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The Island Climate Update

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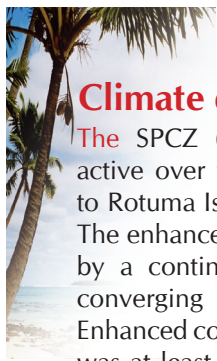
October's climate

- The South Pacific Convergence Zone was very active over the Solomon Islands
- Well above average rainfall in parts of Vanuatu and New Caledonia's Loyalty Islands
- Much drier in the main islands of New Caledonia, Fiji and southern Tonga
- Warmer in Western Kiribati, Samoa, southern Tonga, the Southern Cook Islands and the Society Islands of French Polynesia

El Niño/Southern Oscillation and Seasonal Rainfall Forecasts

- A weak El Niño persists in the central Pacific
- Above average rainfall is likely in Western and Eastern Kiribati, and Tuvalu
- Rainfall trending below or near average from Papua New Guinea southeast to the Southern Cook Islands and the Marquesas Islands



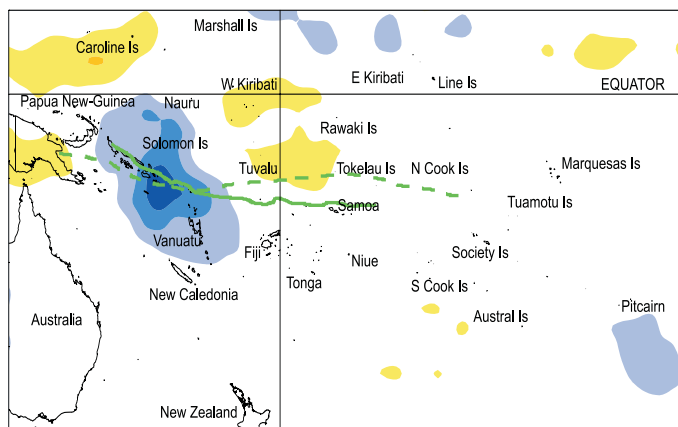


Climate developments in October 2004

The SPCZ (South Pacific Convergence Zone) was very active over the Solomon Islands, extending east-southeast to Rotuma Island, and across to the region north of Samoa. The enhanced rainfall over the Solomon Islands was caused by a continuation of by cross-equatorial northwesterlies converging with the southern hemisphere trade winds. Enhanced convergence also occurred over Vanuatu. Rainfall was at least 200% of average in isolated parts of Vanuatu, and also the Loyalty Islands of New Caledonia, and at least 125% of average rainfall occurred in parts of Vanua Levu (the northern island of Fiji), Samoa, and the Marquesas Islands of French Polynesia. A high rainfall event in the Loyalty Islands on the 20th produced 150 - 300 mm.

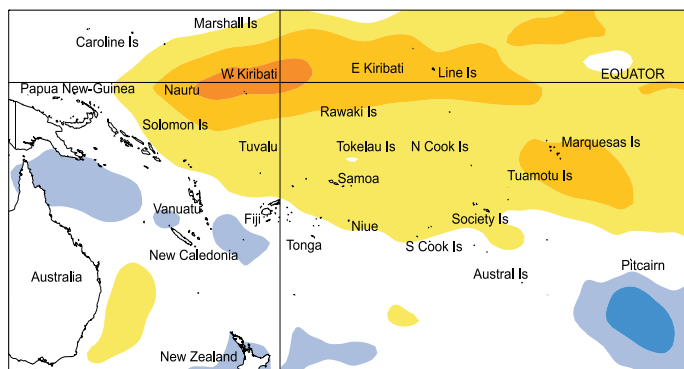
A large region of suppressed convection occurred over Southeast Asia, Indonesia, and northern Australia, extending to southern Papua New Guinea and the Caroline Islands. Convection was also suppressed over Western Kiribati, and much of Tuvalu. Rainfall was well below average, being less than 25% of average in parts of New Caledonia's main island, and less than 50% of average in the main island of Fiji and in southern Tonga, where ridges of high pressure were frequent.

Mean air temperatures were at least 0.5 to 0.9°C above average in Western Kiribati, Samoa, southern Tonga, the Southern Cook Islands, and the Society Islands of French Polynesia, consistent with the warm sea surface temperatures affecting these regions. Tropical Southwest Pacific mean sea-level pressures were at least 1 hPa above average in the region from New Caledonia east to the southern Cook Islands.

