

## A cool month in the south and dry in the east.

<b>Rainfall</b>	Rainfall was well below normal (< 50%) or below normal (50-79%) in eastern parts of both Islands. It was particularly dry in north Canterbury and eastern Bay of Plenty. Rainfall was above normal (120-149%) for the West Coast, Taranaki, and parts of the central North Island, and well above normal (>149%) in parts of Southland and Otago. Rainfall was near normal (80-119%) elsewhere.
<b>Temperature</b>	Mean temperatures were below average (-0.51°C to -1.20°C) in parts of Auckland, western Waikato, Taranaki, Tasman, Canterbury, Otago, and Southland, and well below average (< -1.20°C) in parts of south Canterbury and Southland. August temperatures were near average (-0.50°C to +0.50°C) elsewhere.
<b>Sunshine</b>	August sunshine was near normal for most of the country (90-109%). South-west Waikato received above normal sunshine (110-125%) and Taranaki to Wellington as well as Nelson and Tasman received below normal sunshine (75-89%).
<b>Soil Moisture</b>	As of 1 September 2015, soil moisture levels were below normal for this time of year for Hawke's Bay, coastal Wairarapa, and eastern parts of Canterbury and North Otago.

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### Overview

Overall, August 2015 was characterised by air pressures that were much lower than normal to the west and south of the country, and pressures that were higher than normal to the north of New Zealand. This circulation pattern resulted in more northwest winds than usual over the country.

The northwest flow brought thunderstorms to parts of the country throughout the month, but were interrupted by outbreaks of cold southerlies that delivered snowfalls to low elevations that frequently closed highways in the South Island. There were a number of extreme events as expected for this time of year (see *Highlights and extreme events* section for further details).

Rainfall anomalies varied across the country in August, with areas of higher and lower than normal rainfall sometimes in quite close proximity. However in general, areas in the west had higher rainfall than normal and areas in the east had lower rainfall than normal for August. Rainfall was above normal

(120-149% of August normal) or well above normal (> 149% of August normal) in the west of the North Island, between Taupo and Gisborne, the coastal fringes of the West Coast, and southern Southland. In contrast, rainfall was below normal (50-79% of August normal) or well below normal (< 50% of August normal) in the eastern Bay of Plenty, southern Hawke's Bay, Nelson, Marlborough, Kaikoura, Hurunui, and central Otago. The low rainfall in north Canterbury exacerbated concerns about the persistent dry conditions there. Near normal rainfall (80-119% of August normal) was experienced elsewhere in New Zealand. As of 1 September 2015, soils were notably drier than normal for Hawke's Bay, coastal Wairarapa, eastern parts of Marlborough, north Canterbury, coastal south Canterbury and parts of Otago. Elsewhere, soil moisture levels were typically near normal for this time of year.

It was a cool month for most of the South Island and parts of the North Island. Mean temperatures were below average (0.51°C to 1.20°C below the August average) in parts of Auckland, western Waikato, Tararua, Tasman, south Canterbury, coastal Otago and Southland. Some locations in south Canterbury and Southland recorded well below normal temperatures for August (< 1.2°C below normal). Mean temperatures were near average for the remainder of the country (between -0.50°C to +0.50°C of the August average). The nation-wide average temperature in August 2015 was 8.6°C (0.2°C below the 1981-2010 August average from NIWA's seven station temperature series which begins in 1909)<sup>1</sup>.

Sunshine was near normal (90-109% of the August normal) for much of the country in August. Exceptions were south-west Waikato which received above normal sunshine (110-125% of the August normal) and from Taranaki to Wellington as well as Nelson and Tasman that received below normal sunshine for August (75-89% of August normal).

#### **Further Highlights:**

- The highest temperature was 23.8°C, observed at Christchurch (Riccarton) on 3 August.
- The lowest temperature was -11.5°C, observed at Lake Tekapo on 11 August.
- The highest 1-day rainfall was 134 mm, recorded at North Egmont on 5 August.
- The highest wind gust was 141 km/hr, observed at Cape Turnagain on 19 August.
- Of the six main centres in August 2015, Auckland was the warmest and wettest, Dunedin was the coolest and cloudiest, Christchurch was the driest, and Hamilton was the sunniest.
- Of the available, regularly reporting sunshine observation sites, the sunniest four stations so far in 2015 (1 January to 31 August) are: Blenheim (1742 hours), Whakatane (1724 hours), Appleby (1701 hours) and Waipara West (1671 hours).

