

# The Climate Update

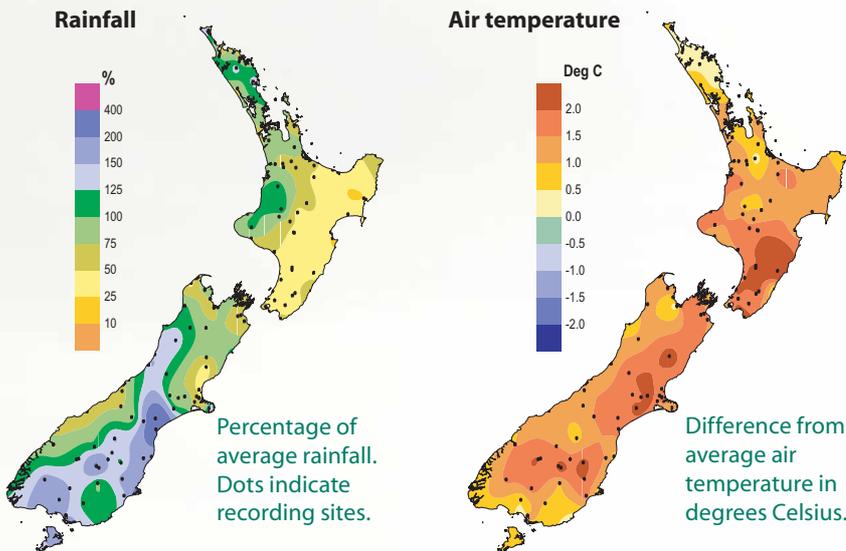
**A monthly newsletter from the National Climate Centre**

**New Zealand's eighth warmest February on record. Below normal rainfall in many areas, but above normal in the southeast of the South Island. Low stream flows in much of the North Island and the northern South Island.**

**Outlook for March to May – air temperatures average or below in the North Island and near average in the South Island; rainfall normal or below normal in the north and east of the North Island and near normal elsewhere.**



# New Zealand climate in February 2005



## February

February 2005 was one of the warmest on record. The first 10 days of February were very hot, with maximum temperatures of 30 °C or more in many locations throughout New Zealand, and temperatures of 35 °C or more in sheltered inland areas of the South Island.

For the month, the national average temperature of 18.6 °C was 1.3 °C above normal, and the 8th highest February temperature since reliable measurements started in the mid 1860s.

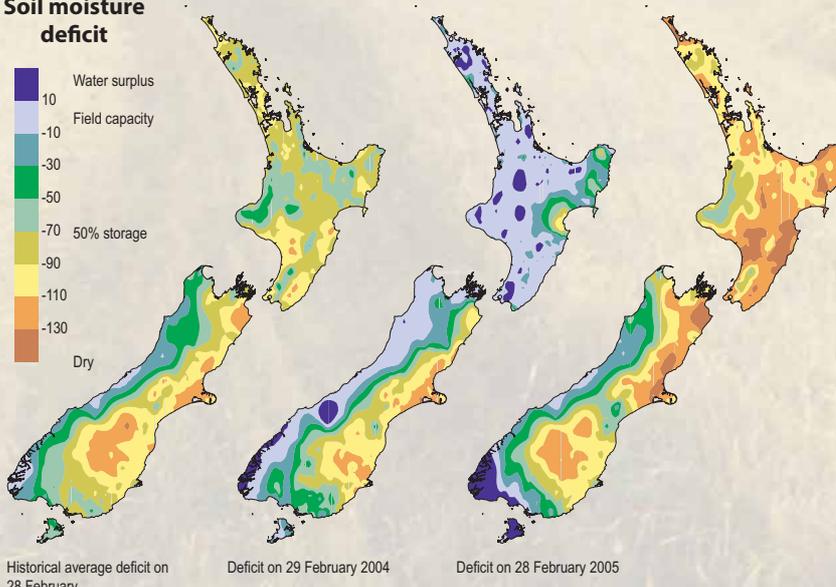
Rainfall was below average over much of the North Island, especially parts of Hawke's Bay, Wairarapa, inland and eastern Bay of Plenty, Gisborne, and Manawatu. The south and southeast of the South Island were wetter than normal.

