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NIWA
Taihoro Nukurangi

The Climate Update

A monthly newsletter from the National Climate Centre

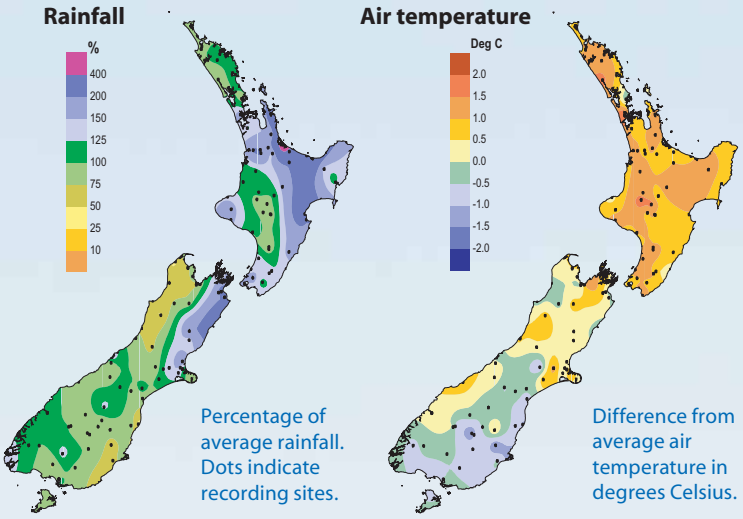
May – record high rainfall in Bay of Plenty. Well above average temperatures in the North Island. Some very high river and stream flows, and contrasting low flows in the north of both islands.

Outlook for June to August – in spite of the usual cold snaps, air temperatures are likely to remain above average in the North Island and north of the South Island. Rainfall normal or above in the north and west of the country. Normal soil moisture levels and stream flows are expected in all regions.

New Zealand climate in May 2005

Record rains lashed Bay of Plenty, with severe flooding. Tauranga recorded 634 mm (695 percent of normal), its wettest calendar month for any time of the year in more than a century, including its heaviest 1-day rainfall on record (347 mm on 18 May).

May was very much warmer than usual in the North Island, but temperatures were below average along the South Canterbury and Otago coasts. The national average temperature for May was 11.4 °C, which was 0.7 °C above the historical average.



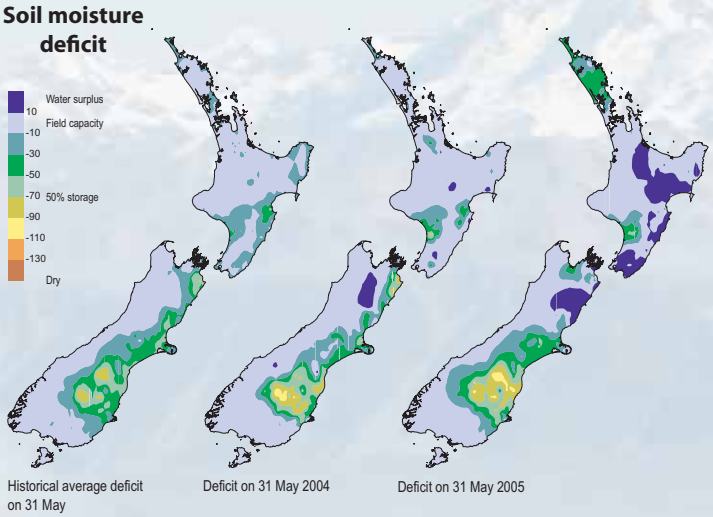
Percentage of average rainfall. Dots indicate recording sites.

Difference from average air temperature in degrees Celsius.

For more information on the climate in May, visit the climate summaries page at www.niwa.co.nz/ncc/cs/mclimsum_05_05

Soil moisture recovery in the north

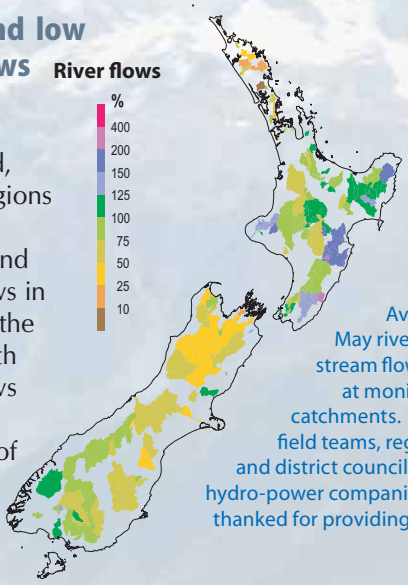
Northern soil moisture levels rose following high rainfalls particularly in Northland and Waikato, but also in Manawatu and Horowhenua. At the end of May, soils were unusually wet from Bay of Plenty down the east coast to Kaikoura. Otago soils remained a little drier than average in some places.



