

New Zealand Climate Summary: **Summer 2016-17** Issued: 3 March 2017

# A cool summer for most but dry in the north and east

|  |  |
| --- | --- |
| **Temperature** | Summer temperatures were below average (-0.51°C to -1.20°C) or well below average (< -1.20°C) for southern and western parts of the North Island and South Island. Isolated parts of Hawke’s Bay and Gisborne observed above average temperatures (+0.51°C to +1.20°C). Temperatures were typically near average (-0.50°C to +0.50°C) for the remainder of the country. |
| **Rainfall** | Rainfall was below normal (50-79%) in many northern and eastern areas of the North Island and South Island. It was a particularly dry summer in parts of Northland and East Cape where rainfall was well below normal (< 50%). In contrast, rainfall was above normal (120-149%) for western parts of the South Island. Near normal rainfall (80-119%) was observed for remaining areas of New Zealand. |
| **Soil moisture** | The abnormally dry start to summer for northern and eastern parts contributed to soil moisture levels that were well below normal for the time of year in those areas. In early February, Northland’s drought was officially classified as a medium-scale adverse event. Many central and eastern parts of the North Island observed a considerable increase in soil moisture levels by the end of February, due to a period of heavy rainfall in the preceding few weeks. A fairly settled and dry end to summer resulted in soils becoming drier than normal over much of the South Island as of 1 March 2017. |
| **Sunshine** | Summer sunshine was above normal (110-125%) for parts of Northland, Gisborne, Hawke’s Bay and Canterbury. Southeastern parts of the North Island observed below normal sunshine (75-89%), with the remainder of the country typically observing near normal sunshine (90-109%). |

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## Overview

For the season as a whole, mean sea level pressures were below normal over New Zealand, with considerably lower than normal pressures present to the southwest of the country. This pressure pattern delivered more westerly and southwesterly winds than normal during the season. These winds resulted in cool and unsettled summer weather for many parts of the country, especially in southern and western regions which are exposed to southwesterly winds. In contrast, areas sheltered from the southwesterly airflow experienced warm and dry conditions for much of the summer. This was particularly evident in Hawke’s Bay and Gisborne, where daily maximum temperatures frequently exceeded 30°C and extended dry spells were observed. Sea surface temperatures surrounding New Zealand were typically lower than normal for the time of year, although these temperatures returned to near-normal towards the end of the season. Anticyclones (high pressure systems) prevailed over New Zealand throughout the latter half of February, resulting in a warm, dry and sunny end to summer for the majority of the country.

Summer temperatures were below average (-0.51°C to -1.20°C of the summer average) for western parts of Southland, the Southern Lakes, West Coast, Tasman, Wellington and Waikato. Well below average temperatures (< -1.20°C of the summer average) were observed at Te Kuiti, Takaka, Appleby and Mt Cook Village. In contrast, isolated parts of Hawke’s Bay and Gisborne observed above average temperatures (+0.51°C to +1.20°C), as did Rangiora (Canterbury) and Lauder (Central Otago). Temperatures were typically near average (-0.50°C to +0.50°C) for the remainder of the country. The nation-wide average temperature for summer 2016-17 was 16.3°C (0.4°C below the 1981-2010 summer average, using NIWA’s seven-station temperature series which begins in 1909). This is the coldest summer in five years (since 2011-12), and the fifth-coolest summer in the last 20 years (the colder ones in order being 1999-2000 (coldest), 2011-12, 2002-03, and 2004-05).

Rainfall was below normal (50-79% of the summer normal) in Auckland, Waikato, Gisborne, Nelson, Blenheim, and parts of Canterbury. It was a particularly dry summer for Northland and the East Cape where rainfall was well below normal (< 50% of the summer normal). In contrast, rainfall was above normal (120-149%) for the West Coast and Fiordland. Near normal rainfall (80-119%) was observed for remaining areas of New Zealand. Hawke’s Bay received very little rainfall during December and January, with Napier observing its third-driest January in records that began in 1870. However, considerable rainfall during February resulted in near normal rainfall totals in the region for the summer overall.

