

The Tasman Tempest causes a deluge in the upper North Island.

Rainfall	Significant rainfall totals were experienced across the upper North Island, with over 300% of normal March rainfall recorded in some places. Other locations recorded over 200% of normal March rainfall. The remainder of the North Island had a wet month, with most locations recording above normal rainfall or more (>120% of normal March rainfall). Parts of the northern and eastern South Island also recorded above normal or well above normal (>149% of March normal) rainfall. In contrast, the west and south of the South Island was much drier – some locations recorded well below normal rainfall (<50% of March normal) and many locations recorded below normal rainfall (50-79% of normal).
Temperature	The North Island experienced well above average (>1.20°C above average) or above average (0.51 to 1.20°C above average) temperatures. The South Island was an island of two halves, with the north and west recording above or well above average temperatures and the south and east recording near (-0.50 to 0.50°C of average) or below average (-1.20 to -0.51°C below average) temperatures.
Soil Moisture	As of 1 April 2017, soils in the upper half of the North Island were much wetter than normal for the time of year, as well as around Wellington, northern Tasman-Nelson and part of the coastal Ashburton District. Soils were much drier than normal for the time of year for Southland, Stewart Island, Queenstown-Lakes, north Canterbury and Marlborough.
Sunshine	Below normal (75-89% of normal) or well below normal (<75% of normal) sunshine hours were recorded for most of the North Island and parts of the northern South Island. In contrast, parts of Otago and Southland recorded well above normal (>125% of normal) sunshine.

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Overview

March 2017 was characterised by higher than normal atmospheric pressure over and to the south and west of the South Island combined with lower than normal pressure to the northwest of New Zealand. This pressure pattern resulted in a predominant wind flow from the northwest over the North Island, bringing with it moist tropical air masses and record-high rainfall for the upper North Island. Anomalous southeasterly airflow was prevalent over the South Island for the month of March, bringing rainfall and cool temperatures to the east but sheltering the west.

Heavy rain was the flavour of the month for much of the North Island. Warm, humid air masses crossing the North Island brought heavy rain and flooding to much of the top half of the North Island, particularly for Northland, Auckland, and the Coromandel. The impacts of these significant rainfall events are covered in more detail in the *Highlights and Extreme Events* section. Many locations in these regions, as well as Bay of Plenty, Waikato, Hawke's Bay and the Kapiti Coast received more than double the normal rainfall for March (>200% of March normal). Some locations in Auckland, Waikato and the Bay of Plenty recorded over three times the normal rainfall for March (>300% of normal), while Whangaparaoa (north of Auckland) received an incredible 497% of normal March rainfall (354 mm), or nearly five times the normal March total rainfall. Many of these monthly totals broke records for March and also for any month (see Rainfall section on Page 4). The remainder of the North Island had a relatively wet month, with most locations recording above normal rainfall or more (>120% of normal). In addition, Tasman District and parts of coastal Canterbury and Otago recorded above normal rainfall (120-149% of normal March rainfall) or well above normal (>149% of normal); the high rainfall in the east being due to the predominant southeasterly airflow. In contrast, due to the persistent high pressure and blocking of moist air masses from the southeast by mountain ranges, the south and west of the South Island recorded low rainfall totals. Some locations in Southland, Otago and around the Main Divide recorded well below normal rainfall (<50% of normal March rainfall) – a mere 14% of normal March rainfall (53 mm) was observed at Mt Cook Village. Other locations in the south and west of the South Island recorded below normal (50-79% of normal) or near normal (80-119% of normal) rainfall for March.

