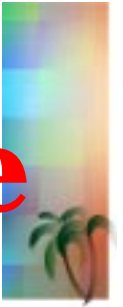


# 31

7 April 2003

# The Island Climate Update



An overview of the present climate in the tropical South Pacific, with an outlook for the coming months, to assist in dissemination of climate information in the Pacific region

Produced by the National Institute of Water and Atmospheric Research, New Zealand

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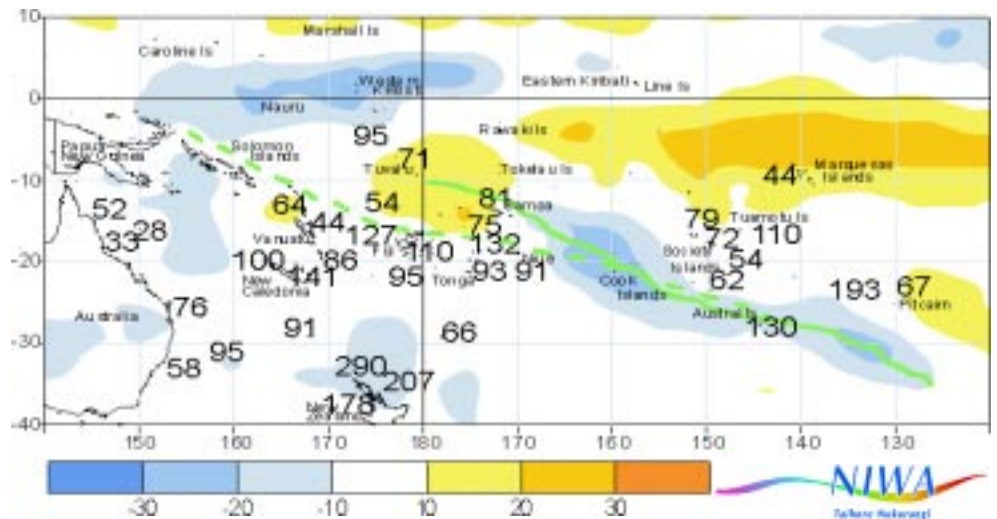
UK Met Office

International Research Institute for Climate Prediction, IRICP

World Meteorological Organisation, WMO

### March's climate

The El Niño episode is continuing to weaken. Enhanced convection persisted over Western Kiribati, but it was weaker than in most recent months. The South Pacific Convergence Zone (SPCZ) remained further east than usual, extending from the Cook Islands to the south of Pitcairn Island, with above average rainfall from the Austral Islands to southern French Polynesia. Rainfall totals were also above average in southern New Caledonia, western and central parts of Fiji, and parts of central and southern Tonga. A large region of suppressed convection and below average rainfall occurred in the southern near-equatorial region east of Tokelau Islands. This region extended well to the east of the Marquesas Islands of northern French Polynesia. Tropical cyclone 'Erica' devastated parts of New Caledonia near middle of the month. *More on Page 2*



Outgoing Long-wave Radiation (OLR) anomalies, in  $Wm^{-2}$  are represented by hatched areas, and rainfall percentage of average, shown by numbers. High radiation levels (yellow) are typically associated with clearer skies and lower rainfall, while cloudy conditions lower the OLR (blue) and typically mean higher rainfalls. The March 2003 position of the South Pacific Convergence Zone (SPCZ), as identified from total rainfall, is indicated by the solid green line. The average position of the SPCZ is identified by the dashed green line.

### ENSO and sea surface temperatures

Based on present conditions, and the recent model forecasts, the present El Niño event is expected to return to neutral by the early southern hemisphere winter 2003. The Southern Oscillation Index (SOI) showed little change to -1.0 in March but sea surface temperatures (SSTs) in the equatorial Pacific and other indicators of the El Niño Southern Oscillation (ENSO) eased further during March.