Water balance in the pasture root zone where the available water capacity is taken to be 150 mm.

Contrasting high and low river and stream flows

High streamflows in Bay of Plenty, the east coast of the North Island, Taranaki, and coastal regions of Marlborough, North Canterbury, and Southland contrasted with low flows in Northland and much of the northern half of the South Island. Near normal flows occurred in the central North Island and much of the southern half of the South Island.



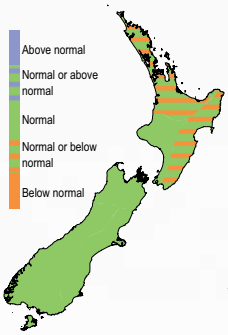
Average May river and stream flows(%) at monitored catchments. NIWA field teams, regional and district councils, and hydro-power companies are thanked for providing data.

March to May: the climate we predicted and what happened

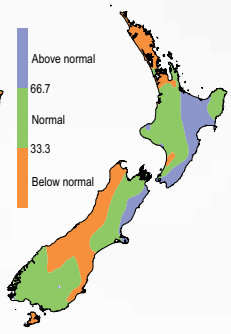
Rainfall

Rainfall was below normal as predicted in the north of the North Island, but wetter than expected in Bay of Plenty, eastern North Island, and in Marlborough. Much of the South Island was drier than predicted.

Outlook



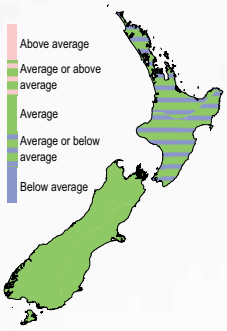
Outcome



Air temperature

Air temperatures were higher in the north of New Zealand than indicated in the March to May forecast, although much of the South Island recorded near normal temperatures as expected.

Outlook



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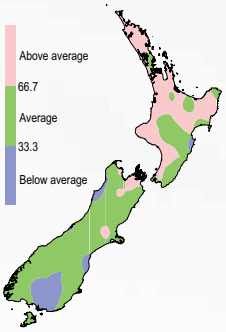
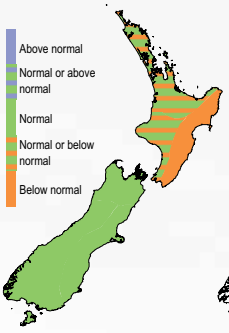


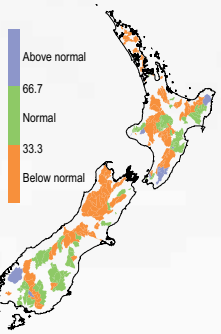
River flows

River and streamflows were higher than forecast in the eastern North Island, and lower than expected in the north and northwest of the South Island.

Outlook



Outcome



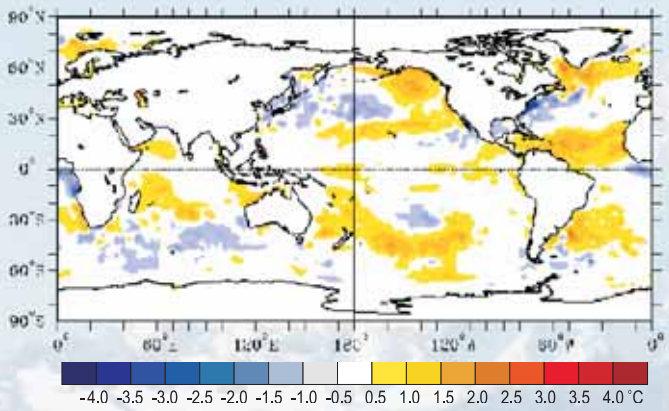
The three outcome maps give the tercile rankings of the rainfall totals, mean air temperatures, and river flows that eventuated from March to May, in comparison with the forecast conditions.

