NIWA National Climate Centre

Seasonal Climate Summary

NIWA Taihoro Nukurangi

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.

For further information, please contact:
Mr Chris Brandolino
Principal Scientist – Forecasting, NIWA National Climate Centre
Tel. 09 375 6335, Mobile 027 866 0014

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] or near-record mean air temperatures for summer were recorded at:

Location	Mean air temp. (°C)	Departure from normal (°C)	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

[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.

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. (°C)	Departure from normal (°C)	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. (°C)	Departure from normal (°C)	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] 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

[2] A dry spell is defined as the number of consecutive days with < 1.0 mm rainfall on any day.

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. (°C)**	**Departure from normal (°C)**	**Comments**
Auckland[a]	18.9	-0.3	Near average
Tauranga[b]	19.3	+0.2	Near average
Hamilton[c]	17.4	-0.6	Below average
Wellington[d]	16.0	-0.5	Near average
Christchurch[e]	16.4	-0.2	Near average
Dunedin[f]	14.4	-0.3	Near average
Rainfall			
Location	**Rainfall (mm)**	**% of normal**	**Comments**
Auckland[a]	143	65%	Below normal
Tauranga[b]	235	91%	Near normal
Hamilton[c]	247	95%	Near normal
Wellington[d]	248	108%	Near normal
Christchurch[e]	129	102%	Near normal
Dunedin[f]	209	95%	Near normal
Sunshine			
Location	**Sunshine (hours)**	**% of normal**	**Comments**
Auckland[a]	641	102%	Near normal
Tauranga[b]	701	99%	Near normal
Hamilton[g]	566	90%	Near normal
Wellington[d]	560[3]	82%	Below normal
Christchurch[e]	635	97%	Near normal
Dunedin[f]	621	123%	Above normal

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

[3] Missing one day of data.

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.

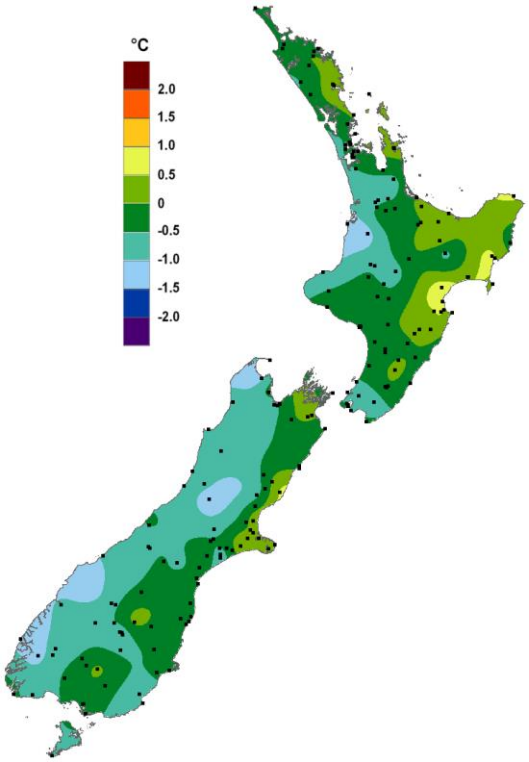
Snow and ice

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.

For further information, please contact:

Mr Chris Brandolino
Principal Scientist – Forecasting, NIWA National Climate Centre
Tel. 09 375 6335, Mobile 027 866 0014

For climate data enquiries, please contact:
Mr Gregor Macara
Climate Scientist, NIWA Wellington
Tel. 04 386 0509



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