

6. Annual Review and Significant Events

January-May: El Niño decays, summer heatwave in northwest WA, encouraging rains in southeast Australia

In contrast to the end of the previous year, 2007 started with a wetter than average month for much of the continent. This was consistent with the rapid decay of the El Niño in the equatorial Pacific during January and February, following its peak intensity in November and December 2006. After severe flooding on the south coast of Western Australia in the first week of January (Esperance's 153.2 mm on the 5th was a daily record for any month at the site), there were further signs of a shift in the broadscale weather patterns in mid-January when a tropical low drifted through central Australia. This system generated widespread heavy rain. Over the 21st and 22nd, Bedourie, Qld (206 mm), Boulia, Qld (130 mm) and Hawker, SA (176 mm) recorded more rain than for the entire 2006 calendar year (54 mm, 95 mm and 156 mm respectively). The Flinders Ranges were affected by severe flooding.

Extreme high temperatures occurred in much of Western Australia from early January to early March. Numerous locations in that State's interior set records for prolonged heat. Marble Bar exceeded 40°C on 52 consecutive days from 5th January to 27th February, and had a mean maximum of 44.9°C for February, the highest monthly mean maximum ever recorded at an Australian station. There were two notable episodes when the heat extended south and west. On 3rd February a number of stations in the wheatbelt reached 48°C, a record high for the region, including 48.6°C at Hyden, Australia's highest temperature in 2007. In early March the most exceptional heat was on the west coast, with Carnarvon's 47.8°C on the 6th equalling the Australian record for March. It was the hottest February on record for Western Australia (state-wide mean temperature anomaly +2.61°C) by a substantial margin.

Hot weather in southeastern Australia fanned numerous bushfires, including the longest-lasting fire in Victoria's history. From early December 2006, extensive fires burned in the mountains of northeast Victoria, being finally contained on 7th February after 69 days. 11 000 square kilometres were burned, most of it uninhabited forest, but there were substantial property losses around the fire's edge, with a total of 51 houses being razed.

After a lull in the monsoon during February, there was renewed rainfall across the tropics during March, with occasional southward extensions over southeastern Australia. Severe tropical cyclone *George* made landfall as a category 5 system east of Port Hedland on the evening of 8th March, with estimated wind gusts reaching 275 km/h. Three lives were lost at mining camps inland from the point of landfall, and there was substantial wind damage, particularly in Port Hedland. The cyclone also caused some flooding, especially in its developing stages at the end of February over the Top End of the NT; from 3rd to 5th March, Darwin had three consecutive days with rain totaling 100 mm or more for the first time in any month.

In general terms, average to above average rainfall persisted over southeastern Australia for the remainder of autumn, thereby providing the best start to the growing season for some years. Computer outlooks of a transition to La Niña bolstered optimism further. However, May was an exceptionally warm month over much of the eastern half of Australia: in the record dating from 1950, the state-wide mean temperatures were the highest in Queensland, NSW, Victoria and Tasmania. In the south the month was distinguished by consistent warmth rather than individual extreme events. State records for May were set in Queensland (39.3°C on the 4th at Julia Creek) and the NT (38.6°C on the 4th at Timber Creek, and on the 5th at Daly Waters).

June: An exceptional month of climate contrasts

Averaged over Australia, June's mean temperature was the lowest in the post-1950 period. Persistent upper troughs generated widespread, unseasonable cloud and rain across the tropics resulting in unusually low daytime maxima. One especially noteworthy period from the 19th to 21st saw 35% of Australia's land area record its coldest June day in the period dating from 1941. Fourteen locations in the tropics had daily maximum temperatures below 10°C on the 20th; prior to this there were only twelve such occurrences in the entire historical record. The low temperatures included maxima of 8.0°C at Tennant Creek (19°39' S), the most northerly sub-10 maximum in Australia, and 7.7°C at The Monument (Qld), the lowest daily maximum temperature ever recorded in the Australian tropics. Further south, a Queensland June record was set at Applethorpe, with a maximum of 4.9°C. While Darwin was too far north to experience the full extent of the cold spell, the maximum of 22.7°C on the 20th was still a June record. The northern half of the NT and much of Queensland were wetter than average, with large areas having their wettest June on record.

