Number 66, March 2006

The Island Climate Update

February's climate

- Active South Pacific Convergence Zone (SPCZ) extending from north of the Solomon Islands southeast towards the Southern Cook Islands
- Strongly suppressed convection over Queensland, extending east towards Vanuatu
- Very high rainfall in parts of Samoa and northern Tonga
- Warmer than average throughout much of French Polynesia
- Four tropical cyclones for the season to date

El Niño/Southern Oscillation and seasonal rainfall forecasts

- Tropical Pacific Ocean and atmosphere remains consistent with weak La Niña conditions
- Below average rainfall in Western and Eastern Kiribati
- On average, two to three tropical cyclones occur in March

Collaborators

Australian Bureau of Meteorology

Meteo France

Fiji Meteorological Service

NOAA National Weather Service

NOAA Climate Prediction Centre (CPC)

International Research Institute for Climate and Society

European Centre for Medium Range Weather Forecasts

UK Met Office

World Meteorological Organization

SOPAC

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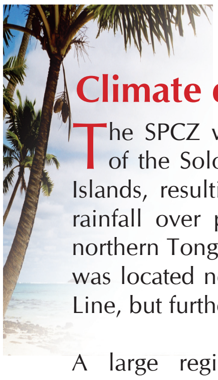


Climate developments in February 2006

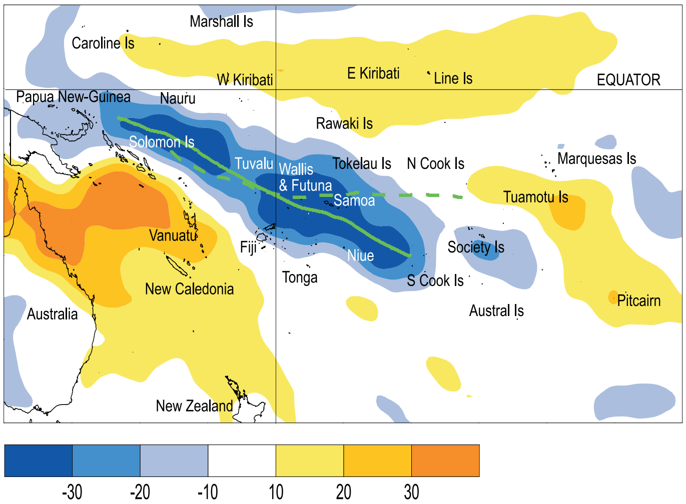
The SPCZ was rather active, extending from the region north of the Solomon Islands southeast towards the Southern Cook Islands, resulting in enhanced convection and/or above average rainfall over parts of Tuvalu, Wallis and Futuna, northern Fiji, northern Tonga, Samoa, and the Southern Cook Islands. The SPCZ was located near its average position about and west of the Date Line, but further south than average in the east.

A large region of strongly suppressed convection affected Queensland, extending east towards Vanuatu. Weakly suppressed convection persisted over Western and Eastern Kiribati in the central equatorial Pacific.

Rainfall was more than 300% of average in northern parts of Tonga, more than 250% of average in parts of Samoa (over 1000 mm in Apia), and at least 125% of average in Fiji's Rotuma Island and the Southern Cook Islands. High rainfall totalling almost 200 mm occurred in Labasa, Fiji, towards the end of February, resulting in landslides. There were three fatalities. In contrast, February rainfall was less than 50% of average in parts of Western and Eastern Kiribati, and less than 25% of average in several northern regions of New Zealand.

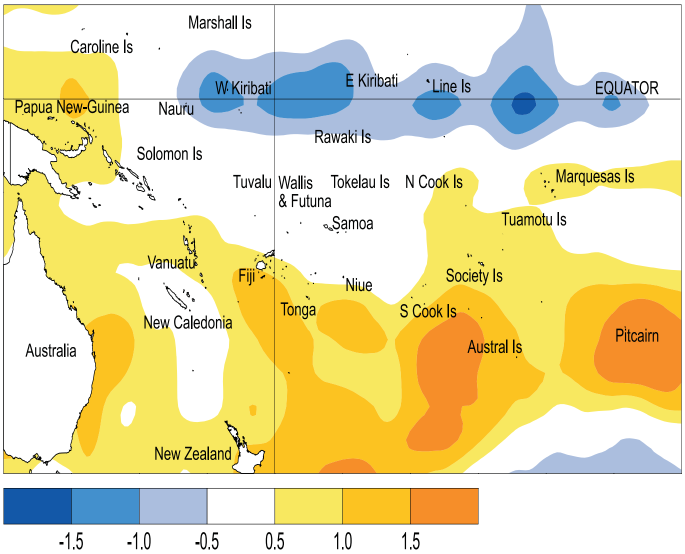
Mean air temperatures were 0.5 ºC or more above average throughout much of French Polynesia.