*Details Page 2*

### The next three months April to June 2003

Enhanced convection in the equatorial Pacific is likely to result in above average rainfall for Western and Eastern Kiribati. Rainfall is also expected to be average or above average for the Solomon Islands, Tokelau and Samoa. Average or below average rainfall is expected in New Caledonia and Fiji with below average rainfall for the Marquesas Islands. *More on Page 3*



New Zealand Agency for International Development  
Nga Hoe Tuputupu-mai-tawhiti





## Climate developments in March 2003

**Enhanced convection persists, but weaker than in most recent months over Western Kiribati**

**SPCZ further east, from the Cook Islands to the south of Pitcairn**

The area of enhanced convection that has predominated over the warmer seas around Western Kiribati since August last year showed signs of weakening in March, with some westward movement to affect Nauru. This is related to the equatorial surface easterlies which strengthened further in March, reaching their highest frequency at Tarawa (92% of observations) since April 2002. The SPCZ continued to be displaced further east than normal, with enhanced convection from the Cook Islands southeast to the region south of Pitcairn Island.

**El Niño continues to weaken towards a neutral state**

**Equatorial Pacific SST anomalies eased further**

The El Niño event in the tropical Pacific is nearing its end. Most of the leading El Niño Southern Oscillation (ENSO) models show that the event will weaken to a neutral state by early winter in southern hemisphere.

### CLIMATE EXTREMES IN MARCH 2003

Country	Location	Rainfall (mm)	% of average	Comments
French Polynesia	Gambier	345	193	Record High
New Zealand	Kaitaia	226	290	Record High
Fiji	Savusavu	104	37	Extremely Low

Country	Location	Mean Air Temp (°C)	Departure	Comments
French Polynesia	Hiva Hoa, Atuona	28.1	+1.0	Extremely High
French Polynesia	Tahiti-Faaa	28.3	+1.0	Well above average

Country	Location	Max Air Temp (°C)	Date	Comments
Fiji	Tokotoko	34.0	15th	Extremely High
Fiji	Nausori	34.6	15th	Extremely High

March rainfall was at least 125% of average (and more than 300 mm in places) over parts of Western Kiribati and northern New Zealand, and in a band from the Austral Islands of southern French Polynesia to the region south of Pitcairn Island. Rainfall totals were also 125% or more of average in southern New Caledonia, western and central parts of Fiji (with more than 400 mm in some areas there), and parts of central and southern Tonga. The above average rainfall in New Caledonia was caused by the passage of tropical cyclone 'Erica'.

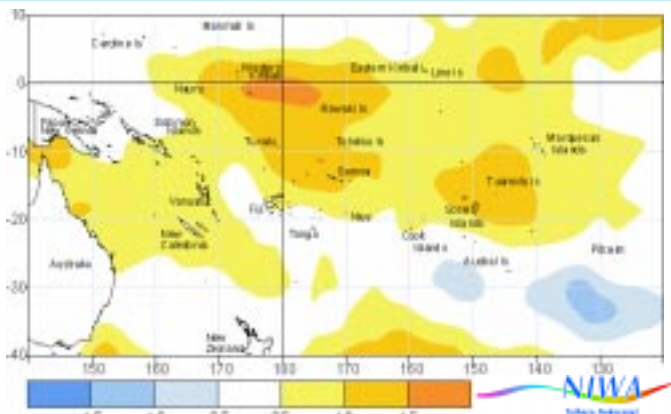
The NINO3 SST anomaly eased further to +0.4°C in March, and NINO4 remains near +1.0°C. The three month (January -March) means are about +0.7°C and +1.1°C for NINO3 and NINO4, respectively. Equatorial subsurface temperature anomalies remain weak and have only changed slightly since February. Zonal winds are close to normal across the equatorial Pacific, but an area of reduced OLR (enhanced convection) persists near the date line, associated with

A large region of suppressed convection (associated with rainfall totals less than 50% of average) occurred in the southern near equatorial region east of the Tokelau Islands. This region extended well to the east of the Marquesas Islands of northern French Polynesia. Rainfall was also below average over central Tuvalu and Vanuatu.

