



Climate Summary for Winter 2008

Winter 2008: Very stormy and wet with floods and snow to low levels.

- **Rainfall:** Well above normal for north and west of North Island and eastern South Island
- **Temperature:** Above average in the north and west, below average in coastal Otago
- **Sunshine:** Above normal for much of the North Island, Fiordland and Southland

Winter 2008 was very wet and stormy in many areas, with frequent extremes. Significant flood-producing rainfall events occurred in Northland, Coromandel, and the Bay of Plenty, and twice in Marlborough. Wanganui, Manawatu, Marlborough, and parts of the central Plateau and Wellington had their wettest winters on record. Damaging windstorms occurred in the north of the North Island and August snow storms fell to unusually low levels in some places. In contrast, winter was comparatively benign in South Westland and Fiordland.

Winter rainfall was over 200 percent (double) of normal in Marlborough and Canterbury and about 150 percent (one and a half times) normal in Auckland, Waikato, Bay of Plenty, Taranaki, Manawatu, Wellington, northern parts of the Southern Alps, and coastal Otago. Not only were the rainfall totals far above normal for these locations, the number of days with rain was also much higher than average, particularly during July (23 days of rain in Kaitaia and New Plymouth, 22 in Auckland and Pukekohe, and 20 in Wellington). Gisborne, Hawkes Bay and Westland received about normal rainfall for winter, while parts of Fiordland and central Otago received about 75 percent (three quarters) of normal rainfall.

Winter overall was slightly warmer than average in parts of northern New Zealand, central Otago and Fiordland, and below average in eastern Otago and the Wairarapa. The national average temperature of 8.5 °C was 0.2 °C above average for winter. June saw a mild start to winter with much warmer than average conditions in many places especially inland South Canterbury and Otago, with temperatures 1.5 to 2°C above average. Average daily maximum temperatures during June were between 2 and 3 °C above average in these same areas. July was also generally warmer than average overall, and only slightly cooler than June, despite a cold spell which saw frosts as far north as Auckland and -9.1°C in Waiouru (a record low July minimum temperature for this location) in the second week of the month. August temperatures were near average in the North Island but below average in the South Island. The three days from the 9th to the 11th were particularly cold for many locations, with minimum temperatures as low as -5.0°C recorded at Dunedin Airport, -4.0°C at Martinborough and 1.5°C at Kaitaia (all August records). The overall winter climate pattern was dominated by more depressions ('lows') crossing central New Zealand and often centred to the east, with more frequent south easterly flows over the southern South Island, and westerlies over the North Island.

Major Highlights

- Winter produced several high rainfall/flood-producing events. On 26 July heavy rainfall in Northland and Coromandel (166 mm was recorded in Paeroa, the highest ever 1-day total for July since 1914) caused severe flooding. A few days later on 29 July, heavy rainfall caused more flooding, slips and damage in Thames/Coromandel, Auckland, Nelson and Marlborough, with a North Shore home completely destroyed by a slip and another 14 homes at risk.
- More severe flooding occurred on 26 August, when 126 mm of rain fell in the 24 hours to 9am on the 26th at Kaikoura (the second highest 1-day August rainfall for this location since 1898) resulting in several landslides, damage and death of many livestock.
- The highest temperature during winter 2008 was 23.1°C recorded at Waipara West on the 15th of June. This was only 0.9°C below the record South Island temperature for June of 24.0°C recorded at Kaikoura and Temuka on 2 June 1976.
- The lowest temperature during winter was recorded at Arthurs Pass on the 20th of August, where the minimum temperature was -9.5°C. In July, there were freezing temperatures across the country on the 9th, with negative numbers recorded from Auckland (-1°C) to Queenstown (-4°C). The unusual sight of frost in Auckland was seen for two days in a row on the 8th and 9th.
- Windstorms struck Northland and Auckland on 26 July bringing down powerlines and trees, leaving 53,000 homes without power in the Auckland region.
- There were two major snowfall events in winter. The first occurred on 15 August bringing snow to unusually low levels in the north west of the South Island. Three days later on 18 August, snow fell to very low levels in the North Island, with over 1 m of snow at Ruapehu village.
- Of the five main centres, Auckland was the warmest, Wellington the wettest and sunniest, and Dunedin was the driest. Winter temperatures were near or slightly above average at all five locations. Rainfall was well above normal in Auckland and Christchurch, above normal in Hamilton and Wellington, and near normal in Dunedin. Winter sunshine was near normal everywhere.

