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The Island Climate Update



An overview of the present climate in the tropical South Pacific Islands, with an outlook for the coming months, to assist in dissemination of climate information in the Pacific region.

October's climate

Very dry conditions have now persisted for many months in parts of the Coral Sea. Low rainfall also continued throughout central Tonga and Niue with totals less than 50% of average. Other regions with well below average October rainfall were Kiribati, northern Vanuatu, and the Marquesas. In contrast, October rainfall was at least 200% of average in central Vanuatu, areas around Noumea - New Caledonia, western areas of Viti Levu - Fiji, northern New Zealand, and Bora Bora - French Polynesia. *More on Page 2.*

Acknowledgements

US Department of
 Energy Atmospheric
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Australian Bureau of
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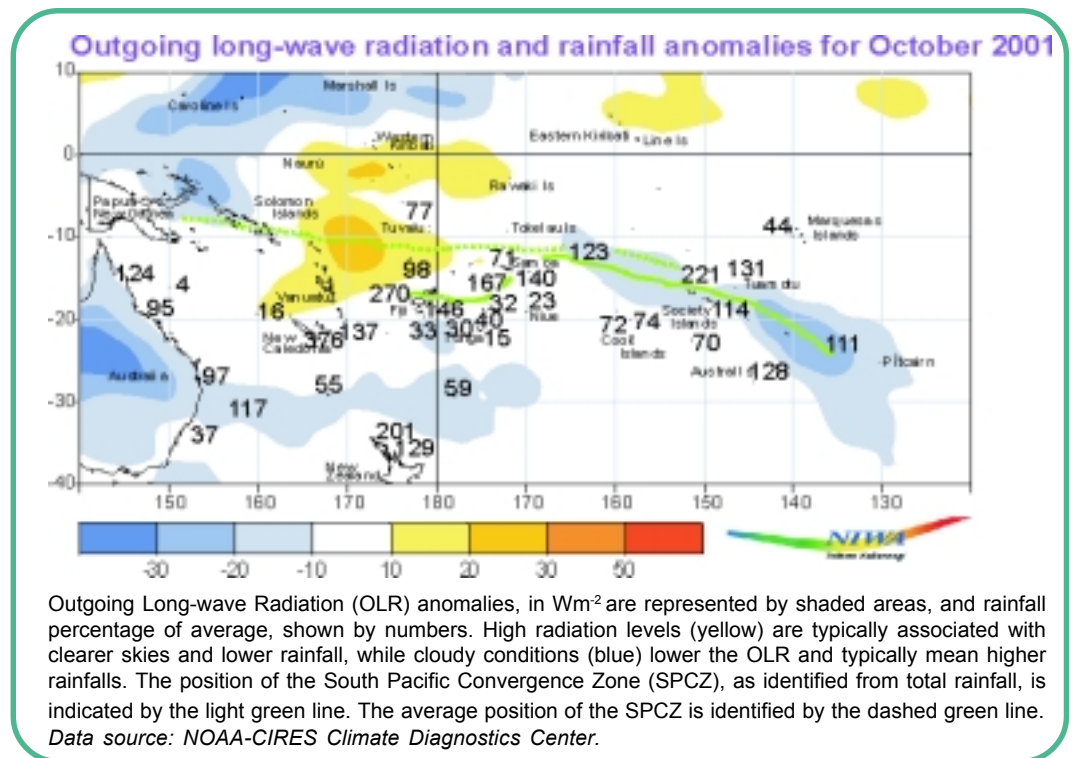
European Centre for
 Medium Range
 Forecasting, ECMWF

NOAA Climate Prediction
 Centre

UK Meteorological
 Office

International Research
 Institute for Climate
 Prediction, IRICP

World Meteorological
 Organisation, WMO



ENSO and sea surface temperatures

The three-month mean Southern Oscillation Index (SOI) remains in the neutral range. The October value was -0.3 . Overall atmospheric conditions and sea surface temperature (SST) anomalies also continue in the neutral range. Neutral ENSO conditions are expected to persist throughout the Southwest Pacific wet season. *Details on Page 2.*

The next three months (November 2001 to January 2002)