**For more information on the climate in January, visit the climate summaries page at [www.niwa.co.nz/ncc/cs/mclimsum\\_05\\_02](http://www.niwa.co.nz/ncc/cs/mclimsum_05_02)**

## Dry soils in the north

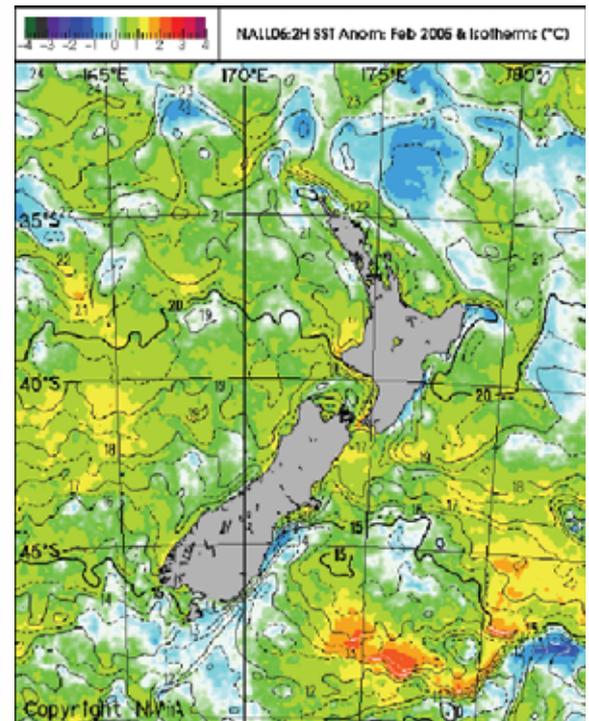
Soil moisture levels were well below normal in much of the North Island at the end of February. The northeast coast of the South Island was also drier than normal. Otago soils had near normal moisture, while Southland moisture levels were higher than normal.

### Soil moisture deficit



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

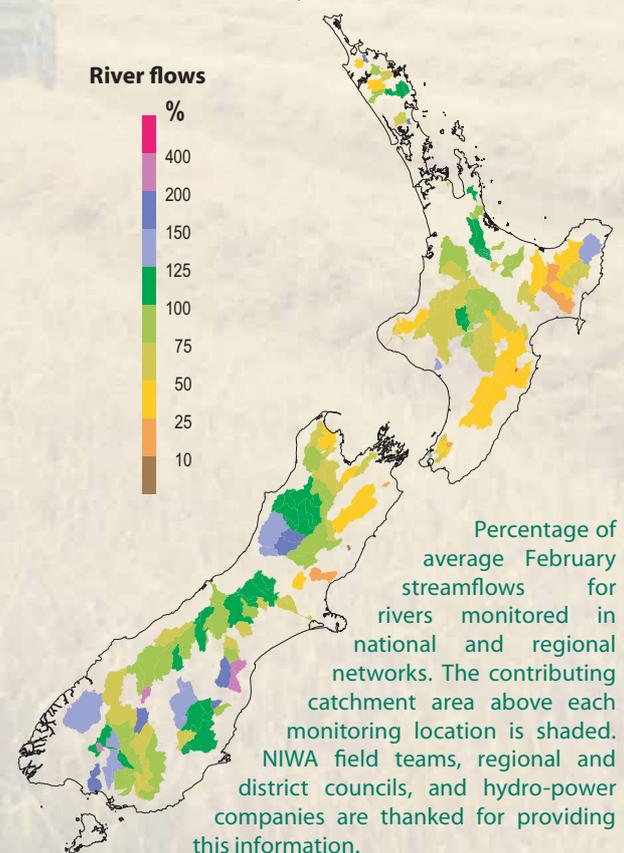
## Sea surface temperatures



Difference from normal surface water temperatures in the seas around New Zealand. The New Zealand average sea surface temperature rose in February to about 0.7 °C above the historical mean, from 0.7 °C below the mean in January and 1.0 °C below in December.