Southwest Pacific mean sea-level pressures tended below average over much of the tropical Pacific about and east of Vanuatu, the largest negative anomalies being south of the Cook Islands. Equatorial surface easterlies continued to be very persistent along the Equator, occurring in about 99% of observations at Tarawa.

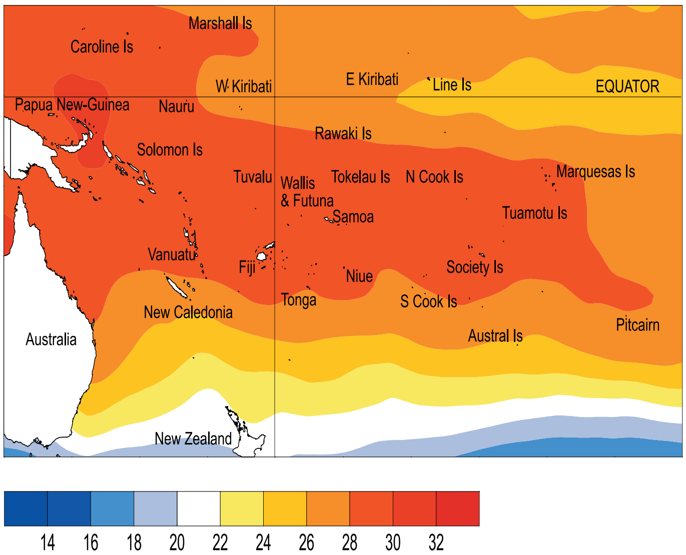


Outgoing Long-wave Radiation (OLR) anomalies, in Wm^{-2}. The February 2006 position of the SPCZ, as identified from total rainfall, is indicated by the solid green line. The average position of the SPCZ is identified by the dashed green line (blue equals high rainfall and yellow equals low rainfall).

Country	Location	Monthly Rainfall (mm)	% of average	Comments
Tonga	NiuaFoo'u	846	340	Record high
Samoa	Apia	1029	279	Record high
Eastern Kiribati	Kiritimati	15	21	Well below normal
Australia	Lord Howe Island	21	18	Extremely low
New Zealand	Auckland Airport	7	9	Record low



Sea surface temperature anomalies (°C) for February 2006.



Mean sea surface temperatures (°C) for February 2006.

The state of the tropical Pacific Ocean and atmosphere remains characteristic of weak La Niña conditions, though the one-month Southern Oscillation Index (SOI) has returned to near zero for February. The region of strongest negative sea surface temperature (SST) anomalies continued to migrate westwards in February, weakening as it approached the Date Line. The NINO3 SST anomaly was about 0.3°C for February (-0.4°C in January, -0.5°C for December–February) and NINO4 fell to -0.7°C (-0.3°C in January and for December–February). At around 100 m depth, the negative temperature anomaly seen earlier near 140°W moved eastwards to be centred near 120°W, while a positive anomaly strengthened west of the Date Line. SPCZ-related convection was enhanced in February from the Solomon Islands, and out across the region of Fiji and Samoa towards the southeast, while convection was suppressed over northern Australia and the Coral Sea, and in the equatorial belt east of the Date Line. A region of Madden-Julian Oscillation (MJO) related convection should move through the Indonesian region over the coming two weeks.

Most El Niño/Southern Oscillation global forecast models are on the cool side of neutral conditions for autumn, with three showing La Niña conditions. All models tend back towards neutral conditions by mid-year, with considerable spread in the forecasts after that. The latest NCEP/CPC statement calls for La Niña conditions during the next 3–6 months, while the IRICP summary gives a 65% chance of La Niña conditions over the next three months, reducing to 20% by mid year.

Tropical rainfall outlook: March to May 2006

Suppressed convection is expected in the equatorial region of Western and Eastern Kiribati, where rainfall is expected to be below average.

Near or below average rainfall is likely in Tuvalu, east to the Marquesas and Tuamotu Islands including Tokelau and the Northern Cook Islands.

