

## A warm month, wet in the west but dry in the east

<b>Temperature</b>	Temperatures were above average (0.51-1.20°C above average) or well above average (>1.20°C above average) for most of the country. Near average temperatures ( $\pm 0.50^\circ\text{C}$ of average) were observed in southeastern parts of the South Island. Tara Hills (near Omarama) was the only location where temperatures were below average (0.51-1.20°C below average).
<b>Rainfall</b>	Rainfall was above normal (120-149% of normal) or well above normal (>149% of normal) for many western and inland parts of New Zealand. Rainfall was below normal (50-79% of normal) or well below normal (<50% of normal) for eastern parts of the country, and western parts of Northland.
<b>Soil Moisture</b>	At the end of the month, soil moisture levels were significantly lower than normal for eastern-most parts of Otago and Canterbury. Soil moisture levels were higher than normal for inland parts of the South Island, especially inland Canterbury. Near normal soil moisture levels were typical for the remainder of the country.

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### Overview

June 2022 mean sea level air pressure was lower than normal in the Aotearoa New Zealand region. The Tasman Sea and Southern Ocean was particularly unsettled with numerous strong low pressure systems and fronts, especially during the first half of the month. This was associated with a northwesterly air flow anomaly for the month overall. The prevalence of these air flows, and ongoing warmer than average sea surface temperatures, meant it was a warm start to winter for most of the country. The Southern Annular Mode (SAM), a proxy for the location of the polar jet stream and storm track, was in its negative phase<sup>1</sup> for much of June, with the 30-day running average becoming negative for the first time since early September 2021.

Temperatures were above average (0.51-1.20°C above average) or well above average (>1.20°C above average) in every region of New Zealand, with well above average temperatures prevailing over most

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<sup>1</sup> In its negative phase, the SAM usually results in lower-than-normal air pressure and increased westerlies around New Zealand, increasing the risk for unsettled weather conditions.

of the North Island. The exception to this unseasonable warmth were parts of Southland and southeastern Otago, where temperatures were near normal ( $\pm 0.50^{\circ}\text{C}$  of average). In addition, Tara Hills (near Omarama) observed below average mean temperatures ( $0.51\text{-}1.20^{\circ}\text{C}$  below average). The area received a heavy snowfall in mid-June, followed by a prolonged spell of cold days and nights associated with high atmospheric pressure (see *Highlights and extreme events* for further details). Overall, the nationwide average temperature in June 2022 was  $9.9^{\circ}\text{C}$ . This was  $1.3^{\circ}\text{C}$  above the 1981-2010 June average, making it New Zealand's 8th-warmest June since NIWA's seven station temperature series began in 1909.

Rainfall was above normal (120-149% of normal) or well above normal ( $>149\%$  of normal) for many western and inland parts of New Zealand. It was especially wet in inland parts of Otago and Canterbury, and Tauranga, where rainfall totals observed were approximately double the June average, respectively. In contrast, rainfall was below normal (50-79% of normal) or well below normal ( $<50\%$  of normal) for eastern parts of both the North and South Island. This pattern is consistent with the northwesterly air flow anomaly observed.

By the end of June, soils were significantly drier than normal for eastern parts of Otago and Canterbury, from Balclutha north to Banks Peninsula. This was accompanied by "dry" or "very dry" conditions (according to NIWA's New Zealand Drought index) for eastern Otago, coastal South Canterbury and Banks Peninsula. Soil moisture levels were typically near normal for remaining parts of the country. The exception was for inland parts of the South Island, particularly inland Canterbury, where soils were wetter than normal for the time of year.