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<sup>1</sup> Interim value

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## Rainfall: Patchy areas of dry and wet

August 2015 saw patchy rainfall patterns across the country. In general, the west was wetter than normal and the east was drier than normal, but this was not always the case. The already extremely dry conditions in north Canterbury were exacerbated by yet another month with lower than normal rainfall, with Kaikoura receiving just 35% of normal August rainfall.

### Record<sup>2</sup> or near-record August rainfall totals were recorded at:

Location	Rainfall total (mm)	Percentage of normal	Year records began	Comments
High records or near-records				
Hawera	163	165	1977	2nd-highest
Kaitaia	207	143	1985	4th-highest
Low records or near-records				
None recorded				

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## Temperature: Cool for much of the South Island

Although mean temperatures were cooler than usual for much of the country, only two locations measured near-record low mean temperatures for August as a whole. However, a period of southerlies combined with clear skies mid-way through in the month resulted in a number of locations observing record or near-record low daily maximum and daily minimum temperatures. Additionally, a warm northwesterly flow on the 4<sup>th</sup> saw record and near-record high minimum temperatures observed for August (see *Highlights and extreme events section* for further details). The nation-wide average temperature in August 2015 was 8.6°C (0.2°C below the 1981-2010 August average from NIWA's seven station temperature series which begins in 1909).

### Record or near-record mean air temperatures for August were recorded at:

Location	Mean air temp. (°C)	Departure from normal (°C)	Year records began	Comments
High records or near-records				
None recorded				
Low records or near-records				
Te Kuiti	8.0	-1.6	1959	3rd-lowest
Lumsden	4.4	-1.3	1982	3rd-lowest

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<sup>2</sup> The rankings (1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>.etc) in all Tables in this summary are relative to climate data from a *group* of nearby stations, some of which may no longer be operating. The current climate value is compared against all values from any member of the group, without any regard for homogeneity between one station's record, and another. This approach is used due to the practical limitations of performing homogeneity checks in real-time.

**Record or near-record mean maximum air temperatures for August were recorded at:**

Location	Mean maximum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
High records or near-records				
None recorded				
Low records or near-records				
Te Kuiti	13.3	-1.1	1959	2nd-lowest
Lumsden	9.3	-1.3	1982	3rd-lowest
South West Cape	9.3	-0.8	1991	4th-lowest

**Record or near-record mean minimum air temperatures for August were recorded at:**

Location	Mean minimum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
High records or near-records				
None recorded				
Low records or near-records				
Lumsden	-0.4	-1.2	1982	3rd-lowest
Balclutha	0.3	-1.8	1964	3rd-lowest
Te Kuiti	2.7	-2.0	1959	4th-lowest
Winchmore	-0.2	-2.3	1928	4th-lowest

**Sunshine: Near normal sunshine hours for most of the country**

Because sunshine was near normal for much of the country in August, there were not many records or near-records observed. Of the available, regularly reporting sunshine observation sites, the sunniest four stations so far in 2015 (1 January to 31 August) are: Blenheim (1742 hours), Whakatane (1724 hours), Appleby (1701 hours) and Waipara West (1671 hours).

**Record or near-record August sunshine hours were recorded at:**

Location	Sunshine hours	Percentage of normal	Year records began	Comments
High records or near-records				
Cheviot	166	128	1983	3rd-highest
Low records or near-records				
None recorded				

## August climate in the six main centres

August temperatures were near average in all the main centres except for Dunedin where the temperature was below normal. It was drier than normal in Christchurch, with the city receiving 70% of normal August rainfall. In contrast, rainfall was well above normal in Auckland, which received 154% of normal August rainfall. Of the six main centres in August 2015, Auckland was the warmest and wettest, Dunedin was the coolest and cloudiest, Christchurch was the driest, and Hamilton was the sunniest.