Due to the frequent tropical air masses travelling over the North Island, higher than average mean temperatures were experienced throughout the Island. Well above average (>1.20°C above average) temperatures were experienced in parts of Northland, Auckland, Waikato, Bay of Plenty, Hawke's Bay, and Taranaki for March. Above average (0.51 to 1.20°C above average) temperatures were recorded in all other North Island regions, except for the Wairarapa which experienced near average (-0.50 to 0.50°C of average) or below average (-1.20 to -0.51°C below average) temperatures. The South Island was an island of two halves due to the predominant southeasterly airflow, with above or well above average temperatures recorded in the west and north, and average or below average temperatures recorded in the east and south. A few locations in coastal Canterbury recorded well below average temperatures (< -1.20°C below average). This distinct division in temperatures that followed the Main Divide was due to the foehn effect, as cool southeast air masses affected the south and east of the South Island but this air warmed as it travelled down the western (lee) side of the mountain ranges. The nationwide average temperature in March 2017 was 16.0°C (0.3°C above the 1981-2010 March average from NIWA's seven station temperature series which begins in 1909).

Soil moisture levels across the country at the end of March approximately reflected the rainfall pattern experienced during the month. Soils in the upper half of the North Island were much wetter than normal for the time of year, as well as around Wellington, northern Tasman-Nelson and part of the coastal Ashburton District. Soils were much drier than normal for the time of year for Southland, Stewart Island, and Queenstown-Lakes District, as well as northern Canterbury and Marlborough. Soil moisture was near normal for the time of year for other regions.

Sunshine was lower than normal for some parts of the North Island and the upper South Island, due to the moist airmasses that brought cloudy and rainy conditions to those parts of the country. Locations in Northland, Bay of Plenty, Wellington, Taranaki, West Coast, Nelson and Marlborough recorded well below normal (<75% of normal March sunshine) or below normal (75-89% of normal) sunshine, while Auckland recorded near normal (90-109% of normal) sunshine for March. In contrast, parts of Otago and Southland recorded well above normal sunshine (>125% of normal), consistent with clear skies and low rainfall totals for the month.

Further Highlights:

- The highest temperature was 33.0°C, observed at Leeston (Canterbury) on 17 March.
- The lowest temperature was -1.7°C, observed at Lake Pukaki on 8 March.
- The highest 1-day rainfall was 231.8 mm, recorded at North Egmont on 11 March.
- The highest wind gust was 137 km/hr, observed at Castlepoint on 20 March.
- Of the six main centres in March 2017, Tauranga was the warmest and wettest, Dunedin was the coolest, driest, and sunniest, and Christchurch was the least sunny (although it was missing three days of data).
- Of the available, regularly reporting sunshine observation sites, the sunniest four locations in 2017 (1 January – 31 March) were Whakatane (753.6 hours), Lake Tekapo (751.3 hours), Blenheim (729.0 hours) and Gisborne (726.3 hours).

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Rainfall: Record wetness in the upper North Island, dry in the South.

Numerous extreme rainfall events throughout March 2017 led to record-high or near-record-high rainfall totals for the month as whole at many stations in Northland, Auckland, Bay of Plenty, Waikato, and the Kapiti Coast. Whangaparaoa (north of Auckland) received 354 mm, which is 497% (nearly five times) the usual March rainfall for that location. This was the wettest March on record, and the second-wettest month (of any month) on record for the Whangaparaoa station group (see footnote) – missing out on the top spot by a mere 2 mm (the wettest month was August 1965, with 356 mm). It was also the wettest March (and third-wettest of any month) for Mangere in south Auckland, which recorded 269 mm (315% of March normal), and the wettest March for Pukekohe (south of Auckland), with 297 mm (391% of March normal). These rainfall events caused significant flooding and slips, which are covered in the *Highlights and Extreme Events* section below.

In contrast, March was a dry month for parts of the west and south of the South Island due to persistent high pressure and predominant southeasterly airflow. Tiwai Point recorded its driest March on record with 26 mm (26% of normal March rainfall). Mt Cook Village and Wanaka recorded just 14% and 15% of March normal rainfall, respectively – although these weren't record setting rainfall totals.

