Number 36 15 June 2002

NIWA
Taihoro Nukurangi

The Climate Update

A monthly summary of New Zealand's climate from the National Climate Centre for Monitoring and Prediction

May 2002: Drier than normal in many areas

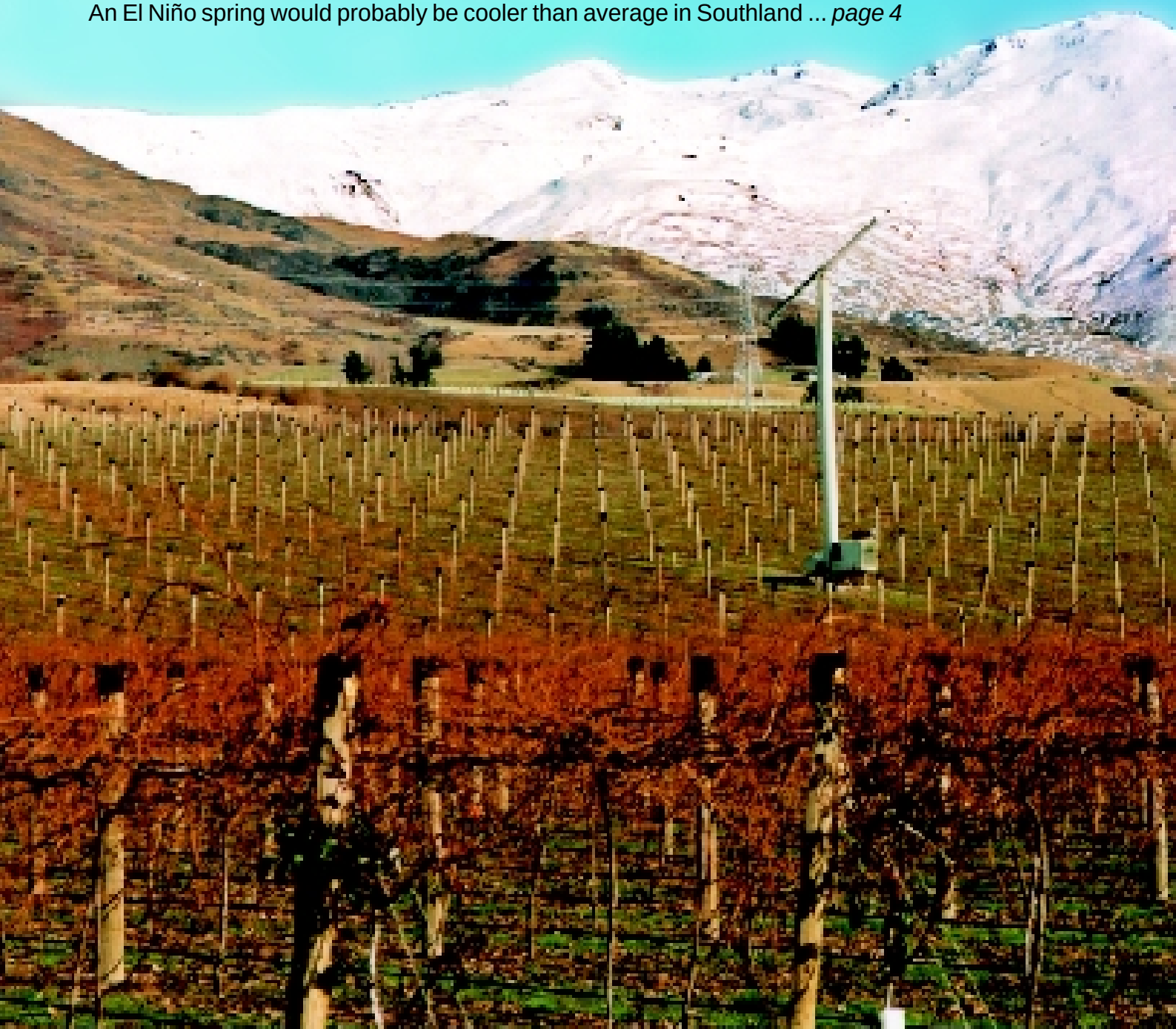
The last month of autumn was drier and warmer than normal ... *page 2*

