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# 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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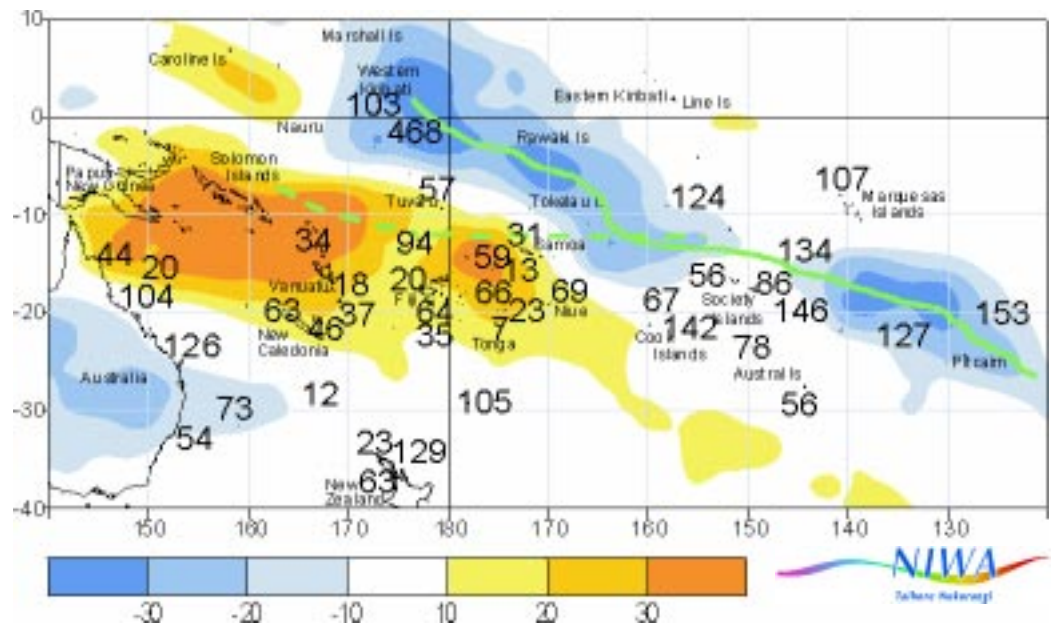
UK Meteorological Office

International Research Institute for Climate Prediction, IRICP

World Meteorological Organisation, WMO

### February's climate

The El Niño episode although weakening continued to affect Southwest Pacific rainfall patterns, with enhanced convection and above average rainfall extending from Western Kiribati through Tokelau to the Northern Cook Islands. In contrast, a large area of suppressed convection and below average rainfall extended from Papua New-Guinea to Niue. February rainfall was also above average from the Tuamotu Islands of French Polynesia to Pitcairn Island. There have been six tropical cyclones so far this season, the latest being 'Erica', which tracked southeast in the western Coral Sea area off the Queensland coast of Australia from 4 -6 March. **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 February 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 current conditions, and the recent model forecasts, the present El Niño event is expected to ease back to neutral by the end of May 2003. The Southern Oscillation Index (SOI) strengthened to -0.9 in February and sea surface temperatures (SSTs) in the equatorial Pacific, and other indicators, weakened further during February. **Details Page 2**

### The next three months March to May 2003

Continued enhanced convection and above average rainfall expected to persist in the equatorial region, with average or above average rainfall in Tuvalu. Below average or average rainfall is likely from New Caledonia, eastwards to Niue, including the Austral Islands. Below average rainfall is expected in the Marquesas Islands. Near average rainfall is expected elsewhere. **More on Page 3**



Ministry for the Environment and Territory  
Department for Global Environment, International and Regional Co-operation



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





## Climate developments in February 2003

**SPCZ produces enhanced convection from Western Kiribati to Pitcairn**

**Suppressed convection from Papua New-Guinea to Niue**

The SPCZ was generally displaced further north and east than average, with enhanced convection over much of the region from Western Kiribati southeast to Pitcairn Island. An equally large area of enhanced convection also occurred further west, over Indonesia and much of Australia. The frequency of equatorial surface westerlies weakened even further in February, reaching their lowest frequency at Tarawa (15% of observations) since May 2002.

