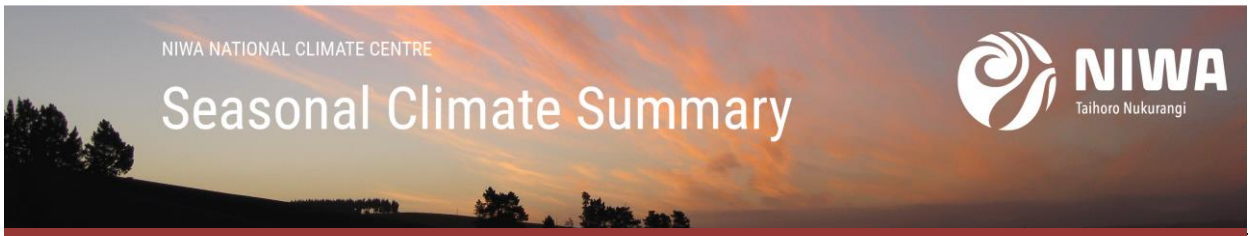

New Zealand Climate Summary: **Spring 2018** Issued: 4 December 2018

Spring 2018: a season of weather swings for New Zealand

Temperature	Temperatures were near average (-0.50°C to +0.50°C of the spring average) for much of the country. Pockets of below average temperatures (-0.51°C to -1.20°C of the spring average) were observed in coastal Canterbury. A few locations across the west of the South Island recorded above average temperatures (+0.51°C to +1.20°C of the spring average), as did a few isolated locations across interior Gisborne.
Rainfall	Well above normal rainfall (>149% of the spring normal) was observed in Otago and lower Canterbury, as well as across Hawke's Bay. Rainfall was generally above normal (120-149% of the spring normal) for the remainder of the east of both islands. Rainfall was below normal (50-79% of the spring normal) in parts of Auckland, Manawatu-Wanganui, Taranaki, Tasman, Nelson, Marlborough, and the northern West Coast.
Soil moisture	At the end of spring 2018, drier than normal soils were present in Manawatu-Wanganui, Tasman, Nelson, Marlborough, and in pockets along the West Coast. Soil moisture levels were above normal for the time of year in the east of both islands, as well as across the Coromandel Peninsula and parts of the Far North.

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

Overview

Early in the season, spring 2018 was defined by frequent high pressure systems, particularly over and to the southwest of New Zealand. This influenced more southeasterly wind flows than normal and led to below normal rainfall across interior and western parts of both islands during September and across much of the North Island and the western South Island during October. The tables were turned during November, with lower than normal sea level pressure over the Tasman Sea and higher than normal sea level pressure to the south of the country. This pressure 'squeeze' influenced several extreme rainfall events in eastern and inland parts of New Zealand, with century-old rainfall records being broken in some locations (see *Highlights and extreme events* section for further details).

The continuation of ENSO-neutral conditions (neither El Niño nor La Niña) contributed to the variable air flow patterns observed across New Zealand through the season. Warmer than average Tasman Sea surface temperatures may have been associated with the mild yet active November pattern.

Further Highlights:

- The highest temperature was 31.2°C, observed at Cheviot and Kaikoura on 8 November.
- The lowest temperature was -7.5°C, observed at Mt Cook Airport on 13 October.
- The highest 1-day rainfall was 326 mm, recorded at Arthur's Pass on 8 November.
- The highest wind gust was 169 km/h, observed at Cape Turnagain on 1 November.
- Of the six main centres in spring 2018, Auckland was the warmest and driest, Tauranga was the sunniest, Christchurch was the coolest, and Wellington was the wettest, and least sunny.

For further information, please contact:
Mr Ben Noll
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Temperature: Near average for most of the country

The nationwide average temperature for spring 2018 was 12.4°C (0.3°C warmer than the 1981-2010 spring average, using NIWA's seven-station temperature series which begins in 1909). Mean temperatures for New Zealand were near average during September, October, and November.

There were a limited number of locations that had record or near-record temperatures during spring. Rotorua observed its warmest spring on record in terms of mean maximum temperature since records began in 1964. Warkworth recorded its coldest spring on record in terms of mean minimum temperature since 1966, likely owing in part to below normal soil moisture. Lower water vapour than normal in the air allowed more longwave radiation to escape into space at night, producing a net cooling effect.

