

Variable temperature and rainfall patterns with frequent southwesterly winds

Temperature	Temperatures were above average (0.51°C to 1.2°C above average) in parts of central Southland, north Otago, Taranaki, Whanganui, southern Hawke's Bay, Waikato and the Coromandel. Temperatures were below average (0.51°C to 1.2°C below average) in parts of the West Coast, Tasman, Marlborough and Wairarapa.
Rainfall	Rainfall was above (120% to 149% of normal) or well above normal (>149% of normal) for western and southern parts of the South Island, as well as coastal North Otago, Manawatu-Whanganui, central Waikato and Auckland. Rainfall was below (50% to 79% of normal) or well below normal (<50% of normal) in parts of western Otago, the Mackenzie Basin, eastern Canterbury, Hawke's Bay, Gisborne, Bay of Plenty and eastern Northland.
Soil Moisture	As of 31 August, soil moisture was near normal for most of New Zealand. Soils were drier than normal for isolated parts of inland north Otago, and wetter than normal about Kaikoura.

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Overview

August 2019 was characterised by considerably lower than normal mean sea level pressure over and to the south of New Zealand. This set up resulted in a strong southwest airflow anomaly (i.e. more southwesterly winds) than normal across the country. The prevailing southwest winds delivered an unsettled month of weather to exposed southern and western parts of the country, with frequent periods of rainfall there. Several strong cold fronts were associated with these southwesterly winds, bringing periods of thunderstorms and even snowfall to sea level in parts of the West Coast (see [Highlights and extreme events](#) section for further details). The active climate pattern was fuelled by the polar and sub-tropical jet streams, which were stronger than normal in the New Zealand region. The weather was typically more settled in eastern and inland parts of the country which are relatively sheltered from southwesterly winds.

It has now been 31 consecutive months since New Zealand experienced a nationwide average temperature that was below average (at least 0.51°C below the 1981-2010 average). The nationwide average temperature in August 2019 was 8.9°C (0.1°C above the 1981-2010 August average from NIWA's seven station temperature series which begins in 1909). Temperatures were above average (0.51°C to 1.2°C above average) in parts of central Southland, north Otago, Taranaki, Whanganui,

southern Hawke's Bay, Waikato and the Coromandel. Isolated areas observed well above average temperatures (>1.2°C above average) including Middlemarch and Hastings. In contrast, temperatures were below average (0.51°C to 1.2°C below average) in parts of the West Coast, Tasman, Marlborough and Wairarapa. Temperatures were typically near average (within 0.50°C of average) for remaining areas of the country.

Rainfall was variable throughout New Zealand. Eastern and inland parts of the country were generally drier than normal. Specifically, rainfall was below (50% to 79% of normal) or well below normal (<50% of normal) in parts of western Otago, the Mackenzie Basin, eastern Canterbury, Hawke's Bay, Gisborne, Bay of Plenty and eastern Northland. In contrast, many western and southern parts of the country observed a wetter than normal August. Rainfall was above (120% to 149% of normal) or well above normal (>149% of normal) for parts of Southland, the West Coast, coastal North Otago, Manawatu-Whanganui, central Waikato, Auckland and the Far North.

Further Highlights:

- The highest temperature was 20.8°C, observed at Whitianga on 11 August.
- The lowest temperature was -9.0°C, observed at Tara Hills (Omarama) on 19 August.
- The highest 1-day rainfall was 84 mm, recorded at Greymouth on 10 August.
- The highest wind gust was 182 km/h, observed at Cape Turnagain on 13 August.
- Of the six main centres in August 2019, Auckland was the warmest and wettest, while Christchurch was the coldest, driest and sunniest.
- Of the available, regularly reporting sunshine observation sites, the sunniest four regions in 2019 so far are Wider Nelson (1814 hours), Marlborough (1788 hours), Hawke's Bay (1729 hours), and Bay of Plenty (1726 hours).

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Temperature: Near average for the country overall

The nationwide average temperature in August 2019 was 8.9°C (0.1°C above the 1981-2010 August average from NIWA's seven station temperature series which begins in 1909). Notably, this meant that August 2019 was colder than the previous month (July 2019) when the nationwide average temperature was 9.6°C. New Zealand's temperature is typically 1.0°C warmer in August compared to July.

Several locations observed record or near-record mean, mean maximum and mean minimum temperatures (see following three tables), but overall it was an unremarkable month in terms of mean temperature records.