## Below normal flows in the north

Stream flows were below normal in most of the North Island apart from Northland, and in the northern South Island as far as North Canterbury. Elsewhere in Northland, and in the rest of the South Island, stream flows were normal to above normal.



Percentage of average February 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

## December 2004 to February 2005

Rainfall was as forecast in the north and southwest of the North Island, and in north Canterbury, Central Otago, and Southland. It was wetter than predicted elsewhere in the east, and lower than predicted elsewhere in the west.

Air temperatures were lower than forecast in parts of the North Island, but generally average or below average as predicted in the South Island.

Streamflows were normal to above normal in much of the North Island, apart from Hawke's Bay and the east coast where they were below normal. Streamflows were below normal or normal in the north and west of the South Island and well above normal in the east and south.

# Outlook

## March to May 2005

Below average sea-level pressures are expected over the New Zealand and Tasman Sea region, with slightly enhanced southwesterly air flows across the country.

Air temperatures are expected to be average or below average in the North Island and near average in the South Island.

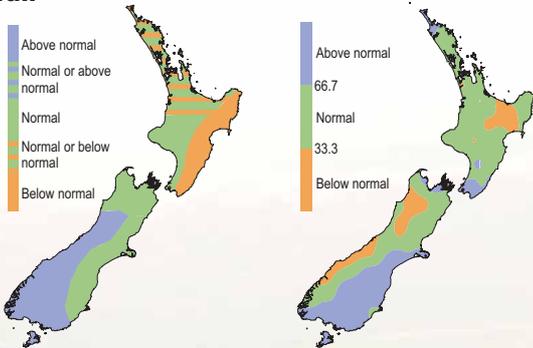
Rainfalls are likely to be normal or below normal in the north and east of the North Island and near normal elsewhere. Normal soil moisture conditions are expected throughout the country apart from normal or below normal in the east of the North Island. Normal streamflows are expected throughout the South Island, with a tendency to normal or below normal in the north and west of the North Island, and to below normal in the east of the North Island.

The tropical Pacific is in a weak El Niño state, but should ease to neutral conditions by May.