Record[1] or near-record mean air temperatures for spring were recorded at:

Location	Mean air temp. (°C)	Departure from normal (°C)	Year records began	Comments
High records or near-records				
South West Cape	10.5	0.8	1991	Highest
Puysegur Point	11.0	0.8	1978	4th-highest
Farewell Spit	14.1	0.9	1971	4th-highest
Low records or near-records				
None observed				

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

[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.

Location	Mean maximum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
High records or near-records				
Rotorua	17.7	1.5	1964	Highest
Whitianga	19.7	1.3	1962	2nd-highest
Taupo	18.1	2.1	1949	2nd-highest
Hamilton (Ruakura)	19.8	1.7	1906	2nd-highest
Te Kuiti	19.2	1.2	1959	2nd-highest
Turangi	17.6	1.2	1968	2nd-highest
Farewell Spit	17.6	0.8	1971	2nd-highest
Motu	16.3	1.6	1990	3rd-highest
Reefton	18.2	1.5	1960	3rd-highest
South West Cape	13.1	0.7	1991	3rd-highest
Whangaparaoa	18.4	0.6	1982	4th-highest
Low records or near-records				
Oamaru	14.4	-0.9	1967	3rd-lowest

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
High records or near-records				
South West Cape	7.9	0.9	1991	Highest
Low records or near-records				
Warkworth	8.0	-1.5	1966	Lowest
Taumarunui	5.7	-1.5	1947	2nd-lowest
Turangi	5.0	-1.3	1968	2nd-lowest
Kaikoura (Middle Creek)	5.7	-2.6	1963	2nd-lowest
Whangarei	8.9	-1.4	1967	4th-lowest

Rainfall: Record rainfall for parts of the South Island

Rainfall was well above normal (>149% of the spring normal) in Otago, where Oamaru, Middlemarch, Cromwell, and Lauder all observed their wettest spring on record. The 326 mm of rain that fell in Oamaru is 69% of the town's normal annual rainfall. In Middlemarch, the 305 mm that fell during the spring 2018 season is more rain than fell in the entire year in 2003 (when annual rainfall was 296 mm). On the contrary, several Auckland locations observed their driest spring on record, including Albany (North Shore) and Western Springs (Motat). Elsewhere, Turangi in the Central Plateau had its driest spring on record whilenearby Lake Taupo observed low inflows during the season.

At the end of spring 2018, drier than normal soils were present in Manawatu-Wanganui, Tasman, Nelson, Marlborough, and in pockets along the West Coast. Soil moisture levels were above normal for the time of year in the east of both islands, as well as across the Coromandel Peninsula and parts of the Far North.

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				
Takapau Plains	413	167	1962	Highest
Oamaru	326	310	1941	Highest
Middlemarch	305	248	1896	Highest
Lauder	216	220	1924	Highest
Gore	333	149	1907	Highest
Ranfurly	197	200	1897	2nd-highest
Ashburton	312	187	1909	3rd-highest
Tara Hills	235	202	1949	3rd-highest
Hastings	248	145	1965	4th-highest
Timaru	245	191	1881	4th-highest
Waipounamu	315	153	1917	4th-highest
Cromwell	170	196	1949	4th-highest
Low records or near-records				
Auckland (North Shore)	159	56	1966	Lowest
Auckland (Motat)	197	69	1948	Lowest
Turangi	179	43	1968	Lowest
Ohakune	161	39	1961	Lowest
Arapito	333	51	1978	Lowest
Lower Retaruke	238	55	1966	2nd-lowest
Stratford	330	60	1960	2nd-lowest
Reefton	258	48	1960	2nd-lowest
Takaka	247	45	1976	3rd-lowest
Westport	304	54	1944	3rd-lowest
Greymouth	399	63	1947	3rd-lowest

Spring climate in the six main centres

Temperatures were near average for all of the main centres during spring 2018. This was the first season since summer 2016-17 that no main centre observed above average temperatures. It turned out to be a very wet spring for Christchurch and Dunedin, whose rainfall totals were primarily driven by several extreme events during November. Of the six main centres in spring 2018, Auckland was the warmest and driest, Tauranga was the sunniest, Christchurch was the coolest, and Wellington was the wettest and least sunny.