### August 2015 main centre climate statistics:

Temperature			
Location	Mean temp. (°C)	Departure from normal (°C)	Comments
Auckland <sup>a</sup>	11.8	+0.2	Near normal
Tauranga <sup>b</sup>	10.6	-0.2	Near normal
Hamilton <sup>c</sup>	9.2	-0.4	Near normal
Wellington <sup>d</sup>	9.5	+0.1	Near normal
Christchurch <sup>e</sup>	6.8	-0.4	Near normal
Dunedin <sup>f</sup>	6.7	-1.0	Below normal
Rainfall			
Location	Rainfall (mm)	% of normal	Comments
Auckland <sup>a</sup>	175	154%	Well above normal
Tauranga <sup>b</sup>	151	137%	Above normal
Hamilton <sup>c</sup>	121	101%	Near normal
Wellington <sup>d</sup>	95	82%	Near normal
Christchurch <sup>e</sup>	44	70%	Below normal
Dunedin <sup>f</sup>	60	107%	Near normal
Sunshine			
Location	Sunshine (hours)	% of normal	Comments
Auckland <sup>a</sup>	154	104%	Near normal
Tauranga <sup>b</sup>	152	88%	Below normal
Hamilton <sup>g</sup>	155	107%	Near normal
Wellington <sup>d</sup>	123	83%	Below normal
Christchurch <sup>e</sup>	142	92%	Near normal
Dunedin <sup>f</sup>	131	107%	Near normal

<sup>a</sup> Mangere <sup>b</sup> Tauranga Airport <sup>c</sup> Hamilton Airport <sup>d</sup> Kelburn <sup>e</sup> Christchurch Airport <sup>f</sup> Musselburgh <sup>g</sup> Ruakura

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## Highlights and extreme events

### Rain and slips

On August 6, the Taranaki town of Opunake experienced flooding due to heavy rain. Several houses were flooded, all schools and the public library closed for the day, and no buses were running. In the Auckland suburb of Orakei, a bank collapsed under a house from runoff due to the heavy rain, causing the occupants to be evacuated.

On 6 and 7 August, SH 1 between Taupo and Turangi was affected by flooding, closing the road for a time.

The highest 1-day rainfall was 134 mm, recorded at North Egmont on 5 August.

### Record or near-record August extreme 1-day rainfall totals were recorded at:

Location	Extreme 1-day rainfall (mm)	Date of extreme rainfall	Year records began	Comments
Hawera	48	5th	1977	2nd-highest
Whatawhata	72	31st	1952	3rd-highest
Wairoa	71	9th	1967	3rd-highest

### Temperatures

On 3 and 4 August, a warm northwesterly flow caused numerous high minimum temperature records to be set for that time of year in different parts of the country.

On the mornings of 10 and 11 August, many parts of the country woke up to frosts and temperatures around freezing, due to clear skies and a southerly flow.

The highest daily maximum temperature for the country was 23.8°C, observed at Christchurch (Riccarton) on 3 August. This was followed by 23.3°C at Rangiora on 3 August and 22.3°C at Kaikoura on 4 August.

The lowest daily minimum temperature for the country was -11.5°C, observed at Lake Tekapo on 11 August. This was followed by -9.0°C at Arthur's Pass on 11 August and -8.3°C at Snowdon on 12 August.

### Record or near-record daily maximum air temperatures for August were recorded at:

Location	Extreme maximum (°C)	Date of extreme temperature	Year records began	Comments
High records or near-records				
Leigh	21.1	28th	1966	Highest
Christchurch (Riccarton)	23.8	3rd	1863	Highest

Masterton	20.4	30th	1992	2nd-highest
Waione	20.6	4th	1991	4th-highest
Reefton	18.3	30th	1960	4th-highest
Ranfurly	18.0	3rd	1975	4th-highest
Kaikoura	22.3	4th	1963	Equal 4th-highest
<b>Low records or near-records</b>				
Le Bons Bay	3.0	9th	1984	Lowest
Haast	5.8	7th	1949	2nd-lowest
Waipawa	5.7	9th	1945	2nd-lowest
Waione	7.7	9th	1993	Equal 2nd-lowest
Secretary Island	6.1	7th	1989	Equal 3rd-lowest
Martinborough	7.6	8th	1986	4th-lowest
Ngawi	7.8	8th	1972	4th-lowest
Mahia	8.0	9th	1990	4th-lowest
Puysegur Point	5.8	6th	1978	4th-lowest
South West Cape	5.0	7th	1991	4th-lowest

