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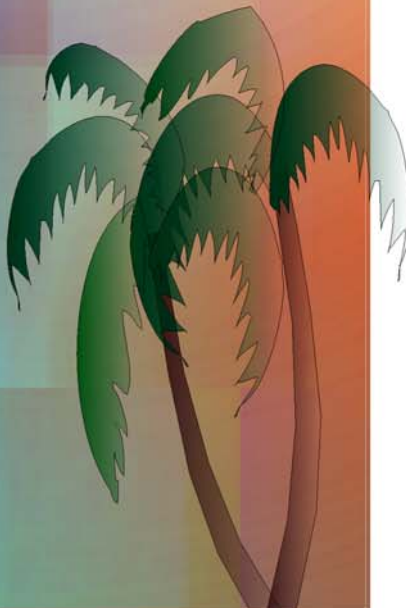
NOAA Climate Prediction Centre, CPC

International Research Institute for Climate Prediction, IRI

European Centre for Medium Range Weather Forecasts, ECMWF

UK Met Office

World Meteorological Organisation, WMO



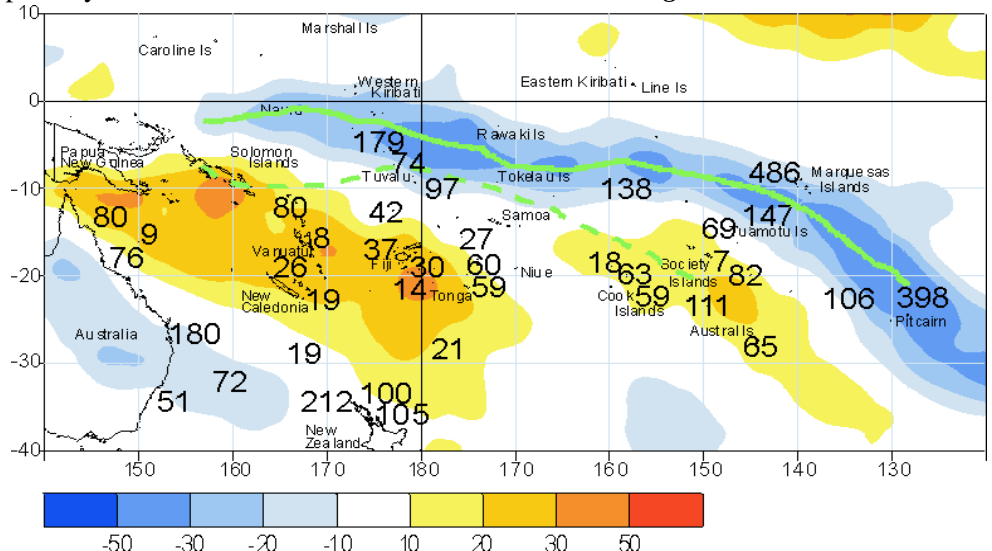
The Island Climate Update



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

January's climate

The South Pacific Convergence Zone (SPCZ) was a major feature in January's climate, being located much further north and east than usual, extending east from the region north of the Solomon Islands, toward the Marquesas Islands and Pitcairn Island. Rainfall was well above average in the SPCZ affected region, where totals were at least 300 mm in many locations. A large region of suppressed convection and well below average rainfall affected the region from the Coral Sea southeast to Tonga, including the Solomon Islands, Vanuatu, New Caledonia, and Fiji. A smaller region of suppressed convection and generally below average rainfall occurred over central and southern French Polynesia, with record low rainfall at Tahiti. To date, 'Heta', which devastated Niue on 6 January, is the only tropical cyclone to have occurred this season. **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 January 2004 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

The equatorial Pacific remains in a neutral El Niño Southern Oscillation (ENSO) state. Equatorial sea surface temperatures (SSTs) continue to ease. The mean Southern Oscillation Index (SOI) for January was -1.3. Global climate models indicate neutral conditions till May 2004, with the hint of a warm event developing over the winter of 2004. **Details Page 2**

The next three months February to April 2004

Rainfall is expected to be above average over Western Kiribati and the Solomon Islands, with average or below average rainfall likely over Eastern Kiribati and the Marquesas Islands. Near average rainfall is expected elsewhere in the region. **More on Page 3**



