

**National Climate Summary – Summer 2009/10: Cold start, hot finish!**

- **Temperature: Cold start, hot finish – extreme temperatures along the way.**
- **Rainfall: Very wet in Hawkes Bay, Wairarapa, Gisborne, Southland and the West Coast. Extremely dry in Northland, below normal rainfall in Auckland and east of the South Island.**
- **Soil moisture: Severe soil moisture deficits continued all summer in Northland, and developed by late summer in parts of Auckland, Marlborough, Canterbury and Otago.**
- **Sunshine: Extremely sunny for the southern South Island and Northland. Very cloudy from Taranaki to Wellington.**

It was a topsy-turvy summer. It started out extremely cold, with record cold temperatures in early December, but finished hot, with heat waves and above average temperatures in February. Overall, the New Zealand national average temperature for summer was near normal (16.6°C, 0.1°C below the long-term seasonal average). Summer temperatures were above average (between 0.5°C and 1.2°C above average) for Northland, Auckland, Coromandel, and the Bay of Plenty, as well as in inland and western areas of the South Island. Below average temperatures (between 1.2°C and 0.5°C below average) were observed about coastal Otago. Elsewhere, summer temperatures were close to normal.

Summer rainfalls were well above normal in Hawkes Bay, Wairarapa, Gisborne, and parts of Southland and the West Coast. In contrast, it continued extremely dry in Northland. Below normal rainfall also occurred in Auckland and the east of the South Island. Near normal summer rainfall was observed elsewhere. The most significant rainfall event of summer occurred on January 31<sup>st</sup>, affecting the eastern and central North Island, as well as Waikato and Coromandel. A moist, easterly air stream brought heavy rain and thunderstorms to these areas, causing flooding, slips, and road closures. Particularly hard hit were Gisborne and Hawkes Bay.

Summer sunshine totals were well above normal (more than 125 percent of normal) at either end of the country, with Kaitaia and Balclutha both experiencing their sunniest summer on record. In contrast, it was very cloudy (between 75 and 90 percent of normal sunshine hours) from Taranaki to Wellington.

Overall, it was an “El Niño” summer. Summer 2009/10 was characterised by more ‘highs’ in the Tasman Sea and over northern New Zealand, resulting in stronger than normal southwest winds over the country. This climate pattern resulted in well below average summer rainfall, and associated drought conditions, in Northland. Severe soil moisture deficits also developed by the end of summer in parts of Auckland, Marlborough, Canterbury and Otago, following a very dry February.

**Further Highlights:**

- The highest summer temperature was 35.6°C recorded at Cheviot on February 22<sup>nd</sup> (2<sup>nd</sup> highest summer temperature at this site). The lowest summer temperature of -3.5°C was recorded at Lumsden on December 3<sup>rd</sup> (a new summer record at this site).
- The highest 1-day summer rainfall was 203 mm recorded at Franz Josef on 6 January (not a record).
- The peak wind gust was 182 km/hr recorded at Cape Turnagain on 12 December (not a record).
- Of the six main centres this summer, Tauranga was the warmest and sunniest, Dunedin the coolest, Hamilton the wettest, and Christchurch the driest.

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**TEMPERATURES: ABOVE AVERAGE IN THE NORTH OF THE NORTH ISLAND AND INLAND AND WESTERN AREAS OF THE SOUTH ISLAND; NEAR AVERAGE ELSEWHERE.**

Overall, summer temperatures were above average (between 0.5°C and 1.2°C above average) for Northland, Auckland, Coromandel, and the Bay of Plenty, as well as in inland and western areas of the South Island. Below average temperatures (between 1.2°C and 0.5°C below average) were observed about coastal Otago. Elsewhere, summer temperatures were close to normal. The New Zealand national average temperature for summer was in the normal range (16.6°C, 0.1°C below the long-term average).

It was extremely warm in Northland and Auckland, with the summer of 2009/10 being the warmest summer on record for Kerikeri and Whangaparaoa. In contrast, it was an extremely cold summer in the far south, and around Cape Campbell. Morning temperatures in Dunedin this summer were the lowest on record.

