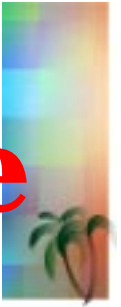


# 32

8 May 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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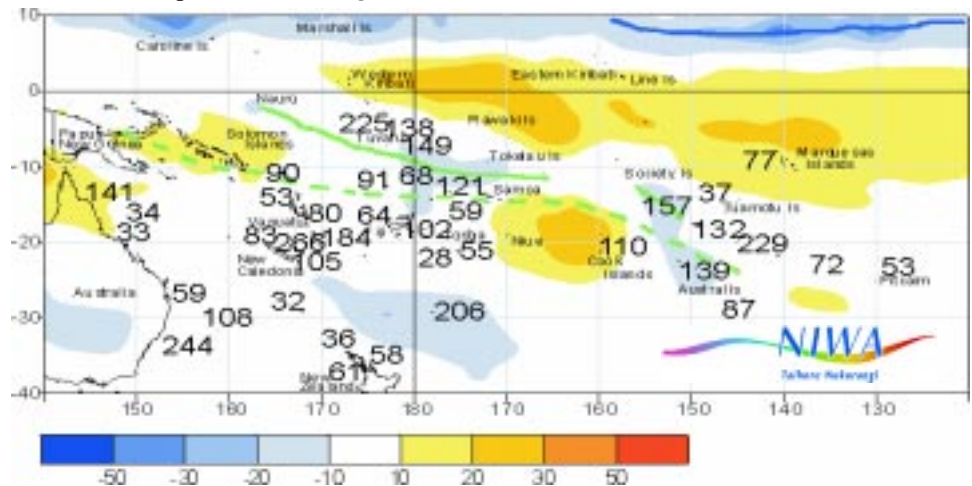
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### April's climate

The El Niño episode is now over, with enhanced equatorial easterlies across the Pacific. The South Pacific Convergence Zone (SPCZ) was displaced further north than average, with enhanced convection and above average rainfall in many areas from Tuvalu to the Society Islands of French Polynesia. Rainfall totals were also above average in southern Vanuatu, parts of New Caledonia, the Kermadec Islands northeast of New Zealand, and areas of the Austral Islands in southern French Polynesia. The last week of the month was unsettled with flooding and heavy rainfall in some of Fiji's Central Division areas, as well as in parts of New Caledonia. A large region of suppressed convection and below average rainfall extended from Western Kiribati well to the east of the Marquesas Islands of northern French Polynesia. Air temperatures were above average throughout much of the tropical Southwest Pacific, as far east as Pitcairn Island. There have been nine tropical cyclones so far this season, with one occurrence in April. *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 April 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. The April 2003 Inter-Tropical Convergence Zone (ITCZ) is indicated by the solid blue line.

### ENSO and sea surface temperatures

The El Niño event that has been affecting the region since middle of 2002 has dissipated. Most of the global climate models and oceanic observations show a return to neutral conditions which are likely to continue through the southern hemisphere winter and into spring. The Southern Oscillation Index (SOI) eased to -0.6 in April. *Details Page 2*

### The next three months May to July 2003

Average or above average rainfall is likely in Western and Eastern Kiribati, the Solomon Islands, Tuvalu, Tokelau, and the Society Islands. Rainfall is expected to be average or below average in Fiji, Tonga, Niue and the Tuamotu Islands. Below average rainfall is likely in the Marquesas Islands.

*More on Page 3*



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





## Climate developments in April 2003

### SPCZ further north, from Tuvalu to the Society Islands

### Enhanced convection no longer exists over Kiribati

The SPCZ was displaced further north than average, with enhanced convection over parts of Tuvalu, Tokelau, and the Society Islands of French Polynesia. April rainfall was at least 125% of average (and 300 mm or more in places) over much of this region. Rainfall totals were also 125% or more of average in southern Vanuatu, parts of New Caledonia, the Kermadec Islands northeast of New Zealand, and areas of the Austral Islands in southern French Polynesia.

### Neutral conditions prevail in the tropical Pacific

### Negative SST anomalies have developed along the South American coast

The El Niño event in the tropical Pacific has ended as most El Niño Southern Oscillation (ENSO) indicators return to neutral conditions.