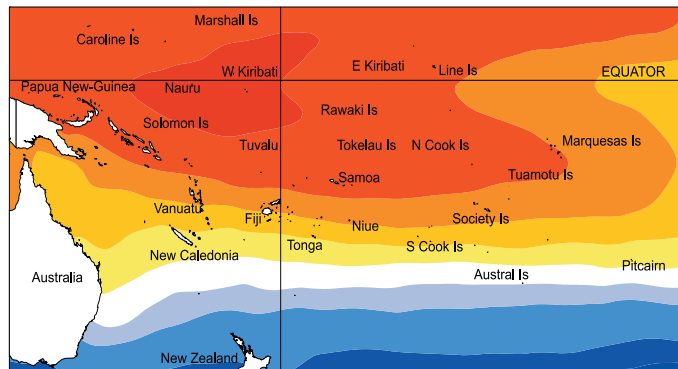


Outgoing Long-wave Radiation (OLR) anomalies, in Wm^{-2} . The October 2004 position of the South Pacific Convergence Zone (SPCZ), as identified from total rainfall, is indicated by the solid green line. The average position of the SPCZ is identified by the dashed green line.

Country	Location	Rainfall (mm)	% of average	Comments
New Caledonia	La Roche	186	221	Well above average
New Caledonia	Ouanaham	241	395	Well above average
New Caledonia	Ouloup	275	474	Extremely high
New Caledonia	Ile Art, Belep	3	6	Extremely low
New Caledonia	Poindimie	10	8	Extremely low
Fiji	Nadi Airport	25	24	Well below average
Tonga	Salote Pilolevu Airport	5	6	Extremely low
Tonga	Nuku'alofa	26	20	Well below average



Sea surface temperature anomalies ($^{\circ}C$) for October 2004.

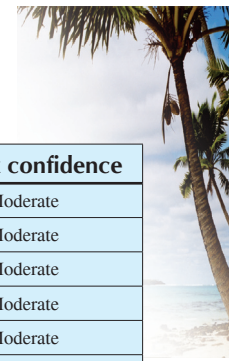


Mean sea surface temperatures ($^{\circ}C$) for October 2004.

The tropical Pacific Ocean exhibited a weak El Niño state, but the atmosphere remained uncoupled from the ocean during October. The NINO3.4 average anomaly was $+0.9^{\circ}C$ again in October (as in September), and $+0.8^{\circ}C$ for August to September (up from $+0.6$ in July to September). The subsurface temperature profile shows a region of positive anomalies ($+2^{\circ}C$ or more) near the surface at the South American coast. Sea surface temperature (SST) anomalies have become positive right across the eastern Equatorial Pacific in the last two weeks. Positive zonal wind anomalies were evident at times during October. However, the Southern Oscillation Index (SOI) remained weak at -0.5 for October, with the August to September 3-month mean at

-0.6 . October outgoing longwave radiation (OLR) and the Tropical Rainfall Measuring Mission (TRMM) rainfall anomalies show anomalous convection in the region of the Solomon Islands, with suppressed convection over Southeast Asia and Indonesia. However, Southwest Pacific convective anomalies do not show El Niño-like characteristics as yet.

Most available models indicate (weak) El Niño conditions into early 2005, with about half indicating El Niño conditions persisting into autumn of 2005. No model is predicting substantial cooling in the equatorial Pacific over the next nine months.



