Aotearoa New Zealand Climate Summary: **December 2022** Issued: 11 January 2023

A generally warm month with variable rainfall patterns

Temperature	Temperatures were above average (0.51°C to 1.20°C above average) to well above average (>1.20°C above average) across a majority of the North Island, Nelson, Tasman, the West Coast, much of southern Canterbury, Otago, and Southland. Near average (±0.50°C of average) temperatures were observed in coastal Gisborne, Hawke's Bay, eastern Marlborough, northern Canterbury, and pockets of interior Otago.
Rainfall	December rainfall was above normal (120-149% of normal) or well above normal (>149% of normal) in eastern Northland, the Coromandel Peninsula, Bay of Plenty, much of the Central Plateau, southern Gisborne, Hawke's Bay, Wairarapa, eastern Marlborough, and parts of northern and southern Canterbury. Below normal (50-79% of normal) or well below normal (<50% of normal) rainfall was observed in the Far North, southern Auckland, Tasman, the West Coast, Banks Peninsula, along with most of Otago and Southland. Elsewhere, near normal (80-119% of normal) rainfall was observed.
Soil Moisture	At the end of December, soil moisture levels were above normal or well above normal in southern Northland, Auckland, the Coromandel Peninsula, Bay of Plenty, the Central Plateau, Hawke's Bay, much of Manawatū-Whanganui and Wellington, along with parts of northern and central Canterbury. Soil moisture levels were below normal in a portion of the Far North, Māhia Peninsula, Nelson, the West Coast, Banks Peninsula, and coastal Otago and Southland. Elsewhere, soil moisture levels were generally near normal.

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Overview

December 2022 was characterised by higher than normal mean sea level pressure over and to the south of the South Island, with lower than normal pressure north of Aotearoa New Zealand. La Niña, a positive Southern Annular Mode (SAM), and a moderate-to-strong marine heatwave influenced New Zealand's climate during December. The SAM is a proxy for the location of a belt of westerly winds that encircle the South Ocean and occasionally protrude into the mid-latitudes. Usually, a positive SAM indicates calmer and drier conditions for New Zealand.

The combination of these climate drivers produced substantially more easterly airflows than normal during December. This resulted in a temperature pattern where western areas tended to be warmer

than eastern areas due to easterly Foehn winds. Similarly, eastern regions of New Zealand were generally wetter than western regions due to the enhanced onshore wind flow in the east.

The second half of December featured a nearly stationary area of low pressure located in the Tasman Sea that brought a humid, unstable air mass to New Zealand. This resulted in almost daily afternoon showers and thunderstorms across large portions of the country, some resulting in flooding. This included flash flooding in South Taranaki on 19 December, where several roads were closed, and Hamilton on 20 December, which recorded its third-wettest hour on record with 24.2 mm between 12:00-1:00 pm. On 17 December, a tornado moved through rural Alexandra and Springvale, causing extensive damage to some properties (see the highlights and extreme events section for more details).

December temperatures were above average (0.51°C to 1.20°C above average) to well above average (>1.20°C above average) across a majority of the North Island, Nelson, Tasman, the West Coast, much of southern Canterbury, Otago, and Southland. Near average (±0.50°C of average) temperatures were observed in coastal Gisborne, Hawke's Bay, eastern Marlborough, northern Canterbury, and pockets of interior Otago. Overall, the nationwide average temperature for December 2022 was 17.0°C (1.3°C above the 1981-2010 October average), making it the 10th-warmest December on record based on NIWA's seven station temperature series that begins in 1909. Furthermore, coastal sea surface temperatures ranged from 1.1˚C to 1.8˚C above average during December as compared to the 1991-2020 December average, qualifying as a moderate-to-strong marine heatwave.

