

## A soggy and exceptionally warm November

<b>Rainfall</b>	Rainfall was above normal (120-149% of normal) or well above normal (>149% of normal) for the majority of the North Island and South Island. Near normal rainfall (80-119% of normal) was observed in patches about Cape Egmont, the Māhia Peninsula, south of Cape Kidnappers, eastern Wellington, the northern Canterbury Bight, parts of coastal Southland and parts of Otago. Rainfall was below normal (50-79% of normal) or well below normal (<50% of normal) in Fiordland and eastern Otago.
<b>Temperature</b>	It was the warmest November on record for Aotearoa New Zealand. Temperatures were above average (0.51°C to 1.20°C above average) or well above average (>1.20° above average) for the majority of Aotearoa New Zealand.
<b>Soil Moisture</b>	At the end of November, soil moisture levels were well above normal for much of the North Island, as well as parts of Marlborough, Tasman, Canterbury and Southland. Small patches of below normal soil moisture levels were observed in eastern Wellington, near Dunedin and parts of Rakiura/Stewart Island. Elsewhere, near normal soil moisture levels were observed.

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### Overview

November 2022 was characterised by lower-than-normal mean sea level pressure (MSLP) over Aotearoa New Zealand, with a strong area of higher-than-normal MSLP to the east. This pressure setup resulted in northerly air flows being more common than normal, drawing warm and moist air from the sub-tropics and tropics across the country. Sea surface temperatures near New Zealand were also exceptionally warm; 1.1-1.7°C above average. These factors, combined with an active sub-tropical jet stream, led to an increase in the frequency and intensity of low pressure systems, heavy rainfall events and thunderstorm outbreaks.

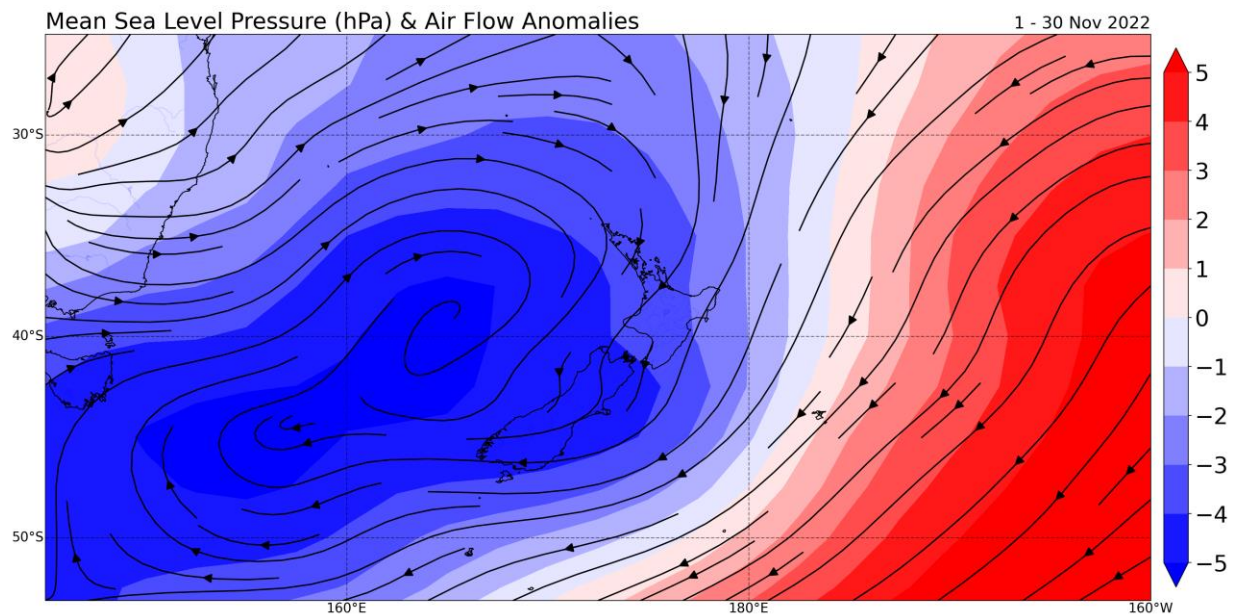


Figure 1: Mean sea level pressure anomalies (coloured) and air flow anomalies (streamlines) during November (data: NCEP).