## CLIMATE EXTREMES IN APRIL 2003

| Country          | Location             | Rainfall (mm) | % of average | Comments    |
|------------------|----------------------|---------------|--------------|-------------|
| Tuvalu           | Nanumea              | 565           | 225          | Record High |
| French Polynesia | Tuamotu, Hereheretue | 290           | 229          | Record High |

| Country | Location        | Rainfall (mm) | Date | Comments          |
|---------|-----------------|---------------|------|-------------------|
| Fiji    | Tokotoko, Navua | 229           | 30th | Record 1-Day High |

| Country | Location | Min Air Temp (°C) | Date | Comments   |
|---------|----------|-------------------|------|------------|
| Fiji    | Penang   | 17.4              | 17th | Record Low |

Rainfall was variable over Fiji. Enhanced convection was also associated with the Inter-Tropical Convergence Zone (ITCZ) in latitudes 8-10° north of the equator.

The last week of April was unsettled with flooding and heavy rainfall totalling over 200 mm in some of Fiji's Central Division areas, as well as in parts of New Caledonia (288 mm at Ouanaham on the 23<sup>rd</sup>).

The large region of suppressed convection (associated with rainfall totals generally less than 75% of average) extended further west

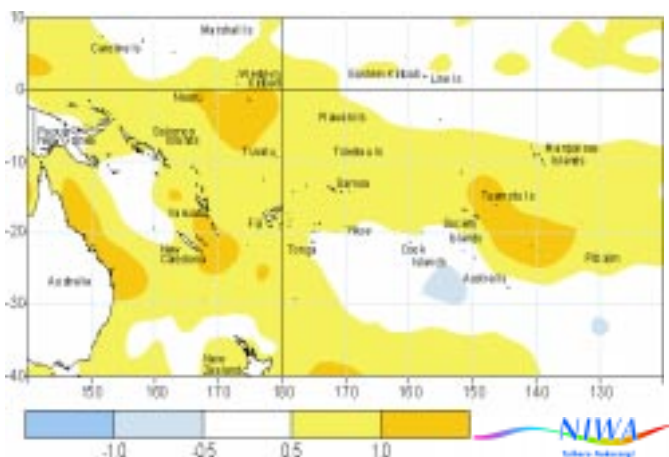
in April, driven by the equatorial surface easterlies, which occurred in 91% of observations at Tarawa (Western Kiribati), extending from Western Kiribati well to the east of the Marquesas Islands of northern French Polynesia. Suppressed convection also occurred over the Solomon Islands.

Air temperatures were at least 0.5°C above average throughout much of the tropical Southwest Pacific, as far east as Pitcairn Island, but near average in New Caledonia.

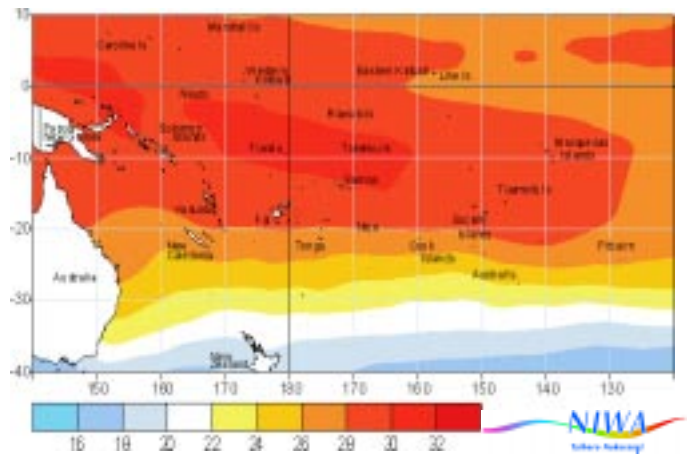
The NINO3 SST anomaly was zero in April, and NINO4 has eased back to +0.6°C. The three month (February - April) means are about +0.3°C and +0.9°C for NINO3 and NINO4, respectively. Equatorial subsurface temperature anomalies remain weak, apart from a region of negative anomalies below 100 m depth. Strong easterlies prevailed across the equatorial Pacific in April.

The area of suppressed convection in the eastern Pacific continued to move westwards, past the dateline along the equator.

Most of the ENSO global climate models indicate neutral conditions throughout the southern hemisphere winter and into spring.



Sea surface temperature anomalies (°C) for April 2003



Mean sea surface temperatures (°C) for April 2003



## Forecast validation

### Forecast period: February to April 2003

Enhanced convection over Western and Eastern Kiribati was expected to persist, extending west to include the Solomon Islands. Above average or average rainfall was also expected from Tuvalu across to the Society Islands of central French Polynesia. Below average rainfall was predicted for New Caledonia, the Marquesas Islands and Pitcairn Island. Average or below average rainfall was expected in many areas from

Vanuatu east to the Austral Islands, including Fiji and Tonga. Near average rainfall was projected elsewhere.

