

## A tumultuous month with record breaking rainfall for eastern South Island

<b>Rainfall</b>	July rainfall was well above normal (>150% of the July normal) for the Greater Wellington Region, Otago and mid to south Canterbury. Rainfall was above normal (120-149% of the July normal) for large parts of the North Island and Nelson. Below normal rainfall (50-79% of the July normal) was observed in parts of Northland, the West Coast, western Southland and western Otago.
<b>Temperature</b>	July temperatures were near average (-0.50°C to +0.50°C of the July average) for much of the country. Temperatures were below average (-0.51°C to -1.20°C of the July average) about the districts of Hurunui, Mackenzie, Waitaki, Dunedin and Clutha as well as eastern Southland. Pockets of above average temperature (+0.51°C to +1.20°C of the July average) were observed in the Waikato and Manawatu-Whanganui.
<b>Sunshine</b>	July sunshine hours were near normal (90-109% of the July normal) for much of the country. The exceptions to this were parts of Wellington, Taranaki, Nelson and Christchurch where below normal (75-89% of the July normal) or well below normal (< 75% of the July normal) sunshine was observed.
<b>Soil Moisture</b>	As at 1 August 2017, soil moisture levels were near normal for virtually the entire country. Soil moisture was slightly higher than normal for coastal areas from Timaru to Dunedin.

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### Overview

July was a tumultuous month due to the passage of several active low pressure systems and consequently there were numerous high impact weather events throughout the month. These included a major winter storm that brought snow to sea level in Otago and Tropical Cyclone Category 1 strength winds<sup>1</sup> to the Wellington Region. Most notably, record breaking rainfall in parts of Canterbury

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<sup>1</sup> Based on BoM Tropical Cyclone Classification. Gusts of 90-125 km/hr recorded over open flat land. Note higher category gusts on ridge tops also occurred.

and Otago led to severe flooding and the declaration of a State of Emergency. See the *Highlights and Extreme Events* section for full details.

In terms of temperature, there were a handful of cold spells in July which led to new record or near-record low daily maximums and minimums being set. Despite this, frequent bouts of warm weather meant that average temperatures for all of July were near average for most of the country. Sunshine hours were also near average for much of the country despite the wet flavour to the month. This can be attributed to the nature of the rain, which was often heavy but short lived.

Further Highlights:

- The highest temperature was 19.2°C, observed at Wairoa on 20 July.
- The lowest temperature was -14.6°C, observed at Tekapo on 29 July.
- The highest 1-day rainfall was 197.6 mm, recorded at North Egmont on 1 July. The second highest was 161.2mm at Oamaru on 21 July.
- The highest wind gust was 167 km/hr, observed at both Brothers Island and Mt Kaukau (Wellington) on 13 July.
- Of the six main centres in July 2017, Auckland was the warmest, Christchurch was the coldest and least sunny, Tauranga was the sunniest and driest, and Wellington was the wettest.
- Of the available, regularly reporting sunshine observation sites, the sunniest four locations in 2017 so far (1 January – 31 July) are Whakatane (1463 hours), Richmond (1428 hours), Blenheim (1423 hours), and Napier (1364 hours).

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## Rainfall: A wet month for large parts of the country

July rainfall was well above normal (>150% of the July normal) for the Greater Wellington Region, Otago and mid to south Canterbury. Rainfall was above normal (120-149% of the July normal) in large parts of the North Island and Nelson. These high rainfall amounts for the month as a whole were driven by a handful of extreme events including the persistent heavy rainfall on July 21 which caused flooding and a State of Emergency declaration issued for Otago, Timaru, and Christchurch. More details on these events can be found in the *Highlights and Extreme Events* section.