**Extreme summer mean maximum daily air temperatures were recorded at:**

Location	Mean maximum air temperature (°C)	Departure from normal (°C)	Year records began	Comments
Kaitaia	24.2	0.3	1985	2nd-highest
Kerikeri	25.3	1.4	1981	Highest
Whangarei	24.8	1.0	1967	3rd-highest
Whangaparaoa	23.7	1.9	1982	Highest
Appleby	23.0	1.3	1943	2nd-highest
Cape Campbell	18.3	-3.1	1953	3rd-lowest
Gore	18.0	-0.8	1971	4th-lowest
Balclutha, Telford	18.3	-1.4	1964	3rd-lowest

**Extreme summer mean minimum daily air temperatures were recorded at:**

Location	Mean minimum air temperature (°C)	Departure from normal (°C)	Year records began	Comments
Reefton	11.7	1.3	1960	4th-highest
Kaitaia	13.0	-1.7	1967	2nd-lowest
Warkworth	13.7	-1.0	1966	3rd-lowest
Le Bons Bay	10.8	-0.3	1984	4th-lowest
Dunedin (Airport)	8.1	-0.8	1947	Lowest

**RAINFALL: VERY WET IN HAWKES BAY, WAIRARAPA, GISBORNE, PARTS OF SOUTHLAND AND THE WEST COAST. EXTREMELY DRY IN NORTHLAND. BELOW NORMAL RAINFALL IN AUCKLAND AND THE EAST OF THE SOUTH ISLAND.**

Summer rainfalls were well above average (with rainfall totals above 150 percent of summer normal) in Hawkes Bay, Wairarapa, Gisborne, and parts of Southland and the West Coast. In contrast, it continued extremely dry in Northland. Kaitaia recorded its driest summer ever, since records began in 1967. Below normal summer rainfall also occurred in Auckland and the east of the South Island, with totals between 50 and 75 percent of normal. Near normal summer rainfall was observed elsewhere.

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

Location	Rainfall total (mm)	Percentage of normal	Year records began	Comments
Castlepoint	417	232	1902	2nd-highest
Lumsden	289	107	1982	4 <sup>th</sup> -highest
Kaitaia	80	30	1967	Lowest
Kerikeri	140	45	1981	3 <sup>rd</sup> -lowest
Kumeu	177	69	1978	3 <sup>rd</sup> -lowest
Blenheim	67	48	1941	4 <sup>th</sup> -lowest

**SUNSHINE: EXTREMELY SUNNY FOR THE SOUTHERN SOUTH ISLAND AND NORTHLAND. VERY CLOUDY FROM TARANAKI TO WELLINGTON.**

Summer sunshine totals were well above normal (more than 125 percent of normal) at either end of the country, with Kaitaia and Balclutha both experiencing their sunniest summer on record. In contrast, it was very cloudy (between 75 and 90 percent of normal sunshine hours) from Taranaki to Wellington, including parts of the Wairarapa. Elsewhere, summer sunshine totals were close to normal.

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

Location	Sunshine (hours)	Percentage Of normal	Year records began	Comments
Kaitaia	803	125	1985	Highest
Balclutha	690	133	1964	Highest
Martinborough	552	86	1986	4th-lowest
Wallaceville	499	79	1939	3rd-lowest

**SUMMER CLIMATE IN THE SIX MAIN CENTRES**

Summer temperatures were above average in Tauranga and Hamilton, and near average in the other main centres. It was a drier than normal summer for Auckland, Christchurch and Dunedin, but summer rainfalls in Tauranga, Hamilton and Wellington were near seasonal normal. Sunshine totals were above normal for Tauranga and Dunedin, below normal for Wellington, and near normal in the other main centres.

Of the six main centres this summer, Tauranga was the warmest and sunniest, Dunedin the coolest, Hamilton the wettest, and Christchurch the driest.