The observed MSLP patterns for the month were associated with a continuation of a moderate La Niña event and a positive Southern Annular Mode (SAM). The SAM is a proxy for the location of a belt of westerly winds that encircle the Southern Ocean and occasionally protrude into the mid-latitudes. Additionally, in the Indian Ocean, a see-saw of anomalous sea surface temperatures called the Indian Ocean Dipole (IOD) began to wane, but still had an impact on New Zealand’s weather.

These weather patterns led to a wet month with several landfalling atmospheric rivers and bouts of thunderstorms, causing widespread saturated soils across the North Island and parts of the South Island. Rainfall was above normal (120-149% of normal) or well above normal (>149% of normal) nearly everywhere, but there were areas of near normal rainfall (80-119% of normal) observed in patches about Cape Egmont, the Māhia Peninsula, south of Cape Kidnappers, eastern Wellington, the northern Canterbury Bight, parts of coastal Southland, and parts of Otago. Meanwhile, rainfall was below normal (50-79% of normal) or well below normal (<50% of normal) in Fiordland and eastern Otago.

November 2022 was +1.8°C above the 1981-2010 average from NIWA’s seven station temperature series, making November 2022 the warmest November on record, surpassing the record set just last year. The top three warmest Novembers on record have all occurred since 2019.

Note that due to data collection issues, there are less stations than normal in this summary. This does not affect the results of the seven station series.

#### Further Highlights:

- The highest November temperature was 30.2°C, observed at Hanmer Forest on 15 November.
- The lowest November temperature was -1.8°C, observed at Waipara North on 11 November.
- The highest 1-day rainfall was 146 mm, recorded at Mt Cook Airport on 2 November.
- The highest wind gust was 167 km/h, observed at South West Cape on 2 November.
- Of the six main centres in November 2022, Auckland was the warmest, Dunedin was the coolest and driest, Hamilton was the wettest and least sunny, and Wellington was the sunniest.

- Of the available, regularly reporting sunshine observation sites, the sunniest four regions in 2022 so far are Taranaki (2388 hours), Bay of Plenty (2335 hours), Wider Nelson (2325 hours), and the interior of Canterbury (2251 hours).

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## Rainfall: Soggy and thundery

It was a wet November overall, fuelled by warm oceans surrounding New Zealand and frequent low pressure systems. Several landfalling atmospheric rivers and thunderstorm outbreaks, particularly during the second half of the month, led to bursts of heavy rainfall.

The western South Island and North Island were the most affected by these features; 23 of the 24 record or near-record November rainfall totals were in the North Island. Additionally, parts of the upper North Island received in excess of 300% of their monthly normal, including at Taupō, Whangārei, and Dargaville.

### Record<sup>1</sup> or near-record November rainfall totals were recorded at:

Location	Rainfall total (mm)	Percentage of normal	Year records began	Comments
<b>High records or near-records</b>				
Whangārei	367	482	1937	Highest
Taupō	213	314	1949	Highest
Whitianga	286	276	1961	Highest
Warkworth	253	275	1966	Highest
Paraparaumu	205	257	1945	Highest
Lower Retaruke	302	232	1966	Highest
Mt Ruapehu	425	180	2000	Highest
Russell	242	273	1919	2nd-highest
Motu	450	258	1920	2nd-highest
Hamilton (Ruakura)	208	251	1905	2nd-highest
Te Kuiti	281	241	1950	2nd-highest
Taumarunui	293	233	1913	2nd-highest
Waipara West	122	204	1973	2nd-highest
Waiouru	149	190	1950	2nd-highest
Dargaville	172	318	1943	3rd-highest
Leigh	180	263	1966	3rd-highest
Hamilton	202	226	1935	3rd-highest
Tūrangi	249	199	1968	3rd-highest
Whakatāne	206	272	1952	4th-highest
Auckland (Albany)	201	250	1966	4th-highest
Auckland (Whenuapai)	190	235	1943	4th-highest
Kerikeri	268	235	1935	4th-highest
Whanganui	165	225	1890	4th-highest
Greymouth	355	180	1947	4th-highest
Waiouru	135	172	1950	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.

