The Island Climate Update

26

7 November 2002

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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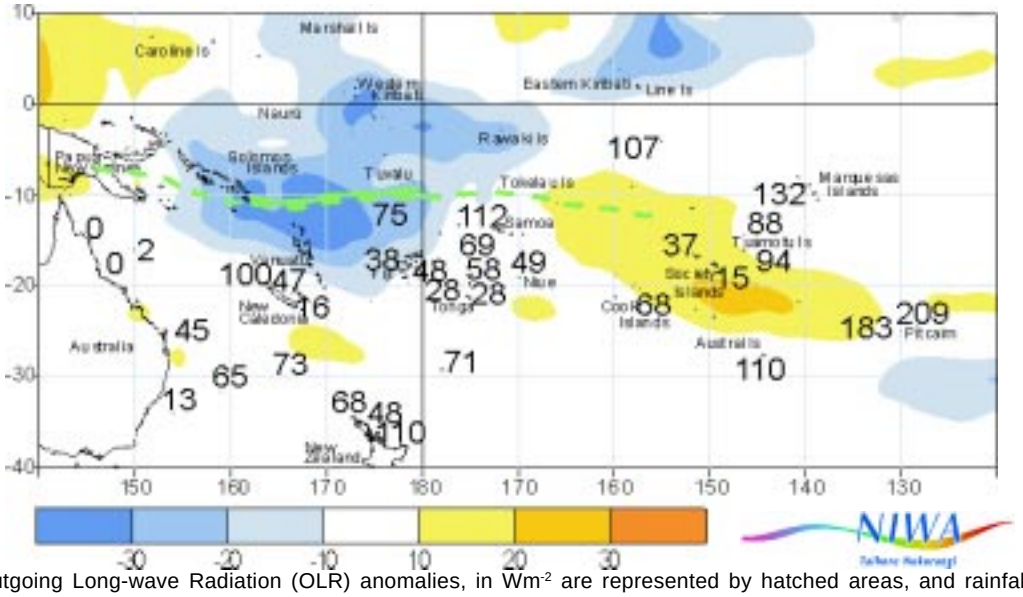
October's climate

The El Niño is continuing to affect Southwest Pacific rainfall patterns, with enhanced convection and well above average rainfall over much of Kiribati, but contrasting areas of suppressed convection and well below average rainfall from Australia across to central French Polynesia. The SPCZ was enhanced in many areas near its average location about and west of the dateline, but as in recent months had little activity further east. Willis Island, in the western Coral Sea, has now recorded 15 consecutive months with less than 75% of average rainfall. Rainfall was less than 50% of average in many areas of New Caledonia, Fiji, Tonga, Niue, and Central French Polynesia. *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 October 2002 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 moderate El Niño is expected to last through the southern hemisphere summer. However, it is unlikely to be as strong as the 1997/98 event. The 3-month Southern Oscillation Index (SOI) remains steady at -1.2, and positive equatorial sea surface temperature (SST) anomalies have intensified east of the dateline. The El Niño is expected to persist until autumn 2003. *Details Page 2.*

The next three months (November 2002 to January 2003)

Above average rainfall is likely in both Western and Eastern Kiribati. Wallis & Futuna, Tuvalu and Tokelau are likely to experience average or above average rainfall. Below average or average rainfall is expected from Fiji to the Austral Islands including Samoa and Southern Cooks Islands. Below average rainfall is forecast for Vanuatu, New Caledonia, Tonga, and Niue.

More on Page 3.

Ministry for the Environment and Territory

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

SPREP

Climate developments in October 2002

CLIMATE EXTREMES IN OCTOBER 2002

Country	Location	Rainfall (mm)	% of average	Comments
Western Kiribati	Tarawa	357	330	Well above average
Western Kiribati	Arorae	315	371	Well above average
Pitcairn	Pitcairn Island	279	209	Well above average
French Polynesia	Rikitea	341	183	New Record
Australia	Willis Island	<1	2	Extremely Low
Australia	Cairns Airport	0	0	Record Low
Australia	Townsville Airport	0	0	Record Low
New Caledonia	La Tontouta	3	6	Extremely Low
New Caledonia	Noumea	8	16	Well below average
Tonga	Fua'amotu Airport	27	24	Extremely Low
French Polynesia	Tahiti - Faaa	13	15	Extremely Low

Country	Location	Max air Temp (°C)	Date of Occurrence	Comments
French Polynesia	Hao	32.1	27th	New High
Fiji	Rotuma	33.0	25th	New High
Fiji	Nabouwalu	32.9	23rd	New High