Spring 2018 main centre climate statistics:

Temperature			
Location	**Mean temp. (°C)**	**Departure from normal (°C)**	**Comments**
Auckland[a]	14.6	0.0	Near average
Tauranga[b]	14.5	+0.4	Near average
Hamilton[c]	13.0	0.0	Near average
Wellington[d]	12.5	+0.4	Near average
Christchurch[e]	11.2	-0.2	Near average
Dunedin[f]	11.3	+0.3	Near average
Rainfall			
Location	**Rainfall (mm)**	**% of normal**	**Comments**
Auckland[a]	216	83%	Near normal
Tauranga[b]	225	91%	Near normal
Hamilton[c]	227	79%	Below normal
Wellington[d]	352	112%	Near normal
Christchurch[e]	218	160%	Well above normal
Dunedin[f]	261	157%	Well above normal
Sunshine			
Location	**Sunshine (hours)**		
Auckland[a]	563		
Tauranga[b]	673		
Hamilton[g]	570		
Wellington[d]	531		
Christchurch[e]	604[2]		
Dunedin[f]	571		

[a] *Mangere* [b] *Tauranga Airport* [c] *Hamilton Airport* [d] *Kelburn* [e] *Christchurch Airport* [f] *Musselburgh* [g] *Ruakura*
[2] *Missing 1 day*

Highlights and extreme events

This section contains information pertaining to some of the more significant highlights and extreme events that occurred during spring 2018. Note that a more detailed list of significant weather events for spring 2018 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 at the following website: http://www.niwa.co.nz/climate/summaries/monthly

Rain and slips

Beginning 3 September, a low pressure system lingering to the east of New Zealand delivered heavy rain to eastern and southeastern parts of the North Island for almost a week. Flooding and slips occurred in numerous locations between Wellington and Hawke's Bay. It was reported that the storm saw the loss of an estimated 100,000 spring lambs.

On 24 October, water restrictions were put into place in Masterton due to low spring rainfall. Residents were not allowed to use hand held hoses because the water supply from the Waingawa River was running low.

On 8 and 9 November, persistent heavy rain fell on many western and inland parts of the South Island. Heaviest falls were along the West Coast, where widespread surface flooding and slips were reported. There were several road closures because of flooding, including an extended stretch of SH6 from Hokitika to Haast. Westland Civil Defence opened a welfare centre in Harihari for locals and tourists that required support. Further inland, SH73 from Arthurs Pass to Jacksons was closed due to flooding, road washouts and slips. Widespread surface flooding was reported on roads throughout the South Canterbury District.

On 19 and 20 November, persistent rain fell over many southern and eastern parts of the South Island. Considerable flooding occurred on the Taieri Plains, where residents of Henley were advised to evacuate. The area was subsequently cut off from SH1 by floodwaters, and local farmers reported floodwaters up to 3 metres deep on their paddocks. Widespread surface flooding was reported in Dunedin, Mosgiel, Lawrence, Beaumont, Middlemarch and Weston. At Dunedin Airport, water was required to be pumped off the runway to enable flights to land. The Clutha River's flow peaked at approximately 2700 cumecs; which was reported as its highest level since November 1999.

On 26 November, heavy rain caused surface flooding in some northeastern parts of the South Island. Motorists were warned to take extra care on SH1 between Blenheim and Picton, and a number of rural roads in the Koromiko area were closed due to floodwaters. Farther north, parts of Wairarapa were also struck with prolonged heavy rain. Dalefield School in Carterton was closed after the Kaipatangata Stream burst its banks and blocked Dalefield Road. State highway 53 into Martinborough was closed at the Waihenga Bridge due to a flooded Ruamahanga River.

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
Tara Hills	70	Nov-08th	1949	Highest
Ranfurly	53	Nov-08th	1897	Highest
Oamaru	52	Nov-08th	1950	2nd-highest
Lauder	52	Nov-08th	1924	2nd-highest
Masterton	74	Nov-21st	1926	3rd-highest
Waiouru	48	Sep-04th	1950	3rd-highest
Clyde	41	Nov-08th	1978	3rd-highest
Flemington	72	Sep-04th	1958	4th-highest
Pongaroa	57	Sep-04th	1973	4th-highest
Ripia	105	Sep-04th	1967	4th-highest
Hastings	93	Sep-05th	1983	4th-highest

Timaru	63	Nov-08th	1881	4th-highest

Temperatures

On 19 September, Hanmer Forest in Canterbury recorded both New Zealand's coolest (-3.1°C) and warmest (22.5°C) temperature for the day. This occurred again on 14 November when Hanmer Forest's maximum temperature reached 26.5°C and its minimum temperature was 2.6°C.