The wet conditions extended southward to eastern Victoria, with the development of four major lows off the NSW and Victorian coasts. The most significant was from 8th to the 10th when flood rains and gales affected the Newcastle, Hunter Valley and Central Coast regions. Numerous stations recorded daily rainfalls in excess of 200 mm on the 9th, including 293 mm at Mangrove Mountain (which had a four-day total of 461 mm ending the 10th), while Norah Head had a peak wind gust of 135 km/h. There was major flooding on the Hunter River, especially around Maitland, while Newcastle and the Central Coast were badly affected by flash flooding. Five people were killed when a road collapsed near Gosford. The bulk carrier *Pasha Bulker* failed in its attempt to enter Newcastle Harbour; the gales drove it aground just off Nobbys Beach where it remained stranded for several weeks. Total property losses were expected to approach A\$1 billion.

The last in the series of east-coast lows brought severe flooding to eastern Victoria at the end of the month. The daily total of 319 mm at Mt Wellington on the 28th was a Victorian June record and the second-highest daily fall for any month. Major flooding occurred on the Gippsland Lakes and on several rivers, especially the Macalister, Mitchell, Avon and Latrobe. Elsewhere in southern Australia June was drier than average, with parts of northern Tasmania having record low falls. Southwest WA had a poor start to the growing season, with both May and June being drier than normal.

July-October: Generally dry despite the development of La Niña

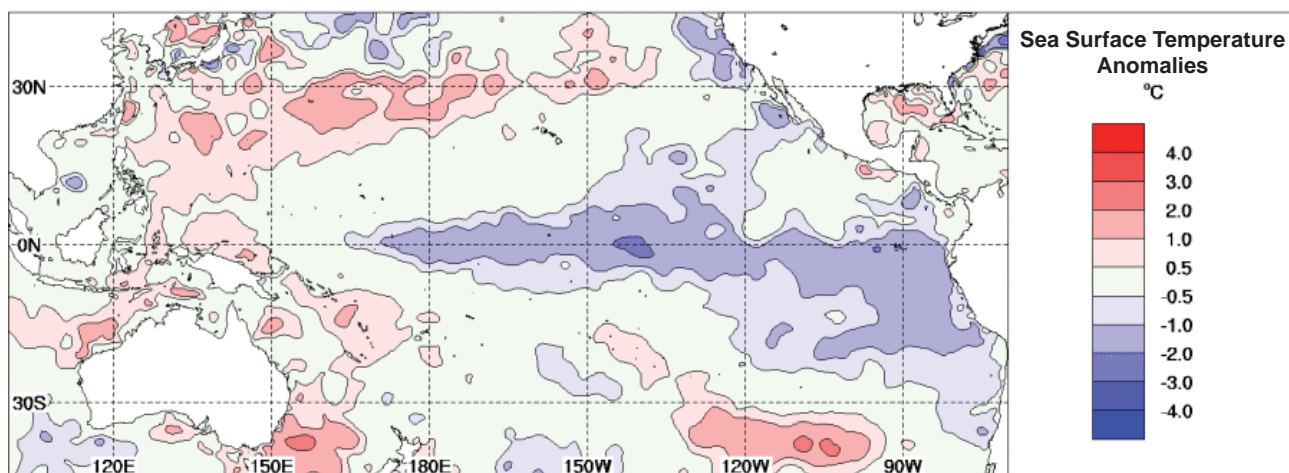
As foreshadowed earlier in the year, a La Niña event developed in the Pacific, although it was perhaps about two to three months behind its historical counterparts. Despite this however, widespread drier than average conditions prevailed across eastern and southern Australia from July to September, and to a lesser extent in October. These dry months could not have come at a worse time, particularly for those in the Murray-Darling Basin (MDB), Australia's "bread basket", which recorded its seventh driest July-September period since records began in 1900. Furthermore, it was the first time in this record that an El Niño drought (as in 2006) in the MDB was not followed by at least one three-month period with above normal (Basin average) rainfall by the end of the following winter. These severe short-term rainfall deficits and high temperatures towards the end of the period had a devastating impact upon crops, particularly in the context of record low rainfall over the previous six years. The six-year period from November 2001 to October 2007 had rainfall which equalled the previous record low set from 1939-45 in the MDB.