**Record or near-record daily minimum air temperatures for August were recorded at:**

Location	Extreme minimum (°C)	Date of extreme temperature	Year records began	Comments
<b>High records or near-records</b>				
Whatawhata	14.4	4th	1952	Highest
Stratford	12.6	4th	1972	Highest
Hawera	13.2	4th	1977	Highest
Wanganui	14.1	4th	1972	Highest
Reefton	10.9	4th	1972	Highest
Waipara West	14.6	4th	1973	2nd-highest
Dannevirke	13.1	4th	1951	Equal 2nd-highest
Culverden	13.2	4th	1930	3rd-highest
Masterton	12.2	4th	1992	3rd-highest
Kerikeri	14.2	31st	1981	4th-highest
Kaikohe	14.2	31st	1973	4th-highest
Ohakune	9.6	4th	1972	4th-highest
Blenheim	12.6	4th	1972	4th-highest
Port Taharoa	13.7	4th	1974	Equal 4th-highest
Ngawi	14.0	4th	1972	Equal 4th-highest
<b>Low records or near-records</b>				
Appleby 2	-7.6	10th	1932	Lowest
Tiwai Point	-3.0	12th	1970	Lowest
Lumsden	-7.1	11th	1982	Equal lowest
Te Kuiti	-3.1	11th	1959	3rd-lowest
Blenheim	-5.5	10th	1932	3rd-lowest
Arthurs Pass	-9.0	11th	1973	3rd-lowest
Kerikeri	0.9	13th	1981	4th-lowest
Whangaparaoa	4.8	11th	1982	4th-lowest

## Wind

On 4 August, wind warnings were in place for SH 2 at Rimutaka Hill, SH 87 from Outram to Kyeburn, and SH 6 from Harihari to Fox Glacier. Caution was advised for motorcyclists and high-sided vehicles.

On 5 August, wind warnings were in place for SH 6 between Harihari and Fox Glacier.

On 6 August, strong winds brought down power lines and cut power to parts of the Waikato and Bay of Plenty regions. A large tree fell across SH 2 in Te Puna, blocking the road.

On 7 August, wind warnings were in place for SH 2 at Rimutaka Hill.

On 10 August, a funnel cloud was seen above Auckland's North Shore, but it did not make it to the ground to form a tornado.

On 14 August a small tornado caused damage near Katikati. Tiles were pulled off roofs and trees were ripped from the ground.

On 24 August a wind gust toppled a trailer carrying large window frames and shattered glass was strewn across a stretch of SH 2 between Greytown and Carterton.

The highest wind gust was 141 km/hr, observed at Cape Turnagain on 19 August.

### Record or near-record August extreme wind gusts were recorded at:

Location	Extreme wind gust (km/hr)	Date of extreme gust	Year records began	Comments
Whakatane	96	19th	1974	Equal 4th-highest

## Snow and ice

On 3 August, SH 94 from Te Anau to Milford Sound was closed due to snow.

On 4 August, caution was advised on SH 94 from Te Anau to Milford Sound, chains had to be carried and no towing was allowed from Hollyford to Chasm.

On 5 August, SH 94 from Te Anau to Milford Sound was closed due to snow.

On 7 August, SH 94 from Te Anau to Milford Sound was closed due to snow. Snow and ice warnings were in place for SH 80 between Twizel and Mt Cook, SH 8 between Omarama and Tarras, SH 6 at Haast Pass, SH 8 between Fairlie and Twizel and SH 73 between Arthur's Pass and Otira.

Overnight on 7-8 August, Arthur's, Lewis and Haast Passes were all closed due to snow. SH 94 from Te Anau to Milford Sound remained closed due to snow. SH 1 at the Desert Road was closed for a time due to snow.

On 8 August, snow and ice warnings were in place for SH 63 from Renwick to St Arnaud, SH 6 from Murchison to Nelson, SH 75 from Little River to Barry's Bay, SH 6 from Kingston to Dipton, SH 1 from



Dunedin to Palmerston, SH 60 at Takaka Hill, SH 94 from Mossburn to Te Anau, SH 85 from Kyeburn to Palmerston, SH 87 from Middlemarch to Outram, SH 79 at Kakahu, SH 8 from Fairlie to Twizel and SH 80 from Mt Cook to Twizel.

On 9 August, snow showers affected areas above 400 m around the central North Island. Snow fell around the Chateau Tongariro, the largest amount of snow seen there since 2008. Hundreds of motorists were trapped on the Turoa Ski Field access road for up to 5 hours after blizzard conditions set in and multiple crashes blocked the road. Snow fell on Banks Peninsula, prompting police to warn motorists against non-essential travel. Dunedin was also blanketed in snow, disrupting some city bus services. Rimutaka Hill Road was closed for a time due to snow and snow was seen falling to sea level in Christchurch.

