Number 93, 15 March 2007

NIWA
Taihoro Nukurangi

The Climate Update

A monthly newsletter from the National Climate Centre

February – well below normal rain in most regions, apart from some flooding in Northland. Temperatures were above average in western and inland South Island regions, and below average in many northern and eastern regions.

Outlook for March to May – more northerly or northeasterly airflows than usual. Air temperatures are likely to be average or above average. Normal rainfall in most places, but above normal rainfall is likely in the north of the country.

New Zealand climate in February

February was unusually dry over much of New Zealand. Ranfurly in North Otago had no measurable rainfall in February, and just 1% of normal rainfall was recorded at Lake Tekapo, making it the driest February there in over 80 years. The exception to the dry conditions was in Northland where three days of heavy rain caused flooding.

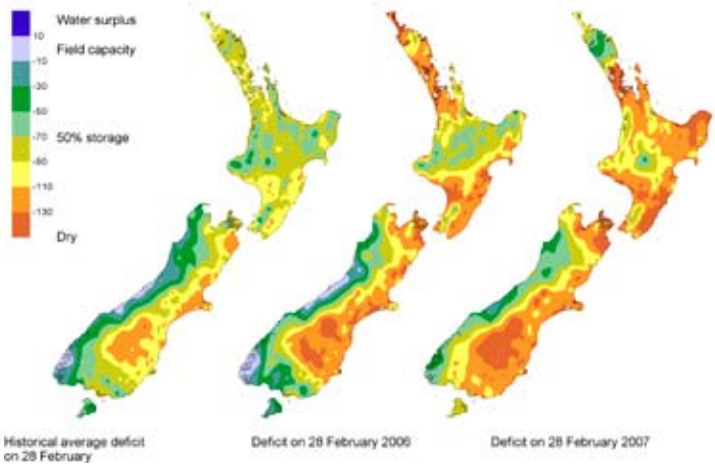
The national average temperature of 17.0 °C was 0.2 °C below normal.

For more information on the climate in February 2007, visit the climate summaries page at www.niwascience.co.nz/ncc/cs/mclimsum_07_02

Wide spread low soil moisture

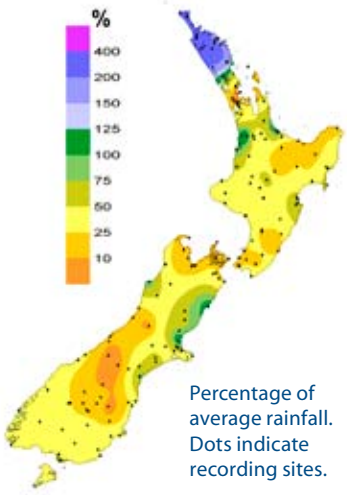
Soil moisture levels over much of the country were much drier than normal at the end of February. Moisture deficits of at least 130 mm were reached in all eastern regions from Gisborne to Central Otago, as well as in Auckland, Waikato, Eastern Bay of Plenty, Wanganui, Manawatu, Wellington, and Nelson. Deficits of 110 mm or more were also widespread.

Soil moisture deficit



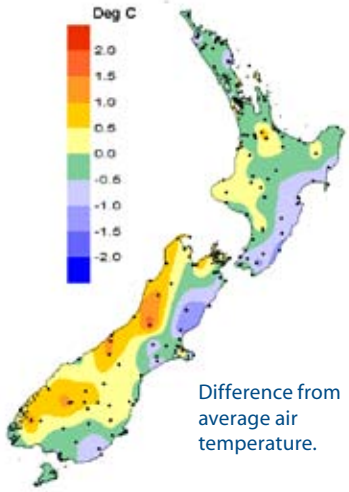
Water balance in the pasture root zone for an average soil type, where the available water capacity is taken to be 150 mm.

Rainfall



Percentage of average rainfall. Dots indicate recording sites.