Record¹ 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				
Oamaru	8.2	0.7	1967	3rd-highest
Stratford	9.5	1.3	1960	4th-highest
Hawera	10.1	1.1	1977	4th-highest
Medbury	7.7	1.3	1927	4th-highest
Low records or near-records				
Takaka	7.5	-1.2	1978	2nd-lowest
Campbell Island	4.0	-1.3	1991	2nd-lowest

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				
Stratford	13.6	1.5	1960	2nd-highest
Waipawa	14.9	1.6	1945	3rd-highest
Wairoa	16.5	1.7	1964	3rd-highest
Tara Hills	11.7	1.8	1949	4th-highest
Oamaru	12.9	1.0	1967	4th-highest
Low records or near-records				
Campbell Island	6.4	-1.0	1991	2nd-lowest
Franz Josef	10.9	-1.4	1953	4th-lowest

¹ The rankings (1st, 2nd, 3rd.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 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				
Hawera	7.0	1.6	1977	Highest
Taupo	5.0	2.4	1949	2nd-highest
Whanganui	7.8	1.4	1937	2nd-highest
Lower Retaruke	5.1	1.8	1966	3rd-highest
Medbury	2.0	1.3	1927	4th-highest
Lumsden	2.0	1.2	1982	4th-highest
Low records or near-records				
Greymouth	3.1	-2.0	1947	Lowest
Takaka	1.2	-2.1	1978	2nd-lowest
Campbell Island	1.6	-1.5	1991	2nd-lowest
Rangiora	0.6	-1.3	1965	3rd-lowest

Rainfall: Wet in the west, dry in the east

New Zealand's rainfall patterns were mixed during August, with generally higher than normal rainfall in western and southern parts of the country, and lower than normal rainfall in eastern and inland areas. The notable exception to this was North Otago, where it was considerably wetter than normal. For example, Oamaru observed 101 mm of rainfall during August 2019, which is 274% of the town's August normal rainfall.

Invercargill received double its usual August rainfall, resulting in its third-highest August rainfall total since records began in 1900. The city observed 25 rain days² during the month. It was also an unsettled month of weather in Auckland, with 28 rain days observed at climate stations in Mangere and Whenuapai.

Record 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				
Arapito	305	163	1978	2nd-highest
Gore	99	164	1907	3rd-highest
Invercargill	152	201	1900	3rd-highest
Campbell Island	136	129	1992	3rd-highest
Low records or near-records				
None recorded				

² 0.1 mm or more of rainfall constitutes a single rain day, where a day is defined as the 24-hour period to 9 a.m. When measuring rainfall, it is common climatological practice to define a 'day' as 9 a.m. to 9 a.m. This means contemporary records are analogous to historic records from manual climate stations, where observers typically made their once-daily observations of climatological variables (including 24-hour rainfall totals) at 9 a.m.

August climate in the six main centres

August temperatures were above or near average for all main centres. After an especially warm mid-winter, August temperatures were colder than July in Wellington, Christchurch and Dunedin. It was a particularly dry month in Christchurch and Tauranga, with 64% and 67% of normal August rainfall, respectively. Of the six main centres in August 2019, Auckland was the warmest and wettest, while Christchurch was the coldest, driest and sunniest.

August 2019 main centre climate statistics:

Temperature			
Location	Mean temp. (°C)	Departure from normal (°C)	Comments
Auckland ^a	12.2	+0.6	Above average
Tauranga ^b	11.7	+0.9	Above average
Hamilton ^c	10.3	+0.7	Above average
Wellington ^d	9.7	+0.3	Near average
Christchurch ^e	7.1	-0.1	Near average
Dunedin ^f	7.8	+0.1	Near average
Rainfall			
Location	Rainfall (mm)	% of normal	Comments
Auckland ^a	168	149	Above normal
Tauranga ^b	74	67	Below normal
Hamilton ^c	131	109	Near normal
Wellington ^d	99 ³	85	Near normal
Christchurch ^e	40	64	Below normal
Dunedin ^f	50 ⁴	89	Near normal
Sunshine			
Location	Sunshine (hours)		
Auckland ^a	156		
Tauranga ^b	172		
Hamilton ^e	145		
Wellington ^d	166		
Christchurch ^e	205		
Dunedin ^f	143 ³		

^a Mangere ^b Tauranga Airport ^c Hamilton Airport ^d Kelburn ^e Christchurch Airport ^f Musselburgh ^g Ruakura

³ Missing two days of data.

⁴ Missing one day of data.

Highlights and extreme events

Rain and slips

On 10 August, heavy rain fell in eastern parts of Otago and South Canterbury. Flooding forced the closure of SH1 between Oamaru and Timaru.

