

A very wet winter for the eastern South Island, mild temperatures for most of the country

Rainfall	Rainfall was well above normal (> 149%) for parts of the eastern South Island from Christchurch to Oamaru. Rainfall was above normal (120-149%) in parts of eastern Otago, Nelson, Wellington and Northland. Below normal rainfall (50-79%) was observed in southern parts of Southland, Queenstown and Marlborough.
Temperature	Winter temperatures were well above average (> +1.20°C) for parts of Central Otago, and above average (+0.51°C to +1.20°C) in parts of Northland, Auckland, Bay of Plenty, Gisborne, Manawatu-Whanganui, Nelson, West Coast and the Southern Lakes. Temperatures were below average (-0.51°C to -1.20°C) in parts of Tasman and the Mackenzie Basin.
Soil moisture	At the end of winter 2017, soil moisture levels were above normal for the time of year for eastern parts of Otago and Marlborough. Soil moisture levels were below normal for isolated inland parts of Otago, and typically near normal for the remainder of the country.
Sunshine	Winter sunshine was above normal (110-125%) in parts of Southland and western Waikato. In contrast, below normal sunshine (75-89%) was observed in Christchurch and Wellington.

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Overview

Winter 2017 got off to a relatively settled start, with record or near-record low rainfall totals for June in many North Island locations. In contrast, July was an active month due to the passage of several low pressure systems. Record-breaking rainfall was recorded in parts of Canterbury and Otago, leading to severe flooding and the declaration of a State of Emergency in those parts. August was a warm month throughout the country, with abundant rainfall in western and central parts of the North and South Islands. For the winter season, overall, air pressures were higher than normal to the southeast of New Zealand and near normal across the country, with no significant airflow anomaly observed.

Further Highlights:

- The highest temperature was 23.2°C, observed at Kaikoura on 17 August.
- The lowest temperature was -14.6°C, observed at Tekapo on 29 July.
- The highest 1-day rainfall was 161 mm, recorded at Oamaru on 21 July.
- The highest wind gust was 170 km/hr, observed at Akitio (Hawke's Bay) on 13 August.
- Of the six main centres in winter 2017, Auckland was the warmest, Dunedin was the driest, Tauranga was the sunniest, Christchurch was the coolest, and Wellington was the wettest and least sunny.
- Of the available, regularly reporting sunshine observation sites, the sunniest four locations in 2017 so far (1 January – 31 August) were Whakatane (1646 hours), Blenheim (1608 hours), Richmond (1587 hours) and Napier (1552 hours).

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Rainfall: A wet season for eastern parts of Canterbury and Otago

Rainfall was well above normal (> 149% of the winter normal) for parts of the eastern South Island from Christchurch to Oamaru. Oamaru observed its wettest winter since records began in 1941, with 285 mm of rain recorded during the season. Notably, Oamaru recorded 161 mm of rainfall in the 24 hours to 9 a.m. 22 July; this is 45 mm more than the total rainfall typically observed during the entire winter season. This heavy rainfall event resulted in widespread flooding, and the declaration of a State of Emergency in eastern parts of the South Island (see *Highlights and extreme events* section for more details). It was also a wet season in parts of eastern Otago, Nelson, Wellington and Northland where rainfall was above normal (120-149% of the winter normal). Much of the winter precipitation recorded in eastern parts of the South Island fell during southeasterly airflows. In the east of the South Island, much of the winter precipitation fell during relatively cold southeasterly airflows. These delivered considerable snowfalls to the Canterbury ski fields, particularly those situated farthest east.

In contrast, rainfall was below normal (50-79% of the winter normal) in southern parts of Southland, Queenstown and Marlborough. No locations observed record or near-record low winter rainfall totals, although Queenstown recorded just two-thirds (67%) of its normal winter rainfall. Remaining areas of the country typically observed near normal rainfall (80-119% of the winter normal).

At the end of winter 2017, soil moisture levels were above normal for the time of year for eastern parts of Otago and Marlborough. Soils in some eastern parts of Otago remained sodden after the flooding event in July, with pools of surface water still reported in the Taieri Plains (west of Dunedin). Soil moisture levels were typically near normal for the remainder of the country, except for isolated inland parts of Otago, where soils were drier than normal for the time of year.

