



## 2018: New Zealand’s equal-2<sup>nd</sup> warmest year on record

<b>Temperature</b>	Annual temperatures were above average (+0.51°C to +1.20°C above the annual average) across the majority of New Zealand, including much of the North Island as well as the western and southern South Island. A small strip of well above average (>1.20°C from average) temperatures were observed in southern Manawatu-Whanganui. Elsewhere, near average (within -0.50°C to +0.50°C of average) temperatures occurred in parts of southern Canterbury, Otago, small parts of Auckland and the Far North. 2018 was the equal 2 <sup>nd</sup> -warmest year on record for New Zealand, based on NIWA’s seven-station series which began in 1909.
<b>Rainfall</b>	Yearly rainfall in 2018 was above normal (120-149% of the annual normal) across much of the eastern and upper South Island, as well as parts of Wellington, Wairarapa, Bay of Plenty, northern Waikato, and Auckland. Well above normal rainfall (>149% of normal) was observed in portions of southern Canterbury. Rainfall was near normal (80-119% of normal) for the remainder of New Zealand.
<b>Soil moisture</b>	2018 began with below or well below normal soil moisture nearly nationwide, but soil moisture in the North Island and upper South Island gradually increased during January. Widespread heavy rainfall from ex-tropical cyclones Fehi and Gita during February resulted in well above normal soil moisture across most of New Zealand. Near to above normal soil moisture persisted through autumn, with near normal soil moisture widespread during the winter. During spring, soils became drier than normal in much of the country, although remained wetter than normal in southern Canterbury and Otago. Heavy rain in November brought widespread wetter than normal soils to the east of both islands, while a heavy rain event around Christmas did the same for the upper North Island. As of 1 January, soils were much wetter than normal in the upper and eastern North Island, and large portions of the eastern South Island. Soils were drier than normal in parts of Taranaki, Tasman, West Coast, and Southland.
<b>Sunshine</b>	The wider Nelson region experienced New Zealand’s highest annual sunshine total during 2018 (2555 hours).

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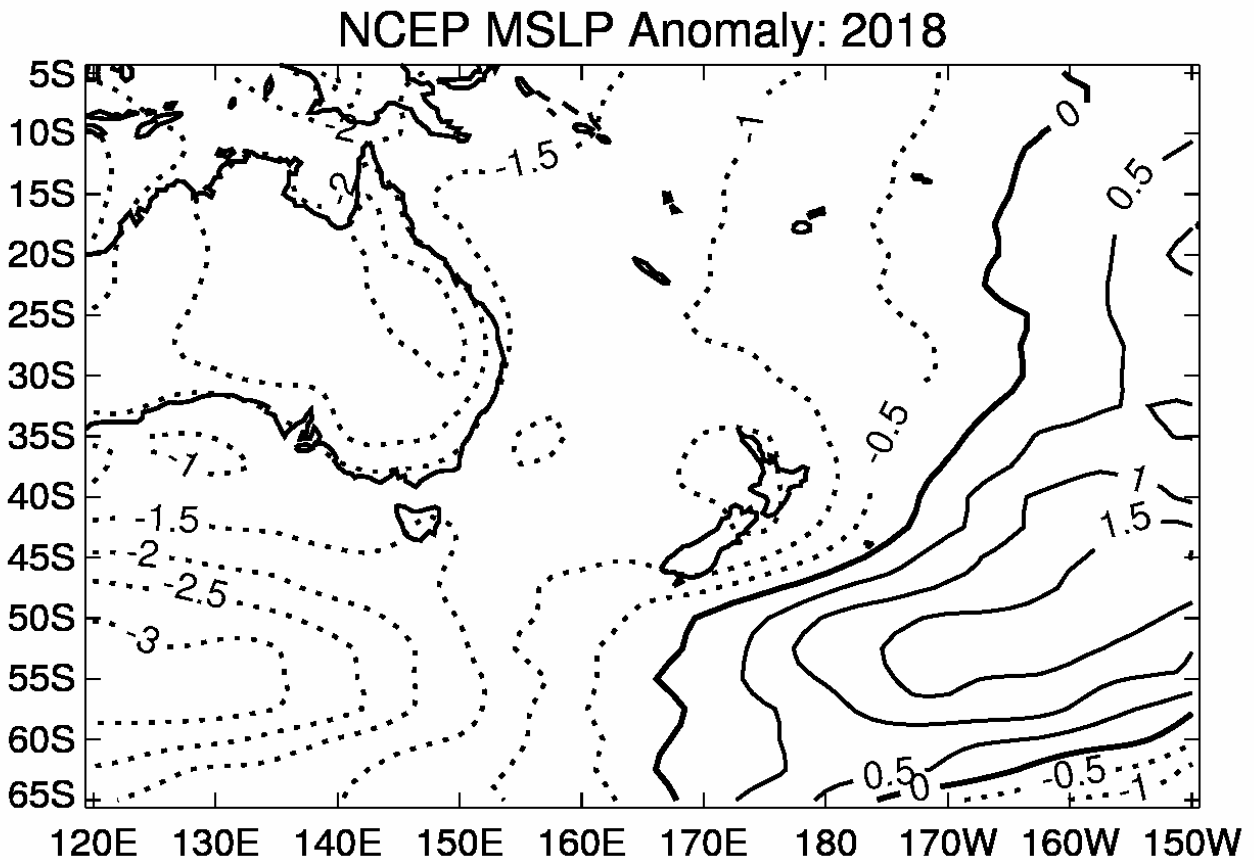
### Overview

The nationwide average temperature for 2018, calculated using stations in NIWA’s seven-station temperature series which began in 1909, was 13.41°C (0.80°C above the 1981–2010 annual average). This

makes 2018 the equal 2<sup>nd</sup>-warmest year on record along with 1998, only placing behind 2016 which had a nationwide average temperature of 13.45°C (0.84°C above the 1981–2010 annual average).

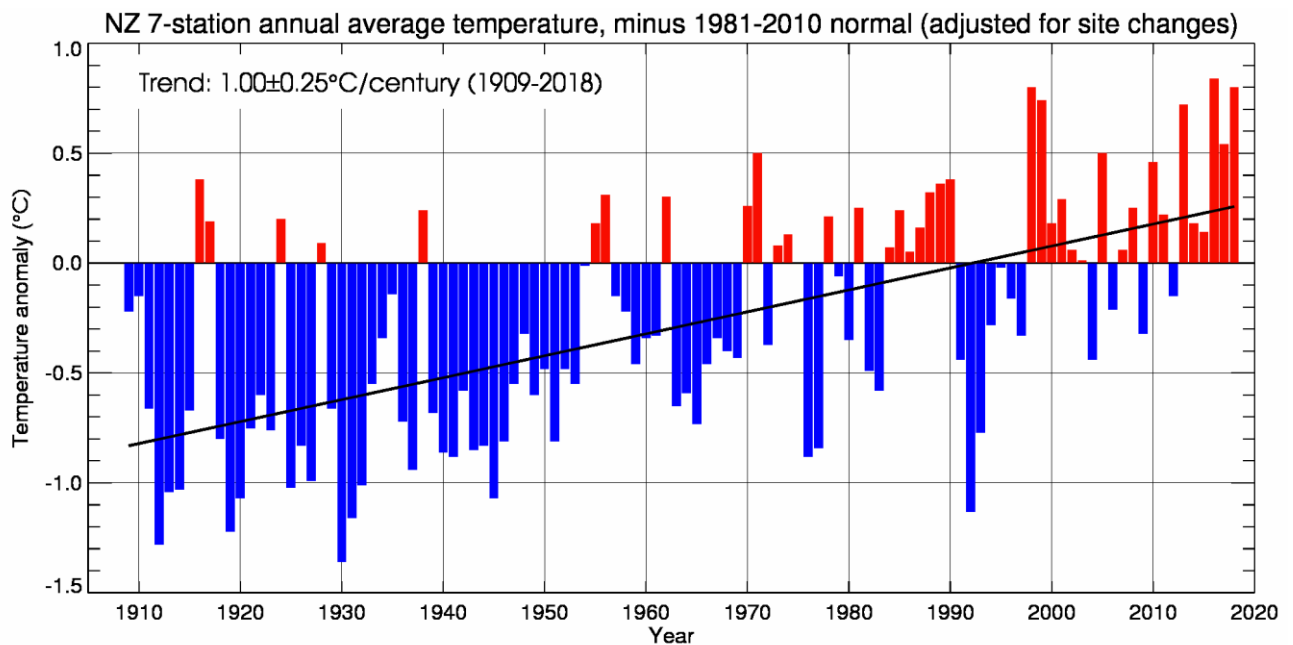
Annual mean sea level pressures for 2018 were slightly lower than normal over and just to the west of New Zealand, and higher than normal east of the country. This atmospheric pressure pattern produced slightly more northerly wind flows than normal for the year in the North Island, and more northeasterly to easterly wind flows in the South Island. This flow contributed to above normal to well above normal annual rainfall in parts of the eastern South Island.

Early 2018 featured more frequent warm northerly and northeasterly winds than normal, consistent with La Niña conditions.



**2018 Mean Sea Level Pressure Anomaly map.** Lower pressures than normal are depicted as dashed lines, and higher pressures than normal are depicted as solid lines. The measurement units are hectopascals (hPa).

During 2018, temperatures were above average (+0.51°C to +1.20°C above the annual average) across the majority of New Zealand, including much of the North Island and the western and southern South Island. A small strip of well above average (>1.20°C from average) temperatures were observed in southern Manawatu-Whanganui. Elsewhere, near average (within -0.50°C to +0.50°C of average) temperatures occurred in parts of southern Canterbury, Otago, small parts of Auckland and the Far North. Many locations observed record or near-record high mean, mean maximum, and mean minimum temperatures.



**Historical nation-wide annual temperature anomalies (degrees above or below the 1981-2010 normal) from NIWA’s seven-station temperature series which begins in 1909. Four of the past six years have been among New Zealand’s warmest on record.**

For minimum temperatures, 2018 set a new warm record at  $0.94^\circ\text{C}$  above the 1981–2010 annual average, which exceeds the previous record minimum of  $+0.80^\circ\text{C}$  held by the year 2016. Research has shown that historical warming rates have been larger for minimum temperatures compared with maximum temperatures, but temperature projections show inconsistencies – increasing diurnal range in some areas and decreasing in others<sup>1</sup>.

Four of the past six years have been among New Zealand’s warmest on record.

2018 monthly temperatures started off with January recording a remarkable  $3.1^\circ\text{C}$  above the long-term average. With a mean temperature of  $20.3^\circ\text{C}$ , January 2018 surpassed February 1998 as the hottest month on record in New Zealand. January 2018 was the fourth month in the 21<sup>st</sup> century to have a nationwide temperature more than  $2.0^\circ\text{C}$  above average (after February 2016, May 2016 and December 2017). March and December were the other months to experience well above average temperatures (both  $1.3^\circ\text{C}$  above average). Three months, including February ( $0.8^\circ\text{C}$  above average), July ( $1.1^\circ\text{C}$  above average), and August ( $0.9^\circ\text{C}$  above average) recorded above average temperatures. Meanwhile, six months, including April, May, June, September, October, and November had near average temperatures ( $-0.5^\circ\text{C}$  to  $+0.5^\circ\text{C}$  of the 1981–2010 monthly average).

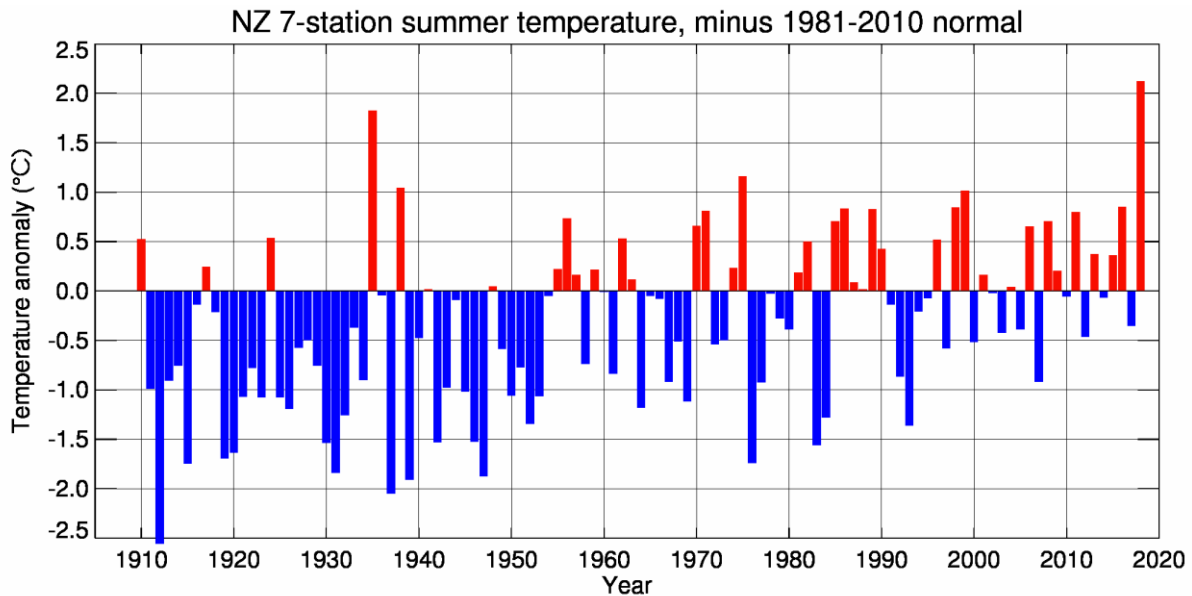
Sea surface temperatures (SSTs) in the Tasman Sea and New Zealand coastal waters spiked to  $2^\circ\text{C}$  to  $4^\circ\text{C}$  above average beginning in November 2017 and persisted until February 2018. This was described as a “marine heatwave” due to its duration and intensity. Tasman Sea surface temperatures were their warmest on record during summer 2017-18, fuelled by higher than normal air pressure and light winds. For New

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<sup>1</sup> Ministry for the Environment, 2018. Climate change projections for New Zealand. <http://www.mfe.govt.nz/publications/climate-change/climate-change-projections-new-zealand>

Zealand, well above average SSTs drove unusually warm air temperatures, resulting in New Zealand's hottest summer on record as well as its hottest single month on record (January 2018). (See *Significant Weather and Climate Events in 2018* for further details).