Winter outlook

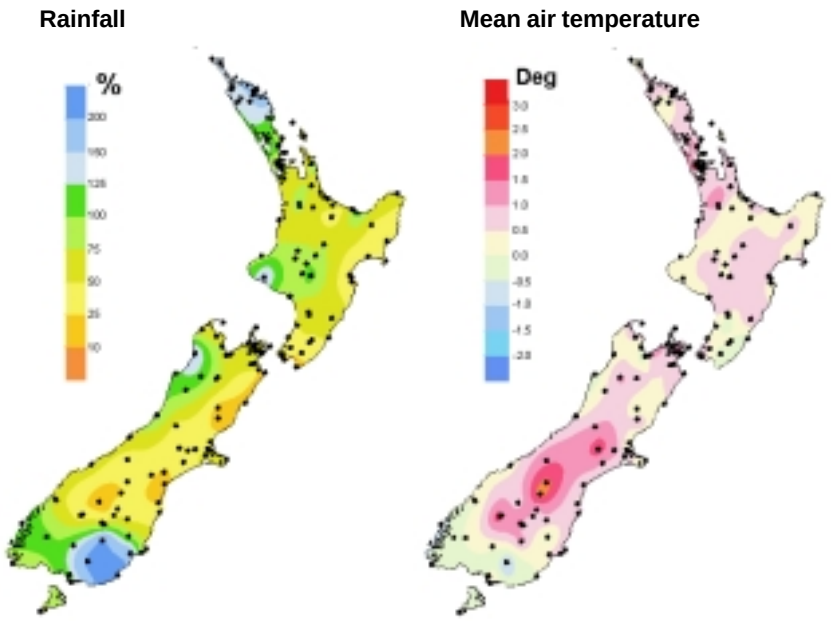
Drier than normal on eastern coasts; winter temperatures warmer than average overall ... *page 3*

Past El Niños: spring temperature at Invercargill

An El Niño spring would probably be cooler than average in Southland ... *page 4*



New Zealand climate in May 2002



Percentage of average rainfall (left) and difference from the average air temperature in degrees Celsius (right). Dots indicate recording sites.

Summer to winter in one month

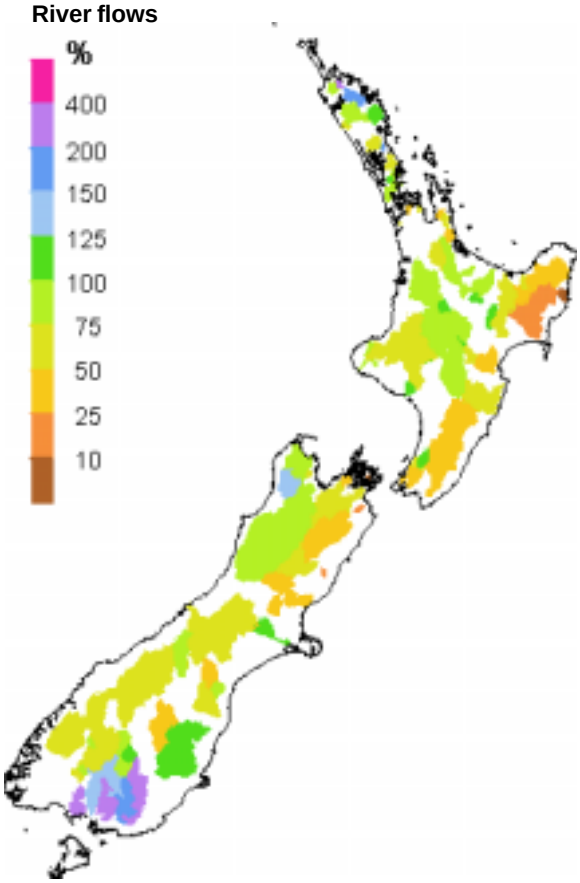
May air temperatures were above average for the first three weeks, even summer-like at times. Then on 23 May a deep depression tracked across the South Island bringing thunderstorms to many western areas. This was followed by wintry southwesterlies which battered coastal Otago and Southland between 25 and 28 May, with freezing conditions and snow to low levels. Despite this, mean temperatures for the month were 1.5 °C or more above the historical average in parts of Central Otago and in many northern North Island areas. Christchurch Botanic Gardens recorded a maximum temperature of 27.2 °C, the highest May reading since records began in 1864.

