NEW ZEALAND

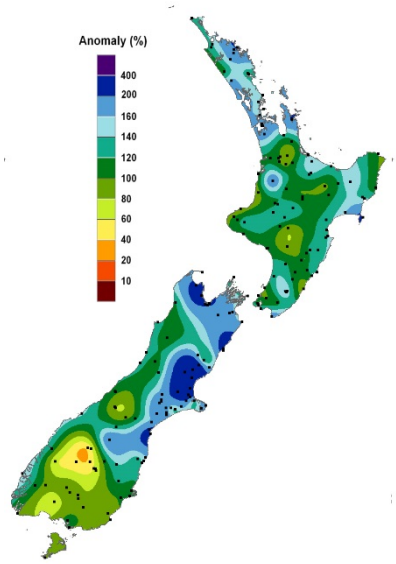
Climate Update

NIWA Taihoro Nukurangi

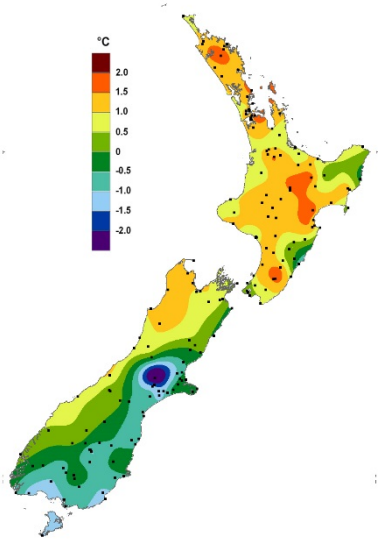
New Zealand Climate Update No 200, February 2016

Current climate – January 2016

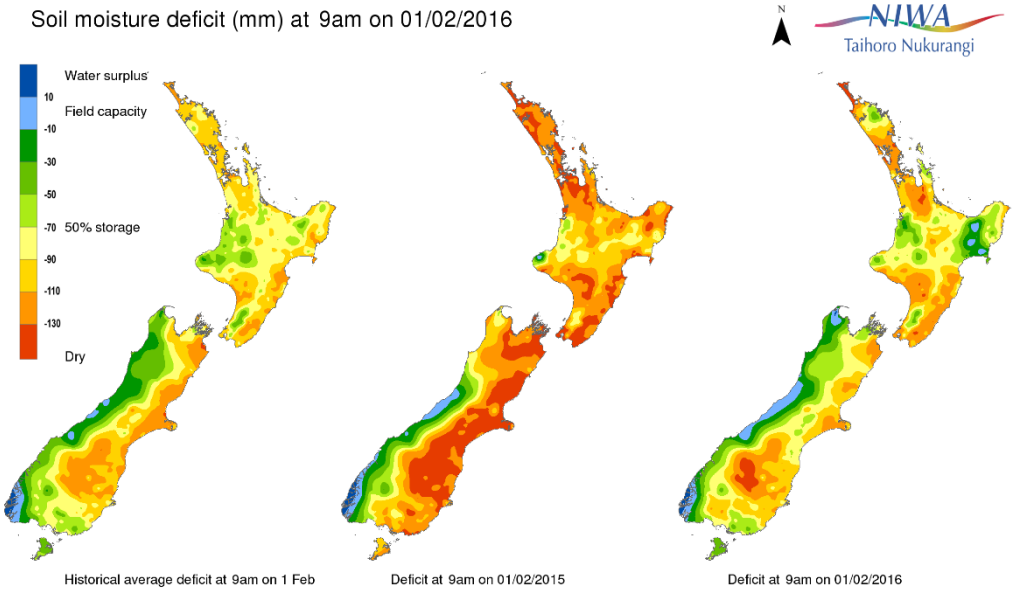
During January 2016, strong El Niño conditions continued in the Tropical Pacific. However, rather than the typical south-westerly flow anomaly over New Zealand that is associated with El Niño at this time of year, high pressure anomalies to the east of New Zealand, as well as to the south and west of the South Island caused northeast flow anomalies over the North Island and southeast flow anomalies over the South Island in January.