The nationwide average temperature for summer 2017-18 was 18.8°C (2.1°C above the 1981-2010 summer average from NIWA's seven station temperature series which began in 1909); the only summer on record to have a nationwide temperature more than 2.0°C above the 1981-2010 average. Thus, the summer of 2017-18 claimed the record of New Zealand's hottest summer formerly held by the summer of 1934-35.



**Historical nation-wide summer temperature anomalies (degrees above or below the 1981-2010 normal) from NIWA's seven-station temperature series which begins in 1909. The summer of 2017-18 claimed the record of New Zealand's hottest summer formerly held by the summer of 1934-35.**

2018 began on a wet note for much of the North Island and upper South Island, although the lower South Island was quite dry in January. Ex-Tropical Cyclones Fehi and Gita brought well above normal rainfall to much of New Zealand in February. During Gita on 20 February, 148.4 mm of rain was recorded in Motueka-Riwaka between 4:00 am and 6:00 pm, or 173% of their February normal rainfall in just 14 hours. Between 4:00 am on 20 February and 10:00 am on 21 February, 202.0 mm of rain was recorded in Kaikoura. That amount is nearly four times the monthly normal there, 28% of the annual normal rainfall, and was more rain in less than 24 hours than had fallen in November 2017, December 2017, and January 2018 combined.

Autumn remained generally wetter than normal in the east of both islands, while on 28-29 April, Rotorua received 167.8 mm of rainfall over a 36-hour period, which is almost 1.5 times its normal rainfall for all of April.

During spring, easterly wind flows brought wetter than normal conditions back to the eastern South Island, particularly in November when widespread heavy rainfall was observed. It was extremely wet in Otago, where Oamaru, Middlemarch, Cromwell, and Lauder all observed their wettest spring on record. Conversely, several Auckland locations observed their driest spring on record, including Albany (North Shore) and Western Springs (MOTAT).

Yearly rainfall in 2018 was above normal (120-149% of the annual normal) across much of the eastern and upper South Island, as well as parts of Wellington, Wairarapa, Bay of Plenty, northern Waikato, and Auckland. Well above normal rainfall (>149% of normal) was observed in portions of southern Canterbury. Rainfall was near normal (80-119% of normal) for the remainder of New Zealand.

Soil moisture levels were below or well below normal to start 2018. Prolonged dry conditions prompted the Ministry of Primary Industries to declare a medium-scale adverse event for the Grey and Buller districts on 10 January. This classification was extended to include Otago and Southland on 30 January. Widespread heavy rainfall from ex-Tropical Cyclones Fehi and Gita during February resulted in well above normal soil moisture across most of New Zealand. Near or above normal soil moisture persisted through autumn, with near normal soil moisture during the winter. During the spring, soils became drier than normal in much of the country, although remained wetter than normal in southern Canterbury and Otago. On 24 October, water restrictions were initiated in Masterton due to low spring rainfall. Heavy rain in November brought widespread wetter than normal soils to the east of both islands, while a heavy rain event around Christmas did the same for the upper North Island.

The wider Nelson region experienced New Zealand's highest annual sunshine total during 2018 (2555 hours), followed by Bay of Plenty (2518 hours) and Marlborough (2503 hours).

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## Section 1: The year in review

The monthly sequence of New Zealand climate was as follows:

### **January 2018: New Zealand's hottest month on record**

January temperatures were well above average (>1.20°C above average) throughout New Zealand. Temperatures were more than 2°C above the January average for most of the country, and parts of Southland, Otago, West Coast, Kapiti Coast and Taranaki observed mean temperatures more than 4°C above average. Periodic hot spells resulted in numerous locations observing record or near-record extreme maximum temperatures for January. Rainfall was above normal (120-149% of normal) or well above normal (>149% of normal) throughout much of the top half of the South Island, as well as many areas of the North Island. Rainfall was below normal (50-79% of normal) or well below normal (<50% of normal) for much of Southland, Otago, and Hawke's Bay. By the end of January, soils were drier than normal for the time of year across large parts of Southland, Otago, the West Coast and Taranaki, as well as southern and eastern parts of the North Island. Soil moisture was above normal for eastern parts of Northland, Auckland, Bay of Plenty and Nelson.

### **February 2018: Two ex-tropical cyclones impact New Zealand**

February temperatures were above average (0.51 to 1.20°C above average) or well above average (>1.20°C of average) across the North Island. Temperatures were more than 2°C above the February average for parts of Hawke's Bay, Gisborne, and across lower Manawatu-Whanganui. In the South Island, temperatures were above average across the north and mostly near average (-0.50 to +0.50°C) across the central and south. Rainfall was well above normal (>149% of normal) across much of the upper North Island, Wellington-Wairarapa, the upper South Island, Canterbury and Otago. Elsewhere, rainfall was above normal (120-149% of normal) or near normal (80-119% of normal). By the end of February, soils were wetter than normal for the time of year across the upper North Island and the central and upper South Island. Soil moisture was near normal elsewhere; although parts of Hawke's Bay, Gisborne, and Southland had slightly below normal soil moisture.

### **March 2018: The warmth continues everywhere and wetness for some**

March temperatures were above average (0.51 to 1.20°C above average) or well above average (>1.20°C from average) across New Zealand, with isolated parts of Tasman and Southland experiencing near average temperatures (-0.50 to +0.50°C). Rainfall was well above normal (>149% of normal) in the central North Island, the eastern North Island (south of Napier), Kapiti Coast, Nelson, south Canterbury, north and central

Otago, and Fiordland. Rainfall was above normal (120-149% of normal) in Northland, the southern half of the North Island, and Tasman. Below normal rainfall (50-79% of normal) was experienced in isolated patches of Auckland, Waikato, Bay of Plenty, East Cape, Christchurch, Dunedin, and Southland. Near normal rainfall (80-119% of normal) was observed elsewhere. By the end of March, soils were wetter than normal for the time of year across most of New Zealand. Soils were drier than normal in East Cape, Manawatu-Whanganui, eastern Southland, and Stewart Island.

#### **April 2018: Two large storms bring destruction to parts of New Zealand**

April rainfall was above normal (120% to 149% of normal) or well above normal (>149% of normal) for Auckland City, Coromandel Peninsula, most of the Wellington region, a large portion of the central North Island, and most of the South Island, particularly in the east. Below normal (50% to 79% of normal) or well below normal (<50% of normal) rainfall was observed in East Cape, eastern Northland, and localised patches in the Taranaki and Manawatu-Whanganui regions. Near average temperatures (-0.50 to +0.50°C of average) were located in the southeast of the North Island as well as parts of the central North Island (north Taranaki through to Napier) and East Cape. Above average (0.51 to +1.20°C above average) temperatures were found elsewhere in the North Island. In contrast, large parts of central Canterbury, Fiordland, and the West Coast experienced below average (-0.50°C to -1.20°C below average) temperatures while the rest of the South Island observed mostly near average temperatures. By the end of April, soil moisture levels were above normal for much of the South Island except along the West Coast and in Southland where levels were near normal. In the North Island, soils were drier than normal for East Cape, as well as parts of Manawatu-Whanganui, and southern parts of Northland. Remaining locations in the North Island were wetter than normal.

#### **May 2018: Warm and dry to start, then cooler and unsettled**

May temperatures were well above average (> +1.20°C from average) in parts of Hawke's Bay. Temperatures were above average (+0.51°C to +1.20°C above average) for most remaining parts of the North Island, except Northland, Taranaki and Wellington where temperatures were near average (within -0.50°C to +0.50°C of average). Temperatures were above average in Nelson and coastal Canterbury north of Ashburton, and below average (-0.51°C to -1.20°C below average) in parts of Southland. Rainfall was well below normal (< 50% of normal) for coastal south Canterbury and north Otago. Below normal rainfall (50-79% of normal) was recorded in the western Bay of Plenty, Hawke's Bay, Wairarapa and eastern Otago. Rainfall was well above normal (>149% of normal) for parts of the eastern Bay of Plenty, Taranaki, Manawatu, Marlborough, and Kaikoura. Above normal rainfall (120-149% of normal) was observed in parts of Waikato, Whanganui, and north Canterbury. By the end of May, soil moisture levels were above normal for the time of year for eastern and inland parts of the South Island north of Southland, and southwestern parts of the North Island. Soil moisture levels were generally near normal for the time of year across the remainder of the country.

#### **June 2018: A dry start to winter for much of the South Island**

June rainfall was well below normal (< 50% of normal) for Taranaki, Tasman, Nelson, parts of West Coast, inland south Canterbury, inland Otago, Fiordland, northern Southland, and Stewart Island. Below normal rainfall (50-79% of normal) was recorded in the rest of the South Island aside from northern Canterbury. Rainfall was well above normal (> 149% of normal) for eastern Northland, Auckland, Coromandel, Hawke's Bay, Gisborne, and northern Canterbury. Temperatures were above average (0.51°C to 1.20°C above average) for the Far North, eastern Waikato, Bay of Plenty, East Cape, and parts of Canterbury and the West Coast. Below average temperatures (-0.51°C to -1.20°C below average) were recorded in Taranaki, Tararua District, Marlborough, inland Canterbury, Otago and Southland. Temperatures were near average (within -0.50°C to +0.50°C of average) for remaining parts of New Zealand. By the end of June, soil moisture levels

were above normal for the time of year for eastern and central parts of the South Island north of Southland, and Hawke's Bay. Soil moisture levels were generally near or slightly above normal for the time of year across the remainder of the country.

### **July 2018: A warm mid-winter for most of New Zealand**

July temperatures were well above average ( $>1.20^{\circ}\text{C}$  above average) for interior Canterbury, interior Otago, and much of Southland. For much of the rest of the South Island, Taranaki, Manawatu-Whanganui, Hawke's Bay, and Wellington-Wairarapa, temperatures were above average ( $0.51^{\circ}\text{C}$  to  $1.20^{\circ}\text{C}$  above average). Near average temperatures ( $-0.50^{\circ}\text{C}$  to  $+0.50^{\circ}\text{C}$  of average) were found in parts of Tasman, Nelson, Marlborough, and the remainder of the North Island. Rainfall was well below normal ( $<50\%$  of normal) for the Far North, coastal Gisborne, Hawke's Bay, and much of Canterbury. Below normal rainfall ( $50\text{-}79\%$  of normal) was recorded in the rest of Northland, Gisborne, and Hawke's Bay, northern Auckland, eastern Bay of Plenty, and areas east of the Southern Alps. In Tasman District, the West Coast, and Fiordland rainfall was above normal ( $120\text{-}149\%$  of normal) or well above normal ( $>149\%$  of normal). By the end of July, soil moisture levels were above normal for the time of year in northern Otago and southern Canterbury. Soil moisture levels were generally near or slightly above normal for the time of year across the rest of the country.

### **August 2018: A dry end to winter for much of the South Island**

August temperatures were above average ( $0.51^{\circ}\text{C}$  to  $1.20^{\circ}\text{C}$  above average) for most of New Zealand, particularly the southern half of the North Island and the central and western South Island. Near average temperatures ( $-0.50^{\circ}\text{C}$  to  $+0.50^{\circ}\text{C}$  of average) were observed for most of the eastern South Island and northern and western North Island. Rainfall was well below normal ( $<50\%$  of normal) for most of Canterbury and interior Otago. Northland experienced below normal rainfall ( $50\text{-}79\%$  of normal). Well above normal rainfall ( $>149\%$  of normal) was observed in the Bay of Plenty and East Cape, as well as Nelson. Parts of Manawatu-Whanganui experienced above normal rainfall ( $120\text{-}149\%$  of normal), and near normal rainfall was observed elsewhere ( $80\text{-}119\%$  of normal). By the end of August, soil moisture levels were above normal for the time of year in coastal Otago and Marlborough, as well as around coastal Gisborne. Slightly drier than usual soils were present in southern Hawke's Bay, north Canterbury, and central Otago. Soil moisture levels were generally near normal for the time of year across the rest of the country.