Air temperature

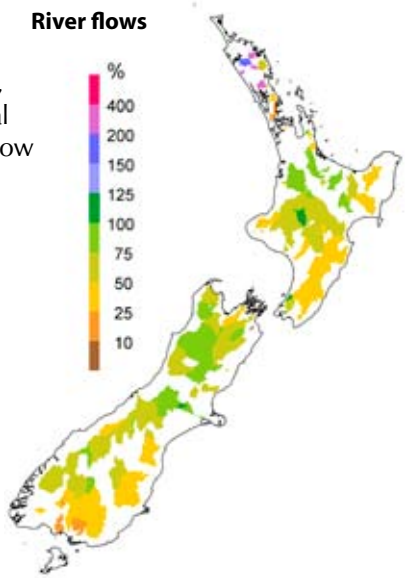


Difference from average air temperature.

High flows in Northland

February stream flows were above normal in the far north, normal in Waikato and coastal Canterbury, and generally below normal elsewhere.

River flows



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

December to February – the climate we predicted and what happened

Rainfall

Rainfall in the North Island, apart from Northland, and in the north and much of the east of the South Island, was normal or below normal as predicted. The west and south of the South Island were drier than expected

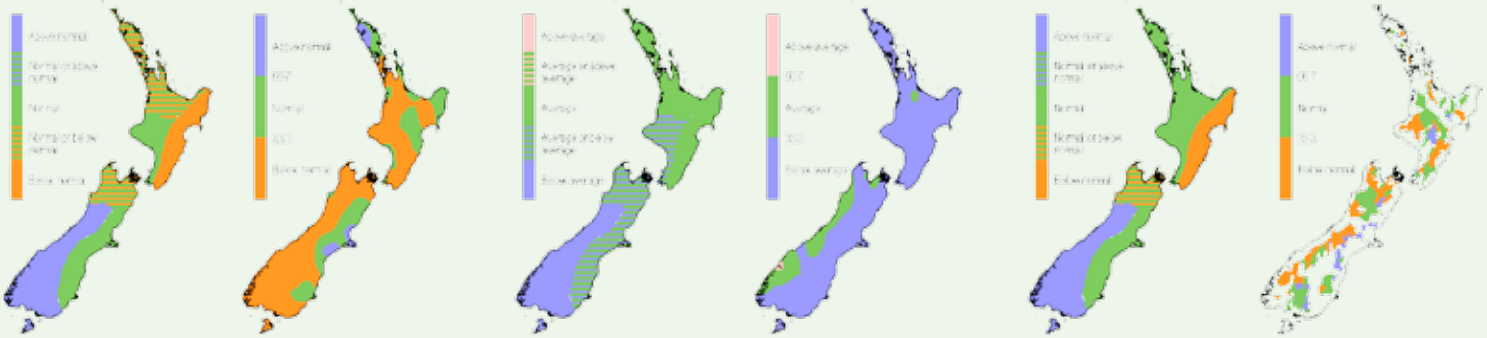
Air temperature

Air temperatures were higher than expected in the west of the South Island, and lower than expected in the north and east of the North Island. Elsewhere temperatures were correctly forecast.

River flows

North Island stream flows were below normal to normal, in line with predictions. In the South Island stream flows flows were below normal in the north as predicted, but lower than expected in the west and south.

Outlook **Outcome** **Outlook** **Outcome** **Outlook** **Outcome**



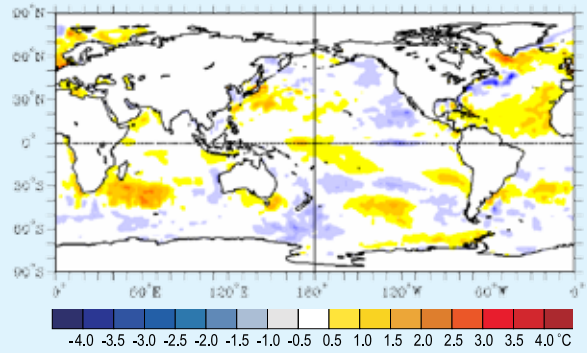
The three outcome maps give the tercile rankings of the rainfall totals, mean air temperatures, and mean river flows that eventuated from December to February, in comparison with the forecast conditions.

