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The Island Climate Update

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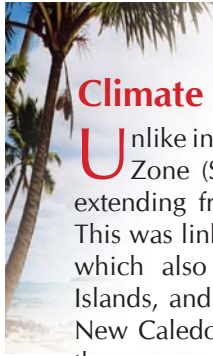
January's climate

- South Pacific Convergence Zone extended from Papua New Guinea southeast to Tokelau
- Enhanced convergence in the west, suppressed convection in the east
- Warmer than usual temperatures throughout much of the Southwest Pacific
- Four tropical cyclones to date this season – Judy, Kerry, Lola, and Meena

El Niño/Southern Oscillation and Seasonal Rainfall Forecasts

- El Niño conditions eased during January 2005 and are likely to return to normal by mid 2005
- Enhanced convection over Western and Eastern Kiribati and Tokelau
- Below average rainfall over the Marquesas Islands



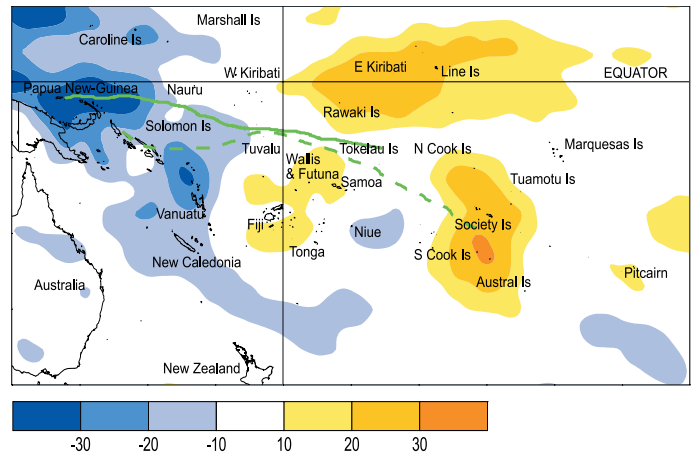


Climate developments in January 2005

Unlike in December 2004, the South Pacific Convergence Zone (SPCZ) was quite active west of the Date Line, extending from Papua New Guinea east toward Tokelau. This was linked to a large region of enhanced convergence, which also affected the Caroline Islands, the Solomon Islands, and Vanuatu. Enhanced convergence also affected New Caledonia, with generally well above average rainfall there, some places recording more than 600 mm (mainly from the passage of tropical cyclone Kerry near Chesterfield Island to the west over 8–13 January). Rainfall was well above average in parts of Fiji's Northern Division, and also in the Marquesas Islands of northern French Polynesia. Udu Point, in Fiji, measured rainfall totalling 160 mm on 28 January.

A large region of suppressed convection covered much of Indonesia and Australia. In the Pacific, regions of suppressed convection and mostly 50% below average rainfall occurred over Eastern Kiribati and parts of central and southern French Polynesia, with another, although less anomalous, area of suppressed convection over the region between Samoa, Fiji, and Tonga. Fiji's rainfall was below average, apart from some areas in the northeast.

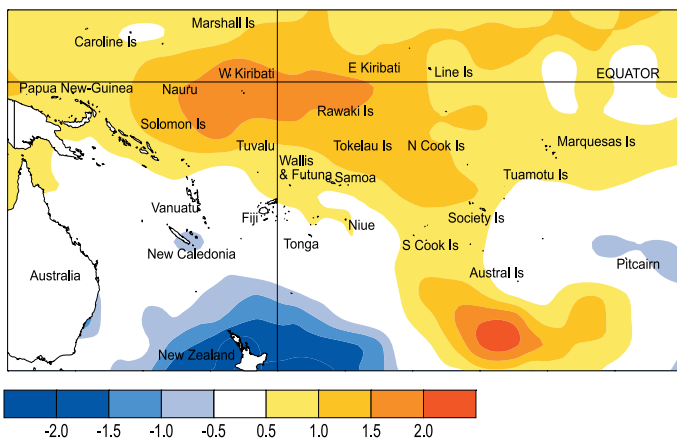
It was warmer than usual throughout much of the Southwest Pacific in January, with mean air temperatures 1.0 °C or more above average on many islands, and about 0.5 °C above average in Vanuatu, Fiji, and the Marquesas Islands. A heatwave occurred from 4–7 January in La Tontouta, New Caledonia, with maximum temperatures between 36 and 37 °C. New Caledonia's mean temperatures were 1.3 °C above normal for the month.