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

Location	Rainfall total (mm)	Percentage of normal	Year records began	Comments
High records or near-records				
Whangaparaoa	354	497	1946	Highest
Auckland (Mangere)	269	315	1959	Highest
Pukekohe	297	391	1944	Highest
Kaitaia	236	293	1948	2nd-highest
Auckland (North Shore)	267	304	1966	2nd-highest
Rotorua	377	379	1963	2nd-highest
Auckland (Airport)	261	347	1959	2nd-highest
Whatawhata	301	266	1952	2nd-highest
Hamilton (Ruakura)	238	298	1905	2nd-highest
Kaikohe	265	242	1956	3rd-highest
Warkworth	304	280	1966	3rd-highest
Paeroa	335	373	1914	3rd-highest
Te Puke	353	245	1973	3rd-highest
Hamilton (Airport)	216	256	1935	3rd-highest
Auckland (Western Springs)	242	275	1948	4th-highest
Paraparaumu	143	209	1945	4th-highest
Low records or near-records				
Tiwai Point	26	26	1970	Lowest
Mt Cook Village	53	14	1928	2nd-lowest
Lake Manapouri (West Arm)	103	32	1971	2nd-lowest

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.

Milford Sound	164	28	1929	3rd-lowest
Wanaka	8	15	1927	3rd-lowest
Invercargill	24	25	1900	3rd-lowest
South West Cape	56	49	1991	3rd-lowest

Temperature: Warm in the North Island, cool in the eastern South Island.

Much of the North Island experienced a warmer than usual March, due to the predominant northwesterly airflow originating in the tropics. Many locations recorded above average (0.51 to 1.20°C above average) or well above average (>1.20°C above average) mean air temperatures. Numerous near-records were set for high mean temperature as well as mean maximum temperature, mostly in the upper half of the North Island. In contrast, the South Island experienced a division in temperatures along the Main Divide, with near average (-0.50 to 0.50°C of average) or below average (-1.20 to -0.51°C below average) temperatures experienced in most locations in the east and south of the South Island, and a few locations in coastal Canterbury recorded well below average temperatures (< -1.20°C below average). Notably, Timaru recorded its third-coolest March since records began there in 1885. In the west of the South Island, above or well above average temperatures were recorded due to the foehn effect caused by the southeasterly flow over the Southern Alps .

The nationwide average temperature in March 2017 was 16.0°C (0.3°C above the 1981-2010 March average from NIWA's seven station temperature series which begins in 1909).

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

Location	Mean air temp. (°C)	Departure from normal (°C)	Year records began	Comments
High records or near-records				
Taupo	17.8	2.8	1949	2nd-highest
Motu	15.6	1.7	1990	2nd-highest
Whatawhata	19.4	2.2	1952	3rd-highest
Hicks Bay	19.5	1.6	1969	3rd-highest
Whitianga	19.3	1.6	1962	4th-highest
Te Puke	18.7	1.6	1973	4th-highest
Motueka	17.4	1.7	1956	4th-highest
Low records or near-records				
None observed				

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

Location	Mean maximum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
High records or near-records				
Whangarei	24.4	1.3	1967	3rd-highest
Whitianga	24.1	1.5	1962	3rd-highest
Motu	21.0	2.4	1990	3rd-highest
Rotorua	22.2	1.7	1964	4th-highest
Taupo	22.6	2.2	1949	4th-highest
Low records or near-records				
Timaru	16.5	-2.2	1885	3rd-lowest

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

Location	Mean minimum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
High records or near-records				
Whatawhata	15.0	3.1	1952	Highest
Taupo	12.9	3.3	1949	2nd-highest
Lower Retaruke	12.7	3.3	1966	2nd-highest
Cheviot	9.5	1.1	1982	2nd-highest
Mokohinau	18.3	0.9	1994	3rd-highest
Auckland (Henderson)	15.9	2.2	1948	3rd-highest
Waione	12.8	1.5	1991	3rd-highest
Mahia	15.1	1.0	1990	3rd-highest
Auckland (Whenuapai)	14.9	1.6	1945	4th-highest
Motu	10.1	1.0	1990	4th-highest
Hicks Bay	16.4	1.6	1969	4th-highest
Low records or near-records				
Kaikoura (Middle Creek)	10.1	-1.7	1963	3rd-lowest

Sunshine: Cloudy for most but sunny in the south.

