

## A wet & warm spring in the North Island; near normal South

<b>Temperature</b>	Spring temperatures were generally above average (+0.51°C to +1.20°C of average) for a majority of the North Island, Nelson, parts of Tasman and Marlborough, far northern Canterbury, most of the West Coast, and Fiordland. Isolated pockets of well above average temperatures (>1.20°C of average) were observed in Northland and eastern Bay of Plenty. Near average temperatures ( $\pm 0.50^\circ\text{C}$ of average) occurred in western Waikato, coastal Gisborne, Wairarapa, along with most of Canterbury, Otago, and Southland. No areas experienced below average temperatures.
<b>Rainfall</b>	It was a very wet season in much of the North Island, with above normal (120-149% of normal) or well above normal (>149% of normal) rainfall observed in most regions, along with parts of central and southern Canterbury. Near normal rainfall (80-119% of normal) was observed in western Northland, parts of Manawatū-Whanganui and western Wellington, along with a majority of the South Island. Pockets of below normal rainfall (50-79% of normal) occurred in the interior upper South Island, Marlborough, Banks Peninsula, eastern Otago, and Southland.
<b>Soil moisture</b>	At the end of spring, soil moisture levels were above normal to well above normal across most of the North Island, northern Tasman, Marlborough Sounds, northern and central Canterbury, and parts of Southland. Soil moisture was near normal across most of the South Island. Slightly below normal soil moisture was observed in coastal Wairarapa and the Dunedin area.

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### Overview

Spring 2022 was characterised by higher than normal pressure east of Aotearoa New Zealand and lower than normal pressure over eastern Australia and the Coral Sea. This generally resulted in more northeasterly winds than normal, bringing moist air from the tropics and sub-tropics across New Zealand, resulting in periods of wet and warm weather.

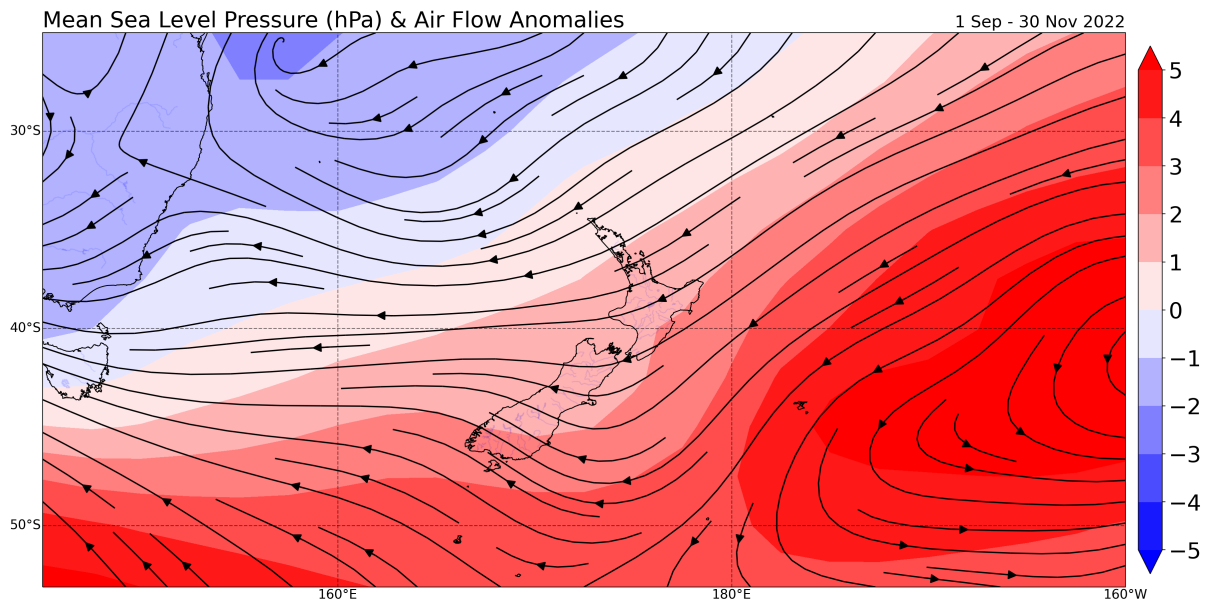


Figure 1: Mean sea level pressure anomalies (coloured) and air flow anomalies (streamlines) throughout spring (NOAA/NCEP)

