

## A generally warm month with variable rainfall patterns

|                      |   |
|----------------------|---|
| <b>Temperature</b>   | 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 ( $\pm 0.50^\circ\text{C}$ of average) temperatures were observed in coastal Gisborne, Hawke's Bay, eastern Marlborough, northern Canterbury, and pockets of interior Otago.  |
| <b>Rainfall</b>      | 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. |
| <b>Soil Moisture</b> | 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.  |

Click on the link to jump to the information you require:

[Overview](#)

[Temperature](#)

[Rainfall](#)

[December 2022 climate in the six main centres](#)

[Highlights and extreme events](#)

### 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 ( $\pm 0.50^\circ\text{C}$  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 10<sup>th</sup>-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), Wairarapa (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 2<sup>nd</sup>-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<sup>1</sup> or near-record mean air temperatures for December were recorded at:

| Location                            | Mean air temp. (°C) | Departure from normal (°C) | Year records began | Comments    |
|-------------------------------------|---------------------|----------------------------|--------------------|-------------|
| <b>High records or near-records</b> |                     |                            |                    |             |
| 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 |
| <b>Low records or near-records</b>  |                     |                            |                    |             |
| None observed                       |                     |                            |                    |             |

<sup>1</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 December were recorded at:**

| Location                            | Mean maximum air temp. (°C) | Departure from normal (°C) | Year records began | Comments    |
|-------------------------------------|-----------------------------|----------------------------|--------------------|-------------|
| <b>High records or near-records</b> |                             |                            |                    |             |
| 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 |
| Ōkārīto                             | 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 |
| <b>Low records or near-records</b>  |                             |                            |                    |             |
| 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    |
|-------------------------------------|-----------------------------|----------------------------|--------------------|-------------|
| <b>High records or near-records</b> |                             |                            |                    |             |
| 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 |
| <b>Low records or near-records</b>  |                             |                            |                    |             |
| None observed                       |                             |                            |                    |             |

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## 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 |

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## 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 <sup>a</sup>     | 19.7             | +1.5                       | Well above average                                      |
| Tauranga <sup>b</sup>     | 19.2             | +1.2                       | Above average   |
| Hamilton <sup>c</sup>     | 18.6             | +1.7                       | Well above average (4 <sup>th</sup> -warmest on record) |
| Wellington <sup>d</sup>   | 16.7             | +1.3                       | Well above average                                      |
| Christchurch <sup>e</sup> | 16.2             | +0.4                       | Near average  |
| Dunedin <sup>f</sup>      | 14.7             | +0.9                       | Above average   |
| Rainfall                  |                  |                            |   |
| Location                  | Rainfall (mm)    | % of normal                | Comments  |
| Auckland <sup>a</sup>     | 97               | 113                        | Near normal   |
| Tauranga <sup>b</sup>     | 137              | 145                        | Above normal  |
| Hamilton <sup>c</sup>     | 104              | 99                         | Near normal   |
| Wellington <sup>d</sup>   | 100              | 120                        | Above normal  |
| Christchurch <sup>e</sup> | 63               | 135                        | Above normal  |
| Dunedin <sup>f</sup>      | 30               | 37                         | Well below normal                                       |
| Sunshine                  |                  |                            |   |
| Location                  | Sunshine (hours) |                            |   |
| Auckland <sup>a</sup>     | 224              |                            |   |
| Tauranga <sup>b</sup>     | 219              |                            |   |
| Hamilton <sup>g</sup>     | 233              |                            |   |
| Wellington <sup>d</sup>   | 218              |                            |   |
| Christchurch <sup>e</sup> | 223              |                            |   |
| Dunedin <sup>f</sup>      | 188              |                            |   |

<sup>a</sup> Māngere <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

### 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 2<sup>nd</sup>-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          |
|-------------------------------------|----------------------|-----------------------------|--------------------|-------------------|
| <b>High records or near-records</b> |                      |                             |                    |                   |
| 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 2                           | 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 |
| <b>Low records or near-records</b>  |                      |                             |                    |                   |
| 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 |
|-------------------------------------|----------------------|-----------------------------|--------------------|----------|
| <b>High records or near-records</b> |                      |                             |                    |          |
| 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 |
| Westport                           | 18.1 | 16th | 1966 | 4th-highest       |
| Ōkārito                            | 16.6 | 16th | 1983 | Equal 4th-highest |
| <b>Low records or near-records</b> |      |      |      |                   |
| 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.

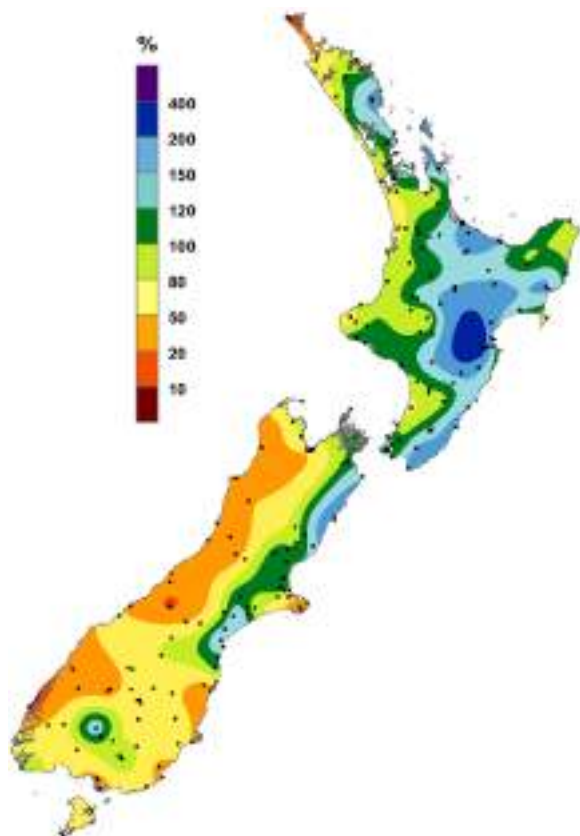
**Cloud and fog**

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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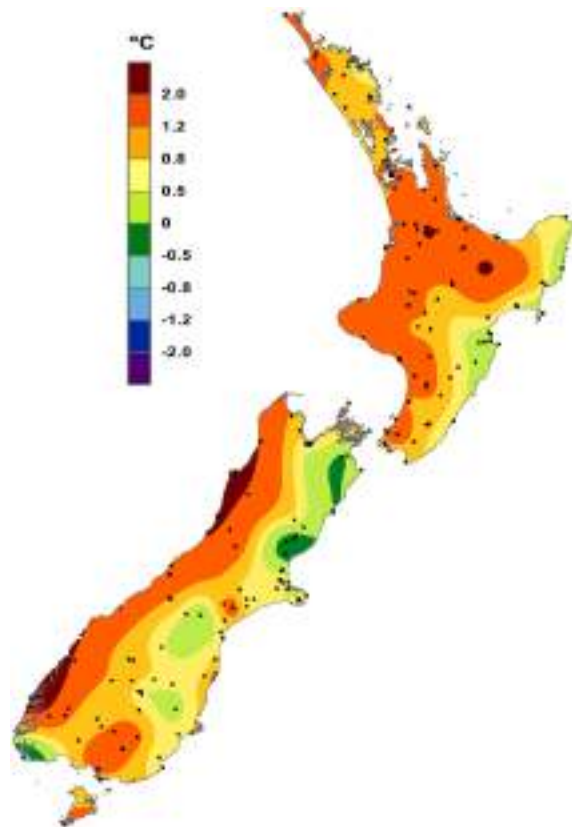
**For further information, please contact:**

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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.

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

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