Rainfall

Winter rainfall was over 200 percent (double) of normal in Marlborough and Canterbury and about 150 percent (one and a half times) normal in Auckland, Waikato, Bay of Plenty, Taranaki, Manawatu, Wellington, northern parts of the Southern Alps, and coastal Otago. Gisborne, Hawkes Bay and Westland received about normal rainfall for winter, while parts of Fiordland and central Otago received about 75 percent (three quarters) of normal rainfall.

Temperature

Seasonal mean temperatures were about 0.5 °C above average in western parts of Northland, Taranaki and Fiordland and more than 1.0 °C above average in parts of Central Otago. They were below average by about 0.5°C in the southeast of the North Island and eastern Otago.

Sunshine

Winter sunshine hours were at least 110 percent of normal in Northland, Waikato, Bay of Plenty, Gisborne, Hawkes Bay, Wellington and southwestern South Island. In Taranaki, Manawatu, Westland and coastal Otago totals were lower than usual, being 90 percent of normal.

Full report available from www.niwa.co.nz

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Acknowledgement of NIWA as the source is required.

NOTABLE WEATHER IN NZ - WINTER 2008

Winter 2008 was memorable one, with several periods of stormy weather affecting NZ. These storms with their heavy rain, gales and snow, caused damage and severe disruption to many areas.

JUNE

- 3rd - Cold squally southerly spreading over South Island later in the day, with snow above about 800 metres on the high country, and some hail in the south.
- 4th - Fresh snow above about 1000 metres on North Island ranges.
- 5th - -3C minimums in Taupo, Taumaranui, and Queenstown.
- 6th-8th - Active fronts with a very cold outbreak bringing snow to low levels in the South Island. (see details below)
- 9th - Period of westerly winds pushes up maximum temperatures in Canterbury. 20C maximum in Timaru, only two days after city was blanketed by snow.
- 11th - -4C minimums in Twizel and Alexandra.
- 12th - Heavy rain in Fiordland. (137mm recorded at Milford Sound by next day, when it eased)
- 13th - Mild northwesterly flow over NZ, eg 20C maximum in Napier. Heavy rain in Westland.
- 14th - Mild northwesterly flow continuing, with 19C maximums in Kaikoura, Napier, and Hastings. Heavy rain in Fiordland (143mm at Milford Sound) and Westland; welcome rain also spreading across the divide into the southern hydro lakes.
- 15th - Warm spell continues in northern and eastern areas from North Canterbury northwards. 23C maximum at Waipara West. 21C maximums in Blenheim and Hanmer. (warmest June maximum at latter for over 15 years) 20C maximums in Kaikoura, Gisborne, Whangarei, and Kaitaia.
- 16th - A foggy morning in Wellington and in many parts of South Island, including Dunedin, Christchurch, and Blenheim. (disrupting Airport operations) A balmy (record?) 22C maximum in Wanganui, due to a foehn northeasterly. Heavy rain in Coromandel Peninsula, eg 221mm at Pinnacles, and 99mm in Whitianga. (recorded up to 2am 17th)
- 17th - Mild 19C maximums in Kaitaia and Whangarei. Also unseasonably high 17-18C maximums along South Island West Coast.
- 20th - Extensive fog areas in South Island. Christchurch Airport closed in morning, while Timaru only manages to reach 5C under fog. (after -6C minimum)
- 22nd-30th - Long stormy period. (see details below)

JULY

- 1st - Severe frosts in many parts of South Island, eg -6C minimums in Alexandra and at Dunedin Airport. Only 5C maximums in Queenstown, Alexandra, and Milford Sound, as high cloud follows the frost ahead of approaching fronts.

