NIWA National Climate Centre

Annual Climate Summary

NIWA Taihoro Nukurangi

New Zealand Climate Summary: **2017** Issued: 9 January 2018

2017: A year of weather extremes across New Zealand

Temperature	Annual temperatures were near average (within 0.5°C of the annual average) for much of the South Island and lower and western North Island. Above average temperatures (>0.50°C above the annual average) occurred in the Bay of Plenty, Gisborne, Hawke's Bay and in parts of Northland, Waikato, Manawatu-Whanganui, Nelson, Marlborough, Buller, upper Canterbury, interior Otago, and along the West Coast. 2017 was the 5th warmest on record for New Zealand, based on NIWA's seven-station series which began in 1909.
Rainfall	Yearly rainfall in 2017 was above normal (120-149% of the annual normal) for parts of Auckland, Waikato, Bay of Plenty, coastal Canterbury, and north coastal Otago. In contrast, rainfall was below normal (50-79% of the annual normal) in much of Southland and interior Otago. Rainfall was near normal (80 to 119% of the annual normal) for the remainder of New Zealand.
Soil moisture	The start to 2017 had below or well below normal soil moisture in the northern and eastern North Island, which was then alleviated by several rainstorms that occurred from mid-February through April. During April, above normal soil moisture developed in the eastern South Island and persisted through much of the winter and spring. From October through the end of the year, below normal soil moisture levels occurred in the western South Island from the development of La Niña. Very low rainfall during November and December led to below or well below normal soil moisture nationwide. 11 of New Zealand's 16 geographical regions experienced meteorological drought, according to the New Zealand Drought Index by the end of the year.
Sunshine	Annual sunshine was mainly near normal (90-109% of the annual normal) or above normal (110-124% of the annual normal) throughout New Zealand. The wider Nelson region experienced New Zealand's highest annual sunshine total during 2017 (2633 hours).

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Overview

Annual mean sea level pressures for 2017 were slightly higher than normal to the south and east of New Zealand, primarily over and to the east of the Chatham Islands. This atmospheric pressure pattern produced slightly more northerly wind flows than normal for the year as a whole. Many months were characterised by high pressure anomalies either east or south of New Zealand, with the months of January and September

2017 being notable exceptions. The last quarter of the year was marked by easterly flow anomalies over the country and progressively increasing temperature anomalies, ending with the second warmest December on record.

Sea surface temperatures (SSTs) around New Zealand were below normal during the beginning of 2017, but rebounded to near or above average levels during mid-2017. From November into December, a "marine heatwave" was observed across the Tasman Sea and in New Zealand coastal waters when SSTs were 2°C to 4°C above average. La Niña conditions in the equatorial Pacific quickly faded to neutral at the beginning of 2017 and remained neutral through much of the year. Then, in November-December 2017, La Niña conditions re-emerged in the tropical Pacific Ocean and were accompanied by higher than normal air pressure across New Zealand.

During 2017, temperatures were near average (within 0.5°C of the annual average[1]) across much of the South Island and lower and western North Island. Above average temperatures (0.51°C to 1.20°C above the annual average) occurred in Bay of Plenty, Gisborne, Hawke's Bay and in parts of Northland, Waikato, Manawatu-Whanganui, Nelson, Marlborough, Buller, upper Canterbury, interior Otago, and along the West Coast. Several locations, particularly in the North Island, observed record or near-record high mean, mean maximum, and mean minimum temperatures.

From month-to-month, January saw a nationwide temperature 0.7°C below the long-term average. This was the only month of the year that had below average temperatures. Five months, including February, March, May, June and July, had near average temperatures (-0.5°C to 0.5°C of the 1981–2010 monthly average). Six months, including April (0.7°C above average), August (1.3°C above average), September (0.7°C above average), October (1.0°C above average), November (1.1°C above average), and December (2.4°C above average) recorded above average temperatures. The warmer than average run between August and October was the warmest-equal August-October period (equal with 1988) on record since 1909 for New Zealand using the NIWA's seven-station temperature series.

The nation-wide average temperature for 2017, calculated using stations in NIWA's seven-station temperature series, was 13.15°C (0.54°C above the 1981–2010 annual average). The four years 2016, 2013, 1999, and 1998 were warmer than 2017 according to the NIWA seven-station series, thus making 2017 the 5th warmest on record.

For rainfall, 2017 was a year of two halves. The year started off on a rather wet and stormy note for the South Island in January, a theme that expanded to include the North Island during March and April as the "Tasman Tempest", Ex-Tropical Cyclone Debbie, and Ex-Tropical Cyclone Cook contributed to record or near-record amounts of rain and flooding for some areas. Drought conditions in Northland during February were quickly erased due to these storms. During late 2017, significant dryness emerged about the South Island and the lower North Island. Christchurch observed 1 mm of rain during November, the driest November on record. By the end of the month, the city had a 35-day dry spell, which increased to 47 days before ending in December. Oamaru also recorded its driest November on record (6 mm), just four months after observing its wettest July on record (224 mm of rain fell), which also happened to be its second wettest month, overall, on record. Furthermore, Oamaru recorded its wettest winter on record during 2017. During December, meteorological drought emerged in the western and lower North Island around the Wellington-Wairarapa

[1] Note all temperature, rainfall and sunshine anomalies reported in this document are relative to the 1981-2010 average/normal.

region following a near-record 30-day dry spell in Wellington city. The drought was then classified by MPI as a medium-scale adverse event in Taranaki and western parts of the Manawatu-Whanganui region and in Wellington.

By the end of September 2017, all six main centres had already recorded their normal annual rainfall. However, a drier than normal end to the year meant that only a handful of locations saw record or near-record rainfall for the year as a whole.

Annual rainfall totals for 2017 were above normal (120-149% of the annual normal) for parts of Auckland, Waikato, Bay of Plenty, and coastal Canterbury, and north coastal Otago. In contrast, rainfall was below normal (50-79% of the annual normal) in most of Southland, interior Otago, and in the Southern Alps. Rainfall was near normal (80 to 119% of the annual normal) for the remainder of New Zealand.

It was an especially wet year in Oamaru which had its 2nd wettest year on record (813 mm of rain). On 21 July, 161 mm of rain fell, making it the wettest day in the town on record since records began in 1950; thereafter, Oamaru recorded just 163 mm during the following five months combined (August-December 2017). Meanwhile, Tiwai Point (Southland) had its driest year on record (731 mm of rain recorded at that site).

Soil moisture levels began the year drier than normal across much of the North Island, particularly in Northland, following a dry end to 2016 and start to 2017. Early in February, Northland's dry conditions were classified as a medium-scale adverse event under MPI's Primary Sector Recovery Policy. A heavy rain event in mid-February relieved soils of their significant dryness there, and this was followed by several more rainstorms (including rain from ex-tropical cyclones) during March and April. During November 2017, very dry weather across the country led to major decreases in soil moisture, especially across the South Island and lower North Island. This led to the issuing of a ban on residential sprinklers and irrigation systems in the Wellington area. Dry conditions persisted during December and led to the emergence of meteorological drought in Wellington-Wairarapa, Manawatu-Whanganui, and Taranaki. Thus, water restrictions were put in place across the western and lower North Island as well as Tasman, Nelson, parts of Otago, the Coromandel, the Bay of Plenty, and Hawke's Bay.

Annual sunshine was mainly near normal (90-109% of the annual normal) or above normal (110-124% of the annual normal) throughout New Zealand. The greater Nelson region experienced New Zealand's highest annual sunshine total during 2017 (2633 hours).

Section 1: The year in review

The monthly sequence of New Zealand climate (with some exceptions) was as follows:

January 2017: Cool for many and very dry in the eastern North Island

January temperatures were well below average (< -1.20°C below average) or below average (-1.20°C to -0.51°C below average) for most of the South Island and the south and west of the North Island. Temperatures were near average (-0.50°C to +0.50°C of average) for eastern areas and well above average (>1.20°C above average) for a small number of locations in Hawke's Bay. Rainfall was well below normal (<50% of normal) in Gisborne, Hawke's Bay and Northland. Above normal (120-149% of normal) or well above normal (>149% of normal) rainfall occurred in the West Coast, middle and south-coastal Canterbury, Otago, inland Southland, Wellington and Manawatu-Whanganui. Sunshine was near (90-110% of normal) or above normal (110-125% of normal) in eastern areas of the North Island and for parts of eastern

Canterbury. Sunshine was below normal (75-89% of normal) or well below normal (<75% of normal) in the west and south of both the North and South Island.

February 2017: Wet for some of the North Island, dry for the South Island

February temperatures were near average (-0.50°C to +0.50°C of average) for most of the South Island except in western Southland and northern Tasman where below average temperatures (-0.51°C to -1.20°C below average) and well below average (<-1.2°C below average) were experienced, respectively. Near average temperatures occurred for the south and west of the North Island while above average (+0.51 to +1.20°C above average) and well above average (>1.2°C above average) temperatures occurred in the north and eastern North Island. Rainfall for February was above normal (120-149% of normal) or well above normal (>149% of normal) for central and southeastern parts of the North Island, as well in the Far North. The rest of the North Island experienced mostly near normal (80 to 119% of normal) rainfall. Much of the eastern South Island experienced below normal (50-79% of normal) or well below normal (<50% of normal) rainfall totals while areas of near normal (80-119% of normal) rainfall were recorded to the west. Sunshine was below normal (75-89% of normal) through much of the western and central North Island. Sunshine hours were near normal (90-110% of normal) in Northland, Wellington, and Taumarunui. Above (110-125% of normal) or well above normal (>125% of normal) sunshine hours occurred for much of the eastern and central South Island. The exception to this was Christchurch which, along with Nelson, experienced near normal sunshine hours.

March 2017: The Tasman Tempest causes downpours in the upper North Island

March temperatures were well above average (>1.20°C above average) or above average (0.51 to 1.20°C above average) across the North Island. The South Island was an island of two halves, with the north and west recording above or well above average temperatures and the south and east recording near (-0.50 to 0.50°C of average) or below average (-1.20 to -0.51°C below average) temperatures. Significant rainfall totals were experienced across the upper North Island, with over 300% of normal March rainfall recorded in some places. This was due in large part to the "Tasman Tempest", a prolific rain storm that occurred between 7-12 March. The remainder of the North Island had a wet month, with most locations recording above normal rainfall or more (>120% of normal March rainfall). Parts of the northern and eastern South Island also recorded above normal or well above normal (>149% of normal) rainfall. In contrast, the west and south of the South Island was much drier – some locations recorded well below normal rainfall (<50% of normal) and many locations recorded below normal rainfall (50-79% of normal). Below normal (75-89% of normal) or well below normal (<75% of normal) sunshine hours were recorded for most of the North Island and parts of the northern South Island. In contrast, parts of Otago and Southland recorded well above normal (>125% of normal) sunshine. Soils were much wetter than normal in the upper half of the North Island and much drier than normal across the lower half of the South Island.

