

Wet end to the year for the North Island and north-eastern South Island

Rainfall	Rainfall was well above normal (>149% of normal) for the majority of the North Island with the exception of Taranaki and parts of Northland and Manawatu-Whanganui where rainfall was near normal (80-119% of normal). Rainfall was also well above normal for Marlborough and northern Canterbury while the remainder of the South Island saw largely below normal (50-79% of normal) rainfall.
Temperature	Temperatures were well above average (> 1.20°C above average) for the regions of Southland, the West Coast, Nelson, as well as large parts of Otago, Tasman, Manawatu-Whanganui, Waikato and the Bay of Plenty. Temperatures were near average (-0.50°C to +0.50°C of average) along the coastal fringes of eastern Marlborough and Canterbury as well as for Gisborne through to Masterton. Elsewhere temperatures were above average (0.51-1.20°C above average).
Soil Moisture	As of 1 January, soils were significantly wetter than normal for the time of year across large parts of the eastern and inland South Island, as well as large parts of the North Island. Soil moisture levels were lower than normal for the time of year in Nelson, Tasman, Southland, the New Plymouth district and parts of the West Coast.

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Overview

December 2018 was characterised by slightly lower than normal pressure over the North Island and higher than normal pressure over the South Island. This pressure set up was associated with more easterly winds than normal.

The prevalence of warm and moist easterly to north-easterly winds contributed to an unsettled month for much of the North Island and northeast of the South Island, with frequent periods of atmospheric instability contributing to many days of thunderstorm activity (see *Highlights and extreme events* for further details). Conversely, southern and eastern parts of the South Island experienced many dry and sunny days throughout the month resulting in below to well below normal rainfall totals.

The frequent origin of tropical airmasses led to widespread warm temperatures. Overall, the nationwide average temperature in December 2018 was 17.0°C (1.3°C above the 1981-2010 December

average from NIWA's seven station temperature series which begins in 1909). This ranked as the 9th equal warmest December on record.

Further Highlights:

- The highest temperature was 32.8°C, observed at Cromwell on 25 December.
- The lowest temperature was -0.2°C, observed at Manapouri on 23 December.
- The highest 1-day rainfall was 115 mm, recorded at Whakatane on 24 December.
- The highest wind gust was 167 km/h, observed at Akitio on 5 December.
- Of the six main centres in December 2018, Tauranga was the warmest, sunniest and wettest, Christchurch was the least sunny, Dunedin was the coldest and driest.
- Of the available, regularly reporting sunshine observation sites, the sunniest four locations in 2018 are Wider Nelson (2555 hours), Bay of Plenty (2518 hours), Marlborough (2502 hours) and Taranaki (2496 hours).
- Of the available, regularly reporting low elevation rainfall sites, the two wettest locations in 2018 are Milford Sound (5945 mm) and Arthur's Pass (4698 mm). The two driest locations in 2018 are Clyde (526 mm) and Cromwell (541 mm).

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Rainfall: Very wet in the North Island and north-eastern South Island

December was an unsettled month across the North Island and north-eastern parts of the South Island (Marlborough, central and northern Canterbury) where several thunderstorm events contributed to widespread well above normal rainfall totals (>149% of the December normal) for the month. In particular, it was one of the wettest Decembers on record for several Auckland climate stations with more than double the normal December rainfall observed. The predominantly easterly flow kept Taranaki and Manawatu-Whanganui largely sheltered and thus, near normal rainfall was observed there (80-119% of the December normal).

In the South Island, other than the high rainfall amounts for the aforementioned north-eastern areas, rainfall was largely below normal (50-79% of the December normal) with parts of Westland and Southland seeing well below normal rainfall amounts (<50% of the December normal). Invercargill experienced its 4th driest December on record where records date back to 1900.

The wet December for parts of the country followed on from a wet November for eastern New Zealand. As a result, as of 1 January, soils were significantly wetter than normal for the time of year across large parts of the eastern and inland South Island, as well as much of the North Island. Soil moisture levels were lower than normal for the time of year in Nelson, Tasman, Southland, the New Plymouth district and parts of the West Coast.