### **September 2018: A wet start to spring for some, but dry for most**

September temperatures were near average (within  $-0.50$  to  $+0.50^{\circ}\text{C}$  of average) across most of the country. Below average temperatures ( $-0.51$  to  $-1.20^{\circ}\text{C}$  below average) were restricted to eastern locations in Canterbury and Marlborough, as well as part of Northland, and other isolated patches in the North Island. Rainfall was above normal ( $120\text{-}149\%$  of normal) to well above normal ( $>149\%$  of normal) for eastern parts of the North Island as well as around Otago and Southland. Northland and Wellington experienced near normal rainfall totals ( $80\text{-}119\%$  of normal) while much of the country experienced below normal ( $50\text{-}79\%$  of normal) or well below normal ( $<50\%$  of normal) rainfall. By the end of September, soil moisture levels were above normal for the time of year for much of Otago, particularly toward the coast, as well as around coastal Gisborne. Drier than normal soil moistures were present from Nelson through to northern Canterbury and through much of the central and southern North Island. Soil moisture levels were generally near normal for the time of year across the rest of the country.

### **October 2018: A dry month for much of New Zealand**

October temperatures were near average (within  $-0.50$  to  $+0.50^{\circ}\text{C}$  of average) for nearly all locations across New Zealand. A small portion of Auckland observed temperatures slightly below average ( $-0.51$  to  $-1.20^{\circ}\text{C}$  below average), while a handful of locations around the country observed above average ( $+0.51$  to  $+1.20^{\circ}\text{C}$  above average) temperatures. Rainfall was below normal ( $50\text{-}79\%$  of normal) or well below normal ( $<50\%$  of normal) across large swaths of New Zealand, particularly in the North Island and the western South Island.

Meanwhile, near normal rainfall (80-119% of normal) was observed across northern Waikato and Bay of Plenty, as well as Canterbury, Otago, and interior Southland. In addition, areas of above normal (120-149% of normal) to well above normal (>149% of normal) rainfall were observed from northern Canterbury to Otago. By the end of October, soil moisture levels were generally below normal for the time of year across much of Northland, parts of Auckland, western Waikato, Hawke's Bay to Wairarapa, and the upper South Island. Meanwhile, above normal soil moisture levels were found from central Canterbury to interior Southland. Soil moisture levels were generally near normal for the time of year across the rest of the country.

### **November 2018: Very wet for eastern and inland parts of the South Island**

November was very wet 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. Temperatures were above average (+0.51 to +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. By the end of November, 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.

### **December 2018: Wet end to the year for the North Island and north-eastern South Island**

Rainfall was well above normal (>149% of normal) for the majority of the North Island except for Taranaki and parts of Northland and Manawatu-Whanganui where rainfall was near normal (80-119% of normal). Rainfall was also well above normal for Marlborough and northern Canterbury while the remainder of the South Island saw largely below normal (50-79% of normal) rainfall. Temperatures were well above average (>1.20°C above average) for the regions of Southland, the West Coast, Nelson, as well as large parts of Otago, Tasman, Manawatu-Whanganui, Waikato and the Bay of Plenty. Temperatures were near average (within -0.50°C to +0.50°C of average) along the coastal fringes of eastern Marlborough and Canterbury as well as for Gisborne through to Masterton. Elsewhere temperatures were above average (+0.51 to +1.20°C above average). At the end of 2018, soils were significantly wetter than normal for the time of year across large parts of the eastern and inland South Island, as well as large parts of the North Island. Soil moisture levels were lower than normal for the time of year in Nelson, Tasman, Southland, the New Plymouth district and parts of the West Coast.



Section 2: Monthly temperature (in °C, as a departure from the 1981-2010 monthly averages)

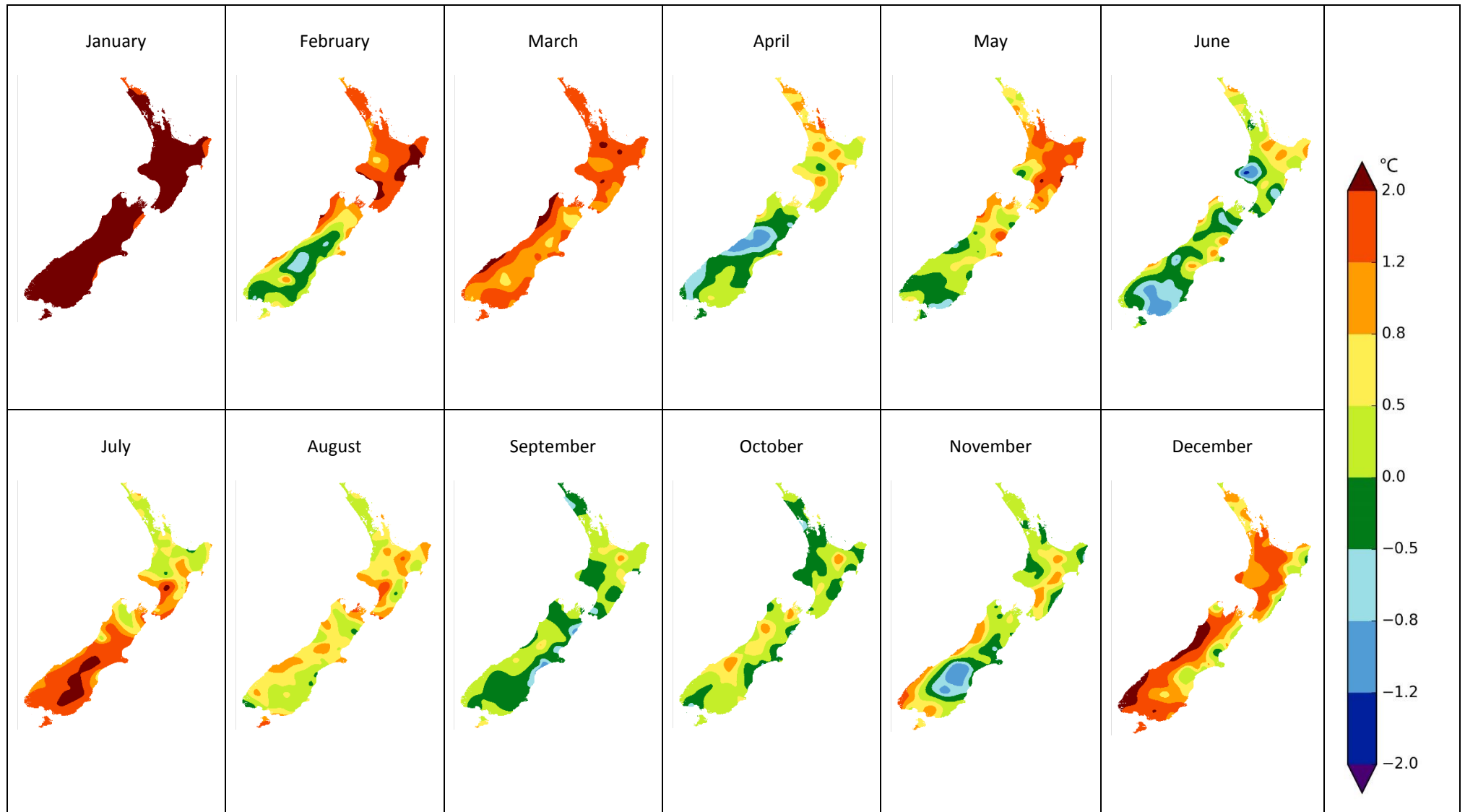


Figure 1: Monthly temperature anomalies (compared to the 1981-2010 monthly averages) for each month of 2018.

### Section 3: Monthly rainfall (as a percentage of the 1981-2010 monthly normals)

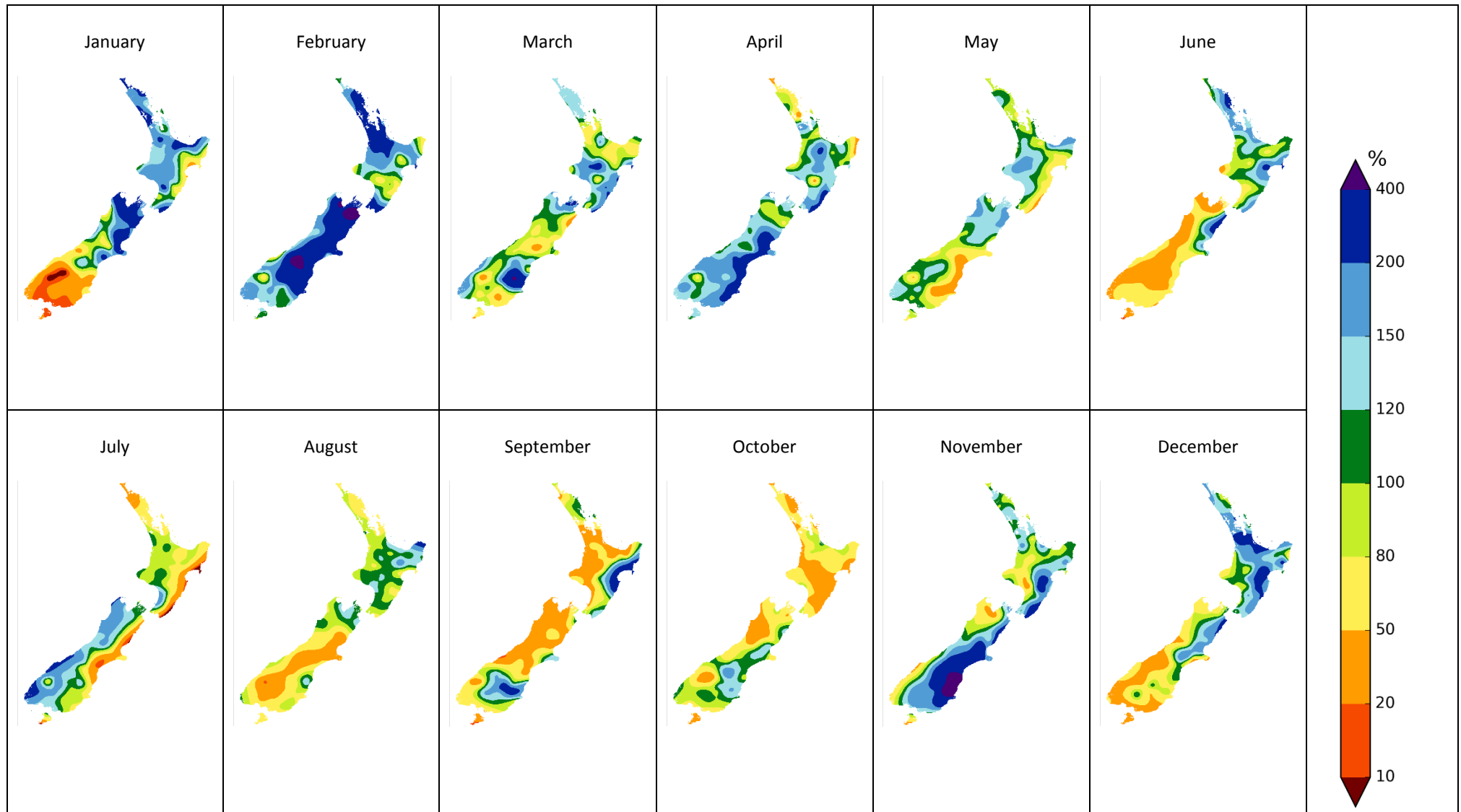


Figure 2: Monthly rainfall as a percentage of each 1981-2010 monthly normal for each month of 2018.

## Section 4: Observations and statistics

Based on data available at the time of writing, NIWA analyses of month-by-month records show:

- The nationwide average temperature for 2018 was 13.41°C (0.80°C above the 1981–2010 annual average). Using NIWA’s seven-station temperature series, 2018 was the equal 2<sup>nd</sup>-warmest year on record since 1909 (tied with 1998).
- Leigh recorded the highest annual average temperature for 2018 with 17.0°C, followed by Kaitaia and Whangarei with 16.4°C.
- The highest air temperature of the year was 38.7°C recorded at Alexandra, followed by 37.6°C at Clyde and 37.4°C at Middlemarch, all of which occurred on 30 January.
- The lowest air temperature of the year was -10.4°C recorded at Mt Cook (Airport) on 3 June, followed by -9.2°C at Ranfurly on 1 June, and -8.7°C at Ophir on 30 May.
- The top three daily rainfall totals from regularly reporting gauges in 2018 were 517 mm at Ivory Glacier on 8 November, 402 mm at Mt Philistine on 8 November, and 346 mm at Castle Mount on 20 May.
- The top three daily rainfall totals from regularly reporting gauges in 2018 *excluding* high elevation stations were: 326 mm at Arthur’s Pass on 8 November, 297 mm at Upper Takaka on 17 January, and 267 mm at Milford Sound on 25 February.
- Of all the regularly reporting gauges, the wettest locations in 2018 were: Cropp River (West Coast, 975 metres above sea level) with 9817 mm, Tuke River (West Coast, 975 metres above sea level) with 9170 mm, and Doon River (Southland, 1211 metres above sea level) with 7648 mm.
- Of the regularly reporting gauges, the wettest locations in 2018 *excluding* high elevation stations were: Milford Sound with 6818<sup>2</sup> mm, Franz Josef with 3841 mm, and Manapouri (West Arm Jetty) with 3808 mm.
- The lowest rainfall recording locations for 2018 were Clyde with 526 mm, Cromwell with 541 mm, and Alexandra with 556 mm.
- The sunniest region<sup>3</sup> during 2018 was the wider Nelson region with 2555 hours, followed by Bay of Plenty (2518 hours) and Marlborough (2503 hours).
- The highest confirmed wind gust for 2018 was 187 km/h recorded at Akitio on 21 May.
- Of the six main centres in 2018: Auckland was the warmest, Dunedin was the coolest and driest, Tauranga was the wettest and sunniest, and Wellington was the least sunny.