The abnormally dry start to summer for northern and eastern parts of the country contributed to soil moisture levels that were well below normal for the time of year in those areas. In early February, Northland’s drought was officially classified as a medium-scale adverse event by the Minister for Primary Industries. Many central and eastern parts of the North Island observed soil moisture levels that were well below normal during December, January and early February. However, farmers in these areas welcomed a considerable increase in soil moisture levels by the end of February, due to periods of heavy rainfall that occurred during mid-February. An extended period of settled and dry weather at the end of February resulted in soils becoming drier than normal over much of the South Island by the end of summer. In addition, as of 1 March 2017 soil moisture levels were below normal in Taranaki, and considerably below normal about the East Cape.

Summer sunshine was above normal (110-125%) for parts of Northland, Gisborne, Hawke’s Bay and Canterbury. In contrast, southeastern parts of the North Island observed below normal sunshine (75-89%). Remaining areas of the country typically observed near normal sunshine (90-109%). Summer was particularly dour in the southwest of the North Island; Wellington narrowly avoided a near-record low sunshine total for the season due to a 10-day period of mostly sunny weather at the end of February.

**Further Highlights:**

* The highest temperature was 35.5°C, observed at Wairoa on 6 February.
* The lowest temperature was -1.7°C, observed at Mt Cook Airport on 5 January.
* The highest 1-day rainfall was 309 mm, recorded at Milford Sound on 31 January.
* The highest wind gust was 178 km/hr, observed at Akitio on 13 February.
* Of the six main centres in summer 2016-17, Tauranga was the warmest and sunniest, Dunedin was the coolest, Christchurch was the driest, and Wellington was the wettest and cloudiest.

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## Temperature: Cooler than usual for many

Summer 2016-17 temperatures were cooler than usual for many parts of the country, and six locations observed record or near-record low mean temperatures. Whangarei observed its third-highest summer mean maximum temperature on record, and second-lowest summer mean minimum temperature on record (records began in 1967). Clearer skies than normal was the likely main cause, as these enable enhanced radiative daytime heating and night-time cooling. Indeed, Whangarei observed its third-highest summer sunshine total on record. The nation-wide average temperature for summer 2016-17 was 16.3°C (0.4°C below the 1981-2010 summer average, using NIWA’s seven-station temperature series which begins in 1909).

**Record[[1]](#footnote-1) or near-record mean air temperatures for summer were recorded at:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Location** | **Mean**  **air temp. (oC)** | **Departure from normal (oC)** | **Year records began** | **Comments** |
| High records or near-records | | | | |
| Wairoa | 19.8 | 1.1 | 1964 | 4th-highest |
| Low records or near-records | | | | |
| Takaka | 15.2 | -1.7 | 1978 | Lowest |
| Motu | 14.5 | -0.7 | 1990 | 2nd-lowest |
| Secretary Island | 13.2 | -1.2 | 1985 | 2nd-lowest |
| Te Kuiti | 16.5 | -1.5 | 1959 | 3rd-lowest |
| Appleby | 15.4 | -1.6 | 1932 | 3rd-lowest |
| Lake Manapouri (West Arm) | 12.6 | -1.2 | 1971 | 3rd-lowest |
| Port Taharoa | 17.7 | -1.2 | 1973 | 4th-lowest |
| Turangi | 15.6 | -1.1 | 1968 | 4th-lowest |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Location** | **Mean maximum**  **air temp. (oC)** | **Departure from normal (oC)** | **Year records began** | **Comments** |
| High records or near-records | | | | |
| Whangarei | 25.1 | 1.2 | 1967 | 3rd-highest |
| Hicks Bay | 22.6 | 1.2 | 1969 | 3rd-highest |
| Wairoa | 25.8 | 1.9 | 1964 | 3rd-highest |
| Gisborne | 25.7 | 1.7 | 1905 | 4th-highest |
| Cheviot | 23.2 | 1.1 | 1982 | 4th-highest |
| Low records or near-records | | | | |
| Secretary Island | 16.1 | -1.5 | 1985 | Lowest |
| South West Cape | 14.7 | -1.0 | 1991 | Lowest |
| Port Taharoa | 20.2 | -2.3 | 1973 | 2nd-lowest |
| Takaka | 20.8 | -1.7 | 1978 | 2nd-lowest |
| Te Kuiti | 21.9 | -1.7 | 1959 | 3rd-lowest |
| Arthurs Pass | 16.0 | -1.7 | 1973 | 3rd-lowest |
| Te Anau | 18.3 | -1.6 | 1963 | 3rd-lowest |
| Martinborough | 21.7 | -1.1 | 1986 | 4th-lowest |
| Haast | 16.8 | -1.3 | 1949 | 4th-lowest |
| Lake Manapouri (West Arm) | 17.1 | -1.5 | 1971 | 4th-lowest |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Location** | **Mean minimum**  **air temp. (oC)** | **Departure from normal (oC)** | **Year records began** | **Comments** |
| High records or near-records | | | | |
| None observed |  |  |  |  |
| Low records or near-records | | | | |
| Motu | 7.8 | -2.4 | 1990 | Lowest |
| Clyde | 8.0 | -2.1 | 1978 | Lowest |
| Whangarei | 13.0 | -1.7 | 1967 | 2nd-lowest |
| Secretary Island | 10.3 | -0.9 | 1985 | 2nd-lowest |
| Appleby | 9.5 | -2.6 | 1932 | 2nd-lowest |
| Winchmore | 8.3 | -1.9 | 1928 | 2nd-lowest |
| Turangi | 9.5 | -1.5 | 1968 | 3rd-lowest |
| Takaka | 9.6 | -1.6 | 1978 | 3rd-lowest |
| Lake Manapouri (West Arm) | 8.0 | -0.9 | 1971 | 3rd-lowest |
| Alexandra | 8.9 | -1.3 | 1929 | 4th-lowest |