Country	Location	Min air Temp (°C)	Date of Occurrence	Comments
Fiji	Rotuma	26.9	3rd	New High
Fiji	Labasa Airfield	25.8	24th	New High

Enhanced convection over much of the western and central Pacific

Well below average rainfall from Australia across to central French Polynesia

The SPCZ was near its average location about and west of the dateline, with enhanced convection between the Solomon Islands and Tuvalu. This region merged with the ENSO related area of enhanced convection situated over Kiribati in the central equatorial Pacific. Episodes of equatorial westerlies, enhancing the ENSO linked convection over Kiribati, were not as frequent as in the past few months. Anomalous rainfall continued, as much as 300-400% of average, in parts of Western Kiribati, and totals at least 200% of average in parts of Eastern Kiribati, as well as localised parts of Vanuatu and Pitcairn Island. Rainfall was at least 125% average in the Marquesas Islands of French Polynesia.

The SPCZ continued to be weak with little activity east of Tokelau in the Southwest Pacific.Convection remained suppressed over Indonesia, and Australia where extremely dry conditions persisted. Rainfall continued below average across the Coral Sea to New Caledonia, now affecting Fiji, Tonga, Niue, and Central French Polynesia, all with totals less than 50% of average in many areas. However, Rikitea recorded its highest monthly and 24-hour rainfall for October, 341mm and 131mm respectively.

Temperatures were generally around and above average throughout the Pacific region.

Moderate El Niño expected to last through Summer

Much of the equatorial Pacific remains warmer than normal

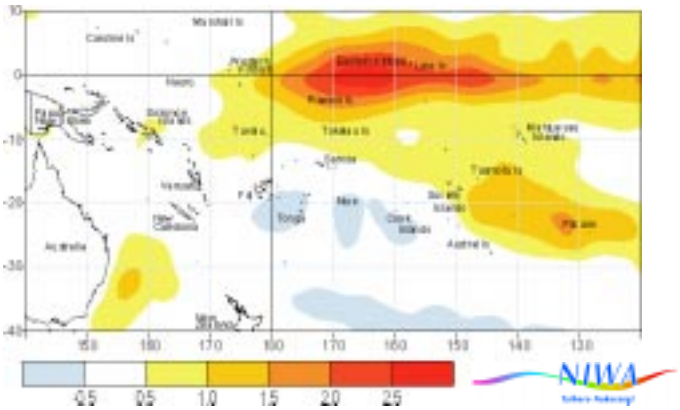
Central Pacific SST anomalies intensified further during October, with some areas around Eatern Kiribati more than 2.0°C above average. The horseshoe like Pacific SST anomaly pattern is more organised with some areas of cooler than normal SSTs.

NINO3 and NINO4 regions remain warmer than normal (+1.1°C to +1.2°C), with positive subsurface SST anomalies (+4.0°C) evident across the equatorialPacific east of the dateline, in the upper 150m.

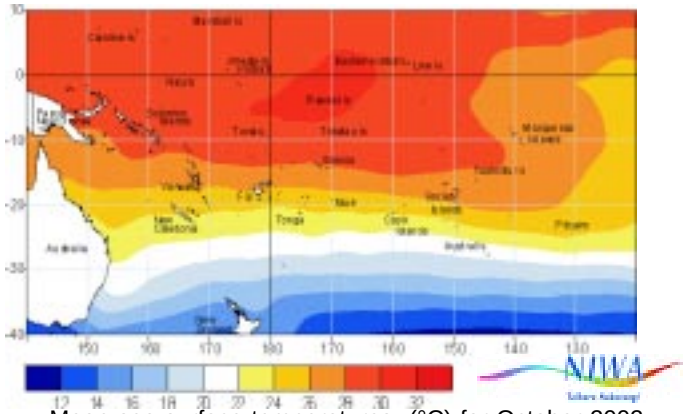
The warmer than average SST anomaly along the east coast of Australia and the region southwest of New Caledonia weakened during October.

The region of warmer than average SSTs between Kiribati and Pitcairn Island has intensified further. Anomalous equatorial westerlies continue to persist, affecting countries west of the date line.

The El Niño event is expected to last throughout the southern hemipshere summer and is likely to continue affecting the South Pacific climate.



