NIWA National Climate Centre

Monthly Climate Summary

NIWA Taihoro Nukurangi

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

Very wet for eastern and inland parts of the South Island

Rainfall	It was a very wet November for eastern and inland parts of the South Island, with many locations recording at least double the normal rainfall for the time of year. Rainfall was well above normal (>149% of normal) in eastern and inland parts of Otago, Canterbury, Southland, Wairarapa and Hawke's Bay. Rainfall was mostly above normal (120-149% of normal) in remaining parts of these provinces, as well as Northland, Auckland, western Bay of Plenty, Gisborne and Wellington. In contrast, rainfall was well below normal rainfall (<50% of normal) in Nelson and Tasman, and below normal (50-79% of normal) in western parts of New Zealand including Fiordland, Whanganui, Taranaki and Taihape.
Temperature	Temperatures were above average (0.51-1.20°C above average) for western and southernmost parts of the South Island, Auckland, Wellington, Hawke's Bay, Manawatu, Whanganui and the Kapiti Coast. Temperatures were below average (0.51-1.20°C below average) in eastern and inland parts of Otago and Canterbury including Oamaru, Ranfurly and the Mackenzie Country.
Soil Moisture	As of 1 December, soils were significantly wetter than normal for the time of year across large parts of the eastern and inland South Island, as well as the eastern North Island. Soil moisture levels were lower than normal for the time of year in Nelson, Tasman, Whanganui, the central Plateau, and parts of the West Coast.

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Overview

November 2018 was characterised by higher than normal sea level pressure to the south of the country, and lower than normal sea level pressure over the Tasman Sea. This pressure setup led to more northeasterlies than normal.

Many eastern and inland parts of New Zealand received exceptionally high rainfall during November, which contributed to damaging flood events during the month. Particularly notable rainfall occurred in Otago, where several locations observed their highest November rainfall in at least 100 years of records. It was an unsettled month of weather overall, with frequent periods of atmospheric instability contributing to many days of thunderstorm activity (see *Highlights and extreme events* for further details).

Temperatures during the month were a mixed bag, with periods of warmth offset by cold outbreaks that delivered relatively heavy snow to low elevations in the South Island. Overall, the nationwide average temperature in November 2018 was 14.2°C (0.5°C above the 1981-2010 November average from NIWA's seven station temperature series which begins in 1909).

Further Highlights:

- The highest temperature was 31.2°C, observed at Cheviot and Kaikoura on 8 November.
- The lowest temperature was -2.8°C, observed at Hanmer Forest on 21 November.
- 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 November 2018, Auckland was the warmest, Wellington was the least sunny, Dunedin was the coldest and wettest, Hamilton was the driest, and Tauranga was the sunniest.
- Of the available, regularly reporting sunshine observation sites, the sunniest four locations in 2018 so far (1 January – 30 November) are Wider Nelson (2318 hours), Marlborough (2290 hours), Bay of Plenty (2273 hours) and Hawke's Bay (2219 hours).
- Of the available, regularly reporting low elevation rainfall sites, the two wettest locations in 2018 so far (1 January – 30 November) are Milford Sound (6341 mm) and Arthur's Pass (4398 mm). The two driest locations in 2018 so far are Clyde (481 mm) and Cromwell (504 mm).

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Rainfall: Very wet in eastern and inland parts of the country

Dunedin, Oamaru, Middlemarch, Ranfurly and Takapau Plains all recorded their wettest November on record. Especially noteworthy was Middlemarch and Ranfurly, where records began in 1896 and 1897, respectively. Oamaru recorded more than five times its normal November rainfall (226 mm; 533% of normal) which is equivalent to 48% of the town's normal annual rainfall.

Rainfall was well above normal (>149% of the November normal) in eastern and inland parts of Otago, Canterbury, Southland, Wairarapa and Hawke's Bay. Rainfall was typically above normal (120-149% of the November normal) in remaining parts of these provinces, as well as Northland, Auckland, western Bay of Plenty, Gisborne and Wellington. In contrast, rainfall was below normal (50-79% of the November normal) in western parts of New Zealand including Fiordland, Whanganui, Taranaki as well as Taihape. Well below normal rainfall (<50% of the November normal) was observed in Nelson and Tasman. Nelson city recorded 29 mm of rainfall for the month (37% of normal).

As of 1 December, soils moisture levels closely resembled the rainfall anomalies of November. Soils were significantly wetter than normal for the time of year across large portions of the eastern and inland South Island, as well as the eastern North Island. Soil moisture levels were lower than normal for the time of year in Nelson, Tasman, Whanganui, the central Plateau, and parts of the West Coast.