On 17 August, a period of heavy rain caused surface flooding in Levin.

On 20 August, a short period of heavy rain caused localised surface flooding in Devonport, Auckland. In the nearby area of Mairangi Bay, the bout of inclement weather reportedly caused a power outage.

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
Oamaru	78	10th	1950	Highest
Waimate	83	10th	1898	2nd-highest
Greymouth	84	10th	1947	3rd-highest

Temperatures

On 4 August, a cold front brought chilly temperatures for the time of year, with many locations in the South Island observing record or near-record low daily maximum temperatures (see table below).

The highest August temperature was 20.8°C, observed at Whitianga on 11 August. The lowest August temperature was -9.0°C, observed at Tara Hills (Omarama) on 19 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				
Whitianga	20.8	11th	1962	Highest
Greymouth	19.4	11th	1947	Highest
Tara Hills	18.3	31st	1949	3rd-highest
Whangarei	20.7	11th	1967	4th-highest
Whangaparaoa	18.7	11th	1982	4th-highest
Low records or near-records				
Auckland (Western Springs)	9.0	18th	1971	Lowest
Haast	4.8	4th	1949	Lowest
Balclutha	2.4	4th	1972	Lowest
Nugget Point	1.2	4th	1972	Lowest
Campbell Island	0.8	13th	1991	Lowest
Greymouth	7.4	4th	1972	2nd-lowest
Secretary Island	5.6	4th	1989	2nd-lowest
Manapouri (West Arm Jetty)	1.0	4th	1972	2nd-lowest
Westport	8.5	4th	1966	Equal 2nd-lowest
Manapouri	2.2	4th	1973	Equal 2nd-lowest
Hokitika	4.8	4th	1866	3rd-lowest
Reefton	4.5	4th	1972	3rd-lowest
Franz Josef	5.6	4th	1953	3rd-lowest

Tiwai Point	5.7	4th	1972	Equal 3rd-lowest
Pukekohe	9.7	18th	1969	4th-lowest
Milford Sound	3.6	4th	1935	4th-lowest
Te Anau	2.3	4th	1973	4th-lowest
Gore	2.0	4th	1907	4th-lowest
South West Cape	4.8	4th	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
High records or near-records				
Oamaru	11.2	29th	1972	2nd-highest
Porirua	12.2	26th	1972	3rd-highest
Whakatu	12.7	7th	1972	4th-highest
Low records or near-records				
Greymouth	-3.1	4th	1947	Lowest
Takapau Plains	-4.0	20th	1962	3rd-lowest
Franz Josef	-2.8	5th	1953	3rd-lowest
Mt Cook (Airport)	-8.8	12th	1929	3rd-lowest
Porirua	-2.0	19th	1968	Equal 3rd-lowest
Tara Hills	-9.0	19th	1949	Equal 4th-lowest

Wind

On 2 August, strong winds at Napier Airport forced a flight arriving from Auckland to abort its first landing attempt. The flight landed successfully on its second attempt.

On 3-4 August, a combination of a deep low pressure system and strong winds generated large swells along the western coasts of New Zealand. Coastal erosion of up to 10 m was reported in Cobden (Greymouth), where a make-shift sea wall had been erected. Residents of six properties in the coastal settlements of Hector and Ngakawau (north of Westport) self-evacuated, with one property inundated with seawater.

On 11 August, strong winds in Auckland tore part of the roof off *The Cloud* on Queen's Wharf. Ports of Auckland reported 20 shipping containers were knocked over by the wind.

On 12 August, several tornadoes were reported in Taranaki. A trampoline hit a car on Devon Rd (SH3) just north of New Plymouth. On nearby Paraitē Rd, 40-year old trees were brought down with roofs torn off several buildings, and a woman suffered a broken collarbone after being blown into a wall. A tornado was observed in south Taranaki, causing damage to a power pole on Oeo Rd near Opunake.

Later in the evening of 12 August, a thunderstorm struck central Auckland's waterfront, with reports of a tornado there. Trees were shredded of their branches and metal construction fencing had been brought down. A shipping container was blown onto a car at Jellicoe Wharf, trapping and injuring the driver. Several yachts lost their moorings at Westhaven Marina, and a catamaran was overturned, with significant damage reported to numerous recreational vessels. There was considerable debris in

the harbour - including a shipping container, prompting a warning for mariners to be vigilant when navigating the area.