Regions of near or above average rainfall expected from Fiji east-southeast to Pitcairn Island including, Tonga, the Southern Cook Islands, and the Austral Islands. Rainfall is also expected to be near or above average in Papua New Guinea.

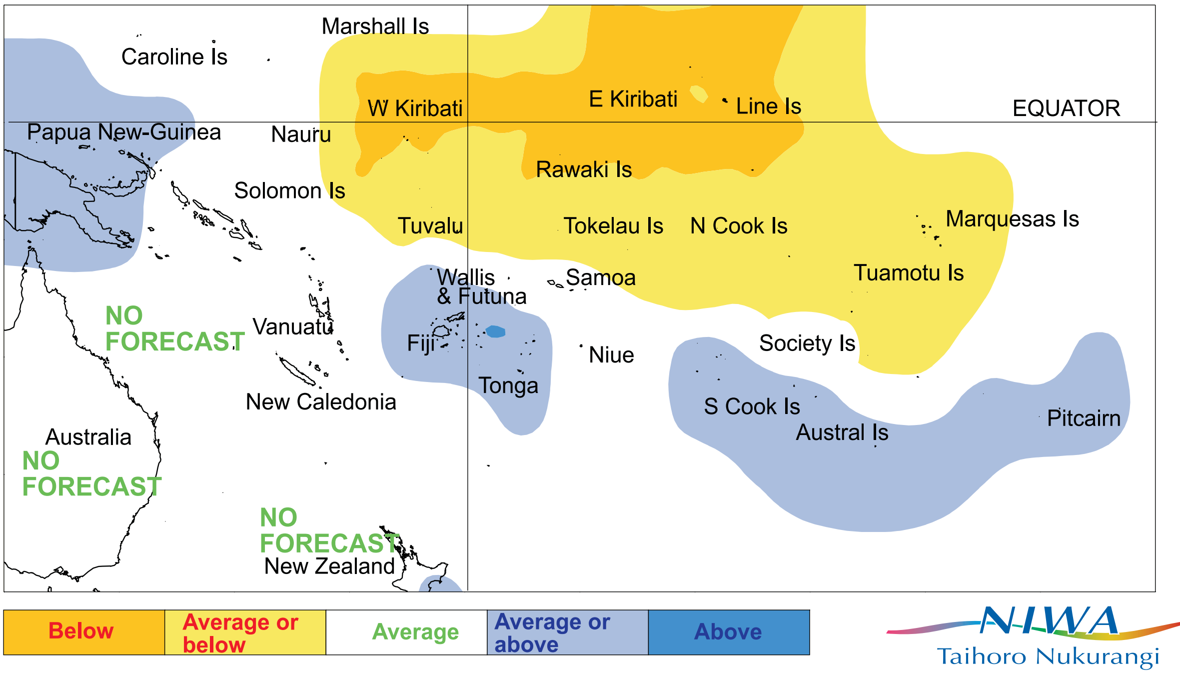
Near average rainfall is forecast for the rest of the countries in the region.

The global rainfall model skill is around moderate for this time of the year as the end of the tropical cyclone season approaches.

On average, there are two to three tropical cyclone occurrences in March.

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

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.



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Rainfall outlook map for March to May 2006.

Forecast validation: December 2005 to February 2006

Suppressed convection with below average rainfall was expected over Western and Eastern Kiribati, extending to the Northern Cook Islands and the Marquesas Islands. Rainfall was expected to be near or below average over Tuvalu, Tokelau, and the Tuamotu Islands. A large region of near or above average rainfall was forecast from the Solomon Islands southeast to the Austral Islands, including Vanuatu, Fiji, Wallis and Futuna, Tonga, Samoa, Niue, the Southern Cook Islands, and the Society Islands, with near average rainfall elsewhere.

Areas of enhanced convection and above average rainfall affected Papua New Guinea and the northern Solomon Islands, extending southeast to include parts of Fiji, Wallis and Futuna, Tonga, Samoa, and Niue. Suppressed convection or below average rainfall occurred over Western and Eastern Kiribati, extending to the Northern Cook Islands. Rainfall was higher than expected in Samoa and Northern French Polynesia, and lower than forecast in Vanuatu. The overall rainfall outcome was similar to what was expected, with a 'hit' rate for the December 2005–February 2006 outlook of about 80%.