## Rainfall: Dry in the north and east, wet for the western South Island

Summer 2016-17 rainfall was a mixed bag, with three locations observing record or near-record low rainfall and three locations observing record or near-record high rainfall. It was particularly dry in parts of Northland, Auckland and East Cape, with several stations observing less than half of normal summer rainfall. Gisborne and Napier recorded a prolonged dry spell[[2]](#footnote-2) lasting 35 days and 30 days, respectively, which ended in early February.

**Record or near-record summer rainfall totals were recorded at:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Location** | **Rainfall total (mm)** | **Percentage of normal** | **Year records began** | **Comments** |
| High records or near-records | | | | |
| Arapito | 792 | 144 | 1978 | Highest |
| Lake Manapouri (West Arm) | 1647 | 145 | 1971 | 2nd-highest |
| Campbell Island | 459 | 136 | 1992 | 3rd-highest |
| Low records or near-records | | | | |
| Mahia | 78 | 37 | 1990 | Lowest |
| Auckland (Western Springs) | 110 | 47 | 1948 | 2nd-lowest |
| Whangarei | 121 | 41 | 1937 | 4th-lowest |

## Sunshine: Near normal for most but a sunny season throughout Northland

Summer sunshine was plentiful throughout Northland, and in parts of Gisborne, Hawke’s Bay and Canterbury. In contrast, sunshine hours were fewer than usual for the southwest of the North Island. Paraparaumu recorded its lowest summer sunshine hours on record.

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Location** | **Sunshine hours** | **Percentage of normal** | **Year records began** | **Comments** |
| High records or near-records | | | | |
| Kaitaia | 762 | 128 | 1951 | 2nd-highest |
| Whangarei | 695 | 116 | 1954 | 3rd-highest |
| Ashburton | 678 | 123 | 1930 | 3rd-highest |
| Invercargill | 656 | 121 | 1913 | 4th-highest |
| Low records or near-records | | | | |
| Paraparaumu | 495 | 76 | 1953 | Lowest |

## Summer climate in the six main centres

Temperatures were below average in Hamilton for summer 2016-17 overall, and near average at the remaining main centres. Auckland experienced below normal rainfall, with near normal rainfall observed at the remaining main centres. Summer sunshine was above normal in Dunedin, below normal in Wellington, and near normal for the remaining main centres. Of the six main centres in summer 2016-17, Tauranga was the warmest and sunniest, Dunedin was the coolest, Christchurch was the driest, and Wellington was the wettest and cloudiest.