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## Temperature: The warmest November on record

November was the warmest November on record, finishing +1.8°C above average. This surpasses the record set just last year. The top three warmest Novembers on record have all occurred since 2019.

Marine heatwave conditions and a persistent northerly air flow were responsible for the sustained warmth. This allowed both daytime and night-time temperatures to remain much warmer than average.

Despite a cold outbreak late in the month, more than 65 locations had record or near-record mean temperatures for November. Some of these records have over 100 years of continuous data; Christchurch has records back to 1863, Levin 1895, Gisborne 1905, Napier 1870, and Ranfurly 1897.

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

Location	Mean air temp. (°C)	Departure from normal (°C)	Year records began	Comments
High records or near-records				
Gisborne	18.4	2.8	1905	Highest
Martinborough	16.6	2.6	1986	Highest
Christchurch (Botanic Gardens)	16.3	2.5	1863	Highest
Dannevirke	16.1	2.5	1951	Highest
Palmerston North	16.7	2.5	1928	Highest
Levin	16.4	2.4	1895	Highest
Upper Hutt (Trentham)	15.7	2.3	1939	Highest
Paraparaumu	16.1	2.2	1953	Highest
Hāwera	15.2	2.1	1977	Highest
New Plymouth	16.3	2.1	1944	Highest
Puysegur Point	13.2	2.1	1978	Highest
Wellington (Kelburn)	15.5	2.1	1928	Highest
Secretary Island	13.9	2.0	1985	Highest
Wellington (Airport)	16.5	2.0	1962	Highest
Porirua (Elsdon Park)	16.0	1.9	1968	Highest
Okarito	14.5	1.8	1982	Highest
South West Cape	12.4	1.8	1991	Highest
Brothers Island	15.2	1.4	1997	Highest
Napier	18.6	2.9	1870	2nd-highest
Franz Josef	14.0	2.4	1953	2nd-highest
Leigh	18.4	2.2	1966	2nd-highest
Stratford	14.6	2.1	1960	2nd-highest
Waipawa	16.3	2.1	1945	2nd-highest
Kaikōura	15.3	2.0	1963	2nd-highest
Oamaru	14.3	2.0	1967	2nd-highest
Akaroa	15.9	1.9	1978	2nd-highest
Whakatāne	17.5	1.9	1974	2nd-highest
Whanganui	16.8	1.9	1937	2nd-highest
Greymouth	14.8	1.8	1947	2nd-highest

Ngawi	17.2	1.8	1972	2nd-highest
Haast	13.5	1.6	1949	2nd-highest
Le Bons Bay	13.5	1.5	1984	2nd-highest
Tiwai Point	13.3	1.5	1970	2nd-highest
Windsor	13.7	1.4	2000	2nd-highest
Whangaparāoa	17.4	1.3	1982	2nd-highest
Mokohinau	17.5	1.1	1994	2nd-highest
Wairoa (North Clyde)	18.2	2.5	1964	3rd-highest
Masterton	16.3	2.4	1906	3rd-highest
Hanmer Forest	14.4	2.3	1906	3rd-highest
Rangiora	15.3	2.2	1965	3rd-highest
Hamilton (Ruakura)	16.7	1.8	1906	3rd-highest
Whatawhata	16.5	1.8	1952	3rd-highest
Auckland (Western Springs)	17.7	1.7	1948	3rd-highest
Kerikeri	17.5	1.7	1945	3rd-highest
Middlemarch	13.7	1.6	2000	3rd-highest
Paeroa	17.4	1.6	1947	3rd-highest
Auckland (Whenuapai)	16.8	1.4	1945	3rd-highest
Hastings	17.6	3.1	1965	4th-highest
Waiouru	12.5	2.3	1962	4th-highest
Port Taharoa	17.4	1.9	1973	4th-highest
Te Puke	16.8	1.9	1973	4th-highest
Blenheim	16.5	1.8	1932	4th-highest
Ranfurly	13.0	1.7	1897	4th-highest
Stewart Island	12.6	1.7	1975	4th-highest
Te Anau	13.0	1.7	1963	4th-highest
Waikeria	16.6	1.7	1957	4th-highest
Whangārei	18.1	1.6	1967	4th-highest
Auckland (Airport)	17.7	1.5	1959	4th-highest
Orari Estate	14.2	1.4	1972	4th-highest
Cape Reinga	16.9	1.3	1951	4th-highest
Nugget Point	12.3	1.1	1970	4th-highest
<b>Low records or near-records</b>				
None observed				