## Summer 2009 main centre climate statistics:

Location	Mean temp. (°C)	Departure from normal (°C)		Rainfall (mm)	% of normal		Sunshine (hours)	% of normal	
Auckland <sup>a</sup>	19.1	-0.2C	Near average	131	60%	Below normal	645	101%	Near normal
Tauranga <sup>b</sup>	19.7	+1.0C	Above average	260	109%	Near normal	771	110%	Above normal
Hamilton <sup>c</sup>	18.3	+0.6C	Above average	296	112%	Near normal	612	94%	Near normal
Wellington <sup>d</sup>	16.0	-0.4C	Near average	251	114%	Near normal	594	87%	Below normal
Christchurch <sup>e</sup>	16.2	-0.4C	Near average	90	69%	Below normal	592	92%	Near normal
Dunedin <sup>f</sup>	14.5	-0.2C	Near average	145	67%	Below normal	591	118%	Above normal

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

## HIGHLIGHTS AND EXTREME EVENTS

### • Heavy rain, flooding, lightning and hail

The highest 1-day summer rainfall was 203 mm recorded at Franz Josef on 6 January (not a record). Other notable summer weather events, in which several sites recorded their largest-ever 1-day summer rainfall amount, include the heavy rainfall event on January 21<sup>st</sup> in Central Otago, the floods in Napier and the Wairarapa on January 22<sup>nd</sup>, and the heavy rainfall on 30 and 31 January across much of the North Island.

Heavy rain caused localised flooding in parts of Auckland, the North Shore and Waikato on 2 and 4 December. On 11 December, wet weather caused a giant slip, that blocked SH3 north of New Plymouth. On 14 December, severe hailstorms in inland Canterbury (from Geraldine to north of Rangiora) caused significant damage to vegetable and arable crops.

After heavy rainfall in the Tararua Ranges on 27 December, the Tokomaru River in the Manawatu rose above its banks, resulting in localised flooding. On 29 December, SH1 was closed south of Levin when the Kuku stream burst its banks. The Kahuterawa River near Linton reached levels not seen in many years. The North Manakau Road bridge between Otaki and Levin was closed as a precaution amid fears rising water could wash away the approach to the structure.

On 3 January, SH6, south of Fox Glacier, was closed for more than six hours after the northern bank of Bullock Creek broke.

In the 10 minutes before 2 pm on 7 January, Invercargill Airport recorded 8.4 mm of rain. The intense rainfall was caused by a mid-afternoon thunderstorm, with hail covering northern and central Invercargill. Buildings throughout the CBD, including the Southland District Council and the Invercargill Public Library, were flooded. The thunderstorm also caused electricity cuts, which affected 3500 customers in southern Invercargill, Bluff and Awarua.

The Desert Road was closed by heavy rain about 10.30 pm on 15 January, and re-opened the following morning. On 16 January, heavy rain flooded campsites in the Wairarapa, and closed Paekakariki Hill Road, north of Wellington, when a slip and large trees blocked both lanes. The Wairoa A&P Show, held over the weekend of 16-17 January, was also affected by heavy rain, with events such as woodchopping, equestrian, and shearing either cancelled, cut back, or moved to an alternative location.

On 21 January, thunderstorm activity associated with a complex low over the country affected the Ida Valley, Central Otago, producing very intense rainfall rates – several of which were the highest on record for summer. On the same day, thunderstorms and lightning affected the water treatment plant in Hamilton.

On 22 January, heavy rain flooded streets in Flaxmere, near Hastings, and closed SH50 between Ongaonga

and Tikokino. The flash flooding was caused by downpours from thunderstorms in the area. Overnight on 22-23 January, Hawkes Bay experienced about 2000 lightning strikes. On 23 January, heavy rain caused a large slip on SH5, near Titiokura Summit, with one lane closed, and other sections of the road affected by flooding.

On 26 January lightning struck the central North Island, especially Taranaki, Taumarunui and South Waikato. On 27 January, torrential rain caused flooding in the Fairy Springs Road area of Rotorua, and blocked SH1 near Lake Karapiro. Several homes in Cambridge were flooded. Again, the downpours were caused by thunderstorm activity, with a severe electrical storm centred directly over Hamilton City.