**Summer 2016-17 main centre climate statistics:**

|  |  |
| --- | --- |
| **Temperature** | |
| **Location** | **Mean temp. (oC)** | **Departure from normal (oC)** | **Comments** |
| Aucklanda | 18.9 | -0.3 | Near average |
| Taurangab | 19.3 | +0.2 | Near average |
| Hamiltonc | 17.4 | -0.6 | Below average |
| Wellingtond | 16.0 | -0.5 | Near average |
| Christchurche | 16.4 | -0.2 | Near average |
| Dunedinf | 14.4 | -0.3 | Near average |
| **Rainfall** | |
| **Location** | **Rainfall (mm)** | **% of normal** | **Comments** |
| Aucklanda | 143 | 65% | Below normal |
| Taurangab | 235 | 91% | Near normal |
| Hamiltonc | 247 | 95% | Near normal |
| Wellingtond | 248 | 108% | Near normal |
| Christchurche | 129 | 102% | Near normal |
| Dunedinf | 209 | 95% | Near normal |
| **Sunshine** | |
| **Location** | **Sunshine (hours)** | **% of normal** | **Comments** |
| Aucklanda | 641 | 102% | Near normal |
| Taurangab | 701 | 99% | Near normal |
| Hamiltong | 566 | 90% | Near normal |
| Wellingtond | 560[[3]](#footnote-3) | 82% | Below normal |
| Christchurche | 635 | 97% | Near normal |
| Dunedinf | 621 | 123% | Above normal |  |

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

## Highlights and extreme events

This section contains information pertaining to some of the more significant highlights and extreme events that occurred during summer 2016-17. Note that a more detailed list of significant weather events for summer 2016-17 can be found in the *Highlights and extreme events* section of NIWA’s monthly Climate Summaries. These monthly summaries are available online, and may be viewed at the following website: <http://www.niwa.co.nz/climate/summaries/monthly>

### Temperatures

Throughout January, very warm afternoon temperatures (although not record-breaking) were recorded in parts of Northland, Gisborne and the Hawke’s Bay. These warm conditions were exacerbated due to the ongoing dryness in those areas at the time, with incoming solar radiation predominantly heating the dry ground and heating the air close to the ground as opposed to the solar energy being used to evaporate soil moisture.

The highest temperature recorded during summer 2016-17 was 35.5°C, observed at Wairoa on 6 February. This was followed by 34.9°C observed at Maraekakaho (Hawke’s Bay) on 6 February, and 34.7°C at Waiau (North Canterbury) on 5 February. The lowest temperatures were observed on 5 January: -1.7°C at Mt Cook Airport, and -1.5°C at Hanmer Forest and Lake Tekapo.

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Location** | **Extreme maximum (°C)** | **Date of extreme temperature** | **Year records began** | **Comments** |
| High records or near-records | | | | |
| Whangarei | 31.8 | Feb-13th | 1967 | Highest |
| Whangaparaoa | 30.5 | Feb-7th | 1982 | Highest |
| Whitianga | 33.0 | Feb-6th | 1962 | Highest |
| Whakatane | 32.1 | Feb-7th | 1975 | 3rd-highest |
| Leigh | 29.6 | Feb-13th | 1966 | 4th-highest |
| Mahia | 31.3 | Feb-13th | 1990 | 4th-highest |
| Low records or near-records | | | | |
| Takaka | 13.2 | Feb-2nd | 1978 | Lowest |
| Balclutha | 12.0 | Jan-19th | 1972 | Equal 2nd-lowest |
| Secretary Island | 11.5 | Jan-7th | 1989 | Equal 3rd-lowest |
| Tautuku | 10.5 | Jan-19th | 1976 | 3rd-lowest |
| Alexandra | 13.2 | Jan-19th | 1992 | 4th-lowest |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Location** | **Extreme minimum (°C)** | **Date of extreme temperature** | **Year records began** | **Comments** |
| High records or near-records | | | | |
| Mahia | 20.6 | Feb-14th | 1990 | Highest |
| Cheviot | 21.7 | Feb-1st | 1982 | 2nd-highest |
| Waipara West | 22.4 | Feb-22nd | 1973 | Equal 2nd-highest |
| Waiau | 21.3 | Feb-1st | 1974 | 3rd-highest |
| Waione | 20.8 | Feb-7th | 1993 | Equal 3rd-highest |
| Alexandra | 17.8 | Dec-10th | 1992 | Equal 3rd-highest |
| Franz Josef | 17.4 | Feb-21st | 1953 | 4th-highest |
| Low records or near-records | | | | |
| Motu | -0.6 | Jan-5th | 1990 | 3rd-lowest |
| Waiau | 0.6 | Jan-5th | 1974 | 4th-lowest |
| Castlepoint | 6.0 | Jan-6th | 1994 | Equal 4th-lowest |
| Mt Cook (Airport) | -1.7 | Jan-5th | 1929 | Equal 4th-lowest |

### Rain and slips

On February 3, The Minister of Primary Industries officially classified the impact of Northland’s drought as a medium-scale adverse event under the Primary Sector Recovery Policy. This announcement came following several months of low rainfall resulting in significant soil moisture deficits, low pasture covers, and low supplementary feed.