Record[1] or near-record November rainfall totals were recorded at:

Location	Rainfall total (mm)	Percentage of normal	Year records began	Comments
High records or near-records				
Takapau Plains	217	302	1962	Highest
Ranfurly	129	358	1897	Highest
Oamaru	226	533	1941	Highest
Middlemarch	184	406	1896	Highest
Dunedin (Musselburgh)	155	275	1918	Highest
Balclutha	136	267	1964	Highest
Ashburton	189	325	1909	2nd-highest
Waipara West	113	188	1973	2nd-highest
Akaroa	140	200	1977	2nd-highest
Lake Tekapo	135	327	1925	2nd-highest
Orari Estate	193	357	1897	2nd-highest
Timaru	164	347	1881	2nd-highest
Waimate	182	426	1898	2nd-highest
Lauder	110	269	1924	3rd-highest
Masterton	161	221	1926	4th-highest
Tara Hills	124	297	1949	4th-highest
Waipounamu	143	197	1917	4th-highest
Cromwell	94	283	1949	4th-highest
Clyde	81	196	1978	4th-highest
Low records or near-records				
None observed				

Temperature: A mixed bag, near average for the country overall

The nationwide average temperature in November 2018 was 14.2°C (0.5°C above the 1981-2010 November average from NIWA's seven station temperature series which begins in 1909). November temperatures were above average (0.51-1.20°C above the November average) for western and southernmost parts of the South Island, Auckland, Wellington, Hawke's Bay, Manawatu, Whanganui and the Kapiti Coast. Temperatures were below average (0.51-1.20°C below the November average) in eastern and inland parts of Otago and Canterbury including Oamaru, Ranfurly and the Mackenzie Country. Temperatures were typically near average (-0.50°C to +0.50°C of the November average) for remaining areas of the country.

[1] The rankings (1st, 2nd, 3rd.etc) in all Tables in this summary are relative to climate data from a *group* of nearby stations, some of which may no longer be operating. The current climate value is compared against all values from any member of the group, without any regard for homogeneity between one station's record, and another. This approach is used due to the practical limitations of performing homogeneity checks in real-time.

Record or near-record mean 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				
Secretary Island	13.3	1.4	1985	2nd-highest
Puysegur Point	12.8	1.7	1978	2nd-highest
South West Cape	11.7	1.1	1991	4th-highest
Low records or near-records				
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
High records or near-records				
Puysegur Point	15.8	2.2	1978	Highest
South West Cape	14.7	1.1	1991	2nd-highest
Tiwai Point	16.6	1.4	1970	3rd-highest
Motu	17.7	1.1	1990	4th-highest
Secretary Island	16.8	1.8	1985	4th-highest
Low records or near-records				
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
High records or near-records				
Martinborough	10.3	1.6	1986	3rd-highest
Puysegur Point	9.8	1.2	1978	3rd-highest
Te Anau	7.7	2.0	1963	3rd-highest
South West Cape	8.7	1.1	1991	3rd-highest
Ngawi	12.7	0.8	1972	4th-highest
Secretary Island	9.7	0.9	1985	4th-highest
Low records or near-records				
Warkworth	9.7	-1.4	1966	3rd-lowest

November climate in the six main centres

November was a very wet month in Dunedin, with the city observing its wettest November on record. Temperatures were above average in Auckland and Wellington, and near average for remaining main centres. Of the six main centres in November 2018, Auckland was the warmest, Wellington was the least sunny, Dunedin was the coldest and wettest, Hamilton was the driest, and Tauranga was the sunniest.

November 2018 main centre climate statistics:

Temperature			
Location	Mean temp. (°C)	Departure from normal (°C)	Comments
Auckland[a]	16.7	+0.6	Above average
Tauranga[b]	16.4	+0.5	Near average
Hamilton[c]	15.0	+0.3	Near average
Wellington[d]	14.1	+0.7	Above average
Christchurch[e]	13.4	-0.1	Near average
Dunedin[f]	12.7	+0.3	Near average
Rainfall			
Location	Rainfall (mm)	% of normal	Comments
Auckland[a]	96	147	Above normal
Tauranga[b]	113	152	Well above normal
Hamilton[c]	92	103	Near normal
Wellington[d]	132	135	Above normal
Christchurch[e]	103	222	Well above normal
Dunedin[f]	155	275	Wettest November on record
Sunshine			
Location	Sunshine (hours)		
Auckland[a]	200		
Tauranga[b]	222		
Hamilton[g]	189		
Wellington[d]	175		
Christchurch[e]	208		
Dunedin[f]	184		

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

Highlights and extreme events

Rain and slips

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 13 November, a heavy downpour associated with a thunderstorm caused surface flooding in parts of Pūtāruru and Tokoroa (South Waikato).