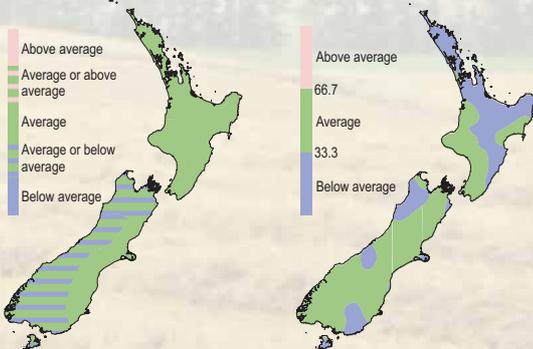
### Outlook What we said

### Outcome What actually happened

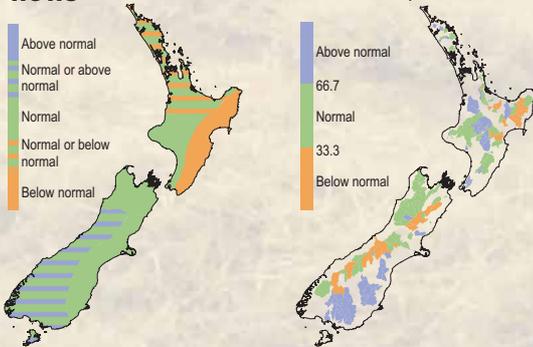
#### Rainfall



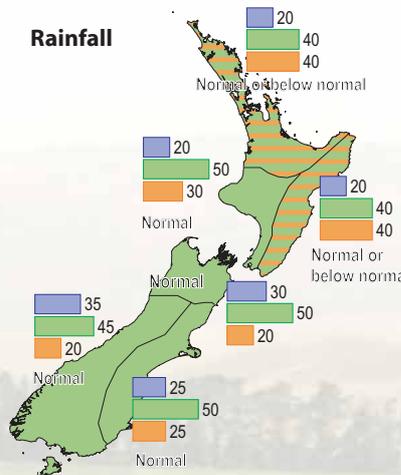
#### Mean air temperature



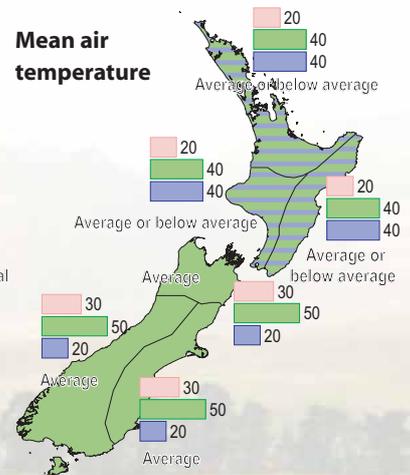
#### River flows



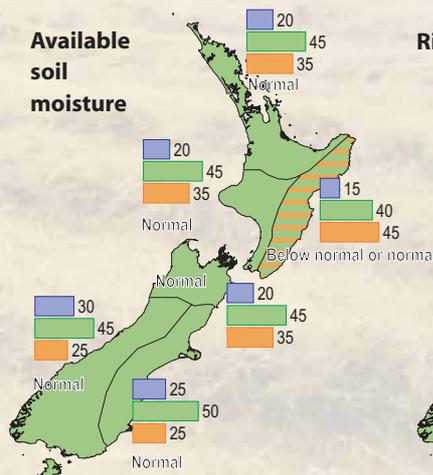
#### Rainfall



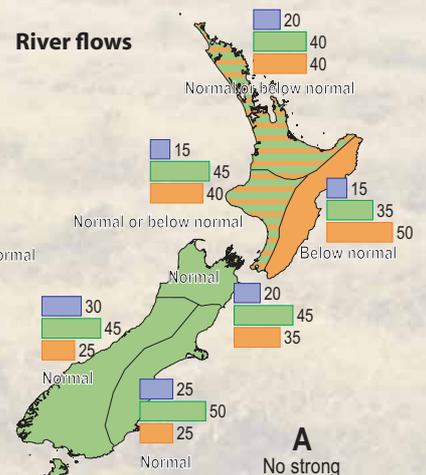
#### Mean air temperature



#### Available soil moisture

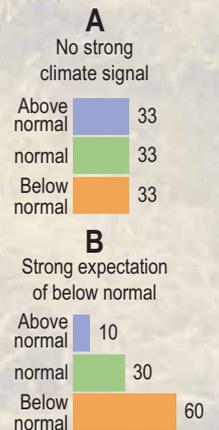


#### River flows



### 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).



The three outcome maps (right column) give the tercile rankings of the rainfall totals, mean air temperatures, and river flows that eventuated from December to February, 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.

# Global setting

## Temporary dip in the Southern Oscillation Index?

The Southern Oscillation Index (SOI), a measure of differences in atmospheric pressures across the Pacific, is a useful guide to the state of the El Niño–Southern Oscillation. However, its underlying ‘message’ is vulnerable to short-term pressure fluctuations.

The tropical Pacific Ocean is currently in a weak El Niño state, but there were rapid developments in aspects of ocean and atmosphere conditions in late February. These developments resulted in large, but probably short-term, changes in a number of the indicators we use to recognise the state of the El Niño–Southern Oscillation (ENSO).

Sea surface temperatures in the equatorial Pacific have continued their downward trend. Temperatures have now returned to normal near South America, although they are still above average nearer the Dateline.