Further Highlights:

- The highest temperature was  $22.8^{\circ}\text{C}$ , observed at Hastings on 1 June.
- The lowest temperature was  $-11.2^{\circ}\text{C}$ , observed at Middlemarch on 23 June.
- The highest 1-day rainfall was 131 mm, recorded at Arthur's Pass on 1 June.
- The highest wind gust was 165 km/h, observed at Cape Foulwind on 13 June.
- Of the six main centres in June 2022, Auckland was the warmest, Tauranga was the wettest and sunniest, Christchurch was the coldest, and Dunedin was the driest and least sunny.
- Of the available, regularly reporting sunshine observation sites, the sunniest four locations in 2022 so far are Taranaki (1415 hours), Bay of Plenty (1345 hours), wider Nelson (1328 hours) and Auckland (1288 hours).

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## Temperature: A warm month for most areas of the country

Winter began on a warm note for most areas of New Zealand. The warmth was widespread, with 29 locations across both the North and South Islands observing record or near-record high mean temperatures. It was particularly warm in Castlepoint (Wairarapa), where the mean temperature of  $13.9^{\circ}\text{C}$  was  $3.2^{\circ}\text{C}$  higher than the location's 1981-2010 average. The relative warmth observed in

throughout the country likely resulted from a combination of more northwesterly airflows than usual, and warmer than average sea surface temperatures around the country.

Despite June's overall warmth, a cold-snap during the middle of the month brought heavy snow followed by settled weather for areas of the South Island, leading to a succession of cold nights for parts of Southland, Otago and Canterbury. Balclutha's mean daily minimum temperature of 0.1°C was 1.7°C lower than average, and the lowest observed since records began there in 1964. Mean daily minimum temperatures were also cooler than usual at Invercargill (0.9°C, 1.2°C below average), Dunedin Airport (-1.1°C, 1.6°C below average), and Tara Hills (-3.4°C, 1.4°C below average).

**Record<sup>2</sup> or near-record mean air temperatures for June were recorded at:**

Location	Mean air temp. (°C)	Departure from normal (°C)	Year records began	Comments
<b>High records or near-records</b>				
Mokohinau	15.4	1.4	1994	Highest
Motu	9.1	2.6	1990	Highest
Castlepoint	13.9	3.2	1972	Highest
Whangaparāoa	14.1	1.5	1982	2nd-highest
Whitianga	13.2	2.1	1962	2nd-highest
Hicks Bay	13.9	2.0	1969	2nd-highest
Whakatu	11.1	2.3	1965	2nd-highest
Porirua	11.4	1.6	1968	2nd-highest
Akaroa	10.5	2.4	1978	2nd-highest
Leigh	15.0	1.6	1966	3rd-highest
Auckland (Whenuapai)	12.7	1.5	1945	3rd-highest
Paeroa	12.6	2.1	1947	3rd-highest
Te Puke	11.7	1.7	1973	3rd-highest
Whakatāne	12.3	2.3	1974	3rd-highest
Masterton	10.2	2.3	1906	3rd-highest
Gisborne	12.3	2.1	1905	3rd-highest
Hastings	11.1	2.3	1965	3rd-highest
Paraparaumu	11.9	2.2	1953	3rd-highest
Brothers Island	12.5	1.4	1997	3rd-highest
Waiau	7.6	1.8	1974	3rd-highest
Rangiora	8.3	1.8	1965	3rd-highest
Oamaru	7.8	0.7	1967	3rd-highest
Campbell Island	6.3	1.2	1991	3rd-highest
Tauranga Aero	12.9	1.9	1913	4th-highest
Martinborough	10.2	1.6	1986	4th-highest
Wairoa	12.1	2.1	1964	4th-highest
Wellington (Airport)	12.0	1.5	1962	4th-highest
Upper Hutt (Trentham)	10.2	1.5	1939	4th-highest

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<sup>2</sup> The rankings (1st, 2nd, 3rd.etc) in all Tables in this summary are relative to climate data from a group of nearby stations, some of which may no longer be operating. The current climate value is compared against all values from any member of the group, without any regard for homogeneity between one station's record, and another. This approach is used due to the practical limitations of performing homogeneity checks in real-time.