Sea surface temperature anomalies (°C) for October 2002



Mean sea surface temperatures (°C) for October 2002

Forecast validation

Forecast period:
August to October 2002

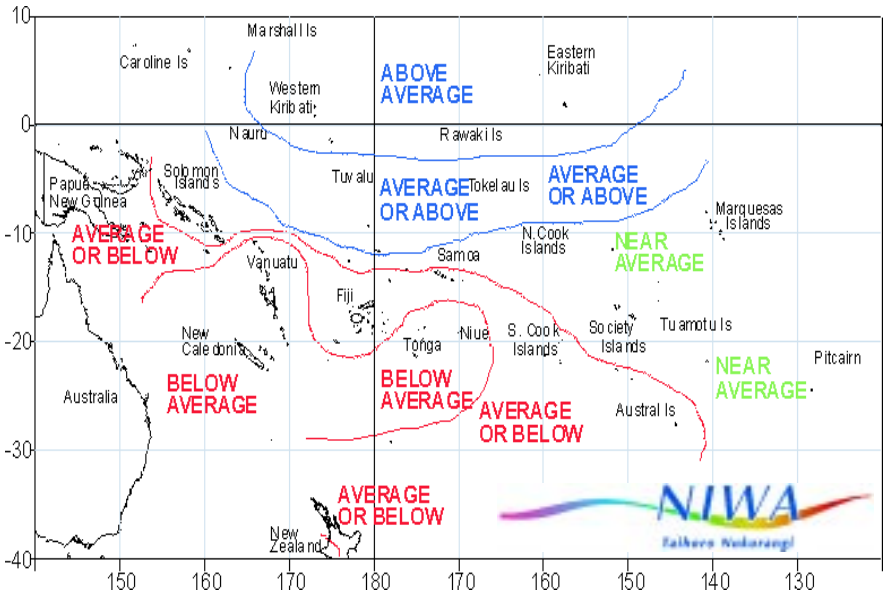
The influence of the El Niño was expected to have a significant influence on rainfall anomalies, with more convergence and a tendency towards above average rainfall projected for Kiribati and Tuvalu, and average to below average rainfall from the Coral Sea to New Caledonia. The South Pacific Convergence Zone was expected to remain fairly inactive east of the date line, with average to below average rainfall likely from Samoa across to the Marquesas Islands, including the southern Cook Islands.

Average to above average rainfall was expected in French Polynesia and Pitcairn Island. Average rainfall was forecast for other areas.

The overall rainfall anomaly pattern was similar to what was expected. However, the region of above average rainfall was larger than expected, extending to the Solomon Islands and Vanuatu, and also to the Marquesas. The average or below average region east of the date line extended to include Niue and the Society Islands. The overall 'hit rate' for the August to October rainfall outlook was 65%.

Rainfall outlook: November 2002 to January 2003

- Enhanced convection and above average rainfall in Western and Eastern Kiribati
- Rainfall trending towards below average in many countries from Papua New Guinea across to the Austral Islands, especially New Caledonia to Niue



Rainfall outlook map for November 2002 to January 2003

The El Niño-related regions of enhanced convection should persist affecting Western and Eastern Kiribati during the November 2002 to January 2003 period, resulting in continued above average rainfall in that region, with above average or average rainfall likely in Wallis & Futuna, Tuvalu and Tokelau.

Below average or average rainfall is expected from Fiji to the Austral Islands, including Samoa and Southern Cook Islands. Below average rainfall is expected for Vanuatu, New Caledonia, Tonga and Niue. Near average rainfall is more likely elsewhere.

The forecast model skills are generally moderate. However skill levels are high in the central equatorial 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
(NOVEMBER 2002 - JANUARY 2003)

Island Group	Rainfall Outlook	Confidence in the Outlook
Western Kiribati	10:15:75 (Above)	High
Eastern Kiribati	10:15:75 (Above)	High
Wallis & Futuna	15:40:45 (Average or above average)	Moderate
Tuvalu	15:40:45 (Average or above average)	Moderate
Tokelau	20:35:45 (Average or above average)	Moderate
Papua New Guinea	40:45:15 (Near average)	Moderate
Solomon Islands	30:55:15 (Near average)	Moderate
Northern Cook Islands	30:50:20 (Near average)	Moderate
Society Islands	25:50:25 (Near average)	Moderate
Pitcairn Island	25:50:25 (Near average)	Moderate
Marquesas Island	30:50:20 (Near average)	Low
Fiji	40:45:15 (Average or below average)	Moderate
Samoa	40:40:20 (Average or below average)	Moderate
Southern Cook Islands	45:40:15 (Average or below average)	Moderate
Austral Island	45:40:15 (Average or below average)	Moderate
Vanuatu	50:25:25 (Below average)	Moderate
New Caledonia	55:30:15 (Below averge)	High
Tonga	50:35:15 (Below average)	Moderate - High
Niue	50:30:20 (Below average)	Moderate - High

Higher risk of Tropical Cyclones for South Pacific countries east of the Date Line

By Dr Jim Salinger, Dr Jim Renwick and Stuart Burgess

For some South Pacific countries east of the date line the chances of tropical cyclone activity are higher than normal for the November 2002 – January 2003 period.

