

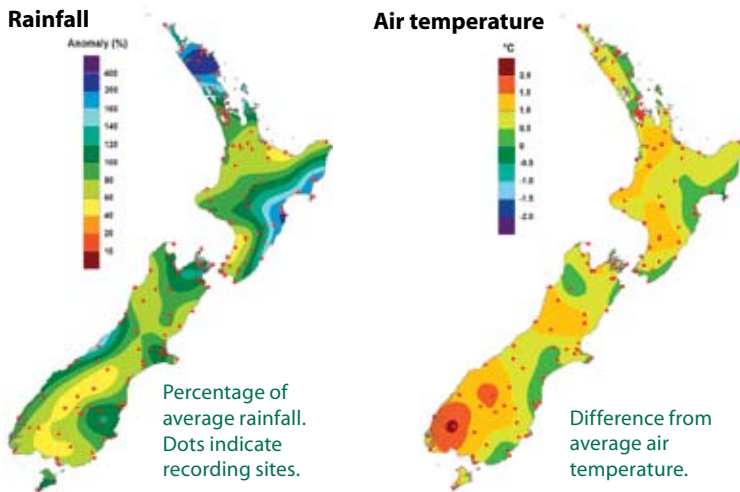
The Climate Update

A monthly newsletter from the National Climate Centre

December climate – below normal rainfall in many areas, but wet in Northland. Warm conditions in most areas, with near normal temperatures in the east. River and stream flows were mostly low, except in Northland.

Outlook for January to March – air temperatures are likely to be above average across New Zealand. Rainfall, soil moisture levels, and stream flows are likely to continue to range from above normal in the northern North Island to normal or below normal in the south of the country.

New Zealand climate in December



Rainfall was less than 60% of normal in Bay of Plenty, and inland South Canterbury. North Taranaki, Manawatu, Buller, the Kaikoura coast, and inland Southland and Otago were also drier than normal. Northland, Coromandel, Gisborne, and Hawke's Bay recorded above normal rainfall.

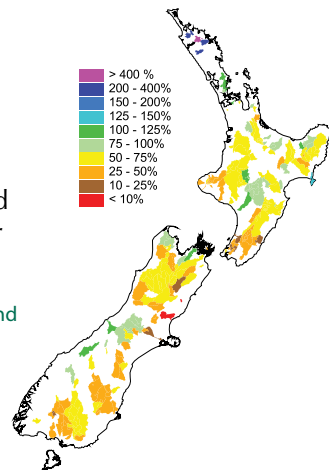
Air temperatures were above average in most northern and western regions, and in Southland and much of Otago, but near average in the east. The national average temperature of 16.1 °C was 0.5 °C above average.

For more information see www.niwascience.co.nz/ncc/cs/mclimsum_07_12

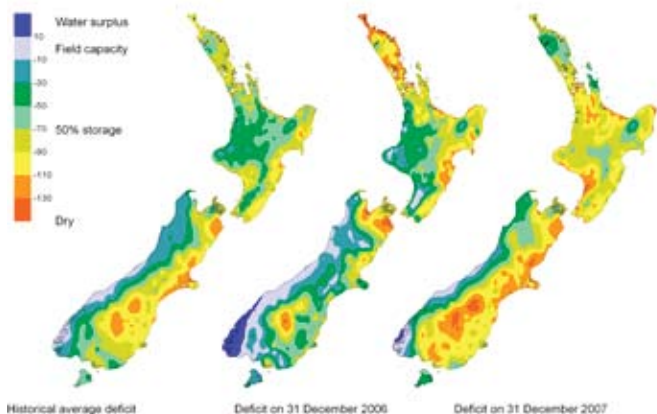
River flows

Stream flows varied across the country. They were high in Northland, near normal in Rangitikei/Manawatu, the North Island east coast and South Island snow-fed rivers, and low in other rivers.

Percentage of average December river and stream flows in monitored catchments. NIWA field teams, regional and district councils, and hydropower companies are thanked for providing data.