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.

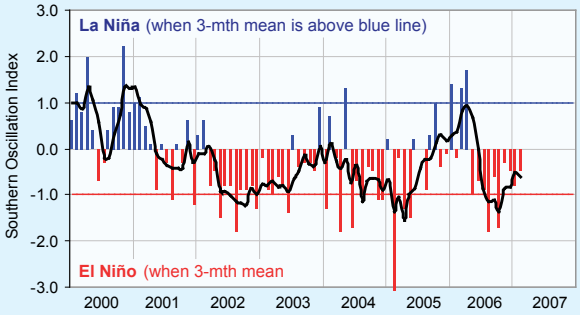
Global setting and climate outlook

ENSO returns to neutral

The moderate El Niño event in the tropical Pacific weakened rapidly during January and February and oceanic conditions are now in a neutral state. For the coming season, the majority of ENSO (El Niño Southern Oscillation) models suggest that ENSO-neutral conditions will continue with a 30% chance of a La Niña event (see also Page 4). Sea surface temperatures are now variable across the equatorial Pacific, about +0.4 °C above average in places from the Date Line to South America, with some areas now slightly below average. Conditions in the tropical Pacific are therefore not expected to affect New Zealand's climate during autumn.



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

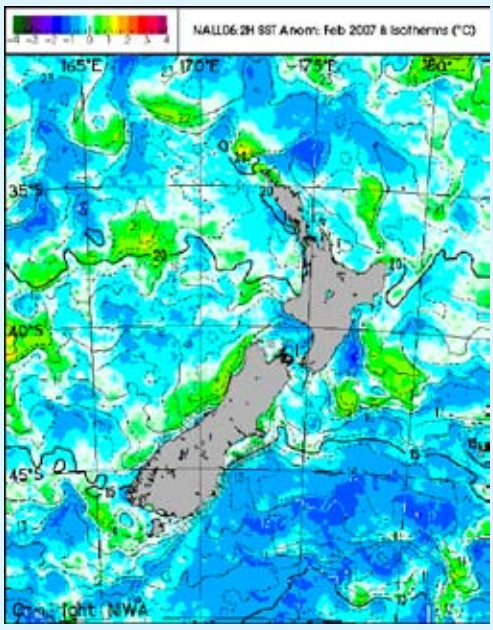


Monthly values of the Southern Oscillation Index (SOI), a measure of the changes in atmospheric pressures across the Pacific, and the three-month mean (black line).

SOI mean values:
February −0.5
December to February −0.6

Sea surface temperatures around New Zealand

The sea surface around New Zealand was on average 0.1 °C cooler than normal in February, although surface temperatures have risen considerably since December 2006. The 3-month (Dec-Feb) temperature anomaly was -0.4 °C.