April 2017: Tropical moisture brings abundant rainfall to the North Island and eastern South Island

April temperatures were well above average (>1.20°C above average) or above average (0.51 to 1.20°C above average) across most of the North Island. Isolated locations in the central and southern North Island, as well as the northern and eastern South Island, recorded near average (-0.50 to 0.50°C of average) temperatures. Temperatures were primarily well above average (>1.20°C above average) or above average (0.51 to 1.20°C above average) in the western and southern South Island. Prolific rainfall totals were observed across nearly the entire North Island. Many locations recorded more than twice the normal April rainfall (>200% of normal) and only northern and western Northland received near normal rainfall (80-119% of normal). The northern and eastern South Island also received widespread rainfall more than 200% of the April normal. Conversely, much of the West Coast saw near normal (80-119% of normal) to above normal (120-149% of normal) rainfall. Meanwhile, much of Southland and Queenstown-Lakes received below

normal rainfall (50-79% of normal). Near normal (90-109% of normal) to below normal (75-89% of normal) sunshine hours were recorded for most locations around New Zealand.

May 2017: Cool and dry for much of the South Island, wet for inland parts of the North Island

May temperatures were below average (-0.51 to -1.20°C) for eastern and inland parts of the South Island, southern Hawke's Bay and Wairarapa. Pockets of well below average temperatures (< -1.20 °C) were observed in Tasman, south Canterbury, Mt Cook and southern Central Otago. May temperatures were typically near average (-0.50°C to +0.50°C) for the remainder of the country. Rainfall was well above normal (>149% of normal) for large parts of the South Island. The exceptions were parts of central and eastern Canterbury where below normal (50-79% of normal) and well below normal (<50% of normal) rainfall was recorded. In the North Island, rainfall was well above normal in Taranaki, Manawatu and Whanganui as well as the western portion of the Wellington region. Well below normal rainfall was recorded along the coastal fringes of Gisborne, Hawke's Bay and eastern Wellington. Soil moisture levels were below normal for the time of year for large parts of Gisborne, Hawke's Bay, the Wairarapa as well as central and northern parts of Canterbury. Sunshine was below normal (75-89% of normal) in Southland, the West Coast, Tasman, Manawatu, Whanganui and Taranaki. Above normal sunshine (110-125% of normal) was recorded along the eastern portions of Gisborne, Hawke's Bay and eastern Wellington.

June 2017: Record-dry June for parts of the North Island

June temperatures were near average for most of the country (-0.50°C to +0.50°C of average). Pockets of above average temperatures (0.51°C to 1.20°C above average) occurred in the Bay of Plenty, West Coast, and inland Otago. Below average temperatures (-0.51°C to -1.20°C below normal) were observed in parts of the Wellington Region and the central North Island. Rainfall was well below normal (<50% of normal) for many locations in the North Island south of Auckland city, particularly in the central and western parts of the Island. Rainfall was also well below normal for some parts of the northern and central South Island, and below normal rainfall (50-79% of normal) was observed in the southern and western South Island. Rainfall was near normal (80-119% of normal) in Hawke's Bay and near normal or above normal (120-149% of normal) in Northland. Sunshine was well above normal (> 125% of normal) in Auckland, Waikato, Kapiti Coast, Taranaki, and parts of Southland. Above normal sunshine (110-125% of normal) was recorded in Marlborough, Nelson and West Coast. Sunshine was typically near normal (90-109% of normal) for the remainder of the country.

July 2017: Record breaking rainfall for the eastern South Island

July temperatures were near average (-0.50°C to +0.50°C of average) for much of the country. Temperatures were below average (-0.51°C to -1.20°C below average) about the districts of Hurunui, Mackenzie, Waitaki, Dunedin and Clutha as well as eastern Southland. Pockets of above average temperatures (0.51°C to 1.20°C above average) were observed in Waikato and Manawatu-Whanganui. July rainfall was well above normal (>150% of normal) for the Greater Wellington Region, Otago and mid to south Canterbury. Rainfall was above normal (120-149% of normal) for large parts of the North Island and Nelson. Below normal rainfall (50-79% of normal) was observed in parts of Northland, the West Coast, western Southland and western Otago. July sunshine hours were near normal (90-109% of normal) for much of the country.

August 2017: A warm end to winter

August temperatures were above average (0.51°C to 1.20°C above average) or well above average (> 1.20°C above average) temperatures for almost the entire country, making it the third-warmest August on record in New Zealand. Rainfall was well above normal (> 149% of normal) in central and western areas of the North Island, with below normal rainfall (50-79% of normal) for the east. In the South Island, rainfall was well below normal (< 50% of normal) in eastern Otago and Southland, but above normal (120-149% of normal) in Fiordland and central parts of the West Coast and Canterbury. Sunshine hours were near normal (90-109%

of normal) or above normal (110-125% of normal) for much of the country. Below normal sunshine (75-89% of normal) occurred in central and southern parts of the North Island, and the far northern portion of the South Island.

September 2017: A wet month for many and warm on the eastern coasts

September temperatures were near average (-0.50°C to +0.50°C of average) across large swaths of the country. Temperatures were above average (0.51°C to 1.20°C above average) in parts of Auckland, Coromandel, northern and central Waikato, Gisborne, Hawke's Bay, southern Manawatu-Whanganui, northern Marlborough, northern Canterbury, and much of Otago. September rainfall was well above normal (>149% of normal) or above normal (120-149% of normal) for large areas of the North Island and much of the upper the South Island, along with eastern Otago and western Southland. Below normal rainfall (50-79% of normal) was observed in central and southern Hawke's Bay, central Otago, and eastern Southland. September sunshine hours were near normal (90-109% of normal) for much of the country.

October 2017: A very dry and warm month for the South Island interior

October temperatures were well above average (>1.20°C of average) in parts of Auckland, Coromandel, Manawatu-Whanganui, Kapiti Coast, Nelson, Canterbury, Otago, Southland, and Fiordland. Temperatures were above average (0.51-1.20°C above average) for much of the rest of the country. Rainfall was well below normal (<50% of normal) for most of Otago as well as parts of Northland, Gisborne, Kapiti Coast, Marlborough, southern Canterbury, and Southland. Rainfall was below normal (50-79% of normal) for parts of Northland, Auckland, Manawatu-Whanganui, Wellington, Wairarapa, Canterbury, Southland, and the West Coast. Rainfall was well above normal (>149% of normal) for parts of western Bay of Plenty, Waikato, and the east coast of the South Island. Thus, soils were much drier than normal for the time of year for interior Otago and interior Southland, Tasman, Kapiti Coast, Taranaki, Gisborne, and Northland. Sunshine was well above normal (>125% of normal) or above normal (110-125% of normal) for Otago and Southland as well as parts of the Wellington and Taranaki regions and near normal (90-110% of normal) for most other parts of the country.

November 2017: Hot in the south and dry countrywide to end spring

Rainfall was well below normal (<50% of normal) for much of Canterbury, the West Coast, Tasman, Nelson, Marlborough, Wellington, Wairarapa, Manawatu-Whanganui, parts of Hawke's Bay, Auckland, and Bay of Plenty. Isolated pockets of above normal (120-149% of normal) rainfall occurred in Northland, the Queenstown-Lakes District, and near Roxburgh (Central Otago). Rainfall was below normal (50-79% of normal) or near normal (80-119%) elsewhere. Temperatures were well above average (>1.20°C of average) in parts of Southland, interior Otago, interior Canterbury, the West Coast, and interior Waikato. Temperatures were above average (0.51-1.20°C above average) for most of the rest of the country. By the end of November, soils were significantly drier than normal for the time of year across a large portion of the South Island, particularly in the west, as well as the lower and western North Island.

December 2017: A very hot and dry start to summer

Rainfall was below normal (50-79% of normal) or well below normal (<50% of normal) for large swaths of New Zealand, including Northland, Auckland, Waikato, Bay of Plenty, Taranaki, coastal Manawatu-Whanganui to Wellington, Nelson, Tasman, interior Canterbury, much of the West Coast, Otago, and parts of Southland. Meanwhile, isolated pockets of near normal (80-119% of normal) to above normal (120-149% of normal) rainfall was observed from coastal Hawke's Bay to Wairarapa, coastal northern and southern Canterbury, and Fiordland. Temperatures were well above average (>1.20°C of average) nearly everywhere in New Zealand. Isolated above average (0.51-1.20°C of average) temperatures were observed in Gisborne, inland Hawke's Bay, and a small area of the Far North. By the end of 2017, soils were significantly drier than

normal for the time of year across a large portion of the North Island, Tasman and northern West Coast, interior Canterbury, and much of Southland and interior Otago.

