

19
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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
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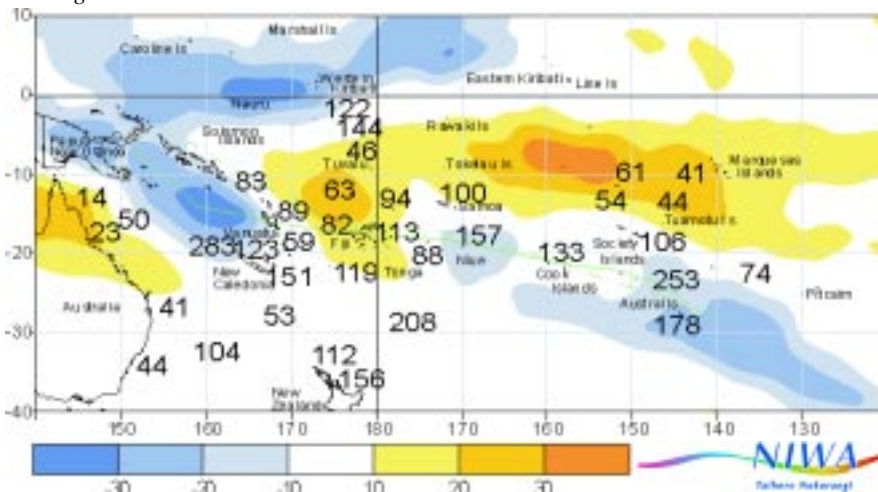
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March's climate

An extensive area of enhanced convection occurred over equatorial waters about and west of the date line, from Papua-New Guinea to Western Kiribati, with another convective band associated with a southward displacement of the South Pacific Convergence Zone (SPCZ) extending from the northern Coral Sea southeast to affect Vanuatu and New Caledonia. The SPCZ continued to be more active than usual over southern French Polynesia. Rainfall was more than 200% of average in parts of New Caledonia and southern French Polynesia. Heavy rainfall occurred in New Caledonia during the passage of tropical cyclone 'Des', the only occurrence in March, which reached storm force as it tracked southeast from 5 through 7 March. Dry, sunny conditions prevailed over northern Fiji, much of Tuvalu, Tokelau and many islands in northern French Polynesia. Rainfall less than 50% of average continued on the Queensland coast of Australia, extending into the western Coral Sea. March was unusually warm in Fiji with mean air temperatures at least 1.5°C above average at some sites.

More on Page 2.



Outgoing Long-wave Radiation (OLR) anomalies, in Wm^{-2} , for February 2002 represented by shaded 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 2002 position of the South Pacific Convergence Zone (SPCZ), as identified from total rainfall, is indicated by the solid green line. The average SPCZ position is identified by the dashed green line. Data source: NOAA-CIRES Climate Diagnostics Center.

ENSO and sea surface temperatures

Based on recent observations in the equatorial Pacific, the likelihood of an El Niño developing this year has increased. The equatorial Pacific Ocean is warmer than average especially near South America, the Southern Oscillation Index became negative this month, and enhanced rainfall has been observed off the west coast of South America near Ecuador. The forecast models show a strong consensus. The last El Niño event occurred in 1997/98. The next few months will be critical to the development of an El Niño episode. *Details Page 2.*

The next three months (April to June 2002)

Above average rainfall is likely in Kiribati and Vanuatu, with average to above average totals in New Caledonia, Fiji, Niue and Pitcairn Island. Average to below average rainfall is expected in many areas from the Solomon Islands east to the Marquesas including the Northern Cook Islands and central French Polynesia. *More on Page 3.*





Climate developments in March 2002

Active convection over equatorial waters about and west of the date line

High rainfall in parts of New Caledonia and southern French Polynesia

Low rainfall from Tuvalu to northern French Polynesia

An extensive area of enhanced convection occurred over equatorial waters about and west of the date line, from Papua-New Guinea to Western Kiribati, with another convective band associated with a southward displacement of the SPCZ extending from the northern Coral Sea southeast to affect Vanuatu and New Caledonia. The SPCZ was situated near its average position about and east of the date line, but was more active than usual over southern French Polynesia (where wet conditions continued). Rainfall was at least 125% of average at many locations within these convective regions, but more than 200% of