Record¹ or near-record winter rainfall totals were recorded at:

Location	Rainfall total (mm)	Percentage of normal	Year records began	Comments
High records or near-records				
Oamaru	285	247	1941	Highest
Mahia	446	118	1990	4th-highest
Ashburton	366	195	1909	4th-highest
Low records or near-records				
None observed				

Temperature: Near average or above average for most of the country

The nation-wide average temperature for winter 2017 was 8.9°C (0.5°C warmer than the 1981-2010 winter average, using NIWA's seven-station temperature series which begins in 1909). This makes the winter of 2017 the 11th-warmest winter on record. Mean temperatures for New Zealand were near average during June and July. However, the country observed its third-warmest August on record, which brought spring-like temperatures to end the winter season for many parts of the country.

Winter temperatures were well above average (> +1.20°C of the winter average) for parts of Central Otago. Lauder observed its warmest winter since records began in 1924. In addition, Lauder's mean minimum temperature for winter was 0.0°C, making 2017 the first time on record the winter mean minimum temperature has not been below freezing at that location. Winter temperatures were above average (+0.51°C to +1.20°C of the winter average) in parts of Northland, Auckland, Bay of Plenty, Gisborne, Manawatu-Wanganui, Nelson, West Coast and the Southern Lakes. Temperatures were typically near average (-0.50°C to +0.50°C of the winter average) for remaining parts of the country. The exception was parts of Tasman and the Mackenzie Basin, where winter temperatures were below average (-0.51°C to -1.20°C of the winter average).

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

Location	Mean air temp. (°C)	Departure from normal (°C)	Year records began	Comments
High records or near-records				
Lauder	5.1	1.8	1924	Highest
Whangaparaoa	12.8	0.7	1982	3rd-highest
Te Puke	11.2	1.3	1973	3rd-highest
Medbury	6.3	0.6	1927	3rd-highest
Cromwell	5.6	1.3	1949	3rd-highest
Dargaville	12.5	0.9	1943	4th-highest

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.

Arapito	9.8	0.8	1978	4th-highest
Haast	9.1	1.1	1949	4th-highest
Secretary Island	9.9	0.7	1985	4th-highest
Akaroa	9.0	1.0	1978	4th-highest
Low records or near-records				
Takaka	7.4	-0.9	1978	4th-lowest

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

Location	Mean maximum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
High records or near-records				
Whangarei	16.7	0.8	1967	Highest
Whitianga	16.5	1.3	1962	Highest
Cromwell	11.2	1.8	1949	Highest
Whangaparaoa	15.4	0.8	1982	2nd-highest
Te Puke	15.8	1.1	1973	2nd-highest
Te Kuiti	15.1	1.2	1959	2nd-highest
Whanganui	15.1	1.4	1937	2nd-highest
Arapito	14.5	1.0	1978	2nd-highest
Secretary Island	12.7	0.7	1985	2nd-highest
Puysegur Point	11.7	0.9	1978	2nd-highest
Kerikeri	16.9	0.7	1945	3rd-highest
Auckland (Mangere)	15.9	1.0	1959	3rd-highest
Waipawa	13.8	0.9	1945	3rd-highest
Haast	12.8	1.1	1949	3rd-highest
Tiwai Point	11.3	1.1	1970	3rd-highest
Auckland (Whenuapai)	15.7	0.7	1945	4th-highest
Rotorua	13.4	1.1	1964	4th-highest
Wairoa	15.7	1.2	1964	4th-highest
Palmerston North	14.0	0.9	1928	4th-highest
Westport	13.9	0.9	1937	4th-highest
Reefton	11.8	1.1	1960	4th-highest
Low records or near-records				
Takaka	12.7	-1.1	1978	Lowest

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

Location	Mean minimum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
High records or near-records				
Lauder	0.0	1.7	1924	Highest
Te Puke	6.6	1.6	1973	3rd-highest
Medbury	0.9	1.0	1927	3rd-highest

Haast	5.4	1.2	1949	4th-highest
Te Anau	2.3	1.6	1963	4th-highest
South West Cape	6.7	0.9	1991	4th-highest
Low records or near-records				
None observed				

Sunshine: Sunniest winter on record for Invercargill

Winter sunshine was above normal (110-125% of the winter normal) in parts of Southland, north Canterbury and western Waikato, with isolated locations observing well above normal sunshine (>125% of the winter normal). It was a particularly sunny season in Invercargill, which had its sunniest winter since records began in 1913. The city observed 129 hours more sunshine than normal for winter. In contrast, Christchurch and Wellington observed below normal sunshine (75-89% of the winter normal). Sunshine hours were typically near-normal (90-109% of the winter normal) for the remainder of the country.