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

Location	Mean maximum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
<b>High records or near-records</b>				
Palmerston North	21.2	2.9	1928	Highest
Paraparaumu	19.7	2.2	1953	Highest
Whanganui	21.0	2.2	1937	Highest
South West Cape	15.5	1.9	1991	Highest
Wellington (Airport)	19.4	1.9	1962	Highest
Brothers Island	17.2	1.2	1997	Highest
Wairoa	24.1	3.2	1964	2nd-highest
Waipawa	22.8	3.1	1945	2nd-highest
Levin	20.6	2.6	1895	2nd-highest



Oamaru	19.2	2.4	1967	2nd-highest
Stratford	19.4	2.4	1960	2nd-highest
Greymouth	18.8	2.3	1947	2nd-highest
Puysegur Point	15.7	2.1	1978	2nd-highest
Wellington (Kelburn)	18.6	2.1	1928	2nd-highest
Ngawi	20.7	1.8	1972	2nd-highest
Porirua	19.3	1.7	1968	2nd-highest
Ōkārīto	18.3	1.4	1982	2nd-highest
Farewell Spit	21.5	3.1	1971	3rd-highest
Hanmer Forest	22.0	3.1	1906	3rd-highest
Hāwera	18.9	2.2	1977	3rd-highest
Secretary Island	17.1	2.1	1985	3rd-highest
Tiwai Point	16.8	1.6	1970	3rd-highest
Motueka	21.3	1.5	1956	3rd-highest
Takapau Plains	20.0	1.5	1962	3rd-highest
Franz Josef	18.5	2.9	1953	4th-highest
Dannevirke	20.6	2.4	1951	4th-highest
Upper Hutt (Trentham)	20.0	2.2	1939	3rd-highest
Martinborough	21.5	2.2	1986	4th-highest
Whatawhata	21.0	2.0	1952	4th-highest
Auckland (Airport)	21.4	1.9	1959	4th-highest
Dunedin (Airport)	19.6	1.8	1962	4th-highest
Appleby	20.5	1.5	1932	4th-highest
<b>Low records or near-records</b>				
None observed				

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

Location	Mean minimum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
<b>High records or near-records</b>				
Napier	14.4	3.7	1870	Highest
Christchurch Botanic Garden	11.7	3.3	1863	Highest
Martinborough	11.8	3.1	1986	Highest
Masterton	10.9	3.1	1906	Highest
Taupō	10.8	2.9	1949	Highest
Rangiora	10.3	2.8	1965	Highest
Whakatāne	13.5	2.8	1974	Highest
Dannevirke	11.6	2.6	1951	Highest
Port Taharoa	14.6	2.6	1973	Highest
Te Anau	8.3	2.6	1963	Highest
Mt Ruapehu	5.8	2.4	2000	Highest
Hicks Bay	14.5	2.3	1969	Highest
New Plymouth	12.9	2.3	1944	Highest
Palmerston North	12.3	2.3	1928	Highest
Akaroa	10.9	2.2	1978	Highest
Paraparaumu	12.5	2.2	1953	Highest
Wellington (Airport)	13.5	2.1	1962	Highest
Kaikōura	11.7	2.0	1963	Highest