Exceptionally heavy rain, associated with moist easterly conditions and numerous embedded thunderstorms, affected the North Island on 30 and 31 January, causing numerous slips, and floods, and closing SH5 between Napier and Taupo, and SH2 north of Gisborne. Rising floodwaters and debris buckled a bridge on the Waipaoa River, isolating more than 30 people at Waipaoa Station. Mangatuna village residents were moved out in the morning as the Uawa River rose, allowed to return several hours later, but were evacuated again in the afternoon. In the Coromandel, Hahei and the Hot Water Beach area were cut off by flooding on Hot Water Beach Road. Tairua was accessible from the north but not from the south, and SH25 at Onemana near Opoutere was blocked by flooding. In the Auckland region, homes were flooded on the Whangaparaoa Peninsula, North Shore, Auckland City, and Howick.

Heavy rain and high rivers on 14 February forced changes to the planned route of the 'Coast to Coast' Race from Kumara to Christchurch, the first time in 28 years that "Plan B" had been activated.

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

Location	Extreme 1-day rainfall (mm)	Date of extreme rainfall	Year Records Began	Comments
Karangahake Gorge	113	Jan-31st	1981	2nd-highest
Waitoa	54	Jan-31st	1987	4th-highest
Morrinsville	80	Jan-31st	1978	2nd-highest
Raglan	83	Jan-31st	1983	3rd-highest
Horsham Downs	86	Jan-31st	1973	2nd-highest
Maungatautari	89	Jan-31st	1975	2nd-highest
Makairo	67	Jan-22nd	1968	3rd-highest
Masterton	84	Jan-22nd	1926	2nd-highest
Waiawa, Whareama	104	Jan-22nd	1968	2nd-highest
Castlepoint	160	Jan-22nd	1907	Highest
Wairarapa Cadet Farm	87	Jan-22nd	1951	Highest
Gladstone Te Kopi	75	Jan-22nd	1953	2nd-highest
Te Wharau, Waimoana	75	Jan-22nd	1958	2nd-highest
Otoko	115	Jan-30th	1913	3rd-highest
Waihirere, Glanavon	70	Jan-30th	1961	4th-highest
Waingake	139	Jan-30th	1946	2nd-highest
Ahititi Stn	131	Jan-30th	1973	2nd-highest
Mokairau, Pakarae	145	Jan-30th	1947	3rd-highest
Te Pohue, Hawkes Bay	167	Jan-31st	1983	Highest
Tareha	160	Jan-31st	1949	2nd-highest
Taurapa	90	Jan-31st	1965	Highest
Brentwood	152	Jan-31st	1966	Highest
Ongaonga	70	Jan-22nd	1969	4th-highest
Lumsden	53	Jan-21st	1982	2nd-highest
Cromwell	48	Jan-21st	1949	4th-highest
Lauder	64	Jan-21st	1945	2nd-highest
Alexandra	39	Jan-21st	1983	Highest
Ettrick	56	Jan-21st	1950	Highest

- **Temperature**

It was a topsy-turvy summer. It started out extremely cold, with record cold temperatures in early December, but finished hot, with heat waves and well above average temperatures in February. The highest summer temperature was 35.6°C recorded at Cheviot on February 22<sup>nd</sup> (the 2<sup>nd</sup> highest summer temperature at this site).

Record or near-record low afternoon temperatures were recorded at numerous sites on 3 and 4 December, from one end of the country to the other, associated with an unseasonably cold southerly event.

Record or near-record warm afternoon conditions were experienced at several sites at the end of January and start of February (29 January – 2 February), linked to sub-tropical, easterly conditions. Notably, several sites on the West Coast of the South Island recorded heat-wave temperatures in this period, showing foehn warming with these easterly winds.