Slightly enhanced trade winds are expected to persist in the central Pacific, displacing the SPCZ further south and west than usual, promoting average to below average rainfall from Tuvalu to the Marquesas and average to above average rainfall in some areas west of the Dateline. *More on Page 3.*





Climate developments in October 2001

Low rainfall continues in the Coral Sea, Tonga and Niue

Extremely high rainfall near Noumea and over parts of Fiji

Rainfall continued well below average during October in the Coral Sea, with totals ranging from 5 to 50% of average. Low rainfall persisted for the second month running throughout central Tonga and Niue, with totals less than 50% of average. Other regions with less than 50% of average rainfall were Kiribati, northern Vanuatu, much of New Caledonia except in the south, and the Marquesas.

Unusually low October rainfall was recorded at:

Country	Location	Rainfall (mm)	% of normal
New Caledonia	Ile Art, Belep	9	16
Tonga	Tonga	20	15
Tonga	Tonga	33	30

Warmer than average seas around Kiribati

SST anomalies have still shown little change since July, with an area of warm 3.0°C surface waters and positive SST anomalies (at least 1.0°C above average) between the Solomon Islands and Western Kiribati. SST anomalies also continued 1.0°C or more above average about and to the east of the Tuamotu Islands. A tongue of cooler equatorial waters remains off the South American coast, enhancing the east-west temperature gradient somewhat. Eastern equatorial SSTs are expected to stay in the neutral range into 2002. The October Southern Oscillation Index (SOI) averaged -0.3; the 3-month mean was -0.4, with trade winds remaining slightly enhanced east of the Dateline in the central equatorial Pacific.



Forecast validation

Forecast period: August to October 2001

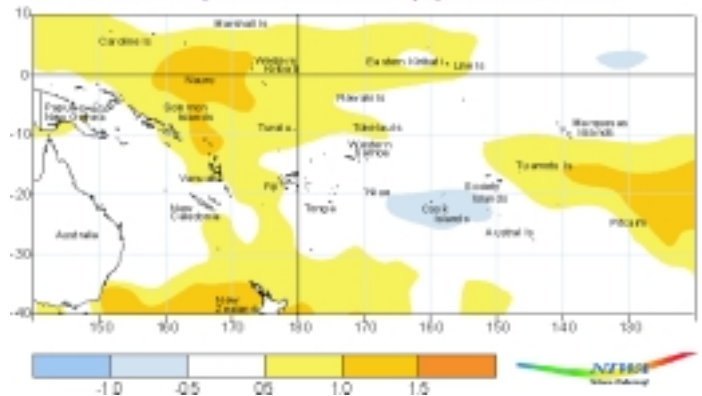
Average to above average rainfall was expected over many islands from Papua New Guinea across to the Southern Cook Islands. Below average rainfalls were forecast for Samoa and the Tokelaus, with average to below average rainfall in Kiribati, Tuvalu, the Northern Cooks and Pitcairn Island. Near average rainfalls were expected in most other parts of the tropical South West Pacific.

Unusually high October rainfall was recorded at:

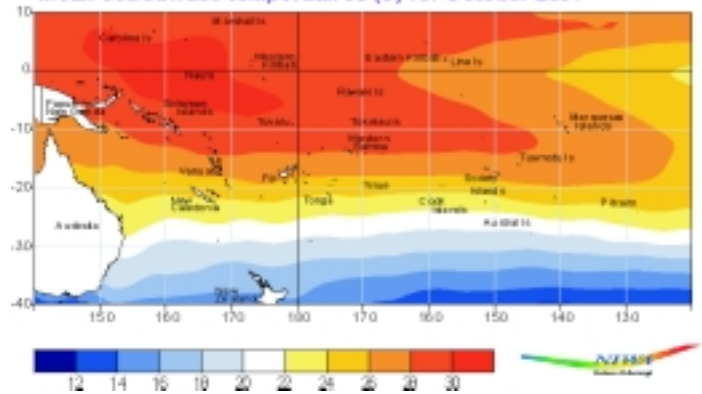
Country	Location	Rainfall (mm)	% of normal
New Caledonia	Noumea	189	376
New Caledonia	Boulari	260	466
Fiji	Nadi Airport	278	270
Fiji	Penang Mill	323	296
New Zealand	Kaitaia	201	201