Hāwera	11.1	1.6	1977	4th-highest
<b>Low records or near-records</b>				
None observed				

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

Location	Mean maximum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
<b>High records or near-records</b>				
Whangaparāoa	16.4	1.3	1982	Highest
Castlepoint	16.6	3.4	1972	Highest
Windsor	13.5	2.3	2000	Highest
Mokohinau	16.8	1.4	1994	2nd-highest
Oamaru	13.1	1.9	1967	2nd-highest
Porirua	14.6	1.4	1968	3rd-highest
Brothers Island	14.2	1.3	1997	3rd-highest
Orari Estate	12.8	1.8	1972	3rd-highest
Middlemarch	11.9	2.4	2000	3rd-highest
Dunedin (Musselburgh)	12.3	1.7	1947	3rd-highest
Whakatāne	16.6	1.4	1974	4th-highest
Te Kuiti	15.4	1.5	1959	4th-highest
Whakatu	16.6	2.2	1965	4th-highest
Levin	15.3	2.0	1895	4th-highest
Waiau	13.2	1.6	1974	4th-highest
Akaroa	14.8	2.1	1978	4th-highest
<b>Low records or near-records</b>				
None observed				

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

Location	Mean minimum air temp. (°C)	Departure from normal (°C)	Year records began	Comments
<b>High records or near-records</b>				
Mokohinau	14.0	1.5	1994	Highest
Whakatāne	8.0	3.4	1974	Highest
Motu	5.9	3.9	1990	Highest
Castlepoint	11.1	2.9	1972	Highest
Hicks Bay	11.2	2.4	1969	Highest
Gisborne	8.1	2.5	1905	Highest
Wairoa	7.8	2.7	1964	Equal highest
Whitianga	9.4	2.7	1962	2nd-highest
Masterton	5.6	3.1	1906	2nd-highest
Porirua	8.3	2.0	1968	2nd-highest
Campbell Island	4.8	1.8	1991	2nd-highest
Paeroa	8.9	2.9	1947	3rd-highest
Te Puke	7.7	2.6	1973	3rd-highest
Paraparaumu	8.5	2.4	1953	3rd-highest
Hāwera	7.8	1.7	1977	3rd-highest

Ōkārito	6.0	2.3	1982	3rd-highest
Le Bons Bay	7.1	1.3	1984	3rd-highest
Tauranga	9.4	2.5	1913	4th-highest
Hamilton (Ruakura)	7.1	2.3	1906	4th-highest
Port Taharoa	10.8	2.0	1973	4th-highest
Lower Retaruke	5.5	2.0	1966	4th-highest
Martinborough	5.8	1.8	1986	4th-highest
Hastings	5.9	2.8	1965	4th-highest
Wellington (Kelburn)	8.8	1.6	1928	4th-highest
Wellington (Airport)	9.5	1.6	1962	4th-highest
Upper Hutt (Trentham)	6.2	1.8	1939	4th-highest
Brothers Island	10.8	1.4	1997	4th-highest
Cape Campbell	9.5	1.6	1953	4th-highest
Kaikōura	7.6	1.4	1963	4th-highest
Culverden	2.3	2.4	1928	4th-highest
<b>Low records or near-records</b>				
Balclutha	0.1	-1.7	1964	Lowest

## Rainfall: A wet month for western and inland areas, dry in the east

It was a particularly wet month for inland parts of the South Island, where Queenstown and Tara Hills observed their wettest June on record. This is especially notable in Queenstown, where records date back to 1871. In contrast, it was a dry month for eastern areas. Akaroa observed a total of 46 mm rain (46% of the June normal), although this was not a record or near-record low total for the town.