Percentage of normal rainfall for January 2016



Departure from average air temperature for January 2016



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

Rainfall: The moist tropical air masses (including ex-tropical cyclones Ula and Victor) that affected New Zealand brought significant rainfall. Rainfall totals for January were well above normal (>149% of January normal) in northern and eastern regions of both Islands. Notably, Timaru received almost three times its normal rainfall for January (296% of January normal rainfall), with over half of that occurring in one day (81 mm, the highest 1-day rainfall total for January in Timaru, in records going back to 1881). Rainfall was above normal (120-149% of January normal) for many other locations in the North Island. Few locations recorded below normal (50-79% of January normal) or well below normal (<50% of January normal) rainfall in January – this only occurred in isolated parts of Taranaki Region and Queenstown-Lakes District.

Air temperature: The northeast flow anomaly over the North Island during January caused warm and humid tropically-derived air masses (including two ex-tropical cyclones) to affect New Zealand during the month. Above average (+0.51°C to +1.20 °C above the January average) and well above average (> +1.20 °C above the January average) temperatures were observed for the entire Island, as well as the north and west South Island. In contrast, the predominant southeast flow anomaly over the South Island caused below average (-1.20°C to -0.51°C below the January average) or well below average (<-1.20°C below the January average) temperatures for the east and south of the South Island. The nation-wide average temperature in January 2016 was 17.6°C (0.6°C above the 1981-2010 January average from NIWA's seven station temperature series which begins in 1909).

Sunshine Sunshine was near normal (90-109% of January normal) or below normal (75-90% of January normal) for the North Island in January. Sunshine was below normal or well below normal (<75% of January normal) for the South Island. The wet and stormy conditions across much of the country during the month caused sunshine totals to be lower than normal for most places.

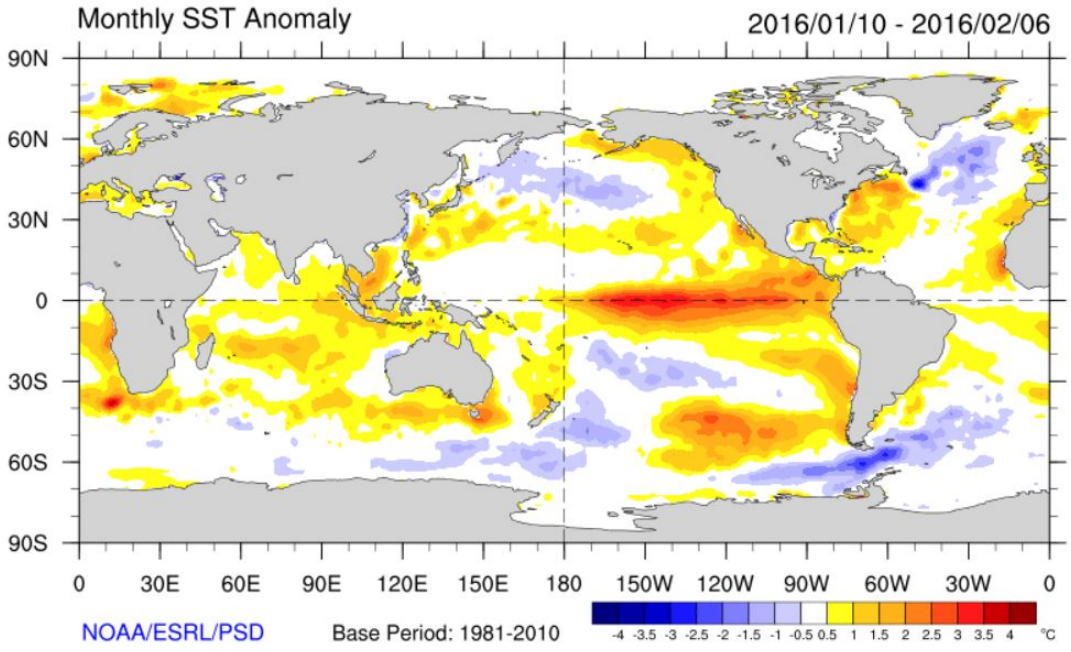
Soil Moisture: At the end of December 2015, soil moisture levels were extremely low for many parts of the country, particularly in the North Island and the north and south of the South Island. However, numerous rainfall events throughout the country in January alleviated soil moisture deficits, and as of 1 February 2016, soil moisture levels were above normal for the time of year for eastern Northland, Coromandel, northern Hawke's Bay and Gisborne, as well as northern Tasman, Nelson, and coastal Canterbury. Drier than normal soils were present in the remainder of the North Island, south Tasman, Otago and Southland. Near normal soil moisture conditions were evident elsewhere.

