarctic stations, Davis and Mawson both set new records for May. Both stations had monthly mean temperatures of −9.7°C, about 6°C above normal. Casey (−12.5°C, 2.9 above normal) did not set a monthly mean temperature record, but did have its "warmest" May day on record when it reached 4.3°C on 23 May. This is the highest temperature recorded at the current Casey site in any month between March and October.

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Australia's third-warmest year on record so far

For the year to date (January-May), Australia is having its third-warmest year on record, 0.95°C above normal. This ranks behind 2005 (+1.13°C) and 1998, which went on to be Australia's two warmest years on record.

Anomalously warm conditions in Australia are typical of the breakdown phase and aftermath of an El Niño event, as is now being experienced. This natural short-term warming is now overlaid on the strong global warming trend. The Australian pattern is consistent with conditions elsewhere in the globe, with the January-April period being the world's warmest on record (May global values are not yet available).

The warmth so far in 2007 has been particularly abnormal in south-eastern Australia. Victoria, Tasmania, South Australia and New South Wales are all 0.3-0.5°C warmer than the previous warmest year on record for the January-May period (Table 3), whilst the southeast Australian region as a whole has had temperatures 1.59°C above normal for the January-May period, 0.56°C above the previous record set in 1968. It has also been by far the warmest start to the year on record, by 0.65°C, over the Murray-Darling Basin (Figure 2).

Further information

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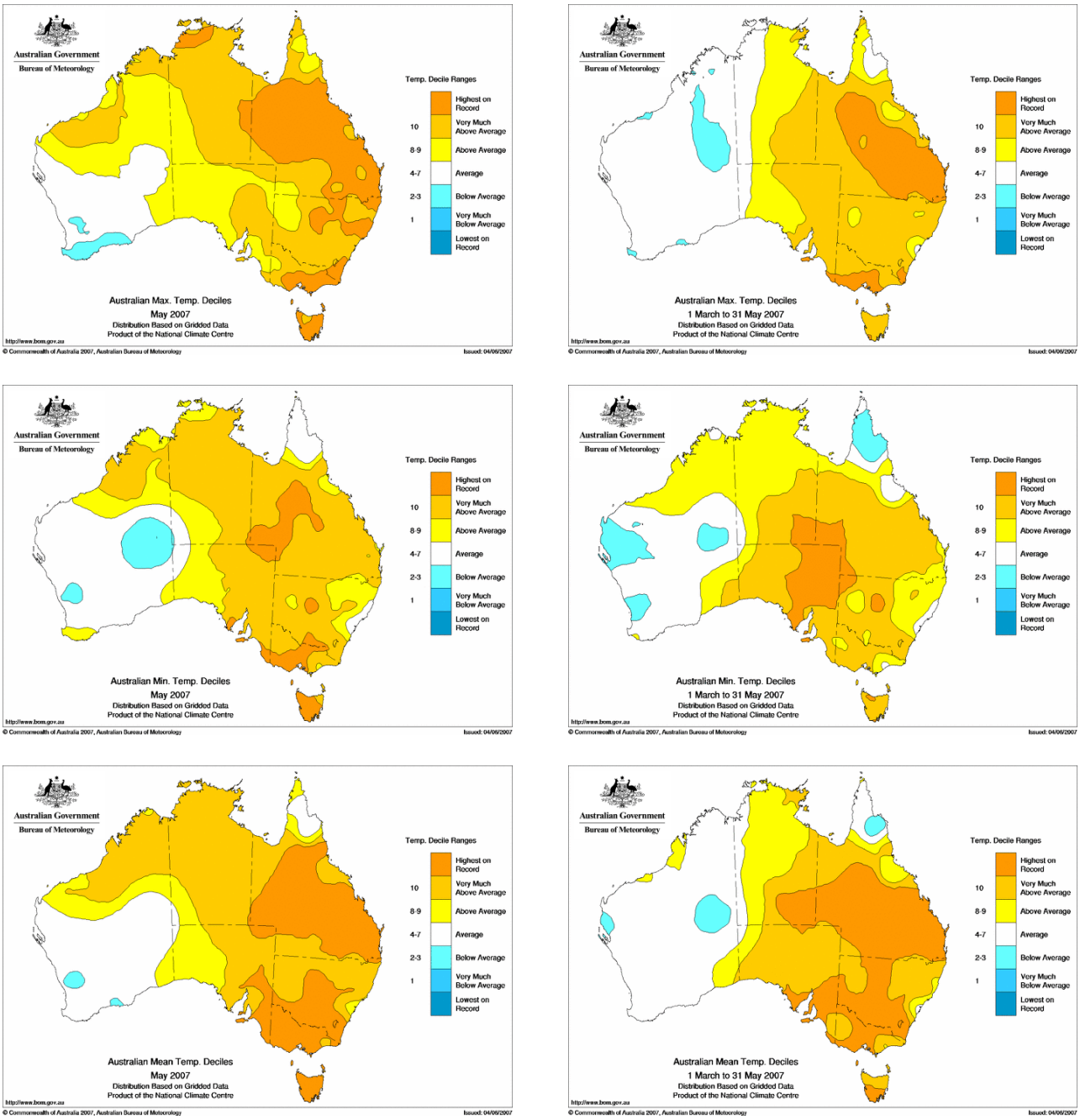