Cloudy skies and wet weather over much of the North Island and upper and eastern South Island resulted in low sunshine totals there for March 2017. In particular, the Wellington region had a very cloudy March, with Paraparaumu, Kelburn (Wellington City) and Martinborough all experiencing their second-lowest March sunshine on record. In contrast, the lower South Island experienced clear skies and low rainfall associated with persistent high pressure systems, which resulted in high sunshine hours for some locations. Queenstown observed its sunniest March on record (records go back to 1930), and Invercargill experienced its second-sunniest March with records going back to 1913.

Of the available, regularly reporting sunshine observation sites, the sunniest four locations in 2017 (1 January – 31 March) were Whakatane (753.6 hours), Lake Tekapo (751.3 hours), Blenheim (729.0 hours) and Gisborne (726.3 hours).

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

Location	Sunshine hours	Percentage of normal	Year records began	Comments
High records or near-records				
Queenstown	244	130	1930	Highest
Invercargill	207	145	1913	2nd-highest
Low records or near-records				
Martinborough	142	65	1986	2nd-lowest
Paraparaumu	128	64	1953	2nd-lowest
Wellington (Kelburn)	143	70	1928	2nd-lowest
Cheviot	165	92	1983	4th-lowest

March climate in the six main centres

March 2017 temperatures were well above average for Tauranga and Hamilton, above average for Auckland, and near average for the remaining centres. All centres apart from Dunedin recorded well above normal rainfall, with Auckland experiencing its third-highest monthly rainfall (of any month) on record. Dunedin recorded below normal rainfall. Wellington and Christchurch experienced well below normal sunshine, and Tauranga and Hamilton recorded below normal sunshine. In contrast, Dunedin recorded well above normal sunshine. Of the six main centres in March 2017, Tauranga was the warmest and wettest, Dunedin was the coolest, driest, and sunniest, and Christchurch was the least sunny (although it was missing three days of data).

March 2017 main centre climate statistics:

Temperature			
Location	Mean temp. (°C)	Departure from normal (°C)	Comments
Auckland ^a	19.3	0.8	Above average
Tauranga ^b	19.5	1.3	Well above average
Hamilton ^c	18.2	1.3	Well above average
Wellington ^d	15.7	-0.1	Near average
Christchurch ^e	14.7	-0.2	Near average
Dunedin ^f	13.3	-0.4	Near average
Rainfall			
Location	Rainfall (mm)	% of normal	Comments
Auckland ^a	269	315	Well above normal (highest March rain, 3 rd highest all-month)
Tauranga ^b	275	283	Well above normal
Hamilton ^c	216	256	Well above normal (3 rd -highest March)
Wellington ^d	130	153	Well above normal
Christchurch ^e	77	169	Well above normal
Dunedin ^f	46	72	Below normal
Sunshine			
Location	Sunshine (hours)	% of normal	Comments
Auckland ^a	172	90	Near normal
Tauranga ^b	174	81	Below normal
Hamilton ^g	163	84	Below normal
Wellington ^d	143	70	Well below normal (2 nd -lowest March)
Christchurch ^e	126 ²	66	Well below normal
Dunedin ^f	184	127	Well above normal

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

² 3 days missing

Highlights and extreme events

Rain and slips

On 1 March, heavy rain caused surface flooding in the Auckland suburbs of Penrose and Mt Wellington.

During the week of 7-12 March, the upper North Island experienced three significant heavy rainfall events which caused major flooding, slips, and damage to homes and infrastructure. These events were caused by a very slow moving subtropical low pressure system in the Tasman Sea (nicknamed the 'Tasman Tempest') which was halted by a 'blocking' high pressure system to the south. The clockwise movement of air around the low pressure system meant that the airmasses originated in the tropics and were therefore very moist. The slow-moving nature of the system, combined with the moist air, caused very heavy rain to fall over the six day period. The three major events are considered separately in the following paragraphs.

