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10 December 2002

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

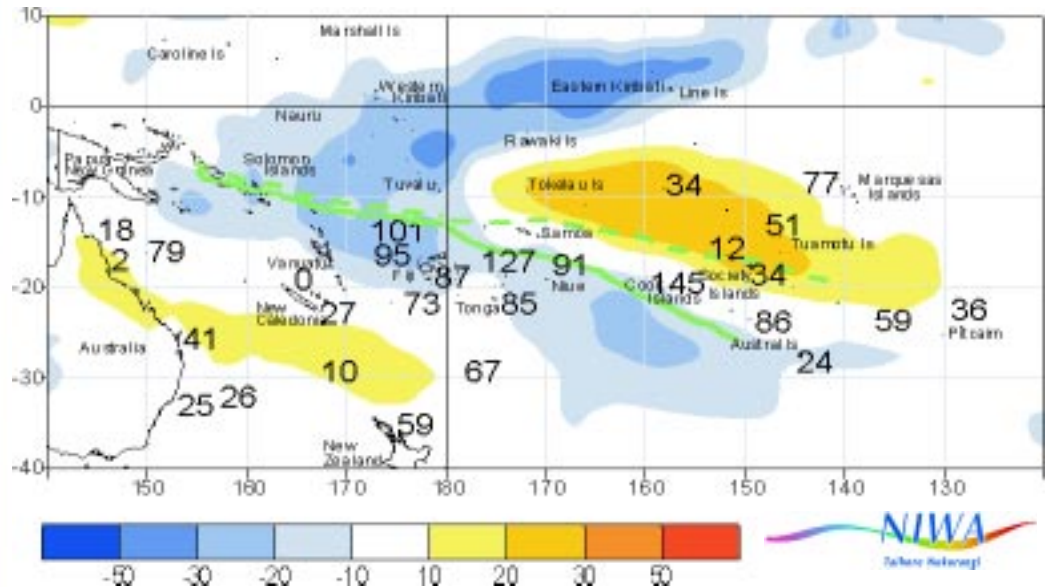


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November's climate

The moderate El Niño episode is continuing to affect Southwest Pacific rainfall patterns, with enhanced convection and above average rainfall over much of Kiribati, and contrasting areas of suppressed convection and well below average rainfall from Queensland across to New Caledonia. The South Pacific Convergence Zone (SPCZ) remained near its average location about and west of the date line, but resumed its activity further east, extending from the region north of Fiji across to the Southern Cook Islands. A large region of suppressed convection and well below average rainfall also persisted from Tokelau to French Polynesia, including the Northern Cook Islands. *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 November 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 El Niño event in the tropical Pacific is expected to last throughout the southern hemisphere summer 2002/03, but should remain weaker than the 1997/98 event and wane as conditions ease back to neutral during autumn 2003. The November Southern Oscillation Index (SOI) was -0.8, with a three month mean of -0.9, indicating steady atmospheric conditions, with respect to the El Niño/Southern Oscillation (ENSO). *Details Page 2.*

The next three months December 2002 to February 2003

The El Niño related convection and tendency towards above average rainfall is expected to persist in equatorial countries, including Tuvalu and Tokelau. Rainfall should tend below average from the Solomon Islands, southeast to the Southern Cook Islands. *More on Page 3.*



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





Climate developments in November 2002

El Niño continues to enhance convection and rainfall over Kiribati

Extremely low rainfall in New Caledonia and parts of French Polynesia

The SPCZ remained near its average location about and west of the date line, with enhanced convection from the Solomon Islands across to Tuvalu, northern Vanuatu, and the sea area northwest of Fiji. This region merged with the Inter-tropical Convergence Zone (ITCZ), which was enhanced over Kiribati and the central equatorial Pacific.

Episodes of equatorial surface westerlies over Western Kiribati, that have been enhancing the ENSO linked convection in

El Niño expected to weaken in the Autumn of 2003

Equatorial Pacific SSTs continue to warm

Sea surface temperature anomalies across the Equatorial Pacific are very positive from the date line across to the South America.

CLIMATE EXTREMES IN NOVEMBER 2002

Country	Location	Rainfall (mm)	% of average	Comments
Australia	Townsville	1	2	Extremely low
Australia	Norfolk Island	7	10	Extremely low
New Caledonia	Koumac	0	0	Record low
New Caledonia	Ouloup	12	12	Extremely low
New Caledonia	Ouanaham	12	11	Well below average
New Caledonia	La Roche	19	18	Extremely low
New Caledonia	La Tontouta	2	4	Extremely low
Fiji	Ba/Rarawai Mill	38	26	Extremely low
Fiji	Penang Mill	27	17	Extremely low
French Polynesia	Bora Bora	27	12	Record low
French Polynesia	Rapa	46	24	Record low

that region, were much less frequent than in recent months. The SPCZ resumed its activity further east, but was further south than average, extending from the region north of Fiji across to the Southern Cook Islands.