### Record or near-record June rainfall totals were recorded at:

Location	Rainfall total (mm)	Percentage of normal	Year records began	Comments
<b>High records or near-records</b>				
Ōkārito	484	185	1981	Highest
Tara Hills	124	272	1949	Highest
Queenstown	182	246	1871	Highest
Paraparaumu	207	190	1945	2nd-highest
Farewell Spit	245	165	1874	2nd-highest
Greymouth	370	155	1947	2nd-highest
Hanmer Forest	228	230	1905	2nd-highest
South West Cape	181	145	1991	2nd-highest
Lower Retaruke	240	170	1966	3rd-highest
Dannevirke	156	157	1951	3rd-highest
Te Puke	309	183	1973	4th-highest
Mt Ruapehu (Chateau)	374	145	2000	4th-highest
Arapito	329	151	1978	4th-highest
Mt Cook (Village)	544	169	1928	4th-highest
Manapouri	186	177	1961	4th-highest
<b>Low records or near-records</b>				
Māhia	77	56	1990	Equal 4th-lowest

## June climate in the six main centres

Temperatures were well above average for most of the main centres. The exception was Dunedin where temperatures were above average. It was a wet June for Hamilton and Tauranga, where rainfall was well above normal. In contrast, it was dry in Dunedin where just 33 mm of rainfall (56% of normal) was recorded. Of the six main centres in June 2022, Auckland was the warmest, Tauranga was the wettest and sunniest, Christchurch was the coldest, and Dunedin was the driest and least sunny.

### June 2022 main centre climate statistics:

Temperature			
Location	Mean temp. (°C)	Departure from normal (°C)	Comments
Auckland <sup>a</sup>	13.4	+1.6	Well above average
Tauranga <sup>b</sup>	12.9	+1.9	Well above average
Hamilton <sup>c</sup>	10.9	+1.5	Well above average
Wellington <sup>d</sup>	11.0	+1.3	Well above average
Christchurch <sup>e</sup>	7.7	+1.3	Well above average
Dunedin <sup>f</sup>	8.2	+0.9	Above average
Rainfall			
Location	Rainfall (mm)	% of normal	Comments
Auckland <sup>a</sup>	148	125	Above normal
Tauranga <sup>b</sup>	256	224	Well above normal
Hamilton <sup>c</sup>	205	163	Well above normal
Wellington <sup>d</sup>	175	127	Above normal
Christchurch <sup>e</sup>	53	92	Near normal
Dunedin <sup>f</sup>	33	56	Below normal
Sunshine			
Location	Sunshine (hours)		
Auckland <sup>a</sup>	124		
Tauranga <sup>b</sup>	142		
Hamilton <sup>g</sup>	130		
Wellington <sup>d</sup>	95		
Christchurch <sup>e</sup>	125		
Dunedin <sup>f</sup>	74		

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

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## Highlights and extreme events

### Temperatures

From 15 June, a ridge of high pressure began extending over New Zealand, resulting in a prolonged period of calm, clear weather over much of the South Island during the second half of June. This brought low overnight temperatures, and in some locations the temperature struggled to rise above freezing during the day. The low daytime temperatures resulted from a combination of features, including i) an inversion meant cooler air remained trapped near the earth surface, ii) snow cover on the ground reflected incoming energy from the sun when skies were clear, and iii) periods of low cloud and/or fog stopped energy from the sun reaching the earth surface.

At Tara Hills (near Omarama, Waitaki District), the mean temperature for the 7-day period from 19-25 June was -2.7°C. The lowest daily minimum temperature recorded during this stretch was -11.0°C on 22 June, followed by -10.6°C on 23 June. The daily maximum temperature recorded on 23 June was just 0.3°C.

The highest temperature was 22.8°C, observed at Hastings on 1 June.

The lowest temperature was -11.2°C, observed at Middlemarch on 23 June.