Southeastern Australia was affected by abnormal warmth in the last week of winter. Adelaide reached 30.4°C on 30th August, breaking the previous record for the earliest 30-degree day by more than two weeks, while Mildura's 29.9°C on the same day equalled the Victorian August record.

Similar to June but less dramatically, August saw rain bands and low pressure affect parts of tropical and eastern Australia. Record high monthly falls occurred in the northern NT, the northern NSW coast and Queensland's Sunshine Coast. The latter experienced localized torrential downpours early on the morning of the 24th, with 24-hour totals including 772 mm at Coops Corner (an unofficial gauge) and 529 mm at Rainbow Beach, a new Australian record for August.

November-December: La Niña takes charge – wetter in eastern Australia

The long-anticipated wet conditions associated with La Niña finally arrived across eastern Australia in November. Rainfall was above to very much above average in eastern Australia south of central Queensland, except in Tasmania which had a record dry November, with a state-wide average of only 19 mm. In the middle of the month, severe tropical cyclone *Guba* reached category 3 off the Queensland coast, the strongest recorded November cyclone to threaten northeastern Australia. The wet conditions were even more widespread in December, with 82% of the country having above-median rainfall, the highest monthly percentage for 2007. On the 21st and 22nd an intensifying cold front interacted with a very warm, humid and unstable air-mass over southeastern Australia resulting in widespread heavy rain, especially over the northern inland of NSW where 48-hour totals approached 200 mm. Moderate flooding occurred around Coonamble and the monthly totals of nearly 300 mm not only re-wrote the record books, but provided the first strong flush of water down the Darling River in over a year.



December: An intensifying La Niña pattern of colder than average water across the Pacific.

Even though most of Australia had cooler than average maxima in December, the southeast was one exception and it capped off one of the hottest years in that area. At 1.4°C above the 1961-90 mean, Victoria's state-wide annual mean maximum temperature was the highest in the record dating from 1910; 1914 is the only other year that Victoria's annual maximum was more than 1°C above normal. Large tracts of southern SA also had their warmest year on record for maximum temperatures. In the west, a heatwave at the end of the month saw Perth smash its December record daily maximum, with 44.2°C on Boxing Day, nearly 2 degrees above the old record set in 1968. Perth records date from 1897.

A. 5th Jan: Heavy rain, severe flooding in south WA. All-time daily record of 153.2 mm at Esperance, along with wind gusts of 111 km/h.

B. Mid-Jan: Slow-moving tropical low in central Australia. Worst floods on 20th-21st in SA, especially Flinders Ranges; daily totals of 100-150 mm. Bedourie (Qld) had 169 mm on 21st Jan, more than three times its 2006 annual total.

C. June: NSW coast buffeted by several east-coast lows in rapid succession. Most significant low 8th-10th; major flooding in Newcastle/Hunter region. 293 mm on 9th at Mangrove Mountain (C1) & wind gusts of 135 km/h at Norah Head. 5 deaths in road collapse near Gosford. Property losses approached \$1 billion.