**El Niño easing to neutral state**  
**Equatorial Pacific SSTs weaken further during February**

Based on the oceanic and atmospheric observations, the El Niño event is now easing back towards a neutral state. Most leading El Niño Southern Oscillation (ENSO) models indicate that the event will weaken to neutral state by end of May 2003.

### CLIMATE EXTREMES IN FEBRUARY 2003

Country	Location	Rainfall (mm)	% of average	Comments
Western Kiribati	Beru	529	468	Extremely High
Fiji	Nadi	59	20	Low
Vanuatu	Port Villa	49	18	Extremely Low
New Caledonia	Poindimie	102	27	Record Low
New Caledonia	Moue	47	29	Record Low
Australia	Norfolk Island	10	12	Extremely Low
Tonga	Nuku'alofa	17	7	Record Low
Tonga	Fua'amotu Airport	30	14	Record Low

Country	Location	Max Air Temp (°C)	Date	Comments
Fiji	Labasa	34.7	7th	Record High

Country	Location	Min Air Temp (°C)	Date	Comments
Fiji	Navua	19.5	3rd	Record Low

February rainfall was at least 125% of average (and approximately 200 mm, or more) over a broad region from Western Kiribati, southeast to Pitcairn Island, including Tokelau, parts of the Cook Islands, and the Tuamotu Islands of French Polynesia.

A large region of suppressed convection occurred from Papua New-Guinea to Niue, including the Solomon Islands, Vanuatu, New Caledonia, Tuvalu, Fiji, Tonga, and Samoa

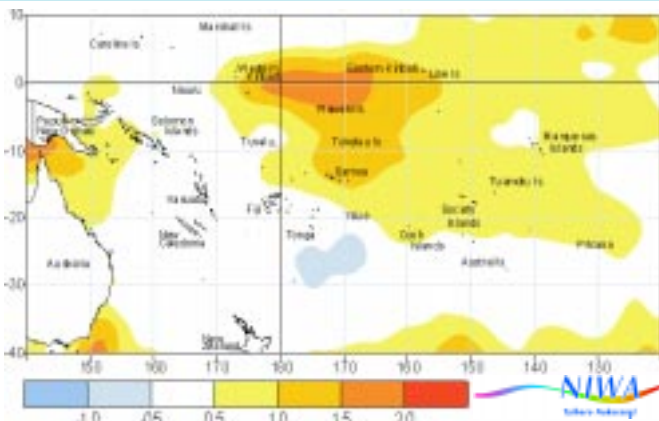
where rainfall totals were less than 75% of average in most areas. Rainfall was less than 50% of average throughout much of Vanuatu, and Tonga.

New temperature records were set in Fiji. Temperatures were generally around average during the day in most places, whereas night time temperatures were generally below average. Some new rainfall records were set in New Caledonia and Tonga.

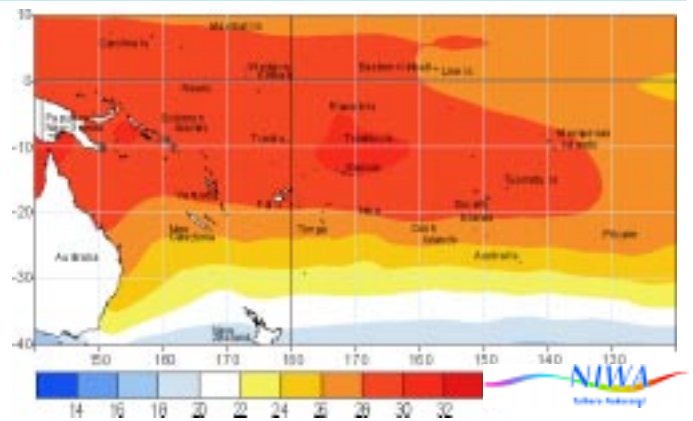
The NINO3 SST anomaly dropped 0.5°C in February (now +0.5°C), and NINO4 dropped to +1.0°C. The three month (December - February) means are about +1.1°C and +1.2°C for NINO3 and NINO4, respectively. Waters remain relatively warm off the southeastern Australian coast and across the southern Pacific east of the Dateline. Westerly zonal wind anomalies are now restricted to the Indonesian region and the area of reduced OLR near the Dateline

appears to be reducing in intensity and has spread off the Equator to the southeast. The area of suppressed convection in the west now lies over the northern Coral Sea extending to the Fiji region.