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

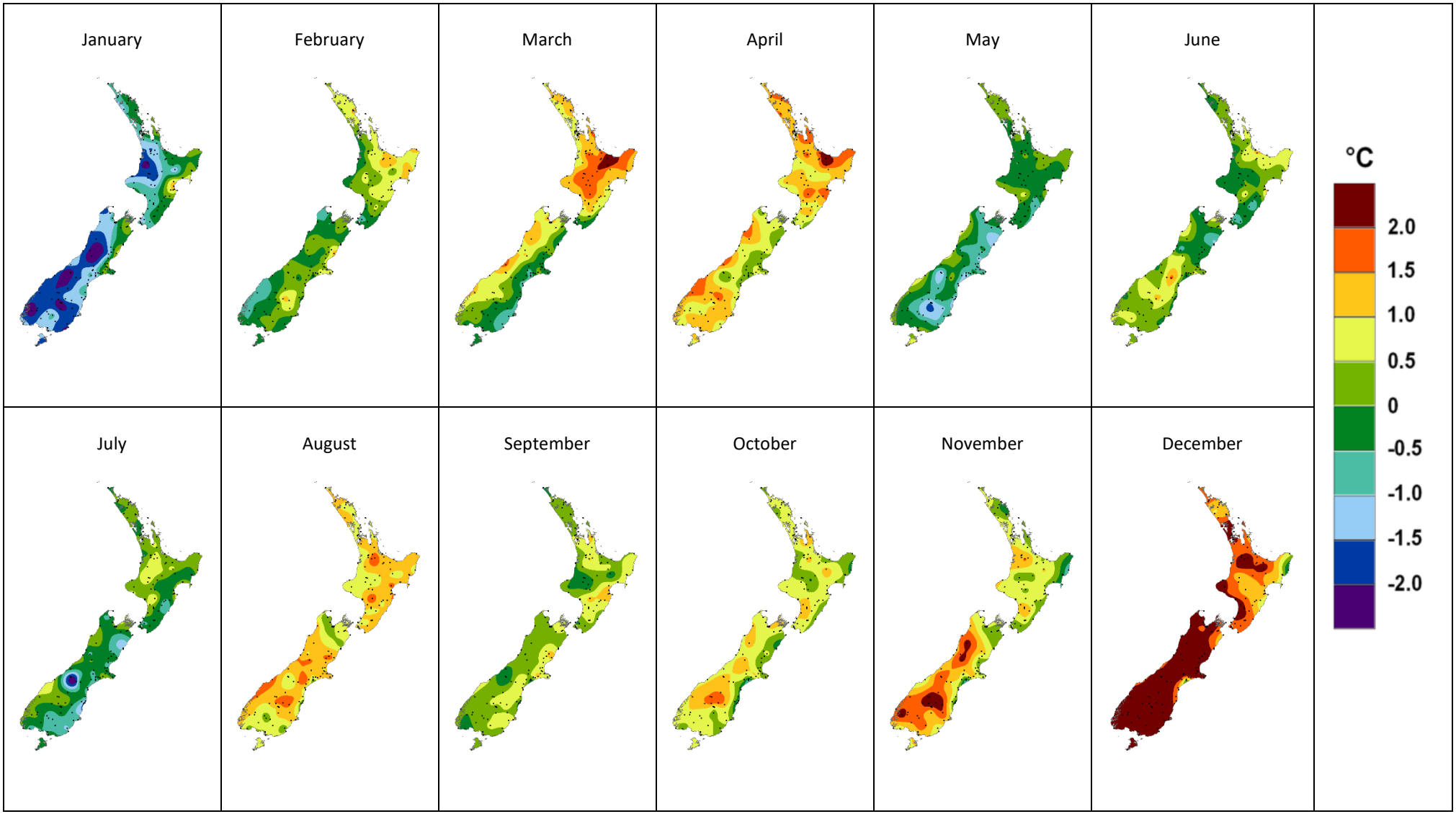

Figure 1: Monthly temperature anomalies (compared to the 1981-2010 monthly averages) for each month of 2017.

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

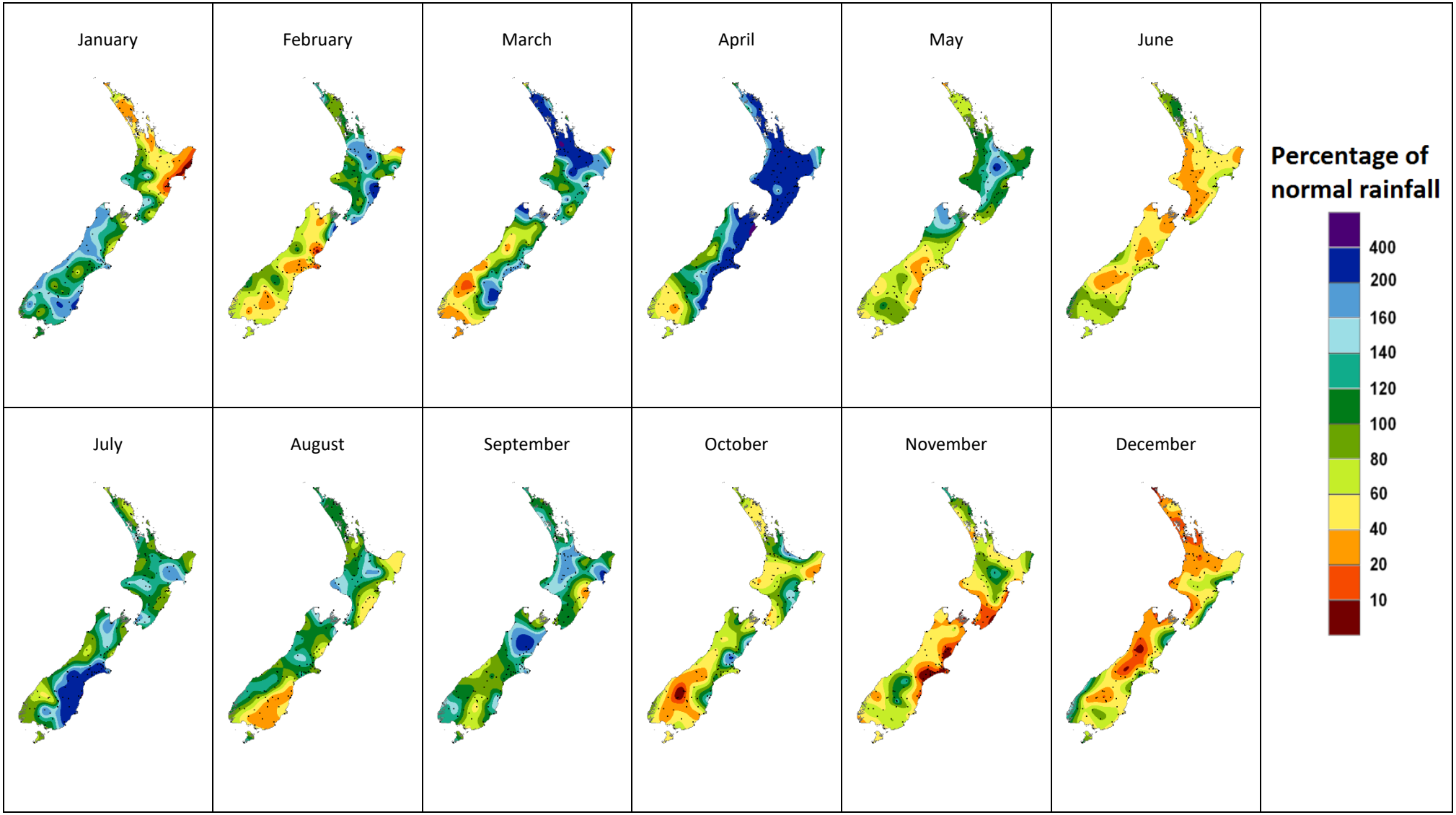

Figure 2: Monthly rainfall as a percentage of the 1981-2010 monthly normals for each month of 2017.

Section 4: Observations and statistics

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

- The nation-wide average temperature for 2017 was 13.15°C (0.54°C above the 1981–2010 annual average). Using NIWA's seven-station temperature series, 2017 was the 5th warmest year on record since 1909.
- Leigh recorded the highest annual average temperature for 2017 with 17.0°C, followed by Whangarei with 16.6°C, and Kaitaia with 16.5°C.
- The highest air temperature of the year was 35.5°C recorded at Wairoa and Ashburton on 6 February, followed by 34.9°C at Maraekakaho (inland from Hastings) on 6 February and 34.7°C at Waiau on 5 February and 8 December.
- The lowest air temperature of the year was recorded at Lake Tekapo; -14.6°C on 29 July. The second lowest air temperature of 2017 occurred at Mt Cook (Airport) on 29 July; -13.7°C.
- The top three daily rainfall totals from regularly reporting gauges in 2017 were 316 mm at Castle Mount on 24 September, 309 mm at Milford Sound on 31 January, and 260 mm at North Egmont on 8 August.
- Of all of the regularly reporting gauges, the wettest locations in 2017 were: Cropp River (West Coast, 975 metres above sea level) with 8662 mm, Tuke River (West Coast, 975 metres above sea level) with 8097 mm, and North Egmont with 7082 mm.
- Of the regularly reporting gauges, the wettest locations in 2017 *excluding* high elevation stations were: Milford Sound with 6000[2] mm, Secretary Island with 4385 mm, and Franz Josef with 3587 mm.
- The lowest rainfall recording locations for 2017 were Clyde with 278 mm, followed by Cromwell with 280 mm, then Alexandra with 297 mm.
- The sunniest region[3] during 2017 was the wider Nelson region with 2633[4] hours, followed by Marlborough (2605 hours) and Hawke's Bay (2504 hours).
- The highest confirmed wind gust for 2017 was recorded at Cape Turnagain; 198 km/h observed on 13 June.
- Of the six main centres for 2017: Auckland was the warmest, Dunedin was the coldest and driest, Tauranga was the wettest and sunniest, and Wellington was least sunny.

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[2] Missing 2 days of data

[3] For 2017 NIWA has created a new regional sunshine ranking. 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 hole 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.