Soil moisture deficit



Water balance in the pasture root zone for an average soil type, where the available water capacity is taken to be 150 mm.

Severe soil moisture deficits persisted during December in Marlborough, Canterbury, and North and Central Otago. Moisture deficits in the North Island east coast were relieved by above average December rainfall. Waikato and Southland soils were unusually dry at the end of the month.

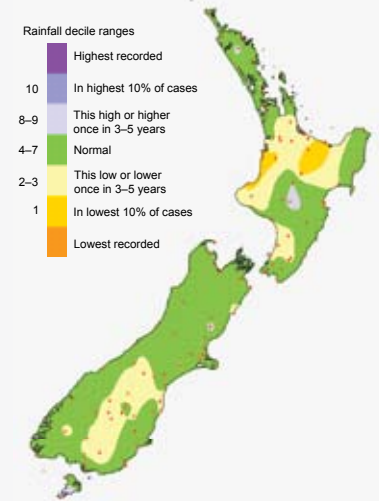
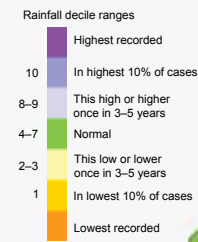
October to December – the climate we predicted and what happened

Rainfall

Predicted: Normal or above normal rainfall in the north and east of the North Island; normal or below normal in the north and east of the South Island; normal elsewhere.

Outcome: Near normal in the north and east of the North Island and much of the South Island. Below normal in Bay of Plenty, Waikato and western North Island, and inland parts of Southland and Otago.

October to December rainfall

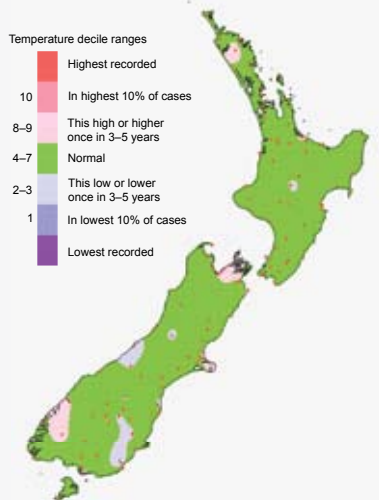
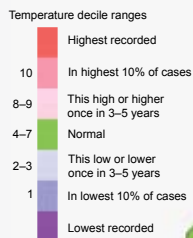


Air temperature

Predicted: Average or above average in all regions.

Outcome: Mostly average; above or below average in a few scattered districts.

October to December temperature

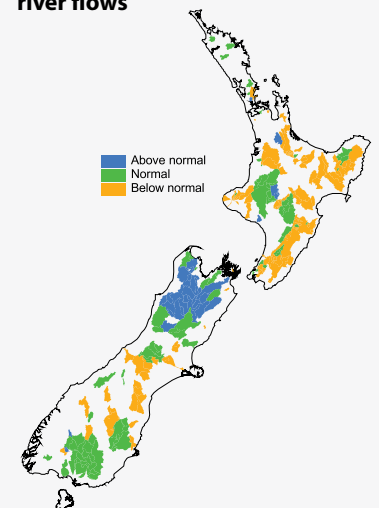
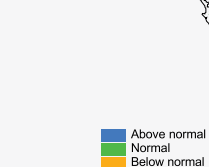


River flows

Predicted: Below normal in the north and east of the South Island, and normal or above normal elsewhere.

Outcome: Stream flows were below normal across much of the North Island, except Northland, above normal in Nelson and Marlborough, and normal to below normal elsewhere.