While October rainfall was at least 200% of average in and about Noumea - New Caledonia, and western areas of Viti Levu -Fiji, much was confined to just a few days with very high rainfall. Rainfall was also at least twice average in central Vanuatu, northern New Zealand, and Bora Bora - French Polynesia. Rainfall was also enhanced in the Solomon Islands, parts of Samoa, and from northern Tonga across the northern Cooks to Tuamotu and areas southeast to the Rapa islands of French Polynesia, all with totals at least 120% of average. Outgoing long-wave radiation (OLR) anomalies were below average, indicating active convection, over the seas to the north of Papua New Guinea and west of Western Kiribati.

Sea surface temperature anomalies (C) for October 2001



Mean sea surface temperatures (C) for October 2001



This scenario was correct for many islands north of 15°S and west of 180°, including Eastern Kiribati. Rainfall was lower than expected for most other regions, especially Tonga and Niue, where below average rainfall resulted when above average was expected. The overall 'hit rate' for the August to October rainfall outlook was only 55%, possibly because many global forecast models still contained some La Niña bias when the ENSO state was neutral.



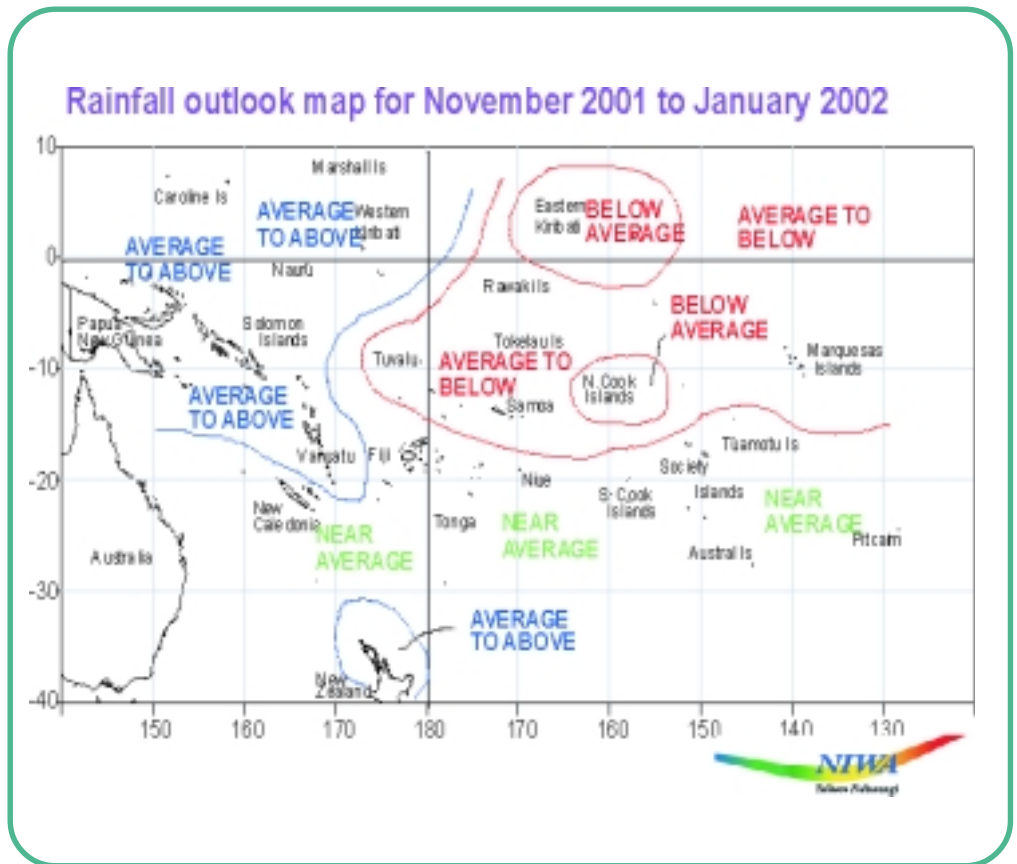
Rainfall outlook: November 2001 to January 2002

Rainfall still suppressed in the central Pacific

Average to below average rainfall in the central Pacific from Tuvalu to the Marquesas

Average to above average rainfall in some areas west of the Dateline

SPCZ is expected to remain south of its normal position east of the Dateline, with slightly enhanced trade winds in the central Pacific, resulting in average to below average rainfall throughout Tuvalu, Eastern Kiribati, the northern Cook Islands, Samoa and the Marquesas islands of French Polynesia. Average to above average rainfall is expected in Papua New Guinea, the Solomons, Vanuatu, and Western Kiribati, with enhanced convection likely in areas west of the Dateline. Average rainfall is likely in most other islands.