Le Bons Bay	10.4	2.0	1984	Highest
Ōkārito	10.6	2.0	1982	Highest
Wellington (Kelburn)	12.3	2.0	1928	Highest
Windsor	8.5	2.0	2000	Highest
Campbell Island	6.4	1.9	1991	Highest
Franz Josef	9.5	1.9	1953	Highest
Timaru	10.3	1.9	1885	Highest
Whitianga	13.2	1.9	1962	Highest
Auckland (Western Springs)	13.8	1.7	1948	Highest
Nugget Point	9.1	1.6	1970	Highest
Brothers Island	13.2	1.5	1997	Highest
Oamaru	9.6	1.5	1967	Highest
Roxburgh	9.3	3.1	1950	2nd-highest
Te Puke	12.6	2.7	1973	2nd-highest
Waimate	9.9	2.7	1908	2nd-highest
Waiouru	7.8	2.7	1962	2nd-highest
Gisborne	13.0	2.6	1905	2nd-highest
Lincoln	10.7	2.6	1881	2nd-highest
Upper Hutt (Trentham)	11.5	2.6	1939	2nd-highest
Blenheim	11.7	2.3	1932	2nd-highest
Porirua	12.8	2.3	1968	2nd-highest
Levin	12.2	2.1	1895	2nd-highest
Puysegur Point	10.7	2.1	1978	2nd-highest
Milford Sound	9.6	2.0	1934	2nd-highest
Paeroa	12.8	2.0	1947	2nd-highest
Hāwera	11.4	1.9	1977	2nd-highest
Ngawi	13.8	1.9	1972	2nd-highest
Orari Estate	8.9	1.9	1972	2nd-highest
Secretary Island	10.7	1.9	1985	2nd-highest
Whangārei	14.2	1.9	1967	2nd-highest
Dunedin (Musselburgh)	10.2	1.6	1947	2nd-highest
Mokohinau	15.8	1.6	1994	2nd-highest
Dargaville	13.6	1.5	1943	2nd-highest
Winchmore	8.7	1.4	1949	2nd-highest
Kaitaia	14.3	2.3	1948	3rd-highest
Alexandra	9.2	2.2	1929	3rd-highest
Kerikeri	13.2	2.2	1945	3rd-highest
Ranfurlly	6.8	2.2	1897	3rd-highest
Tauranga	13.8	2.1	1913	3rd-highest
Kaikohe	13.0	1.7	1973	3rd-highest
Waipara West	9.8	1.7	1973	3rd-highest
Cape Reinga	14.3	1.6	1951	3rd-highest
South West Cape	9.2	1.6	1991	3rd-highest
Stewart Island	8.7	1.6	1975	3rd-highest
Auckland (Whenuapai)	12.7	1.5	1945	3rd-highest
Middlemarch	7.0	1.4	2000	3rd-highest
Hastings	12.2	3.1	1965	4th-highest
Culverden	9.7	2.6	1928	4th-highest



Takapau Plains	10.2	2.3	1962	4th-highest
Lower Retaruke	10.4	2.2	1966	4th-highest
Hamilton (Ruakura)	11.7	1.8	1906	4th-highest
Haast	9.8	1.6	1949	4th-highest
Tiwai Point	9.8	1.4	1970	4th-highest
Low records or near-records				
None observed				

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## November climate in the six main centres

November temperatures were well above average for all six main centres. Additionally, all centres except for Dunedin observed an exceptionally wet November, while Dunedin observed well below normal rainfall. Of the six main centres in November 2022, Auckland was the warmest, Dunedin was the coolest and driest, Hamilton was the wettest and least sunny, and Wellington was the sunniest.

### November 2022 main centre climate statistics:

Temperature			
Location	Mean temp. (°C)	Departure from normal (°C)	Comments
Auckland <sup>a</sup>	17.7	+1.5	Well above average
Tauranga <sup>b</sup>	17.4	+1.5	Well above average
Hamilton <sup>c</sup>	16.5	+1.5	Well above average
Wellington <sup>d</sup>	15.5	+2.1	Well above average
Christchurch <sup>e</sup>	15.2	+1.7	Well above average
Dunedin <sup>f</sup>	13.7	+1.3	Well above average
Rainfall			
Location	Rainfall (mm)	% of normal	Comments
Auckland <sup>a</sup>	165	231	Well above normal
Tauranga <sup>b</sup>	182	245	Well above normal
Hamilton <sup>c</sup>	202	226	Well above normal
Wellington <sup>d</sup>	145	148	Well above normal
Christchurch <sup>e</sup>	120	259	Well above normal
Dunedin <sup>f</sup>	27	48	Well below normal
Sunshine			
Location	Sunshine (hours)		
Auckland <sup>h</sup>	172		
Tauranga <sup>b</sup>	197		
Hamilton <sup>g</sup>	180		
Wellington <sup>d</sup>	230		
Christchurch <sup>e</sup>	224		
Dunedin <sup>f</sup>	207		

<sup>a</sup> Airport <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 <sup>h</sup> Mangere

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## Highlights and extreme events

### Rain and slips

The highest 1-day rainfall was 146 mm, recorded at Mt Cook Airport on 2 November.

