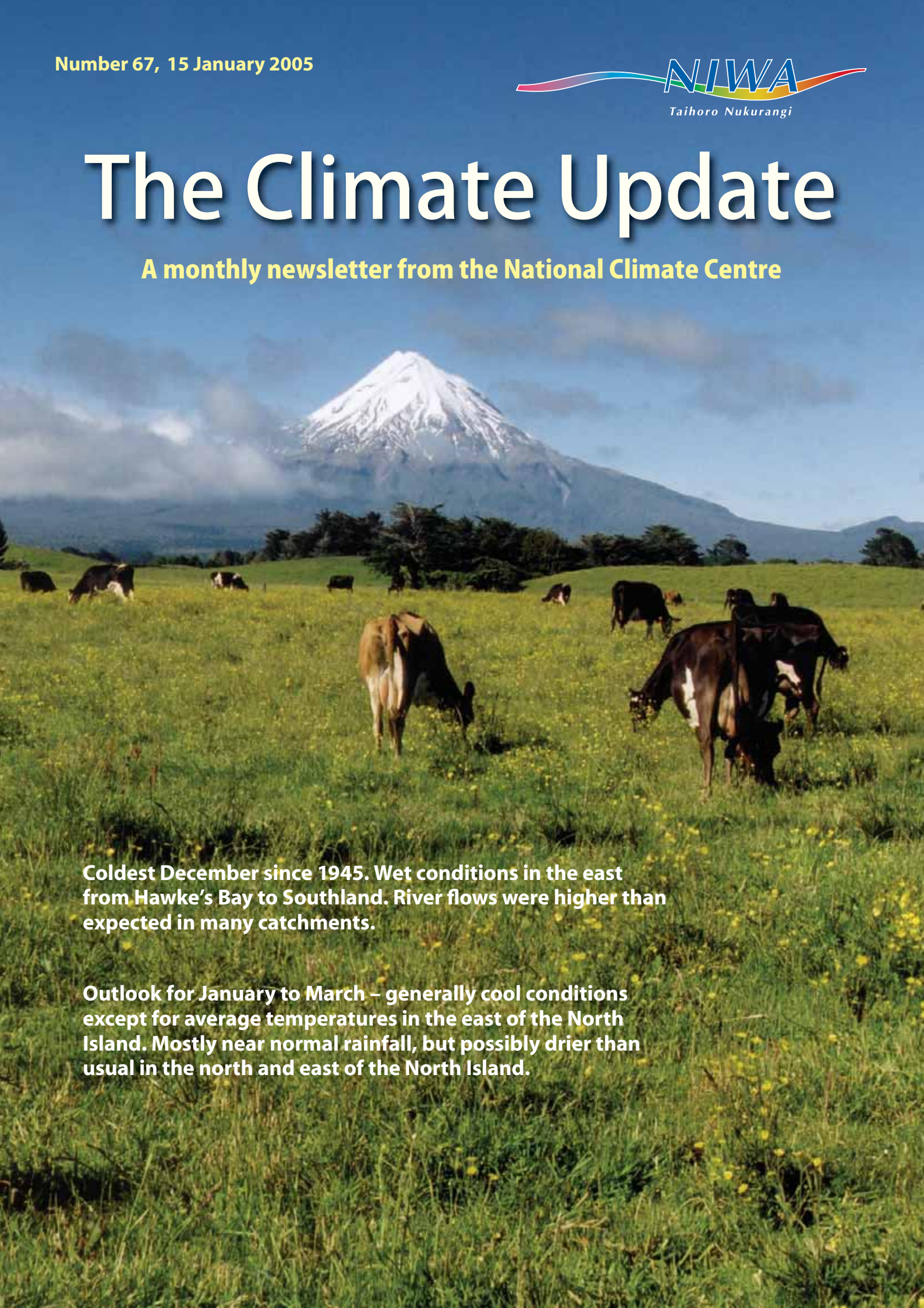
Number 67, 15 January 2005

NIWA
Taihoro Nukurangi

The Climate Update

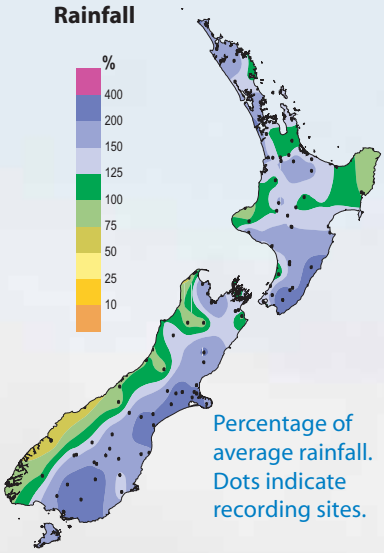
A monthly newsletter from the National Climate Centre



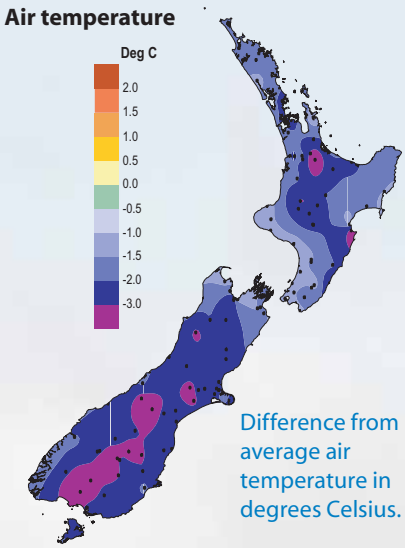
Coldest December since 1945. Wet conditions in the east from Hawke's Bay to Southland. River flows were higher than expected in many catchments.

Outlook for January to March – generally cool conditions except for average temperatures in the east of the North Island. Mostly near normal rainfall, but possibly drier than usual in the north and east of the North Island.