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

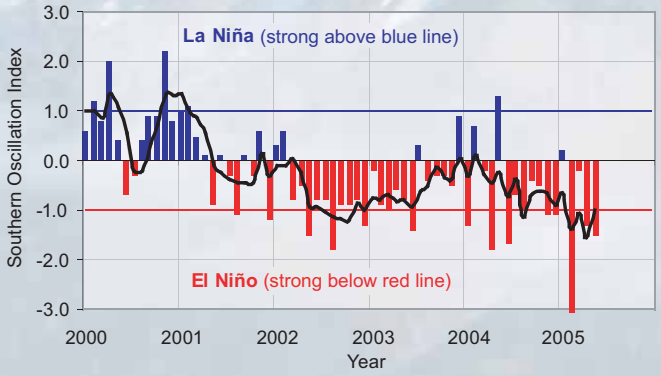
Warming short lived

While surface waters along the equator in the eastern Pacific warmed rapidly in late April and early May, hinting at a possible return to El Niño, these developments appear to have been a short-lived perturbation.



Difference from average global sea surface temperatures. Map courtesy of NOAA/Climate Diagnostics Centre

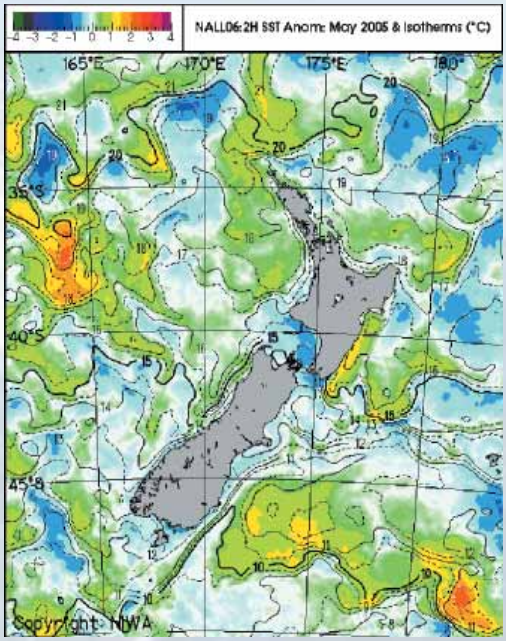
The Southern Oscillation Index (SOI) dropped slightly in May to –1.5, giving a three-month mean of –1.0. Despite the continuing negative SOI, the tropical Pacific is presently in a neutral state (no El Niño or La Niña). Conditions are likely to stay in the neutral range through winter and into early spring



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).

Sea surface temperatures (SST) around New Zealand

The New Zealand average SST anomaly was about +0.7 °C in May, down slightly from April. SSTs are likely to remain near or above average through to the end of August.