Dry in the east and wet in the far north and south

Rainfall was well below normal in eastern regions from Gisborne to Marlborough, and in parts of Canterbury, Central Otago, and the Southern Lakes. Timaru Airport recorded 6 mm, its lowest May rainfall since records began in 1949. It was also drier than normal from Manawatu to Wellington, and in Nelson.

Sunny in central and eastern regions

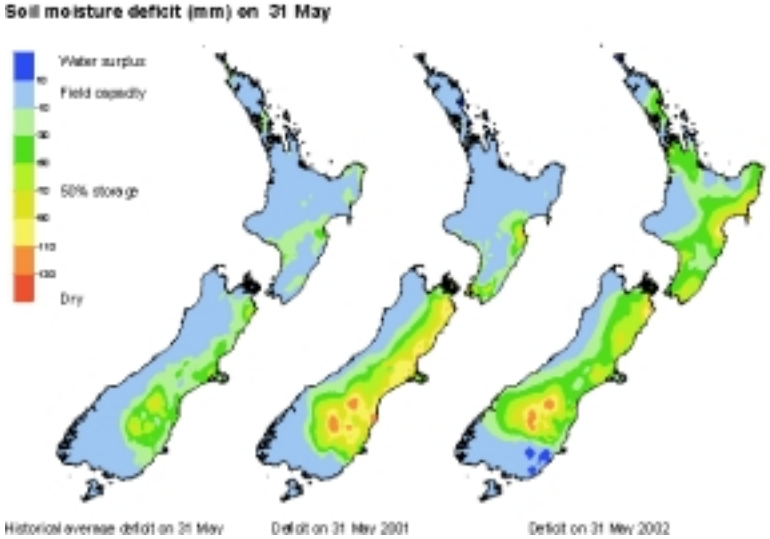
Gisborne and Wellington were sunnier than normal, being sheltered from the southwesterlies. Sunshine hours were lower than average in the upper half of the North Island and in Westland.



Percentage of average May 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.

Mostly below normal streamflows in May

May flows were very high in the far north and at record high levels in coastal Southland. Flows were below normal in most other places, with record lows in Hawkes Bay.



Soil moisture levels rising

Although rainfall during May was lower than normal over much of the country, soil moisture levels in many areas improved during the month. However, the east of both the North and South Islands was still drier than normal by the end of the month, and much of the North Island was drier than at this time last year.

Higher than normal rain in northern Northland and in parts of the southeast of the South Island lifted soil moisture to near saturation at times in the second half of the month.

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

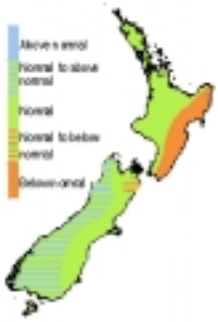
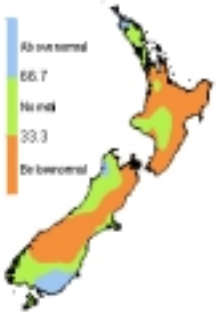
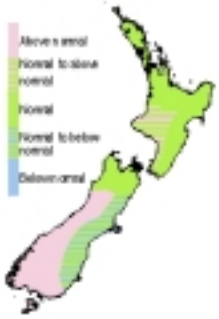
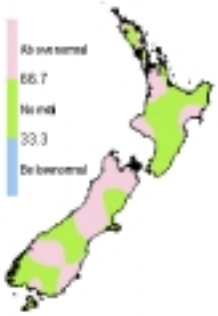
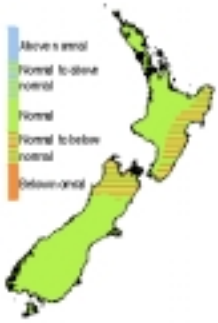
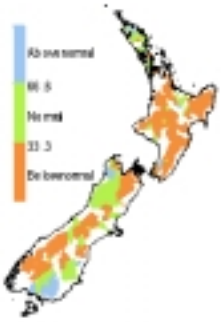
Checkpoint