[4] Missing 1 day of data

Ranked annual total rainfall, mean temperatures and sunshine hours for the stations available at time of writing are displayed on the following four 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	8662
TUKE AT TUKE HUT	8097
CROPP AT CROPP HUT	7387
NORTH EGMONT SRIG	7082[3]
HAAST AT CRON CK	6748
DOON AT MIDDLE ARM	6445
MILFORD SOUND	6000[2]
HOKITIKA AT PRICES FLAT	5847
HOKITIKA AT COLLIERS CK	5812
HAAST AT ROARING BILLY	4355
ARTHURS PASS AWS	3946[8]
FRANZ JOSEF EWS	3587
MANAPOURI, WEST ARM JETTY EWS	3308
MT COOK EWS	3265
MUELLER HUT EWS	3052
HOKITIKA AWS	2894[1]
MURCHISON MTNS EWS	2480
WHITIANGA EWS	2426
GREYMOUTH AERO EWS	2309
MT COOK AERO AWS	2125[2]
MAHANGA EWS	2114
TAKAKA EWS	2110
STRATFORD EWS	2110
PUYSEGUR POINT AWS	2081[5]
ARAPITO EWS	2066
WESTPORT AERO AWS	1964
ROTORUA AERO AWS	1953[3]
WHITIANGA AERO AWS	1885[7]
UPPER RAKAIA EWS	1883[1]
ROTORUA EWS	1855
KERIKERI AERODROME AWS	1809[2]
KAIKOHE AWS	1774
TURANGI 2 EWS	1756
REEFTON EWS	1712
TAURANGA AERO AWS	1687
WARKWORTH EWS	1654
EGLINTON, KNOBS FLAT CWS	1591
OHAKUNE EWS	1571
TAUMARUNUI AWS	1538[3]
KAITAIA AERO EWS	1528
HAMILTON AWS	1528[3]
PUKEKOHE EWS	1502
WAIROA AERO AWS	1484[2]
HAMILTON, RUAKURA 2 EWS	1466[1]
GALATEA AWS	1454[3]
WHAKATANE AERO AWS	1440
WAIROA, NORTH CLYDE EWS	1398
WHANGAPARAOA AWS	1392[5]
PAEROA AWS	1381[13]
FIRTH OF THAMES EWS	1380[2]
AUCKLAND, NORTH SHORE ALBANY EWS	1378
FAREWELL SPIT AWS	1372
AKAROA EWS	1358
WHANGAREI EWS	1356
WELLINGTON, KELBURN AWS	1349
AKITIO EWS	1337
HAWERA AWS	1314[1]
AUCKLAND, MANGERE EWS	1308
NEW PLYMOUTH AWS	1298
TAUPO AWS	1285[1]
UPPER HUTT, TRENTHAM EWS	1277
PAHIATUA EWS	1259
LEIGH 2 EWS	1252
PORT TAHAROA AWS	1237[14]
MT POTTS EWS	1227
DARGAVILLE 2 EWS	1189
AUCKLAND AERO	1188
GISBORNE AWS	1179
WAIOURU AIRSTRIP AWS	1160[1]
TAKAPAU PLAINS AWS	1157
PARAPARAUMU AERO AWS	1135[1]
LEVIN AWS	1125
DANNEVIRKE EWS	1084
PALMERSTON NORTH EWS	1053
APPLEBY 2 EWS	1051
HANMER FOREST EWS	1047[2]
MT PHILISTINE EWS	1033
PALMERSTON NORTH AWS	1012[1]
RICHMOND EWS	987
NELSON AWS	976[2]
ASHBURTON AERO AWS	930
WHANGANUI, SPRIGGENS PARK EWS	928
MANA ISLAND AWS	914[2]
MANAPOURI AERO AWS	907[2]
MASTERTON AERO AWS	899
MASTERTON EWS	888
NAPIER AERO AWS	887
MT LARKINS EWS	882
MARTINBOROUGH EWS	848
GORE AWS	831[1]

WAIPAWA EWS	828[5]
HASTINGS AWS	820[2]
OAMARU AWS	813
CHRISTCHURCH AERO	804
CHATHAM ISLAND EWS	791
DUNEDIN, MUSSELBURGH EWS	784
CHRISTCHURCH, KYLE ST EWS	764[3]
KAIKOURA AWS	763[1]
FIVE RIVERS CWS	762
INVERCARGILL AERO AWS	754[1]
TIWAI POINT EWS	731
WHAKATU EWS	715[3]
BALCLUTHA, TELFORD EWS	705
CAPE REINGA AWS	701[12]
OAMARU AIRPORT AWS	680
CAPE CAMPBELL AWS	676[1]
WAIPARA WEST EWS	646
BLENHEIM AERO AWS	641[2]
NUGGET POINT AWS	639[3]
BARING HEAD	636
TIMARU EWS	632
WAIMATE CWS	618
OAMARU EWS	612
LINCOLN, BROADFIELD EWS	609
LAKE TEKAPO EWS	579
FAIRLIE AWS	577[5]
QUEENSTOWN AERO AWS	561
WINDSOR EWS	560
CULVERDEN AWS	546[3]
TARA HILLS AWS	539[4]
WANAKA AERO AWS	516[1]

MIDDLEMARCH EWS	484
HAKATARAMEA VALLEY CWS	386[8]
LAUDER EWS	347
RANFURLY EWS	344[9]
ALEXANDRA CWS	297
CROMWELL EWS	280
CLYDE 2 EWS	278[1]
Location	**Mean temp (°C)**
LEIGH 2 EWS	17.0
WHANGAREI AERO AWS	16.6
KAITAIA AERO EWS	16.5
WHANGAPARAOA AWS	16.4
AUCKLAND, MANGERE EWS	16.1
AUCKLAND AERO	16.1
CAPE REINGA AWS	16.1
PURERUA AWS	16.1
DARGAVILLE 2 EWS	16.0
NORTH SHORE, AUCKLAND	15.9
KERIKERI AERODROME AWS	15.8
TAURANGA AERO AWS	15.7
HICKS BAY AWS	15.7
WAIROA, NORTH CLYDE EWS	15.6
AUCKLAND, WHENUAPAI AWS	15.5
WHITIANGA AERO AWS	15.4
GISBORNE EWS	15.3
PORT TAHAROA AWS	15.3
KAIKOHE AWS	15.2
TE PUKE EWS	15.2
PUKEKOHE EWS	15.1

TOENEPI EWS	15.1
NGAWI AWS	14.9
WARKWORTH EWS	14.8
WHAKATANE AERO AWS	14.8
HASTINGS AWS	14.8
NAPIER AERO AWS	14.7
FAREWELL SPIT AWS	14.7
MAHIA AWS	14.7
FIRTH OF THAMES EWS	14.7
WANGANUI, SPRIGGENS PARK	14.7
WHANGANUI 2 AWS	14.6
HAMILTON, RUAKURA 2 EWS	14.5
HAMILTON AWS	14.3
NEW PLYMOUTH AWS	14.1
WELLINGTON AERO	14.1
MATAMATA, HINUERA EWS	14.1
TE KUITI EWS	14.0
MASTERTON, TE ORE ORE CWS	13.8
PALMERSTON NORTH AWS	13.8
LEVIN AWS	13.7
BLENHEIM RESEARCH EWS	13.7
NELSON AERO	13.7
PARAPARAUMU AERO	13.6
PARAPARAUMU AERO AWS	13.6
AKAROA EWS	13.5
GALATEA AWS	13.5
ROTORUA EWS	13.5
ARAPITO EWS	13.5
RICHMOND EWS	13.5
WHAKATU EWS	13.5
WELLINGTON, KELBURN AWS	13.4

MOTUEKA, RIWAKA EWS	13.3
WESTPORT AERO AWS	13.3
BARING HEAD	13.2
TAUMARUNUI EWS	13.2
HAWERA AWS	13.2
CHRISTCHURCH, KYLE ST EWS	13.1
DANNEVIRKE EWS	13.1
PAHIATUA EWS	13.0
KAIKOURA AWS	12.9
MARTINBOROUGH EWS	12.9
WAIPARA WEST EWS	12.7
CHATHAM ISLAND AERO AWS	12.7
GREYMOUTH AERO EWS	12.6
DIAMOND HARBOUR EWS	12.5
TAUPO AWS	12.4
HOKITIKA AERO	12.4
REEFTON EWS	12.4
UPPER HUTT, TRENTHAM EWS	12.3
TAKAKA EWS	12.3
LINCOLN, BROADFIELD EWS	12.3
STRATFORD EWS	12.3
WAIAU SCHOOL CWS	12.3
HOKITIKA AWS	12.3
RANGIORA EWS	12.0
CHRISTCHURCH AERO	12.0
APPLEBY 2 EWS	12.0
CROMWELL EWS	12.0
TAKAPAU PLAINS AWS	11.9
HAAST AWS	11.9
CULVERDEN AWS	11.8
TURANGI 2 EWS	11.8

FRANZ JOSEF EWS	11.7
PUYSEGUR POINT AWS	11.7
LE BONS BAY AWS	11.6
DUNEDIN, MUSSELBURGH EWS	11.6
MEDBURY	11.6
WANAKA AERO AWS	11.5
ALEXANDRA CWS	11.5
ASHBURTON AERO AWS	11.4
LAUDER EWS	11.2
OAMARU AWS	11.1
MILFORD SOUND	11.1
TIWAI POINT EWS	11.1
CLYDE 2 EWS	10.9
TIMARU EWS	10.9
HANMER FOREST EWS	10.9
OHAKUNE EWS	10.8
FAIRLIE AWS	10.8
WINDSOR EWS	10.8
DUNEDIN AERO AWS	10.7
INVERCARGILL AERO	10.6
GORE AWS	10.4
NUGGET POINT AWS	10.4
QUEENSTOWN AERO AWS	10.3
TE ANAU AT PARK HQ CWS	10.3
MIDDLEMARCH EWS	10.2
BALCLUTHA, TELFORD EWS	10.2
TARA HILLS AWS	10.1
LUMSDEN AWS	10.0
FIVE RIVERS CWS	9.9
MANAPOURI AERO AWS	9.8
RANFURLY EWS	9.8

MANAPOURI, WEST ARM JETTY	9.5
WAIOURU AIRSTRIP AWS	9.4
LAKE TEKAPO EWS	9.0
MT COOK AERO AWS	9.0
ARTHURS PASS EWS	8.7
Location	**Sunshine (hours)**
RICHMOND EWS	2633[1]
BLENHEIM RESEARCH EWS	2605
NAPIER EWS	2504
LAKE TEKAPO EWS	2500
NEW PLYMOUTH AWS	2490
APPLEBY 2 EWS	2490
WAIPARA WEST EWS	2458[1]
GISBORNE AWS	2420
RAOUL ISLAND AWS	2413
AUCKLAND, MOTAT EWS	2400
CROMWELL EWS	2338
QUEENSTOWN AERO AWS	2324[1]
LEVIN EWS	2284
DIAMOND HARBOUR EWS	2276
WESTPORT EWS	2260
TAKAKA EWS	2259[1]
ASHBURTON AERO AWS	2224[1]
RANGIORA EWS	2219[1]
HOKITIKA AWS	2207[2]
CHEVIOT EWS	2202[15]
KAITAIA EWS	2167
MASTERTON EWS	2157

WAIPAWA EWS	2130[8]
OAMARU EWS	2122
AKAROA EWS	2112
KAWERAU AWS	2110
AUCKLAND, MANGERE EWS	2110
AKITIO EWS	2089
WHANGAREI EWS	2081
PARAPARAUMU AERO	2070[1]
GREYMOUTH AERO EWS	2064
ROTORUA EWS	2064
UPPER HUTT, TRENTHAM EWS	2044
DARGAVILLE 2 EWS	2033
HAMILTON, RUAKURA 2 EWS	2035[4]
STRATFORD EWS	2009
WAIKERIA EWS	2007[6]
CHRISTCHURCH AERO	2000[2]
DUNEDIN, MUSSELBURGH EWS	1999
TURANGI 2 EWS	1973
TE KUITI EWS	1947
DANNEVIRKE EWS	1939
WELLINGTON, KELBURN	1939
MARTINBOROUGH EWS	1932
INVERCARGILL AERO	1895[2]
TAUMARUNUI AWS	1865[1]
OHAKUNE EWS	1849
PARAPARAUMU EWS	1799
MIDDLEMARCH EWS	1798
ARAPITO EWS	1786
PALMERSTON NORTH EWS	1707[1]
REEFTON EWS	1699
BALCLUTHA, TELFORD EWS	1655

MT COOK EWS	1616[1]

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

2017 was New Zealand's 5th warmest year on record based on NIWA's seven-station series. Many locations observed record or near-record high mean, mean maximum, and mean minimum temperatures while no locations observed record or near-record low mean, mean maximum, or mean minimum temperatures.