On 3-4 November, a burst of heavy rainfall caused by an atmospheric river hit the western South Island. Ivory Glacier, Mt Philistine, Mueller Hut, and Arthur's Pass all recorded over 300 mm of rainfall within two days. Conditions were severe enough for MetService to monitor for the possibility of issuing a red warning, their highest level of warning. Due to the intense rainfall, a slip closed SH73 and flooding affected roads across the West Coast including the SH6 near Haast.

On 11 November, a low pressure system from the sub-tropics generated exceptionally heavy rainfall rates for parts of the North Island. Coromandel Peninsula residents were advised to stay home and avoid driving anywhere as torrential rain battered the area. Flooding closed some roads around the Coromandel and Northland region. Around Tairāwhiti, heavy rain caused slips and flooding, with water levels at Hikuwai River bridge exceeding flood alert thresholds. Parts of SH35 were closed due to flooding. In Northland, hourly rainfall amounts exceeded 30-40 mm, causing flooding to affect some surface roads. Some schools and waste and recycling facilities were closed due to the conditions in Whangārei.

On 19 November, low pressure brought heavy rain to Canterbury. Kaikōura recorded 20.6 mm in an hour and Christchurch recorded 46.2 mm of rainfall within 12 hours.

Other notable rainfall was associated with thunderstorms, see the section below entitled "Lightning and hail" for more details.

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

Location	Extreme 1-day rainfall (mm)	Date of extreme rainfall	Year records began	Comments
Whangārei	145	10th	1943	2nd-highest
Whanganui	54	22nd	1937	2nd-highest
Christchurch Botanic Gardens	52	18th	1873	2nd-highest
Cape Reinga	48	7th	1919	2nd-highest
Mokohinau	48	8th	1994	2nd-highest
Westport	95	2nd	1928	3rd-highest
Mt Ruapehu	71	22nd	2000	3rd-highest
Hamilton	67	22nd	1935	3rd-highest
Takapau Plains	63	17th	1962	3rd-highest
Masterton	62	17th	1926	3rd-highest
Waimate	45	19th	1898	3rd-highest
Oamaru	41	19th	1950	3rd-highest
Waipara West	38	18th	1973	3rd-highest
Motu	105	22nd	1920	4th-highest
Greymouth	100	2nd	1947	4th-highest
Westport	91	2nd	1928	4th-highest
Tūrangi	69	22nd	1968	4th-highest
Warkworth	63	10th	1967	4th-highest
Kaikohe	54	22nd	1956	4th-highest
Whanganui	46	22nd	1937	4th-highest

## Temperatures

The highest November temperature was 30.2°C, observed at Hanmer Forest on 15 November.

The lowest November temperature was -1.8°C, observed at Waipara North on 11 November.

From 1-3 November, warm, humid air and foehn winds drove up temperatures in the eastern South Island and North Island leading to three consecutive days of well-above average temperatures.

Temperatures peaked on 2 November where they exceeded 29°C in Christchurch, Hastings, Napier and Wairoa. Waipawa reach 29.5°C, their equal hottest November day on record.

On 15 November, the first 30°C of the season was recorded at Hanmer Forest, reaching 30.2°C. Stratford in the North Island reached 24.8°C, their equal hottest November day on record.