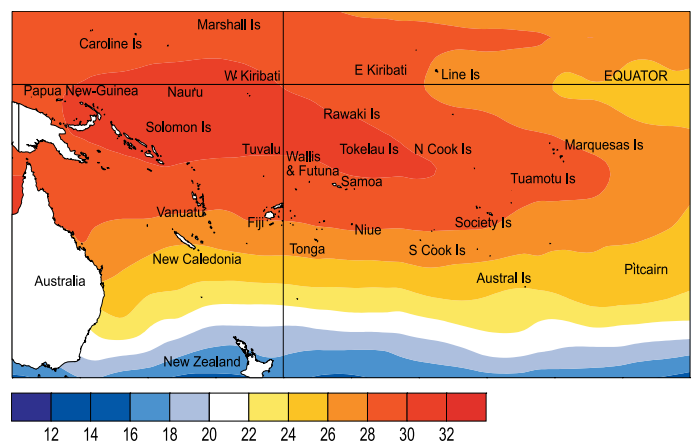
Outgoing Long-wave Radiation (OLR) anomalies, in Wm^{-2} . The January 2005 position of the SPCZ, as identified from total rainfall, is indicated by the solid green line. The average position of the SPCZ is identified by the dashed green line (blue equals high rainfall and yellow equals low rainfall).

Tropical Southwest Pacific mean sea-level pressures continued above average well west of the Date Line. They were below average about and east of the Solomon Islands and further east, especially near the equator. Equatorial easterlies along the equator were stronger in January 2005 than in most recent months.

Country	Location	Rainfall (mm)	% of average	Comments
New Caledonia	Houailou	671.5	235	Extremely high
New Caledonia	Montagne des Sources	635		Extremely high
New Caledonia	La Foa	625.5	327	Extremely high
Fiji	Udu Point	611	195	Extremely high
French Polynesia	Hiva Hoa, Atuona	490	521	Well above average
French Polynesia	Tubuai	21	10	Well below average



Sea surface temperature anomalies (°C) for January 2005.

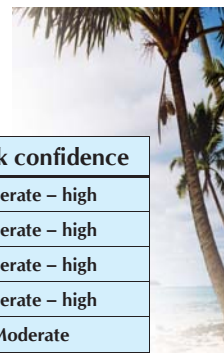


Mean sea surface temperatures (°C) for January 2005.

During January, El Niño/Southern Oscillation (ENSO) conditions in the tropical Pacific eased. The Southern Oscillation Index (SOI) rose to near zero in January, weakening the three-month November to January mean to -0.7 . The NINO3.4 average anomaly was about $+0.7$ °C in January, slightly lower than in December. Subsurface temperature anomalies remained positive (between $+1$ and $+2$ °C) in the top 100 m across much of the Equatorial Pacific. Zonal wind anomalies were positive in the western Pacific in January, but the trade winds were near normal strength east of the Date Line. Out-going longwave radiation (OLR) and rainfall anomalies showed enhanced convection between 140 °E and 160 °E, and suppressed convection over Indonesia and east of the Date Line.

Most global climate models indicate neutral conditions (with positive NINO3.4 anomalies) until April 2005, and a few show warming during the May to July period. Almost all forecast neutral conditions by late winter. The latest US National Center for Environmental Prediction (NCEP/CPC) statement is for weak El Niño conditions continuing for the next three months.

The International Research Institute for Climate Prediction (IRICP) summary describes the present situation as a weak El Niño state, and gives an 85% chance of weak El Niño conditions continuing through until at least March 2005.