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Location** | **Extreme 1-day rainfall**  **(mm)** | **Date of extreme rainfall** | **Year records began** | **Comments** |
| Motueka | 131 | Jan-21st | 1956 | 2nd-highest |
| Arapito | 98 | Jan-18th | 1978 | 3rd-highest |
| Tapawer | 74 | Jan-21st | 1992 | 3rd-highest |
| Leeston | 44 | Dec-11th | 1986 | 3rd-highest |
| Castlepoint | 114 | Feb-17th | 1907 | 4th-highest |
| Glenledi Rd | 69 | Jan-22nd | 1984 | 4th-highest |

### Wind

On 21 January, high winds affected much of the North Island and the northern South Island. Large trees and power lines were toppled, some damaging houses and vehicles in Auckland. Roofs were lifted in the wind and a bouncy castle became tangled in power lines in Kumeu, West Auckland. At the peak of the storm, 15,000 homes in Auckland were without power for a time, and some residents were still without power two days later. Two people were injured when a tree fell on their car as they were driving on the Auckland Southern Motorway. Twelve passengers were evacuated after a tree came down on a train near Papatoetoe. A 250 tonne buoy broke its mooring and washed up on Ngamotu Beach in New Plymouth, and 1500 homes in Taranaki were without power. A gust of wind ripped a wedding reception marquee out of the ground and left it in shreds in south Taranaki. Flights were cancelled in Wellington and part of Vivian Street was closed due to glass falling from a building. In the Hawke’s Bay, a car was blown off the road on SH 2 at the Pakipaki roundabout. In Nelson, strong winds forced the cancellation of the final day of the Evolve Festival after the campsite was badly affected.

On 13 February, a formal Civil Defence State of Emergency warning was issued for Hastings District as strong northwesterly winds combined with high temperatures to fan several wildfires. Up to 70 homes were evacuated overnight and at least one home was completely destroyed.

Meanwhile, between 13 and 15 February, Fire Service resources were stretched between by out-of-control scrub fires on Christchurch’s Port Hills. Unable to fully contain the fires, they were left burning through both nights. A change in wind on the night of 15 February pushed the Summit Rd/Marley Hill fire to spread down the face of the hill toward local landmark, the Sign of the Kiwi, and forced the evacuation of homes around Governors Bay. The Early Valley Rd fire spread into the new Christchurch Adventure Park.

**Record or near record summer extreme wind gusts were recorded at:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Location** | **Extreme wind gust (km/h)** | **Date of extreme gust** | **Year records began** | **Comments** |
| Motu | 100 | Jan-22nd | 1991 | Highest |
| Waiouru | 124 | Jan-22nd | 1970 | Highest |
| Nelson | 115 | Jan-22nd | 1972 | Highest |
| Auckland (Western Springs) | 83 | Jan-21st | 1994 | Equal highest |
| Mahia | 104 | Jan-22nd | 1991 | 2nd-highest |
| Puysegur Point | 159 | Jan-24th | 1986 | 2nd-highest |
| Richmond | 107 | Jan-22nd | 1972 | 2nd-highest |
| Tara Hills | 98 | Jan-31st | 1985 | 2nd-highest |
| Farewell Spit | 96 | Jan-22nd | 1973 | Equal 2nd-highest |
| Oamaru | 98 | Jan-19th | 1984 | Equal 2nd-highest |
| Baring Head | 139 | Jan-19th | 1991 | 3rd-highest |
| Auckland (Airport) | 100 | Jan-21st | 1971 | Equal 3rd-highest |
| Hawera | 93 | Jan-22nd | 1986 | Equal 3rd-highest |
| Whakatane | 85 | Jan-22nd | 1974 | Equal 4th-highest |
| Blenheim | 98 | Jan-19th | 1972 | Equal 4th-highest |

### Lightning and hail

On 13 February, thunderstorms struck parts of coastal and central Otago. In Dunedin, locals dashed for shelter as the storm struck mid-afternoon with heavy hail and torrential rain battering the southern city. Surface flooding and lightning strikes forced a number of CBD shops to close, and some manhole covers were reported as lifting in the deluge.