New Zealand climate in December 2004



Percentage of average rainfall. Dots indicate recording sites.



Difference from average air temperature in degrees Celsius.

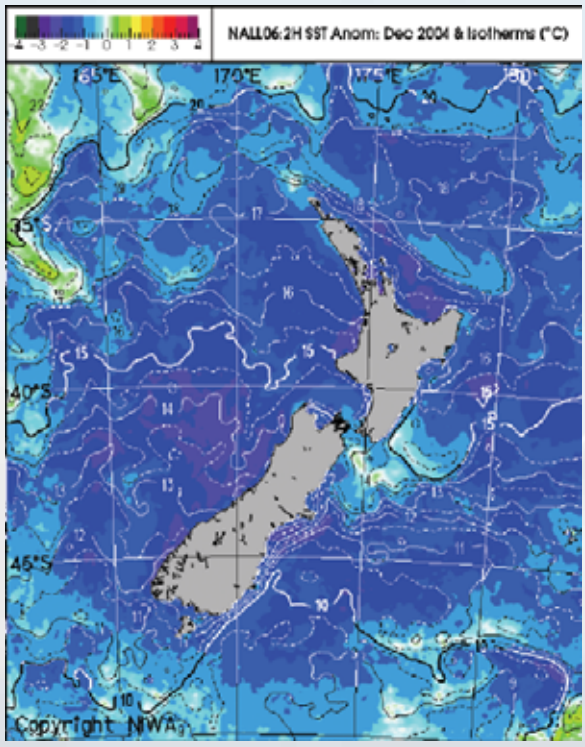
Cold and wet December

New Zealand experienced the coldest December since 1945, with previously unrecorded low temperatures in many places.

Rainfall was well above average in the east from Hawke's Bay to Southland, while conditions in Westland and Fiordland were drier than normal.