The overall rainfall anomaly pattern was similar to that expected. However, the region of above average rainfall did not extend as far west to include the Solomon Islands, where convection was suppressed.

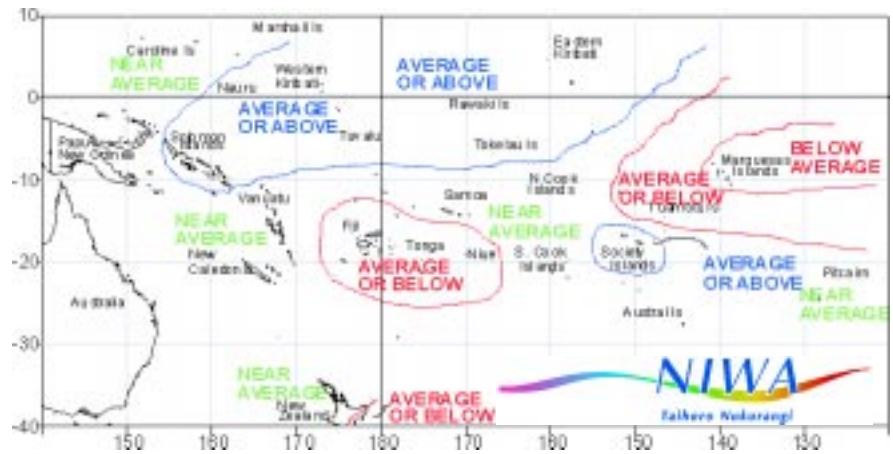


## Rainfall outlook: May to July 2003

**Average or above average rainfall is expected in many equatorial regions**

**Average or below average rainfall in Fiji, Tonga, Niue, and the Tuamotu Islands**

**Below average rainfall in the Marquesas Islands**



Rainfall outlook map for May to July 2003

The enhanced equatorial convection that was prevalent over last year has now dissipated with the strengthening of the easterly tradewinds across the equatorial Pacific. Average or above average rainfall is the most likely outcome for Western and

Eastern Kiribati, the Solomon Islands, Tuvalu, Tokelau and the Society Islands. Average or below average rainfall is expected in Fiji, Tonga, Niue and the Tuamotu Islands. Below average rainfall is more likely for the Marquesas Islands.

Near average rainfall is expected elsewhere in the region.

The forecast model skills are reduced at this time of the year due to the transition from the wet to the dry season.

## Impacts of Tropical Cyclone ERICA on New Caledonia



Courtesy Meteo-France

Tropical Cyclone 'ERICA' affected New Caledonia when it passed along the west coast of the main island on the 14<sup>th</sup> of March. Erica was the strongest tropical cyclone on record to affect New Caledonia since 'BETI' which devastated the country in 1996.

tropical cyclone Colleen in 1969, was shattered with wind gusts up to 202 km/h. A sustained maximum wind gust of 166 km/h was recorded at Vavouto, exceeding the former record of 144 km/h at Poindimié during tropical cyclone Beti in 1996.

Erica brought destructive hurricane force winds. A new maximum wind gust record of 234 km/h was measured at Koniombo (895 m elevation) and Vavouto. The old maximum was 230 km/h at Montagne des Sources (780 m elevation) for Beti. In Nouméa the previous maximum of 159 km/h recorded for

The estimated costs of rehabilitation for New Caledonia are US\$7 million for the telephone network, US\$7.5 million for the electricity network and US\$3.5 million for the crops. These costs do not include the damage to the infrastructure. Meteo-France had to fund US\$200,000 for repairs to its building.

## 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 (MAY - JULY 2003)

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

# TROPICAL CYCLONE SUMMARY FOR THE 2002/03 SEASON

Stuart Burgess and Ashmita Gosai, NIWA

'Fili', was the only tropical cyclone to occur in April, bringing gale force winds to parts of Tonga on the 14<sup>th</sup>. This was the ninth tropical cyclone to occur so far this season, the same as that of an average season (9), and three more than during the previous season (6). January 2003 was the most active month, with 3 occurrences. The 2002/03 tropical cyclone season was the most active since the season of 1998/99 when there were also 9 occurrences (see Figure 1). Unusually, six of the nine 2002/03 tropical cyclones reached major hurricane strength, with sustained wind speeds of at least 168 km/h. Five of the nine 2002/03 tropical cyclones originated east of the date line (the tracks of which are shown in Figure 2) which was expected because of the moderate ENSO conditions.