Tropical rainfall outlook: November 2004 to January 2005

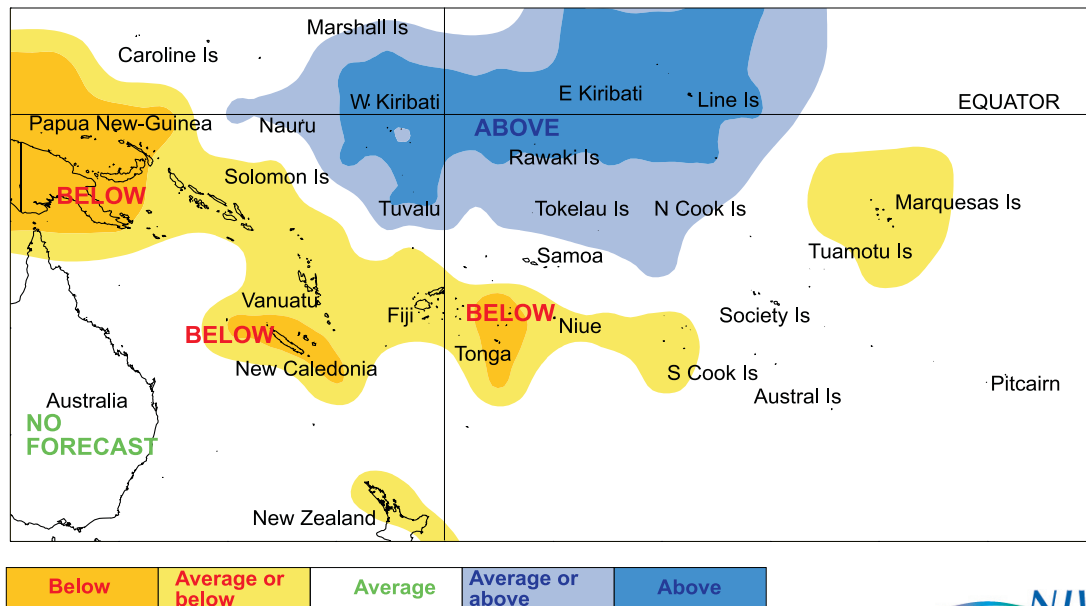
November heralds the start of the rainy and tropical cyclone season for the South Pacific. Enhanced convection is expected in the equatorial Pacific Ocean where above average rainfall is likely in Western and Eastern Kiribati and Tuvalu. Rainfall is expected to be near or above average over Tokelau and the Northern Cook Islands.

Suppressed rainfall is expected from Papua New Guinea southeast to the Southern Cook Islands, including the Solomon Islands, Fiji, Vanuatu, New Caledonia, Niue and Tonga. Rainfall is also expected to be near average or below over the Marquesas Islands.

The model forecast skill confidence ranges from low to moderate for this seasonal forecast period.

Island group	Rainfall outlook	Outlook confidence
Western Kiribati	25:30:45 (Above)	Moderate
Eastern Kiribati	20:30:50 (Above)	Moderate
Tuvalu	20:35:45 (Above)	Moderate
Tokelau	20:40:40 (Near average or above)	Moderate
Northern Cook Islands	20:40:40 (Near average or above)	Moderate
Wallis and Futuna	35:45:20 (Near average)	Moderate
Samoa	35:45:20 (Near average)	Low
Niue	35:45:20 (Near average)	Moderate
Society Islands	20:45:35 (Near average)	Low - Moderate
Austral Islands	30:50:20 (Near average)	Low - Moderate
Tuamotu Islands	25:45:30 (Near average)	Moderate
Pitcairn Island	35:45:20 (Near average)	Moderate
Vanuatu	40:45:15 (Near average or below)	Moderate
Fiji	40:45:15 (Near average or below)	Low - Moderate
Southern Cook Islands	40:40:20 (Near average or below)	Moderate
Marquesas Islands	40:40:20 (Near average or below)	Moderate
Solomon Islands	40:45:15 (Below or near average)	Low - Moderate
Papua New Guinea	45:40:15 (Below)	Moderate
New Caledonia	45:40:15 (Below)	Moderate - High
Tonga	45:40:15 (Below)	Moderate

NOTE: Rainfall estimates for the next three months for Pacific Islands are given in the above 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.



Rainfall outlook map for November 2004 to January 2005

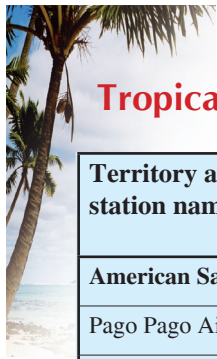


Forecast validation: August to October 2004

Enhanced convection was expected with above average rainfall over Eastern and Western Kiribati, and average or above average rainfall in Tuvalu, the Northern and Southern Cook Islands, and the Tuamotu and Austral Islands of French Polynesia. Suppressed convection with average or below average rainfall was expected over Papua New Guinea, Vanuatu, New Caledonia, and Fiji. Rainfall was expected to be near average elsewhere.

Rainfall anomalies occurred much as expected in Papua New Guinea, New Caledonia, Tuvalu, Tokelau, the Cook

Islands, and the Society, Marquesas, and Austral Islands of French Polynesia. However, elsewhere rainfall patterns differed from what was forecast. Enhanced convection and/or above average rainfall affected the region from the Solomon Islands southeast to Niue, including Vanuatu, Fiji, and Tonga. Rainfall was also above average in the Marquesas and Pitcairn Islands. Rainfall was below average in New Caledonia, and from Wallis and Futuna east to the Society Islands, including the Northern Cook Islands. The overall 'hit' rate for the August to October 2004 rainfall outlook was 50%.