Despite this general pattern, notable winter-like cold snaps were experienced in the early parts of both September and October. Snow flurries were reported in central Dunedin on 5 September, with snow and ice causing treacherous conditions about the hill suburbs of the city on 6 September. Farther north, snow fell to sea level at Christchurch with light accumulations of snow reported in parts of the city. An even more impactful springtime snow event occurred on 5-6 October as a series of cold fronts passed across the South Island, delivering snowfall to sea level for widespread parts of Southland, Otago and Canterbury. The heaviest snowfalls were reported across inland and northern parts of Southland, where approximately 25-30 cm of snow was recorded down to elevations of approximately 300 m above sea level. Snow settled to near sea level in Wellington and low elevations in Manawatū-Whanganui, with widespread snowfall reported in Taranaki. (See the *Highlights and extreme events* section below for more details.)

These early September and early October cold outbreaks saw numerous spring records and near-records set for both coldest daytime maximum temperature and coldest overnight minimum temperature.

After both September and October had near average nationwide temperature anomalies (based on NIWA's seven-station temperature series which begins in 1909), November was New Zealand's warmest November on record. With a temperature anomaly of 1.8°C above average, November propelled spring 2022 into a top-10 warmest ranking. Contrary to the cold records and near-records observed in September and October, November saw a plethora of warm daytime maximum and overnight minimum records and near-records.

November was particularly wet and warm across the country as multiple climate-drivers were active, including La Niña, the Madden-Julian Oscillation (a tropical pulse of rain and cloud that was active in the region), and the negative phase of the Indian Ocean Dipole, marked by warmer than average seas in the tropical eastern Indian Ocean near Sumatra and cooler seas in the west near Africa. This acted as another moisture source for New Zealand, with water vapour streaming across Australia into the Tasman Sea and Coral Sea at times. In addition, marine heatwave conditions remained in place for much of New Zealand's coastal waters, further enhancing the amount of water vapour available.

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

**Further highlights for spring 2022:**

- The highest temperature was 30.2°C, observed at Hanmer Forest on 15 November.
- The lowest temperature was -9.6°C, observed at Mount Cook Airport on 6 September.
- The highest 1-day rainfall was 168 mm, recorded at Lake Moeraki on 1 September.
- The highest wind gust was 176 km/h, observed at Cape Turnagain on 4 September.
- 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).
- Of the six main centres in spring 2022, Auckland was the warmest, Dunedin was the coolest and driest, Tauranga was the wettest, Christchurch was the sunniest, and Hamilton was the least sunny.

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## Temperature: Warm for much of the North Island and West Coast

The nationwide average temperature for spring 2022 was 12.9°C (0.8°C above the 1981-2010 average from NIWA's seven station temperature series which begins in 1909), making spring 2022 the 9<sup>th</sup>-warmest spring on record.

Several locations in the northern North Island observed their warmest springs on record: Leigh, Whakatane, and Port Taharoa. Notably, Levin, where records extend all the way back to 1895, observed its 2nd-warmest spring on record.