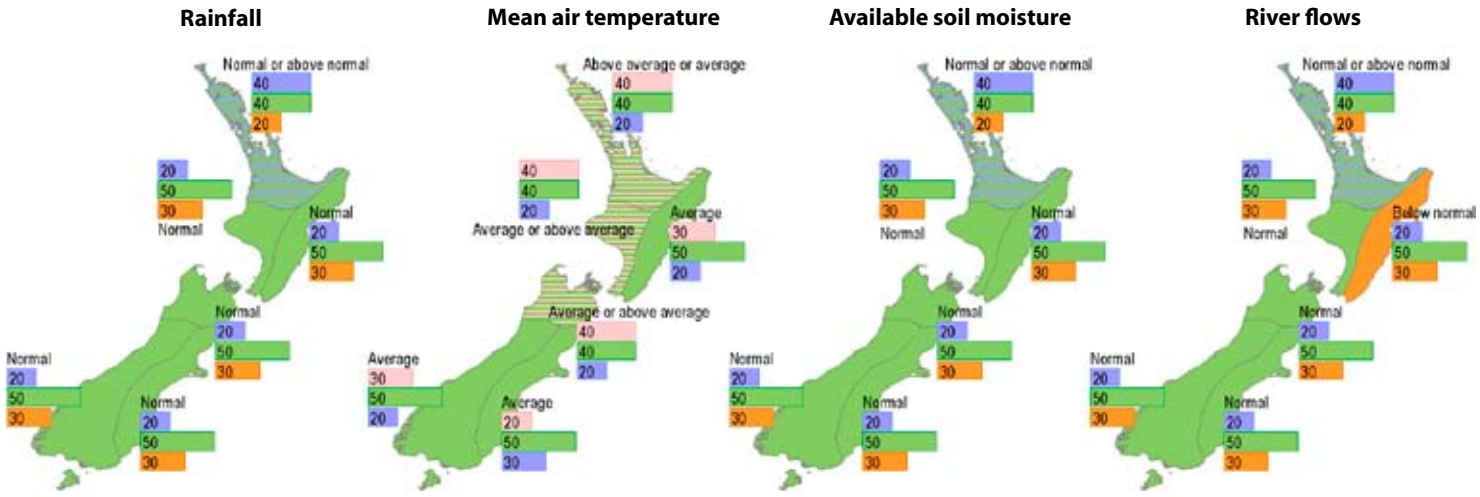


Differences from normal February surface temperatures in the seas around New Zealand.

Outlook for March to May 2007

Atmospheric circulation patterns for March to May are likely to feature higher than average pressures over and to the east of New Zealand, and an anomalous north or northeast airflow over the eastern Tasman and New Zealand.

Temperatures are expected to be average or above average over the country. Rainfall is expected to be normal in most districts, but above normal over northern New Zealand. Normal or above normal soil moisture and stream flows are likely in the north of the North Island. Elsewhere, normal soil moisture and stream flows are likely.



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

El Niño fades faster than expected

The state of the El Niño Southern Oscillation (ENSO) is an important factor in determining seasonal climate predictions for New Zealand. However, when ENSO phases are changing rapidly, its reliability as a climate predictor diminishes, as can be illustrated by the climate of summer 2006–07.