March to May 2002

Rainfall was below average as forecast in the east of the North Island. Southland and the northwest of the South Island had normal or above normal rain as expected. Rainfall was lower than expected in Waikato and Bay of Plenty, and in central South Island areas, including west Otago and south Westland.

Air temperatures were near normal in many districts, as predicted. However Nelson and Marlborough were warmer than expected, as were parts of Canterbury and east Otago.

River flows The east coast of the South Island had normal flows, as was predicted. Northland and the west and south of the South Island had normal to below normal flows, and the rest of the country had below normal flows.

Outlook What we said	Outcome What actually happened
Rainfall	
	
Air temperature	
	
River flows	
	

The three outcome maps (right column) give the tercile rankings of the rainfall totals, mean temperatures, and river flows that eventuated for March to May 2002. Terciles were obtained by dividing ranked March to May data from the past 30 years into three groups of equal frequency (lower, middle, and upper one-third values) and assigning the data for the present year to the appropriate group.

As an approximate guide, middle tercile rainfalls (33.3 to 66.7%) often range from 80 to 115% of the historical average. Middle tercile air temperatures typically occur in the range of the average plus or minus 0.5 °C.

Note that in the maps above, the upper, middle, and lower tercile ranges are described by the terms *Above normal*, *Normal*, and *Below normal,* respectively.

Outlook

June to August 2002

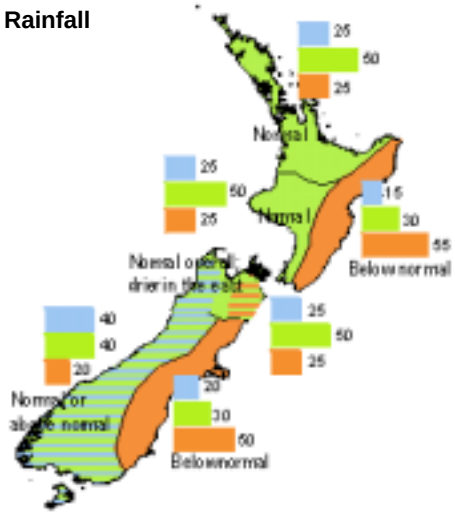
An El Niño event which would influence New Zealand's climate during spring and the 2002–03 summer is looking more likely now than it did a month ago.

For the immediate outlook period, June-August 2002 (winter), New Zealand temperatures are expected to be normal or above normal in all regions.

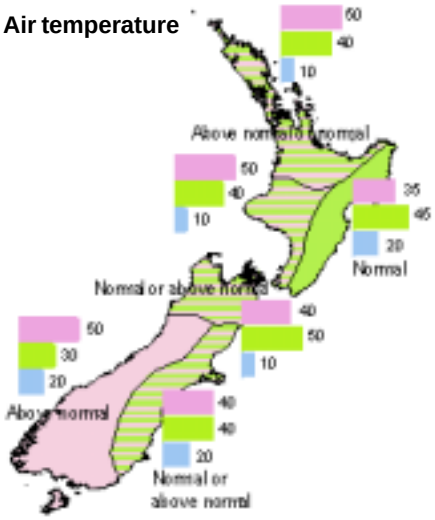
Rainfall is expected to be below average in all eastern regions, and near average elsewhere, except for normal or above normal rain in the west of the South Island.

Normal soil moisture levels and river flows are predicted for all regions of the country, except for the east of both islands where below normal soil moisture levels and river flows are likely .