Of the available, regularly reporting sunshine observation sites, the sunniest four locations in 2017 so far (1 January – 31 August) were Whakatane (1646 hours), Blenheim (1608 hours), Richmond (1587 hours) and Napier (1552 hours).

Record or near-record winter sunshine hours were recorded at:

Location	Sunshine hours	Percentage of normal	Year records began	Comments
High records or near-records				
Invercargill	429	143	1913	Highest
Te Kuiti	379	123	1962	4th-highest
Cheviot	425	131	1983	4th-highest
Low records or near-records				
None observed				

Winter climate in the six main centres

Temperatures were above average in Auckland and Tauranga, and near average for all other main centres during winter 2017. Christchurch received well above normal rainfall (151% of normal), and it was also a wetter than usual winter in Dunedin and Wellington. Sunshine was above normal in Hamilton, below normal in Christchurch and Wellington, and near normal for the remaining main centres. Of the six main centres in winter 2017, Auckland was the warmest, Dunedin was the driest, Tauranga was the sunniest, Christchurch was the coolest, and Wellington was the wettest and least sunny.

Winter 2017 main centre climate statistics:

Temperature			
Location	Mean temp. (°C)	Departure from normal (°C)	Comments
Auckland ^a	12.2	+0.8	Above average
Tauranga ^b	11.4	+0.7	Above average
Hamilton ^c	9.8	+0.5	Near average
Wellington ^d	9.8	+0.5	Near average
Christchurch ^e	6.7	+0.2	Near average
Dunedin ^f	7.5	+0.4	Near average
Rainfall			
Location	Rainfall (mm)	% of normal	Comments
Auckland ^a	361	98%	Near normal
Tauranga ^b	349	99%	Near normal
Hamilton ^c	365	98%	Near normal
Wellington ^d	512 ²	131%	Above normal
Christchurch ^e	278	151%	Well above normal
Dunedin ^f	226	133%	Above normal
Sunshine			
Location	Sunshine (hours)	% of normal	Comments
Auckland ^a	428	108%	Near normal
Tauranga ^b	452	98%	Near normal
Hamilton ^g	422 ³	111%	Above normal
Wellington ^d	318	87%	Below normal
Christchurch ^e	343	86%	Below normal
Dunedin ^f	350	107%	Near normal

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

² Missing 1 day of data.

³ Missing 4 days of data.

Highlights and extreme events

This section contains information pertaining to some of the more significant highlights and extreme events that occurred during winter 2017. Note that a more detailed list of significant weather events for winter 2017 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

On 22 June, heavy rain affected the Far North District. In Kaeo, two schools closed for the day because flooding affected bus services, and a preschool was also closed. Flooding affected SH1 near Horeke as the Waihou River breached its banks, and SH1 near Mangamuka was down to one lane due to flooding. SH10 east of Taipa was also affected by flooding. In Kaitaia, 54 mm of rain fell in just 10 hours, which was more rain than the total recorded during the first three weeks of June 2017 (52 mm).

On 21-22 July, heavy rain and high tides led to hundreds of homes evacuated and a State of Emergency declaration in Waitaki, Dunedin, Christchurch, Selwyn, Timaru and eventually the entire Otago region, as floodwaters inundated coastal parts of the eastern South Island. There were several slips including one large one on Otago Peninsula which cut off residents north of Harwood. Road closures were widespread across coastal Canterbury and Otago. Low temperatures overnight led to black ice on the roads and the NZTA advised caution to motorists. In Christchurch, the Heathcote River burst its banks leading to flooded streets in the suburb of Beckenham. Dozens of properties – largely in Henley (at least 35 properties) and the Taieri Plains remained evacuated on 25 July. At peak flow the Clutha River was flowing at 1800 cumecs, while the Taieri River peaked above 2000 cumecs. The Selwyn River was also flooded. Several rainfall records were set as a result of the storm. Oamaru had its wettest day on record (daily rainfall records began in 1950), with 161 mm of rain. Dunedin had its wettest July day on record (records began in 1918), with 89 mm of rain recorded.