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. Flooding between Roxburgh and Millers Flat damaged a culvert and caused the closure of SH8. Between Raes Junction and Tapanui, SH90 was closed due to a dropout. Flooding from the Tokomairiro River closed SH1 south of Milton. Waikaia School was closed on 20 November due to surface flooding on roads in the area. A slip was reported on SH6 in the Kawarau Gorge, between Cromwell and Gibbston. The Clutha River's flow peaked at approximately 2700 cumecs; which was reported as its highest level since November 1999.

On 24 November, a downpour of rain caused a ceiling collapse at a shop in Whangaparaoa (north of Auckland).

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 November 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	8th	1949	Highest
Ranfurly	53	8th	1897	Highest
Oamaru	52	8th	1950	Highest
Lauder	52	8th	1924	Highest
Masterton	74	21st	1926	2nd-highest
Takapau Plains	63	25th	1962	2nd-highest
Greymouth	104	8th	1947	2nd-highest
Lake Tekapo	66	8th	1925	2nd-highest

Timaru	63	8th	1881	2nd-highest
Waimate	57	8th	1898	2nd-highest
Middlemarch	39	8th	1896	2nd-highest
Clyde	41	8th	1978	2nd-highest
Castlepoint	68	26th	1907	3rd-highest
Kaikoura	88	27th	1898	3rd-highest
Arthurs Pass	290	8th	1906	3rd-highest
Mt Cook	257	8th	1928	4th-highest

Temperatures

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. Farther south, Dunedin registered a very mild 20.8°C between 1-2 a.m. By late-morning, a cold front had passed through the city, with the temperature recorded as low as 10°C between 11 a.m. and midday.

On 9 November, temperatures in parts of Canterbury plummeted due to the passage of a cold front. Timaru's temperature was just 2.6°C at 10 a.m. Farther inland at Fairlie, the mean temperature was 0.4°C between 8-10 a.m., a stark contrast to two days prior when the town recorded a maximum temperature of 24.9°C.

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
High records or near-records				
Westport Aero	25.7	25th	1937	Highest
Milford Sound	25.9	25th	1934	Equal highest
Kaikoura	31.2	8th	1963	2nd-highest
Cheviot	31.2	8th	1982	2nd-highest
Hokitika	25.8	25th	1866	3rd-highest
Greymouth	25.1	28th	1947	3rd-highest
Secretary Island	23.6	26th	1985	3rd-highest
Mahia	26.0	8th	1990	4th-highest
Haast	25.7	25th	1949	4th-highest
Auckland (Mangere)	25.6	29th	1959	Equal 4th-highest
Low records or near-records				
Wanaka	7.8	19th	1972	Lowest
Waipara West	9.2	9th	1973	Equal lowest
Lake Tekapo	3.9	9th	1928	2nd-lowest
Tara Hills	6.1	9th	1949	2nd-lowest
Queenstown	6.9	19th	1871	2nd-lowest
Ohakune	9.1	19th	1972	Equal 2nd-lowest
Te Kuiti	13.4	21st	1959	3rd-lowest
Le Bons Bay	8.3	9th	1984	3rd-lowest
Orari Estate	9.0	20th	1972	3rd-lowest

Timaru	8.4	9th	1885	3rd-lowest
Oamaru	9.5	9th	1972	3rd-lowest
Rangiora	9.9	9th	1972	Equal 3rd-lowest
Mt Cook	3.4	9th	1929	4th-lowest
Akaroa	9.9	9th	1978	4th-lowest

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
High records or near-records				
Masterton Aero	18.6	9th	1943	Highest
Martinborough	18.0	9th	1986	Highest
Arapito	16.4	26th	1978	Highest
Reefton	15.8	9th	1972	Highest
Westport	16.6	26th	1966	2nd-highest
Haast	15.5	26th	1949	2nd-highest
Secretary Island	14.6	26th	1988	2nd-highest
Motueka	16.5	9th	1972	2nd-highest
Palmerston North	16.8	8th	1940	Equal 2nd-highest
Greymouth	16.0	26th	1972	Equal 2nd-highest
South West Cape	12.9	15th	1991	Equal 2nd-highest
Mokohinau	17.4	30th	1994	3rd-highest
Puysegur Point	14.5	15th	1978	3rd-highest
Hawera	16.4	9th	1977	4th-highest
Blenheim	18.2	8th	1947	4th-highest
Low records or near-records				
Mokohinau	9.7	21st	1994	3rd-lowest

Wind

On 1 November, strong winds struck Auckland causing downed trees and power outages in some suburbs. An estimated 2000 homes were without power.