**Extreme daily maximum air temperatures were recorded at:**

Location	Extreme maximum temperature (°C)	Date of extreme temperature	Year Records Began	Comments
Kerikeri	30.4	Feb-14 <sup>th</sup>	1981	Highest
Whangaparaoa	28.6	Jan-30 <sup>th</sup>	1982	Highest
Westport	28.5	Jan-31 <sup>st</sup>	1937	Highest
Hokitika	27.7	Jan-31 <sup>st</sup>	1963	4th-highest
Greymouth	28.7	Feb-01 <sup>st</sup>	1947	3rd-highest
Franz Josef	27.2	Jan-31 <sup>st</sup>	1982	4th-highest
Milford Sound	28.5	Feb-01 <sup>st</sup>	1934	Highest
Cheviot	35.6	Feb-22 <sup>nd</sup>	1982	2nd-highest
Warkworth	16.4	Dec-04 <sup>th</sup>	1966	2nd-lowest
Whangaparaoa	16.6	Dec-04 <sup>th</sup>	1982	2nd-lowest
Kumeu	15.8	Dec-04 <sup>th</sup>	1978	2nd-lowest
Whenuapai	16.0	Dec-04 <sup>th</sup>	1951	2nd-lowest
Henderson	16.3	Dec-04 <sup>th</sup>	1971	Equal 3rd-lowest
Whitianga	16.1	Dec-04 <sup>th</sup>	1971	2nd-lowest
Paeroa	15.8	Dec-04 <sup>th</sup>	1971	Lowest
Tauranga	15.5	Dec-04 <sup>th</sup>	1941	3rd-lowest
Rotorua	13.0	Dec-04 <sup>th</sup>	1972	Lowest
Taupo	12.0	Dec-04 <sup>th</sup>	1976	Lowest
Pukekohe	16.3	Dec-04 <sup>th</sup>	1972	2nd-lowest
Hamilton	17.0	Dec-04 <sup>th</sup>	1972	Equal 4th-lowest
Masterton	11.6	Dec-03 <sup>rd</sup>	1943	Equal 3rd-lowest
Kopua	10.0	Dec-03 <sup>rd</sup>	1972	Lowest
Takapau Plains	9.8	Dec-03 <sup>rd</sup>	1972	Lowest
Dannevirke	11.5	Dec-03 <sup>rd</sup>	1951	3rd-lowest
Castlepoint	10.7	Dec-03 <sup>rd</sup>	1972	Lowest
Martinborough	12.4	Dec-03 <sup>rd</sup>	1986	3rd-lowest
Ngawi	12.5	Dec-03 <sup>rd</sup>	1972	2nd-lowest
Gisborne	14.0	Dec-03 <sup>rd</sup>	1940	Lowest
Napier (Airport)	13.0	Dec-03 <sup>rd</sup>	1973	Lowest
Hastings	12.8	Dec-03 <sup>rd</sup>	1972	3rd-lowest
Waipawa	11.4	Dec-03 <sup>rd</sup>	1945	Lowest
Wairoa, North Clyde	13.6	Dec-03 <sup>rd</sup>	1972	2nd-lowest
Wallaceville	12.1	Dec-03 <sup>rd</sup>	1972	2nd-lowest
Hawera	13.2	Dec-03 <sup>rd</sup>	1977	Lowest
Takaka	15.2	Dec-04 <sup>th</sup>	1985	Equal 4th-lowest
Farewell Spit	14.9	Dec-04 <sup>th</sup>	1972	4th-lowest
Franz Josef	10.5	Dec-13 <sup>th</sup>	1982	Lowest
Blenheim	13.0	Dec-03 <sup>rd</sup>	1972	3rd-lowest
Arthurs Pass	7.8	Dec-13 <sup>th</sup>	1973	4th-lowest

Orari Estate	10.0	Dec-02 <sup>nd</sup>	1972	Equal 2nd-lowest
Timaru	11.0	Dec-02 <sup>nd</sup>	1972	Equal 2nd-lowest
Oamaru	10.0	Dec-02 <sup>nd</sup>	1972	Lowest
Naseby Forest	8.7	Dec-02 <sup>nd</sup>	1983	4th-lowest
Palmerston	10.7	Dec-02 <sup>nd</sup>	1972	3rd-lowest
Dunedin (Airport)	11.0	Dec-02 <sup>nd</sup>	1972	4th-lowest
Tiwai Point	10.8	Dec-20 <sup>th</sup>	1972	3rd-lowest
Balclutha, Telford	11.0	Dec-02 <sup>nd</sup>	1972	3rd-lowest

The lowest summer temperature of -3.5°C was recorded at Lumsden on December 3<sup>rd</sup> (a summer record at this site).