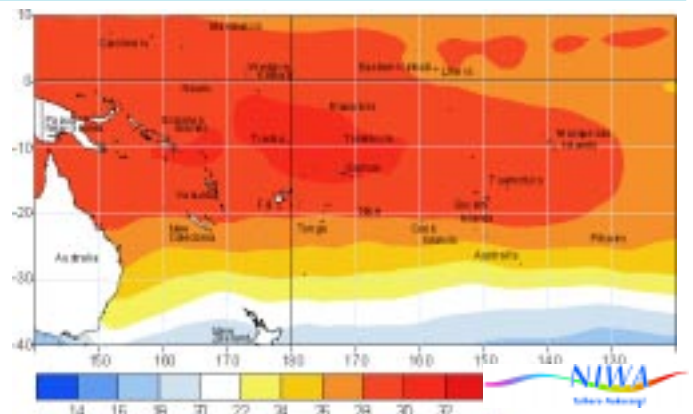
Air temperatures were 0.5 to 1.0°C above average, consistent with warmer than average sea surface temperatures, in many areas from Western Kiribati southeast to central French Polynesia.

above average SSTs in the NINO4 region. The area of suppressed convection evident in February over the Coral Sea has dissipated, while a new region has developed east of 160°W.

Most of the global climate models indicate a trend to neutral conditions from the present through the southern hemisphere winter and into spring.



Sea surface temperature anomalies (°C) for March 2003



Mean sea surface temperatures (°C) for March 2003



## Forecast validation

**Forecast period: January to March 2003**

The El Niño related region of enhanced convection over Western and Eastern Kiribati was expected to persist. Above average or average rainfall was also expected in Tuvalu, and across central French Polynesia to Pitcairn Island. A tendency towards below average rainfall was expected for a broad region from New Caledonia east to Niue, including Vanuatu, Fiji and Tonga, and also about the Marquesas Islands of northern French Polynesia. Near average rainfall was

projected elsewhere.

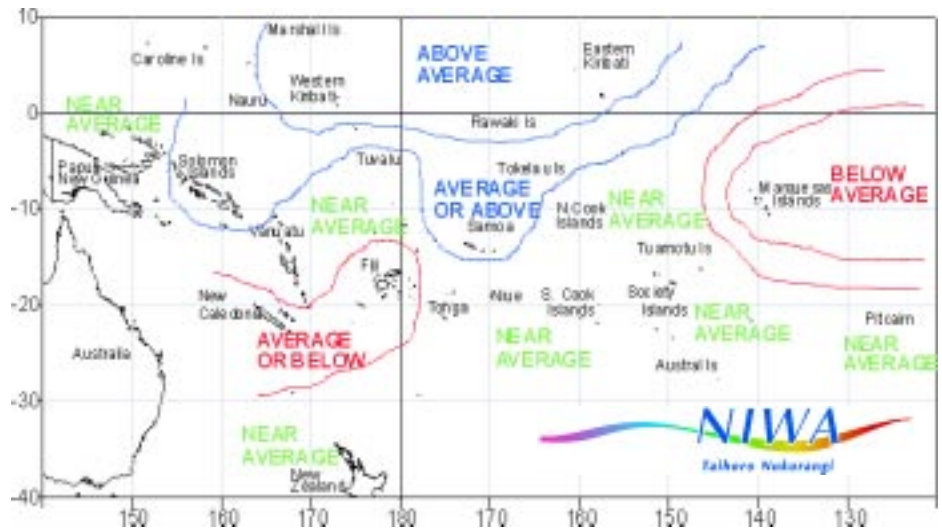
The overall rainfall anomaly pattern agreed well with what was expected. However, the region of above average rainfall did not extend as far east to include Eastern Kiribati. Niue and Tonga had average rather than below average rainfall, and the average or below average region extended further north to include Wallis and Futuna Islands and Samoa.



## Rainfall outlook: April to June 2003

**Above average rainfall in Western and Eastern Kiribati, average or above average rainfall expected in the Solomon Islands, Tokelau and Samoa**

**Average or below average rainfall in New Caledonia and Fiji and below average rainfall in the Marquesas Islands**



Rainfall outlook map for April to June 2003

Continuing enhanced convection in the equatorial Pacific is expected to result in above average rainfall in Western and Eastern Kiribati. Average or above average rainfall is the most likely outcome for the Solomon Islands, Tokelau and Samoa.