Table 1: Near-record or record high or low annual average temperature departures for 2017[5].

Location	Mean air temp. (°C)	Departure from normal (°C)	Year records began	Comments
Mean temperature				
Te Puke	15.2	1.2	1973	Highest
Wairoa, North Clyde	15.6	1.3	1964	Highest
Lauder	11.2	1.6	1924	Highest
Mokohinau	17.0	0.6	1994	2nd-highest
Auckland (Whenuapai)	15.5	0.8	1945	2nd-highest
Whitianga	15.7	1.0	1962	2nd-highest
Hastings	14.8	0.9	1965	2nd-highest
Waiau	12.3	0.9	1974	2nd-highest
Whangarei	16.6	0.8	1967	3rd-highest
Whangaparaoa	16.4	0.7	1982	3rd-highest
Rotorua	13.5	0.8	1964	3rd-highest
Gisborne	15.3	1.0	1905	3rd-highest
Waiouru	9.9	0.9	1962	3rd-highest
Wanganui (Spriggens Park)	14.7	0.7	1937	3rd-highest
Farewell Spit	14.7	0.8	1971	3rd-highest
Arapito	13.5	0.8	1978	3rd-highest
Reefton	12.4	1.0	1960	3rd-highest
Secretary Island	12.4	0.6	1985	3rd-highest
Puysegur Point	11.7	0.7	1978	3rd-highest
Motueka	13.3	0.8	1956	3rd-highest
Akaroa	13.5	1.0	1978	3rd-highest
Wanaka	11.5	1.0	1955	3rd-highest
Cromwell	12.0	1.1	1949	3rd-highest
Kaitaia	16.5	0.8	1948	4th-highest
Auckland (Airport)	16.1	0.6	1959	4th-highest

[5] The rankings (1st, 2nd, 3rd….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.

Masterton	13.8	1.4	1906	4th-highest
Hicks Bay	15.7	0.8	1969	4th-highest
Mahia	14.7	0.6	1990	4th-highest
Hawera	13.2	0.6	1977	4th-highest
Westport	13.3	0.7	1937	4th-highest
Blenheim	13.7	0.6	1932	4th-highest
Te Anau	10.3	0.7	1963	4th-highest
Mean maximum temperature				
Rotorua	18.3	1.3	1964	Highest
Cromwell	18.7	1.7	1949	Highest
Whangarei	20.9	1.1	1967	2nd-highest
Mokohinau	19.1	0.8	1994	2nd-highest
Whangaparaoa	19.6	0.8	1982	2nd-highest
Wairoa, North Clyde	20.7	1.4	1964	2nd-highest
Secretary Island	15.4	0.7	1985	2nd-highest
Hanmer Forest	18.6	1.6	1906	2nd-highest
Lauder	17.5	1.8	1924	2nd-highest
Te Puke	19.8	0.8	1973	3rd-highest
Hicks Bay	19.1	1.1	1969	3rd-highest
Gisborne	20.4	0.9	1905	3rd-highest
Puysegur Point	14.3	0.9	1978	3rd-highest
Waiau School	18.6	0.9	1974	3rd-highest
Manapouri	13.5	0.7	1971	3rd-highest
Tiwai Point	15.0	1.0	1970	3rd-highest
Whangarei	20.6	0.9	1967	4th-highest
Auckland (Whenuapai)	19.8	0.7	1945	4th-highest
Auckland (Mangere)	19.8	0.9	1959	4th-highest
Hastings	20.1	1.1	1965	4th-highest
Mahia	17.6	0.5	1990	4th-highest
Wanganui (Spriggens Park)	18.7	0.7	1937	4th-highest
Westport	17.1	0.9	1937	4th-highest
Arapito	17.9	0.7	1978	4th-highest
Milford Sound	15.6	1.0	1934	4th-highest
Kaikoura	16.8	1.0	1963	4th-highest
Wanaka	17.0	0.9	1955	4th-highest
Lumsden	15.6	0.7	1982	4th-highest
Clyde	18.0	1.2	1978	4th-highest
Mean minimum temperature				
Te Puke	10.5	1.6	1973	Highest
Hastings	9.5	0.8	1965	Highest
Wairoa, North Clyde	10.4	1.1	1964	Highest
Lauder	4.9	1.3	1924	Highest
Auckland (Whenuapai)	11.2	0.9	1945	2nd-highest
Port Taharoa	12.5	0.9	1973	2nd-highest
Hawera	9.5	0.7	1977	2nd-highest
Waiouru	5.4	1.0	1962	2nd-highest
Cape Reinga	13.7	0.6	1951	3rd-highest
Kaitaia Aero	12.8	0.9	1948	3rd-highest

Whangarei	12.5	0.7	1967	3rd-highest
Mokohinau	15.0	0.6	1994	3rd-highest
Whitianga	11.0	0.9	1962	3rd-highest
Lower Retaruke	8.0	0.9	1966	3rd-highest
Masterton	8.3	1.9	1906	3rd-highest
Farewell Spit	11.6	1.4	1971	3rd-highest
Arapito	9.0	0.8	1978	3rd-highest
Reefton	7.1	1.0	1960	3rd-highest
Secretary Island	9.4	0.6	1985	3rd-highest
Puysegur Point	9.2	0.7	1978	3rd-highest
Medbury	5.8	0.5	1927	3rd-highest
Akaroa	9.1	1.6	1978	3rd-highest
Te Anau	5.9	1.4	1963	3rd-highest
Dargaville	12.3	0.7	1943	4th-highest
Mahia	11.8	0.7	1990	4th-highest
Stratford	8.2	0.7	1960	4th-highest
Haast	8.2	0.8	1949	4th-highest
Blenheim	8.6	0.9	1932	4th-highest
Culverden	6.3	1.2	1928	4th-highest

During 2017 several record and near-record extreme temperatures occurred. Overall, there were about as many high maximum and minimum temperature extremes as low maximum and minimum extremes.

Table 2: Near-record or record high or low annual temperature extremes for 2017.

Location	Temperature (°C)	Date of occurrence	Year records began	Comments
Highest extreme maximum temperatures				
Whangarei	31.8	Feb-13th	1967	Highest
Whangaparaoa	30.5	Feb-07th	1982	Highest
Whitianga	33.0	Feb-06th	1962	Highest
Whakatane	32.1	Feb-07th	1975	Equal 2nd-highest
Leigh	29.6	Feb-13th	1966	3rd-highest
Whitianga	30.3	Feb-06th	1962	3rd-highest
Lumsden	29.5	Dec-16th	1982	Equal 3rd-highest
Kaikohe	29.7	Feb-06th	1973	4th-highest
Wairoa, North Clyde	35.5	Feb-06th	1964	4th-highest
Farewell Spit	27.8	Dec-05th	1971	Equal 4th-highest
Lowest extreme maximum temperatures				
Kaikohe	8.8	Jul-13th	1973	Lowest
Ohakune	1.6	Jul-12th	1972	2nd-lowest
Lake Tekapo	-3.9	Jul-29th	1928	2nd-lowest
Oamaru	3.8	Jul-12th	1972	2nd-lowest
Lower Retaruke	5.9	Jul-12th	1972	3rd-lowest

Takapau Plains	4.0	Jul-12th	1972	3rd-lowest
Arapito	7.0	Jul-13th	1978	3rd-lowest
Rangiora	3.2	Jul-12th	1972	3rd-lowest
Lumsden	0.0	Jul-07th	1982	3rd-lowest
Stratford	5.8	Jul-12th	1972	4th-lowest
Waiau S	3.1	Jul-12th	1974	4th-lowest
Whitianga	10.5	Jul-13th	1971	Equal 4th-lowest
Highest extreme minimum temperatures				
Akaroa	21.6	Dec-10th	1978	Highest
Waipara West	22.4	Feb-22nd	1973	Equal 2nd-highest
Hicks Bay	20.5	Mar-12th	1972	3rd-highest
Franz Josef	17.4	Feb-21st	1953	3rd-highest
Secretary Island	17.6	Feb-21st	1988	3rd-highest
Rangiora	20.5	Dec-10th	1972	3rd-highest
Five Rivers	17.7	Dec-05th	1982	3rd-highest
Kaikohe	19.6	Feb-14th	1973	Equal 3rd-highest
Takapau Plains	19.4	Feb-07th	1972	4th-highest
Farewell Spit	18.8	Dec-18th	1972	4th-highest
Lower Retaruke	19.1	Mar-12th	1972	Equal 4th-highest
Lowest extreme minimum temperatures				
Five Rivers	-8.3	Jul-07th	1982	Lowest
Kaikoura	-2.0	Jul-16th	1963	2nd-lowest
Mt Cook	-13.7	Jul-29th	1929	2nd-lowest
Oamaru	-5.4	Jul-30th	1967	3rd-lowest
Turangi	-6.6	Jul-30th	1968	4th-lowest
Appleby	-5.6	Jul-30th	1932	4th-lowest
Lake Tekapo	-14.6	Jul-29th	1925	4th-lowest
Tiwai Point	-4.1	Jul-07th	1970	Equal 4th-lowest

Section 6: Annual rainfall – wetter north, drier south

Areas of above normal rainfall (120-149% of the annual normal) occurred in Auckland, Waikato, Bay of Plenty, and coastal Canterbury, and north coastal Otago. On the other hand, rainfall was below normal (50-79% of the annual normal) in much of Southland and interior Otago. Elsewhere, 2017 annual rainfall totals were near normal (within 20% of the annual average).

Five locations observed near-record high annual rainfall totals, while three locations observed record or near-record low rainfall totals.