Several July total rainfall records and near-records were set for coastal areas from Christchurch south to Balclutha. Oamaru not only had its wettest July on record, but it has already had its wettest winter on record with one month of the season still to come. The 224mm of rain recorded in Oamaru during July also makes it the second-wettest month on record behind May 2010 when 298mm fell. Records at Oamaru began in 1941. It wasn't a wet month for all though, as below normal rainfall (50-79% of the July normal) was observed in Kerikeri, Whangarei, Reefton, Queenstown and Milford Sound.

As of 1 August 2017, soil moisture levels were near normal for virtually the entire country. Soil moisture was slightly higher than normal for coastal areas from Timaru south to Dunedin.

## Record<sup>2</sup> or near-record July rainfall totals were recorded at:

Location	Rainfall total (mm)	Percentage of normal	Year records began	Comments
High records or near-records				
Winchmore	238	353	1909	Highest
Oamaru	224	553	1941	Highest
Wairoa	218	163	1964	2nd-highest
Middlemarch	91	293	1896	2nd-highest
Lauder	61	261	1924	2nd-highest
Roxburgh	70	240	1948	2nd-highest
Balclutha	120	243	1964	2nd-highest
Ashburton	221	336	1909	3rd-highest
Lake Tekapo	154	311	1925	3rd-highest
Timaru	146	335	1881	3rd-highest
Dunedin (Musselburgh)	157	274	1918	3rd-highest
Akaroa	259	197	1977	4th-highest
Ranfurly	70	236	1897	4th-highest
Low records or near-records				
None observed				

## Temperature: Near average temperatures for most of the country

The nationwide average temperature in July 2017 was 7.9°C (0.1°C above the 1981-2010 July average from NIWA's seven station temperature series which begins in 1909).

July temperatures were near average (-0.50°C to +0.50°C of the July average) for much of the country. Temperatures were below average (-0.51°C to -1.20°C of the July average) about the districts of Hurunui, Mackenzie, Waitaki, Dunedin and Clutha as well as eastern Southland. Tekapo and Mt Cook saw well below normal temperatures (<-1.20°C of the July average) during July which was primarily due to a large amount of snowfall in the area as described in the *Highlights and Extreme Events* section. Pockets of above average temperature (+0.51°C to +1.20°C of the July average) were observed in the Waikato and Manawatu-Whanganui.

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

Location	Mean air temp. (°C)	Departure from normal (°C)	Year records began	Comments
High records or near-records				
None observed				
Low records or near-records				
Mt Cook (Airport)	-0.4	-2.6	1929	3rd-lowest
Takaka	6.5	-1.3	1978	4th-lowest
Lumsden	3.0	-0.9	1982	4th-lowest

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

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

Location	Mean maximum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
<b>High records or near-records</b>				
None observed				
<b>Low records or near-records</b>				
Lake Tekapo	3.2	-3.0	1927	3rd-lowest
Le Bons Bay	9.1	-0.7	1984	4th-lowest
Lumsden	7.4	-1.2	1982	4th-lowest
Takaka	11.6	-1.7	1978	Lowest

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

Location	Mean minimum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
<b>High records or near-records</b>				
Lower Retaruke	4.3	1.9	1966	4th-highest
<b>Low records or near-records</b>				
Balclutha	-0.8	-1.8	1964	2nd-lowest
Mt Cook (Airport)	-5.3	-3.1	1929	3rd-lowest
Nugget Point	2.7	-0.7	1970	4th-lowest

**Sunshine: Near normal sunshine hours**

Despite July being a wet month, frequent breaks in the wet weather also brought some sunny days. The swing between sunny and cloudy days throughout July evened each other out so that overall the total July sunshine hours were near normal (90-109% of the July normal) for much of the country. As an example, Dunedin had its third-wettest July on record yet sunshine hours were near normal.

The exceptions to this were parts of Wellington, Taranaki, Nelson and Christchurch, where below normal (75-89% of the July normal) or well below normal (< 75% of the July normal) sunshine was observed. Meanwhile, Queenstown and Invercargill had their fourth-sunniest Julys on record.