December rainfall was above normal (120-149% of normal) or well above normal (>149% of normal) in eastern Northland, the Coromandel Peninsula, Bay of Plenty, much of the Central Plateau, southern Gisborne, Hawke's Bay, Wairarapa, eastern Marlborough, and parts of northern and southern Canterbury. Below normal (50-79% of normal) or well below normal (<50% of normal) rainfall was observed in the Far North, southern Auckland, Tasman, the West Coast, Banks Peninsula, along with most of Otago and Southland. Elsewhere, near normal (80-119% of normal) rainfall was observed.

Further Highlights:

- The highest December temperature was 33.4°C, observed at Alexandra on 28 December.
- The lowest December temperature was 0.0°C, observed at Manapouri Airport on 3 December.
- The highest 1-day rainfall was 91 mm, recorded at Ngawi on 20 December.
- The highest wind gust was 143 km/h, observed at South West Cape on 29 December.
- Of the six main centres in December 2022, Auckland was the warmest, Dunedin was the coolest, driest and least sunny, Tauranga was the wettest, and Hamilton was the sunniest.
- Of the available, regularly reporting sunshine observation sites, the sunniest four regions in 2022 so far are Taranaki (2659 hours), Wider Nelson (2581 hours), Bay of Plenty (2526 hours), and Marlborough (2466 hours).

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Temperature: Generally warm, but cooler along the eastern fringe

December temperatures were generally warmer than average, heavily influenced by continued La Niña conditions and a marine heatwave that strengthened in New Zealand's coastal waters during the month. Due to the month's easterly airflow anomaly, western regions of the country generally saw the most anomalous, or unusual, warmth. This included Westport, which had its 2nd-warmest December since 1937 with a mean temperature 3.0°C warmer than average. This was largely driven by warm nights in Westport, which were 3.5°C warmer than average for the month. Several other locations in the western South Island also experienced near-record warm temperatures for the month. These warm temperatures were likely influenced by marine heatwave conditions along the West Coast, where sea surface temperatures were 3-4˚C warmer than average.

A different story unfolded in the east of both islands, where some locations saw near average temperatures due to the persistent onshore wind flow during December. This included Napier, whose monthly mean temperature was 0.1°C cooler than average, and Blenheim, which was 0.3°C cooler than average.

Record[1] 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				
Westport	18.0	3.0	1937	2nd-highest
Secretary Island	16.2	2.9	1985	2nd-highest
Leigh	20.0	1.9	1966	3rd-highest
Paraparaumu	17.8	1.8	1953	3rd-highest
Upper Hutt	17.3	1.7	1939	3rd-highest
Farewell Spit	18.8	2.5	1971	3rd-highest
Arapito	17.5	2.1	1978	3rd-highest
Greymouth	17.0	2.3	1947	3rd-highest
Cape Reinga	18.8	1.4	1951	4th-highest
Whangaparāoa	19.3	1.4	1982	4th-highest
Matamata	18.8	2.2	1999	4th-highest
Te Puke	18.8	1.8	1973	4th-highest
Auckland (Airport)	19.9	1.6	1959	4th-highest
Hamilton	18.6	1.7	1946	4th-highest
Mt Ruapehu (Chateau)	12.1	1.5	2000	4th-highest
Porirua	17.6	1.3	1968	4th-highest
Stratford	16.3	1.9	1960	4th-highest
Franz Josef	16.0	2.2	1953	4th-highest
South West Cape	13.6	1.5	1991	4th-highest
Low records or near-records				
None observed				