The driest rainfall recording locations during 2017 (based on data available at time of writing) were: Clyde with 278 mm, followed by Cromwell with 280 mm, then Alexandra with 377 mm. Of the regularly reporting gauges the wettest locations in 2017 were: Cropp River (West Coast, 975 metres above sea level) with 8662 mm, Tuke River (West Coast, 975 metres above sea level) with 8097 mm, and North Egmont with 7082 mm. Of the regularly reporting gauges, the wettest locations in 2017 *excluding* high elevation stations were Milford Sound with 6000 mm, Secretary Island with 4385 mm, and Franz Josef with 3587 mm.

Table 3: Record or near-record annual rainfall totals for the year 2017.

Location	Rainfall total (mm)	Percentage of normal	Year records began	Comments
High records or near-records				
Whitianga	2426	132	1961	2nd-highest
Te Puke	2401	146	1973	2nd-highest
Oamaru	813	172	1941	2nd-highest
Waiouru	1281	120	1950	3rd-highest
Akaroa	1358	140	1977	3rd-highest
Lower Retaruke	1837	118	1966	4th-highest
Low records or near-records				
Tiwai Point	731	65	1970	Lowest
Franz Josef	3587	80	1926	3rd-lowest
Cromwell	280	70	1949	3rd-lowest

The top three daily rainfall totals from regularly reporting gauges in 2017 were 316 mm at Castle Mount on 24 September, 309 mm at Milford Sound on 31 January, and 260 mm at North Egmont on 8 August.

It is notable that Oamaru recorded 161 mm of rain on 21 July, the wettest day in the town on record since records began in 1950, but then recorded 163 mm during the following five months combined (August-December 2017), just 2 mm more than the record one-day total.

Five locations recorded their record or near-record highest 1-day extreme rainfall in 2017.

Table 4: Record or near-record high extreme 1-day rainfall totals that occurred in 2017.

Location	1-day extreme rainfall (mm)	Date	Year records began	Comments
Oamaru	161	Jul-21st	1950	Highest
Te Puke	186	Apr-04th	1973	2nd-highest
Auckland (Mangere)	101	Mar-10th	1959	4th-highest
Secretary Island	166	May-02nd	1985	4th-highest
Middlemarch	64	Jul-21st	1896	4th-highest

Section 8: 2017 climate in the six main centres

Three out of the six main centres (Auckland, Hamilton, Tauranga) observed above average temperatures during 2017 while the other three (Wellington, Christchurch, Dunedin) had near average temperatures. In four out of the six main centres (Hamilton, Tauranga, Christchurch, and

Dunedin), above normal rainfall was observed. Of the six main centres in 2017, Auckland was the warmest, Dunedin was the coldest and driest, Tauranga was the wettest and sunniest, and Wellington was the least sunny.

Table 5: 2017 climate in the six main centres.

Rainfall			
Location	**Rainfall (mm)**	**% of normal**	**Comments**
Auckland[a]	1308	116%	Near normal
Tauranga[b]	1687	142%	Above normal
Hamilton[c]	1528[6]	127%	Above normal
Wellington[d]	1349	111%	Near normal
Christchurch[e]	804	135%	Above normal
Dunedin[f]	784	135%	Above normal
Temperature			
Location	**Mean temp. (°C)**	**Departure from normal (°C)**	**Comments**
Auckland[a]	16.1	+0.7	Above average
Tauranga[b]	15.7	+0.8	Above average
Hamilton[c]	14.5	+0.7	Above average
Wellington[d]	13.4	+0.5	Near average
Christchurch[e]	12.0	+0.4	Near average
Dunedin[f]	11.6	+0.5	Near average
Sunshine			
Location	**Sunshine (hours)**		
Auckland[a]	2110		
Tauranga[b]	2281		
Hamilton[g]	2035[7]		
Wellington[d]	1939		
Christchurch[e]	2000[8]		
Dunedin[f]	1999		

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

[6] Missing 3 days of data
[7] Missing 4 days of data
[8] Missing 2 days of data

Section 9: Significant weather and climate events in 2017

This section contains information pertaining to some of the more significant weather and climate events that occurred in 2017. Note that a more detailed list of significant weather events for 2017 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

It was a very dry start to 2017 across the north and east of the North Island, with much of Northland receiving just 20-40% of its normal January rainfall and totals that were even more scant across Gisborne and Hawke's Bay. With just 2 mm of rain during January, Gisborne had its driest January since records began in 1905. A mere 5 mm of rain fell in Napier during January, making it the 3rd driest January on record with records dating back to 1870.

On 3 February 2017, the Minister for Primary Industries officially classified the impact of Northland's dry conditions 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 on Northland farms. During January, the drought fuelled numerous scrub fires and leading to water shortages around the region.

During November 2017, significant dryness returned to New Zealand, this time mainly in the south. Oamaru, Waimate, Lincoln, Christchurch (Airport), Waipara, Ashburton, and Hanmer Forest in the South Island all recorded their driest November on record. Especially noteworthy was Orari, where no rainfall was recorded during the month. This made it the first time in at least 120 years (since records began in 1897) that this location observed 0 mm of rainfall during an entire month. Furthermore, at the end of November, Christchurch a 35-day dry spell, and Lincoln a 35-day dry spell. Additionally, Lincoln had its 2nd-driest month overall since records began in 1881.

Very dry weather continued during December 2017, leading to the classification of a medium-scale adverse event in Taranaki and western parts of the Manawatu-Whanganui and Wellington. On 31 December, according to The New Zealand Drought Index, 11 of New Zealand's 16 geographical regions were experiencing meteorological drought.

Floods and high rainfall

New Zealand's climate during 2017 will be remembered chiefly for a string of high impact and record-setting rainfall events, mainly during the autumn season. The first such event took place across the upper North Island between 7-12 March and was known colloquially as the Tasman Tempest. The tempest was followed by the remnants of ex-Tropical Cyclone Debbie during 4-5 April and then ex-Tropical Cyclone Cook during 12-13 April.

Each of these events and their impact on New Zealand are described in detail below.

The Tasman Tempest

During 7-12 March, the upper North Island experienced three significant heavy rainfall events which caused major flooding, slips, and damage to homes and infrastructure. These events were caused by

a very slow moving subtropical low pressure system in the Tasman Sea (the Tasman Tempest) which was halted by blocking high pressure system to the south. The clockwise movement of air around the low pressure system meant that moisture-laden air masses from the tropics were directed toward New Zealand like an atmospheric river (i.e. a river in the sky). The slow-moving nature of the system, combined with the moist air, caused very heavy rain to fall over a six-day period.

On 7-8 March, heavy downpours and significant flooding affected the upper North Island, particularly southeast Auckland and the Coromandel Peninsula. For some areas, the rainfall event had an average recurrence interval of over 100 years. Early on 8 March, nearly 200 school children were evacuated from waist deep floodwaters at a school camp (Camp Adair) in the Hunua Ranges, southeast of Auckland. Major flooding in Clevedon caused significant stock losses from farms in the area, as well as road closures and evacuations. Farther south, the Coromandel Peninsula was cut off due to State Highway 25 being closed at both Kopu and south of Tairua, due to flooding and slips. The towns of Pauanui, Whangamata, Tairua, Onemana, Hikuai, and Kaiaua were affected by severe flooding and slips, with some evacuations taking place.

On 9 March, Auckland residents were asked by Watercare, the city's water supply company, to reduce water consumption for the next three weeks. This request was made because of increased suspended sediment in the Hunua water supply reservoirs following the 7-8 March rainfall that caused the Ardmore Water Treatment Plant to run at half of its normal capacity.

On 10-11 March, the second extreme rainfall event occurred. Heavy rain fell in eastern Northland, Auckland, and Coromandel. Many houses were flooded and thousands of people were without power. Waiheke Island was affected by flooding and slips in some areas, with a house being left perched above a slip on a cliff in Oneroa. The Clevedon River flooded again for the second time in three days, and Kawakawa Bay was cut off by slips.

On 12 March, the third significant rainfall event occurred. Localised downpours hit Auckland, with many areas being affected by flooding, including Kaukapakapa, Devonport, Parnell, Remuera, Eden Terrace, Blockhouse Bay, Morningside, Massey, Westgate, Whenuapai, New Lynn, Avondale, Titirangi, Henderson, Te Atatu, West Harbour, Glen Eden, and Kelston. The area around New Lynn was the worst affected. Over 320 properties in Auckland were flooded (over 220 in west Auckland), some in waist deep water. Roads were closed in New Lynn due to major flooding, and people were trapped in their cars and in retail stores by floodwaters at the intersection of Great North Road and Clark Street.

Ex-Tropical Cyclone Debbie

During 4-5 April, the remnants of ex-Tropical Cyclone Debbie moved across the North Island. The weather pattern was similar to the Tasman Tempest that occurred just a few weeks prior, with strong low pressure over and west of the North Island while a blocking high existed over and east of the South Island. This atmospheric circulation pattern caused abundant moisture to flow from the tropics toward New Zealand. This storm will be remembered mostly for the prolific flooding that it contributed to in the township of Edgecumbe in Bay of Plenty.

On 4 April, a mud slip slammed into an apartment building in the Kohimarama suburb of Auckland. In Whanganui and Rangitikei, a state of emergency was declared due to heavy rain and the threat of flooding on the Whanganui River. Schools were also closed on 5 April due to the state of emergency.

On 5 April, significant impacts were felt around the Auckland region due to the heavy rainfall. A slip in Titirangi blocked a shared driveway which trapped five families inside their homes, while power was knocked out to around 2000 homes, mainly in St. Heliers, Orakei, and Grey Lynn. The Maraetai and Clevedon areas of Auckland that were hit by floods in early March were again cut off by the flooded Wairoa River.

Elsewhere on 5 April, more than 170 schools and early childcare centres were closed across the North Island, mostly in the Manawatu-Whanganui Region, while 150 students were stranded at a school camp near Port Waikato.

On the morning of 6 April, the entire township of Edgecumbe in Bay of Plenty (about 1600 people) was evacuated due to rising water on the Rangitaiki River. After a stopbank failure, floodwaters reached as high as 1.5 metres in the town, and boats were used to help evacuate residents. About 170 residents returned home on 14 April.

Ex-Tropical Cyclone Cook

During 12-13 April, ex-Tropical Cyclone Cook moved from north to south over New Zealand following a landfall near Whakatane on the evening of the 12th. The storm brought heavy rain and some flooding to the North Island and parts of the South Island following a destructive impact across areas in Vanuatu and New Caledonia. At its peak, Cook had sustained winds of 155 km/h.