Record¹ or near-record December rainfall totals were recorded at:

Location	Rainfall total (mm)	Percentage of normal	Year records began	Comments
High records or near-records				
Auckland (Mangere)	224	260	1959	Highest
Te Puke	355	255	1973	2nd-highest
Whatawhata	237	193	1952	2nd-highest
Auckland (North Shore)	193	206	1966	3rd-highest
Auckland (Pukekohe)	234	239	1944	3rd-highest
Waipara West	103	197	1973	3rd-highest
Kaitaia	191	167	1948	4th-highest
Low records or near-records				
Mt Cook (Airport)	90	18	1928	3rd-lowest
Invercargill	34	33	1900	4th-lowest
Tiwai Point	42	44	1970	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.

Temperature: A warm end to 2018

A warm easterly flow across the country throughout much of the month led to widespread warmer than average temperatures. The nationwide average temperature in December 2018 was 17.0°C (1.3°C above the 1981-2010 December average from NIWA's seven station temperature series which begins in 1909). Temperatures were well above average (> 1.20°C above average) for the regions of Southland, the West Coast and Nelson as well as large parts of Otago, Tasman, Manawatu-Wanganui, Waikato and the Bay of Plenty. Several locations in these regions experienced one of their warmest Decembers on record.

Temperatures were near average (-0.50°C to +0.50°C of average) along the coastal fringes of eastern Marlborough and Canterbury as well as for Gisborne through to Masterton due to onshore winds. Elsewhere temperatures were above average (0.51-1.20°C above average). No locations observed near record low mean, mean minimum or mean maximum temperatures.

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

Location	Mean air temp. (°C)	Departure from normal (°C)	Year records began	Comments
High records or near-records				
Levin	18.1	2.0	1895	2nd-highest
Westport	17.2	2.2	1937	2nd-highest
Stratford	16.1	1.7	1960	3rd-highest
Reefton	17.7	2.3	1960	3rd-highest
Puysegur Point	14.6	2.1	1978	3rd-highest
South West Cape	14.1	2.0	1991	3rd-highest
Mokohinau	19.1	0.8	1994	4th-highest
Taupo	17.7	2.2	1949	4th-highest
Farewell Spit	18.0	1.7	1971	4th-highest
Secretary Island	15.7	2.4	1985	4th-highest
Motueka	17.9	1.6	1956	4th-highest
Cheviot	16.3	1.2	1982	4th-highest
Manapouri	15.5	2.8	1971	4th-highest
Low records or near-records				
None observed				

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

Location	Mean maximum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
High records or near-records				
Westport	21.1	2.8	1937	2nd-highest
Rotorua	22.5	2.1	1964	3rd-highest
Arapito	21.6	2.0	1978	3rd-highest
Reefton	23.7	2.9	1960	3rd-highest
Secretary Island	19.2	2.9	1985	3rd-highest

Puysegur Point	17.4	2.2	1978	3rd-highest
South West Cape	17.2	2.1	1991	3rd-highest
Whangaparaoa	22.4	0.9	1982	4th-highest
Whitianga	23.9	1.6	1962	4th-highest
Levin	22.3	2.3	1895	4th-highest
Farewell Spit	21.6	1.6	1971	4th-highest
Milford Sound	20.9	3.4	1934	4th-highest
Low records or near-records				
None observed				

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

Location	Mean minimum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
High records or near-records				
Masterton	12.4	2.5	1906	3rd-highest
Martinborough	13.0	1.6	1986	3rd-highest
Puysegur Point	11.9	2.0	1978	3rd-highest
Cheviot	11.1	1.6	1982	3rd-highest
Te Anau	10.2	2.7	1963	3rd-highest
Five Rivers	9.3	1.6	1982	3rd-highest
South West Cape	11.0	2.0	1991	3rd-highest
Whitianga	14.6	1.5	1962	4th-highest
Levin	14.0	1.7	1895	4th-highest
Hawera	12.8	1.2	1977	4th-highest
Farewell Spit	14.4	1.7	1971	4th-highest
Secretary Island	12.2	2.0	1985	4th-highest
Orari Estate	11.0	1.7	1972	4th-highest
Oamaru (Airport)	11.2	1.6	1967	4th-highest
Dunedin (Musselburgh)	11.9	1.5	1947	4th-highest
Manapouri	10.5	2.4	1971	4th-highest
Roxburgh	10.7	2.1	1950	4th-highest
Low records or near-records				
None observed				

December climate in the six main centres

December was a very wet month in Auckland, Tauranga, Hamilton and Christchurch with Auckland observing its wettest December on record. Conversely, Dunedin experienced below normal rainfall (following its wettest November on record) while Wellington rainfall was near normal. Temperatures were above or well above average in all main centres other than Christchurch where the mean temperature was near average. Of the six main centres in December 2018, Tauranga was the warmest, sunniest and wettest, Christchurch was the least sunny, Dunedin was the coldest and driest.