Tropical rainfall outlook: February to April 2005

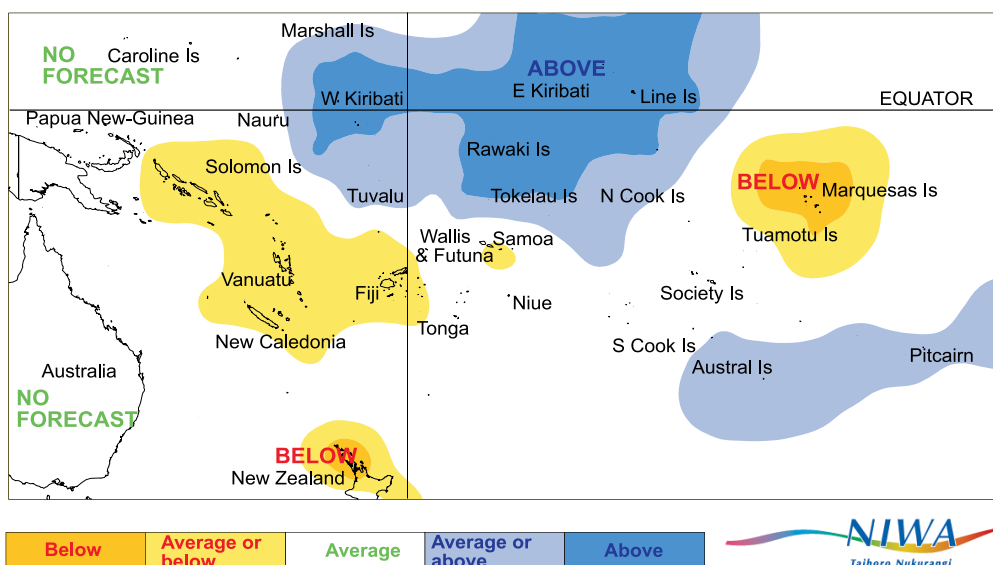
Enhanced convection is forecast in the equatorial region of Western and Eastern Kiribati and Tokelau, where rainfall is expected to be above average. Above average or near average rainfall is forecast for Tuvalu, Northern Cook Islands, Austral Islands, and Pitcairn Island.

Suppressed convection is likely over the Solomon Islands, Vanuatu, New Caledonia, Fiji and Samoa, where rainfall is expected to be near average or below average. Below average rainfall is forecast for the Marquesas Islands of French Polynesia.

Rainfall is expected to be near average elsewhere in the region.

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

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



Rainfall outlook map for February to April 2005

Forecast validation: November 2004 to January 2005

Enhanced convection and above average rainfall were expected over Eastern and Western Kiribati and Tuvalu, with average or above average rainfall over Tokelau and the Northern Cook Islands. Suppressed convection and below or average rainfall was expected over Papua New Guinea southeast to the Southern Cook Islands, including Fiji, Tonga, and Niue. Average or below average rainfall was forecast for the Marquesas Islands. Near average rainfall was expected elsewhere.

Rainfall was below average (and lower than expected) over Kiribati and eastward along the equator, and also over Wallis and Futuna and Samoa. Above average rainfall occurred over parts of Papua New Guinea, the Solomon Islands, and New Caledonia, as well as Pitcairn Island. Totals were near average elsewhere. The overall 'hit' rate for the November 2004 – January 2005 rainfall outlook was about 30%.

Tropical Cyclone Update

Tropical cyclone 'Lola' affected the region near Tonga from 31 January to 2 February, with maximum sustained winds speeds of 63 km/h. Surface pressures fell to 998 hPa at Fua'amotu Airport, with a period of strong winds there on 1 February. Tropical cyclone 'Meena', the 4th named occurrence this season, was east of Samoa on 3 February, and tracking

towards the Southern Cook Islands at the time of writing. So far, central pressures have been below 970 hPa with estimated maximum sustained wind speeds of 230 km/h. Southwest Pacific tropical cyclone occurrences normally peak during the next few months. The March issue of the ICU will provide an update on tropical cyclone information.