### Record or near-record daily maximum air temperatures for June were recorded at:

Location	Extreme maximum (°C)	Date of extreme temperature	Year records began	Comments
High records or near-records				
Kerikeri	21.3	1st	1945	Equal highest
Whitianga	22.1	1st	1962	2nd-highest
Matamata	20.6	1st	1999	2nd-highest
Whakatāne	20.6	1st	1975	2nd-highest
Motu	17.2	8th	1990	2nd-highest
Castlepoint	21.6	1st	1972	2nd-highest
Mokohinau	19.1	1st	1994	Equal 2nd-highest
Te Puke	20.4	1st	1973	Equal 2nd-highest
Whangaparāoa	19.9	1st	1982	3rd-highest
Auckland (Whenuapai)	20.8	1st	1945	3rd-highest
Tauranga	20.9	1st	1913	3rd-highest
Rotorua	18.3	1st	1964	3rd-highest
Hamilton (Ruakura)	21.1	1st	1906	3rd-highest
Te Kuiti	20.6	1st	1959	3rd-highest
Oban (Stewart Island)	16.8	7th	1975	3rd-highest
South West Cape	16.6	1st	1991	3rd-highest
Campbell Island	12.3	6th	1991	3rd-highest
Secretary Island	16.6	1st	1985	Equal 3rd-highest
Middlemarch	19.6	7th	2000	Equal 3rd-highest
Auckland (Airport)	21.2	1st	1959	4th-highest
Whatawhata	20.0	1st	1952	4th-highest
Hamilton (Airport)	20.3	1st	1946	4th-highest
Hastings	22.8	1st	1965	4th-highest

Whakatu	22.7	1st	1965	4th-highest
Māhia	19.4	1st	1990	4th-highest
Waikeria	20.0	1st	1957	Equal 4th-highest
Hāwera	18.5	1st	1977	Equal 4th-highest
<b>Low records or near-records</b>				
None observed				

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

Location	Extreme minimum (°C)	Date of extreme temperature	Year records began	Comments
<b>High records or near-records</b>				
Whangaparāoa	16.1	2nd	1982	Highest
Motu	12.5	2nd	1990	Highest
Port Taharoa	16.1	1st	1974	Highest
Māhia	14.8	2nd	1990	Highest
Porirua	14.4	1st	1972	Highest
Orari Estate	9.0	2nd	1972	Highest
South West Cape	12.3	1st	1991	Highest
Castlepoint	16.0	2nd	1972	Equal highest
Mokohinau	16.9	2nd	1994	2nd-highest
Paraparaumu	14.6	1st	1972	2nd-highest
Hāwera	14.6	1st	1977	2nd-highest
Dunedin (Musselburgh)	11.7	1st	1947	2nd-highest
Campbell Island	9.3	1st	1991	2nd-highest
Auckland (Western Springs)	16.0	2nd	1971	Equal 2nd-highest
Christchurch	11.9	1st	1863	Equal 2nd-highest
Nugget Point	10.5	1st	1972	Equal 2nd-highest
Paeroa	15.8	1st	1971	3rd-highest
Hicks Bay	16.6	2nd	1972	3rd-highest
Wellington (Airport)	14.8	1st	1972	3rd-highest
Upper Hutt (Trentham)	14.5	1st	1972	3rd-highest
Nelson	14.0	1st	1862	3rd-highest
Kaikōura	13.5	2nd	1972	3rd-highest
Ashburton	11.5	1st	1928	3rd-highest
Akaroa	13.4	1st	1978	3rd-highest
Alexandra	9.2	1st	1930	3rd-highest
Whakatu	14.4	2nd	1972	Equal 3rd-highest
Appleby	13.0	1st	1941	Equal 3rd-highest
Leigh	16.4	2nd	1966	4th-highest
New Plymouth	15.4	1st	1944	4th-highest
Gisborne	15.3	2nd	1940	4th-highest
Ōkārīto	11.8	1st	1983	4th-highest
Taupō	12.8	2nd	1950	Equal 4th-highest
Napier	15.6	2nd	1940	Equal 4th-highest
Stratford	12.3	1st	1972	Equal 4th-highest
Richmond	13.5	1st	1862	Equal 4th-highest



Low records or near-records				
Dunedin (Airport)	-8.6	23rd	1962	Lowest
Middlemarch	-11.2	23rd	2000	2nd-lowest
Tara Hills	-11.0	22nd	1949	4th-lowest
Windsor	-5.7	21st	2000	Equal 4th-lowest

### Rain and slips

On 9 June, torrential downpours associated with passing thunderstorms caused flooding on Wellington CBD streets and within buildings. Johnsonville Train Line services were suspended due to signal issues caused by the weather, and areas of surface flooding were reported in Porirua.