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





Climate developments in January 2004

SPCZ much further north and east than usual

Extremely high rainfall from the Marquesas Islands to Pitcairn Island

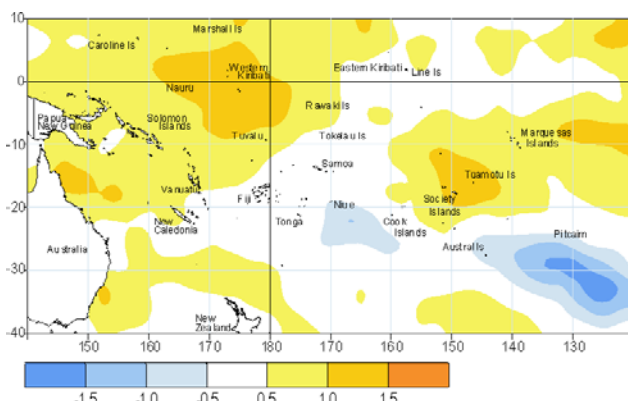
Extremely low rainfall in many tropical islands about and west of the Date Line

The Southwest Pacific in January OLR and rainfall anomaly pattern was almost opposite to that of December. The SPCZ was located much further north and east than usual, extending east from the region north of the Solomon Islands, toward the Marquesas Islands, and down to Pitcairn Island. Rainfall was well above average in the SPCZ affected region, with anomalies 400 to 500% of normal in some places, and totals of at least 300 mm in most locations.

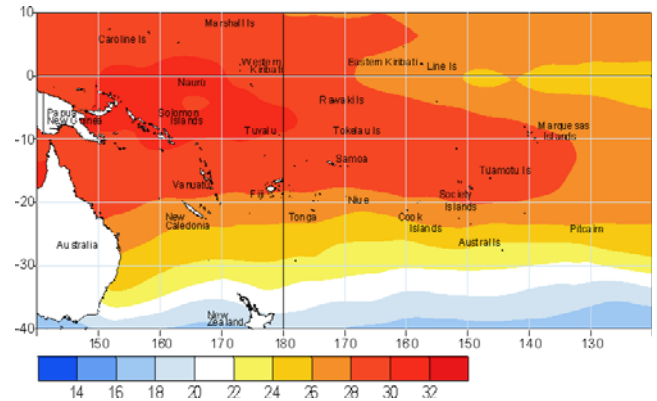
The equatorial Pacific remains in a neutral state

Anomalous equatorial SSTs continue to ease

The equatorial Pacific remains in a neutral ENSO state. Anomalous equatorial SSTs continue to ease, but are still higher than normal, especially in the



Sea surface temperature anomalies (°C) for January 2004



Mean sea surface temperatures (°C) for January 2004

CLIMATE EXTREMES IN JANUARY 2004				
Country	Location	Rainfall (mm)	% of average	Comments
Tuvalu	Nui Island	754	179	Well above average
French Polynesia	Hiva Hoa, Autona	457	486	Highest
Pitcairn	Pitcairn Island	350	398	Highest
New Caledonia	Ouanaham	25	14	Lowest
Vanuatu	Bauerfield	28	11	Extremely low
Vanuatu	Port Villa	23	8	Extremely low
Vanuatu	Burtonfield	20	12	Extremely low
Fiji	Nausori	108	30	Lowest
Fiji	Monasavu	175	26	Lowest
French Polynesia	Tahiti - Faaa	26	7	Lowest

Country	Location	Mean Air Temp (°C)	Dep from av	Comments
French Polynesia	Tahiti-Faaa	27.9	+0.8	Well above average

Country	Location	Min Air Temp (°C)	Date	Comments
Fiji	Monasavu	14.0	20th	Record Low

In contrast the Inter-Tropical Convergence Zone (ITCZ) was fairly inactive. A large region of suppressed convection and well below average rainfall (50% or less of normal) affected the region from the Coral Sea southeast to Tonga, including the Solomon Islands, Vanuatu, New Caledonia, and Fiji. Many stations recorded rainfall totals less than 50 mm. Another smaller region of suppressed convection and generally below average rainfall occurred over

west. The mean SOI for January was -1.3, and -0.3 for November to January. The NINO3 SST anomaly for January was about +0.6°C and NINO4 about +0.8°C (November to January are +0.6°C and +0.9°C, respectively). The trade winds have been near normal for much of January, apart from a westerly wind burst near the Date Line in the first half of the month. The wind burst may be related to

central and southern French Polynesia, with record low rainfall at Tahiti. January was the 11th consecutive month with below average rainfall in parts of Eastern Kiribati.