Global setting

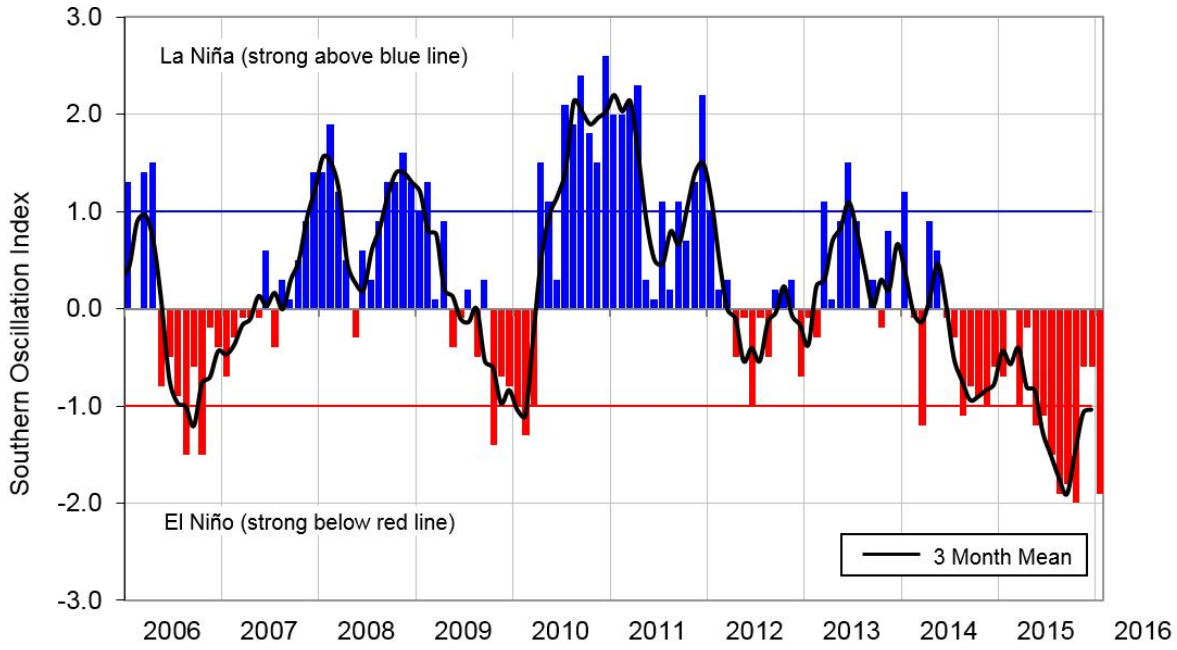
Strong El Niño conditions continued in the tropical Pacific during January 2016. Sea surface temperature anomalies still exceed +2°C in the central and eastern Pacific, but have weakened slightly from the peak values in November-December 2015. The sub-surface ocean temperature anomalies in the eastern Pacific have decreased further since December, and are now about +4°C at 75-100m depth near 120°W, compared to peak values of about +7°C in November 2015. Conversely, the Southern Oscillation Index strengthened to about -2.0 for the month of January.

International guidance indicates that El Niño conditions will continue (96% probability) over the next three months (February – April 2016) and will rapidly decay thereafter, with a return to normal conditions or a transition to La Niña conditions by August – October 2016.