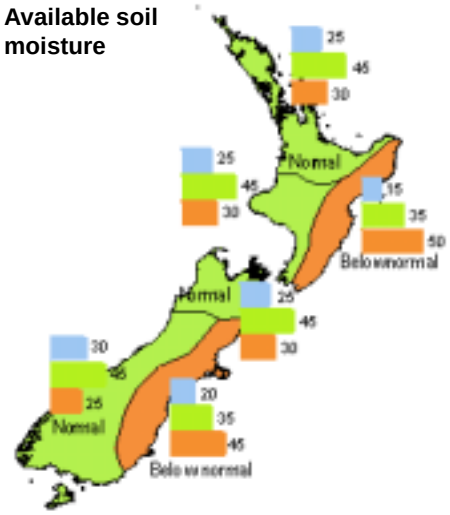
Rainfall



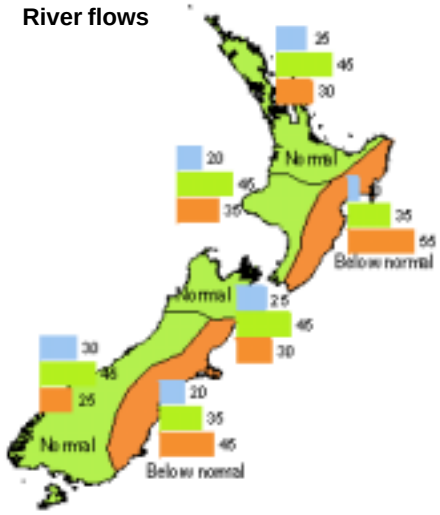
Air temperature



Available soil moisture



River flows



KEY to maps (Example interpretation)

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.

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).

	No strong climate signal	Strong expectation of below normal
Above normal Normal Below normal	A 33 33 33	B 10 30 60

Global setting

El Niño and southern spring temperature

Signs have strengthened over the past month that an El Niño event could affect New Zealand climate by spring. The best indication of how El Niño might affect spring air temperature in a locality can be found in the historial record of previous El Niño spring temperatures. This month we look at an example temperature record, using observations from Invercargill Airport.

El Niño in spring

During El Niños the southern region of New Zealand is typically affected by an increase in southwesterly wind flows. As a result, lower than normal air temperatures (in these southwesterlies) tend to persist over much of New Zealand, and especially the southern districts.

Temperature at Invercargill

The mean air temperature at Invercargill Airport during spring (September to November) is 9.9 °C. Since 1950 the mean temperature has varied from about 1.0 degree below average to 1.1 degree above.

The figure below shows the mean air temperature at Invercargill for each spring since 1950. The data are shown in blue, green, and red to illustrate the temperature departures in each of the lower, middle, and upper terciles. The vertical dashed lines mark the boundaries of the tercile ranges.

El Niño influence

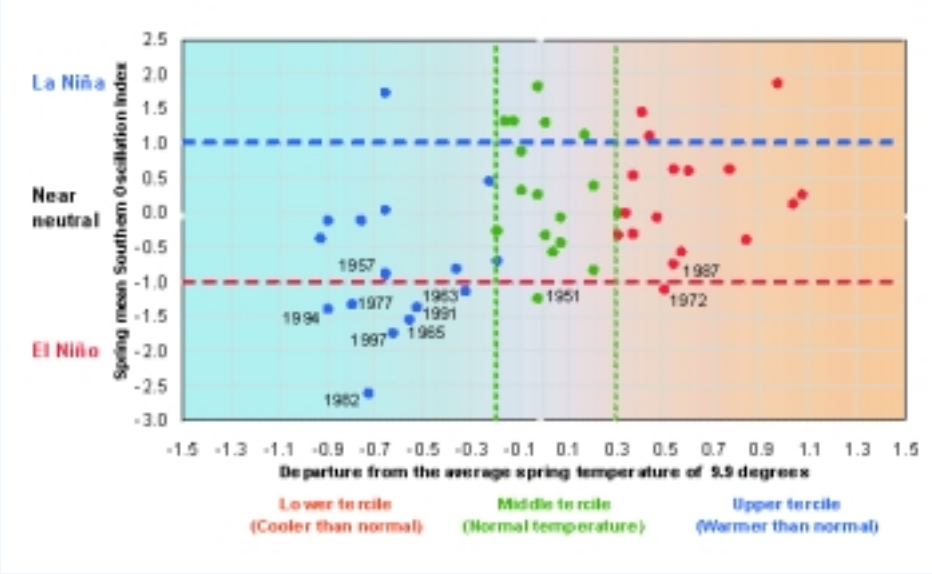
In the figure the data are also plotted according to the state of the Southern Oscillation– positive (La Niña), near neutral, and negative (El Niño) phases of the Southern Oscillation respectively. Typically, El Niños occur when the Southern Oscillation Index is persistently near or less than -1 for at least three months (at or below the red dashed line in the figure).