Air temperatures were about 0.5°C above average in New Caledonia and 0.5-0.9°C above in French Polynesia. In Fiji, daytime temperatures were above average, while overnight lows tended to be below average.

a Kelvin wave that has developed on the thermocline, with a positive temperature anomaly in the central equatorial Pacific at about 150 m, and a negative anomaly further east.

Most of the global climate models indicate neutral conditions till autumn 2004 (with positive SST anomalies).



Forecast validation

Forecast period: November 2003 to January 2004

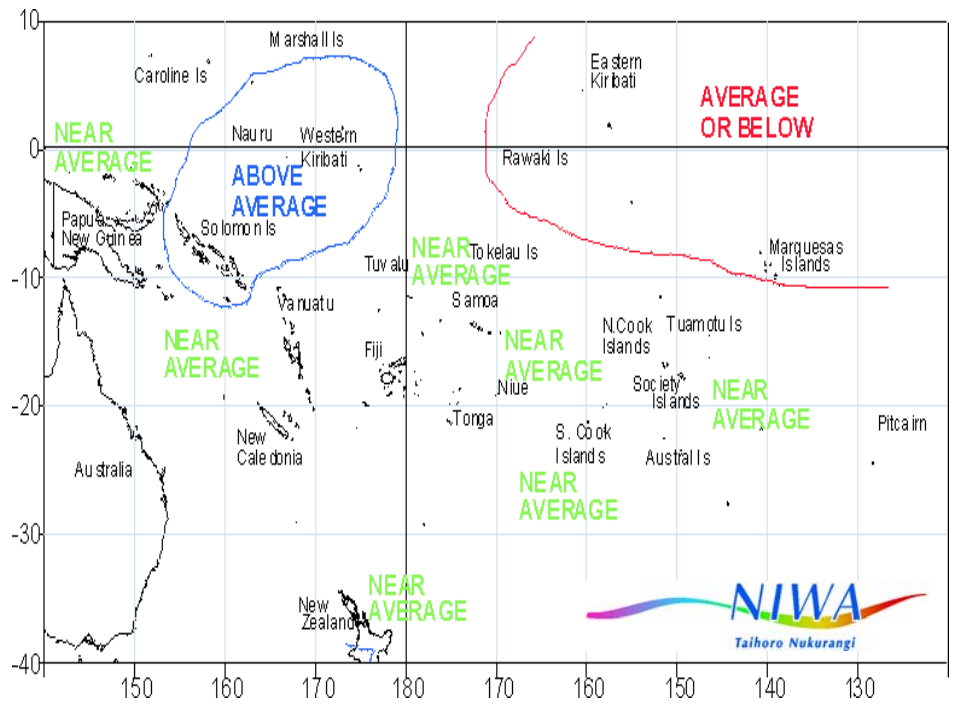
Average or above average rainfall was expected in Papua New Guinea, the Solomon Islands, Samoa, and central French Polynesia. Below average rainfall was forecast for Eastern Kiribati and the Marquesas Islands, and average or below average rainfall from Vanuatu to Niue, including Fiji and Tonga.

Rainfall was lower than expected in Papua New Guinea, New Caledonia, and the Society Islands and higher than expected in Pitcairn Island and the Marquesas Islands, and as forecast elsewhere. The hit overall 'hit rate' for the November to January rainfall outlook was very high, being about 75%.



**Rainfall outlook:
February to
April 2004**

- **Above average rainfall in Western Kiribati and the Solomon Islands**
- **Average or below average rainfall likely over Eastern Kiribati and the Marquesas Islands**
- **Near average rainfall elsewhere**



Rainfall outlook map for February to April 2004

Enhanced convection is expected in the equatorial region west of the Date Line, resulting in above average rainfall in Western Kiribati and the Solomon Islands.

Suppressed convection is expected in the eastern equatorial Pacific which is likely to result in average or below average rainfall over Eastern Kiribati and the Marquesas Islands. Rainfall is expected

to be near average elsewhere in the region with low or moderate skill. During this time of the year, rainfall is largely affected by any tropical cyclones and depressions affecting the region.