On 24 October, unseasonable warmth peaked in the lee of the Southern Alps due to a foehn northwest flow. Several locations observed near-record warmth while the temperature at Hanmer Forest reached 28.6°C, its warmest October temperature on record.

On 8 November, warm northwesterly winds ahead of an approaching cold front delivered high temperatures to eastern parts of the country. The highest temperature for the day was observed in Cheviot and Kaikoura, which both reached 31.2°C in the afternoon. This was the first time 30°C was exceeded in New Zealand since 6 March 2018.

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				
Westport	25.7	Nov-25th	1937	Highest
Milford Sound	25.9	Nov-25th	1934	Equal highest
Greymouth	25.1	Nov-28th	1947	Highest
Haast	25.7	Nov-25th	1949	Highest
Milford Sound	25.9	Nov-25th	1934	Equal highest
Secretary Island	23.6	Nov-26th	1985	2nd-highest
Cheviot	31.2	Nov-08th	1982	2nd-highest
Winton	29.0	Oct-22nd	1951	2nd-highest
Hokitika	25.8	Nov-25th	1866	3rd-highest
Kaikoura (Middle Creek)	31.2	Nov-08th	1963	3rd-highest
Mokohinau	22.0	Nov-29th	1994	4th-highest
Mahia	26.0	Nov-08th	1990	4th-highest
Hokitika	25.7	Nov-25th	1866	4th-highest
Kaikoura	30.6	Nov-08th	1963	4th-highest
Auckland (Mangere)	25.6	Nov-29th	1959	Equal 4th-highest
Low records or near-records				
Wanaka	3.9	Sep-17th	1972	Equal lowest
Waipara West	5.6	Oct-12th	1973	Equal 2nd-lowest
Taihape	8.0	Sep-04th	1972	3rd-lowest
Mt Cook Airport	1.1	Oct-12th	1929	Equal 3rd-lowest
Five Rivers	5.0	Sep-17th	1982	Equal 3rd-lowest
Lumsden	5.2	Sep-17th	1982	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
Low records or near-records				
Turangi	-5.4	Sep-10th	1968	Lowest
Alexandra	-5.6	Sep-07th	1992	Lowest
Upper Hutt (Trentham)	-4.6	Oct-19th	1939	2nd-lowest
Mt Cook Airport	-7.5	Oct-13th	1929	2nd-lowest
Appleby	-3.0	Sep-08th	1932	3rd-lowest
Arapito	-0.8	Oct-13th	1978	4th-lowest
Boyle River Lodge	-5.4	Sep-09th	1983	4th-lowest
Timaru	-4.3	Sep-08th	1885	4th-lowest
Kaikoura (Middle Creek)	0.3	Sep-19th	1963	Equal 4th-lowest
High records or near-records				
Masterton	18.6	Nov-09th	1943	Highest
Martinborough	18.0	Nov-09th	1986	Highest
Arapito	16.4	Nov-26th	1978	Highest
Reefton	15.8	Nov-09th	1972	Highest
Westport	16.6	Nov-26th	1966	2nd-highest
Haast	15.5	Nov-26th	1949	2nd-highest
Secretary Island	14.6	Nov-26th	1988	2nd-highest
Puysegur Point	15.1	Oct-24th	1978	2nd-highest
Motueka (Riwaka)	16.5	Nov-09th	1972	2nd-highest
Palmerston North	16.8	Nov-08th	1940	Equal 2nd-highest
Greymouth	16.0	Nov-26th	1972	Equal 2nd-highest
South West Cape	12.9	Nov-15th	1991	Equal 2nd-highest
Balclutha	14.5	Oct-24th	1972	2nd-highest
Whangaparaoa	16.9	Nov-30th	1982	3rd-highest
Mokohinau	17.0	Nov-30th	1994	4th-highest
Hawera	16.4	Nov-09th	1977	4th-highest
Blenheim	18.2	Nov-08th	1947	4th-highest

Wind

On 9 September, a gust of wind brought down New Zealand's oldest oak tree (aged 194 years) in a paddock at Waimate North.

On 12 October, the Interislander cancelled seven ferry sailings because of expected severe wind and sea conditions in the Cook Strait.