Tropical cyclone update

There have been four tropical cyclones to date. The most recent was tropical cyclone 'Kate', with sustained wind speeds of 90 km/h. 'Kate' was fairly localised, occurring over the Coral Sea south of Papua New Guinea from 24 to 25 February.

There are on average two to three tropical cyclone occurrences in March. The April issue of the ICU will provide an update on information relating to any occurrences of tropical cyclones in the region.

Tropical Pacific rainfall – February 2006

Territory and station name	February 2006 rainfall total (mm)	Long-term average (mm)	February 2006 percent of average	Lowest on record (mm)	Highest on record (mm)	Records began
Australia						
Cairns Airport	276.6	457	61	30	1287	1941
Townsville Airport	15.4	292	5	4	904	1940
Brisbane Airport	50.6	172	29	24	544	1929
Sydney Airport	28.0	106	26			1929
Cook Islands						
Penrhyn	234.8	341	69	28	867	1937
Rarotonga Airport	336.7	202	167	12	509	1929
Rarotonga EWS	303.4	202	150	172	313	2000
Fiji						
Rotuma	401.2	322	125	111	925	1912
Udu Point	296.1	249	119	152	772	1946
Nadi	228.8	292	78	46	792	1942
Nausori	316.5	268	118	105	612	1956
Ono-I-Lau	103.9	194	54	17	492	1943
French Polynesia						
Hiva Hoa, Atuona	115.2	157	73	7	1021	1961
Bora Bora Motu	246.6	236	104	41	809	1976
Tahiti - Faa'a	228.6	216	106	21	759	1957
Tuamotu, Takaroa	128.2	193	66	43	606	1951
Gambier, Rikitea	81.6	175	47	22	397	1980
Tubuai	350.4	200	175	25	515	1966
Rapa	170.8	186	92	12	530	1951
Kiribati						
Christmas Is/Kiritimati	15.4	74	21	0	524	1951
Butaritari	68.8	264	26	12	744	1945
Tarawa	49.5	182	27	4	541	1946

Tropical Pacific rainfall – February 2006

Territory and station name	February 2006 rainfall total (mm)	Long-term average (mm)	February 2006 percent of average	Lowest on record (mm)	Highest on record (mm)	Records began
New Caledonia						
Ile Art, Belep	126.6	198	64	40	624	1962
Koumac	98.8	160	62	19	473	1951
Ouloup	266.0	189	141	37	417	1966
Ouanaham	324.8	246	132	38	573	1961
Poindimie	352.6	383	92	101.8	1151	1965
La Roche	179.6	210	86	42	853	1956
La Tontouta	111.0	131	85	15	435	1949
Noumea	180.8	117	155	15	406	1863
Moue	181.0	161	112	47.2	555	1972
New Zealand						
Kaitaia	12.8	101	13	14	309	1985
Whangarei Aiport	15.0	112	13	6	452	1937
Auckland Airport	7.0	82	9	8	272	1962
North Tasman						
Lord Howe Island	21.2	116	18	22	337	1886
Norfolk Island	20.2	81	25	3	298	1921
Raoul Island	34.6	148	23	11	731	1937
Samoa						
Faleolo	630.1	374	168	164	825	1951
Apia	1029.4	369	279	90	947	1890
Tonga						
Queen Lavinia	845.6	249	340	65	456	1971
Niuatoputapu	437.8	255	172	20	635	1947
Nuku'alofa	260.4	210	124	16.5	712	1944
Lupepau'u	312.5	218	143	101	356	1995
Salote Pilolevu Airport	311.2	194	160	35	486	1947
Tuvalu						
Nui Island	390.0	342	114	26	963	1941
Funafuti	402.7	316	127	93	1139	1927
Nuilakita	622.9	320	195	63	673	1941

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 subject 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.