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

Location	Extreme maximum (°C)	Date of extreme temperature	Year records began	Comments
<b>High records or near-records</b>				
Stratford	24.8	15 <sup>th</sup>	1960	Equal highest
Waipawa	29.5	2 <sup>nd</sup>	1945	Equal highest
Puysegur Point	22.3	15 <sup>th</sup>	1978	2 <sup>nd</sup> -highest
Ōkārito	22.4	18 <sup>th</sup>	1982	Equal 2 <sup>nd</sup> -highest
Greymouth	25.1	18 <sup>th</sup>	1947	Equal 3 <sup>rd</sup> -highest
Dargaville	26.1	11 <sup>th</sup>	1943	4 <sup>th</sup> -highest
Hanmer Forest	30.2	15 <sup>th</sup>	1906	4 <sup>th</sup> -highest
Hokitika	25.2	10 <sup>th</sup>	1866	4 <sup>th</sup> -highest
Levin	26.1	18 <sup>th</sup>	1895	4 <sup>th</sup> -highest
Porirua	23.9	18 <sup>th</sup>	1968	4 <sup>th</sup> -highest
Secretary Island	23.2	18 <sup>th</sup>	1985	4 <sup>th</sup> -highest
South West Cape	22.0	14 <sup>th</sup>	1991	4 <sup>th</sup> -highest
Motu	25.5	1 <sup>st</sup>	1990	Equal 4 <sup>th</sup> -highest
<b>Low records or near-records</b>				
None observed				

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

Location	Extreme minimum (°C)	Date of extreme temperature	Year records began	Comments
<b>High records or near-records</b>				
Christchurch Botanic Gardens	23.4	5 <sup>th</sup>	1863	Highest
Motu	15.9	3 <sup>rd</sup>	1990	Highest
Puysegur Point	16.4	16 <sup>th</sup>	1978	Highest
South West Cape	14.7	16 <sup>th</sup>	1991	Highest
Brothers Island	15.0	16 <sup>th</sup>	1997	Equal 2 <sup>nd</sup> -highest
Mokohinau	17.8	18 <sup>th</sup>	1994	Equal 2 <sup>nd</sup> -highest
Nugget Point	13.2	16 <sup>th</sup>	1972	Equal 2 <sup>nd</sup> -highest
Secretary Island	14.6	15 <sup>th</sup>	1988	Equal 2 <sup>nd</sup> -highest

Hicks Bay	17.1	19 <sup>th</sup>	1972	Equal 4 <sup>th</sup> -highest
Low records or near-records				
None observed				

## Wind

The highest wind gust was 167 km/h, observed at Southwest Cape on 2 November.

The atmospheric river of 3-4 November that brought flooding to parts of the West Coast was also associated with widespread powerful winds. Gusts exceeded 100 km/h in Wellington, including at Wellington Airport, Baring Head, and Kelburn. Gusts reached as high as 72 km/h in the Upper Hutt at Trentham, while over the Remutaka Range, Martinborough reached 94 km/h. Meanwhile in the South Island, gusts reached as high as 94 km/h in Kaikoura, 91 km/h at Invercargill, 81 km/h at Bromley, 81 km/h at Lauder and 75 km/h at Nelson. The winds also fanned a fire near Tekapo, blowing smoke over the Canterbury region.

A low pressure system from the sub-tropics and a strong high pressure ridge to the south generated a sustained period of powerful southeasterly winds on 10-11 November. Around 2000 homes lost power in the Coromandel, and lane reductions were actioned on Auckland's Harbour Bridge. Additionally, boats came off their moorings in Auckland due to the large waves generated from the powerful winds. Whangaparāoa recorded gusts of 109 km/h, Paeroa 95 km/h, Leigh 81 km/h, Whangārei 77 km/h and Taupō 78 km/h.

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

Location	Extreme wind gust (km/h)	Date of extreme gust	Year records began	Comments
Oamaru	98	2 <sup>nd</sup>	1984	Highest
Te Puke	65	30 <sup>th</sup>	1987	Highest
Mokohinau	122	11 <sup>th</sup>	1994	2 <sup>nd</sup> -highest
Paeroa	95	11 <sup>th</sup>	1991	2 <sup>nd</sup> -highest
Secretary Island	146	2 <sup>nd</sup>	1994	2 <sup>nd</sup> -highest
Mt Cook Airport	141	1 <sup>st</sup>	2000	3 <sup>rd</sup> -highest
Mt Ruapehu	100	10 <sup>th</sup>	2000	3 <sup>rd</sup> -highest
Reefton	57	2 <sup>nd</sup>	1999	3 <sup>rd</sup> -highest
Waiouru	106	3 <sup>rd</sup>	1970	3 <sup>rd</sup> -highest
South West Cape	167	2 <sup>nd</sup>	1991	4 <sup>th</sup> -highest

## Lightning and hail

November had frequent thunderstorm outbreaks. Over 35,000 lightning strikes were observed over the month.