Of the available, regularly reporting sunshine observation sites, the sunniest four locations in 2017 so far (1 January – 31 July) are Whakatane (1463 hours), Richmond (1428 hours), Blenheim (1423 hours), and Napier (1364 hours).

**Record or near-record July sunshine hours were recorded at:**

Location	Sunshine hours	Percentage of normal	Year records began	Comments
<b>High records or near-records</b>				
Queenstown	132	150	1930	4th-highest
Invercargill	125	127	1913	4th-highest
<b>Low records or near-records</b>				
None observed				

## July climate in the six main centres

July was a wet month for all main centres, with above normal rainfall observed, except for Tauranga where rainfall was near normal. Both Christchurch and Dunedin recorded more than double their usual July rainfall. The bulk of this rain fell over the 21<sup>st</sup> and 22<sup>nd</sup> of July. Temperatures were above average in Auckland but near average for all other main centres. In terms of sunshine, Wellington and Christchurch had a cloudy July while the remaining main centres saw near normal sunshine hours.

Of the six main centres in July 2017, Auckland was the warmest, Christchurch was the coldest and least sunny, Tauranga was the sunniest and driest, and Wellington was the wettest.

### July 2017 main centre climate statistics:

Temperature			
Location	Mean temp. (°C)	Departure from normal (°C)	Comments
Auckland <sup>a</sup>	11.5	+0.6	Above average
Tauranga <sup>b</sup>	10.3	0.0	Near average
Hamilton <sup>c</sup>	9.1	+0.4	Near average
Wellington <sup>d</sup>	9.0	+0.1	Near average
Christchurch <sup>e</sup>	5.5	-0.3	Near average
Dunedin <sup>f</sup>	6.1	-0.4	Near average
Rainfall			
Location	Rainfall (mm)	% of normal	Comments
Auckland <sup>a</sup>	190	138%	Above normal
Tauranga <sup>b</sup>	124	96%	Near normal
Hamilton <sup>c</sup>	160	124%	Above normal
Wellington <sup>d</sup>	230	168%	Well above normal
Christchurch <sup>e</sup>	159	246%	Well above normal
Dunedin <sup>f</sup>	157	274%	Well above normal – 3 <sup>rd</sup> -highest on record
Sunshine			
Location	Sunshine (hours)	% of normal	Comments
Auckland <sup>a</sup>	126	96%	Near normal
Tauranga <sup>b</sup>	138	91%	Near normal
Hamilton <sup>g</sup>	112 <sup>3</sup>	90%	Near normal
Wellington <sup>d</sup>	97	81%	Below normal
Christchurch <sup>e</sup>	93	73%	Well below normal
Dunedin <sup>f</sup>	100	91%	Near normal

<sup>a</sup> Mangere <sup>b</sup> Tauranga Airport <sup>c</sup> Hamilton Airport <sup>d</sup> Kelburn <sup>e</sup> Christchurch Airport <sup>f</sup> Musselburgh  
<sup>g</sup> Ruakura

<sup>3</sup> Missing 4 days of data

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## Highlights and extreme events

### Rain and slips

On 6 July afternoon thunderstorms caused localised flooding in the Auckland region. Surface flooding affected traffic heading through Spaghetti Junction from Hobson St through to the northwestern motorway. Meanwhile, Auckland Transport said flooding near Panmure affected train services on the eastern line. Emergency services received several calls to flooded homes and properties across the region.

On 8 July a heavy downpour struck New Plymouth around midday and caused flash flooding. Streets and several homes flooded and the steps inside the Centre City mall briefly became a “waterfall”. The water was reportedly up to 30cm deep in some places with cars struggling to drive through some streets.

On 13 July heavy rain in the Wairarapa caused flooding in Carteron. Both the Waihenga Bridge over the Ruamahanga River and the Ponatahi Bridge over the Ponatahi Stream were closed by flooding cutting the two main access routes to Martinborough. On SH56 near Opiki a section of the road was closed due to flooding.