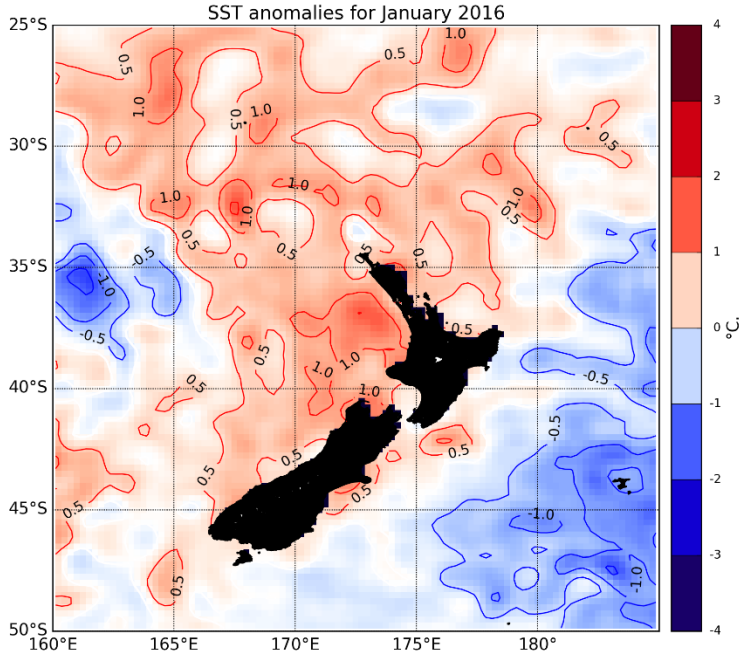
For February - April 2016, above normal pressure is forecast to the north of New Zealand, while below normal pressure is expected to the south of the country. This circulation pattern is likely to be accompanied by anomalous westerly wind flows – a signature consistent with El Niño.



Differences from average global sea surface temperatures for 10 January 2016 – 06 February 2016. Map courtesy of NOAA Climate Diagnostics Centre (http://www.cdc.noaa.gov/map/images/sst/sst.anom.month.gif)



Monthly values of the southern Oscillation Index (SOI), a measure of changes in atmospheric pressures across the pacific, and the 3 month mean (black line). SOI mean values: January SOI -1.9; November to January average -1.0.



Differences from average January surface temperatures in the seas arouns New Zealand.

Outlook – February 2016 to April 2016

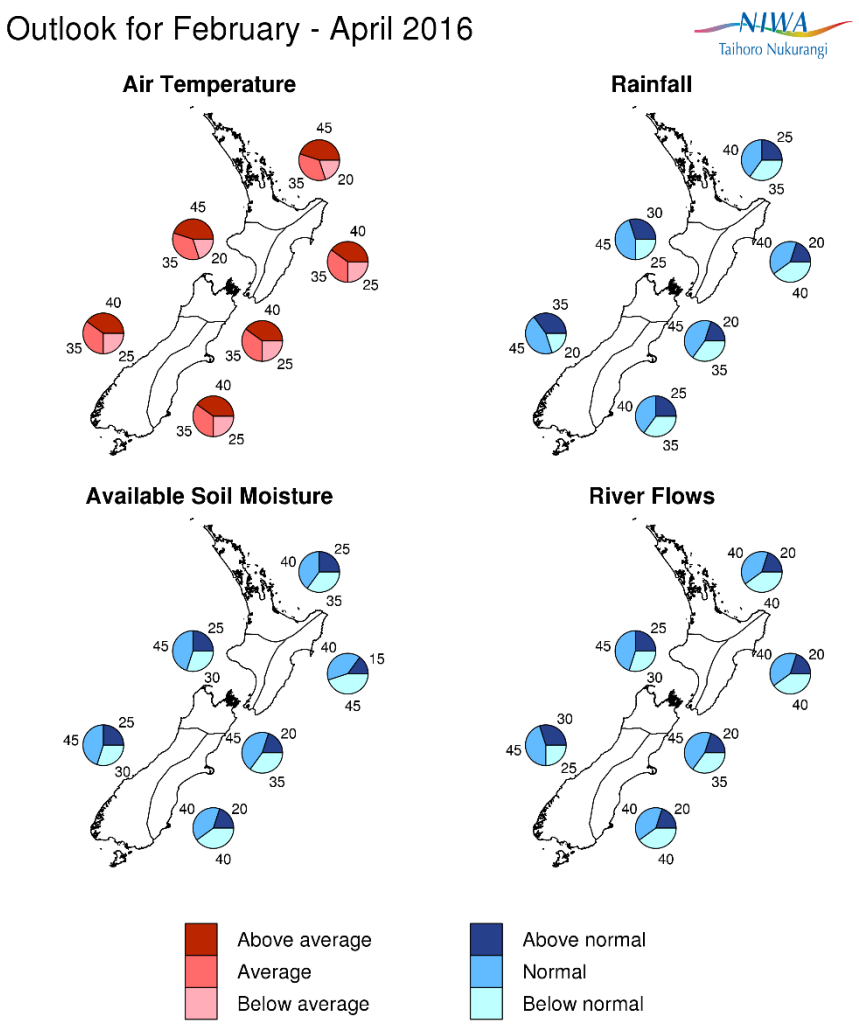
Temperatures are most likely (45% chance) to be above average for the north and west of the North Island. Temperatures are about equally likely to be near average (35% chance) or above average (40% chance) for all remaining regions of the country.