### Record<sup>1</sup> or near-record mean air temperatures for spring were recorded at:

Location	Mean air temp. (°C)	Departure from normal (°C)	Year records began	Comments
<b>High records or near-records</b>				
Leigh	16.6	1.7	1966	Highest
Whakatāne	15.0	1.3	1974	Highest
Port Taharoa	15.2	1.1	1973	Highest
Levin	13.7	1.2	1895	2nd-highest
Farewell Spit	15.2	2.0	1971	2nd-highest
Secretary Island	12.2	1.2	1985	2nd-highest
Puysegur Point	11.4	1.1	1978	2nd-highest
Kerikeri	15.4	1.0	1945	3rd-highest
Mokohinau	15.8	0.8	1994	3rd-highest
Whangaparāoa	15.5	0.9	1982	3rd-highest
Taupō	12.8	1.7	1949	3rd-highest
Hicks Bay	15.0	1.1	1969	3rd-highest
Porirua	13.1	0.5	1968	3rd-highest
Okarito	12.0	0.8	1982	3rd-highest
Kaitaia	15.7	1.2	1948	4th-highest
Whangārei	15.8	0.9	1967	4th-highest
Palmerston North	13.8	1.2	1928	4th-highest
Waiouru	9.6	1.3	1962	4th-highest
Greymouth	12.8	1.2	1947	4th-highest
Franz Josef	11.7	1.3	1953	4th-highest
<b>Low records or near-records</b>				
None observed				

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

Location	Mean maximum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
<b>High records or near-records</b>				
Greymouth	16.9	1.6	1947	Highest
Stratford	16.5	1.3	1960	2nd-highest
Farewell Spit	19.5	2.7	1971	2nd-highest
Secretary Island	15.4	1.5	1985	2nd-highest
Whangaparāoa	18.9	1.0	1982	3rd-highest
Paraparaumu	17.1	1.2	1953	3rd-highest
Levin	17.9	1.5	1895	3rd-highest
Ōkārīto	16.2	0.8	1982	3rd-highest
Franz Josef	16.4	1.8	1953	3rd-highest
Puysegur Point	13.8	1.1	1978	3rd-highest
Leigh	20.5	2.8	1966	4th-highest
Whakatāne	19.4	0.7	1974	4th-highest
Auckland (Airport)	19.2	1.3	1959	4th-highest
Whatawhata	18.6	1.3	1952	4th-highest
Te Kuiti	19.2	1.2	1959	4th-highest
Waipawa	19.2	1.7	1945	4th-highest
Palmerston North	18.1	1.4	1928	4th-highest
Porirua	16.5	0.4	1968	4th-highest
Tākaka	18.6	0.9	1978	4th-highest
Oamaru	16.5	1.3	1967	4th-highest
Manapouri (West Arm)	14.5	1.5	1971	4th-highest
<b>Low records or near-records</b>				
None observed				

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

Location	Mean minimum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
<b>High records or near-records</b>				
Mokohinau	14.1	1.0	1994	Highest
Whakatāne	10.7	1.8	1974	Highest
Port Taharoa	12.4	1.6	1973	Highest
Puysegur Point	8.9	1.2	1978	Highest
Kaitaia	12.2	1.5	1948	2nd-highest
Kerikeri	10.9	1.3	1945	2nd-highest
Hicks Bay	12.1	1.2	1969	2nd-highest
Mt Ruapehu (Chateau)	3.1	1.1	2000	3rd-highest
Secretary Island	9.0	1.0	1985	3rd-highest
Le Bons Bay	8.0	0.9	1984	3rd-highest
Te Puke	10.1	1.7	1973	4th-highest
Taupō	7.9	1.7	1949	4th-highest

Porirua	9.8	0.7	1968	4th-highest
Farewell Spit	11.0	1.4	1971	4th-highest
Rangiora	6.8	1.2	1965	4th-highest
Low records or near-records				
None observed				

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## Rainfall: Wet in the North Island; generally near normal in the South Island

Four locations, all in the northern half of the North Island, experienced their wettest spring on record and an additional nine locations experienced a near-record wet month. Only one location (Rakiura/Stewart Island) had a near-record dry spring.

It was the wettest spring on record for Hamilton Airport since records began there in 1935. Despite Tauranga receiving 245% of its normal spring rainfall, this did not place as a top-four wettest spring there.