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<sup>2</sup> Missing 1 day of data

<sup>3</sup> NIWA has had a regional sunshine ranking since 2017. This considers the differences between the data recorded by our new high precision electronic sensors and the historic method of recording, using a Campbell Stokes sunshine instrument, which burns a trace in a sun card. The regional sunshine ranking reflects the highest sunshine hours in local authority regions, except for Nelson which has been extended to include the wider Nelson urban area (i.e. including Richmond).

The manual Campbell Stokes recorders are gradually being replaced, and the main table this year primarily contains data from stations with electronic sensors. Three manual sites have been included – Tauranga, Wellington, and Christchurch. They have been included only because they are main centres and there are no electronic sensors nearby. The comparison of data using the different recorders is currently being assessed.

Ranked annual total rainfall, mean temperatures and sunshine hours for the stations available at time of writing are displayed on the following five pages. Some sites have missing days of data. The number of missing days is indicated by a superscript number next to the annual value in the tables below.

Location	Rainfall (mm)
CROPP AT WATERFALL	9817
TUKE AT TUKE HUT	9170
DOON AT MIDDLE ARM	7648
HAAST AT CRON CREEK	6912
MILFORD SOUND AWS	6818 <sup>1</sup>
IVORY AT RIPPLEROCK	6587
IVORY GLACIER CWS	6584
HOKITIKA AT PRICES FLAT	6519
HOKITIKA AT COLLIERS CREEK	6081
CASTLE MOUNT EWS	5962 <sup>2</sup>
WAIHO AT DOUGLAS HUT	5755
RAKAIA AT LAKE RAMSAY	5028
WHATAROA AT SHB	4982
GODLEY AT PANORAMA RIDGE	4957
HAAST AT ROARING BILLY	4808
ARTHURS PASS AWS	4698 <sup>2</sup>
GODLEY AT EADE HUT	4023
FRANZ JOSEF EWS	3841
MANAPOURI (WEST ARM JETTY)	3808
MATHIAS AT NZDSA HUT	3807
TAIPO AT SH BRIDGE	3770
MURCHISON AT ROSE RIDGE	3612
MT COOK EWS	3570
PIGEON CREEK CWS	3536 <sup>2</sup>
HAAST AT MOA CREEK	3508
BUTCHERS CRK AT BUTCHERS GULLY	3420
MUELLER HUT EWS	3196 <sup>1</sup>
WAIPOA AT MANGATU DIVIDE	3163
MT RUAPEHU, CHATEAU EWS	3104

HOKITIKA AWS	2909 <sup>1</sup>
MURCHISON MTNS EWS	2818 <sup>1</sup>
HOKITIKA AERO	2803 <sup>1</sup>
ALBERT BURN	2674 <sup>5</sup>
NGAHERE AT NGAHERE HUT	2671
AHURIRI AT CASSINIA MORAINES	2668
COBB AT TRILOBITE	2646
MAKOTUKU AT F TRIG	2646
MOTU AT WAITANGIRUA	2630
PUYSEGUR POINT AWS	2533 <sup>11</sup>
MT PHILISTINE EWS	2519 <sup>2</sup>
TAKAHE VALLEY CWS	2369 <sup>1</sup>
TONGARIRO AT MANGATOETOE	2359
UPPER RAKAIA EWS	2348
GREYMOUTH AERO EWS	2303
TE PUKE EWS	2176 <sup>7</sup>
TAKAKA EWS	2169
MAHANGA EWS	2168
EGLINTON, KNOBS FLAT CWS	2136
WESTPORT EWS	2123
ARAPITO EWS	2084
AWAKINO EWS	2021 <sup>10</sup>
KERIKERI AERODROME AWS	2004 <sup>1</sup>
OTAMATUNA (TE MAPOU HUT)	1992
WHITIANGA EWS	1938
TROUNSON CWS	1919
PUREORA FOREST CWS	1906
REEFTON EWS	1827
WARKWORTH EWS	1827
WHANGANUI AT TE PORERE	1810 <sup>11</sup>
TAURANGA CWS	1808

WAIPOA AT WAITETI STATION	1797
PURUKOHUKOHU AT NO 4	1783
KAIKOHE AWS	1782 <sup>3</sup>
ROTORUA EWS	1780
HICKS BAY AWS	1761 <sup>5</sup>
LOWER RETARUKE CWS	1704 <sup>15</sup>
MANGARE STREAM AT MANGARE RD	1701
WHAKATANE AERO AWS	1678 <sup>1</sup>
RUSSELL CWS	1653 <sup>2</sup>
RANGITAIKI AT ANIWHENUA	1636
FAREWELL SPIT AWS	1623 <sup>2</sup>
WHANGAREI EWS	1616
TARAPOUNAMU EWS	1611 <sup>1</sup>
TUTIRA CWS	1610
PUKEKOHE EWS	1583
AUCKLAND (NORTH SHORE)	1532
TONGARIRO AT TURANGI	1507
TURANGI 2 EWS	1504
TAURANGA AERO AWS	1503 <sup>1</sup>
WHIRINAKI AT GALATEA	1501
WHANGANUI AT BELOW PIRIAKA	1484
TAKAPAU PLAINS AWS	1478 <sup>5</sup>
HAMILTON (RUAKURA)	1469
WAIKERIA EWS	1463
TAHUNAATARA AT OHAKURI RD	1461
KAITAIA EWS	1448
UPPER HUTT, TRENTHAM EWS	1447
PURERUA AWS	1436 <sup>4</sup>
WAIROA AERO AWS	1425 <sup>6</sup>
LEIGH 2 EWS	1416 <sup>4</sup>
WELLINGTON (KELBURN)	1411 <sup>2</sup>

AUCKLAND AERO	1387
WAIMARINO AT KEPA RD	1384
WAIKAPA AT TTT RD CULVERT	1382
AUCKLAND (MANGERE)	1381 <sup>10</sup>
AUCKLAND (WESTERN SPRINGS)	1375
WAIKAPA NORTH BRANCH	1371
FIRTH OF THAMES EWS	1370 <sup>1</sup>
WAIKAPA EWS	1359 <sup>12</sup>
TAUPO CWS	1355
PAHIATUA EWS	1336
OHAKUNE EWS	1333
TAURANGA-TAUPO AT KIKO RD	1329
LAKE KARAPIRO CWS	1328
NGAWI AWS	1325 <sup>1</sup>
WHAKAURU AT MOSSOP RD	1311
POKAIWHENUA AT PUKETURUA	1304
WAIKAPA AIRSTRIP AWS	1302 <sup>3</sup>
NELSON AERO	1298
MATAMATA, HINUERA EWS	1292
NEW PLYMOUTH AWS	1281
PARAPARAUMU AERO	1248
WAIROA, NORTH CLYDE EWS	1246
PORIRUA, ELSDON PARK AWS	1239 <sup>5</sup>
DARGAVILLE 2 EWS	1236
HANMER FOREST EWS	1227
MAKOTUKU AT SH49A BRIDGE	1221
MANAPOURI AERO AWS	1212 <sup>3</sup>
WELLINGTON AERO	1211
AKAROA EWS	1208
WAIOTAPU AT REPOROA	1208
MANGAKINO AT DILLON RD	1196

APPLEBY 2 EWS	1191
PALMERSTON NORTH EWS	1177 <sup>2</sup>
HAWERA AWS	1174 <sup>9</sup>
PARAPARAUMU EWS	1172
WAIKATO AT REIDS FARM	1168
NELSON AWS	1164 <sup>5</sup>
LEVIN EWS	1154
WELLINGTON (GRETA POINT)	1154 <sup>1</sup>
GISBORNE AWS	1149 <sup>1</sup>
METHVEN CWS	1149 <sup>7</sup>
FIVE RIVERS CWS	1138
RICHMOND EWS	1135
MASTERTON (TE ORE ORE)	1132
MASTERTON EWS	1130
PALMERSTON NORTH AWS	1116 <sup>3</sup>
GISBORNE EWS	1109
ASHCOTT ROAD CWS	1109
PARAPARAUMU AERO AWS	1090
INVERCARGILL AERO 2 EWS	1089
CASTLEPOINT AWS	1088 <sup>11</sup>
DANNEVIRKE EWS	1072
MT POTTS EWS	1068
LEVIN AWS	1060
WAIKATO, CAMBRIDGE GOLF COURSE	1058
OHOKA CWS	1043
TAUPO AWS	1029 <sup>3</sup>
LUMSDEN AWS	1021 <sup>5</sup>
MT LARKINS EWS	1019
STANTON AT CHEDDAR VALLEY	1015
MASTERTON AERO AWS	1012 <sup>10</sup>

ASHBURTON AERO AWS	1009 <sup>3</sup>
KAIKOURA AWS	997 <sup>1</sup>
TIWAI POINT EWS	994
BIRCHWOOD WXT AWS	992 <sup>4</sup>
GALATEA AWS	984 <sup>12</sup>
LISMORE, RACEMANS HOUSE	979
CHEVIOT EWS	977
MARTINBOROUGH EWS	977 <sup>2</sup>
WAIKAPA EWS	974 <sup>1</sup>
MATUKITUKI AT WEST WANAKA	974
OAMARU AWS	961 <sup>5</sup>
QUEENSTOWN EWS	960
BROTHERS ISLAND AWS	960 <sup>2</sup>
WINCHMORE 2 EWS	949
NAPIER AERO AWS	948
GORE AWS	933 <sup>3</sup>
BLENHEIM AERO AWS	928
FAIRLIE AWS	925 <sup>4</sup>
HASTINGS AWS	920 <sup>4</sup>
AHURIRI AT STH DIADEM	914
WAIKAPA WEST EWS	902
WAIKAPA SCHOOL CWS	899
DIAMOND HARBOUR EWS	884
PUKAKI AERODROME AWS	874 <sup>3</sup>
CHRISTCHURCH AERO	865
RANGIORA EWS	860
NAPIER EWS	860
CHERTSEY CWS	858
TIMARU EWS	858
CHRISTCHURCH, KYLE ST EWS	843 <sup>5</sup>
WAKANUI 2 CWS	835 <sup>2</sup>

DUNEDIN AERO AWS	834 <sup>5</sup>
GORE EWS	833
OAMARU EWS	827 <sup>1</sup>
BALMORAL EAST CWS	825
DUNEDIN, MUSSELBURGH EWS	823
OAMARU AIRPORT AWS	814 <sup>2</sup>
BLLENHEIM RESEARCH EWS	810
WINDSOR EWS	782
MEDBURY CWS	781
MIDDLEMARCH EWS	763 <sup>1</sup>
WANAKA CWS	761
WAIMATE CWS	756 <sup>2</sup>
LINCOLN, BROADFIELD EWS	753
LAKE TEKAPO EWS	748 <sup>7</sup>
QUEENSTOWN AERO AWS	742
TIMARU AERO AWS	726 <sup>4</sup>
CULVERDEN AWS	701 <sup>3</sup>
BARING HEAD	692
BALCLUTHA, TELFORD EWS	692
TARA HILLS AWS	690 <sup>2</sup>
NUGGET POINT AWS	682 <sup>3</sup>
WANAKA AERO AWS	681
HAKATARAMEA VALLEY CWS	648
RANFURLY EWS	641
LAUDER EWS	613
DORIE CWS	567
ALEXANDRA CWS	556
CROMWELL EWS	541
CLYDE 2 EWS	526
ALEXANDRA AWS	515 <sup>4</sup>

<b>Location</b>	<b>Mean temp (°C)</b>
LEIGH 2 EWS	17.0
KAITAIA AERO EWS	16.4
WHANGAREI AERO AWS	16.4
WHANGAPARAOA AWS	16.3
DARGAVILLE 2 EWS	16.2
KERIKERI EWS	16.1
AUCKLAND AERO	16.1
CAPE REINGA AWS	16.1
AUCKLAND, MANGERE EWS	15.9
KERIKERI AERODROME AWS	15.8
TAURANGA AERO AWS	15.8
HICKS BAY AWS	15.8
AUCKLAND, NORTH SHORE EWS	15.6
AUCKLAND, WHENUAPAI AWS	15.5
WHITIANGA AERO AWS	15.4
NGAWI AWS	15.4
KAIKOHE AWS	15.3
PAEROA AWS	15.3
PUKEKOHE EWS	15.3
WAIROA, NORTH CLYDE EWS	15.3
GISBORNE AWS	15.2
FAREWELL SPIT AWS	15.1
WHAKATANE AERO AWS	15.0
HASTINGS AWS	15.0
TE PUKE EWS	14.9
NAPIER AERO AWS	14.9
MAHIA AWS	14.9
FIRTH OF THAMES EWS	14.8
WARKWORTH EWS	14.8