- 2nd - Thunderstorms on the South Island West Coast, with about 7000 lightning strikes recorded. Warm 19C maximum in Kaikoura.
- 3rd - Squally showers and thunderstorms in western areas of both islands. Small tornadoes reported in Inglewood and Auckland. (Glendowie) 20C maximums in Kaitaia and Whangarei, prior to the arrival of a cold front in the afternoon. Evening thunder and hail in parts of Christchurch during a brief southerly change.
- 4th-7th - Very cold, stormy outbreak, including widespread snow. (see details below)
- 9th - Severe frosts in many areas in wake of cold southerly outbreak. -5C minimum in Alexandra; -4C minimums in Hamilton and Taumaranui. A chilly 3C maximum at Manapouri.
- 11th - Some heavy rain in north and west of South Island and Mt Taranaki. (120mm at Mt Cook; 419mm recorded at North Egmont up to 7am next day) Heavy downpour causes surface flooding and slips in and around Nelson. Warm northwesterlies push the temperatures to 22C in Kaikoura (second highest ever for July) and 19C in Darfield and Dunedin.
- 12th - More heavy rain in western areas from central North Island southwards. 21C maximum in Hastings under a northwesterly flow. Gales in some areas, eg 61 knot gust recorded at Mt Kaukau, and 57 knots in Kaikoura.
- 14th - Areas of fog in many North Island areas.
- 16th - Widespread fog in Southland, inland Otago, and Waikato.
- 17th - More fog in inland Southland and Central Otago. Only 4C maximum in Alexandra.
- 19th - Some heavy rain in areas exposed to the north and west of both islands, eg 200mm recorded at Dawson Falls. Warm 20C maximums in Whangarei and Auckland's North Shore, but cold air trapped under the moisture results in snow in parts of the Mackenzie Basin and Central Otago. (chains essential on Lindis Pass)
- 20th - Thunderstorms in many northern and western areas, with localised downpours.
- 22nd - Thunderstorms in northern and western areas. Small tornado causes some damage in South Taranaki.
- 23rd - Cold southeasterlies bring snow to South Island high country. Burst of heavy rain causes surface flooding in Hutt Valley and Kapiti Coast.
- 24th - Severe southerly gales about central NZ. Swells reached as high as 10 metres in Cook Strait, resulting in several ferry crossing being cancelled. Snow continuing to fall on South Island high country, especially Canterbury foothills. (55cm recorded at Mt Hutt)
- 25th - Snow showers to fairly low levels in south and east of South Island, including Christchurch's Port Hills.
- 26th July-3rd August - Storms cause extensive damage to many areas. (see details below)

AUGUST

- 4th - Snow showers above about 300-400 metres in Southland and parts of Otago, and about 500 metres in North Canterbury. Small tornado causes some damage near Levin before dawn.
- 5th - Some early morning thunderstorms about central NZ and Taranaki. (house damaged by lightning in Eltham) Fresh snow on high country of both islands. Waiouru only reaches 5C.
- 8th - Very cold southerlies spreading over South Island, with snow showers to low levels in south and east. Vehicles stranded by snow on Dunedin's Northern Motorway, and highway from Outram to Middlemarch closed.

- 9th - Very cold southerlies bring snow showers to near sea-level in south and east of South Island. (Christchurch receives light dusting in the early morning) Snow also on hills in south of North Island, closing Rimutaka Hill Road. Flurries reported in some higher Wellington hill suburbs, while heavy snow in Tararuas results in high avalanche risk about the higher parts of the range. However, only light snowfalls further north in central North Island, with no roads closed.
- 10th - -7C minimum at St Arnaud.
- 11th - -4C minimums in Timaru, Taupo, and Rotorua. Only 7C maximum in Nelson, as cloud cover (from an approaching low pressure system) follows frost.
- 12th - Some heavy rain in north and west of North Island (150mm at Dawson Falls) and top of South Island. Squally thunderstorms in north of North Island, with large hail reported in Whakatane, and a tornado in Mt Maunganui. Snow to low levels for a time in mid and South Canterbury and Otago, as cold air persists while low moves over. Only 3C maximum in Alexandra.
- 13th-19th - Unsettled period with heavy snow in parts of South Island. (see details below)
- 21st - -4C minimums in Masterton (August record) and Upper Hutt.
- 24th-27th August - Heavy rain causes flooding in northeast of South Island. (see details below)
- 29th - Warm 18C maximums in Murchison and Kawerau.