### Record or near-record spring rainfall totals were recorded at:

Location	Rainfall total (mm)	Percentage of normal	Year records began	Comments
High records or near-records				
Te Puke	766	207	1973	Highest
Taupō	540	229	1949	Highest
Hamilton (Airport)	538	187	1935	Highest
Tūrangi	618	150	1968	Highest
Warkworth	521	157	1966	2nd-highest
Auckland (North Shore)	465	163	1966	2nd-highest
Motu	984	170	1920	2nd-highest
Hamilton (Ruakura)	493	185	1905	2nd-highest
Taumarunui	680	161	1913	3rd-highest
Lower Retaruke	648	149	1966	3rd-highest
Napier	365	208	1870	3rd-highest
Whangārei	621	230	1937	4th-highest
Whitianga	630	153	1961	4th-highest
Low records or near-records				
Stewart Island	246	61	1975	3rd-lowest

## Spring in the six main centres

Temperatures were above average in all North Island main centres, and near average in Christchurch and Dunedin. It was the wettest spring on record in Hamilton, with above normal or well above normal rainfall also observed in Auckland, Tauranga, and Christchurch. Dunedin was the only main centre to receive below normal spring rainfall. Of the six main centres in spring 2022, Auckland was the warmest, Dunedin was the coolest and driest, Tauranga was the wettest, Christchurch was the sunniest, and Hamilton was the least sunny.

### Spring 2022 main centre climate statistics:

Temperature			
Location	Mean temp. (°C)	Departure from normal (°C)	Comments
Auckland <sup>a</sup>	15.5	+0.9	Above average
Tauranga <sup>b</sup>	15.1	+0.9	Above average
Hamilton <sup>c</sup>	13.9	+0.9	Above average
Wellington <sup>d</sup>	12.8	+0.7	Above average
Christchurch <sup>e</sup>	11.9	+0.4	Near average
Dunedin <sup>f</sup>	11.3	+0.4	Near average
Rainfall			
Location	Rainfall (mm)	% of normal	Comments
Auckland <sup>a</sup>	367	149	Above normal
Tauranga <sup>b</sup>	564 <sup>2</sup>	245	Well above normal
Hamilton <sup>c</sup>	538	187	Well above normal (wettest on record)
Wellington <sup>d</sup>	347	111	Near normal
Christchurch <sup>e</sup>	183	135	Above normal
Dunedin <sup>f</sup>	120	72	Below normal
Sunshine			
Location <sup>3</sup>	Sunshine (hours)		
Auckland <sup>a</sup>	514		
Tauranga <sup>b</sup>	570 <sup>4</sup>		
Hamilton <sup>g</sup>	508 <sup>5</sup>		
Wellington <sup>d</sup>	580		
Christchurch <sup>e</sup>	637		
Dunedin <sup>f</sup>	606		

<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

<sup>2</sup> Missing one day of data.

<sup>3</sup> Tauranga, Wellington and Christchurch record sunshine use Campbell-Stokes manual sunshine recorders, whereas Auckland, Hamilton and Dunedin record sunshine with high-precision electronic sensors.

<sup>4</sup> Missing one day of data

<sup>5</sup> Missing two hours of data (10 a.m. – 12 p.m. 7 October 2022)

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## Highlights and extreme events

This section contains information pertaining to some of the more significant highlights and extreme events that occurred during spring 2022. Note that a more detailed list of significant weather events for spring 2022 can be found in the *Highlights and extreme events* section of NIWA's monthly Climate Summaries. These monthly summaries are available online, and may be viewed [here](#).

### Temperatures

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

The lowest temperature was -9.6°C, observed at Mount Cook Airport on 6 September.

From 5-7 September, a cold front delivered a pool of cold air over New Zealand, with low daily maximum and minimum temperatures observed in many regions of the country. Pukekohe recorded a daily maximum of 9.8°C on 5 September; its equal-lowest daily maximum temperature for September since records began in 1969. Mount Cook Airport recorded a daily minimum temperature of -9.6°C on 6 September; its lowest daily minimum temperature for September since records began in 1929.

From 4-5 October, the polar jet stream bucked northwards over New Zealand. This resulted in a strong high pressure system to south of Tasmania, driving a series of polar fronts over New Zealand during 5-7 October. The cold snap was particularly severe for the time of year, as the surface air mass experienced in New Zealand derived from the deep Southern Ocean and Antarctic continent. Numerous locations observed record or near-record low daily maximum and minimum temperatures during this period.