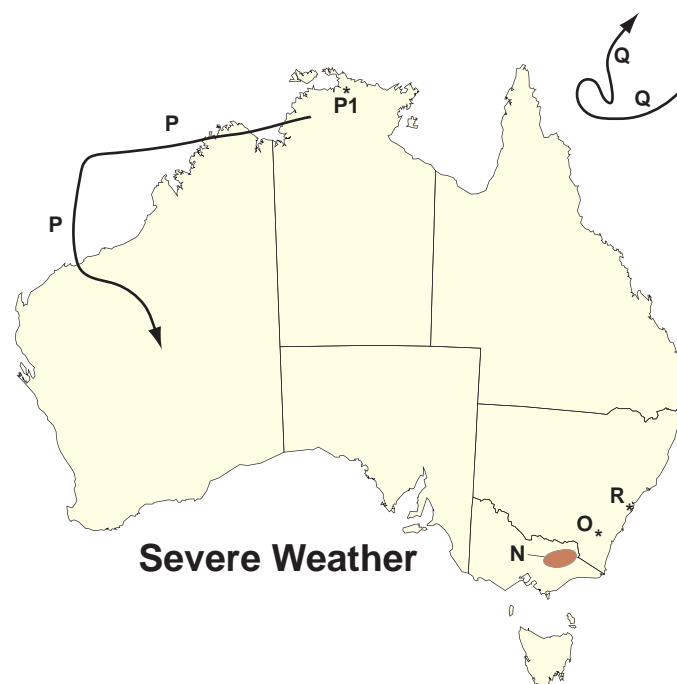
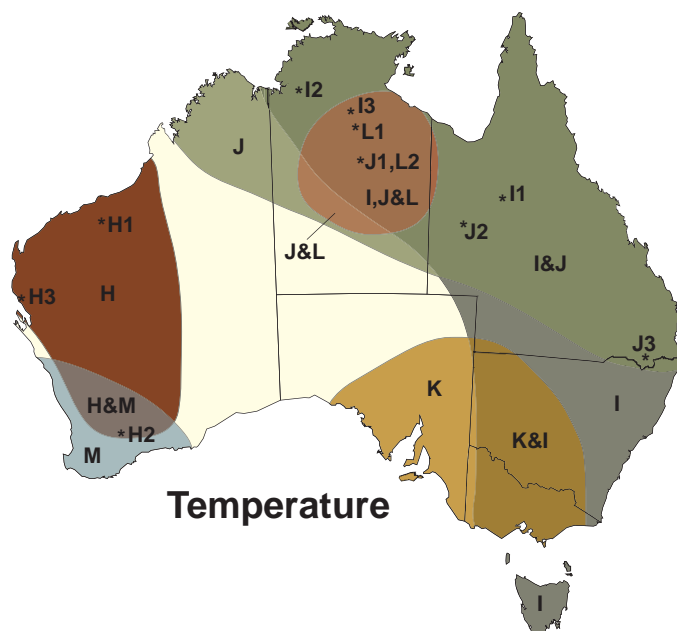
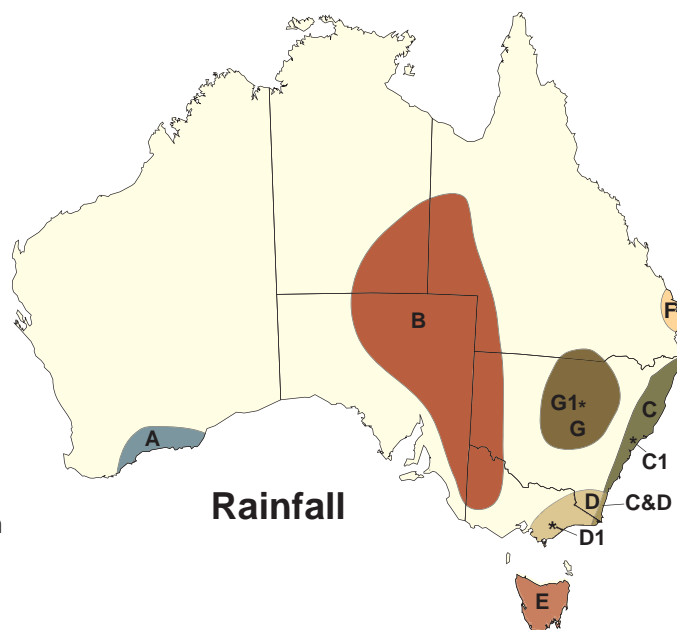
D. 27th-29th June: Gippsland affected by east-coast low, including 319 mm at Mt Wellington (D1) on 28th, second-highest daily fall on record in Vic. Major flooding on the Gippsland Lakes & on several rivers, especially Macalister, Mitchell and Avon.