On 20 July heavy rain and wind high wind affected parts of the North Island. Large trees came down, cutting power across the Bay of Plenty. About 1000 homes were without power in the western Bay of Plenty, including 600 in the Tauranga suburb of Pyes Pa. More than a dozen outages also affected residents in the Far North and the Bay of Islands, while 250 homes had no power in Inglewood in Taranaki. In Auckland, Vector responded to outages in St Heliers, Waiheke, Whitford, Helensville and South Head. SH 4 from Fields Track to Raetihi to was closed due to a slip

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 eastern parts of the South Island. There were several slips including one large one on the 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. In Christchurch, the Heathcote River burst its banks leading to streets flooded in the suburb of Beckenham. Dozens of properties – largely in Henley (at least 35 properties) and the Taieri Plain remained evacuated on the 25<sup>th</sup> of July. At peak flow the Clutha 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 (all time not just July) on record since daily rainfall records started in 1950, with 161mm of rain. The previous record was 56mm of rain observed on the 30<sup>th</sup> of July 1974. Dunedin also had its wettest July day on record since records began in 1918. 89mm fell in 24 hours in Dunedin – beating the 2007 record of 75.8mm.

On 27 July downpours flooded roads in parts of Taranaki. Surface flooding on SH3 near Inglewood slowed traffic to a crawl in the late afternoon. Several cars stalled in the deepest parts of the flooded road and traffic was reduced to a single lane.

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

Location	Extreme 1-day rainfall (mm)	Date of extreme rainfall	Year records began	Comments
Winchmore	112	21st	1927	Highest
Oamaru	161	21st	1950	Highest
Dunedin (Musselburgh)	89	21st	1918	Highest
Roxburgh	49	21st	1950	Highest
Wellington (Airport)	60	13th	1958	2nd-highest
Ashburton	93	21st	1927	2nd-highest
Waimate	87	21st	1898	2nd-highest
Middlemarch	64	21st	1896	2nd-highest
Waipounamu	43	21st	1917	2nd-highest
Lauder	23	1st	1924	2nd-highest
Balclutha	46	21st	1964	2nd-highest
Dunedin (Airport)	63	21st	1962	2nd-highest
Arapito	73	21st	1978	3rd-highest
Lake Tekapo	61	21st	1925	3rd-highest
Timaru	69	21st	1881	3rd-highest
Masterton	62	12th	1926	4th-highest
Martinborough	62	13th	1924	4th-highest
Ranfurly	29	21st	1897	4th-highest

### Temperatures

On 12 and 13 July a southerly outbreak which brought snow to low levels across the country also led to many North Island and some eastern South Island locations observing record or near-record low maximum temperatures.

On 19 and 20 July a warm north-westerly air flow brought warm temperatures to the North Island, particularly eastern areas. Wairoa reached a maximum of 19.2°C on the 20<sup>th</sup> which was the warmest temperature recorded in the country for July 2017.

On 29 July a cold southerly flow caused very low temperatures in the South Island. The lowest temperature of the month across the country was recorded on this day. This was -14.6°C at Tekapo – the fourth-lowest July minimum temperature recorded there since records began in 1925.

On 30 July many North Islanders woke up to the coldest morning of the year so far. In some locations, such as Hamilton, it was the coldest morning in five years. While the temperatures were notably cold, only Warkworth ranked in the top-4 coldest July temperatures. The minimum of -1.8°C recorded there was the equal third-lowest temperature recorded in Warkworth since records began in 1966.