The 11 springs since 1950 when there was an El Niño phase are labelled in the figure.

Eight of these 11 springs recorded lower tercile temperatures, suggesting that there is a better than 70% chance that an El Niño spring would be cooler than normal. Only twice was the spring warmer than normal.

El Niño spring outlook?

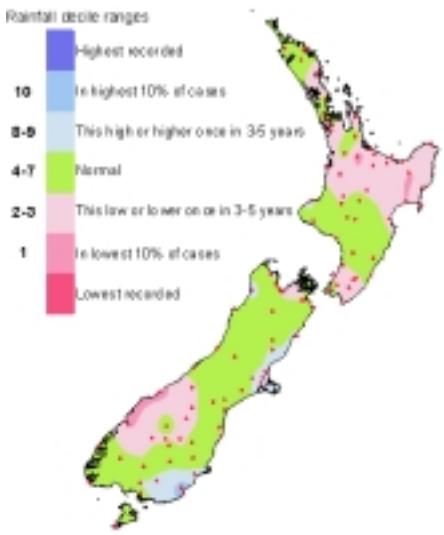
While an El Niño is considered to be likely by spring, how strong the El Niño will be, and whether it will conform to typical El Niño weather patterns, are still uncertain.



ABOVE. Spring air temperature departure from average at Invercargill Airport from 1950 to 2001. The horizontal lines show the divisions between the positive (La Niña), neutral, and negative (El Niño) phases of the Southern Oscillation Index. The vertical dashed green lines mark the tercile temperature boundaries. The labelled data are El Niño springs – 2 in the upper tercile, 1 in the middle, and 8 in the lower tercile.

2002 rainfall to date

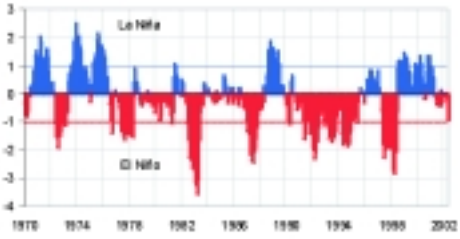
Rainfall so far this year has been lower than average in much of the north of the North Island and in parts of the north and west of the South Island. Some eastern and southeastern areas of the South Island have been wetter than average.



ABOVE: Total rainfalls for 1 January to 30 June 2002, shown according to decile rankings of all rainfalls for this period from 1972. Dots indicate observation sites used in the analysis.

Update on the SOI

The mean Southern Oscillation Index (SOI) for May was -1.5, with the three month average now at about -0.9. A weak to moderate El Niño is expected to develop by spring.



ABOVE: The Southern Oscillation Index (SOI), a measure of changes in the atmospheric pressures across the Pacific, smoothed over three months. La Niña or El Niño typically have an observable effect on the New Zealand climate when there is a large departure of the SOI from zero.

The Climate Update

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Cover picture: Favourable micro-climates in Central Otago provide opportunities for vineyard development. A wind propeller stands like a sentinel, ready to combat frosts during flowering.

Photograph: Alan Blacklock