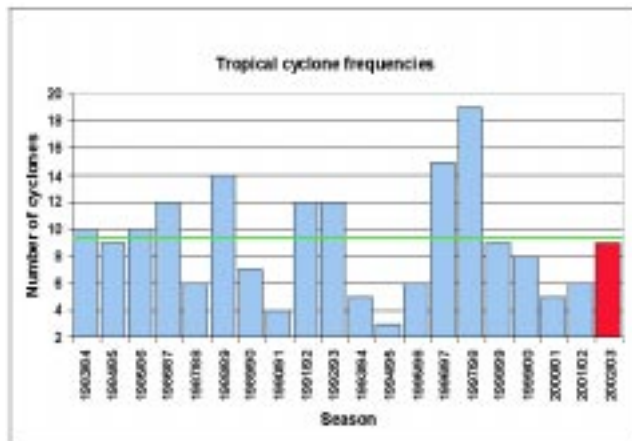


Figure 1. The number of Southwest Pacific tropical cyclones for the 2002/03 season (solid red bar) compared to frequencies during the past 20 years. The horizontal green line indicates the 20-year average.

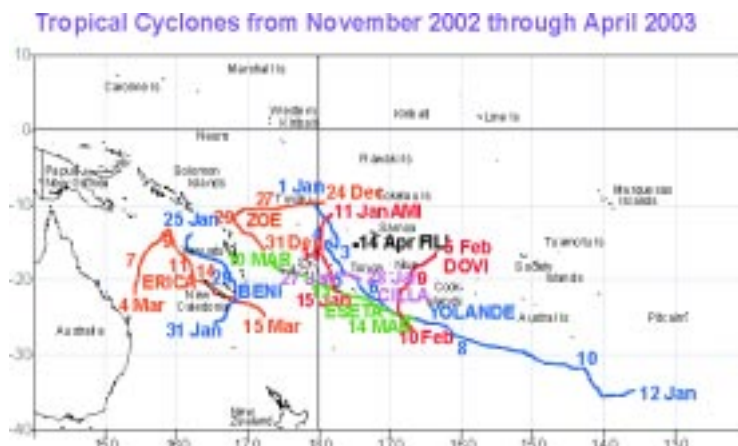


Figure 2. Southwest Pacific tropical cyclone tracks: for the 2002/03 season.

Estimates of maximum sustained wind speeds for named tropical cyclones in the 2002/03 season:

| Name    | Origin     | Period of Occurrence | Estimated Maximum Sustained Wind Speed (km/h) | Classification      |
|---------|------------|----------------------|---|---------------------|
| Yolande | 10°S 179°E | 1-12 Dec 2002        | 75  | Tropical Depression |
| Zoe     | 10°S 179°W | 24-31 Dec 2002       | 285   | Major Hurricane     |
| Ami     | 11°S 177°W | 11-15 Jan 2003       | 205   | Major Hurricane     |
| Beni    | 12°S 158°E | 25-31 Jan 2003       | 230   | Major Hurricane     |
| Cilla   | 19°S 177°W | 27-28 Jan 2003       | 65  | Gale                |
| Dovi    | 13°S 163°W | 5-10 Feb 2003        | 240   | Major Hurricane     |
| Erica   | 22°S 155°E | 4-15 Mar 2003        | 260   | Major Hurricane     |
| Eseta   | 16°S 173°E | 10-14 Mar 2003       | 205   | Major Hurricane     |
| Fili    | 16°S 176°W | 14 Apr 2003          | 65  | Gale                |

The three most devastating tropical cyclones of the 2002/03 season were 'Zoe', which was very destructive to the Santa Cruz Islands of Tikopia and Anuta of the Solomon Islands, wiping out plantations, and causing many islanders to take shelter in caves. 'Ami', affected the north and east of Fiji, with at least 15 people swept away by floodwaters with 4 still missing, along with extensive damage to villages and plantations. 'Erica', was very powerful, with hurricane force winds and high rainfall affecting New Caledonia, resulting in extensive damage – the most destructive there in the last 50 years. Mean sea level pressures at Vavouto fell as low as 952.3 hPa.

There is still a small chance of another tropical cyclone occurring in May.

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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