Rainfall is about equally likely to be below normal (35-40% chance) or in the normal range (40% chance) for the north and east of the North Island and for the east of the South Island. Seasonal rainfall totals are most likely to be near normal (45% chance) for west of the North Island and for the north and west of the South Island.

Soil moisture levels are most likely to be in the below normal range (45-55% chance) for the north and east of both Islands. Soil moisture levels are equally likely to be normal (40% chance) or below normal (40% chance) in the west of the North Island. In the west of the South Island, soil moisture levels are about equally likely to be in the above normal range (40% chance) or normal range (35% chance).

River flows are about equally likely to be below normal (35-45% chance) or in the normal range (40% chance) for the north and east of the North Island and for the east of the South Island. Soil moisture levels and river flows are most likely to be near normal (45% chance) for west of the North Island and for the north and west of the South Island.

Sea surface temperatures (SSTs) are forecast to be near average to the west and below average to the east of the country



Graphical representation of the regional probabilities, Seasonal Climate Outlook, February - April 2016.

The climate we predicted (November 2015 – January 2016) and what happened

Predicted rainfall: November 2015 – January 2016 rainfall was most likely to be below normal in the north and east of the North Island, but equally likely to be near normal or above normal in the west of the South Island. Near normal rainfall was the most likely outcome for the west of the North Island and north of the South Island. There was low confidence in seasonal rainfall in coastal Canterbury and east Otago.

Outcome: Actual rainfall was largely near normal for the north and east of both the North and South Island as well as Westland and coastal Southland. Rainfall was below normal elsewhere.

Predicted air temperature: November 2015 – January 2016 temperatures were equally likely to be average or below average for the north and east of the North Island, and most likely to be near average for the east of the North Island and north of the South Island. Below average temperatures were most likely for the west and east of the South Island.

Outcome: Actual temperatures were near average for the majority of New Zealand. Slightly warmer than normal temperatures occurred in Whangarei, the Far North and the Taupo district.

Predicted air pressure: November 2015 - January 2016, above normal pressure was forecast to the north and west of New Zealand, while below normal pressure was expected to the south of the country. This circulation pattern was likely to be accompanied by anomalous west-southwesterly wind flows - a signature of El Niño conditions.

Outcome: Actual pressures were slightly higher than normal in the Tasman Sea and extended over New Zealand. Lower than normal pressure was present to the south of the country. This pressure set-up lead to more south-westerlies than normal over the South Island and more south-easterlies than normal over the North Island.

For more information about NIWA's climate work, visit:
www.niwa.co.nz/our-science/climate