On 7-8 March, heavy downpours and significant flooding affected the upper North Island, particularly southeast Auckland and the Coromandel Peninsula. For some areas, the rainfall event had a return period of over 100 years. Early on 8 March, nearly 200 school children were evacuated from waist-deep floodwaters at a school camp (Camp Adair) in the Hunua Ranges, southeast of Auckland. The Coastguard rescued three people and a dog who were trapped by floodwaters, also in the Hunua area, and numerous motorists were rescued when their cars became trapped in floodwaters. Major flooding in Clevedon caused significant stock losses from farms in the area, as well as road closures and evacuations. In Kawakawa Bay, southeast of Auckland, 15 houses were affected by flooding and slips on Turei Hill and this prevented people from leaving Kawakawa Bay. Kawakawa Bay Kindergarten was almost totally destroyed after a nearby tidal creek flooded. Thousands of dollars' worth of children's books and games, as well as furniture and computers, were ruined. A police car was swept away in a flash flood near Clevedon and one officer was stranded on the roof of the car. Houses and roads were also affected by flooding in Beachlands and Maraetai. 150 children at another school camp (Hunua Falls Camp) were evacuated when a fallen tree blocked access to the camp. Around 1000 homes were without power in Auckland's southeast. Waiheke Island also experienced flooding and slips, and a wooden footbridge washed up on Onetangi Beach after being washed down a stream. Five regional parks in Auckland were closed due to flooding (Tapapakanga, Hunua Ranges, Waitawa, Duder and Waharau).

The Coromandel Peninsula was cut off due to SH 25 being closed at both Kopu and south of Tairua, due to flooding and slips. SH 2 through the Karangahake Gorge was also closed for a time due to flooding. The towns of Pauanui, Whangamata, Tairua, Onemana, Hikuai, and Kaiaua were affected by severe flooding and slips, with some evacuations taking place. Whiritoa was cut off by slips on SH 25, and some houses were evacuated there. Pupils and teachers from Otumoetai College were evacuated from a Whangamata surf camp. Seventeen schools and 11 early childcare centres were closed for the day across Auckland and Coromandel, although mostly in Coromandel. A slip in Onemana pushed a Dodge ute 50m downhill and flattened a caravan. More than 8000 homes on the Coromandel Peninsula were without power for a time. Other roads throughout the Coromandel Peninsula and

northeast Waikato were closed due to flooding and slips, leading to lengthy detours for motorists. Many of these roads remained closed for a number of days.

Heavy rain also occurred in Northland on 7-8 March, causing surface flooding.

On 9 March, Auckland residents were asked by Watercare, the city's water supply company, to reduce water consumption for the next three weeks due to increased suspended sediment in the Hunua water supply reservoirs following the 7-8 March rainfall, which caused the Ardmore Water Treatment Plant to run at half of its normal capacity. Over 100 households in the Clevedon, Kawakawa Bay and Whitford areas remained without power because repair crews could not reach the damaged lines due to flooding and slips. Also on 9 March, heavy rain affected eastern Northland. In Kerikeri, an overflowing gutter entered the ceiling cavity above Soundlounge, an independent record store, flowing into the store and damaging thousands of dollars' worth of stock. Rainwater also brought down part of a ceiling in a Kemp Rd home in Kerikeri.