Figure 1. Temperature decile maps for May 2007 (left) and autumn 2007 (right); maximum (top), minimum (middle) and mean (bottom) temperatures.

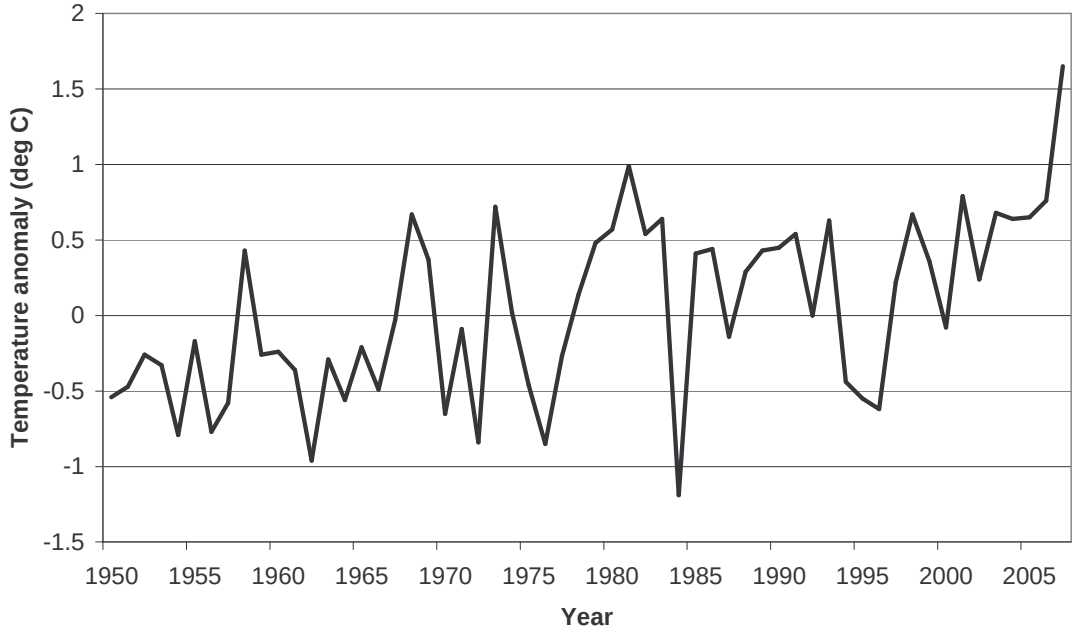

Figure 2. January-May mean temperature anomalies for the Murray-Darling basin.

Region	Mean temperature			Maximum temperature			Minimum temperature		
	2007	Rank	Record	2007	Rank	Record	2007	Rank	Record
Australia	1.03	5	1.62 (2005)	1.08	6	2.21 (2005)	0.98	8	1.16 (1992)
Western Australia	0.10	26	2.21 (2005)	0.03	30	2.35 (2005)	0.16	24	2.06 (2005)
South Australia	1.52	2	1.91 (2005)	1.33	5	2.75 (2005)	1.71	1	1.40 (1973)
Northern Territory	1.25	8	1.95 (1958)	1.17	9	2.48 (2005)	1.33	6	1.89 (1958)
Queensland	1.64	1	1.32 (1958)	2.02	1	1.93 (2002)	1.26	4	1.92 (1989)
New South Wales	1.53	1	1.20 (1986)	1.71	3	2.11 (2005)	1.34	4	2.40 (1989)
Victoria	1.33	1	1.15 (1988)	1.52	1=	1.52 (2005)	1.14	5	1.97 (1974)
Tasmania	1.19	1	1.15 (1988)	1.21	3	1.42 (1988)	1.17	2	1.28 (1956)
Eastern Australia	1.57	1	1.09 (1958)	1.87	1	1.77 (2005)	1.27	2	2.00 (1989)
Murray-Darling Basin	1.71	1	1.18 (1986)	1.96	2	2.15 (2005)	1.46	3	2.44 (1989)