Tropical Pacific rainfall - October 2004

Territory and station name	October 2004 rainfall total (mm)	Long-term average (mm)	October 2004 percent of average	Lowest on record (mm)	Highest on record (mm)	Records began
American Samoa						
Pago Pago Airport	291.6	254	115			1966
Australia						
Cairns Airport	22.0	41	54	0	205	1941
Townsville Airport	7.8	26	30	0	253	1940
Brisbane Airport	42.4	94	45	4	407	1929
Sydney Airport	168.4	78	216			1929
Cook Islands						
Rarotonga Airport	41.6	102	41	10	319	1929
Fiji						
Rotuma	546.1	340	161	80	656	1912
Nadi	24.8	102	24	2	342	1942
Nausori	55.7	205	27	32	914	1956
Ono-i-Lau	27.8	86	32	2	338	1943
French Polynesia						
Hiva Hoa, Atuona	141.0	81	174	7	301	1951
Tahiti - Faaa	68.4	85	80	12	204	1919
Tuamotu, Takaroa	135.6	115	118	20	279	1953
Gambier, Rikitea	200.8	186	108	51	419	1952
Tubuai	160.6	113	142	7	297	1953
Rapa	154.0	172	90	67	521	1951
Kiribati						
Tarawa	63.8	127	50	0	433	1946
New Caledonia						
Ile Art, Belep	3.2	54	6	4	208	1962
Koumac	9.0	28	32	0	177	1951
Ouloup	275.0	58	474	3	201	1966
Ouanaham	240.8	61	395	4	386	1961
Poindimie	10.0	119	8	13	644	1965
La Roche	185.6	84	221	0	230	1956
La Tontouta	17.4	43	40	0	213	1949
Noumea	21.0	49	43	0	208	1863
Moue	81.7	86	95	4	529	1972
Niue						
Hanan Airport	228.0	187	122	11	340	1996



Tropical Pacific rainfall - October 2004

Territory and station name	October 2004 rainfall total (mm)	Long-term average (mm)	October 2004 percent of average	Lowest on record (mm)	Highest on record (mm)	Records began
New Zealand						
Kaitaia	117.8	100	118	42	209	1985
Whangarei Airport	85.0	111	77	18	313	1937
Auckland Airport	104.2	79	132	17	184	1962
North Tasman						
Lord Howe Island	120.0	134	90	35	337	1886
Norfolk Island	62.0	91	68	12	289	1921
Raoul Island	36.4	80	46	14	234	1937
Pitcairn Island	126.8	121	105	13	541	1940
Samoa						
Faleolo	384.4	233	165	57	479	1951
Apia	400.1	226	177	31	579	1890
Tonga						
Queen Lavinia/Niuafu'ou	200.4	174	115	12	424	1971
Niutoputapu/Mata'aho	174.4	183	95	9	552	1947
Lupepau'u	173.3	176	98	7	283	1995
Salote Pilolevu Airport	5.1	91	6	0	339	1947
Nuku'alofa	25.7	128	20	17	452	1944
Fua'amotu Airport	32.8	103	32	24	500	1980
Tuvalu						
Nanumea	244.6	169	145	8	647	1941
Nui Island	129.1	194	67	71	540	1941
Funafuti	146.5	266	55	60	556	1927
Nuilakita Island	222.2	298	75	103	691	1942
Vanuatu						
Pekoa	<i>106.2</i>	180	59	3	561	1951
Lamap	<i>304.0</i>	114	267	6	359	1960
Bauerfield	96.5	71	136	3	176	1985
Burtonfield	<i>30.6</i>	46	67	1	211	1961
Aneityum	<i>152.2</i>	95	160	1	285	1958
Wallis & Futuna						
Wallis Island, Hihifo	296.2	266	111	56	433	1951
Maopopo, Futuna Island	<i>173.2</i>	271	64			

Rainfall totalling 200 percent or more is normally well above average. Totals of 40 percent or less are normally well below average. **Highlighted values are new records.**

Data are as received and may be subject to change with later quality control. The data in italics are obtained from synoptic weather reports and can sometimes differ from the true values, due to communications or station outage, etc. Superscripts represent days of missing data.



Tropical Cyclone Guidance

Dr Jim Salinger, Dr Jim Renwick, and Stuart Burgess

Higher risk of tropical cyclones for some South Pacific countries near and east of the Date Line this year

Countries with increased risk over this period are Fiji, Wallis and Futuna, Niue, and the southern Cook Islands, and possibly the Solomon Islands, Tuvalu, Tokelau, Samoa, Tonga, and the Austral Islands of French Polynesia. Islands west of the Date Line are still likely to experience tropical cyclones, with a normal rate of occurrence expected (Table 1).