December 2018 main centre climate statistics:

Temperature			
Location	Mean temp. (°C)	Departure from normal (°C)	Comments
Auckland ^a	19.0	+0.8	Above average
Tauranga ^b	19.3	+1.3	Well above average
Hamilton ^c	18.1	+1.2	Well above average
Wellington ^d	16.8	+1.4	Well above average
Christchurch ^e	16.1	+0.3	Near average
Dunedin ^f	15.2	+1.4	Well above average
Rainfall			
Location	Rainfall (mm)	% of normal	Comments
Auckland ^a	224	260	Well above normal – wettest December on record
Tauranga ^b	278	293	Well above normal
Hamilton ^c	179	170	Well above normal
Wellington ^d	86	104	Near normal
Christchurch ^e	69	147	Above normal
Dunedin ^f	57	71	Below normal
Sunshine			
Location	Sunshine (hours)		
Auckland ^a	218		
Tauranga ^b	243		
Hamilton ^g	218		
Wellington ^d	189		
Christchurch ^e	156		
Dunedin ^f	212		

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

Highlights and extreme events

Rain and slips

On 2 December a localised heavy downpour caused flash flooding in Dinsdale, Hamilton and saw 24 people evacuated from 10 homes.

On 3 December flash flooding occurred around Gladstone School near Carterton.

Between 8:00-9:00 am on Tuesday 4 December, Auckland (Mangere) recorded its wettest December hour on record with 31.4 mm. It was also the 2nd wettest summer hour on record and the 5th wettest hour annually on record since hourly records began in 1965. Many parts of Auckland experienced flash flooding.

On 6 December surface flooding impacted Dunedin and large parts of Southland. The worst hit area was Otapiri Gorge Rd where flooding caused a slip and blocked the road completely.

On 13 December, thunderstorms caused extensive flooding in Palmerston North and caused some roads to be impassable.

On 15 December, a localised thunderstorm caused flash flooding in the Auckland suburb of Pukekohe.

On 24 December more than 100 holiday-makers were evacuated from their campsites overnight after flooding in Waihi Beach. The flooding was due to heavy rainfall coinciding with a high King Tide.

On 25 December there were several flood related incidents across the North Island. A severe localised thunderstorm struck Napier. The thunderstorm led to several flooding call-outs. Flooding and slips also affected State Highway 4, which closed between Whanganui and Raetihi. Likewise, State Highway 25 from Coromandel to Whitianga was closed due to slips in the Whanapoua Hill area. In Auckland, localised flooding closed State Highway 16 in Kaukapakapa and also resulted in five adults needing to be rescued from two vehicles which were swept along by floodwaters.

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

Location	Extreme 1-day rainfall (mm)	Date of extreme rainfall	Year records began	Comments
Palmerston North	79	25th	1928	Highest
Waipara West	42	19th	1973	2nd-highest
Te Puke	99	24th	1973	3rd-highest
Mokohinau	64	24th	1994	4th-highest
Whakatane	115	24th	1952	4th-highest
Whatawhata	52	19th	1952	4th-highest

Temperatures

Several locations across Otago and Southland observed one of their warmest December nights on record on the 30th of December. In Gore, the temperature didn't drop below 17.3°C, making it Gore's 4th warmest night since records began in 1907.

The highest temperature of the month was 32.8°C, observed at Cromwell on 25 December.

The lowest temperature of the month was -0.2°C, observed at Manapouri on 23 December.

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

Location	Extreme maximum (°C)	Date of extreme temperature	Year records began	Comments
High records or near-records				
Rotorua	28.4	10th	1964	2nd-highest
Secretary Island	25.0	2nd	1985	2nd-highest
Motueka	31.1	31st	1956	2nd-highest
Whitianga	29.1	18th	1962	3rd-highest
Balclutha	29.6	29th	1964	3rd-highest
Farewell Spit	25.6	9th	1971	4th-highest
Appleby	29.2	31st	1932	4th-highest
Whangaparaoa	26.5	18th	1982	Equal 4th-highest
Milford Sound	26.2	15th	1934	Equal 4th-highest
Puysegur Point	23.2	3rd	1978	Equal 4th-highest
South West Cape	24.1	3rd	1991	Equal 4th-highest
Low records or near-records				
None observed				