On 12 June, thunderstorms delivered periods of heavy rainfall to the Wellington region. Surface flooding was reported in Lower Hutt, Porirua, Plimmerton, and Waikanae, while SH59 at Paremata was closed due to flooding. Farther south, flooding was reported on SH6 between Cromwell and Luggate, and the intersection of Frankton and Perkins Roads in Queenstown.

On 13 June, a combination of high tide and a swollen river from heavy rain caused a loss of land for properties at Tongapōrutu (north of New Plymouth). The retaining wall of one property collapsed into the river, exacerbating the loss of land. Several North Island roads were closed due to flooding or slips, including SH5 near Rotorua, SH43 between Stratford and Taumarunui, SH1 in Marton, SH56 near Opiki, the Waihenga Bridge between Featherston and Martinborough, and Paekākāriki Hill Road (Wellington). Another bout of heavy rain caused surface flooding in parts of Porirua and Tītahi Bay, and flooding forced the closure of Pāremata School.

The highest 1-day rainfall was 131 mm, recorded at Arthur's Pass on 1 June.

### Record or near-record June extreme 1-day rainfall totals were recorded at:

Location	Extreme 1-day rainfall (mm)	Date of extreme rainfall	Year records began	Comments
South West Cape	41	11th	1991	Highest
Mt Ruapehu (Chateau)	68	1st	2000	3rd-highest
Taumarunui	56	1st	1913	4th-highest
Hanmer Forest	74	1st	1905	4th-highest
Tara Hills	32	13th	1949	4th-highest

### Wind

On 10 June, the Auckland Harbour Bridge was reduced to four open lanes due to strong wind gusts.

On 13 June, strong winds and high seas resulted in damaging waves along the West Coast, and inundation of coastal land by sea surges. The residents of Ngakawau, Granity, Hector and Mokihinui (north of Westport) were advised to evacuate due to large swells in the area. In Greymouth, Domett Esplanade was closed due to debris washed ashore by large waves. Farther north, swells of up to 6 metres occurred about the Kāpiti Coast, with at least one property having a concrete fence, pavers and a wooden gate torn away by the large waves. The Plimmerton Fire Brigade on Sunset Parade reported large pieces of wood and rocks had been deposited over the road from sea surges. Waves were regularly crashing over Marine Drive (Eastern Bays, Wellington), however the road remained open. Foxton Beach also suffered flooding and debris issues because of high seas. The Kāpiti Coast District

Council closed Reikorangi Road (southeast of Waikanae) due to the risk of falling trees, which left around 400 residents of the Reikorangi community isolated. Approximately 200 customers in the area were without power due to a downed tree damaging power lines. In Taranaki, power outages at around 1,000 properties were caused due to downed trees taking out power lines. By early evening, 270 properties in Waititi, Urenui, Tarata, New Plymouth and Waverley remained without power.

The highest wind gust was 165 km/h, observed at Cape Foulwind on 13 June.

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

Location	Extreme wind gust (km/h)	Date of extreme gust	Year records began	Comments
Martinborough	115	13th	2001	Highest
Palmerston North	95	13th	1991	Highest
Upper Hutt (Trentham)	93	13th	1999	Highest
Farewell Spit	115	13th	1973	Highest
Reefton	57	7th	1999	Highest
Middlemarch	165	30th	2000	Highest
Dargaville	106	13th	1997	2nd-highest
Taupō	93	13th	1982	2nd-highest
New Plymouth	117	13th	1972	2nd-highest
Baring Head	150	13th	1991	2nd-highest
Mt Ruapehu (Chateau)	117	30th	2000	Equal 2nd-highest
Auckland (Whenuapai)	93	13th	1972	3rd-highest
Westport	111	13th	1973	3rd-highest
South West Cape	159	27th	1991	3rd-highest
Mt Cook (Airport)	122	11th	2000	Equal 3rd-highest
Te Puke	57	13th	1987	4th-highest
Māhia	100	13th	1991	4th-highest
Puysegur Point	137	7th	1986	4th-highest
Brothers Island	139	13th	1997	4th-highest
Hāwera	93	13th	1986	Equal 4th-highest
Whanganui	98	13th	1977	Equal 4th-highest