HAMILTON, RUAKURA 2 EWS	14.8
WANGANUI AWS	14.7
WELLINGTON AERO	14.6
TE KUITI EWS	14.5
NEW PLYMOUTH AWS	14.5
LEVIN AWS	14.5
TOENEPI EWS	14.4
CASTLEPOINT AWS	14.4
MATAMATA, HINUERA EWS	14.3
HAMILTON AWS	14.3
PALMERSTON NORTH EWS	14.3
PARAPARAUMU AERO	14.2
PARAPARAUMU AERO AWS	14.2
PALMERSTON NORTH AWS	14.2
WHAKATU EWS	14.1
BROTHERS ISLAND AWS	14.1
WELLINGTON, KELBURN AWS	13.9
RICHMOND EWS	13.9
BLLENHEIM RESEARCH EWS	13.9
AKAROA EWS	13.8
MARTINBOROUGH EWS	13.7
WESTPORT AERO AWS	13.7
NELSON AERO	13.7
HAWERA AWS	13.7
MOTUEKA, RIWAKA EWS	13.6
NELSON AWS	13.6
CAPE CAMPBELL AWS	13.5
PAHIATUA EWS	13.4
ROTORUA AERO AWS	13.4
BLLENHEIM AERO AWS	13.2
TAKAKA EWS	13.2

CHATHAM ISLAND AERO AWS	13.1
DANNEVIRKE EWS	13.0
KAIKOURA AWS	13.0
CHRISTCHURCH, KYLE ST EWS	13.0
GREYMOUTH AERO EWS	12.9
TAUMARUNUI EWS	12.7
HOKITIKA AERO	12.7
SECRETARY ISLAND AWS	12.7
WAIAMAU SCHOOL CWS	12.7
UPPER HUTT, TRENTAM EWS	12.6
DIAMOND HARBOUR EWS	12.6
TAUPO AWS	12.6
HOKITIKA AWS	12.6
REEFTON EWS	12.6
TAKAPAU PLAINS AWS	12.5
TURANGI 2 EWS	12.3
HAAST AWS	12.3
LINCOLN, BROADFIELD EWS	12.3
APPLEBY 2 EWS	12.2
CHRISTCHURCH AERO	12.2
MOTU EWS	12.1
RANGIORA EWS	12.1
MEDBURY CWS	12.0
DUNEDIN, MUSSELBURGH EWS	11.8
LE BONS BAY AWS	11.7
FRANZ JOSEF EWS	11.6
MILFORD SOUND	11.5
CROMWELL EWS	11.5
ASHBURTON AERO AWS	11.5
MILFORD SOUND AWS	11.4
ALEXANDRA CWS	11.4

OAMARU AWS	11.4
TIMARU EWS	11.3
WANAKA AERO AWS	11.3
TIWAI POINT EWS	11.3
SOUTH WEST CAPE AWS	11.3
CLYDE 2 EWS	11.1
OAMARU AIRPORT AWS	11.0
DUNEDIN AERO AWS	11.0
OHAKUNE EWS	10.9
TIMARU AERO AWS	10.9
HANMER FOREST EWS	10.8
GORE AWS	10.8
INVERCARGILL AERO	10.8
NUGGET POINT AWS	10.7
BALCLUTHA, TELFORD EWS	10.7
WINDSOR EWS	10.6
TE ANAU AT PARK HQ CWS	10.5
MIDDLEMARCH EWS	10.4
LAUDER EWS	10.4
QUEENSTOWN AERO AWS	10.3
LUMSDEN AWS	10.3
TARA HILLS AWS	10.1
MANAPOURI AERO AWS	10.1
MANAPOURI, WEST ARM JETTY	9.7
WAIOURU AIRSTRIP AWS	9.7
RANFURLY EWS	9.5
MT COOK EWS	9.4
LAKE TEKAPO EWS	9.3
ARTHURS PASS EWS	8.7
MT RUAPEHU, CHATEAU EWS	7.5

Location	Sunshine (hours)
RICHMOND EWS	2555
WHAKATANE	2518
BLENHEIM RESEARCH EWS	2503
NEW PLYMOUTH AWS	2496
NAPIER EWS	2455 <sup>1</sup>
APPLEBY 2 EWS	2445
GISBORNE AWS	2407 <sup>1</sup>
LAKE TEKAPO EWS	2353 <sup>7</sup>
AUCKLAND, MOTAT EWS	2335 <sup>1</sup>
DIAMOND HARBOUR EWS	2321
TAURANGA AERO	2314
NELSON AERO	2294
WAIKATO WEST EWS	2261
TAKAKA EWS	2248 <sup>10</sup>
WESTPORT EWS	2243
LEVIN EWS	2229
KAITIA EWS	2219 <sup>1</sup>
QUEENSTOWN AERO AWS	2215 <sup>1</sup>
PARAPARAUMU AERO AWS	2215
CHEVIOT EWS	2203 <sup>1</sup>
AUCKLAND, NORTH SHORE EWS	2198 <sup>1</sup>
CROMWELL EWS	2189
ASHBURTON AERO AWS	2181 <sup>3</sup>
HOKITIKA AWS	2151 <sup>2</sup>
RANGIORA EWS	2142 <sup>1</sup>
AKITIO EWS	2134 <sup>1</sup>
OAMARU EWS	2123 <sup>2</sup>
WAIKATO EWS	2121



DARGAVILLE 2 EWS	2111
AKAROA EWS	2093
MASTERTON EWS	2074 <sup>1</sup>
WHANGAREI EWS	2073
AUCKLAND, MANGERE EWS	2041
HAMILTON, RUAKURA 2 EWS	2029 <sup>1</sup>
CHRISTCHURCH AERO	2017 <sup>4</sup>
INVERCARGILL AERO 2 EWS	2014
KAWERAU AWS	2003 <sup>2</sup>
WAIKERIA EWS	2002
ROTORUA EWS	1981 <sup>2</sup>
GREYMOUTH AERO EWS	1966
FRANZ JOSEF EWS	1964 <sup>6</sup>
UPPER HUTT, TRENTHAM EWS	1961
DUNEDIN, MUSSELBURGH EWS	1946 <sup>1</sup>
GORE EWS	1902
TE KUITI EWS	1900
WELLINGTON, KELBURN	1900
MARTINBOROUGH EWS	1813 <sup>3</sup>
TAUMARUNUI AWS	1795 <sup>4</sup>
ARAPITO EWS	1755
MIDDLEMARCH EWS	1708
DANNEVIRKE EWS	1704
REEFTON EWS	1691 <sup>1</sup>
OHAKUNE EWS	1655 <sup>1</sup>
PALMERSTON NORTH EWS	1587 <sup>3</sup>
BALCLUTHA, TELFORD EWS	1571
TURANGI 2 EWS	1533 <sup>1</sup>
MT COOK EWS	1500

## Section 5: Annual temperature – record or near record warmth for many locations

2018 was New Zealand’s equal 2<sup>nd</sup>-warmest year on record based on NIWA’s seven-station series, which begins in 1909. Many locations observed record or near-record high mean, mean maximum, and mean minimum temperatures.

**Table 1: Near-record or record high or low annual average temperature departures for 2018<sup>4</sup>.**

Location	Mean air temp. (°C)	Departure from normal (°C)	Year records began	Comments
Mean temperature				
Farewell Spit	15.1	1.2	1971	Highest
Hastings	14.9	1.8	1965	Highest
Kerikeri	16.1	0.8	1945	Highest
Levin	14.5	1.4	1895	Highest
Medbury	12.0	0.6	1927	Highest
Motu	12.1	1.3	1990	Highest
Ngawi	15.4	0.9	1972	Highest
Secretary Island	12.7	0.9	1985	Highest
South West Cape	11.3	1.1	1991	Highest
Taupo	13.4	1.7	1949	Highest
Te Kuiti	14.5	0.9	1959	Highest
Waiau School	12.6	1.2	1974	Highest
Wellington (Airport)	14.6	0.8	1962	Highest
Wellington (Kelburn)	13.9	1.0	1927	Highest
Arapito	13.7	1.0	1978	2nd-highest
Auckland (Whenuapai)	15.5	0.8	1945	2nd-highest
Cheviot	12.4	0.9	1982	2nd-highest
Dunedin (Musselburgh)	11.8	0.7	1947	2nd-highest
Haast	12.3	1.1	1949	2nd-highest
Hicks Bay	15.8	0.9	1969	2nd-highest
Milford Sound	11.5	1.2	1934	2nd-highest
Motueka, Riwaka	13.6	1.1	1956	2nd-highest
Palmerston North	14.3	1.0	1928	2nd-highest
Reefton	12.6	1.2	1960	2nd-highest
Tauranga	15.8	0.9	1913	2nd-highest
Westport	13.7	1.1	1937	2nd-highest

<sup>4</sup> The rankings (1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>....etc) in Tables 1 to 12 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 because of the practical limitations of performing homogeneity checks in real-time.

Whitianga	15.7	1.0	1962	2nd-highest
Akaroa	13.8	1.3	1978	3rd-highest
Blenheim	13.9	0.8	1932	3rd-highest
Brothers Island	14.1	0.6	1997	3rd-highest
Dargaville	16.2	1.0	1943	3rd-highest
Gisborne	15.4	1.1	1905	3rd-highest
Hamilton (Ruakura)	14.8	1.0	1906	3rd-highest
Mahia	14.9	0.8	1990	3rd-highest
Masterton	13.9	1.5	1906	3rd-highest
New Plymouth	14.5	0.8	1944	3rd-highest
Paeroa	15.3	0.6	1947	3rd-highest
Paraparaumu	14.2	1.2	1953	3rd-highest
Te Anau	10.5	0.9	1963	3rd-highest
Tiwai Point	11.3	0.7	1970	3rd-highest
Waipawa	13.4	0.6	1945	3rd-highest
Wairoa	15.3	1.0	1964	3rd-highest
Leigh	17.0	0.9	1966	4th-highest
Lumsden	10.3	0.7	1982	4th-highest
Martinborough	13.7	0.9	1986	4th-highest
Oamaru	11.4	0.3	1967	4th-highest
Pukekohe	15.3	0.8	1969	4th-highest
Rotorua	13.5	0.8	1964	4th-highest
Whangarei	16.4	0.6	1967	4th-highest
<b>Mean maximum temperature</b>				
Farewell Spit	18.4	0.8	1971	Highest
Levin	18.7	1.4	1895	Highest
Puysegur Point	14.5	1.1	1978	Highest
Secretary Island	15.7	1.0	1985	Highest
South West Cape	13.7	1.0	1991	Highest
Te Kuiti	20.0	1.2	1959	Highest
Westport	17.6	1.4	1937	Highest
Whitianga	20.8	1.5	1962	Highest
Arapito	18.2	1.0	1978	2nd-highest
Auckland (Whenuapai)	19.9	0.8	1945	2nd-highest
Hamilton (Ruakura)	20.6	1.7	1906	2nd-highest
Kerikeri	20.9	0.8	1945	2nd-highest
Milford Sound	15.9	1.3	1934	2nd-highest
Ngawi	18.4	0.8	1972	2nd-highest
Paraparaumu	17.9	1.0	1953	2nd-highest
Reefton	17.8	1.1	1960	2nd-highest
Rotorua	18.2	1.2	1964	2nd-highest
Taupo	18.5	1.8	1949	2nd-highest
Waipawa	19.1	0.9	1945	2nd-highest
Brothers Island	16.1	0.7	1997	3rd-highest
Gisborne	20.5	1.0	1905	3rd-highest
Hastings	20.2	1.7	1965	3rd-highest
Motu	17.0	1.6	1990	3rd-highest
Waiau School	18.7	1.0	1974	3rd-highest