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

Location	Extreme minimum (°C)	Date of extreme temperature	Year records began	Comments
High records or near-records				
Five Rivers	20.5	30th	1982	Highest
Balclutha	18.1	30th	1972	Highest
Ngawi	20.5	31st	1972	Equal highest
Nugget Point	16.4	30th	1972	Equal highest
Dunedin (Airport)	18.8	30th	1972	2nd-highest
Dunedin (Musselburgh)	18.4	30th	1947	2nd-highest
Lumsden	20.4	30th	1982	2nd-highest
Manapouri	16.0	30th	1972	Equal 2nd-highest
Oamaru	17.5	30th	1972	3rd-highest
Alexandra	18.9	30th	1930	Equal 3rd-highest
Clyde	18.1	30th	1978	Equal 3rd-highest
South West Cape	14.6	18th	1991	Equal 3rd-highest
Te Anau	16.6	30th	1973	4th-highest
Roxburgh	19.0	30th	1950	4th-highest
Gore	17.3	30th	1907	4th-highest
Cromwell	18.7	30th	1949	Equal 4th-highest
Low records or near-records				
None observed				

Wind

The highest wind gust of the month was 167 km/h, observed at Akitio on 5 December.

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

Location	Extreme wind gust (km/h)	Date of extreme gust	Year records began	Comments
Dargaville	83	25th	1997	2nd-highest
Castlepoint	159	5th	1972	2nd-highest
Paeroa	85	23rd	1991	3rd-highest
Levin	82	5th	1971	Equal 3rd-highest
Secretary Island	120	18th	1994	4th-highest
Brothers Island	113	4th	1997	4th-highest

Lightning and hail

On 3 December four people were injured after lightning struck a rugby goalpost at a Hamilton school and jumped into neighbouring classrooms.

On 4 December several hundred lightning strikes were recorded across the Auckland and Waikato regions. At 9:30am, lightning struck an Auckland home, exploding a lamp and propelling shattered glass. In Mangere, lightning injured a woman. Lightning also struck and killed 4 cows on a farm in Hamilton. The lightning caused delays and cancellations at Auckland airport. Later in the day, lightning was responsible for cutting power to 1400 homes in Rotorua.

On 13 December South Taranaki was impacted by rain, hail and thunderstorms.

On 14 December over 30,000 lightning strikes were recorded across the country, the bulk of these were over the North Island. Fire and Emergency received 40 weather related calls across the Auckland region.

Cloud and fog

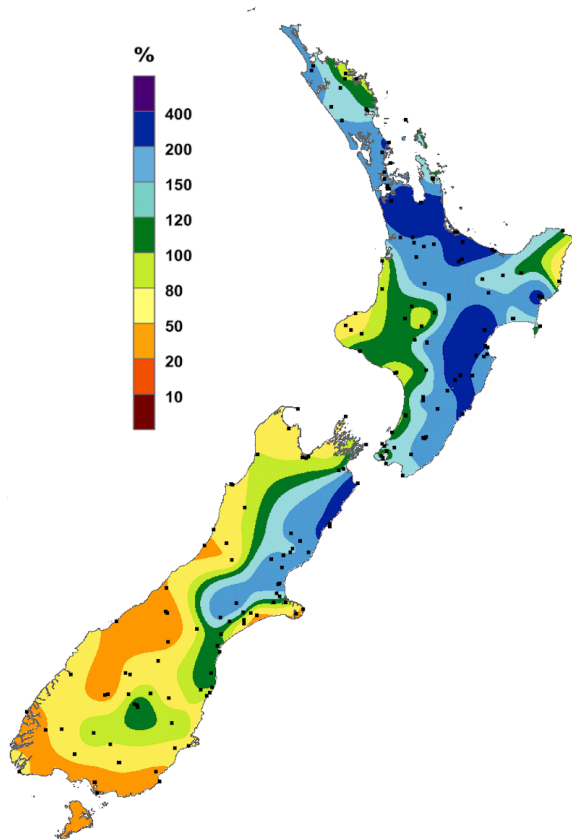
On 26 December low cloud disrupted flights at Wellington airport leading to cancellations and diversions.

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December 2018 rainfall, expressed as a percentage of normal (1981-2010 normal).

Rainfall was well above normal (>149% of normal) for the majority of the North Island with the exception of Taranaki and parts of Northland and Manawatu-Whanganui where rainfall was near normal (80-119% of normal).

Rainfall was also well above normal for Marlborough and northern Canterbury while the remainder of the South Island saw largely below normal (50-79% of normal) rainfall.

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