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

Location	Extreme wind gust (km/h)	Date of extreme gust	Year records began	Comments
Secretary Island	161	2nd	1994	Highest
Puysegur Point	156	20th	1986	2nd-highest
Port Taharoa	109	5th	1978	3rd-highest
Clyde	69	2nd	1983	Equal 3rd-highest
Waiouru	107	22nd	1970	Equal 4th-highest

Lightning and hail

On 10 August, a thunderstorm struck parts of Wellington, with heavy rain, hail and surface flooding reported in Island Bay, Lyall Bay and Newtown.

On 11 August, thundery weather brought strong winds and heavy rain in parts of Auckland. Five homes in St Heliers had damaged roofs, while a home in Kumeu was struck by lightning. Over 700 lightning strikes were recorded over western and inland parts of the upper North Island during a one-hour period during the evening.

On 12 August, thunderstorms brought large hail and lightning to parts of Taranaki and western Waikato. Over 400 lightning strikes were recorded in these parts in a one-hour period on during the morning.

On 22 August, thunderstorms brought hail to many parts of Auckland. Approximately 50 lightning strikes were recorded in the Auckland region in a 1-hour period during the day. Flooding was reported at Sylvia Park Mall in the suburb of Mt Wellington.

Snow and ice

On 4 August, snow fell to sea level in southern and western parts of the South Island, and to approximately 300 metres above sea level in Dunedin inland parts of Otago. Snowfall was reported in Greymouth, Hokitika, Kumara, Moana, Runanga and Serpentine Beach, which is a particularly uncommon occurrence in those places. The prevailing southwesterly flow during this event meant southern parts of Southland and South Otago received the heaviest snowfalls. There were a raft of road closures due to snow throughout the country from 4-5 August, including the Desert Road (SH1), Takaka Hill road (SH60), SH7 between Reefton and Springs Junction, the Lewis (SH7) and Lindis (SH8) Passes, the Crown Range road between Queenstown and Wanaka, Dunedin to Waitati highway (SH1), SH1 between Clinton and Milton, SH93 between Clinton and Matura, SH8 from Milton to Lawrence and about Raes Junction, and the Milford Road (SH94).

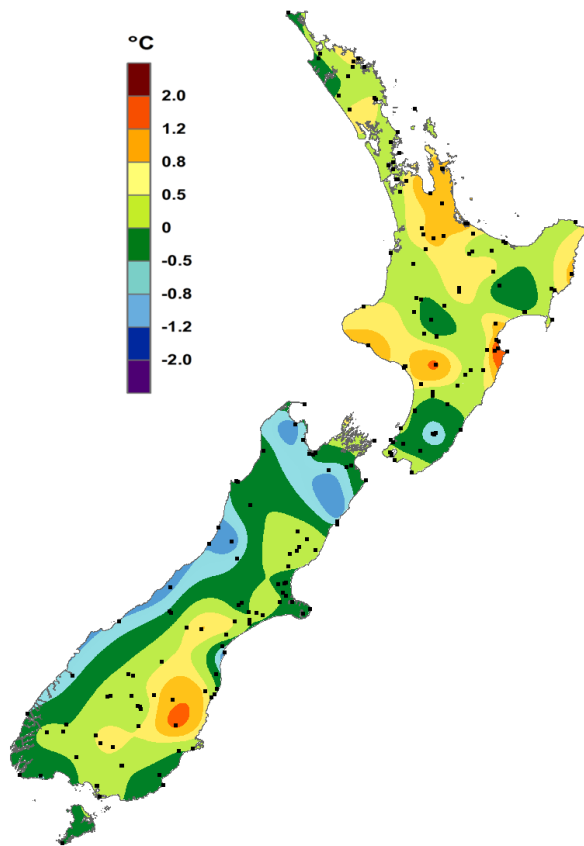
On 5 August, snow settled in Mamaku, near Rotorua. Snow could also be seen on Mt Ngongotahā from Rotorua during the morning.

On 10 August, snowfall closed Burkes Pass (SH8) between Fairlie and Tekapo, and Arthur's Pass (SH73). Large accumulations of new snow were reported at several ski areas including Broken River and

Craigieburn (50 cm), and Temple Basin (63 cm). Particularly heavy snowfalls were reported in Arthur's Pass and Mount Cook Villages.

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August temperature, expressed as a departure from the 1981-2010 average.

Temperature patterns were variable across the country, with areas of cooler and warmer than average temperatures. These areas tended to balance each other out, such that New Zealand's nationwide average temperature was near average for August.

It has now been 31 months since New Zealand experienced a nationwide average temperature that was below average (0.51°C to 1.20°C below the 1981-2010 average).

<https://www.niwa.co.nz/our-science/climate>

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