CLIMATE EXTREMES IN MARCH 2002				
Country	Location	Rainfall (mm)	% of normal	Comments
New Caledonia	Ile Art, Belep	612	283	Highest
French Polynesia	Tubuai	574	253	Highest
Fiji	Matei Airfield	44	4	Lowest

Country	Location	Mean air temperature, °C	Departure from average	Comments
Fiji	Rotuma	28.6	+1.5	Highest
Fiji	Nabouwalu	28.5	+1.9	Highest
French Polynesia	Bora bora	29.5	+1.6	Highest
French Polynesia	Rikitea	26.5	+0.8	Highest

Country	Location	Extreme air temperatures, °C		Comments
French Polynesia	Hao	Extreme daily maximum	32.9	New record
Fiji	Viwa	Highest overnight min.	28.3	New record

average in parts of New Caledonia and southern French Polynesia, some sites recording more than 400 mm. Rainfall totalling more than 100 mm was measured in many parts of New Caledonia during the passage of tropical cyclone 'Des' to the southwest from 5 through 7 March. Aoupinié recorded 275 mm on 6 March and 390 mm in two days. Some flooding occurred although not major. Further high rainfall (at least 100 mm) also occurred in northern and eastern parts of New Caledonia from 14-15 and 22-24 March.

Sunny conditions, with less than 75% of average rainfall, prevailed over northern Fiji, much of

Tuvalu, Tokelau and many islands in northern French Polynesia. Below normal rainfall (less than 50% of average) continued on the Queensland coast of Australia, extending into the western Coral Sea. Willis Island, off the Queensland coast, has now recorded 8 consecutive months with less than 75% of average rainfall.

High mean March air temperatures (1.0°C or more above average), associated with warmer than average sea surface temperatures, were measured in Fiji and northern and central French Polynesia. Air temperatures were near average in New Caledonia.

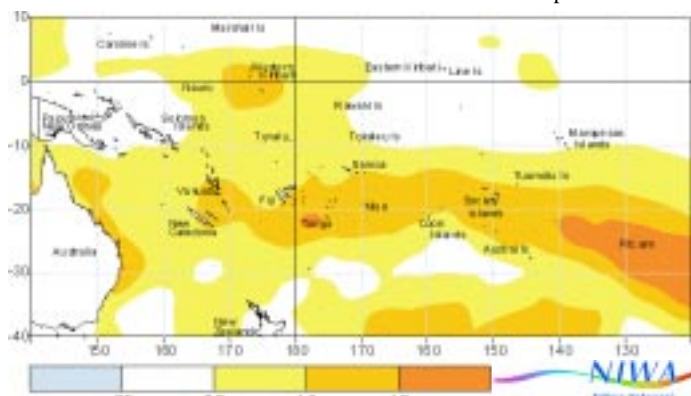
Conditions are set for the development of an El Niño

Warmer than average seas across the whole of the tropical Southwest Pacific

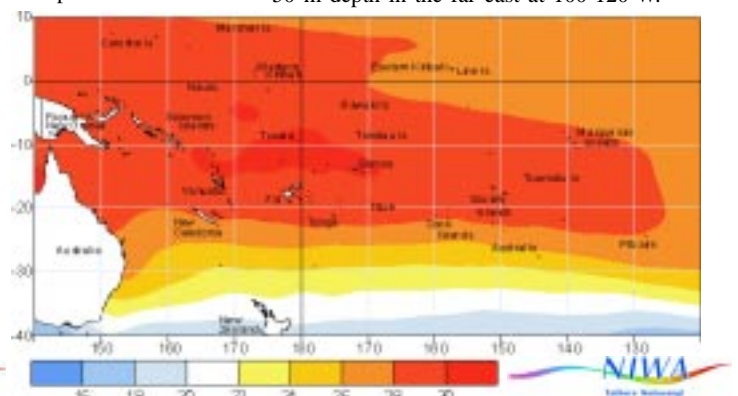
The likelihood of an El Niño developing this year, based on recent observations in the equatorial Pacific, has increased. The equatorial Pacific Ocean temperatures are becoming warmer than average especially near South America where anomalies now exceed +1.0°C. The Southern Oscillation Index showed a substantial fall

(to -0.8) in March, from weakly positive values over the previous two months. The March OLR data showed extensive positive anomalies (indicating decreased convection) from Sumatra in Indonesia across northern Australia to the western Coral Sea, while enhanced convection and high rainfall was observed off the west coast of South America near Ecuador. The global forecast models show a strong consensus. All these factors point to an increased likelihood of an El Niño developing. There are no significant anomalies in the Pacific equatorial trade winds at this stage. The next few months will be critical to the development of an El Niño episode.

