

Number 81, June 2007

The Island Climate Update

Collaborators

Pacific Islands National
Meteorological Services

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Meteorology

Meteo France

NOAA National Weather
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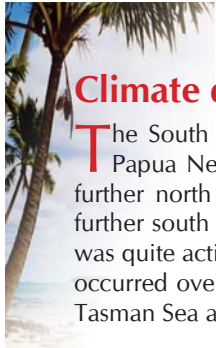
May's climate

- South Pacific Convergence Zone (SPCZ) located from Papua New Guinea to the Society Islands; quite active over Samoa
- Rainfall above average in parts of Fiji, American Samoa, and Northern French Polynesia
- Below average rainfall in parts of New Caledonia, Western Kiribati, the Austral, and the Kermadec Islands
- Warmer than normal in Southern Tonga, Niue, the Southern Cook Islands, parts of Central and Southern French Polynesia, and throughout Tuvalu
- Pierre, the 7th named tropical cyclone of the season

El Niño/Southern Oscillation (ENSO) and seasonal rainfall forecasts

- Neutral ENSO conditions prevail in the tropical Pacific
- Below average rainfall likely over Eastern Kiribati and Tuvalu
- Above average rainfall forecast for the Solomon Islands, Wallis and Futuna, Samoa, the Northern Cook Islands and Society Islands





Climate developments in May 2007

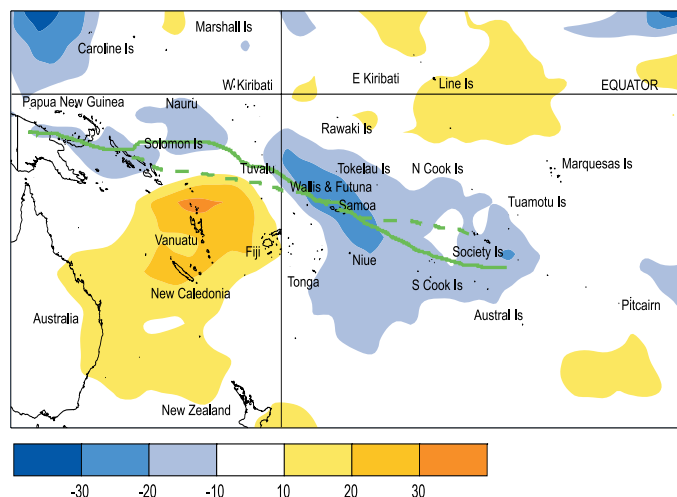
The South Pacific Convergence Zone (SPCZ) extended from Papua New Guinea to the Society Islands, and was slightly further north than average west of the Date Line, and a little further south than average well east of the Date Line. The SPCZ was quite active over Samoa. A region of suppressed convection occurred over Vanuatu and New Caledonia, extending into the Tasman Sea and toward Fiji.

Rainfall was above average (at least 150% of normal) in several parts of Fiji and American Samoa, and at least 125% of normal in parts of Northern French Polynesia. May rainfall was extremely low being 25% or less of normal in the Kermadec Islands, and also below average (75% or less of normal) in parts of New Caledonia, Western Kiribati, and the Austral Islands.

May mean air temperatures were about 1.0 °C or more above average in Southern Tonga, Niue, the Southern Cook Islands, and parts of Central and Southern French Polynesia, and at least 0.5 °C above average throughout Tuvalu. New Zealand recorded its warmest May since reliable measurements commenced in the 1860s, and all eastern Australian States also recorded their warmest May on record.

Tropical Southwest Pacific mean sea-level pressures were above average in the sub-tropics from the North Tasman Sea to the region west of South America, and slightly below average in the tropics about and east of the Date Line.

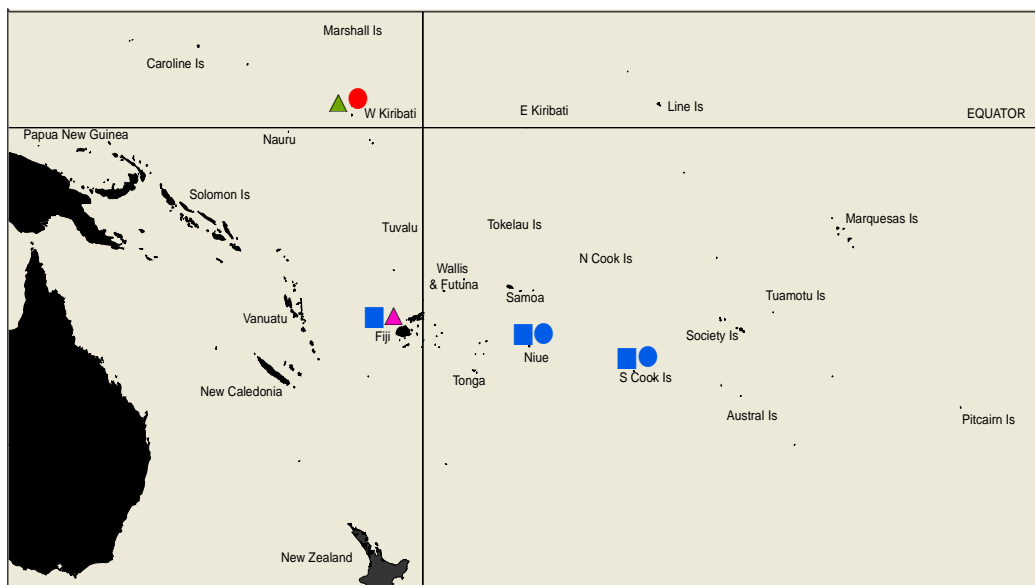
Equatorial surface easterlies occurred in 67% of observations at Tarawa, a significant decrease from 97% during April.