From 29-31 October, a warm and humid northerly air flow covered the country. Dozens of locations observed record or near-record high daily maximum and daily minimum temperatures. Perhaps most notably, Nelson recorded a daily minimum temperature of 15.8°C on 29 October, making it the city's highest daily minimum temperature for October since records began in 1862.

On 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 reached in excess of 29°C in Christchurch, Hastings, Napier and Wairoa.

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

Location	Extreme maximum (°C)	Date of extreme temperature	Year records began	Comments
High records or near-records				
Stratford	24.8	Nov-15th	1960	Equal highest
Greymouth	25.1	Nov-18th	1947	Equal highest
Secretary Island	23.2	Nov-18th	1985	2nd-highest
Puysegur Point	22.3	Nov-15th	1978	2nd-highest
South West Cape	22.0	Nov-14th	1991	3rd-highest
Ōkārito	22.4	Nov-18th	1982	Equal 3rd-highest
Dargaville	26.1	Nov-11th	1943	4th-highest
Porirua	23.9	Nov-18th	1968	4th-highest
Hanmer Forest	30.2	Nov-15th	1906	4th-highest
Cape Reinga	23.1	Nov-10th	1951	Equal 4th-highest

Levin	26.1	Nov-18th	1895	Equal 4th-highest
<b>Low records or near-records</b>				
Castlepoint	6.5	Oct-06th	1972	Lowest
Taihape	5.5	Oct-06th	1972	Lowest
Puysegur Point	6.4	Oct-05th	1978	Lowest
Pukekohe	9.8	Sep-05th	1969	Equal lowest
Ohakune	4.7	Oct-06th	1972	2nd-lowest
Le Bons Bay	5.1	Oct-06th	1984	2nd-lowest
Alexandra	7.2	Sep-05th	1992	2nd-lowest
Tapanui	2.5	Oct-05th	1900	2nd-lowest
Balclutha	4.9	Sep-05th	1972	2nd-lowest
South West Cape	5.4	Oct-05th	1991	2nd-lowest
Tautuku	4.5	Oct-05th	1976	Equal 2nd-lowest
Hamilton (Ruakura)	9.9	Sep-05th	1940	3rd-lowest
Port Taharoa	11.5	Sep-05th	1974	3rd-lowest
Five Rivers	4.5	Sep-05th	1982	3rd-lowest
Stewart Island	6.2	Oct-05th	1975	3rd-lowest
Nugget Point	3.7	Sep-05th	1972	3rd-lowest
Mt Ruapehu (Chateau)	1.6	Oct-06th	2000	Equal 3rd-lowest
Takapau Plains	6.3	Oct-06th	1972	4th-lowest
Māhia	9.4	Sep-06th	1990	4th-lowest
Te Anau	4.3	Oct-05th	1973	4th-lowest
Gore	3.0	Oct-05th	1907	4th-lowest
Taupō	7.9	Sep-05th	1950	Equal 4th-lowest

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

Location	Extreme minimum (°C)	Date of extreme temperature	Year records began	Comments
<b>Low records or near-records</b>				
Whitianga	-1.8	Oct-07th	1962	Lowest
Rotorua	-3.5	Oct-07th	1964	Lowest
Te Kuiti	-2.5	Oct-07th	1959	Lowest
Ōkārīto	-2.6	Oct-06th	1982	Lowest
Haast	-3.4	Oct-06th	1949	Lowest
Le Bons Bay	-1.3	Oct-06th	1984	Lowest
Manapouri	-7.3	Oct-06th	1963	Lowest
South West Cape	0.5	Oct-06th	1991	Lowest
Māhia	3.2	Sep-07th	1990	2nd-lowest
Greymouth	-1.8	Oct-06th	1947	2nd-lowest
Franz Josef	-2.1	Oct-06th	1953	2nd-lowest
Mt Cook (Airport)	-9.6	Sep-06th	1929	2nd-lowest
Akaroa	-2.3	Oct-06th	1978	2nd-lowest
Orari	-3.6	Sep-06th	1972	2nd-lowest
Taumarunui	-4.2	Oct-07th	1947	Equal 2nd-lowest
New Plymouth	-1.3	Oct-07th	1944	Equal 2nd-lowest
Waipawa	-3.2	Sep-07th	1945	Equal 2nd-lowest