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

Location	Extreme maximum (°C)	Date of extreme temperature	Year records began	Comments
<b>High records or near-records</b>				
Milford Sound	16.8	20th	1934	3rd-highest
<b>Low records or near-records</b>				
Rotorua	5.7	13th	1972	Lowest
Rangiora	3.2	12th	1972	Lowest
Arapito	7.0	13th	1978	Lowest
Cape Reinga	10.8	13th	1971	Equal lowest
Waipara West	3.2	12th	1973	2nd-lowest
Cheviot	4.7	12th	1982	Equal 2nd-lowest
Takapau Plains	4.0	12th	1972	3rd-lowest
Stratford	5.8	12th	1972	3rd-lowest
Ohakune	1.6	12th	1972	3rd-lowest
Kaikohe	8.8	13th	1973	3rd-lowest
Lumsden	0.0	7th	1982	Equal 3rd-lowest
Kaitaia	10.3	13th	1948	Equal 3rd-lowest
Waiau	3.1	12th	1974	4th-lowest
Paeroa	8.7	13th	1971	4th-lowest
Mokohinau Island	11.0	13th	1994	4th-lowest
Whakatane	9.3	13th	1975	Equal 4th-lowest
Tauranga	8.9	13th	1941	Equal 4th-lowest
Kaikoura	4.9	12th	1972	Equal 4th-lowest

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

Location	Extreme minimum (°C)	Date of extreme temperature	Year records began	Comments
<b>High records or near-records</b>				
Milford Sound	10.2	22nd	1935	Equal 3rd-highest
<b>Low records or near-records</b>				
Mt Cook (Airport)	-13.7	29th	1929	Lowest
Five Rivers	-8.3	7th	1982	Equal 2nd-lowest
Mahia	1.8	13th	1990	Equal 2nd-lowest
Mokohinau	6.6	13th	1994	Equal 2nd-lowest
Kaikohe	1.7	13th	1973	3rd-lowest
Warkworth	-1.8	30th	1966	Equal 3rd-lowest
Lake Tekapo	-14.6	29th	1925	4th-lowest
Tiwai Point	-4.1	7th	1970	4th-lowest
Appleby	-5.6	30th	1932	Equal 4th-lowest



## Wind

On 4 July a storm off the east coast sent powerful easterly swells over the beach crest at Haumoana. The wave height was only around 2m but the swell had a long period and coincided with high tide which contributed to the impact. It was reported that two metres of the coastline was eroded during this event.

On 13 July more than 9000 people were without power in the lower North Island and many flights in and out of Wellington were cancelled as strong winds struck the region. At Baring Head sustained 10 minute winds of 135.7 km/hr were recorded between 8:40am and 8:50am – 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 recorded maximum wind gusts of 167 km/hr 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 was consistently recording a significant wave height (highest 1/3 of waves) greater than 6m between 5am and 8am on 13 July. Observed maximum wave heights were in the 10m range. The Interislander ferry was cancelled during this time.

On 27 July some evening flights into Wellington were diverted due to strong wind.

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

Location	Extreme wind gust (km/hr)	Date of extreme gust	Year records began	Comments
Baring Head	156	13th	1991	Highest
Whanganui	119	13th	1977	Highest
Oamaru	91	21st	1984	Highest
Queenstown	93	21st	1972	Equal highest
Mt Kaukau (Wellington)	167	13th	1969	2nd-highest
Hawera	104	13th	1986	Equal 2nd-highest
Kaikohe	96	22nd	1986	3rd-highest
Whakatane	102	20th	1974	3rd-highest
Mahia	111	20th	1991	3rd-highest
Cape Campbell	117	13th	1963	3rd-highest
Wanaka	80	21st	1992	3rd-highest
Taupo	89	20th	1982	Equal 3rd-highest
Rotorua	93	20th	1972	Equal 4th-highest

## Snow and ice

On 1 July up to 30 vehicles were towed after SH 8 between Twizel and Fairlie, and State Highway 80 between Aoraki Mt Cook and Ben Ohau, were closed due to snow. Snowfall also cut road access into Tekapo and Mt Cook and also caused two buses to slide into snow. The road closure forced several day visitors to Tekapo to stay for the night.