Wairoa	20.6	1.3	1964	3rd-highest
Wellington (Kelburn)	16.7	0.8	1927	3rd-highest
Whangarei	20.9	1.0	1967	3rd-highest
Akaroa	18.1	0.6	1978	4th-highest
Cheviot	18.1	0.7	1982	4th-highest
Haast	16.0	1.0	1949	4th-highest
Hanmer Forest	18.2	1.2	1906	4th-highest
Hicks Bay	19.1	1.1	1969	4th-highest
Kaikoura, Middle Creek	16.8	1.0	1963	4th-highest
Mahia	17.8	0.7	1990	4th-highest
Palmerston North	18.7	1.0	1928	4th-highest
<b>Mean minimum temperature</b>				
Alexandra	5.5	1.1	1929	Highest
Cape Campbell	11.5	0.8	1953	Highest
Cheviot	6.7	1.1	1982	Highest
Culverden	6.7	1.6	1928	Highest
Dunedin (Musselburgh)	8.3	0.7	1947	Highest
Farewell Spit	11.8	1.6	1971	Highest
Hastings	9.7	2.1	1965	Highest
Levin	10.3	1.4	1895	Highest
Lincoln	7.7	1.1	1881	Highest
Martinborough	8.9	1.2	1986	Highest
Masterton	8.5	2.1	1906	Highest
Medbury	6.3	1.0	1927	Highest
Motu	7.3	1.1	1990	Highest
Motueka	8.2	1.4	1956	Highest
Mt Cook	4.6	1.0	1929	Highest
Ngawi	12.3	1.0	1972	Highest
Orari Estate	6.1	0.9	1972	Highest
Reefton	7.4	1.3	1960	Highest
South West Cape	8.8	1.1	1991	Highest
Wellington (Airport)	11.8	1.0	1962	Highest
Wellington (Kelburn)	11.1	1.2	1927	Highest
Akaroa	9.6	2.1	1978	2nd-highest
Arapito	9.2	1.0	1978	2nd-highest
Blenheim	8.9	1.2	1932	2nd-highest
Brothers Island	12.1	0.6	1997	2nd-highest
Castlepoint	11.7	0.8	1972	2nd-highest
Gore	6.2	0.7	1907	2nd-highest
Haast	8.6	1.2	1949	2nd-highest
Mahia	12.0	0.9	1990	2nd-highest
Paraparaumu	10.6	1.3	1953	2nd-highest
Rangiora	6.8	0.9	1965	2nd-highest
Secretary Island	9.6	0.8	1985	2nd-highest
Taupo	8.3	1.5	1949	2nd-highest
Te Anau	6.4	1.9	1963	2nd-highest
Waiau School	6.5	1.5	1974	2nd-highest
Auckland (Whenuapai)	11.1	0.8	1945	3rd-highest

Cape Reinga	13.8	0.7	1951	3rd-highest
Dargaville	12.5	0.9	1943	3rd-highest
Gisborne	10.3	1.2	1905	3rd-highest
Hicks Bay	12.6	0.8	1969	3rd-highest
Hokitika	8.6	0.9	1866	3rd-highest
Kaikoura	9.8	0.6	1963	3rd-highest
Lauder	4.6	1.0	1924	3rd-highest
Nugget Point	7.7	0.8	1970	3rd-highest
Oamaru	7.0	0.2	1967	3rd-highest
Paeroa	10.6	0.9	1947	3rd-highest
Palmerston North	9.9	0.9	1928	3rd-highest
Roxburgh	6.7	2.0	1950	3rd-highest
Tara Hills	4.1	0.8	1949	3rd-highest
Tauranga	11.8	1.1	1913	3rd-highest
Tiwai Point	7.7	0.5	1970	3rd-highest
Wanganui	10.9	1.0	1937	3rd-highest
Westport	9.8	0.9	1937	3rd-highest
Greymouth	9.5	1.0	1947	4th-highest
Kerikeri	11.3	0.6	1945	4th-highest
Le Bons Bay	8.9	0.7	1984	4th-highest
New Plymouth	10.6	0.6	1944	4th-highest
Pukekohe	11.0	0.6	1969	4th-highest
Taumarunui	8.2	0.9	1947	4th-highest
Taupo	7.9	1.1	1949	4th-highest
Te Kuiti	9.1	0.7	1959	4th-highest
Wairoa	10.1	0.8	1964	4th-highest
Whakatane	10.3	1.1	1974	4th-highest
Whitianga	11.0	0.9	1962	4th-highest

During 2018 many high record and near-record extreme temperatures occurred. Overall, there were 73 high maximum and minimum temperature extremes, while only one low maximum extreme occurred.

**Table 2: Near-record or record high or low annual temperature extremes for 2018.**

Location	Temperature (°C)	Date of occurrence	Year records began	Comments
<b>Highest extreme maximum temperatures</b>				
Kaikoura, Middle Creek	34.8	Feb-1st	1963	Highest
Cheviot	37.3	Jan-30th	1982	Highest
Ranfurlly	33.7	Jan-30th	1897	Highest
Queenstown	34.2	Jan-29th	1871	Highest
Lumsden	32.3	Jan-14th	1982	Highest
Clyde	37.6	Jan-30th	1978	Highest
Cromwell	36.6	Jan-29th	1949	Equal highest

Balclutha	35.1	Jan-31st	1964	Equal highest
Hanmer Forest	36.7	Jan-30th	1906	2nd-highest
Kaikoura	34.3	Feb-1st	1963	2nd-highest
Medbury	35.7	Jan-25th	1927	2nd-highest
Wanaka Aero	35.2	Jan-27th	1955	2nd-highest
Manapouri (West Arm Jetty)	29.5	Jan-28th	1971	2nd-highest
Five Rivers	31.2	Jan-15th	1982	2nd-highest
Lauder	35.8	Jan-29th	1924	2nd-highest
Invercargill	32.3	Jan-14th	1905	2nd-highest
Whitianga	31.0	Jan-24th	1962	3rd-highest
Auckland (Airport)	29.4	Jan-12th	1959	3rd-highest
Levin	30.9	Jan-29th	1895	3rd-highest
Mt Cook	32.1	Feb-16th	1929	3rd-highest
Tiwai Point	30.2	Jan-15th	1970	3rd-highest
Alexandra	36.1	Jan-30th	1928	Equal 3rd-highest
Te Kuiti	30.9	Jan-26th	1959	4th-highest
Westport	28.0	Mar-3rd	1937	4th-highest
Manapouri (Airport)	30.4	Jan-29th	1963	4th-highest
Lowest extreme maximum temperatures				
Tiwai Point	5.2	Jun-2nd	1972	3rd-lowest
Highest extreme minimum temperatures				
Cape Reinga	20.9	Feb-20th	1971	Highest
Auckland (Whenuapai)	22.1	Feb-13th	1951	Highest
Whitianga	21.8	Feb-13th	1971	Highest
Whakatane	22.4	Feb-20th	1975	Highest
Rotorua	20.8	Feb-13th	1972	Highest
Te Kuiti	22.1	Feb-13th	1959	Highest
New Plymouth	21.6	Feb-12th	1944	Highest
Ngawi	24.1	Jan-31st	1972	Highest
Paraparaumu	20.7	Jan-25th	1972	Highest
Levin	21.2	Feb-12th	1950	Highest
Wellington (Kelburn)	20.2	Feb-1st	1931	Highest
Ohakune	18.1	Feb-12th	1972	Highest
Greymouth	19.8	Jan-25th	1972	Highest
Brothers Island	19.3	Jan-30th	1997	Highest
Akaroa	21.8	Feb-1st	1978	Highest
Wanaka	21.1	Jan-25th	1972	Highest
Te Anau At Park Hq	19.6	Jan-25th	1973	Highest
Manapouri (West Arm Jetty)	18.3	Jan-30th	1972	Highest
Five Rivers	20.5	Dec-30th	1982	Highest
Balclutha	18.1	Dec-30th	1972	Highest
Pukekohe	21.6	Feb-13th	1969	Equal highest
Wellington (Airport)	21.0	Feb-1st	1972	Equal highest
Kaitia	22.2	Feb-20th	1948	2nd-highest
Kerikeri	22.2	Feb-20th	1952	2nd-highest
Whangarei	22.1	Feb-13th	1967	2nd-highest
Auckland (Western Springs)	22.1	Feb-13th	1971	2nd-highest
Auckland (Airport)	22.3	Feb-13th	1961	2nd-highest

Hamilton	21.8	Feb-13th	1946	2nd-highest
Paraparaumu	20.6	Jan-25th	1972	2nd-highest
Oamaru	18.6	Jan-29th	1972	2nd-highest
Dunedin (Airport)	21.5	Jan-16th	1972	2nd-highest
Manapouri (Airport)	19.1	Jan-31st	1973	2nd-highest
Lumsden	20.4	Dec-30th	1982	2nd-highest
Tiwai Point	17.8	Jan-28th	1972	2nd-highest
Tauranga	21.8	Feb-12th	1941	3rd-highest
Martinborough	20.8	Feb-13th	1986	3rd-highest
Palmerston North	20.4	Feb-12th	1940	3rd-highest
Westport	19.9	Feb-1st	1966	3rd-highest
Arapito	19.6	Feb-1st	1978	3rd-highest
Waipawa	20.4	Feb-12th	1945	Equal 3rd-highest
Upper Hutt, Trentham	19.4	Feb-17th	1972	Equal 3rd-highest
Dargaville	21.3	Feb-1st	1951	4th-highest
Turangi	18.7	Jan-30th	1968	4th-highest
Franz Josef	17.3	Jan-16th	1953	4th-highest
Hanmer Forest	20.2	Feb-1st	1972	4th-highest
Arthurs Pass	15.4	Jan-25th	1973	4th-highest
Wanaka	19.8	Jan-31st	1972	4th-highest
Dunedin (Musselburgh)	18.6	Jan-28th	1947	4th-highest
Lowest extreme minimum temperatures				
None observed				

## Section 6: Annual rainfall – a wet year in the eastern South Island

2018 rainfall was above normal (120-149% of the annual normal) across much of the eastern and upper South Island, as well as parts of Wellington, Wairarapa, Bay of Plenty, northern Waikato, and Auckland. Well above normal rainfall (>149% of normal) was observed in portions of southern Canterbury. Rainfall was near normal (80-119% of normal) for the remainder of New Zealand.

Four locations observed near-record high annual rainfall totals, while no locations observed record or near-record low rainfall totals.

The lowest rainfall recording locations for 2018 (based on data available at time of writing) were Clyde with 526 mm, Cromwell with 541 mm, and Alexandra with 556 mm. Of the regularly reporting gauges, the wettest locations in 2018 were: Cropp River (West Coast, 975 metres above sea level) with 9817 mm, Tuke River (West Coast, 975 metres above sea level) with 9170 mm, and Doon River (Southland) with 7648 mm. Of the regularly reporting gauges, the wettest locations in 2018

excluding high elevation stations were Milford Sound with 6818<sup>5</sup> mm, Franz Josef with 3841 mm, and Manapouri (West Arm Jetty) with 3808 mm.

**Table 3: Record or near-record annual rainfall totals for the year 2018.**

Location	Rainfall total (mm)	Percentage of normal	Year records began	Comments
<b>High records or near-records</b>				
Waipara West	902	145	1973	2nd-highest
Lauder	613	140	1924	2nd-highest
Warkworth	1827	126	1966	4th-highest
Timaru	858	159	1881	4th-highest
<b>Low records or near-records</b>				
None observed				

The top three daily rainfall totals from regularly reporting gauges in 2018 were 517 mm at Ivory Glacier on 8 November, 402 mm at Mt Philistine on 8 November, and 346 mm at Castle Mount on 20 May.

Spring 2018 was extremely wet in Otago, where Oamaru, Middlemarch, Cromwell, and Lauder all observed their wettest spring on record. The 326 mm of rain that fell in Oamaru is 69% of the town's normal annual rainfall. In Middlemarch, the 305 mm that fell during the spring 2018 season is more rain than fell in the entire year in 2003 (when annual rainfall was 296 mm).

Four locations recorded their near-record highest 1-day extreme rainfall in 2018.

**Table 4: Record or near-record high extreme 1-day rainfall totals that occurred in 2018.**

Location	1-day extreme rainfall (mm)	Date	Year records began	Comments
Waipara West	117	Feb-20th	1973	2nd-highest
Takaka	223	Jan-17th	1976	4th-highest
Hokitika	187	Jan-11th	1866	4th-highest
Akaroa	158	Feb-20th	1977	4th-highest

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<sup>5</sup> Missing 1 day of data



## Section 8: 2018 climate in the six main centres

Five out of the six main centres observed above average temperatures during 2018 while only one (Auckland) had near average temperatures. In fact, three of the six main centres had their warmest or 2<sup>nd</sup>-warmest year on record. In three out of the six main centres (Auckland, Tauranga, and Christchurch), above normal rainfall was observed, while the others received near normal rainfall. Of the six main centres in 2018, Auckland was the warmest, Dunedin was the coolest and driest, Tauranga was the wettest and sunniest, and Wellington was the least sunny.

**Table 5: 2018 climate in the six main centres.**

Rainfall			
Location	Rainfall (mm)	% of normal	Comments
Auckland <sup>a</sup>	1482	132%	Above normal
Tauranga <sup>b</sup>	1503 <sup>6</sup>	126%	Above normal
Hamilton <sup>c</sup>	1434	119%	Near normal
Wellington <sup>d</sup>	1411 <sup>7</sup>	116%	Near normal
Christchurch <sup>e</sup>	865	146%	Above normal
Dunedin <sup>f</sup>	823	111%	Near normal
Temperature			
Location	Mean temp. (°C)	Departure from normal (°C)	Comments
Auckland <sup>a</sup>	15.9	+0.5	Near average
Tauranga <sup>b</sup>	15.8	+0.9	Above average (2 <sup>nd</sup> -warmest on record)
Hamilton <sup>c</sup>	14.3	+0.7	Above average
Wellington <sup>d</sup>	13.9	+1.0	Above average (Warmest on record)
Christchurch <sup>e</sup>	12.2	+0.6	Above average
Dunedin <sup>f</sup>	11.8	+0.7	Above average (2 <sup>nd</sup> -warmest on record)

<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>6</sup> Missing 2 days of data

<sup>7</sup> Missing 3 days of data

**Table 6 continued: 2018 climate in the six main centres.**

Sunshine	
Location	Sunshine (hours)
Auckland <sup>a</sup>	2041
Tauranga <sup>b</sup>	2314
Hamilton <sup>c</sup>	2029 <sup>8</sup>
Wellington <sup>d</sup>	1900
Christchurch <sup>e</sup>	2017 <sup>9</sup>
Dunedin <sup>f</sup>	1946 <sup>10</sup>

<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

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<sup>8</sup> Missing 1 day of data  
<sup>9</sup> Missing 4 days of data  
<sup>10</sup> Missing 1 day of data

## Section 9: Significant weather and climate events in 2018

This section contains information pertaining to some of the more significant weather and climate events that occurred in 2018. Note that a more detailed list of significant weather events for 2018 can be found in the *Highlights and extreme events* section of NIWA's Monthly Climate Summaries. These summaries are available online at <http://www.niwa.co.nz/climate/summaries>.