Table 1(a). Regional temperature anomalies and rankings for autumn 2007

Region	Mean temperature			Maximum temperature			Minimum temperature		
	2007	Rank	Record	2007	Rank	Record	2007	Rank	Record
Australia	1.70	2	2.03 (1958)	1.81	3=	2.21 (2002)	1.59	3	2.25 (1958)
Western Australia	0.61	15	2.46 (2005)	0.95	15	2.93 (2002)	0.27	22	2.33 (1998)
South Australia	1.85	6	2.04 (2002)	1.83	7	2.72 (2002)	1.86	4	2.40 (1988)
Northern Territory	2.18	3	2.96 (1958)	2.12	2	2.58 (1958)	2.24	4	3.39 (1958)
Queensland	2.53	1	2.11 (1958)	2.59	1	2.19 (1958)	2.46	2	2.86 (1989)
New South Wales	2.08	1	2.00 (1958)	2.16	1	2.14 (2005)	1.99	5	2.98 (1989)
Victoria	2.34	1	1.67 (1988)	2.03	1	1.74 (2005)	2.65	1	1.67 (1988)
Tasmania	2.48	1	1.73 (1999)	2.03	1	1.58 (1999)	2.93	1	1.73 (1999)
Eastern Australia	2.38	1	1.97 (1958)	2.41	1	1.88 (1958)	2.35	2	1.97 (1958)
Murray-Darling Basin	2.36	1	2.01 (1958)	2.33	1	2.02 (2005)	2.38	2	2.01 (1958)

Table 1(b). Regional temperature anomalies and rankings for May 2007

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Location	State	Value (°C)	Date	Previous record (°C)
Brunette Downs	NT	38.1	6 May	37.6
Tennant Creek	NT	36.4	4 May	35.5
Yuendumu	NT	34.8	4 May	33.0
Mount Isa	QLD	37.1	4 May	35.3
Georgetown	QLD	36.8	4 May	36.7
Richmond	QLD	37.0	4 May	36.8
Clermont	QLD	35.0	4 May	33.4
Tambo	QLD	34.4	4 May	34.0
Taroom	QLD	34.7	4 May	33.8
Barcaldine	QLD	35.2	4 May	34.1
Isisford	QLD	36.4	4 May	34.2
Longreach	QLD	36.2	4 May	34.2
Camooweal	QLD	38.2	4 May	37.1
Urandangi	QLD	37.8	3 May	37.5
Winton	QLD	36.8	6 May	35.6
Amberley	QLD	33.3	5 May	32.8
Gatton	QLD	33.7	5 May	31.6
Gympie	QLD	32.8	5 May	31.6
Stanthorpe	QLD	27.3	4 May	26.0
Surat	QLD	33.0	4 May	32.4
Cobar	NSW	29.6	8 May	29.5
Mungindi	NSW	32.3	4 May	31.5
Quirindi	NSW	27.8	5 May	27.6
Casino	NSW	32.7	5 May	31.8
Smoky Cape	NSW	29.5	4 May	28.0
Coffs Harbour	NSW	29.8	4 May	29.6
Scone	NSW	28.7	6, 8 May	28.0

Table 2. May record high temperatures set at selected long-term stations in 2007

Region	January-May temperature anomaly, 2007 (°C)	Rank of 2007 value	Highest value in 1950-2006 period
Australia	0.95	3	1.17 (2005)
Western Australia	0.51	13	1.74 (2005)
South Australia	1.55	1	1.18 (2001)
Northern Territory	0.87	9	1.39 (1986)
Queensland	0.93	2	1.11 (1998)
New South Wales	1.55	1	1.08 (1981)
Victoria	1.54	1	1.20 (1968)
Tasmania	1.42	1	0.96 (1971)
SE Australia	1.59	1	1.03 (1968)
Murray-Darling Basin	1.64	1	0.99 (1981)

Table 3. January-May mean temperature anomalies for 2007 compared with previous years

Note: For the purposes of Tables 1-3, 'Eastern Australia' comprises the states of Queensland, NSW, Victoria and Tasmania, whilst 'Southeastern Australia' is the area south of 33°S and east of 135°E, including Tasmania (south of a line running approximately through Port Augusta, Parkes and Newcastle).

Temperature anomalies are measured with respect to the 1961-90 standard reference period. Ranks are calculated over the 58 years from 1950 to 2007.

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