For more information on the climate in December, visit the climate summaries page at www.niwa.co.nz/ncc/cs/mclimsum_04_12

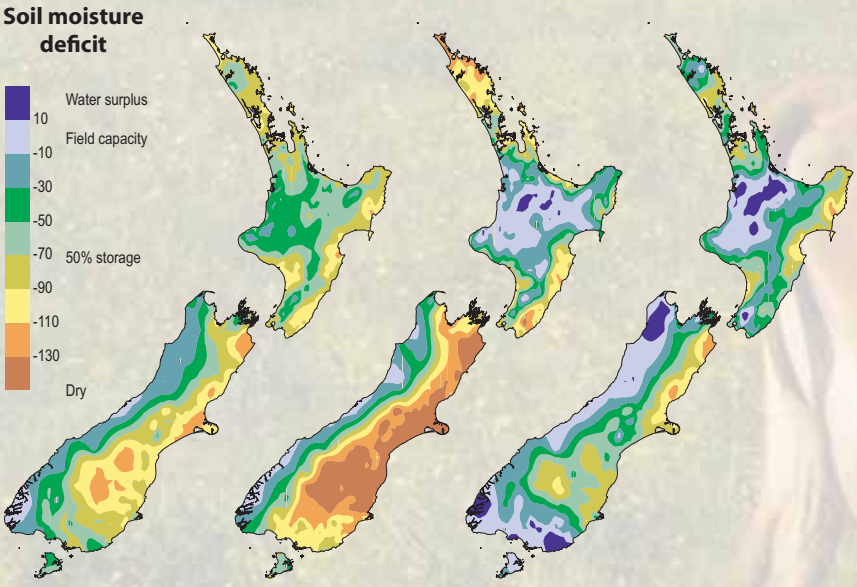
Sea surface temperatures



Difference from normal surface water temperatures in the seas around New Zealand. Temperatures of seas adjacent to New Zealand were low in December, in some areas up to 3 degrees below normal.

High soil moisture levels in most areas

At the end of December, soil moisture levels were generally above average across the country, apart from near average conditions in Gisborne, Marlborough, and Kaikoura. Soils were very wet in the central and western North Island, and in Westland and Southland.



Historical average deficit on 31 December

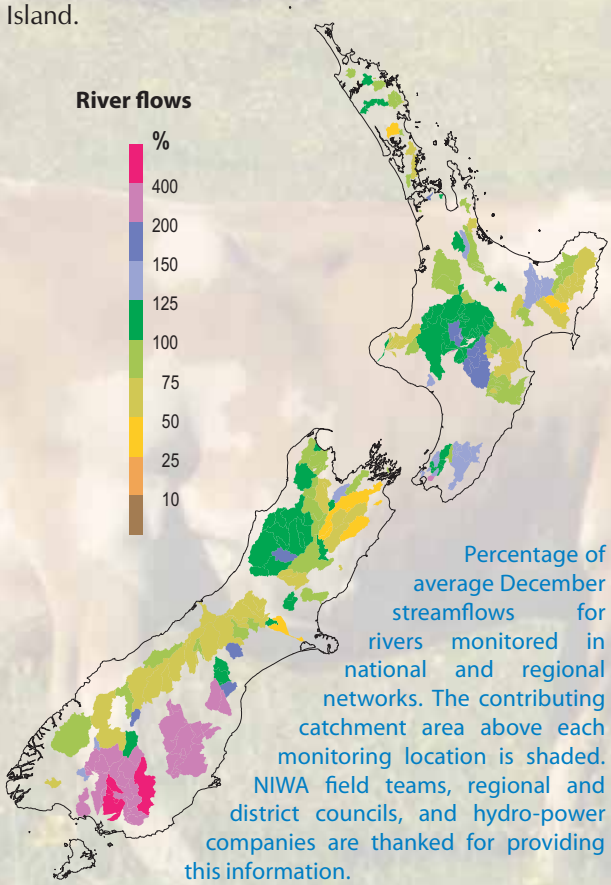
Deficit on 31 December 2003

Deficit on 31 December 2004

Soil moisture deficit in the pasture root zone at the end of December (right) compared with the deficit at the same time last year (centre) and the long-term end of December average (left). The water balance is for an average soil type where the available water capacity is taken to be 150 mm.