On 10-11 March, the second extreme rainfall event occurred. Heavy rain fell in eastern Northland, Auckland, and Coromandel. Many houses were flooded and thousands of people were without power. A family in the Waiomio Valley near Kawakawa in Northland was trapped by floodwaters, and other residents evacuated to the local marae. The Kaeo River flooded SH 10. From 5 p.m. to 6 p.m. on 10 March, Auckland (Airport) experienced its equal-wettest March hour on record, with 27.6mm recorded. Flooding on some Auckland streets led to cars being trapped and one driver was trapped inside their car in floodwaters, having to be rescued by the Fire Service. A person was stopped from wakeboarding behind a car on Auckland's Portland Road, Remuera, by police, where floodwaters were knee-deep. Train services on Auckland's Eastern line were running at a reduced frequency due to the severe weather. Auckland's Cup Day at Ellerslie Racecourse on 11 March was postponed due to the track being too wet. Countdown Te Atatu in west Auckland was affected by ceiling leaks which caused some structural damage to the walls. Waiheke Island was affected by flooding and slips in some areas, with a house being left perched above a slip on a cliff in Oneroa. The Clevedon River flooded again for the second time in three days, and Kawakawa Bay was cut off by slips. Several roads were closed in Auckland due to surface flooding. In the Coromandel, state highways that were closed included SH 26 between Kopu and Paeroa and SH 26A from Kopu to Hikuai. Two sections of SH 25 near Whangamata were also closed. About 200 festival goers were evacuated early on 11 March from Sundaise Festival near Waihi, due to flooding.

On 12 March, the third significant rainfall event occurred. Localised downpours hit Auckland, with many areas being affected by flooding, including Kaukapakapa, Devonport, Parnell, Remuera, Eden Terrace, Blockhouse Bay, Morningside, Massey, Westgate, Whenuapai, New Lynn, Avondale, Titirangi, Henderson, Te Atatu, West Harbour, Glen Eden, and Kelston. The area around New Lynn was the worst affected. Over 320 properties in Auckland were flooded (over 220 in west Auckland), some in waist-deep water. Roads were closed in New Lynn due to major flooding, and people were trapped in their cars and in retail stores by floodwaters at the intersection of Great North Road and Clark Street. In Kelston, residents were evacuated from a block of units due to flooding, and concerns were held for a commercial building in New Lynn which appeared to have a burst water main running through it. A damaged culvert ripped away some of the road and footpath on a New Lynn street, and Bunnings Warehouse in New Lynn was evacuated due to flooding. Lagoon Drive in Panmure was reduced to one lane due to a slip. Thousands of people were without power, less than 24 hours after Vector repaired major faults on its network caused by the 10-11 March rain event. Numerous car crashes were

attributed to the severe weather. At one point during the day, the Fire Service was receiving one emergency call every 24 seconds. In the Gisborne Region, heavy rain caused slips and tree fall in Tikitiki and Hicks Bay. In Rotorua, Utuhina Stream burst its banks and threatened about six houses, and Paradise Valley Road was closed after slips and fallen trees blocked the road and a nearby bridge was washed out. Grays Road near Wellington was closed due to flooding.

On 13 March, Green Bay High School temporarily closed nine classrooms after flooding from 12 March affected them. The school asked its year 13 students to stay home for the day. Slips and flooding affected SH 1 south of Kaikoura, and motorists were asked to use the Inland Route.

On 14 March, rain and strong winds triggered fresh slips south of Kaikoura, keeping SH 1 closed for another morning.

On 26 March, heavy rain didn't stop Auckland's final Adele concert. It did, however, cause flooding for 15 properties in East Auckland, Remuera, and Castor Bay when stormwater drains became blocked.

On 29 March, heavy rain caused the Manaia River in the Coromandel Peninsula to burst its banks, flooding SH 25. Patches of surface flooding were observed in Coromandel Town, and slips came across the highway north of Thames. Heavy rain closed a section of the Hamilton river path as the section of the river bank below the path was being geo-technically monitored for movement following the rain. In Auckland, flash flooding occurred in Pukekohe, Ramarama and Papakura, closing some roads. Numerous motorists became stranded by the floods, and a Ramarama man rescued nine vehicles from the floodwaters with his large truck. Some basements and garages in Pukekohe had to be pumped out by the fire service. A major road near SH 1 in Wellsford was closed for a time due to flooding.

The highest 1-day rainfall was 231.8 mm, recorded at North Egmont on 11 March. Numerous stations, particularly in the Auckland region, experienced their wettest or near-wettest March day on record during the month.