[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 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				
Secretary Island	19.9	3.6	1985	Highest
Te Kuiti	24.7	2.6	1959	2nd-highest
Porirua	21.1	1.3	1968	2nd-highest
Farewell Spit	23.1	3.1	1971	2nd-highest
Arapito	22.5	2.9	1978	2nd-highest
Greymouth	21.1	2.9	1947	2nd-highest
Ōkārito	20.4	2.0	1982	2nd-highest
Franz Josef	21.4	3.4	1953	2nd-highest
Oamaru	20.5	2.4	1967	2nd-highest
Whatawhata	23.5	2.3	1952	3rd-highest
Mt Ruapehu (Chateau)	17.8	2.3	2000	3rd-highest
Westport	20.9	2.6	1937	3rd-highest
Whangaparāoa	23.1	1.6	1982	4th-highest
Paraparaumu	21.8	2.2	1953	4th-highest
Levin	22.6	2.6	1895	4th-highest
South West Cape	16.9	1.8	1991	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				
Westport	15.1	3.5	1937	Highest
Matamata	14.0	2.8	1999	3rd-highest
Te Puke	14.5	2.5	1973	3rd-highest
Secretary Island	12.5	2.3	1985	3rd-highest
Stewart Island	10.7	2.1	1975	3rd-highest
Mokohinau	17.1	1.2	1994	4th-highest
Whakatāne	15.2	2.2	1974	4th-highest
Auckland (Airport)	16.4	1.5	1959	4th-highest
Hamilton (Ruakura)	14.2	2.2	1906	4th-highest
Hāwera	13.0	1.4	1977	4th-highest
Brothers Island	14.3	1.2	1997	4th-highest
Te Anau	10.2	2.6	1963	4th-highest
Low records or near-records				
None observed				

Rainfall: Wet in parts of the North Island; generally dry in the South Island

December's rainfall was quite variable around the country. Plentiful showers and thunderstorms in the second half of the month led to locally high rainfall totals. This included Whakatāne, which had 202% of its normal December rainfall, Napier with 199% of its normal rainfall, and Kaikōura on 242% of its normal rainfall.

Conversely, some western regions were shielded from the moist easterly airflow and experienced a very dry month. Notably, Mt Cook Airport only received 48 mm during December, a mere 10% of normal. This made it the driest December since records began there in 1928. Other West Coast locations saw a near-record dry month, including Lake Moeraki, Greymouth, and Milford Sound.

Record 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				
None observed				
Low records or near-records				
Arapito	52	23	1978	Lowest
Ōkārito	124	36	1981	Lowest
Mt Cook (Airport)	48	10	1928	Lowest
Lake Moeraki	193	47	1985	2nd-lowest
Akaroa	16	26	1977	2nd-lowest
Windsor	22	30	2000	3rd-lowest
Greymouth	93	37	1947	4th-lowest
Milford Sound	234	33	1929	4th-lowest
South West Cape	72	68	1991	4th-lowest

December climate in the six main centres

December temperatures were above average or well above average in all centres except Christchurch, where near average temperatures were observed. It was a wet month in Tauranga, Wellington, and Christchurch, while Dunedin experienced well below normal rainfall. Of the six main centres in December 2022, Auckland was the warmest, Dunedin was the coolest, driest and least sunny, Tauranga was the wettest, and Hamilton was the sunniest.

December 2022 main centre climate statistics:

Temperature			
Location	Mean temp. (°C)	Departure from normal (°C)	Comments
Auckland[a]	19.7	+1.5	Well above average
Tauranga[b]	19.2	+1.2	Above average
Hamilton[c]	18.6	+1.7	Well above average (4th-warmest on record)
Wellington[d]	16.7	+1.3	Well above average
Christchurch[e]	16.2	+0.4	Near average
Dunedin[f]	14.7	+0.9	Above average

Rainfall			
Location	Rainfall (mm)	% of normal	Comments
Auckland[a]	97	113	Near normal
Tauranga[b]	137	145	Above normal
Hamilton[c]	104	99	Near normal
Wellington[d]	100	120	Above normal
Christchurch[e]	63	135	Above normal
Dunedin[f]	30	37	Well below normal

Sunshine	
Location	Sunshine (hours)
Auckland[a]	224
Tauranga[b]	219
Hamilton[g]	233
Wellington[d]	218
Christchurch[e]	223
Dunedin[f]	188

[a] Māngere [b] Tauranga Airport [c] Hamilton Airport [d] Kelburn [e] Christchurch Airport [f] Musselburgh [g] Ruakura

Highlights and extreme events

Temperatures

The highest December temperature was 33.4°C, observed at Alexandra on 28 December.