Higher flows than expected in eastern regions

Streamflows were well above normal in the south and east of the South Island, below normal in the west, and normal or below normal in the north of the South Island. Normal to above normal flows in the North Island.



Percentage of average December streamflows for rivers monitored in national and regional networks. The contributing catchment area above each monitoring location is shaded. NIWA field teams, regional and district councils, and hydro-power companies are thanked for providing this information.

Checkpoint

October to December 2004

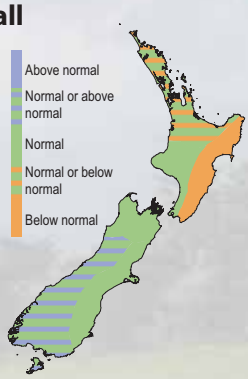
Rainfall was normal or above in the southwest North Island and the east of both Islands, which was higher than predicted. The west of the South Island was drier than forecast. Rainfall was near normal elsewhere.

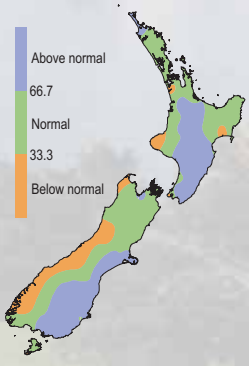
Air temperatures were average (as predicted) in the south west of the North Island, but lower than expected elsewhere in the country.

North Island river flows were normal or above normal, which was generally higher than predicted. Flows were above normal in the southeast of the South Island, generally below predicted levels in the west, and normal or below normal in the north where normal flows had been predicted.

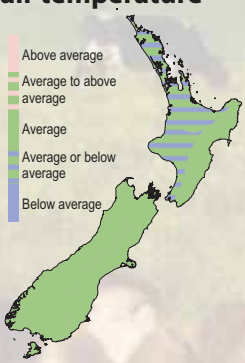
Outlook What we said | **Outcome** What actually happened

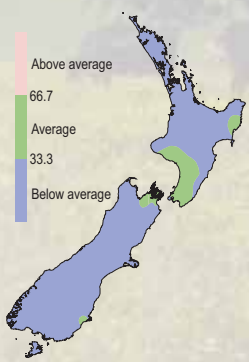
Rainfall



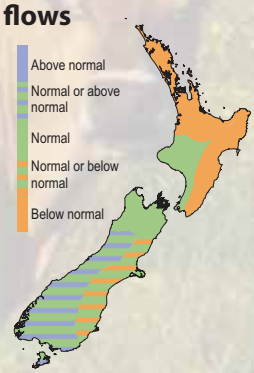


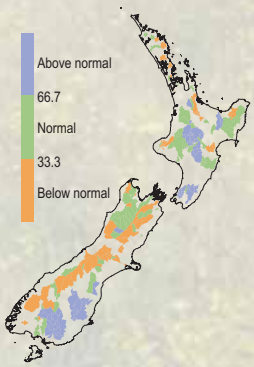
Mean air temperature





River flows





The three outcome maps (right column) give the tercile rankings of the rainfall totals, mean air temperatures, and river flows that eventuated from October to December, in comparison with the forecast conditions (left column).

As an approximate guide, middle tercile rainfalls typically range from 80 to 115% of the historical normal, and middle tercile temperatures range about the average by plus or minus 0.5 °C.

Outlook

January to March 2005

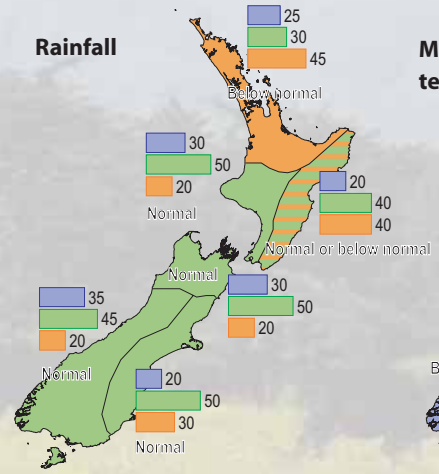
Lower than normal mean sea-level pressures to the south of New Zealand are expected, with stronger than normal west to southwest wind flow over the country. Sea surface temperatures around New Zealand are expected to be below average in January, but tending to average by March.