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

Location	Extreme 1-day rainfall (mm)	Date of extreme rainfall	Year records began	Comments
Winchmore	112	Jul-21st	1927	Highest
Living Springs	67	Jul-23rd	1978	Highest
Coldstream	86	Jul-21st	1964	Highest
Oamaru	161	Jul-21st	1950	Highest
Palmerston	146	Jul-21st	1969	Highest
Lee Flat	113	Jul-21st	1954	Highest
Long Beach	133	Jul-21st	1979	Highest
Balmoral, Outram	164	Jul-21st	1948	Highest
Mosgiel	150	Jul-21st	1952	Highest
Roxburgh	61	Jul-21st	1946	Highest

Rosebank	43	Jul-21st	1984	Highest
Mana Island	72	Jul-13th	1987	2nd-highest
Glenthorne Lower Station	99	Jul-21st	1985	2nd-highest
Hororata West	113	Jul-21st	1948	2nd-highest
Hororata	99	Jul-21st	1890	2nd-highest
Mt Somers	86	Jul-21st	1980	2nd-highest
Peel Forest	105	Jul-21st	1973	2nd-highest
Ashburton	93	Jul-21st	1927	2nd-highest
Governors Bay	81	Jul-22nd	1989	2nd-highest
Middlemarch	64	Jul-21st	1896	2nd-highest
Dunedin, Btl Gardens	111	Jul-21st	1913	2nd-highest
Southern Reservoir	124	Jul-21st	1967	2nd-highest
Green Island, Kaikorai	115	Jul-21st	1993	2nd-highest
Glenledi Rd	62	Jul-21st	1984	2nd-highest
Baverstock Waiwera	42	Jul-21st	1954	2nd-highest
Balclutha	73	Jul-21st	1949	2nd-highest
Baker Road (New Plymouth)	100	Jul-2nd	1990	3rd-highest
Mahana Lodge	91	Jul-12th	1984	3rd-highest
Waituna	41	Jul-13th	1984	3rd-highest
Waimate	87	Jul-21st	1898	3rd-highest
Dunedin (Musselburgh)	89	Jul-21st	1918	3rd-highest
Puhata	69	Jun-21st	1979	4th-highest
Rainbow Point	48	Jul-20th	1978	4th-highest
Kopua	76	Jul-13th	1962	4th-highest
Waikoukou, Longbush	79	Jul-13th	1947	4th-highest
Taihape	45	Jul-9th	1970	4th-highest
Secretary Island	80	Aug-26th	1985	4th-highest
L Tekapo, Mt Hay Stn	57	Jul-1st	1976	4th-highest
Melford Hills	71	Jul-21st	1964	4th-highest
Timaru	69	Jul-21st	1881	4th-highest

Temperatures

On 12 and 13 July, a cold southerly outbreak led to many North Island and some eastern South Island locations observing near-record low maximum temperatures for winter.

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

Location	Extreme maximum (°C)	Date of extreme temperature	Year records began	Comments
High records or near-records				
Motu	19.2	Aug-18th	1990	2nd-highest
Five Rivers	17.9	Aug-26th	1982	4th-highest
Te Puke	20.0	Aug-7th	1973	Equal 4th-highest
Low records or near-records				
Rotorua	5.7	Jul-13th	1972	Equal lowest
Kaikohe	8.8	Jul-13th	1973	2nd-lowest

Oamaru	3.8	Jul-12th	1972	2nd-lowest
Ohakune	1.6	Jul-12th	1972	3rd-lowest
Arapito	7.0	Jul-13th	1978	3rd-lowest
Lumsden	0.0	Jul-7th	1982	3rd-lowest
Cape Reinga	10.8	Jul-13th	1971	Equal 3rd-lowest
Port Taharoa	10.2	Jul-13th	1974	4th-lowest
Takapau Plains	4.0	Jul-12th	1972	4th-lowest
Waipara West	3.2	Jul-12th	1973	4th-lowest
Rangiora	3.2	Jul-12th	1972	4th-lowest
Kopua	4.5	Jul-12th	1972	Equal 4th-lowest

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

Location	Extreme minimum (°C)	Date of extreme temperature	Year records began	Comments
Low records or near-records				
Boyle River Lodge	-9.5	Jul-13th	1983	Lowest
Kaikoura, Middle Creek	-2.0	Jul-16th	1963	2nd-lowest
Mahia	1.8	Jul-13th	1990	Equal 2nd-lowest
Five Rivers	-8.3	Jul-7th	1982	Equal 2nd-lowest
Mokohinau	6.6	Jul-13th	1994	3rd-lowest
Oamaru	-5.4	Jul-30th	1967	3rd-lowest
Mt Cook Airport	-13.7	Jul-29th	1929	4th-lowest
Lake Tekapo	-14.6	Jul-29th	1925	4th-lowest
Thames	-1.6	Jul-30th	1946	Equal 4th-lowest
High records or near-records				
Mahia	13.9	Jun-24th	1990	3rd-highest
Castlepoint Station	13.5	Jun-13th	1994	4th-highest