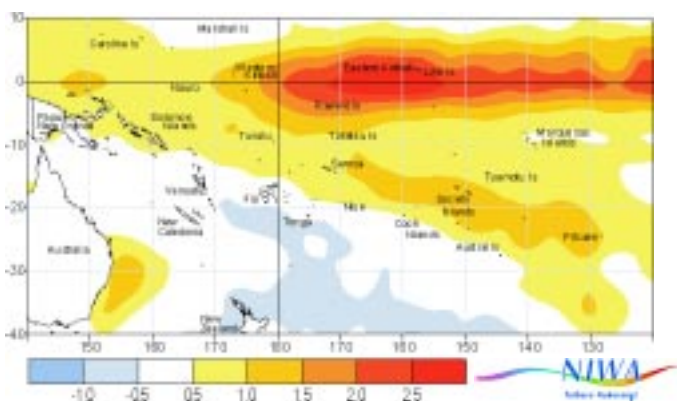
Rainfall was at least 200% of average in localised parts of Vanuatu, and at least 125% average in Western Kiribati, parts of Tonga and the Southern Cook Islands.

Convection was less suppressed over Indonesia, and Australia than in recent months. However, rainfall continued below

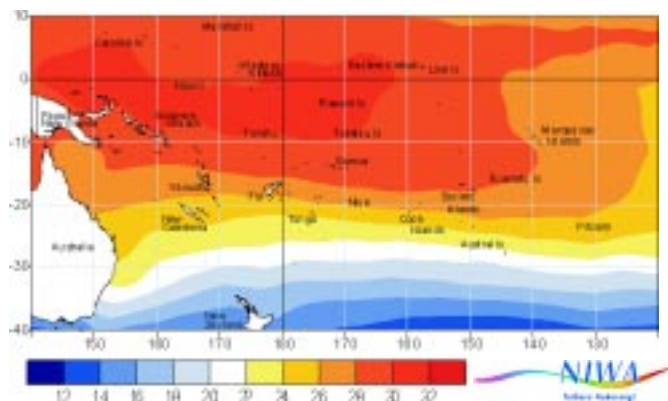
average from Queensland across the southern Coral Sea to New Caledonia, where totals were less than 25% of average in many areas. There was no rainfall at all in Koumac, New Caledonia, and this site recorded only 10 mm during October. A large region of suppressed convection and well below average rainfall also persisted over the Northern Cook Islands extending to affect much of French Polynesia, totals being less than 50% of average at many locations.

The NINO3 region and NINO4 regional sea surface temperature (SST) anomalies were around +1.6°C and +1.7°C respectively in November. The September - November 2002 mean SSTs were about +1.3°C for NINO3, and +1.4°C in the NINO4 region. The normal El Niño related extratropical SST cool “horseshoe” is becoming moreorganised.

The latest US National Center for Environmental Prediction statement suggests that the present El Niño event will peak over the southern hemisphere summer (while remaining weaker than the 1997/98 event), and will then weaken then in the autumn of 2003.



Sea surface temperature anomalies (°C) for November 2002



Mean sea surface temperatures (°C) for November 2002



Forecast validation

Forecast period: September to November 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 for Kiribati, Tuvalu, and Tokelau. Wallis and Futuna, and Pitcairn Island were also expected to receive above average or average rainfall. Below average or average rainfall was expected in a broad area from Papua New Guinea southeast to New Caledonia, across to Tonga and the Southern Cook Islands. Average rainfall was forecast for other areas.