Hamilton	-2.9	Oct-07th	1946	3rd-lowest
Hicks Bay	2.1	Oct-07th	1969	3rd-lowest
Westport	-0.6	Oct-06th	1937	3rd-lowest
Appleby	-3.1	Sep-07th	1932	3rd-lowest
Christchurch (Airport)	-4.7	Sep-07th	1863	3rd-lowest
Clyde	-6.2	Sep-06th	1978	3rd-lowest
Cheviot	-4.1	Sep-15th	1982	Equal 3rd-lowest
Matamata	-2.4	Oct-07th	1999	4th-lowest
Whakatu	-2.6	Sep-07th	1965	4th-lowest
Tākaka	-1.7	Sep-07th	1978	4th-lowest
Wānaka	-4.6	Sep-06th	1955	4th-lowest
Paeroa	-1.8	Oct-07th	1947	Equal 4th-lowest
Castlepoint	1.2	Oct-06th	1972	Equal 4th-lowest
Kaikōura	1.0	Oct-06th	1963	Equal 4th-lowest
<b>High records or near-records</b>				
Puysegur Point	16.4	Nov-16th	1978	Highest
Christchurch Botanic Garden	23.4	Nov-05th	1863	Highest
Stewart Island	14.5	Oct-29th	1975	Highest
South West Cape	14.7	Nov-16th	1991	Highest
Mokohinau	17.8	Nov-18th	1994	Equal highest
Brothers Island	15.0	Nov-16th	1997	2nd-highest
Whakatāne	17.9	Oct-30th	1975	Equal 2nd-highest
Secretary Island	14.6	Nov-15th	1988	Equal 2nd-highest
Porirua	15.7	Nov-21st	1972	3rd-highest
Ōkārito	14.6	Nov-19th	1983	3rd-highest
Port Taharoa	17.6	Nov-17th	1974	Equal 3rd-highest
Hicks Bay	17.1	Nov-19th	1972	Equal 3rd-highest
Franz Josef	13.8	Nov-19th	1953	Equal 3rd-highest
Nugget Point	13.2	Nov-16th	1972	Equal 3rd-highest
Tākaka	15.6	Oct-29th	1978	4th-highest
Farewell Spit	15.6	Nov-03rd	1972	4th-highest
Akaroa	18.0	Nov-03rd	1978	4th-highest

### Rain and slips

The highest 1-day rainfall was 168 mm, recorded at Lake Moeraki on 1 September.

From 1-3 October, approximately 20 slips were reported in Wellington city due to periods of steady rain.

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. Due to the intense rainfall, a slip closed SH73 and flooding affected roads across the West Coast including SH6 near Haast.

On 11 November, a low pressure system from the sub-tropic generated exceptionally heavy rainfall rates for parts of the North Island. Coromandel Peninsula residents were advised to stay home and avoid driving, as torrential rain and gusts of strong wind 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.

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

Location	Extreme 1-day rainfall (mm)	Date of extreme rainfall	Year records began	Comments
Marokopa	73	Oct-29th	1957	Highest
Whangārei	145	Nov-10th	1943	2nd-highest
Te Aroha	63	Sep-05th	1992	2nd-highest
Morrinsville	54	Oct-01st	1978	2nd-highest
Lower Retaruke	71	Oct-29th	1967	2nd-highest
Karapiro Heights	58	Oct-29th	2001	3rd-highest
Whanganui	54	Nov-22nd	1937	3rd-highest
Lake Moeraki	168	Sep-01st	1985	3rd-highest
Mamaranui	72	Oct-01st	1951	4th-highest
Mokohinau	48	Nov-08th	1994	4th-highest
Te Puke	98	Oct-01st	1973	4th-highest
Gladstone	56	Sep-10th	1953	4th-highest
Māhia	67	Sep-30th	1990	4th-highest
Ohakune	67	Oct-29th	1961	4th-highest

**Wind**

The highest wind gust was 176 km/h, observed at Cape Turnagain on 4 September.