Average or below average rainfall is expected in New Caledonia and Fiji. Suppressed convection is likely to result in below average rainfall for the Marquesas Islands. Rainfall is expected to be near average elsewhere.

The forecast model skills during this time of the year are generally reduced. Therefore the model skill is moderate to low for most islands in the region.



## Tropical Cyclone Update

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There were two tropical cyclones during March, bringing the total to date for the season to eight.

200 km/hr over much of New Caledonia resulting in extensive damage. 'Erica' was the worst tropical cyclone to affect New Caledonia in the last 50 years.

'Erica', which occurred from 4 - 15 March, developed in the Coral Sea and tracked northeast towards, but missing, the Solomon Islands. It then moved southeast to track towards New Caledonia, bringing gales and high rainfall there from the 12 - 14 (180 mm was measured at Poindimie). Estimated maximum offshore sustained wind speeds reached 260 km/hr (hurricane force), the most powerful this season, with gusts exceeding

'Eseta', occurred over 10 - 14 March, developing west of Fiji. The system moved south at first, and then east-southeast over open seas, with estimated maximum sustained wind speeds of 205 km/hr (hurricane force).

The May issue will provide specific details on impacts of cyclone 'Erica'.

## Probabilities of rainfall departures from average

Broad-scale rainfall patterns and anomalies in the southern tropical Pacific area are estimated from the state of large-scale regional climate factors, such as La Niña or El Niño, their effect on the South Pacific and Tropical Convergence Zones, surface and sub-surface sea temperatures, and computer models of the global climate.

Rainfall estimates for the next three months for Pacific Islands are given in the adjacent table. The tercile probabilities (e.g. 20:30:50) are derived from the interpretation of several global climate models. They correspond to the odds of the observed rainfall being in the lowest (driest) one third of the rainfall distribution, the middle one third, or the highest (wettest) one third of the distribution. On the long-term average, rainfall is equally likely (33% chance) in any tercile.

The probabilities shown express the expected shift in the distribution from the long-term average, based on predictions of oceanic and atmospheric conditions. The amount of inter-model forecast consistency is indicated by the levels of confidence expressed in the table.

### TROPICAL PACIFIC RAINFALL OUTLOOK (APRIL - JUNE 2003)

Island Group	Rainfall Outlook	Confidence in the Outlook
Western Kiribati	10:20:70 (Above)	Moderate - High
Eastern Kiribati	10:25:65 (Above)	Moderate
Solomon Islands	20:40:40 (Average or above average)	Moderate
Tokelau	20:45:35 (Average or above average)	Moderate
Samoa	10:45:45 (Average or above average)	Moderate
Papua New Guinea	20:60:20 (Near average)	Moderate
Vanuatu	25:55:20 (Near average)	Moderate
Tuvalu	20:60:20 (Near average)	Moderate
Wallis & Futuna	20:60:20 (Near average)	Moderate
Tonga	20:60:20 (Near average)	Moderate
Niue	20:60:20 (Near average)	Moderate
Northern Cook Islands	30:55:15 (Near average)	Moderate
Southern Cook Islands	15:60:25 (Near average)	Moderate
Society Islands	10:60:30 (Near average)	Low
Austral Islands	25:50:25 (Near average)	Moderate
Pitcairn Island	35:45:20 (Near average)	Moderate
Fiji	35:40:25 (Average or below average)	Moderate - Low
New Caledonia	40:40:20 (Average or below average)	Moderate - Low
Marquesas Islands	50:25:25 (Below average)	High