MAJOR EVENTS

6th-8th June - Active fronts with a very cold outbreak and snow to low levels in the South Island

A series of cold fronts crossed NZ during this period, most notably bringing a very cold southerly outbreak with snow to low levels in the South Island, especially in Canterbury.

During the 6th, a west to northwest flow strengthened over the South Island, with gales in exposed areas. (Gore reported 110kph gusts) These conditions spread over the North Island overnight and into the 7th. Temperatures were unseasonably high that night in eastern areas.

However, this was soon to change as a cold front moved onto the South Island, followed by much colder southwesterlies which brought some snow to low levels in parts of Otago and Southland.

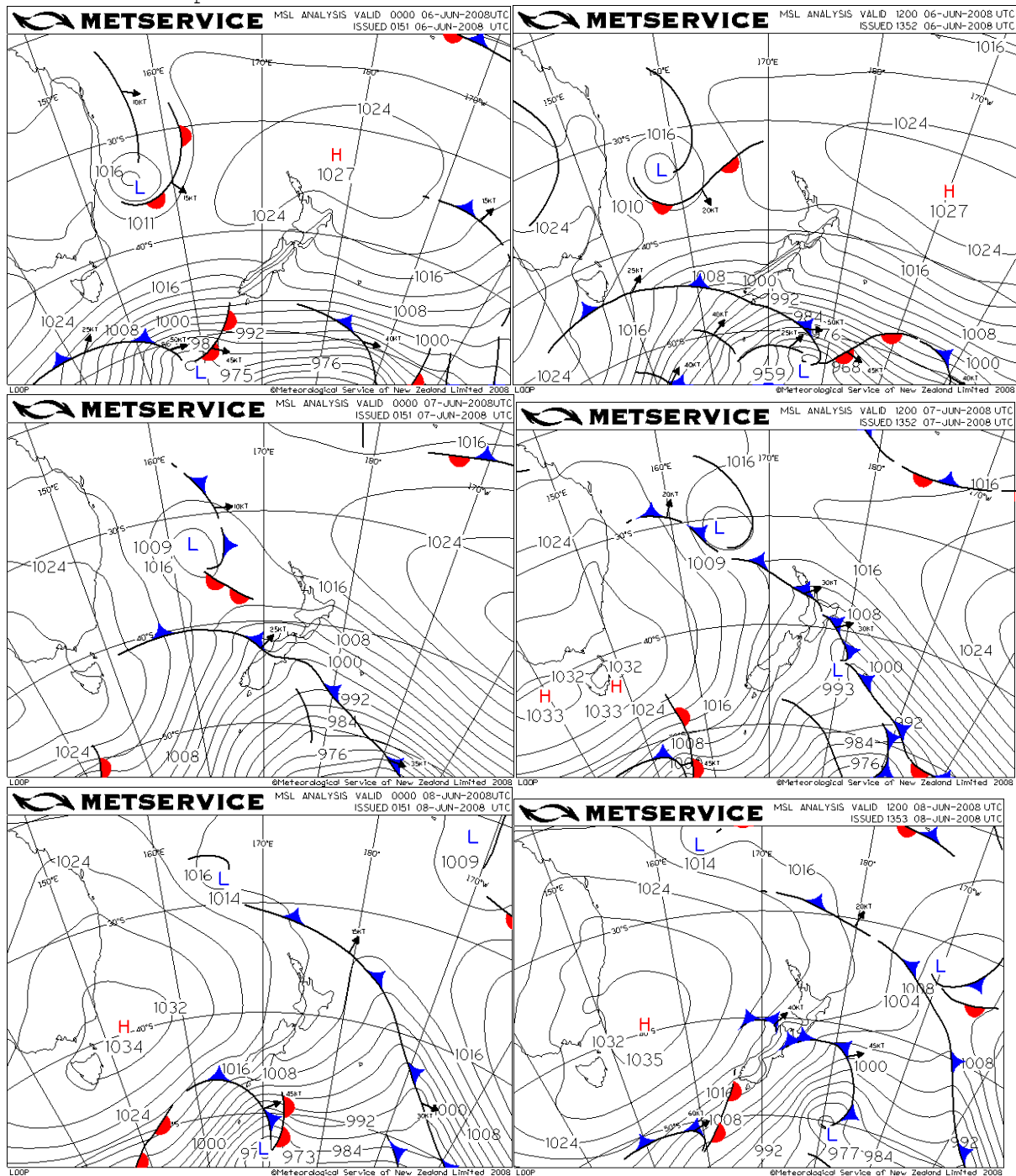
However, in Canterbury, undercutting cold air delivered heavier snowfalls in the wake of the front, with the snow lowering to sea-level. Timaru recorded about 5cm, while snow also settled in many parts of Christchurch from midafternoon, briefly closing the Airport. A number of cars were stuck in the snow at Porters Pass. Civil Defence authorities became concerned for a while, as the situation bore similarities to the weather system which produced the big snowstorm of June 2006. However, this time the weather system wasn't as active and moved away much more quickly, sparing the district any major disruption.