### Drought and low rainfall

Prolonged dry conditions prompted the Ministry of Primary Industries to declare a medium-scale adverse event for the Grey and Buller districts on 10 January. This classification was extended to include Otago and Southland on 30 January. The lack of meaningful rainfall and persistent high temperatures saw elevated fire hazard conditions throughout Southland and Otago, particularly during the second-half of the month. As of 30 January, Central Otago volunteer fire brigades reported responding to 208 callouts during January alone; which is as many as would typically be attended during an entire year.

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

Several Auckland locations observed their driest spring on record, including Albany (North Shore) and Western Springs (Motat). Elsewhere, Turangi in the Central Plateau had its driest spring on record while nearby Lake Taupo observed low inflows during the season.

### Floods and high rainfall

New Zealand was impacted by two ex-tropical cyclones in early 2018. The first was Fehi on 1-2 February, followed by Gita on 20-21 February. These events caused heavy rainfall and significant flooding, particularly in portions of the South Island. (See the *February 2018 Monthly Climate Summary* for further details on Fehi and Gita).

On 28 April through to 29 April, Rotorua received 167.8 mm of rainfall over a 36-hour period, which is almost 1.5 times its normal rainfall for April as a whole. A local state of emergency was declared for Ngongotaha near Rotorua after Ngongotaha Stream burst its banks, forcing the evacuation of about 30 homes. Surface flooding was widespread in Rotorua and many vehicles were submerged. A reported 200 people were trapped by rising waters at the Rotorua Agrodome.

On 4-5 June, torrential rain fell in the East Cape area, causing significant flooding and slips in the area. Many roads were closed, and some properties lost power. Tolaga Bay was particularly affected by debris flows caused by forestry slash that had been left on hillsides. The debris flowed onto paddocks and over roads, and even moved a house off its foundations. Sixty-one bridges in the Tolaga Bay catchment were closed due to flooding, and one bridge had twisted and moved at least 30 cm after the flash floods.

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

On 8 and 9 November, persistent heavy rain fell on many western and inland parts of the South Island. The heaviest falls were along the West Coast, where widespread surface flooding and slips were reported. Widespread surface flooding was reported on roads throughout the South Canterbury District.

On 19 and 20 November, persistent rain fell over many southern and eastern parts of the South Island. Considerable flooding occurred on the Taieri Plains, and 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. The Clutha River’s flow peaked at approximately 2700 cumecs; which was reported as its highest level since November 1999.

On 25 December there were several flood related incidents across the North Island. A severe localised thunderstorm struck Napier, which led to several flooding call-outs. Flooding and slips also affected State Highway 4, which closed between Whanganui and Raetihi. Likewise, State Highway 25 from Coromandel to Whitianga was closed due to slips in the Whangapoua Hill area. In Auckland, localised flooding closed State Highway 16 in Kaukapakapa and resulted in five adults needing to be rescued from two vehicles which were swept along by floodwaters.

**Table 7: Record high monthly extreme 1-day rainfall totals were recorded in 2018 at:**

Location	Extreme 1-day rainfall (mm)	Date of extreme rainfall	Year records began	Ranking
<b>January</b>				
Takaka	223	17th	1976	Highest
Hokitika	197	11th	1866	Highest
<b>February</b>				
Nelson	116	11th	1862	Highest
Kaikoura (Middle Creek)	164	20th	1898	Highest
Waipara West	117	20th	1973	Highest
Akaroa	158	20th	1977	Highest
<b>March</b>				
Lower Retaruke	160	7th	1967	Highest
Secretary Island	205	19th	1985	Highest
<b>April</b>				
Mahia	88	10th	1990	Highest
Orari Estate	96	28th	1897	Highest
Timaru (Airport)	85	28th	1881	Highest
<b>May</b>				
None observed				
<b>June</b>				
None observed				
<b>July</b>				
Milford Sound	246	6th	1929	Highest
Secretary Island	178	6th	1985	Highest

August				
None observed				
September				
Waiouru	48	4th	1950	Highest
October				
None observed				
November				
Tara Hills	70	8th	1949	Highest
Ranfurlly	53	8th	1897	Highest
Oamaru	52	8th	1950	Highest
Lauder	52	8th	1924	Highest
December				
Palmerston North	79	25th	1928	Highest

### Temperature extremes

January 2018 was the hottest single month on record for New Zealand. All but a handful of stations recorded well above average temperatures throughout the country during January 2018 and 94 locations observed their highest mean January temperatures on record. Several locations observed temperatures among the highest ever recorded in New Zealand during January:

- Alexandra: 38.7°C on 30 January – New Zealand’s 12<sup>th</sup> highest temperature on record overall and 3<sup>rd</sup> warmest January temperature on record. This was New Zealand’s hottest January temperature in 39 years, since Ruatoria reached 38.9°C in January 1979.
- Clyde; 37.6°C on 30 January – New Zealand’s equal 9<sup>th</sup>-highest January temperature on record. In addition, this was Clyde’s highest recorded temperature since records began in 1978.
- Middlemarch; 37.4°C on 30 January – New Zealand’s 11<sup>th</sup>- highest January temperature on record.
- Cheviot; 37.3°C on 30 January – New Zealand’s 12<sup>th</sup>-highest January temperature on record.
- Waiiau; 37.0°C on 25 January and 30 January – New Zealand’s 15<sup>th</sup>-highest January temperature on record.

From 14-16 January, Invercargill recorded three consecutive days above 30°C, which is unprecedented in records going back to 1905. The city had never previously recorded consecutive days above 30°C. In the 112 years of records prior to this month, the city had exceeded 30°C just 14 times during January.

On 30 January, Masterton recorded 35.4°C, which was the highest temperature observed in the North Island during January 2018. This was Masterton’s highest recorded temperature for any month, in records which began in 1906.

During January 2018, Queenstown observed 24 days when the maximum temperature exceeded 25.0°C, considerably more than the January average of 10 days. On 29 January Queenstown’s temperature reached 35.2°C. This was Queenstown’s highest recorded temperature for any month, in records which began in 1871 (previous highest temperature was 34.1°C on 2 January 1948).

On 10-11 April, an active front moving north across the country brought in very cold air, resulting in numerous low daily maximum temperature records for the month of April (*see tables below*).

At the end of May, an inversion and persistent low cloud trapped cold air at the earth's surface throughout Central Otago, resulting in low daytime maximum temperatures for many locations. On 31 May, Lauder only reached a maximum temperature of -2.6°C, which was a new May record with data going back to 1924.

**Table 8: Extremes of high daily maximum temperature in 2018 were recorded at:**

Location	Extreme maximum (°C)	Date of extreme temperature	Year records began	Ranking
<b>January</b>				
Cape Reinga	26.4	27th	1951	Highest
Mokohinau	27.1	25th	1994	Highest
Whangaparaoa	29.2	24th	1982	Highest
Whitianga	31.0	24th	1962	Highest
Masterton	35.4	30th	1906	Highest
Haast	29.4	5th	1949	Highest
Milford Sound	28.4	15th	1934	Highest
Secretary Island	27.9	11th	1985	Highest
Hanmer Forest	36.7	30th	1906	Highest
Medbury	35.7	25th	1927	Highest
Waiau	37.0	25th	1974	Highest
Cheviot	37.3	30th	1982	Highest
Ranfurly	33.7	30th	1897	Highest
Oamaru	33.8	31st	1967	Highest
Dunedin (Airport)	35.0	16th	1962	Highest
Queenstown	34.2	29th	1871	Highest
Lumsden	32.3	14th	1982	Highest
Clyde	37.6	30th	1978	Highest
Tiwai Point	30.2	15th	1970	Highest
Balclutha	35.1	31st	1964	Highest
Nugget Point	34.2	31st	1970	Highest
Stratford	28.2	30th	1960	Equal highest
Puysegur Point	24.7	16th	1978	Equal highest
Cromwell	36.6	29th	1949	Equal highest
South West Cape	27.3	14th	1991	Equal highest
<b>February</b>				
Kaikoura (Middle Creek)	34.8	1st	1963	Highest
Whatawhata	30.6	12th	1952	Equal highest
<b>March</b>				
Whitianga	28.3	6th	1962	Highest

Rotorua	28.7	5th	1964	Highest
April				
None observed				
May				
Hamilton (Ruakura)	23.5	1st	1906	Highest
June				
None observed				
July				
Kaikoura, Middle Creek	22.3	21st	1963	Equal highest
August				
Whitianga	20.5	31st	1962	Highest
September				
Wairoa	25.8	13th	1964	Highest
Motueka	24.1	14th	1956	Highest
Hamilton (Ruakura)	23.0	20th	1906	Equal highest
October				
Hanmer Forest	28.6	24th	1906	Highest
Mt Cook (Airport)	26.1	23rd	1929	Highest
Manapouri	24.0	22nd	1963	Highest
November				
Westport	25.7	25th	1937	Highest
Milford Sound	25.9	25th	1934	Equal highest
December				
None observed				

**Table 9: Extremes of low daily maximum temperature in 2018 were recorded at:**

Location	Extreme low maximum (°C)	Date of extreme temperature	Year records began	Ranking
January				
None observed				
February				
Oamaru	10.2	21st	1972	Lowest
Cromwell	10.6	21st	1949	Lowest
Alexandra	10.5	21st	1930	Lowest
Roxburgh	10.5	21st	1950	Lowest
March				
Wanaka	6.6	22nd	1972	Lowest
Oamaru	9.0	22nd	1972	Lowest
April				
Warkworth	13.4	11th	1966	Lowest
Whakatane	10.5	11th	1975	Lowest
Rotorua	9.3	11th	1972	Lowest
Port Taharoa	12.5	11th	1974	Lowest
Palmerston North	9.5	10th	1940	Lowest

Upper Hutt	8.4	10th	1972	Lowest
Waiouru	3.4	11th	1972	Lowest
Takaka	11.7	10th	1978	Lowest
Farewell Spit	12.0	10th	1972	Lowest
Westport	10.8	10th	1966	Lowest
Hanmer Forest	1.7	10th	1972	Lowest
Kaikoura	5.9	10th	1972	Lowest
Culverden	4.9	10th	1930	Lowest
Waiau	4.8	10th	1974	Lowest
Cheviot	6.2	10th	1982	Lowest
Waipara West	5.6	10th	1973	Lowest
Rangiora	7.4	10th	1972	Lowest
Whangaparaoa	13.5	11th	1982	Equal lowest
<b>May</b>				
Whangaparaoa	11.2	28th	1982	Lowest
Stratford	4.9	28th	1972	Lowest
Tara Hills	-1.0	31st	1949	Lowest
Manapouri (West Arm Jetty)	0.4	30th	1972	Lowest
Lauder	-2.6	31st	1924	Lowest
Alexandra	0.1	31st	1930	Lowest
<b>June</b>				
None observed				
<b>July</b>				
None observed				
<b>August</b>				
None observed				
<b>September</b>				
None observed				
<b>October</b>				
Puysegur Point	7.6	10th	1978	Lowest
Invercargill	5.8	10th	1905	Lowest
Tiwai Point	6.9	10th	1972	Lowest
Mt Cook	1.1	12th	1929	Equal lowest
Waipara	5.6	12th	1973	Equal lowest
<b>November</b>				
Wanaka	7.8	19th	1972	Lowest
Waipara West	9.2	9th	1973	Equal lowest
<b>December</b>				
None observed				

**Table 10: Extremes of low daily minimum temperature in 2018 were recorded at:**

Location	Extreme minimum (°C)	Date of extreme temperature	Year records began	Ranking
<b>January</b>				
None observed				



February				
None observed				
March				
None observed				
April				
Whangaparaoa	7.4	11th	1982	Lowest
Kaikoura	-0.1	12th	1963	Lowest
Arapito	1.0	11th	1978	Equal lowest
May				
None observed				
June				
None observed				
July				
None observed				
August				
None observed				
September				
None observed				
October				
Turangi	-4.1	19th	1968	Lowest
Upper Hutt	-4.6	19th	1939	Lowest
Takaka	-0.5	13th	1978	Lowest
Arapito	-0.8	13th	1978	Lowest
Mt Cook (Airport)	-7.5	13th	1929	Lowest
Queenstown	-4.2	13th	1871	Lowest
Clyde	-3.4	13th	1978	Lowest
November				
None observed				
December				
None observed				