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
(FEBRUARY - APRIL 2004)**

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

The Southwest Pacific Climate in 2003

Stuart Burgess and Dr Jim Salinger, NIWA

The 2002/03 El Niño event, although decaying, had a significant impact in the Southwest Pacific. The event commenced in May 2002, had weakened by January 2003, and dissipated by April (Fig.1). This had a noticeable impact on the Southwest Pacific rainfall anomalies at the beginning of the year with above average rainfall over Eastern and Western Kiribati until it dissipated in April, and below average rainfall over much of New Caledonia and Fiji during the first few months of 2003. Southwest Pacific rainfall patterns were dominated by other features during the remainder of the year. The trade winds increased in strength from February, except for a westerly wind burst that occurred in October. Generally, higher than average sea surface temperature (SST) anomalies occurred throughout the region during 2003 (Fig. 2). Nine tropical cyclone occurrences, five of which were classified as major hurricanes, affected the region.

Both sea surface temperatures (SSTs) and mean air temperatures were at least 0.5°C above average throughout much of the tropical Southwest Pacific, especially along the equator from Nauru to the north of Rawaki Island, Eastern Kiribati where they were about 1.0°C above average. The year was one of the warmest on record for mean air temperatures in the Marquesas (+0.9°C above average at Hiva Hoa) and Tuamotu Islands (+0.7°C above average at Takaroa) of French Polynesia.

Above average air pressures in the Coral Sea suppressed convection in that area, including southern parts of the Solomon Islands, northern Vanuatu, and toward the Date Line. Suppressed convection also occurred in an extensive region along the equator from the Date Line east toward South America, including Eastern Kiribati and the Marquesas Islands (Fig. 3). The 2003 rainfall total at Willis Island (358 mm) was only 32% of average, and extremely low. Ono-i-Lau in Fiji recorded 1068 mm, 65% of average, with Hiva Hoa in the Marquesas Islands recording 751 mm, 62% of average, and one of the lowest annual rainfall totals on record.

Areas of enhanced convection affected the region north of Papua New Guinea, the Marshall Islands, and parts of southern French Polynesia. For the year, the South Pacific Convergence Zone (SPCZ) was generally further north and east than usual. However, its main area of activity was concentrated in areas east of the Date Line from February to May, moving to areas west of the Date Line from September to November. Rainfall was above average in parts of New Caledonia, Tonga, and the southern Cook Islands.

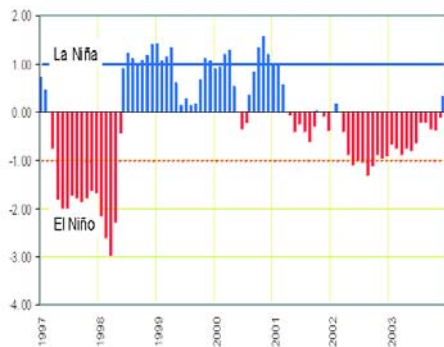


Fig 1: The Southern Oscillation Index (SOI). The coloured bars show monthly standard deviations (blue for positive, red for negative).

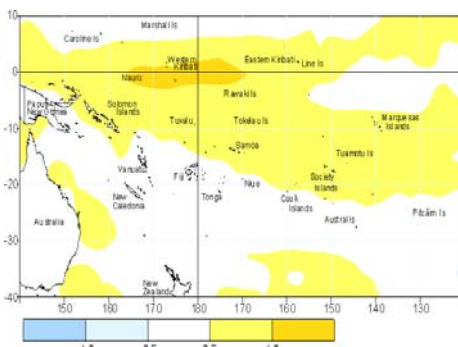


Fig 2: 2003 climate patterns. Sea Surface temperature (SST) anomalies (departure from average, °C). Yellow or orange areas represent warmer than average seas.

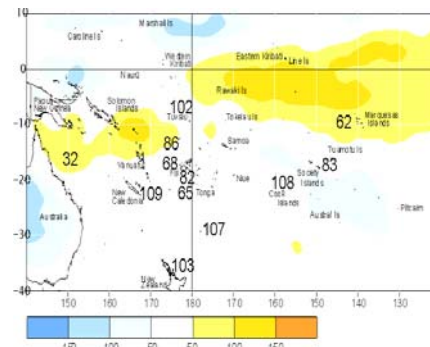


Fig 3: 2003 climate patterns. OLR anomalies. Yellow or orange represents suppressed convection.



Visit The Island Climate Update website at: 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 Island 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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