A state of emergency was declared in Bay of Plenty on 11 April ahead of the approaching storm, with a state of emergency also declared in Thames-Coromandel on 12 April. All schools in Whakatane, Kawerau, and Opotiki districts were closed on 12 April. In the Auckland region, all train service between Papakura and Pukekohe was suspended due to flooding. On the evening of 12 April, Kerikeri had 75.8 mm of rain in only two hours, or just over half the amount normally received during all of April.

On 13 April, Cook approached the upper North Island and made landfall near Whakatane. Thames-Coromandel Civil Defence evacuated everyone from low-lying areas in advance of the storm, and requested that no one visit the Coromandel Peninsula during and shortly after the event. During the storm, several slips and downed trees closed State Highway 25 between Tararu and Preece Point, while diversions were put in place on State Highway 29 due to slips in the Kaimai Range. Additional road closures occurred on State Highway 2 between Napier and Wairoa, on State Highway 1 south of Kaikoura, and the Motueka Valley Highway 20 km north of Tapawera.

On 13 April, schools in the eastern Bay of Plenty were closed, and schools in the western Bay of Plenty were asked to close by 1 pm. In addition, coastal areas of Whakatane were evacuated due to the threat of storm surge and coastal inundation, and about 120 people stayed at the Whakatane evacuation centre. The New Zealand Defence Force also placed at least 500 personnel, along with aircraft and trucks on standby to assist with storm response. Heavy rain associated with Cook on the night of 13-14 April caused flooding along the Heathcote and Avon Rivers in Christchurch.

The winter weather wallop

On 21-22 July, heavy rain and high tides led to hundreds of homes evacuated and a state of emergency declaration in Waitaki, Dunedin, Christchurch, Selwyn, Timaru, and eventually the entire Otago region as floodwaters inundated coastal eastern parts of the South Island. Several rainfall records were set because of the storm. Oamaru had its wettest day (all-time, not just July) on record since daily rainfall records started in 1950 with 161 mm of rain. This was nearly three times more than the previous daily July rainfall record of 56 mm that occurred on the 30th of July 1974. During the storm, Dunedin (Musselburgh) also had its wettest July day on record since records began in 1918 when 89 mm fell.

Table 6: Record high monthly extreme 1-day rainfall totals were recorded in 2017 at:

Location	Extreme 1-day rainfall (mm)	Date of extreme rainfall	Year records began	Ranking
January				
Motueka	131	21st	1956	Highest
February				
None observed				
March				
Auckland (Mangere)	100	10th	1959	Highest
April				
Warkworth	137	4th	1967	Highest
Whangaparaoa	172	4th	1946	Highest
Auckland (North Shore)	111	12th	1966	Highest
Whitianga	161	4th	1961	Highest
Te Puke	186	4th	1973	Highest
Whakatane	137	4th	1952	Highest
Rotorua	137	4th	1964	Highest
Auckland (Mangere)	86	4th	1959	Highest
Pukekohe	84	4th	1944	Highest
Whatawhata	120	4th	1952	Highest
Te Kuiti	109	4th	1957	Highest
Turangi	88	4th	1968	Highest
Takapau Plains	84	4th	1962	Highest
Waiouru	64	4th	1950	Highest
Waipara West	65	5th	1973	Highest
May				
Ohakune	62	11th	1961	Highest
Secretary Island	166	2nd	1985	Highest
July				
Winchmore	112	21st	1927	Highest
Oamaru	161	21st	1950	Highest
Dunedin (Musselburgh)	89	21st	1918	Highest
Roxburgh	49	21st	1950	Highest
August				

None observed				
September				
Hanmer Forest	126	18th	1905	Highest
October				
None observed				
November				
Palmerston North	50	7th	1928	Highest
December				
None observed				

Temperature extremes

Summer 2016-17 was New Zealand's coolest summer in five years (since 2011-12) and the fifth-coolest summer in the last 20 years. 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).

Despite the cooler temperatures overall, several upper North Island locations experienced their warmest summer day on record, due to the ongoing dryness at the time. These include: Whitianga (33.0°C, 6th Feb), Whangaparaoa (30.5°C, 7 Feb), and Whangarei (31.8°C, 13 Feb).

On the morning of 22 May, the temperature at Auckland (Western Springs) dipped to 0.4°C, the coldest temperature since 3 July 2016 (323 days). Many locations in New Zealand dipped below freezing. The low temperatures were recorded after southerly winds hit the country, followed by settled anticyclonic conditions.

On 12 and 13 July, a cold southerly outbreak led to many North Island and some eastern South Island locations observing near-record low maximum temperatures for winter. This included Cape Reinga, which only reached 10.8°C on the 13 July, the 3rd-equal lowest winter daily maximum temperature on record.

Winter 2017, which had a nationwide average temperature of 8.9°C (0.5°C warmer than the 1981-2010 winter average), was New Zealand's 11th-warmest winter on record according to NIWA's seven-station temperature series. Mean temperatures for New Zealand were near average during June and July. However, the country observed its third-warmest August on record, which brought spring-like temperatures to end the winter season for many parts of the country.

On 19 and 20 October, a warm northwest Foehn wind caused very warm temperatures in the Otago region, with a few locations exceeding 30°C. Cromwell recorded 28.6°C on 19 October and 30.0°C on 20 October. The temperature on the 19 October set a new monthly record, and then this new record was beaten the next day. The 30.0°C reading on the 20 October was also the first time a temperature of 30.0°C or greater was observed in Cromwell between the months of April and October and thus was the warmest temperature on record during those months.

On 30 October, another northwest Foehn episode brought warm temperatures to Southland and Otago. Invercargill recorded its highest October temperature on record (25.9°C), where records begin in 1905.

On 23 November, Cromwell reached 33.3°C, its hottest November (and spring) temperature on record since records began in 1949. It was the warmest temperature observed in the country since February 2017. A large ridge of high pressure provided bright sunshine across the interior South Island, prompting the mercury to soar. In addition, from 19-30 November, Cromwell recorded 12 consecutive days with a maximum temperature at or above 25°C, the longest such streak during November on record. It beat the previous November record of 8 days during 1974. Finally, Cromwell observed three days with a maximum temperature of higher than 30°C during November 2017. This was the most days on record, eclipsing two days in 2010 and two days in 1974.

Table 7: Extremes of high daily maximum temperature in 2017 were recorded at:

Location	Extreme maximum (°C)	Date of extreme temperature	Year records began	Ranking
January				
None observed				
February				
Whangarei Airport	31.8	13th	1967	Highest
Whangaparaoa	30.5	7th	1982	Highest
Whitianga	33.0	6th	1962	Highest
Whakatane	32.1	7th	1975	Highest
March				
None observed				
April				
Mokohinau Island	24.5	3rd	1994	Highest
Rotorua	25.1	3rd	1964	Highest
Motu	25.7	2nd	1990	Highest
Gisborne	29.7	2nd	1905	Highest
Hastings	30.1	2nd	1965	Highest
Wairoa	28.8	2nd	1964	Highest
Mahia	26.5	2nd	1990	Highest
Secretary Island	23.8	13th	1985	Highest
May				
None observed				
June				
None observed				
July				
None observed				
August				
Whitianga	20.1	31st	1962	Highest
Whanganui	21.0	28th	1937	Highest
September				
Takapau Plains	22.2	15th	1962	Highest
Hastings	26.6	25th	1965	Highest
Puysegur Point	20.3	24th	1978	Highest
Kaikoura (Middle Creek)	25.7	25th	1963	Highest

Manapouri, West Arm Jetty	19.8	24th	1971	Highest
October				
Haast	23.3	8th	1949	Highest
Milford Sound	24.1	8th	1934	Highest
Puysegur Point	22.1	30th	1978	Highest
Mt Cook	25.2	19th	1929	Highest
Five Rivers	25.8	19th	1982	Highest
Cromwell	30.0	20th	1949	Highest
Invercargill	25.9	30th	1905	Highest
Tiwai Point	23.7	30th	1970	Highest
South West Cape	21.8	30th	1991	Highest
November				
Cromwell	33.3	23rd	1949	Highest
Manapouri	27.5	23rd	1971	Highest
Tara Hills	29.9	23rd	1949	Equal highest
December				
Mokohinau	27.8	22nd	1994	Highest
Whitianga	30.2	16th	1962	Highest
Taupo	29.8	6th	1949	Highest
Whatawhata	30.2	6th	1952	Highest
Castlepoint	29.7	5th	1972	Highest
Hawera	25.7	9th	1977	Highest
Farewell Spit	27.8	5th	1971	Highest
Hanmer Forest	34.6	8th	1906	Highest
Mt Cook	30.1	5th	1929	Highest
Ranfurly	31.3	7th	1897	Highest
Lumsden	29.5	16th	1982	Highest

Table 8: Extremes of low daily maximum temperature in 2017 were recorded at:

Location	Extreme low maximum (°C)	Date of extreme temperature	Year records began	Ranking
January				
None observed				
March				
Whakatane	15.8	8th	1975	Lowest
Port Taharoa	16.8	8th	1974	Lowest
April				
None observed				
May				
Takaka	7.9	20th	1978	Lowest
June				
None observed				
July				

Rotorua	5.7	13th	1972	Lowest
Rangiora	3.2	12th	1972	Lowest
Arapito	7.0	13th	1978	Lowest
August				
None observed				
September				
Oamaru	6.1	1st	1972	Lowest
Taumarunui	7.4	10th	1947	Equal lowest
October				
None observed				
November				
None observed				
December				
None observed				

Table 9: Extremes of low daily minimum temperature in 2017 were recorded at:

Location	Extreme minimum (°C)	Date of extreme temperature	Year records began	Ranking
January				
Waiau	0.6	5th	1974	Lowest
February				
Martinborough	1.8	9th	1986	Lowest
Kaikoura	3.8	10th	1963	Lowest
March				
None observed				
April				
None observed				
May				
Te Kuiti	-3.2	22nd	1959	Lowest
June				
None observed				
July				
Mt Cook (Airport)	-13.7	29th	1929	Lowest
August				
Five Rivers	-7.3	4th	1982	Equal lowest
September				
None observed				
October				
None observed				
November				
None observed				
December				
None observed				

Table 10: Extremes of high daily minimum temperature in 2017 were recorded at:

Location	Extreme high minimum (°C)	Date of extreme temperature	Year records began	Ranking
January				
None observed				
February				
Cheviot	21.7	1st	1982	Highest
March				
None observed				
April				
Cape Reinga	19.9	3rd	1971	Highest
Kerikeri	21.0	5th	1952	Highest
Kaikohe	19.6	4th	1973	Highest
Whangarei	20.9	4th	1967	Highest
Mokohinau Island	20.7	4th	1994	Highest
Whangaparaoa	19.9	4th	1982	Highest
Auckland (Whenuapai)	20.0	4th	1951	Highest
Port Taharoa	19.5	3rd	1974	Highest
Mahia	17.9	3rd	1990	Highest
Secretary Island	15.9	1st	1988	Highest
Auckland (Airport)	20.6	4th	1961	Equal highest
May				
None observed				
June				
None observed				
July				
None observed				
August				
None observed				
September				
Appleby	14.2	26th	1941	Highest
Medbury	14.7	25th	1927	Highest
Waiau School	16.4	25th	1974	Highest
Waipara West	16.7	25th	1973	Highest
Le Bons Bay	13.8	25th	1984	Highest
October				
Secretary Island	14.3	31st	1988	Highest
November				
Farewell Spit	16.8	30th	1972	Highest
December				
Paraparaumu	19.6	9th	1972	Highest
Farewell Spit	18.8	18th	1972	Highest
Greymouth	18.1	17th	1972	Highest

Secretary Island	16.7	7th	1988	Highest
Kaikoura	20.4	10th	1972	Highest
Akaroa	21.6	10th	1978	Highest
Le Bons Bay	20.2	9th	1984	Highest
Manapouri (West Arm Jetty)	16.1	3rd	1972	Highest
Five Rivers	17.7	5th	1982	Highest
Nugget Point	16.4	3rd	1972	Highest

Strong winds

For 'central New Zealand' for the year as a whole (and using the 62 km/hr threshold), 2017 was less windy than the 1981-2010 climatological average (Figure 3)[9], with only 29 days exceeding 62 km/hr average 9am wind speed between Auckland and Christchurch (compared to the climatological number of 35.3 days). For the last three months of the year, only two gale days were experienced (compared to 11.3 days on average), both in October. However, January and September were unusually windy months. The four windiest years in this record are: 1988 (1st, 65 days), 2002 (2nd, 55 days), 1982 (3rd, 54 days), and 2014 (4th, 53 days).

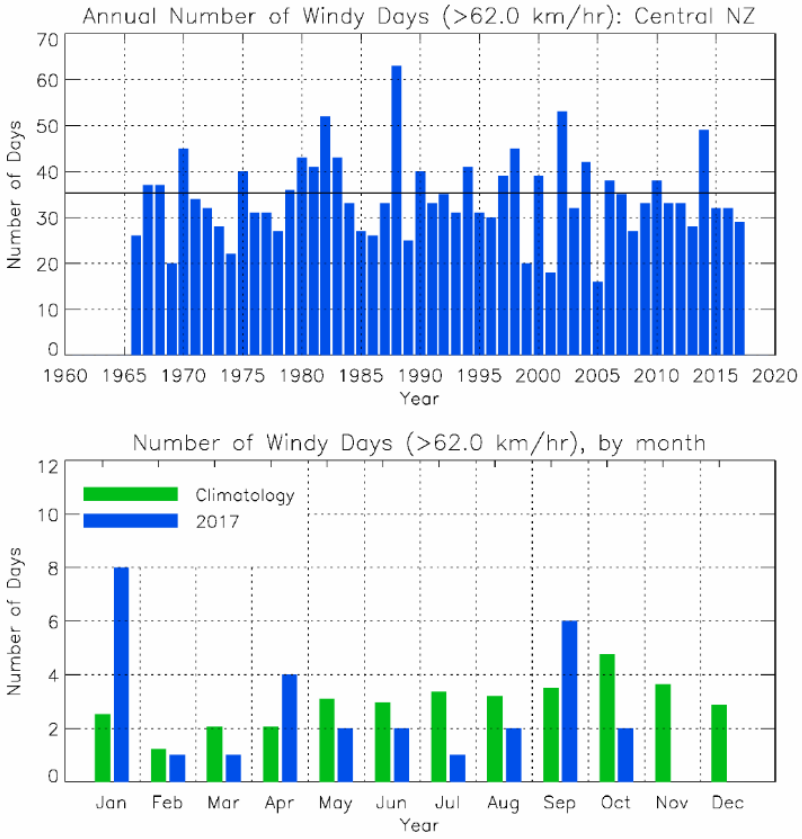

Figure 3: (above) Annual number of 'windy days' for central New Zealand, 1966 to 2017, with horizontal line indicating the 1981-2010 average (35.3 days); (Bottom) Number of 'windy days' by month, comparing the months of 2017 (blue histogram) with the 1981-2010 average (green).

On 19 January, the "bomb low"[10] that hit central and southern New Zealand caused damaging high winds in Wellington and parts of the South Island. State Highway 2 at Rimutaka Hill was closed for a

[9] 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.

[10] A 'bomb low' is a rapidly deepening low pressure system which causes very strong winds, heavy rain and cool temperatures.

time due to high winds, where gusts of around 150km/hr were recorded. More than 400 households in the Hutt Valley were without power for a time, and power was also cut to parts of Marlborough and the West Coast. Trolley buses were taken off the roads due to the danger of high winds and overhead lines, and all harbour ferry crossings were cancelled. Interislander and Bluebridge ferries were delayed and many flights in and out of Wellington airport were cancelled or delayed. Wind warnings were also in place for State Highway 1 at the Desert Road and State Highway 5 from Taupo to Napier. In Invercargill, a line of 25 large pine trees came down during the wind storm.

Beginning 13 February, high temperatures and strong winds also assisted the spread of two out-of-control wildfires on Christchurch's Port Hills. A State of Emergency was declared for Christchurch City and the Selwyn District on 15 February after the fires continued to spread. The fires destroyed eleven homes, forced the evacuation of 450 homes and burned through more than 2000 hectares of land. One helicopter pilot died in a crash while combating the fires.

On 13-14 April, high winds associated with ex-Tropical Cyclone Cook hit Gisborne and Hawke's Bay, bringing down many trees. About 13,000 homes in Hawke's Bay were without power as high winds brought down trees and power lines, and lines company Unison said the damage to its power network was "severe". Twelve Spark cell towers were down and another 16 on battery backup across Bay of Plenty, Gisborne and Hawke's Bay.

On 13 July, strong winds struck the lower North Island. More than 9000 people were without power, and many flights at Wellington Airport were cancelled. Sustained 10-minute winds of 135.7 km/h were recorded at Baring Head between 8:40 a.m. and 8:50 a.m.; this is comparable to winds experienced over flat land during a category 3 tropical cyclone, according to the Australian Bureau of Meteorology's Tropical Cyclone Category System. During that time at Baring Head, the maximum wind gust recorded was 155.9 km/h. Climate stations at Brothers Island in Cook Strait and on Mt Kaukau (Wellington) recorded maximum wind gusts of 167 km/h on this day.

On 1 October, strong winds and heavy rain caused delays at the New Zealand Women's Open near Auckland, meaning that the event had to continue into a fifth day to complete 72 holes of golf. Hoardings flew across the course and a Sky Television contractor fell down a bank due to the wind.

Table 11. Maximum wind gust extremes in 2017 were recorded at:

Location	Maximum wind gust (km/hr)	Date of maximum wind gust	Year records began	Ranking
January				
Auckland (Western Springs)	83	21st	1994	Highest
Motu	100	22nd	1991	Highest
Mahia	104	22nd	1991	Highest
Waiouru	124	22nd	1970	Highest
Nelson	115	22nd	1972	Highest
Oamaru	98	19th	1984	Highest
February				
Mt Kaukau	145	13th	1969	Highest

Wellington (Kelburn)	139	13th	1972	Highest
March				
Paeroa	98	8th	1991	Highest
April				
Te Puke	67	13th	1987	Highest
Whakatane	117	13th	1974	Highest
Motu	111	13th	1991	Highest
Hawera	100	30th	1986	Highest
Oamaru	96	17th	1984	Highest
Lauder	122	28th	1981	Highest
May				
Kaikohe	89	20th	1986	Highest
June				
Farewell Spit	102	14th	1973	Equal highest
July				
Baring Head	156	13th	1991	Highest
Whanganui	119	13th	1977	Highest
Oamaru	91	21st	1984	Highest
Queenstown	93	21st	1972	Equal highest
August				
Hokitika	122	6th	1972	Highest
September				
Hawera	102	8th	1986	Highest
Auckland (North Shore)	74	28th	1994	Equal highest
October				
Kaikohe	104	1st	1986	Highest
November				
Hokitika	107	7th	1972	Highest
Richmond	95	8th	1972	Highest
December				
None observed				

Snow

On 20 May, a southerly outbreak delivered the first significant snowfall to low elevations for the year. Snow settled to approximately 200 metres above sea level in southern parts of the South Island, with snow flurries falling to near sea level. Around 13 cm of snow was recorded in Kingston, and numerous flights were cancelled or delayed in Queenstown due to adverse weather and snow on the runway. Several southern roads were closed due to snow, including State Highway 1 between Dunedin and Waitati and State Highway 87 from Outram to Sutton. Snow drifts of 70-90 cm were observed at The Remarkables ski area near Queenstown, although some exposed slopes were stripped bare of snow due to strong winds that accompanied the snowfall.

On 1 July, up to 30 vehicles were towed after State Highway 8 between Twizel and Fairlie, and State Highway 80 between Aoraki-Mt Cook and Ben Ohau, were closed due to snow. Snowfall also cut road access into Tekapo and Mt Cook, and contributed to two buses sliding off the road. Several day visitors to Tekapo were forced to stay for the night due to road closures.

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

On 13 July, the Desert Road and other sections of State Highways in the Central Plateau were closed due to snow. The NZ Defence Force came to the rescue after a group of Mana bus passengers were stranded near the army camp in Waiouru due to road closures. They stayed overnight at the barracks. Powerco said several thousand customers went without power overnight after heavy snowfalls downed lines and flooding created havoc across the company's network. Damage was spread across a large swathe of the lower North Island including Wairarapa, Manawatu, Whanganui, Taranaki, Ohakune, Waiouru and Taihape.

Tornadoes and waterspouts

On 11 January, the area around Cromwell was affected by up to four mini tornadoes (known as "dust devils"). These are caused by strong convective heating of the near-surface air. Powerlines and fences were blown down, windows were smashed, several trailers were overturned, and building materials were carried up to 500 m away.

On 6 September, a small tornado hit Awatuna in Westland District, ripping the roof off one building and throwing it about 100 metres. There was also lighter damage to several nearby homes and sheds, along with several damaged road signs. The tornado also cut power and water to the township.

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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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