The last few tropical cyclone seasons were relatively 'quiet', with only six occurrences during 2000/01 and five in 2001/02. However, this season some Pacific Island countries east of the date line are likely to experience a higher risk of tropical cyclone occurrence than is usual. This eastward elongation of the normal pattern is expected because of now well-established weak to moderate El Niño conditions presently affecting the tropical Pacific region. The Southern Oscillation Index is negative, and is expected to remain so throughout the cyclone season. Countries with increased risk over the November 2002 to January 2003 period (see Table 1and Figure 1) are: Wallis and Futuna, Samoa, Tokelau, Niue, and the southern Cook Islands. Tropical cyclones are still very likely about and west of the date line, but a lower than normal frequency of occurrence is expected.

The South Pacific tropical cyclone season coincides with southern hemisphere wet season, usually from November through April. Peak cyclone occurrence is usually during January, February and March. On average, the highest numbers occur in the region around Vanuatu, New Caledonia, and the adjacent Coral Sea.

In seasons similar to the present during November to January, at least one tropical cyclone usually occurs in that region. Taken over the whole of the South Pacific, on average four tropical cyclones can occur in the early part of the season, but this can range from as few as zero in 2000/01, to as many as eleven in 1997/98 (the last El Niño).

Tropical cyclones require huge amounts of energy to survive, and will form only over specific regions of the globe's tropical oceans, where conditions are right for their formation and development. The La Niña and El Niño phenomena alter the patterns of climate, altering the risk of a cyclone in different parts of the South Pacific.

The December issue of the ICU will provide an update on information relating to any occurrences and further probability of tropical cyclones in our forecast region of the South West Pacific over the remainder of the wet season.

Area	Average no of cyclones 1970-2001	Average over Moderate El Niño	Probability of Occurrences
Wallis & Futuna	0.9	1.4	Increased
Samoa	0.8	1.2	Increased
Tokelau	0.5	0.8	Increased
Niue	0.9	1.2	Increased
Southern Cook Islands	0.7	1.4	Increased
New Caledonia	1.4	1.1	Reduced
Vanuatu	1.6	1.1	Reduced
Fiji	1.1	0.9	Average
Solomon Islands	0.5	0.3	Average
Tuvalu	0.7	0.9	Average
Tonga	0.9	0.8	Average
Northern Cook Islands	0.4	0.4	Average
Society Islands/Tahiti	0.3	0.3	Average
Austral Islands	0.3	0.4	Average
Northern New Zealand	0.4	0.2	Average
Southern PNG	0.1	Less than 0.1	Unlikely
Tuamotu	0.2	Less than 0.1	Unlikely
Pitcairn Island	0.1	Less than 0.1	Unlikely

Table 1 Probability of tropical cyclones affecting South Pacific Islands during November 2002 to January 2003

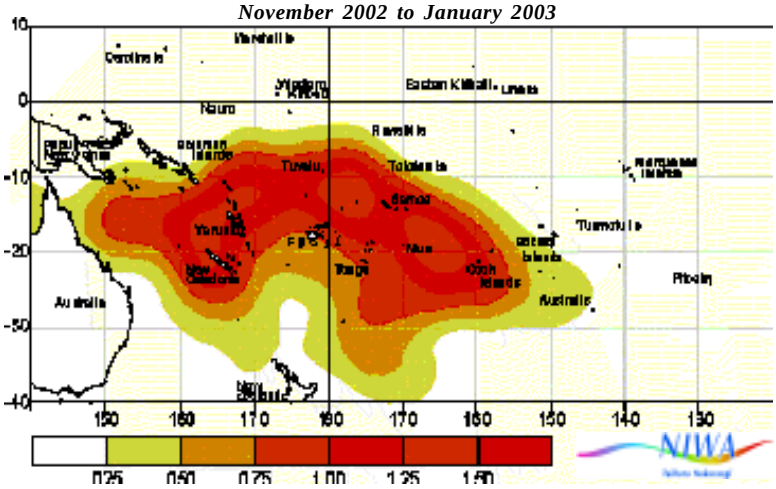


Figure 1 Average number of Tropical Cylone occurrences, Moderate El Niño November - January periods, 1970-2001

Major tropical cyclones bring extremes of wind, rainfall and sea surges, resulting in river and coastal flooding, landslides, and extensive damage to crops, trees, houses, power lines, ports and roads. Many lives can be lost. For a small South Pacific island country the whole economy can be severely affected. Individual tropical cyclones are, however, rather unpredictable; so most South Pacific islands are exposed to some degree of risk every year and must be always prepared.

The Island Climate Update

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 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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