During 3-4 November, embedded thunderstorms in the heavy rainfall hit the South Island, mostly about the ranges, but with the occasional strike in Southland. 420 strikes were observed.

On 12 November, scattered thunderstorms formed over the North Island, affecting areas like Dannevirke, Pahiatua, Wellington, Manawatū and Taupō. Isolated thunderstorms also formed in the Canterbury. Over 5,700 lightning strikes were observed over New Zealand.

From 16-21 November, warm and humid air was drawn over New Zealand. A slow-moving upper cold pool then generated widespread instability, resulting in several days of thunderstorms for the North Island. From Thursday morning to Saturday afternoon, over 5,000 lightning strikes were recorded across New Zealand. Thunderstorms also brought heavy downpours, with Manakau Heads recording 24 mm in an hour, Mt Ruapehu recording 19.2 mm in an hour, and Tauranga recording 20.2 mm in an hour. A waterspout was seen off the North Shore of Auckland, associated with a severe thunderstorm on 20 November.

From 22-23 November, the polar jet and sub-tropical jet combined to produce widespread thunderstorm activity in the North Island.

A band of organised thunderstorms hit the North Island on 30 November, stretching from Northland to the middle of the North Island. Auckland, Hamilton, and Tauranga were among those areas affected.

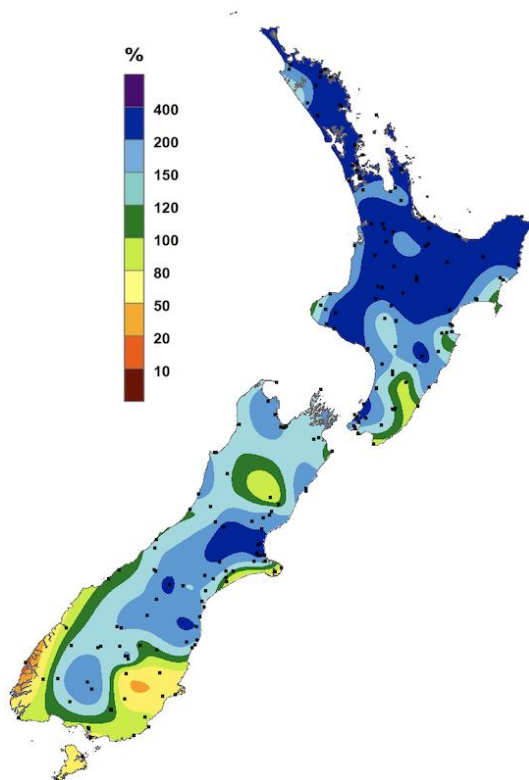
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**For further information, please contact:**

Tristan Meyers

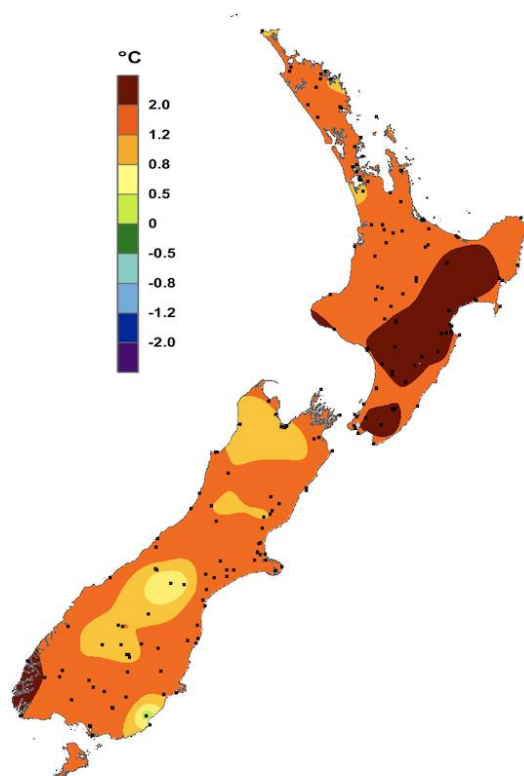
Analytical Meteorologist – NIWA Wellington

Tel. 04-386-0906



**November rainfall**

Expressed as a percentage of the 1981-2010 normal.



**November temperature**

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



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