Table 1 shows the average number of tropical cyclones passing within 555 km (a circle of radius equal to 5° of latitude) of the main island groups of the Southwest Pacific over the full November to May period.

Country	Average over all years	Average over Weak ENSO years	Comment (Risk)
Fiji	2.3	2.6 - 2.8	Increased
Niue	1.8	2.2 - 2.3	Increased
Wallis and Futuna	1.7	2.0 - 2.4	Increased
Southern Cook Islands	1.4	1.9 - 2.1	Increased
Tonga	2.0	2.1 - 2.3	Average - Increased
Tuvalu	1.1	1.2 - 1.8	Average - Increased
Solomon Islands	1.4	1.4 - 1.7	Average - Increased
Samoa	1.4	1.5 - 2.0	Average - Increased
Austral Islands	0.8	0.7 - 1.1	Average - Increased
Tokelau	0.7	0.6 - 1.2	Average - Increased
Northern Cook Islands	0.8	0.9 - 1.0	Average
Southern Papua New Guinea	0.6	0.4 - 0.5	Average
Society Islands	0.8	0.4 - 0.8	Average
Tuamotu Islands	0.4	0.1 - 0.4	Average
Pitcairn Island	0.3	0.1 - 0.2	Average
Vanuatu	3.1	2.4 - 3.8	Variable - Uncertain
New Caledonia	2.8	2.1 - 3.1	Variable - Uncertain
Northern New Zealand	1.0	0.8 - 1.3	Variable - Uncertain
Marquesas Islands	0.1	0.0 - 0.1	Cyclones unlikely

The uncertainty range occurs from analysing different sets of analogues for the coming season. (Based on 34 years of data, and for tropical cyclones having mean wind speeds over 34 knots)

This southeastward elongation of the normal pattern is expected because of weak El Niño conditions now affecting the tropical Pacific region, and the extra ocean warmth around and east of the Date Line (Figure 1). The seas are warmer than normal, and are expected to remain so throughout much of the cyclone season. The 2003/04 tropical cyclone season was unusually 'quiet', with only four occurrences. However, two of these

tropical cyclones reached major hurricane force. One was very destructive, resulting in a national disaster, devastating the island of Niue, with loss of life and property.

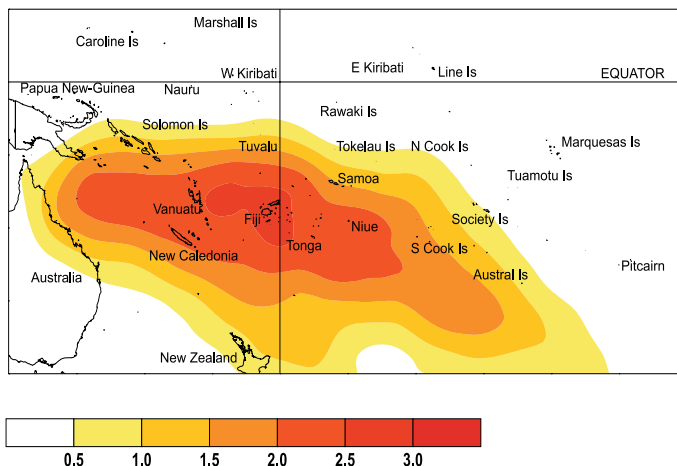


Figure 1 Tropical Cyclone occurrence during weak ENSO years (for November to May periods)

Although South Pacific tropical cyclones usually develop over the wet season, between November and April, there can also be an occasional occurrence in May. Peak cyclone occurrence is usually during January, February, and March. In seasons similar to the present the highest numbers occurred in the region between Vanuatu and Fiji in the South Pacific. Taken over the whole of the South Pacific, on average 9 tropical cyclones occur during the November to April season, but this can range from as few as 4 in 1994/95 and last season, to as many as 17 in 1997/98 during the very strong El Niño event.

On average, in seasons similar to the present, several tropical cyclones usually occur in the region around Vanuatu, New Caledonia, and the adjacent Coral Sea, some affecting other areas. On average, there is a 70% chance that at least one tropical cyclone will occur in the Southwest Pacific before 1 January, increasing to 97% by 1 February. About half of the tropical cyclones that develop reach hurricane force (with) mean wind speeds of at least 64 knots (118 km/h).

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 always be prepared.



The Island Climate Update

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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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