The cold front and southerly change moved onto the North Island during the evening. Wellington was lashed by strong southerlies and driving rain, making for an unpleasant rugby game between the All-blacks and the Irish team. Snow and ice closed the Desert Road.

During the 8th, the flow turned more west to southwest, though it remained cold in many areas, with Waiouru (after overnight snow) only reaching a 3C maximum, and Ashburton and Milford Sound getting to only 6C. Another cold front clipped the south of the South Island later in the day, resulting in

a short blast of severe southwesterly gales about southeastern coasts, including Dunedin.

Mean sea-level analyses for midday NZST 6th June to midnight NZST 8th June in 12 hour steps are shown here.



22nd-30th June - Long stormy period

During this period, the weather over most of NZ was unsettled and stormy, with cold fronts crossing the country, and by the end of the period a deep low had formed to the east.

On the 22nd, a large high (which had given several days of fine, frosty weather to most areas) had moved away to the east, allowing a trough in the Tasman Sea to move closer, preceded by a northerly flow over the country. This flow brought warmer temperatures, including 20C maximums in Kaitaia and Whangarei, plus an unseasonably high 18C in Wellington. However, it

also delivered heavy rain to northern and western parts of the North Island and the north of the South Island.

During the 23rd, the trough crossed NZ, followed by a colder southwesterly flow. Later in the day and into the evening, more fronts moved onto the South Island and these crossed the North Island the next day. By then a very cold southwesterly change was sweeping up the country. This brought snow to low levels in many parts of the South Island (including light falls on the West Coast) and to about 400-500 metres in the central North Island, closing several roads. The change was also accompanied by thunder and hail in many places. Parts of Christchurch were lashed by heavy hail and sleet in late morning, while lightning struck a railway signals line there. In the North Island, west to southwest gales accompanied the thunder and hail.

Usually, following a cold outbreak, the weather becomes more settled, but not this time. Westerlies soon strengthened over the country on the 25th with fronts crossing over NZ through to the 27th in the continuing strong airflow. This meant the weather continued to be unsettled in western areas with squally thunderstorms and hail as the fronts moved across. Some 20,000 lightning strikes were recorded in the Waikato overnight 25th/26th. Temperatures were milder in eastern areas, but snow showers continued on the mountains and high country of both islands.

During the 27th, a complex low pressure system began to form to the east of the South Island, turning the flow southerly there. By the 28th, a deep low had developed to the east of the island, and the southerly delivered heavy rain to Mid and North Canterbury and the Kaikoura Coast in the afternoon and evening, with snow on the high country. (some flooding was reported including Christchurch and 56mm was recorded at a Hurunui station) In the North Island, heavy squally thunderstorms and hail continued to lash the north and west, while heavy snow closed roads in the central high country.

On the 29th, the low moved only slowly away to the east, and extended a trough back towards the North Island, allowing the cold southerly flow to cover the country. Some heavy rain affected central NZ (99mm recorded at Lower Hutt over 24 hours), while southerly gales disrupted ferry services through Cook Strait. Further snow fell on the North Island and northeastern South Island high country.

The southerly flow eased on the the 30th, with a weak ridge moving onto the country and finally giving more settled conditions to most areas by the end of the day.

Mean sea-level analyses for midday NZST 22nd June to midday NZST 30th June in 12 hour steps are shown here.