The lowest December temperature was 0.0°C, observed at Manapouri Airport on 3 December.

Westerly winds originating from Australia brought the warmest temperatures of the summer season thus far to the country between 28-30 December. This included 33.4˚C in Alexandra on 28 December and 30.8˚C in Te Puke on 30 December, the 2nd-warmest December temperature there since at least 1973.

Sea surface temperatures around New Zealand surged during December, with some coastal areas seeing temperature anomalies 3-4˚C warmer than average, particularly near the West Coast and Waikato.

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				
Farewell Spit	27.8	30th	1971	Equal highest
Te Puke	30.8	30th	1973	2nd-highest
Rotorua	29.6	30th	1964	2nd-highest
Lumsden	29.7	28th	1982	2nd-highest
Tākaka	30.2	29th	1978	Equal 2nd-highest
Leigh	28.6	30th	1966	3rd-highest
Taupō	29.6	30th	1949	3rd-highest
Te Kuiti	29.6	27th	1959	3rd-highest
Tūrangi	29.8	30th	1968	3rd-highest
Secretary Island	25.7	27th	1985	3rd-highest
Balclutha	29.8	29th	1964	3rd-highest
Motu	27.8	5th	1990	Equal 3rd-highest
Porirua	26.5	26th	1968	Equal 3rd-highest
Stratford	26.0	13th	1960	4th-highest
Windsor	30.4	29th	2000	4th-highest
Whatawhata	28.4	28th	1952	Equal 4th-highest
Cheviot	31.9	29th	1982	Equal 4th-highest
Manapouri (Airport)	28.5	28th	1963	Equal 4th-highest
Low records or near-records				
Kerikeri	16.7	7th	1952	4th-lowest

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				
Motu	18.9	10th	1990	Highest

Westport	19.4	16th	1966	Highest
Mt Ruapehu (Chateau)	13.1	16th	2000	2nd-highest
Ngawi	20.4	17th	1972	Equal 3rd-highest
Ōkārito	16.6	16th	1983	Equal 4th-highest
Low records or near-records				
None observed				

Rain and slips

The highest 1-day rainfall was 91 mm, recorded at Ngawi on 20 December.

On 10 December, a thunderstorm brought surface flooding to Gore, with some water getting into businesses in the town centre. FENZ received about 20 weather-related callouts in the area.

On 14-15 December, heavy rain and flooding caused slips and road closures in the Coromandel and western Bay of Plenty, while large swells and rip currents resulted in closed beaches. Portions of SH25 between Whitianga and Whangamatā were closed along with other local roads.

Beginning around 17 December and lasting until late in the month, an area of low pressure located in the Tasman Sea brought a humid, unstable air mass to New Zealand that resulted in daily showers and thunderstorms across large portions of the country, some resulting in flooding. This included flash flooding in South Taranaki on 19 December, where several roads were closed, and Hamilton on 20 December, which recorded its third-wettest hour on record with 24.2 mm between 12:00-1:00 pm. This resulted in flooding of the lobby at the NIWA Hamilton office.

On 20 December, thunderstorms brought widespread road flooding to Rotorua, where more than 30 streets were closed. In Greytown, at least two shops and some homes were affected by flooding due to a heavy thunderstorm.

On 26 December, locally heavy rain impacted Auckland, bringing flooding to some roadways. This included SH1 near Mount Wellington, which was blocked due to standing water. Auckland Airport also delayed or cancelled several domestic flights.

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
Stewart Island	59	5th	1975	Highest
Gore	58	22nd	1907	2nd-highest

Wind

The highest wind gust was 143 km/h, observed at South West Cape on 29 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
Mokohinau	106	7th	1994	Equal 2nd-highest
Cape Reinga	120	7th	1974	3rd-highest
Paeroa	83	14th	1991	Equal 4th-highest

Lightning, hail, and tornadoes

On 17 December, a tornado moved through rural Alexandra and Springvale, causing extensive damage to some properties. This included a house whose roof was partially torn off and a shed that was destroyed.