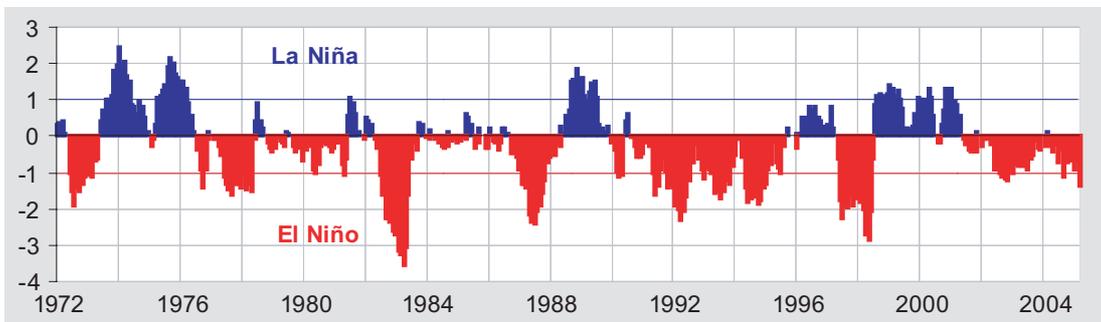
The monthly SOI dropped dramatically from near zero in January to about –3 in February, with the Tahiti monthly mean sea level pressure being the lowest February value on record. The 3 month mean SOI was –1.4 as is shown in the figure below. Westerly winds strengthened in the western equatorial Pacific and there were changes in Pacific rainfall patterns. The South Pacific Convergence Zone, an area of convergence between the low latitude equatorial easterlies and the higher

latitude southeasterly trade winds, moved northeastward and strengthened.

These features are often an indication of a strong El Niño, but in this case cannot be separated from the recent tropical cyclone activity in the southwest Pacific, with four named cyclones passing through the area in February. Cyclones typically generate bursts of westerly winds along the equator, increase rainfall and cloudiness in the South Pacific Convergence Zone, and create lower pressures throughout the region and hence a more negative SOI.

Almost all the available international models that attempt to predict ENSO evolution indicate that the present weak El Niño will ease to a neutral state over the next three months. However, many of these models have not yet incorporated the recent developments during February into their predictions. The westerly winds have generated a subsurface ‘pulse’ of warm water that will reach the eastern boundary in about six weeks. Whether this will cause a resurgence of the El Niño remains to be seen.

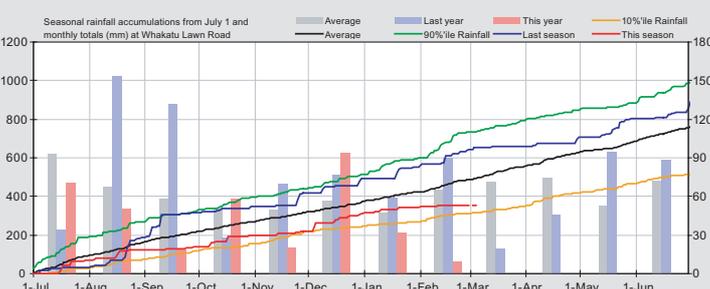
The chance of the opposite phase of ENSO, La Niña, developing is close to zero at present and La Niña conditions are expected to remain very unlikely through much of 2005.



The Southern Oscillation Index (SOI), a measure of the changes in the atmospheric pressures across the Pacific, smoothed over three months. The three month SOI inclusive of February dipped to –1.4, but this low index is likely to be temporary.

## On-line climate graphics

Climate maps and line plots of observations are available by subscription from the NIWA Climate Now website [www.niwa.co.nz/ncc/climatenow](http://www.niwa.co.nz/ncc/climatenow)



Harvesting barley in the Hakataramea Valley. A wetter than normal summer, and high temperatures in February, ensured a better than average crop.

Cover photo: Alan Porteous

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