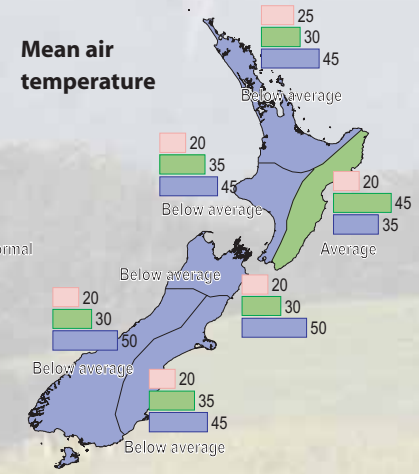
The average air temperature for the next three months is expected to be below the historical average everywhere except in the east of the North Island, where it is expected to be average.

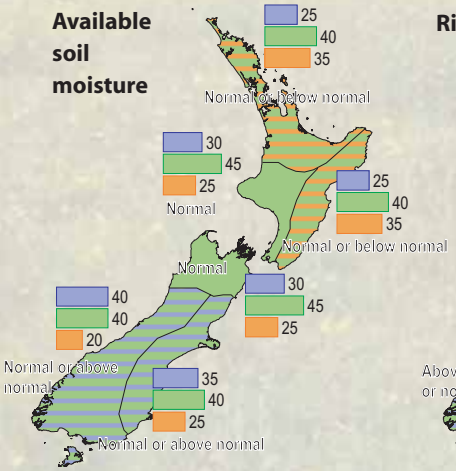
Below normal or normal rainfall is expected in the north and east of the North Island. Rainfalls are expected to be near normal elsewhere.

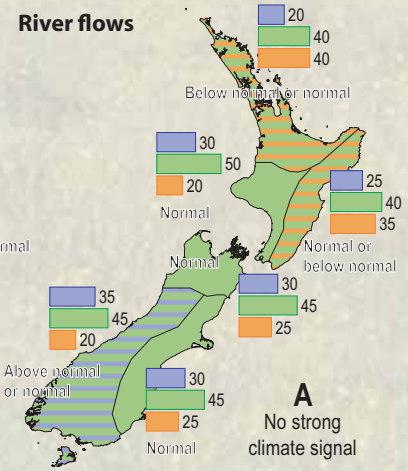
A gradation of soil moisture levels and streamflows is expected across the country, ranging from below normal to normal conditions in the north and east of the North Island to normal or above normal conditions in the west and south of the South Island.

The present weak El Niño is likely to continue through the next three months. The chance of an ex-tropical cyclone affecting New Zealand over the summer is near the long-term average.



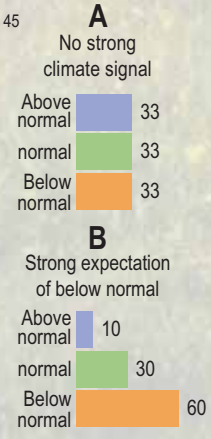






Key to maps (example interpretation)

In example A, climate models give no strong signals about how the climate will evolve, so we assume that there is an equal chance (33%) of the climate occurring in the range of the upper, middle, or lower third (tercile) of all previously observed conditions. In example B there is a relatively strong indication by the models (60% chance of occurrence) that conditions will be below normal, but, given the variable nature of climate, the chance of normal or above-normal conditions is also shown (30% and 10% respectively).



Backgrounder

Bleak December ends a turbulent year

The year 2004 will not be forgotten quickly. Extreme weather conditions, on many occasions unprecedented in the climate record, made it a hazardous year for weather and climate sensitive industries, and may have prompted revised assessments of natural hazard risk. Some examples:

January

Rainfall totalling 74 mm was measured in one day at St Bathans (Otago), with reports of flash flooding in the Wanaka district. Early in the month, record high air temperatures were recorded in many localities.