H. Jan/Feb: Regular extreme high temps in interior WA from early Jan to early March; many records for prolonged heat. Marble Bar (H1) 52 consecutive days over 40°C and Feb monthly mean maximum of 44.9°C (an Aus record). Heat extended south on 3rd Feb, with record highs in southern wheatbelt, including 48.6°C at Hyden (H2). Aus March record high (47.8°C) equalled at Carnarvon (H3) on the 6th.

I. May: Very warm in most of east Aus; record high monthly state-average means in Qld, NSW, Vic & Tas. Extreme heat in tropics early in month; state May records for Qld (39.3°C, Julia Creek (I1), 4th May) & NT (38.6°C, Timber Creek (I2), 4th May and Daly Waters (I3), 5th May).

N. Jan/early Feb: Extensive long-lived fires in east Vic. These started in Dec 2006 & were finally contained on 7th Feb. Over 11 000 square kilometres burnt & 51 properties lost.

O. 27th Feb: Severe hailstorm in Canberra, with hail 3-4 cm in diameter. About 1 100 buildings flooded in central city and inner suburbs.



E. 10th-11th Aug: Widespread flooding in Tas, both north & south. Highest daily total 111 mm at Strathgordon on 10th.

F. 24th-25th Aug: Torrential rain in Sunshine Coast/Wide Bay area; daily falls of 772 mm at Coops Corner and 529 mm at Rainbow Beach on 24th. Widespread flash flooding.

G. 21st-23rd Dec: Widespread heavy rain, most significantly in north-central NSW, 171 mm at Coonamble (G1) on 22nd. Flooding on some rivers in northern NSW and southern Qld.

J. 15th-22nd June: Very low maxima & unseasonable rain in much of tropics. 30% of Australia had coldest June day on record on 20th. Max of 8.0°C at Tennant Creek (J1) on 20th – most northerly sub-10 maximum on record in Australia, while 7.7°C at The Monument (J2) lowest maximum on record in Australian tropics. Qld June record of 4.9°C at Applethorpe (J3).

K. 26th-31st Aug: Very warm in SE Australia. 30.4°C at Adelaide on 30th August, first-ever 30-degree day in winter.

L. 1st-2nd Dec: Extreme heat in NT interior, including all-time records at Elliott (46.5°C, L1) and Tennant Creek (45.4°C, L2) on 2nd Dec.

M. 25th-30th Dec: Heatwave in southwest WA. Perth December record (44.2°C) on 26th. 3 deaths in bushfire east of Southern Cross on 30th.

P. 3rd-11th March. Cyclone *George* – most severe cyclone of season, made landfall as a category 5 storm east of Port Hedland on 8th March. 3 deaths at mining camps near point of landfall. Very heavy rain in Top End of NT during development stages, with 827 mm in four days at Oenpelli (P1) 27th Feb-2nd Mar, and three consecutive 100 mm days at Darwin 3rd-5th Mar.

Q. 14th-20th Nov: Cyclone *Guba* – reached category 3, making it strongest Nov cyclone on record to threaten coastal Qld.

R. 9th Dec. Severe hailstorm in Sydney, especially western suburbs. Hail up to 7 cm diameter recorded, with estimated damage \$200 million.