**Extreme daily minimum air temperatures were recorded at:**

Location	Extreme minimum temperature (°C)	Date of extreme temperature	Year Records began	Comments
Kerikeri	8.0	Dec-16 <sup>th</sup>	1978	Equal 4th-lowest
Warkworth	5.2	Dec-16 <sup>th</sup>	1966	Lowest
Whangaparaoa	9.0	Dec-18 <sup>th</sup>	1982	4th-lowest
Ardmore	4.1	Dec-17 <sup>th</sup>	1969	Equal 4th-lowest
Martinborough	1.4	Dec-22 <sup>nd</sup>	1986	2nd-lowest
Napier	4.0	Dec-22 <sup>nd</sup>	1973	3rd-lowest
Waipawa	1.1	Dec-22 <sup>nd</sup>	1945	Equal 4th-lowest
Woodbury	0.0	Dec-02 <sup>nd</sup>	1973	Equal 4th-lowest
Dunedin	-0.7	Dec-04 <sup>th</sup>	1947	Lowest
Lumsden	-3.5	Dec-03 <sup>rd</sup>	1982	Lowest
Balclutha, Telford	1.0	Feb-08 <sup>th</sup>	1964	4th-lowest
Whangaparaoa	20.6	Feb-18 <sup>th</sup>	1982	Highest
Whakatane	20.0	Jan-26 <sup>th</sup>	1975	4th-highest
Napier	22.0	Jan-04 <sup>th</sup>	1973	3rd-highest
Takaka	19.5	Feb-01 <sup>st</sup>	1978	2nd-highest
Greymouth	18.4	Jan-17 <sup>th</sup>	1972	Equal 4th-highest
Puysegur Point	18.1	Feb-23 <sup>rd</sup>	1978	2nd-highest
Kaikoura	20.0	Feb-25 <sup>th</sup>	1972	3rd-highest
Naseby Forest	17.6	Dec-26 <sup>th</sup>	1984	Highest

• **High winds and tornadoes**

The peak wind gust was 182 km/hr recorded at Cape Turnagain on 12 December (not a record). Also on 12 December, high winds in North Canterbury brought down trees and tore roofs off houses and sheds in Kaikoura.

A tornado was reported near Springfield, 70 km west of Christchurch, on 14 December.

On 18 December, winds gusted up to 130 km/hr in exposed areas of Canterbury, Otago, Southland and Fiordland. Winds also blasted the lower North Island and upper South Island, with gusts of up to 100 km/hr reported on the Rimutaka Hill road (SH2).

Gales hit the bottom of the South Island on 1 January damaging trees in Invercargill. In South Canterbury, SH 8 between Lakes Pukaki and Tekapo was closed at about 6pm to motorcycles and high-sided vehicles. In Wanaka, a power line was brought down by the gale, disrupting power supplies.

On 3 January, winds created havoc during the annual New Year Regatta in Napier, with one girl concussed, and another fished out of the water after boats collided. About half of the 120 boats, competing in 12 classes, withdrew from the regatta. Strong winds were also recorded in Wellington, with Mt. Kaukau recording an extreme gust of 145 km/hr.

On 31 January, gale force winds battered Taranaki, bringing down power lines and trees. The electricity supply was cut to parts of New Plymouth city, Bell Block, and Patea. SH45 near Lucy's Gully, and SH3, just south of Egmont Village, were partially blocked by fallen trees. Some flights in and out of New Plymouth airport were cancelled.

**Extreme high wind gusts for spring were recorded at:**

Location	Extreme wind gust speed (km/hr)	Date of extreme gust	Year Records Began	Comments
Farewell Spit	93	Dec-30 <sup>th</sup>	1973	Equal 4th-highest
Blenheim	109	Dec-30 <sup>th</sup>	1972	3rd-highest

- **Fog**

On the morning of 18 January, Wellington airport was affected by fog, with more than 20 outbound flights cancelled, and five incoming flights diverted.

Wellington city was affected by fog in the evening of 26 January, and on the morning of 27 January.

Fog closed Wellington Airport again on the morning of 29 January, forcing cancellations and delays.

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