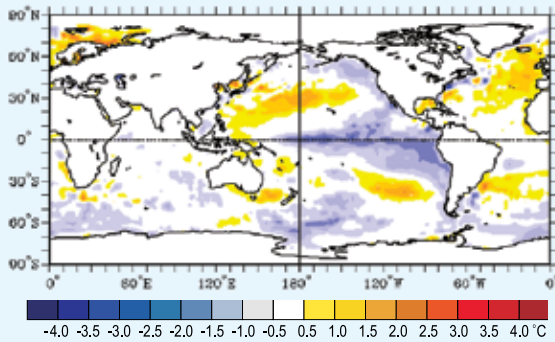
October to December river flows



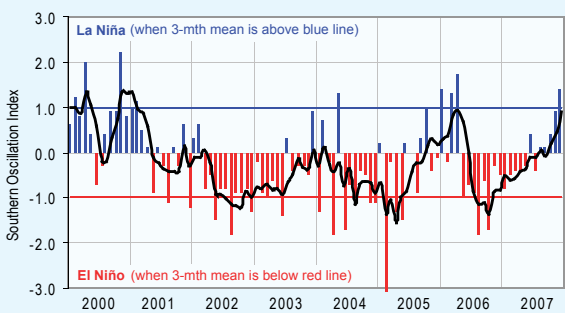
Global setting and climate outlook

La Niña dominates

During December, La Niña conditions strengthened into a moderate to strong event that is likely to persist through autumn. The 'horseshoe' of warm sea surface water (see map) continues in the extra-tropics of both hemispheres. Easterly trade winds were strong and persistent during December over a wide longitude band, including west of the Date Line. The SOI continued its strong movement upwards, being +1.4 for December (+0.9 November), with an October to December average of +0.9.



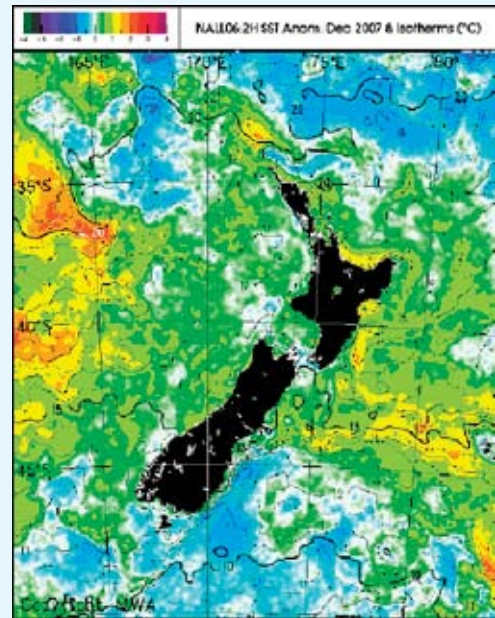
Difference from average global sea surface temperatures for December 2007. Map courtesy of NOAA Climate Diagnostics Centre.



Monthly values of the Southern Oscillation Index (SOI), a measure of the changes in atmospheric pressures across the Pacific, and the three-month mean (black line).
SOI mean values:
December: +1.4
October to December: +0.9

Sea surface temperatures around New Zealand

Sea surface temperature (SST) anomalies in the New Zealand region reversed the trend seen in October and November, with positive anomalies (above average temperatures) developing, consistent with a La Niña event. The December SST anomaly in the New Zealand reference area was +0.3 °C, with an October to December average anomaly of about +0.1 °C. The most persistent positive anomalies are spreading in from the west of the country.



Differences from normal December surface temperatures in the seas around New Zealand.

Outlook for January to March 2008

Late summer average atmospheric sea level pressures are expected to be higher than normal over the South Island, and lower than normal to the north, with more easterly or northeasterly winds than normal across the North Island, and lighter than normal winds across the South Island.

Air temperatures are likely to be above average across the country. Rainfall is expected to be above normal in northern North Island,

below normal in the west, south, and east of the South Island, and near normal elsewhere. Soil moisture levels and stream flows are likely to be above normal in the north of the North Island, and below normal in the southwest of the North Island and in the west, south, and east of the South Island.