Most of the Global Climate Models indicate neutral conditions from the present through the southern hemisphere winter and into spring.



Sea surface temperature anomalies (°C) for February 2003



Mean sea surface temperatures (°C) for February 2003



## Forecast validation

**Forecast period:**  
**December 2002 to**  
**February 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 Tokelau. A tendency towards below average rainfall was forecast for a broad region from the Solomon Islands southeast to the Southern Cook Islands, including Vanuatu, New Caledonia, Fiji, Tonga, and

Niue, as well as the Marquesas Islands. Near average rainfall was predicted elsewhere.

The overall rainfall anomaly pattern was very similar to what was expected. However, the region of above average rainfall extended southeast to include the Northern Cook Islands, parts of French Polynesia, and Pitcairn Island.

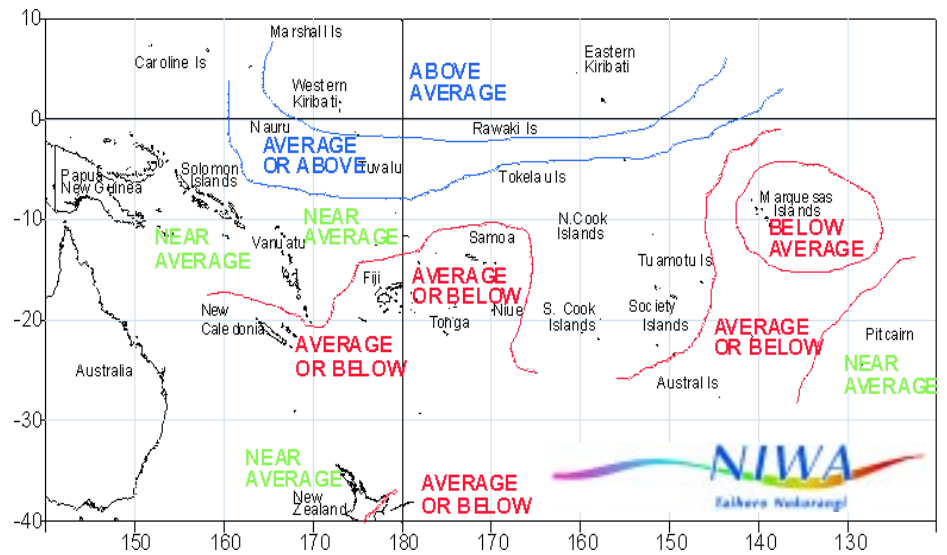


## Rainfall outlook: March to May 2003

Above average rainfall in Western and Eastern Kiribati, average or above average rainfall expected in Tuvalu

Average or below average rainfall from New Caledonia east to Niue and parts of French Polynesia

Below average rainfall in the Marquesas Islands



Rainfall outlook map for March to May 2003

Enhanced convection is expected to continue over Western and Eastern Kiribati resulting in above average rainfall. Tuvalu is expected to experience average or above average rainfall.

Below average or average rainfall is the most likely outcome from New Caledonia, to Niue, including Fiji, Tonga, Samoa, and the Austral Islands.

Marquesas. Near average rainfall is expected elsewhere.

The forecast model skills for this outlook are generally moderate for nearly all islands in the region.



## Tropical Cyclone Update

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We are now in the peak period of the Southwest Pacific tropical cyclone season, and there have been six tropical cyclones so far. 'Dovi', which occurred from 5-10 February, developed east of Samoa and tracked southwest to pass east of Niue on the 9th, then tracked southeast, with estimated maximum sustained winds speeds of 240 km/h (hurricane force). 'Erica', which is the most recent occurrence, tracked

southeast in the western Coral Sea area off the Queensland coast of Australia from 4-6 March, with estimated maximum sustained winds speeds of 65 km/h (gale force).

The April issue of the ICU will provide an update on information relating to any occurrences of tropical cyclones in our forecast region of the South West Pacific.

## 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 (MARCH - MAY 2003)

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

# The Southwest Pacific Climate in 2002

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

The year 2002 was one of more contrasts across the Southwest Pacific. Important drivers of the annual pattern were the development of the El Niño conditions during the second half of the year (See Fig.1), the decreased strength of the trade winds, and the distribution of warm sea surface temperature (SST) anomalies.