On 4 September, strong winds toppled approximately 30 shipping containers at Bluff Port. There were also power outages caused by downed power lines for about 5000 customers in Bluff, Riverton and Ōtātara. At Queens Park golf course in Invercargill, 30 trees were brought down by the wind, whilst 11 flights into and out of Invercargill Airport were cancelled.

On 6 September, power lines were brought down by strong winds in Hāwera, cutting power to 135 households. In Morrinsville, 121 households were without power due to trees falling on power lines. Fallen trees also took out power lines on SH1 south of Kaitaia, with about 500 people without power in that area.

On 5 October, more than 1300 homes in Porirua were affected by a power outage. The cause of the outage was thought to be a tree or branch being blown down onto power lines. Vehicles travelling on SH2 from Kaitoke to Featherston (Remutaka Hill) were warned to take extra care due to strong winds. Interislander and Bluebridge ferry crossings between the North and South Islands were cancelled due to large southerly swells.

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. 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.

**Record or near record spring extreme wind gusts were recorded at:**

Location	Extreme wind gust (km/h)	Date of extreme gust	Year records began	Comments
Hāwera	96	Sep-06th	1986	Equal highest
Puysegur Point	169	Oct-10th	1986	Equal highest
Secretary Island	146	Nov-02nd	1994	3rd-highest
Mokohinau	122	Nov-11th	1994	Equal 3rd-highest
Mt Cook (Airport)	141	Nov-01st	2000	4th-highest
Paeroa	95	Nov-11th	1991	Equal 4th-highest

**Snow and ice**

On 5-6 September, a cold outbreak resulted in snow falling to low elevations for parts of New Zealand. Snow flurries were reported in central Dunedin on 5 September, with snow and ice causing treacherous conditions about the hill suburbs of the city on 6 September. Farther north, snow fell to sea level at Christchurch with light accumulations of snow reported in parts of the city. The snowfalls caused road closures in both the South and North Islands, including SH87 between Outram and Middlemarch, SH1 between Dunedin and Waitati, the Desert Road between Waiouru and Rangipō, and SH5 between Napier and Taupō.

On 13 September, cold southerlies delivered a light snowfall to parts of Southland, including Garston and Kingston.

Early on 5 October the first of several cold fronts passed over the South Island, delivering snowfall to near sea level in Southland, and to approximately 100 m above sea level in Canterbury during the morning. A second, much colder front passed over in the afternoon and evening, delivering snowfall to sea level for widespread parts of Southland, Otago and Canterbury. Overnight on 5 October through to the morning hours of 6 October, this second cold front passed over the North Island, delivering snow to low elevations about the lower North Island and Taranaki. The following list outlines some of the more notable observations of this snowfall event:

- Heaviest snowfalls were reported for inland and northern parts of Southland, where approximately 25-30 cm of snow was recorded down to elevations of approximately 300 m above sea level near Five Rivers and Garston. Snowfall was recorded at sea level along the southern coastline and in Rakiura/Stewart Island.
- Dunedin motorists were asked to stay at home due to treacherous roads, particularly in the hill suburbs, with snowfall blanketing the city down to the beaches at sea level.
- Snow settled to low elevations in Wellington and the Manawatū, including reports of snow on Saddle Road, Pahiatua Track and in Kimbolton.

- Widespread snowfalls were reported in Taranaki, including at Stratford, Pembroke, Cardiff, Ngaere and Eltham.
- Numerous road closures were caused by the snowfall, including SH93 from Clinton to Mataura, SH1 from Dunedin to Palmerston, SH85 from Kyeburn to Palmerston, SH87 from Kyeburn to Outram, SH8 from Roxburgh to Alexandra, SH8 from Omarama to Tarras (Lindis Pass), SH75 from Little River to Barrys Bay, SH73 from Arthur's Pass to Otira, and the Desert Road (SH1).

### **Lightning, hail, and tornadoes**

On 21 September, a thunderstorm struck parts of Hawke's Bay, with thunder, lightning and accumulations of hail reported, particularly about Hastings.