In the tropical Southwest Pacific, a very extensive area of much warmer than usual water at the surface (at least 1.0°C above average) extends from New Caledonia through to the region well east of Pitcairn Island, encompassing most islands between 15 and 25°S. A region of positive SST anomaly (of at least 1.0°C above average) is well established around Western Kiribati. The warmest surface waters (30-31°C) extend from northern Vanuatu across to Samoa. Sub-surface sea temperature observations show positive anomalies from 160°W to the coast of South America, with the (relatively) warmest water near 50 m depth in the far east at 100-120°W.



Sea surface temperature anomalies (°C) for March 2002



Mean sea surface temperatures (°C) for March 2002



Forecast validation

**Forecast period:
January to March 2002**

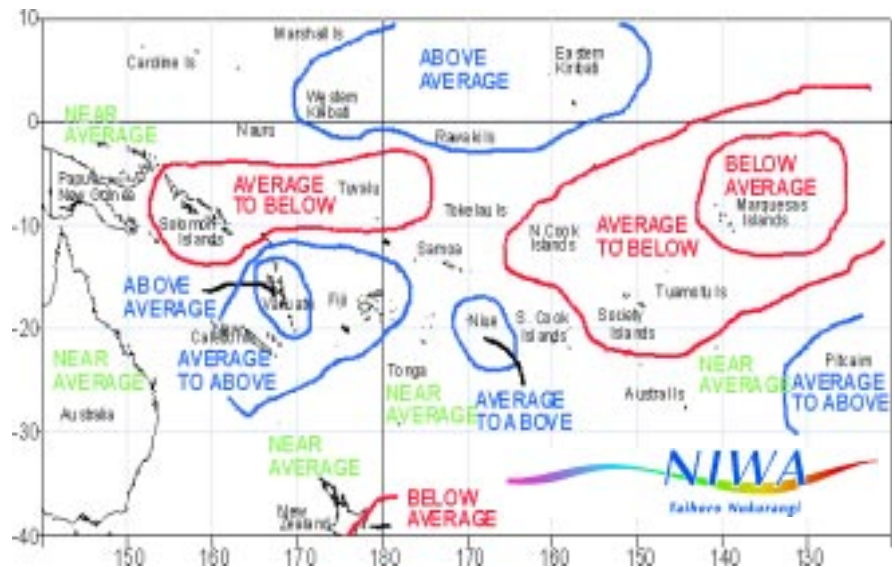
The SPCZ was expected to be more active than usual and also further north than average of its normal location. Rainfall was expected to be average to above average in equatorial latitudes from Western Kiribati southeast to Tonga and Niue, including Tuvalu, Wallis and Futuna, and Samoa. Average to below average rainfall was expected in Vanuatu, Eastern Kiribati, the Society Islands, and the Southern Cooks, with below average rainfall in the Marquesas. Average rainfall was expected in most other areas.

This scenario was correct for many islands. However, the SPCZ was further south than predicted resulting in lower than expected rainfall in the Tokelaus, Wallis and Futuna, Northern Cook Islands and Samoa and higher than forecast rainfall in areas of Papua-New Guinea, New Caledonia, Fiji and the Austral Islands. Mixed rainfall patterns occurred over Vanuatu. The overall 'hit rate' for the January to March rainfall outlook was about 65%.