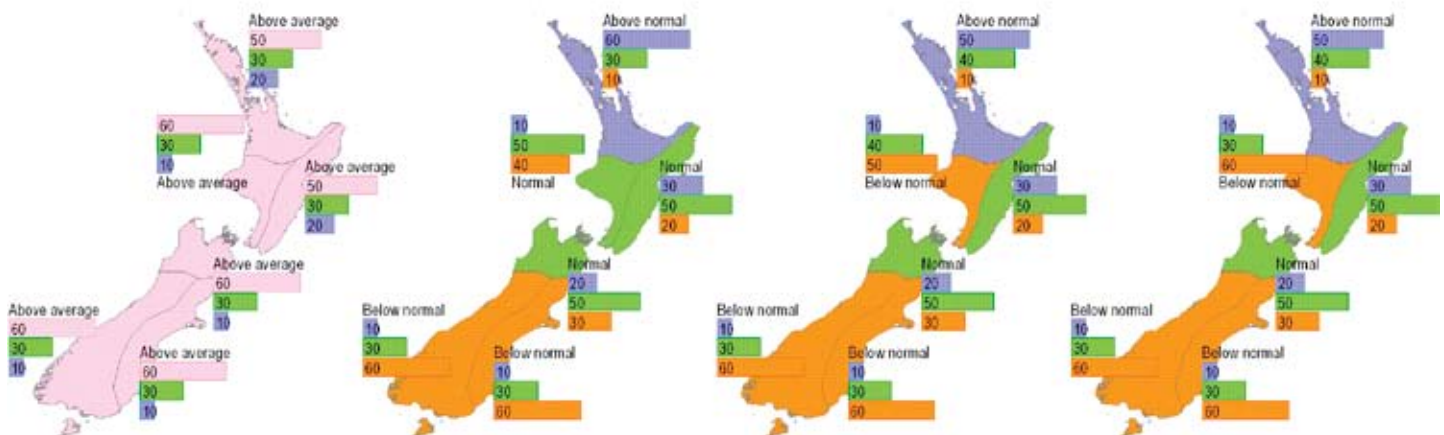
Tropical cyclone risk is normal through to May 2008. Should one approach New Zealand, the regions most at risk are the north and northeast of the North Island.

Mean air temperature

Rainfall

Available soil moisture

River flows



How to interpret these maps

In the example here the climate models suggest that below normal conditions are likely (50% chance), but, given the variable nature of the climate, the chance of normal or above normal conditions is also shown (30% and 20% respectively).

Below normal	20% chance of above normal
20	30% chance of normal
30	50% chance of below normal
50	

Climate summary: the 2007 year

While drier than average in many places, New Zealand's climate year was punctuated by some spectacular weather events.

Generally drier than normal conditions were punctuated by unusually low rainfall in some locations. Record low annual rainfalls were recorded at East Taratahi (Wairarapa) and Tara Hills (north Otago), with less than 70% of normal, and New Plymouth Airport, Palmerston North Airport, Stratford, and Okarito with less than 80% of normal.

Parts of the south and east of the country, and Bay of Plenty and Wellington, recorded unusually sunny years.

The national average temperature for 2007 of 12.7 °C was close to normal. The largest positive temperature anomaly occurred in May at 1.7 °C above normal. The largest negative temperature anomaly occurred in the next month, June, with a national temperature of 0.6 °C below normal.

Other notable climate features in various parts of the country were the disastrous floods in Northland, with contrasting very dry conditions and drought in the east of the North Island. There was an unprecedented swarm of tornadoes in Taranaki, destructive windstorms in Northland and in eastern New Zealand in October, and several spells of hot weather. Extreme weather included two severe hailstorms and seven damaging electrical storms.

The year saw a swing from El Niño to La Niña climate phases of the El Niño–Southern Oscillation. The start of the year was dominated by a weakening El Niño in the equatorial Pacific. From September onwards La Niña conditions developed in the tropical Pacific, with a noticeable increase in the frequency and strength of the westerlies over New Zealand in October and then a significant drop in windiness from November. Moderate to strong La Niña conditions developed by the end of the year. Overall, more anticyclonic conditions than usual occurred over New Zealand.