Tropical Pacific rainfall – January 2005

Territory and station name	January 2005 rainfall total (mm)	Long-term average (mm)	January 2005 percent of average	Lowest on record (mm)	Highest on record (mm)	Records began
American Samoa						
Pago Pago Airport	386.8	346	112			1966
Australia						
Cairns Airport	552.2	395	140	86	1417	1941
Townsville Airport	217.6	271	80	9	1142	1940
Brisbane Airport	70.6	158	45	10	804	1929
Sydney Airport	53.4	100	53			1929
Cook Islands						
Rarotonga Airport	212.4	226	94	24	668	1929
Fiji						
Rotuma	336.4	355	95	28	679	1912
Udu Point	611.2	313	195	17	991	1946
Nadi	250.8	343	73	13	981	1942
Nausori	215.1	365	59	108	686	1956
Ono-i-Lau	47.2	179	26	16	381	1943
French Polynesia						
Hiva Hoa, Atuona	490.2	94	521	14	457	1951
Tahiti - Faaa	57.9	349	17	25.5	956	1919
Tuamotu, Takaroa	309.4	226	137	63	681	1953
Tuamotu, Hereheretue	104.2	210	50	59	599	1962
Gambier, Rikitea	229.6	196	117	14	406	1952
Tubuai	20.6	214	10	20	536	1953
Rapa	287.2	296	97	25	696	1951
Kiribati						
Tarawa	125.8	250	50	2	825	1946
New Caledonia						
Ile Art, Belep	78.6	253	31	21	517	1962
Koumac	166.2	167	100	4	578	1951
Ouloup	285.4	177	161	36	608	1966
Ouanaham	242.6	180	135	25	576	1961
Poindimie	555.8	370	150	43	1245	1965
La Roche	120.0	190	63	28	578	1956
La Tontouta	244.2	123	199	6	380	1949
Noumea	181.2	107	169	0	383	1863
Moue	189.0	171	111	34	711	1972
Niue						

Tropical Pacific rainfall – January 2005



Territory and station name	January 2005 rainfall total (mm)	Long-term average (mm)	January 2005 percent of average	Lowest on record (mm)	Highest on record (mm)	Records began
New Zealand						
Kaitaia	69.1	82	84	2	287	1985
Whangarei Airport	35.2	84	42	1	315	1937
Auckland Airport	16.0	67	24	4	206	1962
North Tasman						
Lord Howe Island	260.0	115	226	10	291	1886
Norfolk Island	140.2	91	154	8	340	1921
Raoul Island	115.6	130	89	2	464	1937
Samoa						
Faleolo	147.2	389	38	58	833	1951
Apia	284.5	461	62	84	1513	1890
Tokelau						
Nukunonu	362.6	329	110	0	905	1948
Tonga						
Lupepau'u	203.1	288	71	82	686	1995
Fua'amotu Airport	223.2	201	111	4	533	1979
Tuvalu						
Nanumea	430.6	357	120	39	1143	1941
Nui Island	360.8	422	85	72	890	1941
Funafuti	408.9	386	106	166	1142	1927
Nuilakita Island	353.6	376	94	73	816	1941
Vanuatu						
Pekoa	431.8	324	133	53	671	1951
Lamap	152.1	252	60	39	678	1960
Bauerfield	266.0	249	107	28	434	1985
Burtonfield	175.4	162	108	19.8	373	
Aneityum	78.9	276	29	18	817	1958
Wallis & Futuna						
Wallis Island, Hihifo	265.4	334	79	126	573	1951

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

Data are published as received and may be subjected to change after undergoing quality control checks. The data in italics are obtained from synoptic weather reports. These can sometimes differ from the true values, due to communications or station outage, etc.

The Southwest Pacific Climate in 2004

Stuart Burgess & Dr Jim Salinger, NIWA

In 2004, the El Niño/Southern Oscillation (ENSO) conditions evolved from a neutral state in the first half of the year to a weak El Niño event in the central equatorial Pacific in the second half of the year (Figure 1). The trade winds were near normal in strength at the start of the year, but equatorial westerly wind bursts occurred, often reaching the Date Line, from June onwards. Apart from these (and warmer temperatures for many), the El Niño had little impact on the climate of most Southwest Pacific Islands. However, much of New Caledonia and Vanuatu, and to a lesser extent, Fiji and Tonga, had several drier than normal months toward the end of the year.

The weak El Niño event was expressed more definitely in sea surface temperature (SST) anomalies. Above average SSTs occurred throughout the region during 2004 (Figure 2), being at least 1.0 °C above average around Western Kiribati, and 0.5 to 0.9 °C above average in many other island nations, especially those east of the Date Line. New Caledonia, Vanuatu, the main island of Fiji, and Tonga, were surrounded by near average SSTs.