Lessons learned from the Pacific ENSO Applications Center (PEAC): building a climate information system in the Pacific

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Interim Director, NOAA Integrated Data and Environmental Applications Center

In the Pacific – and elsewhere in the world – recent events such as the 1997–1998 El Niño have provided evidence that climate forecast and assessment information is helping to enhance resilience in water resource management, disaster management (including drought, flood and fire management as well as tropical cyclones), agriculture, health, fisheries, tourism, and other sectors. Scientists and government officials in the American Flag and U.S. Affiliated Pacific Islands agree advanced forecast information, coupled with education and outreach, provided by the Pacific ENSO Applications Center (PEAC) helped to mitigate the negative impacts of the 1997–1998 El Niño event and continued to provide valuable information to support decision-making. Initiated in 1994 as a research pilot project, the PEAC was established as a partnership involving the U.S. National Oceanic and Atmospheric Administration (NOAA) through the NOAA Climate Program Office (formerly Office of Global Programs) and the U.S. National Weather Service, the University of Hawaii, the University of Guam, and the Pacific Basin Development Council (the Governors of Hawaii, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands). Steps toward the transition of PEAC from research to operations began in 2000 with responsibility assigned to the U.S. National Weather Service Pacific Region (NWS PR). Additional information can be found on the PEAC website (http://lumahai.soest.hawaii.edu/Enso/).

With support from the NOAA Climate Office, the author is completing a review of the first decade of PEAC operations (details on PEAC review can be found at, http://research.eastwestcenter.org/climate/PEAC. Based upon this on-going study, the following is a brief description of some of the lessons learned.

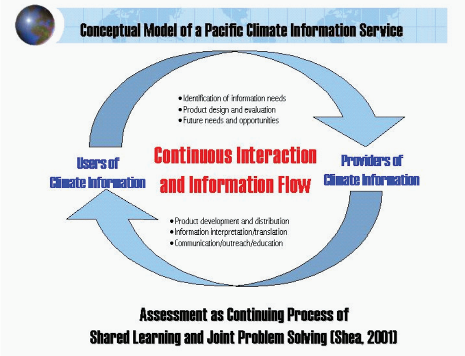

Figure 1 – Pacific Climate Information System

Early and continuous partnership and collaboration with users is essential. It was found climate forecasting services should use a continuous, collaborative, participatory process which engages the users of climate information products as well as the providers of that information in a process of shared learning and joint problem solving (see Figure 1). This process should encourage interaction among and across user communities and recognise the dynamic, evolutionary character of changing climate, social, and economic conditions. Policy responses and the climate service should reflect an iterative, adaptive approach with continuous evaluation and revision as conditions change.

Education, outreach and dialogue -- a critical role. Early and continuing education and outreach efforts: 1) help raise awareness and improve understanding of climate system processes and local impacts; 2) enable climate information providers and users to explore solutions and identify opportunities to enhance the resilience of communities, businesses, and resources; and 3) **build trust and credibility,** an essential characteristic and a long-term endeavour requiring sustained interaction among both individuals and institutions. As a PEAC team member likes to say, establishing and sustaining "eyeball-to-eyeball" contact is essential.

The PEAC experience also shows the importance of: 1) building on existing institutions and trusted information brokers; 2) effectively engaging the national meteorological services, key ministries, local experts, community leaders, and the media; 3) a sustained partnership among climate information users and providers helps to maintain awareness between individual events; and 4) an opportunity to establish a ***climate information system*** as opposed to only an event-based, early warning system.

Forecasts of future conditions must be set in an appropriate context. Establishing a climate information system should start with a clear understanding of the *problem being addressed* – managing water resources, disaster preparedness, coral reef management, etc. Partners in a climate information system should focus on the development and dissemination of *useful and usable information* and forecasts which are appropriate to the intended application and decision-making community. Responses to future events will benefit from setting future conditions in an historical context that *integrates traditional knowledge and practices* as well as instrumental records.

Decision makers in many sectors are interested in climate information on a continuum of timescales from extreme events through seasonal, inter-annual, and decades and longer timescales. Extreme events such as droughts, floods ,or tropical cyclones can be a galvanising focus for planning, response, and capacity-building. In addition, enhancing a community's resilience to year-to-year climate variability can play an important role in developing climate adaptation programmes. Strong partnerships between weather and climate communities in technical and policy arenas are important in exploring the interactions of climate processes across timescales and establish a climate information system which will address today's problems and support future planning.

According to James Weyman, U.S. NWS PR, the results of the PEAC Review will provide a strategic plan or "roadmap" for future U.S. climate services in the Pacific and be a focus for U.S. contributions to the World Meteorological Organization's Regional Climate Centre for Oceania. The above results are offered to support our shared journey toward sustained climate information systems and the mainstreaming of climate information to support adaptation in the face of climate variability and change.

The Island Climate Update

Visit The Island Climate Update 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 Island, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu

Requests for Pacific Island climate data should be directed to the Meteorological Services concerned.

Cover Photo:
Wendy St George,
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