A full climate summary of the climate for 2007 is available at http://www.niwasience.co.nz/ncc/cs/annual/aclimsum_07

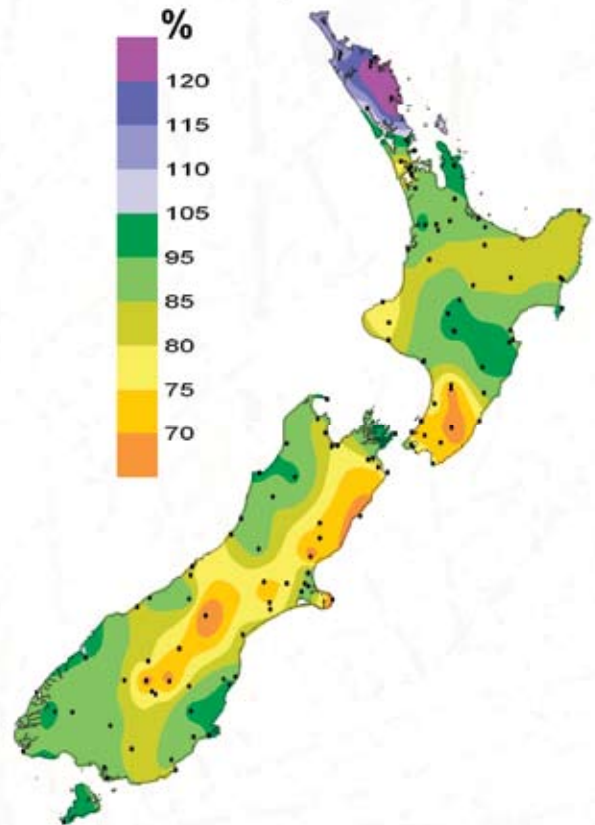


Cabbage tree blossom in early December. Known to Māori as Ti rākau or Ti kōuka, its early flowering is considered to indicate the onset of a long dry summer.

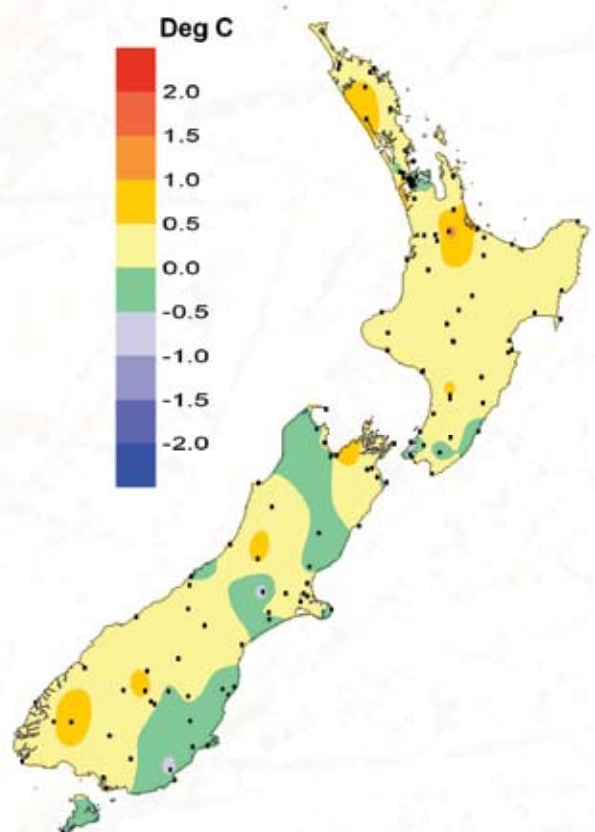
Cover photo: Alan Blacklock

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
Email: ncc@niwa.co.nz
Phone: 0-4-386 0300.
Visit our webpage: www.niwa.co.nz

This newsletter is printed on paper sourced from sustainably managed forests, produced using elemental chlorine-free processes. Vegetable-based inks from renewable sources are used. Packaging is fully biodegradable.



Rainfall anomaly for 1 January to 31 December 2007



Average air temperature anomaly for 1 January to 31 December 2007