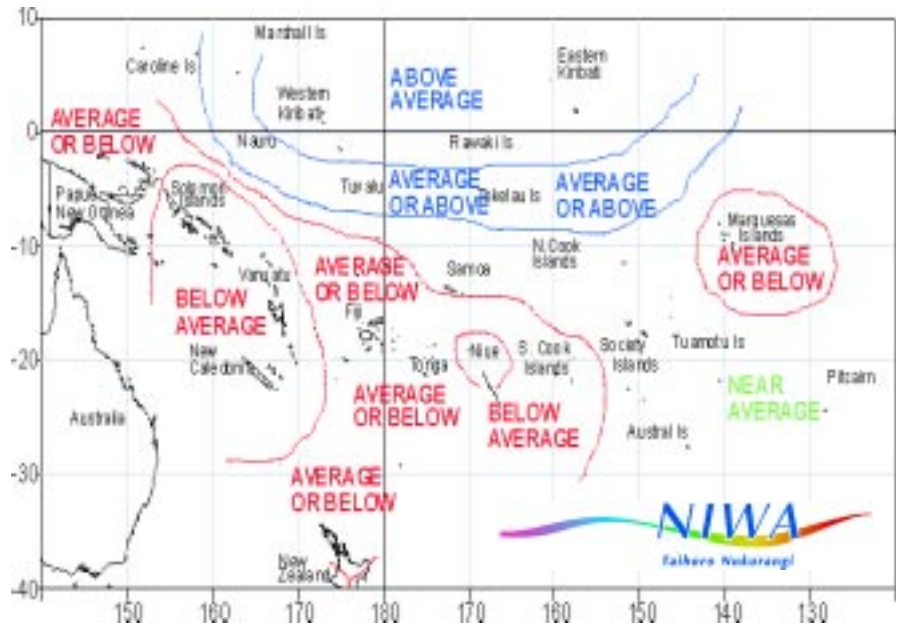
The overall rainfall anomaly pattern was, again, similar to what was expected. However, the region of enhanced convection and above average rainfall was larger than expected, extending to the Solomon Islands, Vanuatu and also to the Marquesas Islands. The average or below average region east of the date line extended to include the Northern Cook Islands and the Society Islands. The overall ‘hit rate’ for the September to November rainfall outlook was 65%.



Rainfall outlook: December 2002 to February 2003

The El Niño related convection and tendency towards above average rainfall is expected to persist in equatorial countries, including Tuvalu and Tokelau

Rainfall should trend below average from the Solomon Islands, southeast to the Southern Cook Islands



Rainfall outlook map for December 2002 to February 2003

The region of enhanced convection in the NINO3 region should continue to persist from December 2002 through February 2003, resulting in a high likelihood of above average rainfall in both Western and Eastern Kiribati.

Average or above average rainfall is expected in Tuvalu and Tokelau. A tendency towards below average rainfall is forecast for a broad region from the Solomon Islands southeast to the Southern Cook Islands, including Vanuatu, New Caledonia, Fiji, Tonga and Niue.

Average or below average rainfall is likely in the Marquesas Islands. Near average rainfall is more likely elsewhere.

The forecast model skills for this outlook are generally moderate or high for most countries.



Tropical cyclone update

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'Yolanda,' the first tropical cyclone of the season, developed between Fiji and Samoa on 5 December, and was tracking southeast over Tonga on 6 December, with estimated maximum sustained winds of 75 km/h.

The chance of tropical activity for the December-April period still remains higher than normal for some countries east of the date line. They are still *very likely* about and west of the date line (but may occur with a lower than normal frequency there).

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 (DECEMBER 2002 - FEBRUARY 2003)

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

El Niño Impacts in the Pacific, now and for the Southern Hemisphere Summer

Ashmita Gosai, Andrew Watkins, Luc Maitrepierre, and Stuart Burgess

Sea surface temperature (SST) anomalies are now very positive in the equatorial Pacific from the date line across to the South American coast. At the same time, the November and September-November means of the Southern Oscillation Index (SOI) remained close to -1.0, indicating steady, but moderate El Niño conditions.

The El Niño has already impacted Pacific countries in the equatorial and western Pacific, one example being the prevalent drought conditions in both Australia and New Caledonia, and reduced rainfall in the eastern parts of New Zealand.

In New Caledonia, rainfall has been below average for six of the past seven months, the composite average being only 38% of normal for the May – November 2002 period (Figure 1), resulting in significant soil moisture deficits and bush fires around the country. This has had a large impact on the country's cattle industry that has had to resort to hay, as the natural pastures have been destroyed by the dry conditions.

Similarly, rainfall deficiencies have intensified in the eastern states of Australia over the last eight months (April to November 2002). Serious to severe rainfall deficiencies cover about half of Victoria and most of Queensland and New South Wales, resulting in outbreaks of bushfires in eastern New South Wales and northern Victoria. The impact on winter crop has been large. The Australian Bureau of Agricultural and Resource Economics (ABARE) have indicated that the winter harvest will be the smallest since 1994-1995, with an estimated 57% of the previous years crop tonnage. The Reserve Bank of Australia has estimated that the impacts of the dry conditions on the economy will be similar to those experienced in the drought of 1982 (BOM Annual Preliminary Summary, 2002).