On 29 October, a tornado touched down near Ruakura in central Waikato just before 1 pm, generally moving through farmland. It swept up soil, lifted large sheets of corrugated iron, a trampoline, and other light items.

On 18 November, a tornado struck near Ashburton at around 3.30-4.00 p.m. Five spans of one irrigator were upended, and one span of another irrigator was bent in half.

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

Location	Extreme wind gust (km/hr)	Date of extreme gust	Year records began	Comments
Wanganui	96	Nov-01st	1977	Equal 2nd-highest
Brothers Island	137	Oct-12th	1997	Equal 2nd-highest
Waiouru	106	Oct-27th	1970	Equal 4th-highest

Snow and ice

On 17 September, a cold front moved over the South Island bringing heavy rain and snow, particularly to Central Otago and parts of Southland. Up to 45 cm of snow was reported on the ground in some Queenstown suburbs with more than a few centimetres falling all the way down to lake level in both Wanaka and Queenstown. Schools in Queenstown, Arrowtown, and Te Anau Basin were closed for the day. Queenstown Airport cancelled more than 30 flights due to snow.

On 10 October, an icy southerly change moved up the South Island, delivering snow to as low as 200 metres in Southland and Otago. State Highway 94 from Te Anau was closed due to several centimetres of settled snow. The Milford Road was closed from Hollyford to Chasm due to an avalanche risk.

On 19-20 November, another very low elevation snowfall event for the time of year occurred in the South Island. Snow settled to lake level in Queenstown on 19 November, where flights were delayed or cancelled due to snowfall and poor visibility. In Arrowtown, a large tree had fallen due to the weight of snow, and 537 customers were without power in the Wakatipu Basin due to snow-laden branches falling on power lines. The Crown Range road between Queenstown and Wanaka was closed, with snow also reported on the Milford Road (SH94) and the Lindis Pass (SH8), and SH73 at Porters Pass and Arthur's Pass.

Lightning and hail

On 18 November, thunderstorms struck eastern parts of the South Island, with hail and lightning reported from Dunedin north to Ashburton. Large hail of approximately 20-30 mm diameter was reported in Ashburton.

On 19 November, an *Air New Zealand* flight from Christchurch to Dunedin was struck by lightning during its descent to landing. Hail showers were also reported between Blenheim and Picton.

On 25 November, thunder and hail were reported throughout Auckland, with downpours of rain causing surface flooding about Westmere and Grey Lynn.

Cloud and fog

On 1 September, fog blanketed the North Island and caused flight delays and cancellations from Gisborne through to Auckland. For Auckland, 41 domestic flights were cancelled while 37 domestic

and 1 international flight were delayed. This was the third consecutive day of fog-related cancellations for the Auckland Airport.

On the morning of 2 October, dense fog blanketed Christchurch, causing widespread delays and cancellations at Christchurch Airport.

For further information and climate data enquiries, please contact:

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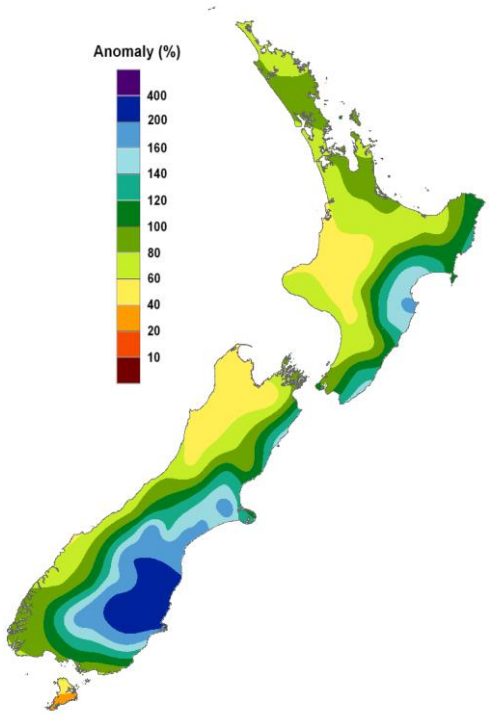
Meteorologist, NIWA Auckland
Tel. 09 375 6334



Spring 2018 rainfall, expressed as a percentage departure from the 1981-2010 normal (mm).

Spring 2018 had well above normal rainfall, as indicated by the dark blue shades, in Otago (>149% of the spring normal) where Oamaru recorded 69% of its annual normal rainfall during the season.

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