On 3-4 July snow caused disruptions across South Island's high country areas. The NZ Transport Agency earlier issued warnings for at least seven South Island highways including SH8 through the Lindis Pass,

SH 85 from Alexandra to Ranfurly and SH90 from Raes Junction to Willowbank. State Highway 94 was closed to towing vehicles from the Hollyford Valley Rd intersection to the Chasm Stream bridge because of black ice. Half a dozen schools and early childhood centres at Tapanui in west Otago were closed for the day.

On 5-7 July temperatures plummeted in the South Island. High atmospheric pressure, fresh snow, clear skies and a southerly flow contributed to the cool weather with NZTA issuing black ice cautions and warnings for many State Highways.

On 8 July black ice was widespread across the lower South Island. Emergency services responded to 34 crashes on roads in Southland and Otago. Two cars rolled down banks on Saturday evening, one near Balclutha and the other at Okaramio, near Blenheim. Ice on the runway at Invercargill airport caused flight cancellations and a diversion.

On 9 July black ice once again impacted roads across the lower South Island. Police had reports of cars rolling because of black ice in Central Otago, Southland and Waitaki. A car rolled into a paddock in icy conditions near Omarama and four people were injured.

On 10 July a number of road ice warnings were in place again across Otago and Southland.

On 11 July ice on the runway at Queenstown airport caused some flights to be cancelled and diverted. Road snow and ice warnings were also in place across Otago and Southland with motorists urged to take caution. Afternoon snowfall led to the closure of SH 8 from Omarama to Tarras and Fairlie to Tekapo. SH85 from Becks to Wedderburn was also closed due to snow. Chains were required to be fitted for anyone travelling on the Crown Range. Snow on the road contributed to a bus rolling on SH 6 near Makarora. There were no injuries.

On 12 July snow closed roads and state highways across the South Island. These included: Lewis Pass, Lindis Pass, SH 73 between Springfield and Arthurs Pass, SH 1 between Waititi and Pine Hill, SH 93 between Matura and Clinton, and SH 85 between Becks and Kyeburn. In Christchurch, Dyers Pass Rd over the Port Hills was closed in the morning due to snow. Snow fell to sea level in Dunedin before sunrise and closed Middleton Rd. Warnings for several other State Highways were in place. Snow and ice caused delays and cancellations at Queenstown and Dunedin airports. In the North Island, the Desert Road was closed after a truck and trailer rolled in icy conditions at about 1:30am. Up to 40cm of snow fell in the upper mountain at Ruapehu's Whakapapa and Turoa ski fields.

On 13 July several South Island roads remained closed due to snow including: Lindis Pass, SH 8, between Omarama and Tarras, SH 85 between Becks and Kyeburn, SH 87 between Middlemarch and Outram, Lewis Pass, SH 7 between the Hanmer Springs turnoff (SH 7A) and Springs Junction, Arthurs Pass, and SH 73 between Otira and Springfield. Despite anticipated improving conditions in Christchurch, most Banks Peninsula roads were restricted to four-wheel-drive vehicles fitted with chains due to snow and ice. In the North Island around a dozen people were rescued from their stricken vehicles after snow closed the Napier-Taupo road. The Desert Road and other sections of State Highways in the Central Plateau were also closed due to snow. The NZ Defence Force came to the rescue after a group of Mana bus passengers were stranded near the army camp in Waiouru due to road closures. They stayed overnight at the barracks. Powerco said several thousand customers went without power overnight after heavy snowfalls downed lines and flooding created havoc across

the company's network. Damage was spread across a large swathe of the lower North Island including Wairarapa, Manawatu, Whanganui, Taranaki, Ohakune, Waiouru and Taihape.

On 14 July roads and state highways around the Central Plateau remained closed due to snow. The Napier-Taupo road and SH 4 from Whanganui to Raetihi also remained closed in the morning due to snow and ice. Hundreds of people were also trapped in lodges around Mt Ruapehu due to snow.

On 27 July SH 8 either side of Tekapo was closed due to snow which cut off access in and out of the town for a few hours. SH 80 to Mount Cook National Park was also closed due to snow and ice. Snow affected parts of Lindis Pass on SH 8 between Tarras and Omarama where warnings were in place for motorists to carry chains.