On 20 December, a severe thunderstorm hit Hamilton with plentiful lightning and hail as large as ten-cent pieces.

On 22 December, a small tornado struck a house in Eltham, Taranaki, ripping off a portion of the roof. Meanwhile, a lightning strike set a home and shed on fire in Waitōtara.

Cloud and fog

On 16 December, multiple morning flights to and from Tauranga Airport were cancelled due to low cloud and fog at the airport. At least four flights out of Auckland were affected by fog, and Christchurch Airport also saw disruptions.

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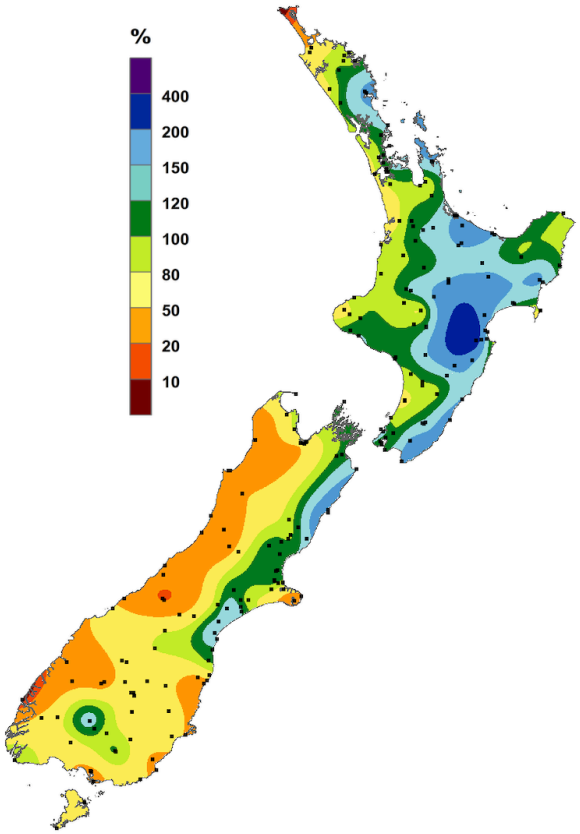
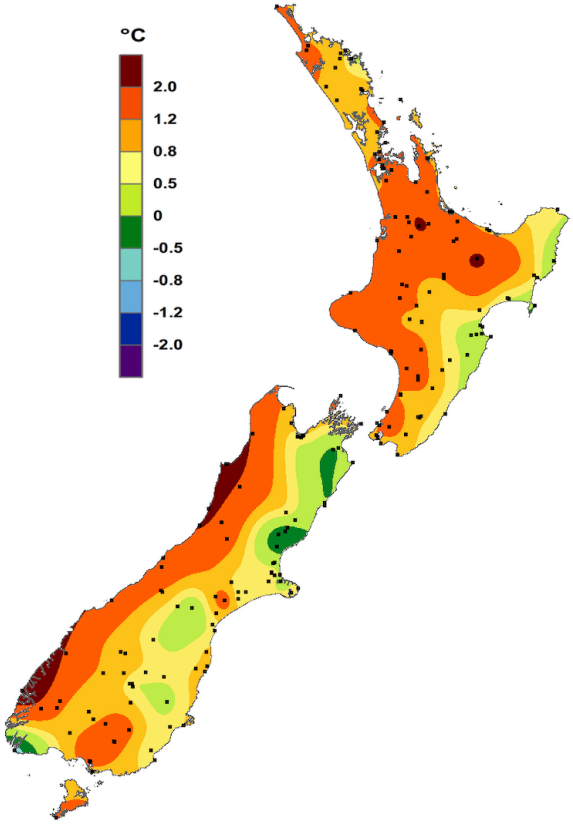


December rainfall
Expressed as a percentage of the 1981-2010 normal.



December temperature
Expressed as a departure from the 1981-2010 average in degrees Celsius.

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