February

The worst rainfall and floods since the 1920s caused $300 million worth of damage in Wanganui-Manawatu. More than 1000 mm of rain fell in the Tararua Ranges. Thousands of households were without gas, electricity, and water for several days. In a separate event, 30 houses were flooded in Turangi as the Tongariro River overflowed its banks. Strong westerly winds buffeted the North Island throughout the month, with record numbers of days with gale force winds.

March

Dargaville recorded its lowest rainfall since records began in 1943, and Paeroa its second lowest March rainfall since 1914. An unusually early snowfall in the central North Island closed the Desert Road.

April

Violent electrical storms caused power outages on the Whangaparaoa Peninsula. In a separate event, a thick layer of hailstones (up to 20 cm deep in places) whitened the ground in Wanganui, damaging roofs and causing disruptions to traffic.

May

Strong winds damaged houses in Wellington. A number of localities recorded their highest maximum temperatures on record for May.

June

Gales in Hawke's Bay brought down trees and cut power to 11 000 homes.

July

Eastern Bay of Plenty floods were reported to be the worst in living memory. More than 17 000 people faced shortages of drinking water. Hail storms battered Hokitika and New Plymouth. Elsewhere, July was unusually frosty.

August

High rainfall and a windstorm caused many slips in the Hutt Valley. Buses were cancelled, and several schools were closed. Thousands of commuters could not make it to work. Wellington Airport experienced over 20 consecutive hours of strong gale force winds, with damage to buildings, in the worst southerly storm for more than a decade.

September

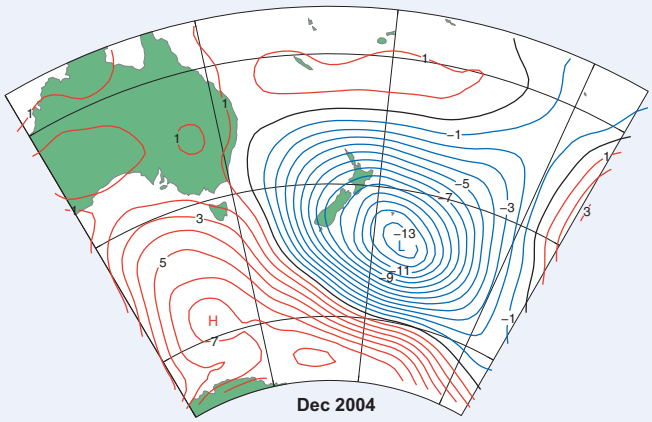
Snowfall in Otago and Southland, and later in Canterbury, caused widespread loss of newborn lambs.

October

Hail storms occurred in Wairarapa and Hawke's Bay, damaging fruit – one orchardist noting it was 'the worst he had seen.'

November

Thick hail blocked guttering and melting water flooded several shops and caused power outages in Oamaru.



Difference from mean sea level pressure (hectopascals) in December – the month was dominated by some of the strongest westerly and southwesterly wind flows on record. Map: *Jim Renwick*

December

Gale force southerlies pounded southern and eastern areas. Snowfall occurred as low as 600 m in the South Island, with a light fall on the Desert Road in the central North Island. Temperatures were 6–8 ºC below normal in many southern and eastern regions during the event. Hailstones ruined fruit in parts of Auckland, Hawke's Bay, Tasman, and Canterbury. Many places recorded record-breaking low mean temperatures.

Summer snow line on Mt Taranaki – fresh snow in December slowed the snow line's normal retreat.

Cover photo: *Wendy St George*

The Climate Update is a monthly newsletter from NIWA's National Climate Centre, and is published by NIWA, Private Bag 14901, Wellington. It is also available on the web. Comments and ideas are welcome. Please contact Alan Porteous, Editor
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Mt Ruapehu in late December – offering the novelty of skiing through the Christmas period.