### Snow and ice

On 21 January, the storm that affected the North Island also dumped snow on mountains in the South Island. *Cardrona Alpine Resort* in the Southern Lakes area received over 30 cm of snow, the largest summer snowfall in living memory, according to Cardrona staff. Lighter falls of snow were reported in the mountains of the Southern Lakes on three other days during January, and typified what had been an unsettled and unseasonably cool month for much of the country.

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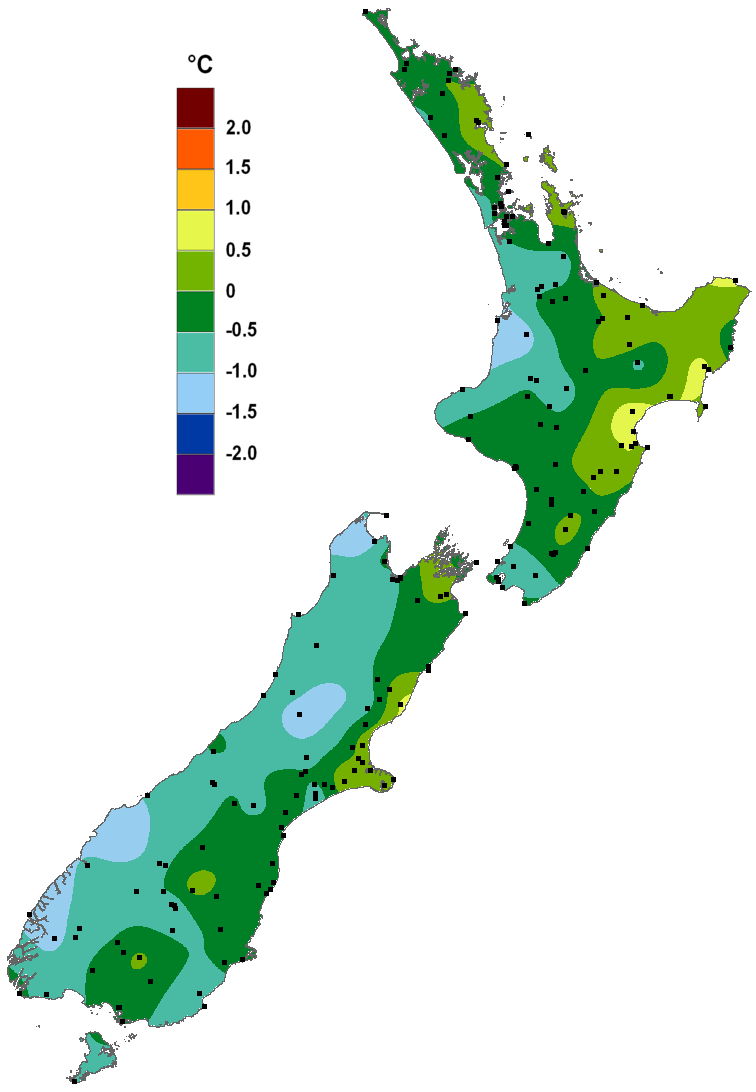
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*Summer 2016-17 mean temperature, expressed as a departure from the 1981-2010 average (°C).*

*The majority of New Zealand observed temperatures that were near average (-0.50°C to +0.50°C) or below average (-0.51°C to -1.20°C) as indicated by the green and light blue shades.*

<https://www.niwa.co.nz/our-science/climate>

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1. The rankings (1st, 2nd, 3rd.etc) in all tables in this summary are relative to climate data from a *group* of nearby stations, some of which may no longer be operating. The current climate value is compared against all values from any member of the group, without any regard for homogeneity between one station’s record, and another. This approach is used due to the practical limitations of performing homogeneity checks in real-time. [↑](#footnote-ref-1)
2. A dry spell is defined as the number of consecutive days with < 1.0 mm rainfall on any day. [↑](#footnote-ref-2)
3. Missing one day of data. [↑](#footnote-ref-3)