On 5 October, several lightning strikes were reported over inland parts of Southland at the same time as snowfall was occurring, a phenomenon known as thundersnow. Farther north, lightning and hail were reported in Christchurch, and later in Wellington, in association with the passage of a cold front.

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

On 12 November, scattered thunderstorms formed over the North Island, affecting areas like Dannevirke, Pahiatua, Wellington, Manawatū and Taupō. Isolated thunderstorms also formed in Canterbury. Over 5700 lightning strikes were observed over New Zealand.

From 16-21 November, humid and warm 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 observed off the North Shore of Auckland, associated with a severe thunderstorm on 20 November.

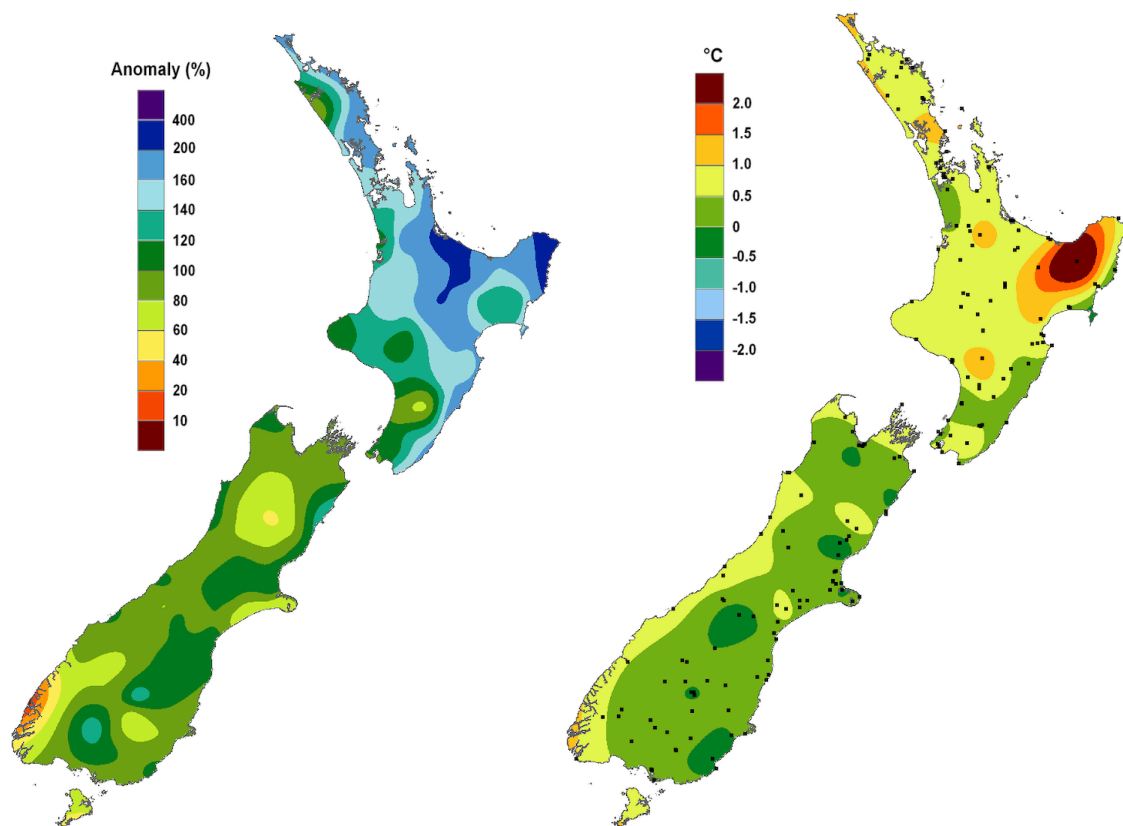
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**Spring rainfall**

Expressed as a percentage of the 1981-2010 normal.

**Spring temperature**

Expressed as a departure from the 1981-2010 average in degrees Celsius. *(note that the red bullseye in interior Gisborne is due to incorrect data from one station and not representative of actual observed temperatures.)*

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