**Snow and ice**

From 7-14 June, a prolonged period of low pressure over and to the south of the South Island delivered considerable snowfalls to mountainous areas, as well as to lower elevations. The timing was ideal for ski areas, with several opening for the season in mid-June. With that said, the large quantity of snowfall and snowdrifts meant considerable work was required to clear ski area access roads, carparks, and base lodge facilities. Many roads and mountain passes were closed due to snow, some for several consecutive days. Some of the key highlights of this event are listed in chronological order below:

- On 10 June, snowfall occurred down to approximately 500 metres above sea level in parts of the South Island. In Canterbury, SH73 from Springfield to Arthur’s Pass was closed due to snow. Chains were required for vehicles travelling over the Crown Range Road due to snow.

- On 11 June, snow fell to sea level in Stewart Island. The Milford Road was closed, with local contractors reporting half a metre of snow at the Homer Tunnel. The Lindis Pass also closed, and was only reopened on 14 June after several days of regular and relatively heavy snowfall.
- On 13 June, snow settled in several inland towns including Glenorchy, Wānaka, Cromwell, Omarama, Twizel and Lake Tekapo. In Wānaka, two schools were closed due to snow. All major mountain passes in the South Road were closed due to snow including SH6 from Haast to Makarora, SH7 from the Hanmer turnoff to Springs Junction, SH8 between Tekapo and Fairlie (Burkes Pass). The ski area manager of Coronet Peak (Queenstown) said the field faced unprecedented issues with avalanches over the skifield and access road. Contractors were required to remove fallen trees near Arthurs Point (Queenstown) and Diamond Lake (Glenorchy) as a result of the weight of snow on branches.

On 14 June, the Queenstown Lakes District Council stated that the Crown Range Road (between Queenstown and Wānaka) would remain closed between Eastburn Gates and Cardrona until an avalanche assessment had been completed for the summit.

### **Lightning, hail, and tornadoes**

June was a particularly stormy month for parts of New Zealand. Over 23,000 lightning strikes were recorded over the land or just offshore throughout the month, and several severe thunderstorms struck the greater Wellington Region, leading to hail and a series of powerful convective wind events.

On 1 June, squally thunderstorms struck the Kāpiti Coast in association with the passage of a cold front. Small tornadoes were reported in Waikanae and Otaihangā, causing damage to property including roofs and fences, and bringing down mature trees.

On 9 June, a possible tornado was reported in Waikanae, with two Norfolk Pine tree trunks smashing through the roof of a warehouse on Omaha Street. Further damage was reported on nearby Kapanui Road, with downed trees and fences there. A severe thunderstorm in Wellington caused power outages at Wellington Hospital, Parliament, the CDB, and Hutt Valley. Farther north, a water spout was seen off the coast of Waiiti (north of New Plymouth).

On 12 June, lightning struck a power pylon on Horokiwi Road in Newlands (Wellington), causing a power outage to 4,000 customers in Newlands and Johnsonville. A funnel cloud was sighted off the coast of Waikanae in the afternoon, while two possible tornadoes caused damage to properties and infrastructure in Waikanae in the evening hours. In New Plymouth, large hailstones of around 2.5 cm were reported, while small hail of around 1 cm were reported in Wellington's CBD.

On 13 June, a funnel cloud was reported over Paraparaumu Beach, and a possible small tornado in Ngakawau (West Coast) lifted a garage off its foundations. Farther north, hail was reported in Hāwera during the passage of a thunderstorm.

### **Cloud, fog, and stratospheric phenomena**

Throughout the month of June, and for many weeks prior, numerous people sent messages to NIWA enquiring about vibrant colourful hues in the sky just before sunrise and just after sunset.