# ENSO Update

By Ashmita Gosai, Stuart Burgess and Dr Jim Salinger, NIWA

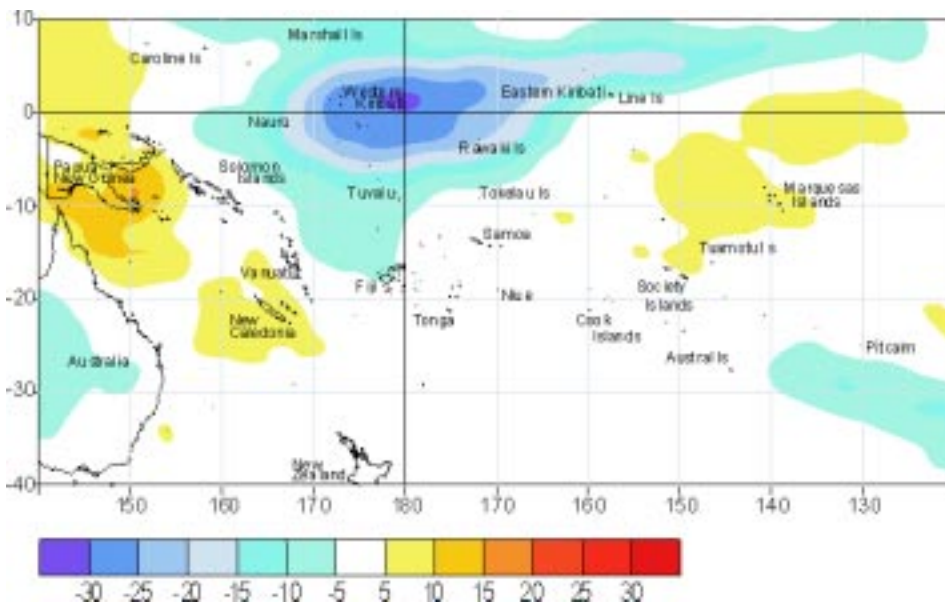
The now-decaying El Niño event began to affect the South Pacific climate from about the middle of 2002, after the sea surface temperatures (SSTs) in the tropical and eastern equatorial Pacific warmed to about 1°C above normal. These temperatures remained warm for the rest of the year, continuing into early 2003.

The climate of the Southwest Pacific had responded much as expected, with equatorial areas near the date line experiencing enhanced convection, resulting in three times average rainfall in Western and Eastern Kiribati extending south to Tuvalu. Suppressed convection over the Western Pacific resulted in below average rainfall in Australia and New Caledonia (Fig. 1). Parts of French Polynesia also experienced below average rainfall during the same period. Rainfall was generally about average for most of the other island nations in the region.

Most of the oceanic and atmospheric observations indicate that the current El Niño event in the tropical Pacific is weakening. The marked SST anomalies in the NINO3 and NINO4 region and the Southern Oscillation Index (SOI) have been weakening since December 2002. There has also been a noticeable breakdown of subsurface temperature anomalies since February 2003, and the easterly trade winds have resumed near normal frequencies.

There is a general consensus among most of the global El Niño Southern Oscillation (ENSO) forecast models that this event is likely to end by the early southern hemisphere winter.

The majority of global ENSO climate models are now predicting neutral conditions, as being most likely for the six months beyond June 2003.



**Fig 1: The El Niño associated convective pattern (August 2002 through March 2003).** Outgoing Long-wave Radiation (OLR) anomalies, in  $Wm^{-2}$  are represented in hatched areas. High radiation levels (yellow) are typically associated with clearer skies and lower rainfall, while cloudy conditions lower the OLR (blue) and typically mean higher rainfall.

## Acknowledgements

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The Island  
Climate Update



Visit The Island Climate Update website at: [www.niwa.co.nz/NCC/ICU/](http://www.niwa.co.nz/NCC/ICU/).

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## Sources of South Pacific rainfall data

This bulletin is a multi-national project, with important collaboration from the following Meteorological Services:

American Samoa Australia Cook Islands Fiji French Polynesia Kiribati New Caledonia New Zealand  
Niue Papua New Guinea Pitcairn Samoa Solomon Islands Tokelau Tonga Tuvalu Vanuatu

Requests for Pacific island climate data should be directed to the Meteorological Services concerned.

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**DISCLAIMER:** This summary is prepared as soon as possible following the end of the month, once the data and information are received from the Pacific Island meteorological services. Delays in data collection and communication occasionally arise. While every effort is made to verify observational data, NIWA does not guarantee the accuracy and reliability of the analysis and forecast information presented, and accepts no liability for any losses incurred through the use of this bulletin and its contents.

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