On 28 July five vehicles, including trucks and a car hit ice and skidded off the road just outside Invercargill. Road snow and ice warnings were in place in the North Island affecting Desert Rd, Napier-Taupo Rd and Rimutaka Hill Rd.

On 29 and 30 July caution was advised by the NZTA across the country due to black ice. There were reports of cars spinning out on slippery surfaces in the Bay of Plenty with a handful of associated crashes reported. Black ice also led to a crash near Porters Pass on SH 73. Frost was also widely reported across the country.

### **Lightning and hail**

On 6 July, during the afternoon Auckland flights were put on hold and some diverted as thunder, lightning and torrential rain passed through. The lightning warning was lifted at 6pm. 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.

On 13 July hail was widely reported in the Waitakere ranges in west Auckland.

### **Cloud and fog**

On 2 July low cloud caused disruption at Invercargill airport with flights being cancelled and diverted.

On 7 July steam fog was observed over Lake Wakatipu, Queenstown.

On 8 July fog at Auckland airport caused 19 flights to be cancelled or delayed.

On 10 July freezing fog caused some disruptions at Dunedin airport. Heavy fog also affected Christchurch airport with several flights cancelled, delayed and diverted.

On 11 July several flights were delayed to fog at Wellington Airport.

On 17 July, fog led to flights being cancelled at Nelson airport.

On 18 July evening flights in and out of Timaru were cancelled and morning flights on the 19 of July were cancelled due to fog.

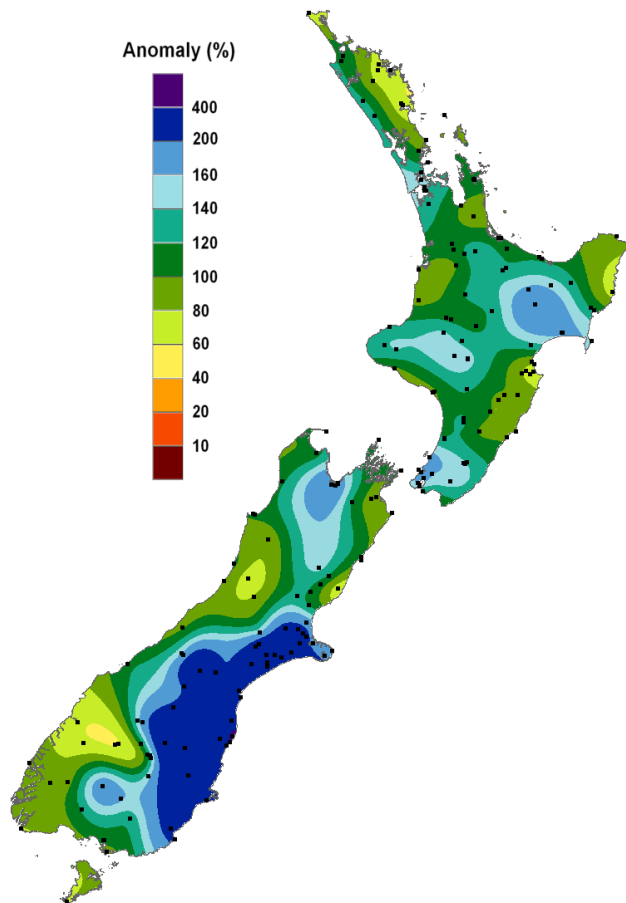
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July 2017 rainfall, expressed as a percentage of normal (1981-2010 normal).

July rainfall was above normal (120-149% of the July normal) in large parts of the North Island and Nelson. Rainfall was well above normal (>150% of the July normal) for the Greater Wellington Region, Otago and mid to south Canterbury. Below normal rainfall (50-79% of the July normal) was observed in parts of Northland, the West Coast, western Southland and western Otago.

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