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 TABLE
(NOVEMBER 2001 - JANUARY 2002)**

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

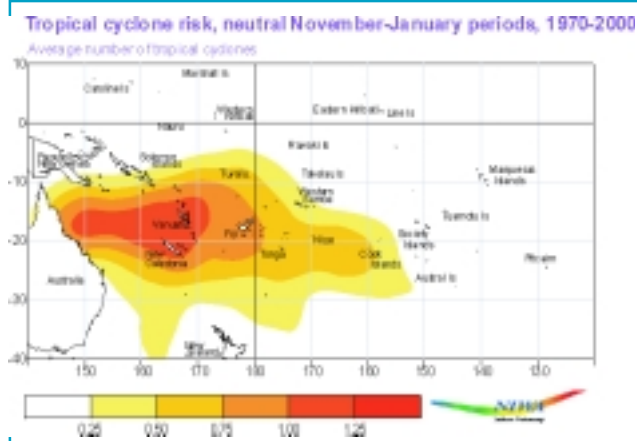
Fewer tropical cyclones are likely in the Pacific this year

By Dr Jim Salinger and Dr Jim Renwick, NIWA

For most South Pacific countries the chances of tropical cyclone activity are lower than normal for the November – January period

Many Pacific Island countries are likely to experience fewer than average tropical cyclones this season (see Table at right). This pattern is expected because Southern Oscillation conditions affecting the tropical Pacific region are neutral, and are expected to remain so over the early part of the cyclone season. Countries with below average risk are: New Caledonia, Vanuatu, Fiji, Wallis and Futuna, Samoa, Tokelau, Niue and the Southern Cook Islands.

Tropical cyclones develop in the South Pacific over the 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.



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.

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 following table shows the average number of tropical cyclones passing near the main island groups of the South Pacific over the November through January period (based on 30 years of data, and for tropical cyclones having mean wind speeds over 34 knots*).

Area	Average for all years	Average for Neutral ENSO years	Risk
S. Papua-New Guinea	0.1	0.2	Average
Solomon Islands	0.5	0.4	Average
Tuvalu	0.7	0.5	Average
Tonga	0.9	0.7	Average
New Caledonia	1.4	1.1	Below average
Vanuatu	1.6	1.1	Below average
Fiji	1.2	0.9	Below average
Wallis and Futuna	0.9	0.5	Below average
Samoa	0.8	0.3	Below average
Tokelau	0.5	0.2	Below average
Niue	0.9	0.6	Below average
Southern Cook Islands	0.8	0.5	Below average
Northern Cook Islands	0.4	<0.1	Cyclones unlikely
Society Islands/Tahiti	0.3	<0.1	Cyclones unlikely
Austral Islands	0.3	<0.1	Cyclones unlikely
Northern New Zealand	0.4	<0.1	Cyclones unlikely

*For the southwest Pacific, "tropical cyclone" is a tropical low-pressure system intense enough to produce sustained gale force winds (at least 34 knots or 63 km/h). A "severe tropical cyclone" produces sustained hurricane force winds (at least 64 knots or 118 km/h), and corresponds to the hurricanes or typhoons of other parts of the world. In the French language, the term "Cyclone tropicaux" refers to the hurricane phase (64 knots or 118 km per hour or more) but the "Island Climate Update" publication follows the English language definition of "Tropical cyclone" as defined in the World Meteorological Organisation Tropical Cyclone Operational Plan for the South Pacific and South-East Indian Ocean as follows "A non-frontal cyclone of synoptic scale developing over tropical waters and having a definite organised wind circulation with maximum 10-minute average wind speed of 34 knots (63 km per hour) or greater".

The Island Climate Update



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