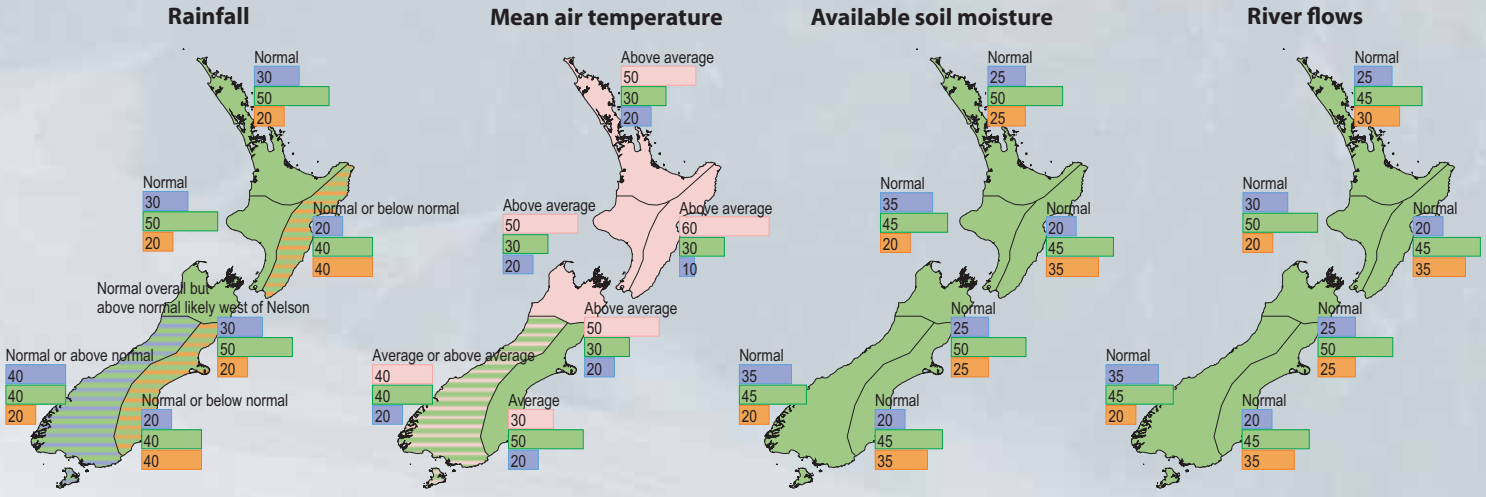


Difference from normal sea surface temperatures (SSTs) in the seas around New Zealand.

Outlook for June to August 2005

While northeasterly wind flows were predominant over northern New Zealand in May, the coming three months are likely to feature enhanced westerly wind flows over the country, the result of expected below average sea-level pressures well to the south.

The maps below show the expected conditions. Air temperatures are likely to be above average in the North Island and northern South Island, and average or above average elsewhere. Rainfalls are likely to be near normal in the north and west of the North Island, normal or above normal in the west of the South Island, and normal or below normal in eastern regions. Normal soil moisture levels and streamflows are expected in all regions.



	Below normal
Upper tercile: 20% chance of above normal	20
Middle tercile: 30% chance of normal	30
Lower tercile: 50% chance of below normal	50

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

Environmental monitoring

Special purpose climate stations – complementing the national climate network

Besides maintaining a national climate reference network and data archive, NIWA frequently deploys special purpose climate stations to collect vital data for projects or to 'fill in' knowledge of the climate in data-sparse areas.

The additional weather stations can support climate sensitive industries such as agriculture and horticulture. The data enable better assessments of risks of extreme weather such as high winds and heavy rain, and more subtle conditions like leaf wetness and high humidity that can cause the onset of disease. Data from previously unstudied areas improve planning for new crops. In other cases, special stations collect meteorological measurements to improve energy use in New Zealand (see climate-energy@niwa.co.nz) and to assess the potential for solar and wind energy.

NIWA also works cooperatively with MetService to ensure data from key 'weather indicator' locations are systematically archived and available for weather and climate research to improve forecasting.

Quality control

Monitoring the climate is not just a matter of sourcing a few low cost instruments and attaching them to a pole somewhere. Quality assurance starts with a careful choice of instruments, understanding how they should be calibrated and placed in position, dealing with a myriad of issues involving data communication and archiving, and finally turning the observations into useful information.

North Canterbury farm climate station. The instruments take hourly samples of wind speed, radiation, rainfall, relative humidity, and air and soil temperatures.

For example, data from a climate station set up recently on a farm in north Canterbury, shown in the adjacent photograph, is monitored on a weekly basis at the National Climate Centre to ensure the sensors are working normally, and that the data represent the 'real world' as closely as possible. The data from the farm will soon be available over the web, and will be used to create climate information products that the farmer will be able to access to assist with decision-making.

NIWA Instrument Systems (NIS), based in Christchurch, designs and deploys special purpose climate stations. In addition, NIS has advanced capability in capturing and communicating data from a wide range of environmental conditions and situations.

For more information, contact Graham Elley 0-3-343 7850, or instruments@niwa.co.nz

Arthur Borrell – farmer, pioneer environmentalist, and voluntary weather observer

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One of the perhaps less known contributions to New Zealand life made by widely respected farmer Arthur Borrell, who died recently at the age of 75, was a near three-decade contribution to New Zealand's National Climate Data Archive. Mr Borrell, former owner of the 33 000 ha Branches Station at the headwaters of the Shotover River, installed a rain gauge soon after purchasing the property in the early 1970s, and recorded the rain and other weather phenomena daily until May 2001. His data and comments, sent each month to the national archive in Wellington, provide valuable information on high country rain, snowfalls, frosts, and river flow. That many of his all-weather trips to the rain gauge were made in his customary attire of bare feet and shorts simply adds to his reputation as a high country farming legend. NIWA pays tribute to Arthur Borrell's commitment to understanding and preserving New Zealand's high country environment.

Sensing the climate at Rose Ridge, Southern Alps. Measurements of snowfall and temperature assist Meridian Energy in scheduling electricity generation.

Cover photo: *Bob Newland*

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