On the other hand, equatorial countries like Kiribati have been experiencing above average rainfall for the most part of 2002 (Figure 2).

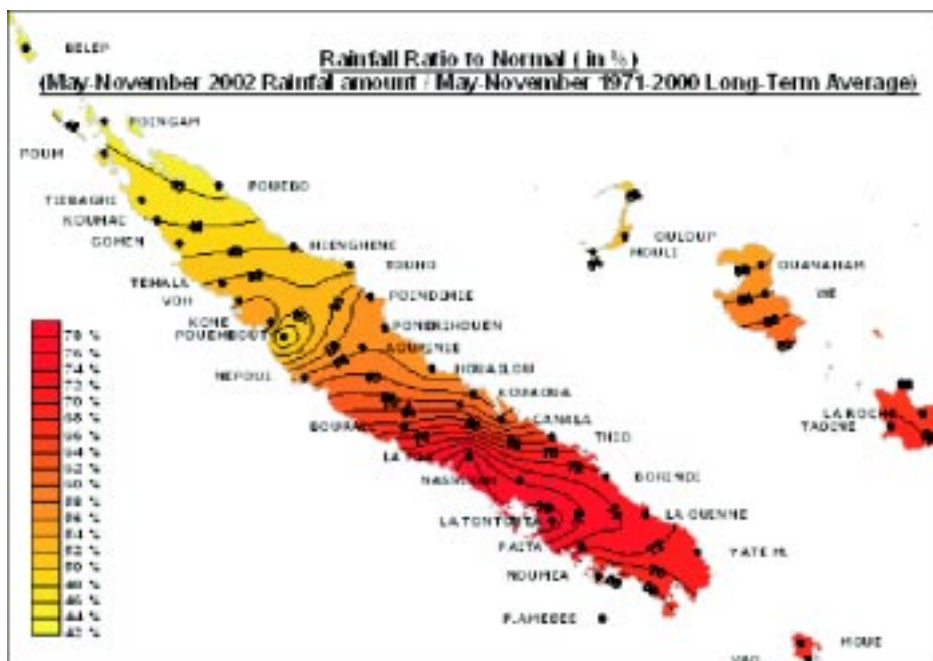


Figure 1. New Caledonia May to November 2002 rainfall compared to the 1971-2000 normal

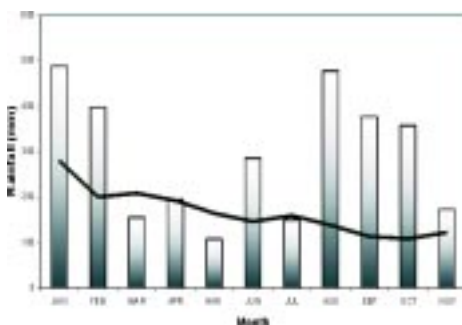


Figure 2. Tarawa, Kiribati, 2002 monthly rainfall. Actual rainfall is shown by the bars. The solid line shows the normal rainfall.

The majority of the global climate models indicate that the current El Niño conditions will weaken by the autumn of 2003. Figure 3 shows SST anomaly predictions (red lines) into the autumn of 2003, from the European Centre for Medium Range Forecasting. The thick dotted line is based on the observed SST anomaly.

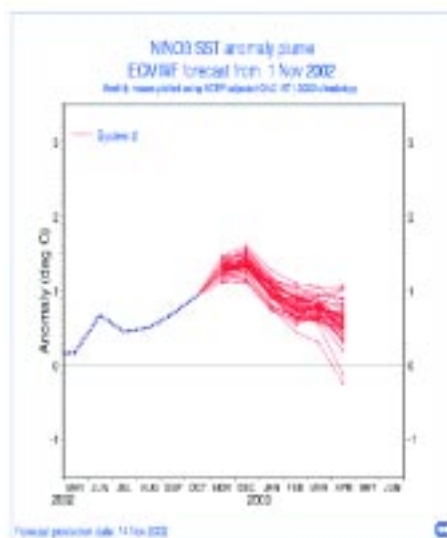


Figure 3. The NINO3 sea surface temperature anomaly forecast (courtesy of ECMWF)



Visit The Island Climate Update website at: www.niwa.co.nz/NCC/ICU/.

Your comments and ideas about The Island Climate Update are welcome. Please contact:

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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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