**Table 11: Extremes of high daily minimum temperature in 2018 were recorded at:**

Location	Extreme high minimum (°C)	Date of extreme temperature	Year records began	Ranking
January				
Whangaparaoa	21.0	29th	1982	Highest
Whitianga	21.5	26th	1971	Highest
Ngawi	24.1	31st	1972	Highest
Paraparaumu	20.7	25th	1972	Highest
Wellington (Kelburn)	19.9	25th	1931	Highest
Wellington (Airport)	20.5	31st	1972	Highest
Farewell Spit	20.4	26th	1972	Highest
Reefton	18.3	25th	1972	Highest

Greymouth	19.8	25th	1972	Highest
Haast	19.1	25th	1949	Highest
Milford Sound	20.5	16th	1935	Highest
Secretary Island	19.2	24th	1988	Highest
Puysegur Point	21.0	31st	1978	Highest
Brothers Island	19.3	30th	1997	Highest
Wanaka	21.1	25th	1972	Highest
Dunedin (Airport)	21.5	16th	1972	Highest
Te Anau	19.6	25th	1973	Highest
Manapouri (West Arm Jetty)	18.3	30th	1972	Highest
Tiwai Point	17.8	28th	1972	Highest
Nugget Point	17.2	28th	1972	Highest
South West Cape	17.7	31st	1991	Highest
Cape Reinga	20.1	31st	1971	Equal highest
Tauranga	21.2	30th	1941	Equal highest
Te Puke	20.3	30th	1973	Equal highest
New Plymouth	20.5	31st	1944	Equal highest
Palmerston North	19.8	20th	1940	Equal highest
Takaka	19.5	27th	1978	Equal highest
<b>February</b>				
Kaitaia	22.2	20th	1948	Highest
Kerikeri	22.2	20th	1952	Highest
Whangaparaoa	21.4	19th	1982	Highest
Auckland (Whenuapai)	22.1	13th	1951	Highest
Auckland (Western Springs)	22.1	13th	1971	Highest
Paeroa	22.2	13th	1971	Highest
Te Puke	21.4	13th	1973	Highest
Whakatane	22.4	20th	1975	Highest
Rotorua	20.8	13th	1972	Highest
Hamilton	21.8	13th	1946	Highest
Port Taharoa	22.1	13th	1974	Highest
Te Kuiti	22.1	13th	1959	Highest
New Plymouth	21.6	12th	1944	Highest
Masterton (Te Ore Ore)	21.3	13th	1943	Highest
Hicks Bay	21.7	12th	1972	Highest
Palmerston North	20.6	12th	1940	Highest
Levin	21.2	12th	1950	Highest
Wellington (Kelburn)	20.2	1st	1931	Highest
Stratford	20.0	12th	1972	Highest
Hawera	20.9	12th	1977	Highest
Wanganui (Spriggens Park)	22.0	1st	1972	Highest
Farewell Spit	20.2	1st	1972	Highest
Brothers Island	19.3	1st	1997	Highest
Akaroa	21.8	1st	1978	Highest
Kaitaia	22.1	20th	1948	Equal highest
Whatawhata	21.5	13th	1952	Equal highest
Castlepoint	22.0	13th	1972	Equal highest
Wellington (Airport)	21.0	1st	1972	Equal highest

March				
Mahia	18.8	7th	1990	Highest
Brothers Island	18.8	3rd	1997	Highest
Five Rivers	17.0	20th	1982	Highest
April				
None observed				
May				
None observed				
June				
None observed				
July				
None observed				
August				
None observed				
September				
None observed				
October				
Puysegur Point	15.1	24th	1978	Highest
Balclutha	14.0	24th	1972	Highest
South West Cape	12.7	24th	1991	Highest
November				
Masterton	18.6	9th	1943	Highest
Martinborough	18.0	9th	1986	Highest
Arapito	16.4	26th	1978	Highest
Reefton	15.8	9th	1972	Highest
December				
Five Rivers	20.5	30th	1982	Highest
Balclutha	18.1	30th	1972	Highest
Ngawi	20.5	31st	1972	Equal highest
Nugget Point	16.4	30th	1972	Equal highest

### Strong winds

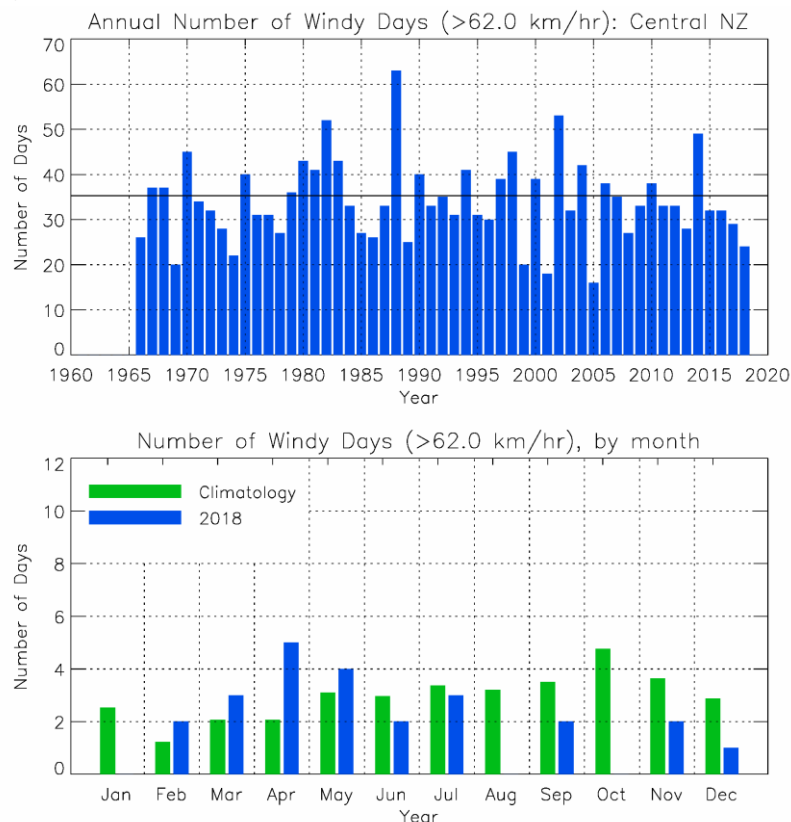
For 'central New Zealand' for the year as a whole (and using the 62 km/hr threshold), 2018 was the least windy year since 2005 based on the 1981-2010 climatological average (Figure 3)<sup>11</sup>, with only 24 days exceeding 62 km/hr average 9am wind speed between Auckland and Christchurch (compared to the climatological number of 35.3 days). The year began with no windy days above the gale-force

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<sup>11</sup> In these graphs, a 'windy day' is defined as one where the daily 9am pressure difference corresponds to a geostrophic wind speed exceeding a specified threshold (either westerly or easterly). Thus, it is a broad measure, and won't capture short-lived southerlies or local wind enhancements. The threshold selected is 62 km/hr. (Note: On the Beaufort wind scale, a mean speed of 62 km/hr or greater corresponds to Gale Force or greater). The wind index used is Z1 (Auckland minus Christchurch), referred to as "Central NZ" in Figure 3.

threshold in January 2018, following on from November and December 2017 also with no gale-force days. This unusually calm period was an important factor in allowing the sea surface in the eastern Tasman to get very warm (due to reduced mixing), promoting the extreme ocean and land heatwave of the 2017-18 summer, New Zealand's hottest summer on record.

The last five months of 2018 were also much less windy than usual, with only 5 days over this whole period above the gale-force threshold. In this record which begins in 1966, 2018 was the 6<sup>th</sup> least windy year. The four least windy years were: 2005 (1<sup>st</sup>, 16 days), 2001 (2<sup>nd</sup>, 18 days), 1969 and 1999 (equal 3<sup>rd</sup>, 20 days).



**Figure 3: (above) Annual number of ‘windy days’ for central New Zealand, 1966 to 2018, with horizontal line indicating the 1981-2010 average (35.3 days); (Bottom) Number of ‘windy days’ by month, comparing the months of 2018 (blue histogram) with the 1981-2010 average (green).**

On 1 February, State Highway 6 from Greymouth to Westport was closed due to fallen trees and strong winds associated with ex-Tropical Cyclone Fehi. Similarly, State Highway 8 between Roxburgh and Millers Flat in Otago was also closed. 6,500 Hokitika residents were without power due to wind and rain impacts. Strong northeast winds, the passage of ex-Tropical Cyclone Fehi to the southwest, and king tides, all combined to cause coastal inundation along Auckland’s east coast. This led to the closure of Tamaki Drive during the morning.

On 20 February, strong winds from ex-Tropical Cyclone Gita across the Taranaki region led to power cuts in 23,000 properties. The pipeline from the New Plymouth water treatment station to the Mangorei Reservoir was ruptured by a fallen tree and residents were urged to conserve water.

On 10-11 April, an active front from the west moved up the country, bringing adverse weather to the South Island and severe thunderstorms to parts of the North Island. Gale force winds and tornadoes

damaged homes in Rahotū, Taranaki and National Park Village, Central Plateau. Auckland was severely affected with widespread power outages and at least 19 schools around the country were closed. *The impacts of this event are summarised in greater detail in the April 2018 Monthly Climate Summary.*

Adverse weather also forced the cancellation of Cook Strait ferry sailings on 10 April, the 50<sup>th</sup> anniversary of the Wahine disaster.

On 28 April, a burst of gusty to gale force winds cut power to over 1000 Auckland homes and brought trees down, some even on to vehicles. Firefighters had been sent to clear debris from state highways in Auckland after high winds sent trees falling into the road.

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

**Table 12. Maximum wind gust extremes in 2018 were recorded at:**

Location	Maximum wind gust (km/hr)	Date of maximum wind gust	Year records began	Ranking
<b>January</b>				
Kaikohe	89	4th	1986	Highest
Dargaville	106	5th	1997	Highest
Auckland (Whenuapai)	96	4th	1972	Highest
Whakatane	95	5th	1974	Highest
Rotorua	91	5th	1972	Highest
Motu	104	5th	1991	Highest
Napier	111	23rd	1973	Highest
Mokohinau	119	5th	1994	Equal highest
<b>February</b>				
Kaikohe	154	1st	1986	Highest
New Plymouth	104	20th	1972	Highest
Hawera	130	20th	1986	Highest
Waiouru	113	1st	1970	Highest
Farewell Spit	95	20th	1973	Equal highest
<b>March</b>				
None observed				
<b>April</b>				
Auckland (Whenuapai)	113	10th	1972	Highest
Auckland (Western Springs)	95	10th	1994	Highest
Paeroa	102	28th	1991	Highest
Auckland (Mangere)	128	28th	1971	Highest
Pukekohe	82	10th	1986	Highest
Brothers Island	139	10th	1997	Highest
Whitianga	78	11th	1991	Equal highest
<b>May</b>				
Manapouri	89	8th	1991	Highest
<b>June</b>				

Whangarei	93	21st	1973	Equal highest
Whakatane	106	12th	1974	Equal highest
July				
Secretary Island	130	7th	1994	Highest
August				
Secretary Island	122	16th	1994	Highest
September				
None observed				
October				
Waiouru	106	27th	1970	Equal highest
November				
Whanganui	96	1st	1977	Equal highest
December				
None observed				

### Snow and ice

On 21 February, the Crown Range was dusted with snow as a cold southerly pushed into the South Island in ex-Tropical Cyclone Gita's wake. The Remarkables ski area near Queenstown reported 50 cm of snowfall, with drifts up to 1 metre deep.

On 11 April, traffic was backed up on roads out of Wellington after hail settled on the road, making driving conditions difficult, and resulting in several crashes. Icy driving conditions occurred in both directions between Tawa and Porirua.

On 6 August, a large avalanche occurred on the upper slopes of Turoa skifield on Mt Ruapehu, damaging the *High Noon Express* chairlift. The damage was significant enough that the chairlift was unable to be used for the remainder of the ski season.

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

### Tornadoes and waterspouts

On 10 April, a tornado appeared to have hit the Swanson Railway Station in West Auckland where roofing iron and wood was blown for 100 metres. A tornado swept through Taranaki town Rahotū, northwest of Ōpunake, downing trees and powerlines. Eleven homes were reportedly damaged, three severely, and seven families had to be relocated.

Also on 10 April, a tornado damaged homes in National Park Village, Central Plateau. The tornado carved a clear path around 500 metres wide through the village, downing trees and power lines, and destroying six homes. Trampolines and sheets of iron were flung through the air hitting cars and powerpoles.

On 20 August, a tornado hit coastal parts of New Plymouth, blowing out windows and tearing off roofs and branches. Up to 30 homes were damaged and power was cut to several properties.

Another tornado hit Ohope, which damaged the conference centre at the Top 10 Holiday Park as well as some houses. Power was also cut there.

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

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

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**Note for editors:**

**Climate measurements have been made in New Zealand for about 150 years, with reasonable coverage of reliable data from at least the early 1900s. NIWA makes its raw climate data publicly available for free on-line. Journalists are advised, however, to take extreme care when interpreting trends from raw data to ensure they have not been compromised by changes in site location, urbanisation, exposure, or instrumentation over time. If in any doubt, please call us.**

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