On 3 November, strong winds downed a tree on Jollies Pass Road in Hanmer Springs. A large gum tree was uprooted by wind at the Botanic Gardens in Wellington.

On 4 November, strong winds brought down trees in the Manawatu region. More than 1500 homes were without power, and two cars were written off by falling trees on the Massey University campus.

On 8 November, the Rimutaka Hill Rd (SH2) was closed due to strong winds.

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 November extreme wind gusts were recorded at:

Location	Extreme wind gust (km/h)	Date of extreme gust	Year records began	Comments
Whanganui	96	1st	1977	Equal highest
Te Puke	57	4th	1987	Equal 2nd-highest
Whangarei	89	1st	1973	3rd-highest
Palmerston North	93	4th	1991	Equal 3rd-highest
Auckland (Western Springs)	82	1st	1994	4th-highest
New Plymouth	95	1st	1972	4th-highest
Mokohinau	104	1st	1994	Equal 4th-highest
Whakatu	78	4th	1997	Equal 4th-highest

Lightning and hail

On 1 November, approximately 160 lightning strikes were recorded about eastern Waikato and the Bay of Plenty.

On the morning of 8 November, 800 lightning strikes were recorded about Hokitika.

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 decent to landing. Hail showers were also reported between Blenheim and Picton.

On 20 November, hail showers fell throughout many parts of Auckland city.

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

On 29 November, several lightning strikes were recorded near Te Anau. The town received a downpour of rain in the early evening which caused some surface flooding.

On 30 November, daytime heating contributed to the development of thunderstorms over Southland in the afternoon and evening. Approximately 500 lightning strikes were recorded over the region. A funnel cloud formed near Roxburgh however it didn't touch the ground.

Snow and ice

On 9 November, snow fell to very low elevations for the time of year in parts of Canterbury. Areas where snow was reported included Fairlie, Geraldine, Burkes Pass and Tekapo. Several schools and roads were closed due to the snow, including Geraldine Primary and High Schools, Mackenzie College, and the Hakataramea Valley Road beyond Cattle Creek.

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.

Cloud and fog

On 8 November, fog caused the cancellation of several flights at New Plymouth.

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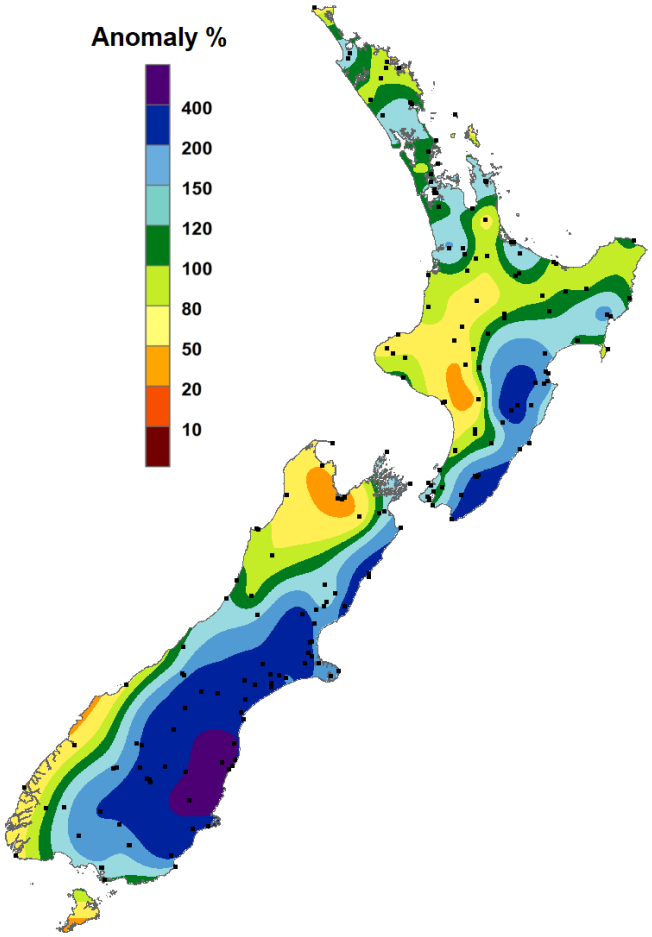

November 2018 rainfall, expressed as a percentage of normal (1981-2010 normal).

Eastern and inland parts of the South Island had a very wet November, with many areas recording at least double normal rainfall for the time of year (indicated by dark blue and purple shading).

Below or well below normal rainfall (indicated by yellow and orange shading) was recorded in some western parts of both Islands.

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