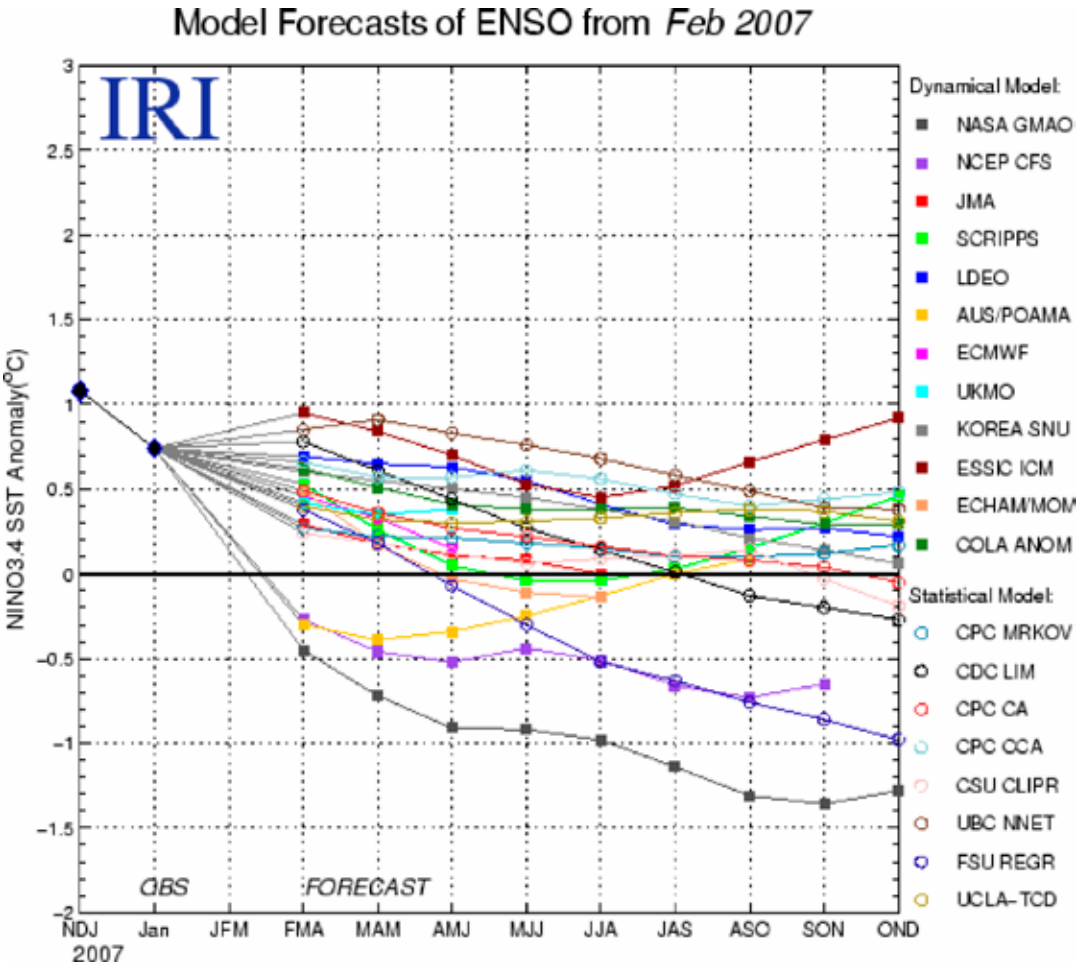
As noted earlier in this publication, the present El Niño event, which peaked in early December 2006, has declined rapidly. Most of the international models used to predict the evolution of ENSO did not capture this rapid rate of return to neutral conditions over the last two months, instead indicating a likely slow decline of El Niño. Sea surface temperatures around New Zealand, typically cooler than normal during El Niño, have also risen quite quickly, from a mean of –0.8 °C in December to –0.1 °C in February.

While summer air temperatures over much of New Zealand were lower than normal, which is often typical of El Niño, rainfall patterns showed little resemblance to average El Niño conditions, apart from the low summer rain in some eastern North Island districts.

ENSO forecast for autumn

The figure below shows forecasts of eastern equatorial Pacific sea surface temperatures, which are used as indicators of the state of ENSO. Out of a large set of dynamical and statistical forecast models, the majority predict ENSO-neutral conditions will continue, with a 30% likelihood of a La Niña event developing in the coming months. The probability of maintaining El Niño conditions through the next two months has dropped to 10%.

For further advice on the development of ENSO over the coming months, see the IRI website at http://iri.columbia.edu/climate/ENSO/currentinfo/update.html



ABOVE: Forecasts made by dynamical and statistical models for SST departures from normal in a region of the eastern equatorial Pacific known as Nino 3.4, for nine overlapping 3-month periods. Note that the expected skills of the models, based on historical performance, are not equal to one another. The skills also generally decrease as the lead time increases. Forecasts made at some times of the year generally have higher skill than forecasts made at other times of the year--namely, they are better when made between June and December than when they are made between February and May. Differences among the forecasts of the models reflect both differences in model design, and actual uncertainty in the forecast of the possible future SST scenario.

The above figure and El Niño information are provided courtesy of IRI – *International Research Institute for Climate and Society.*

Clearing a jump at Masterton. A dry end to summer left a hard surface for horses and their mounts at the February A&P Show. 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