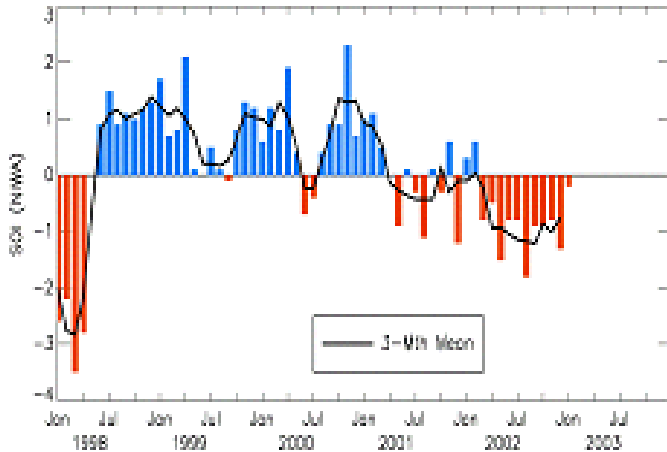


Fig 1: The Southern Oscillation Index (SOI). The solid line represents the 3-month running mean, while the coloured bars show monthly standard deviations (blue for positive, red for negative).

Anomalous equatorial westerlies occurred about and west of the Dateline and in the central Pacific from July through November. The El Niño began to affect rainfall distribution, from August onwards as shown in the monthly outgoing long-wave radiation (OLR) and rainfall anomaly patterns. The equatorial region of enhanced convection had then moved east to lie over Kiribati (Refer to Fig.2 The 2002 annual OLR anomaly map). The South Pacific Convergence Zone (SPCZ) was generally further south than usual during the first half of the year. For the rest of the year, the SPCZ was situated near its average location about and west of the Dateline, but was fairly inactive further east.

Annual rainfall was less than 75% of average from the Northern Cook Islands across to the Society Islands of

central French Polynesia. The 2002 rainfall total at Tahiti-Faaa (1061 mm) was only 65% of average, and one of the lowest on record there. Rainfall was also well below average in the Coral Sea and along the Queensland coast of Australia, associated with above average surface pressure over much of Australia.

A large area of very enhanced rainfall and well below average OLR occurred over Western and Eastern Kiribati, with totals exceeding 150% of average on many islands. The 2002 rainfall total at Tarawa (3492 mm) was 174% of average, and one of the highest on record there. Rainfall was also above average in parts of Fiji and southern Tonga, associated with below average surface pressures in that region.

Surface air temperatures along the equator were largely influenced by the warm ENSO event, being about 0.5°C above average there, Over Kiribati they were at least 1.0°C above average.

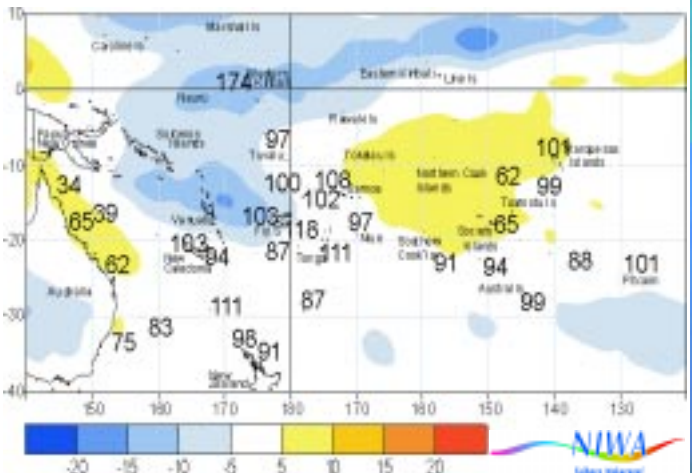


Fig 2: 2002 climate patterns. Outgoing Long-wave Radiation (OLR) anomalies, in  $Wm^{-2}$  are represented by hatched areas, and rainfall percentage of average, shown by numbers. High radiation levels (yellow) are typically associated with clearer skies and lower rainfall, while cloudy conditions lower the OLR (blue) and typically mean higher rainfalls.

The Island  
Climate Update



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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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