Wind

On 13 July, strong winds struck the lower North Island. More than 9000 people were without power, and many flights at Wellington Airport were cancelled. Sustained 10-minute winds of 135.7 km/h were recorded at Baring Head between 8:40 a.m. and 8:50 a.m.; this is comparable to winds experienced over flat land during a category 3 tropical cyclone. During that time at Baring Head, the maximum wind gust recorded was 155.9 km/h. Climate stations at Brothers Island in Cook Strait and on Mt Kaukau (Wellington) recorded maximum wind gusts of 167 km/h on this day. In Seatoun (Wellington), wind gusts led to a large tree crashing through a house. There were reports of roofs lifted in other parts of Wellington.

The NIWA wave buoy near Baring Head consistently recorded a significant wave height (highest 1/3 of waves) greater than 6 metres between 5 a.m. and 8 a.m. on 13 July. Observed maximum wave heights were in the 10 metre range. The *Interislander* ferry was cancelled during this time.

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

Location	Extreme wind gust (km/hr)	Date of extreme gust	Year records began	Comments
Hokitika	122	Aug-6th	1972	Highest
Hawera	104	Jul-13th	1986	Equal highest
Queenstown	93	Jul-21st	1972	Equal highest
Baring Head	156	Jul-13th	1991	2nd-highest
Whanganui	119	Jul-13th	1977	2nd-highest
Oamaru	91	Jul-21st	1984	Equal 3rd-highest
Mahia	111	Jul-20th	1991	4th-highest

Snow and ice

On 1 July, up to 30 vehicles were towed after SH8 between Twizel and Fairlie, and SH80 between Aoraki-Mt Cook and Ben Ohau, were closed due to snow. Snowfall also cut road access into Tekapo and Mt Cook, and contributed to two buses sliding off the road. Several day visitors to Tekapo were forced to stay for the night due to road closures.

Lightning and hail

On 6 July, Auckland flights were put on hold and some diverted as thunder, lightning and torrential rain passed through during the afternoon. The lightning warning was lifted at 6 p.m. Lightning also struck Sancta Maria College in Auckland, which triggered the fire alarm and “fried” the gym speakers. More than 700 lightning strikes were recorded across the Auckland region, with the Sky Tower taking four direct hits.

Cloud and fog

On 17 June, 60 regional flights were cancelled and 48 were delayed when fog descended on Auckland Airport. Four international flights were also affected by delays or diversions. A fatal car accident near Netherton (Waikato) was attributed to the foggy conditions.

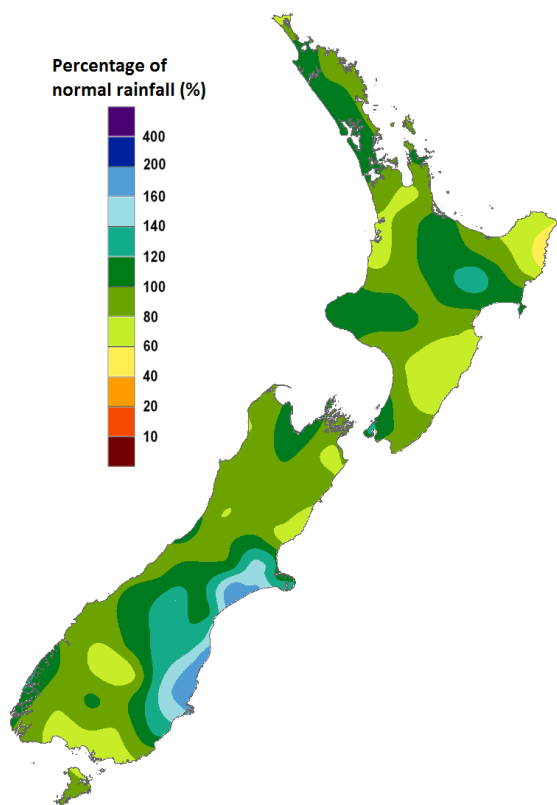
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Winter 2017 total rainfall, expressed as a departure from the 1981-2010 average (%).

Rainfall was well above normal (> 149%) for eastern parts of South Island, particularly from mid-Canterbury to south-Otago. Much of total winter rain in these parts occurred during July, and an especially heavy rainfall event on 21 July caused considerable flooding.

<http://www.niwa.co.nz/climate>

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