Measurements from NIWA Lauder (Central Otago) confirmed unusual increases in aerosols in the stratosphere, about 20-25 km above New Zealand. These aerosols originated from the Hunga Tonga-

Hunga Ha'apai volcanic eruption in January 2022, and were thought to be the cause of the colourful skies (Figure 1).



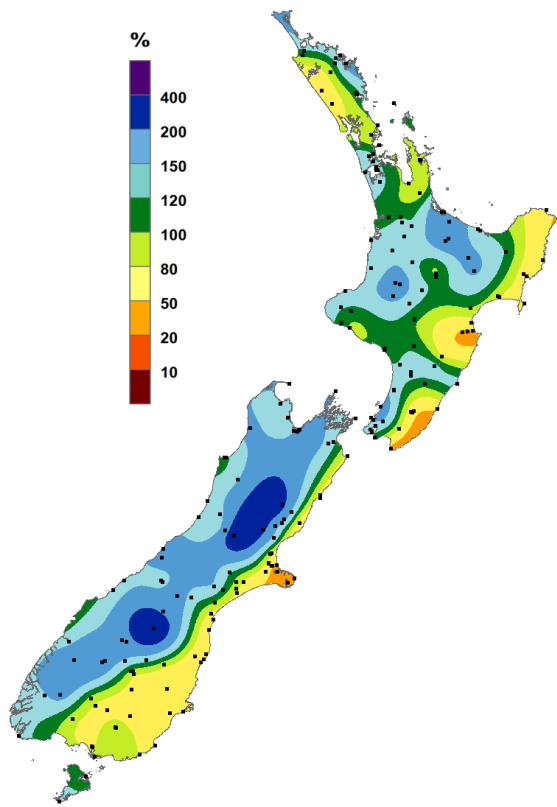
**Figure 1.** Pre-sunrise, looking northeast from Hataitai (Wellington) on 27 June 2022, showing the colourful hues resulting from elevated levels of aerosols in the stratosphere. Matariki also features towards the top-left of the picture. Credit: Lana Young – NIWA.

On 7 June, morning fog occurred in Auckland and Hamilton, with nearly 60 flights at Auckland Airport cancelled or delayed.

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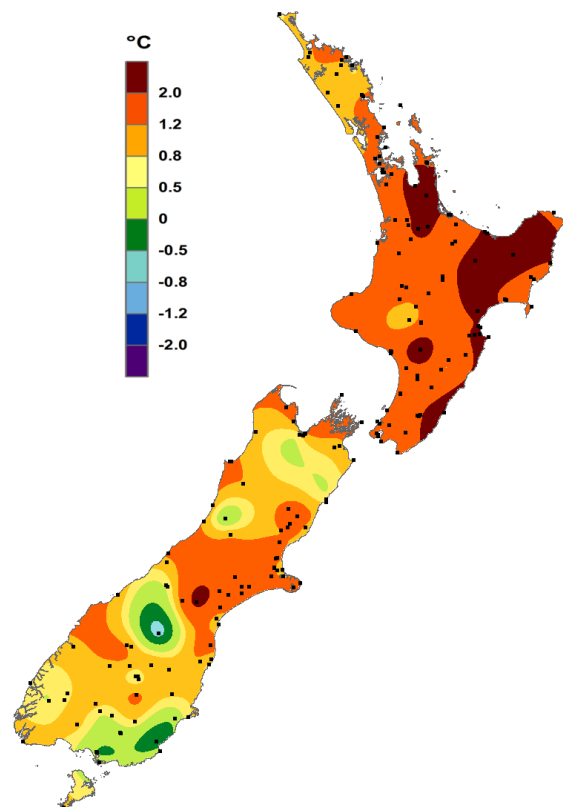
**For further information, please contact:**

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**June rainfall**

Expressed as a percentage of the 1981-2010 normal.



**June temperature**

Expressed as a departure from the 1981-2010 average in degrees Celsius.

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