On 10 August, snow affected SH 2 at Rimutaka Hill. Snow and ice warnings were in place for SH 63 from Renwick to St Arnaud, SH 6 from Nelson to Murchison, SH 75 from Little River to Barry's Bay, SH 8 from Rae's Junction to Milton, SH 1 from Dunedin to Glenavy, SH 1 from Kilmog Hill to Gore, SH 1 from Dunedin to Waitati, SH 90 from Rae's Junction to McNab, SH 87 from Outram to Kyeburn, SH 60 at Takaka Hill, SH 88 from Port Chalmers to Dunedin, SH 79 from Geraldine to Fairlie, SH 8 from Fairlie to Twizel, SH 80 from Mt Cook to Twizel, SH 73 from Springfield to Arthur's Pass and SH 85 from Kyeburn to Palmerston. Dunedin's northern motorway was closed for a time due to a truck sliding on ice. Flights in and out of Dunedin and Queenstown were affected by icy runways. Snow settled in the northern Hawke's Bay town of Wairoa, for the first time in living memory. In the Remarkables Range near Queenstown, a backcountry skier was struck by an avalanche and later died.

On 11 August, snow and ice warnings were in place for SH 25a at Kopu-Hikuai, SH 2 at Rimutaka Hill, SH 2 between Paeroa and Waihi, SH 63 between Renwick and St Arnaud, SH 6 between Nelson and Murchison, SH 60 at Takaka Hill, SH 79 between Geraldine and Fairlie, SH 8 between Fairlie and Twizel and SH 80 between Mt Cook and Twizel. Widespread frosty conditions throughout the country caused black ice to form on many roads.

On 13 August, SH 94 from Te Anau to Milford Sound was closed due to snow, and snow warnings were in place for SH 6 at Haast Pass.

On 17 August, SH 94 from Hollyford to Milford Sound was closed due to snow.

### **Lightning and hail**

On 9 August, hail showers were experienced in Auckland and other parts of the central North Island. Caution was advised on SH 2 at the Karangahake Gorge near Waihi, as the hailstorms had left slippery ice on the road.

On 10 August, soft hail known as graupel fell around the Auckland region, covering some areas in a blanket that resembled snow. Impressive lightning displays were observed in some areas and thunder booms shook houses.

### **Cloud and fog**

On 2 August, thick fog rolled into Nelson and cancelled flights.

On 31 August, heavy fog in Auckland caused one domestic flight to be cancelled and 7 to be delayed.

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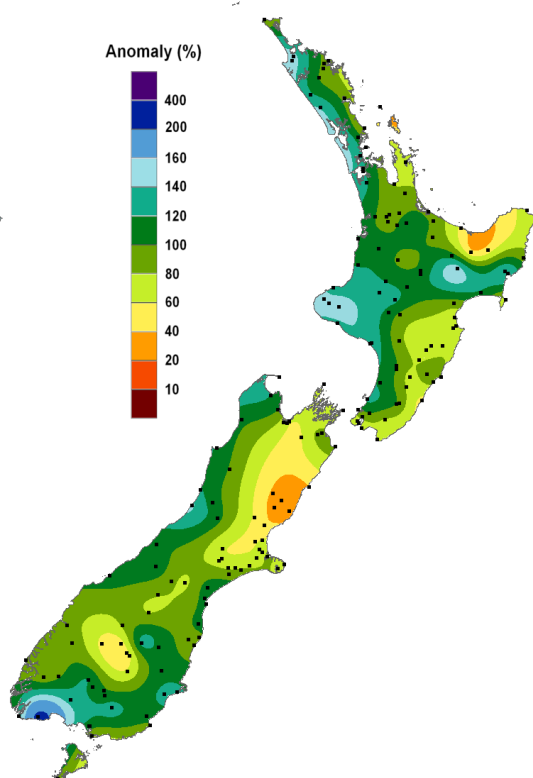
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*August 2015 total rainfall, expressed as a percentage of the 1981-2010 normal (%).*

*It was a dry month for parts of the eastern Bay of Plenty, Marlborough, Canterbury and Otago, as indicated by the yellow and orange shades. Here, rainfall was typically below normal (50-79% of the August normal) or well below normal (< 50% of the August normal). In contrast, rainfall was above normal (120-149% of the August normal) or well above normal (> 149% of the August normal) in western parts of the North Island and western and southern parts of the South Island, as indicated by the teal and blue shades.*

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