Rainfall outlook: April to June 2002

- Average to below average rainfall from the Solomon Islands to the Marquesas, including the Northern Cook Islands and central French Polynesia
- Above average rainfall in Kiribati and Vanuatu
- Mainly average rainfall in other areas



Rainfall outlook map for April to June 2002

The South Pacific Convergence Zone moved south in March, lying over Fiji, Tonga and the Southern Cook Islands: displaced further to the southwest than usual in areas west of the dateline. Rainfall is projected to be above average in

Western and Eastern Kiribati and Vanuatu, and average to above average in New Caledonia, Fiji, Niue and Pitcairn Island. Average to below average rainfall is projected for much of the region from the Solomon Islands east to the Marquesas

including the Northern Cooks, and central French Polynesia. Average rainfall is more likely in other areas. Forecast skill for most rainfall outlook models is usually lowest at the onset of the South Pacific dry season.

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 2002)

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



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Tropical cyclones

Summary of the year 2001/02 tropical cyclone season

- Only five tropical cyclones so far
- Tropical cyclone 'Waka' was particularly destructive
- The season is not quite over; the chance of another tropical cyclone still remains

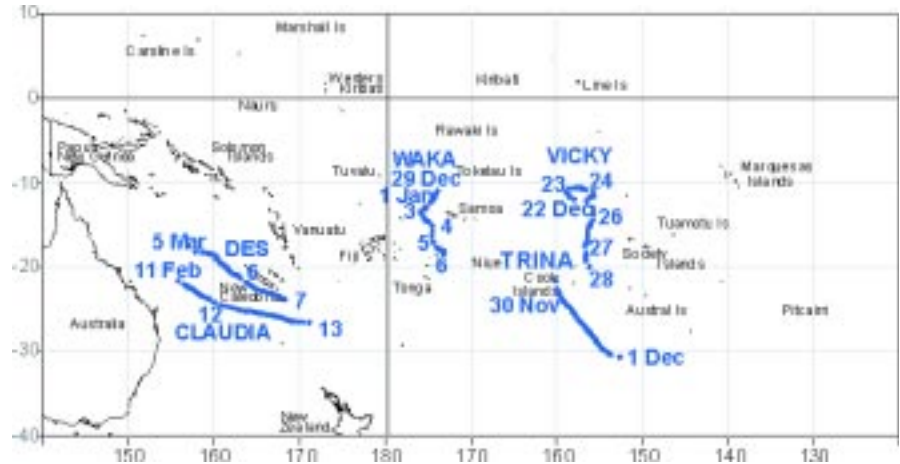
Five tropical cyclones have occurred so far this season, which is the same number as for the whole of last season and well below average (see graph below). The most recent was tropical cyclone 'Des', which developed northwest of New Caledonia near 18°S 158°E on 5 March, and tracked south-east to pass just south of New Caledonia over the 6th and 7th. The cyclone's lowest central pressure was approximately 985 hPa, with sustained maximum wind speeds estimated to be about 95 km/h. A maximum

wind gust of 122 km/h was recorded at Koniambo, New Caledonia on 6 March, with gusts below 100 km/h elsewhere.

This season the period between 22 December and 6 January was quite active, with two occurrences during that time. Three tropical cyclones occurred east of the date line and two to the west (the tracks of which are shown in the figure below). 'Waka' was the most severe tropical cyclone to hit the northern islands of Vava'u and

Niutoputapu in recent times with hurricane force winds destroying 300 houses and six schools, as well as uprooting trees, cutting electricity and telecommunications, destroying crops and affecting water supplies.

There is still a small chance of another tropical cyclone occurring in April or May. On average one tropical cyclone occurs in seasons similar to the present during this period.



Southwest Pacific tropical cyclone tracks: November 2001 through 31 March 2002.



The number of Southwest Pacific tropical cyclones for the 2001/02 season (solid red bar) compared to frequencies during the past 20 years. The horizontal green line indicates the 20-year average.

Estimates of maximum sustained wind speeds for named tropical cyclones in the 2001 / 02 season were:

Name	Origin	Period of occurrence	Estimated maximum sustained windspeed (km/h) and classification
Trina	21°S 160°W	30 Nov.-1 Dec.	65 Tropical Cyclone
Vicki	12°S 158°W	22-28 Dec.	65 Tropical Cyclone
Waka	11°S 174°W	29 Dec.-6 Jan.	185 Hurricane
Claudia	21°S 163°E	11-13 Feb.	140 Hurricane
Des	19°S 161°E	5-7 Mar.	95 Tropical Storm

The Island Climate Update



Visit The Island Climate Update website at: www.niwa.cri.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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