As with SSTs, air temperatures were 0.5 °C or more above average throughout much of the tropical Southwest Pacific in 2004, especially along the equator from Nauru to Western Kiribati where they were about 1.0 °C above average. Air temperatures were near average in many areas southwest of the Date Line, including Vanuatu, New Caledonia, and parts of Fiji. The year was one of the warmest on record for mean air temperature at Fua'amotu Airport in Southern Tonga (+0.7 °C above average).

For much of the year, from April onwards, mean sea level pressures were generally above average west of the Date Line, and below average in the east. Areas of enhanced convection affected the region about and north of the Solomon Islands, and also Pitcairn Island, while suppressed convection occurred along the equator about and east of the Date Line (Figure 3). West of the Date Line, the South Pacific Convergence Zone (SPCZ) was a little further north and east than usual, especially during the first six months. East of the Date Line, the SPCZ was further north and east than usual during the first four months, after which it then lay south of its normal location, with slightly suppressed convection over Samoa and the Society Islands, which is at variance with the normal ENSO climate response.

This pattern affected the year's rainfall distribution, with rainfall being at least 110% of average over much of the Solomon Islands, Tonga, Niue, and parts of Tuvalu, and more than 150% of average in the Marquesas Islands of northern French Polynesia as well as Pitcairn Island. Rainfall was less than 80% of average in parts of New Caledonia, and less than 90% of average in Fiji's Western Division, parts of Samoa, and the Society Islands of central French Polynesia. Rainfall was near normal elsewhere.

Four tropical cyclone occurrences affected the region the January – April 2004 period, two of which were classified as major hurricanes.

Country	Location	Rainfall (mm)	% of average	Comments
New Caledonia	Belep	1054	59	Extremely low
Tuvalu	Nanumea	4154	139	Well above average

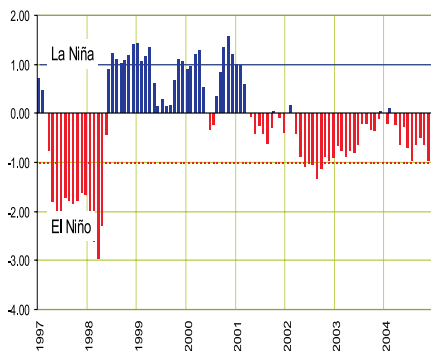


Figure 1. The Southern Oscillation Index (SOI). The index displayed neutral values for the first half of the year, then drifted negative into the weak El Niño range for the remainder of the year.

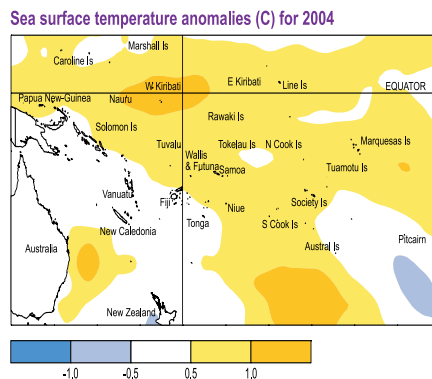


Figure 2: Sea surface temperature (SST) anomalies (departure from average, °C). Yellow or orange areas represent warmer than average SSTs.

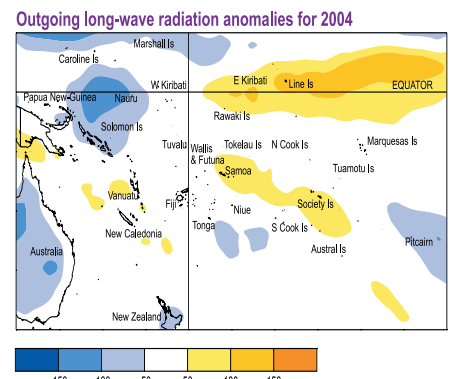


Figure 3. Outgoing Long-wave Radiation (OLR) anomalies, in Wm^{-2} , are represented by coloured areas (blue equals high rainfall and yellow equals low rainfall).



The Island Climate Update

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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 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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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 National Meteorological Services (NMHS). 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 content.

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