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

Location	Extreme 1-day rainfall (mm)	Date of extreme rainfall	Year records began	Comments
Auckland (Mangere)	100	10th	1959	Highest
Kaitaia	104	10th	1948	2nd-highest
Whangaparaoa	153	7th	1946	2nd-highest
Auckland (North Shore)	106	10th	1966	2nd-highest
Whatawhata	107	10th	1952	2nd-highest
Paraparaumu	74	11th	1951	2nd-highest
Auckland (Western Springs)	93	10th	1948	3rd-highest
Rotorua	98	10th	1964	3rd-highest
Pukekohe	83	7th	1944	3rd-highest
Dargaville	69	10th	1943	4th-highest
Hamilton (Ruakura)	77	10th	1907	4th-highest

Temperatures

The highest temperature was 33.0°C, observed at Leeston (Canterbury) on 17 March. The lowest temperature was -1.7°C, observed at Lake Pukaki on 8 March.

Some locations recorded near-record maximum daily temperatures in March 2017, although no new records were set. However, 8 March was a cool day for many locations, with Whakatane and Port Taharoa recording their lowest daily maximum temperature for March on this day, and numerous other locations recording near-record-low daily maximum temperatures for March. Overnight on 12 March was warm for the central North Island, with some locations experiencing near-record-high daily minimum March temperatures.

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

Location	Extreme maximum (°C)	Date of extreme temperature	Year records began	Comments
High records or near-records				
Hawera	26.2	10th	1977	2nd-highest
Motueka	30.1	5th	1956	2nd-highest
Kaikohe	26.9	8th	1973	Equal 2nd-highest
Whanganui	30.3	10th	1937	3rd-highest
Motu	25.7	22nd	1990	Equal 3rd-highest
Farewell Spit	25.7	1st	1971	Equal 3rd-highest
Secretary Island	25.1	14th	1985	4th-highest
Low records or near-records				
Whakatane	15.8	8th	1975	Lowest
Port Taharoa	16.8	8th	1974	Lowest
Te Puke	14.6	8th	1973	2nd-lowest
Motu	11.4	8th	1990	2nd-lowest
Takaka	14.6	25th	1978	2nd-lowest
Farewell Spit	15.4	25th	1972	2nd-lowest
Oamaru	10.6	13th	1972	2nd-lowest
Paeroa	16.5	8th	1971	Equal 2nd-lowest
Te Kuiti	15.1	8th	1959	3rd-lowest
Le Bons Bay	9.9	13th	1984	3rd-lowest
Tauranga	16.7	8th	1941	Equal 4th-lowest

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

Location	Extreme minimum (°C)	Date of extreme temperature	Year records began	Comments
High records or near-records				
Port Taharoa	20.6	12th	1974	2nd-highest
Cape Reinga	19.9	9th	1971	Equal 2nd-highest
Hicks Bay	20.5	12th	1972	Equal 2nd-highest
Te Puke	19.8	12th	1973	3rd-highest
Taupo	18.5	12th	1950	3rd-highest
Lower Retaruke	19.1	12th	1972	3rd-highest
Rotorua	18.8	12th	1972	Equal 3rd-highest
Low records or near-records				

None observed

Wind

On 8 March, strong winds caused a large tree to fall onto a driveway in Rotorangi, Waikato, trapping the occupants at their property. The Fire Service responded to almost 200 weather-related callouts across New Zealand, mostly due to wind and lightning damage. A tree crashed onto a house in Thames, and the Te Aroha Golf Club building was damaged by high winds. Elsewhere in Te Aroha, roofs were lifted and fences were flattened by the strong downslope easterly winds coming over the Kaimai Ranges.

On 10 March, a strong gust of wind associated with a thunderstorm affected Stanmore Bay, Whangaparaoa, Auckland, sending a trampoline flying, damaging a few trees and bringing a fence down.

On 12 March, a large tree in the Auckland Domain fell over a footpath.

On 26 March, wind caused damage to a power pole in west Auckland, causing 1500 properties to lose power for a time.

The highest wind gust was 137 km/hr, observed at Castlepoint on 20 March.

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

Location	Extreme wind gust (km/hr)	Date of extreme gust	Year records began	Comments
Paeroa	98	8th	1991	Highest
Mokohinau	119	8th	1994	2nd-highest

Lightning and hail

On 8 March, lightning strikes caused numerous Fire Service callouts over northern New Zealand. A tree exploded into fire near Whangarei after being struck by lightning.

On 9 March, thunderstorms affected eastern Northland. Over 100 cloud-to-ground lightning strikes were recorded in five minutes. An Air New Zealand flight from Auckland to Kerikeri was struck by lightning and had to return to Auckland.

On 12 March, an Air New Zealand plane was struck by lightning while flying from Wellington to Dunedin. The flight was diverted to Christchurch.

Cloud and fog

On 3 March, unusual 'wave cloud' formations were seen above Christchurch Airport. This phenomenon is called Kelvin-Helmholtz instability, and needs specific conditions to form; namely moist air with no upward movement, a steady wind source and a strong vertical shear of the wind. These clouds were also seen on 14 March in Tauranga and in Wellington on 23 March.

On 17 March fog disrupted several flights at Invercargill Airport. In Dunedin, thick fog affected some coastal areas for much of the day, stopping the cruise ship *Queen Victoria* from docking at Port Chalmers and delaying a couple of flights from Dunedin Airport.

On 22 March, fog delayed and cancelled some morning flights from New Plymouth.

On 29 March, sea fog caused major disruptions at Wellington Airport, cancelling all flights for about 24 hours. About 100 flights were affected. The fog caused numerous road accidents, leading to delays for commuters.

On 30 March, fog caused flight delays and cancellations at Dunedin and Invercargill airports.

For further information, please contact:

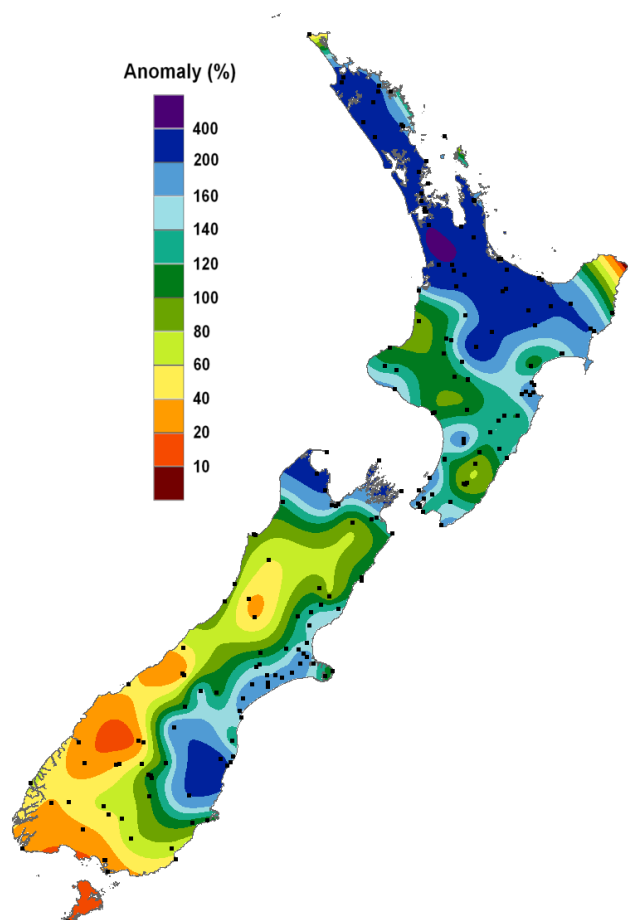
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March 2017 mean rainfall, expressed as percentage of the 1981-2010 normal.

March 2017 was characterised by very heavy rainfall events in the upper North Island over multiple days which caused significant flooding and slips. Some areas received over three times (>300%) the normal March rainfall. The south and west of the South Island experienced well below normal rainfall (<50% of March normal).

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