Outgoing Long-wave Radiation (OLR) anomalies, in Wm^{-2} (blue equals high rainfall and yellow equals low rainfall). The May 2007 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.

Country	Location	Rainfall (mm)	% of average	Comments
Fiji	Ono-i-Lau	285	272	Well above average
Fiji	Udu Point	307	184	Well above average
New Zealand	Raoul Island	28	22	Record low
New Zealand	Kaitaia	29	24	Record low
New Zealand	Auckland Airport	12	13	Record low

Soil moisture in May 2007



May 2007

- Dry
- Wet
- ▲ Moderate

May 2006

- Dry
- Wet
- ▲ Moderate

Estimated soil moisture conditions at the end of May 2007, using monthly rainfall data.

Estimates of soil moisture shown in the map (above) are based on monthly rainfall for one station in each country. Currently there are not many sites in the water balance model. It is planned to include more stations in the future.

The information displayed is based on a simple water balance technique to determine soil moisture levels. Addition of moisture to available water already in the soil comes from rainfall, and losses via evapotranspiration. Monthly rainfall and evapotranspiration are used to determine the soil moisture level and its changes.

Please note that these soil moisture calculations are made at the end of the month. For practical purposes, generalisations were made about the available water capacity of the soils at each site.

At the end of May 2007, Tarawa was experiencing dry soil conditions whilst wet soil conditions prevailed at Rarotonga and Hanan sites. Nadi soils were at moderate capacity.

El Niño/Southern Oscillation (ENSO)

Conditions in the tropical Pacific are currently neutral, although they are suggestive of a slow development towards La Niña.

The pattern of sea surface temperature (SSTs) anomalies is beginning to resemble La Niña conditions with colder than average waters in the far eastern Pacific and slightly warmer than average waters in the western Pacific. SSTs remain slightly above normal to the west of the Date Line, and then below average SSTs extend from 140°W to the South American coast.

The NINO3 anomaly was -0.3°C in May (-0.1°C in April, and also for March–May average) while the NINO4 anomaly was $+0.3^{\circ}\text{C}$ in May (March–May mean around $+0.4^{\circ}\text{C}$). Thus, the surface temperatures are decreasing, but only slowly.

The Southern Oscillation Index (SOI) has remained almost constant, being slightly negative although in the neutral range at -0.3 for May. Subsurface data for May continues to show a prominent negative anomaly in the top 150 metres between the Date Line and the South American coast.

The complication is that there have been anomalous westerly winds west of the Date Line during April and May, which are likely to have constrained upwelling of the cool subsurface waters.

Outgoing longwave radiation (OLR) and tropical rainfall anomalies for May indicate suppressed convection along the equator in the Pacific.

The ENSO Precipitation Index of -0.40 indicates weak cold conditions. The global sea surface height (SSH) anomaly shows a classic La Niña pattern with lower SSH anomalies from the Date Line east, surrounded by a horseshoe of higher SSH anomalies in the western Pacific.

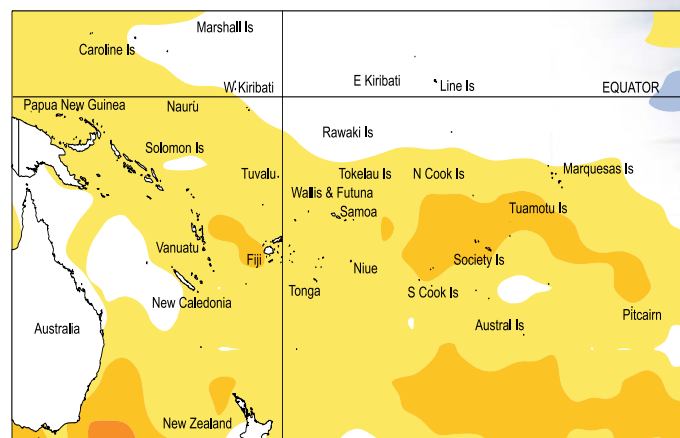
The Madden-Julian Oscillation (MJO) is presently weak.

The dynamical models show a transition to La Niña conditions over the next 3 months, with this persisting for the remainder of the year, whilst the statistical models project neutral ENSO states for the next 6–9 months.

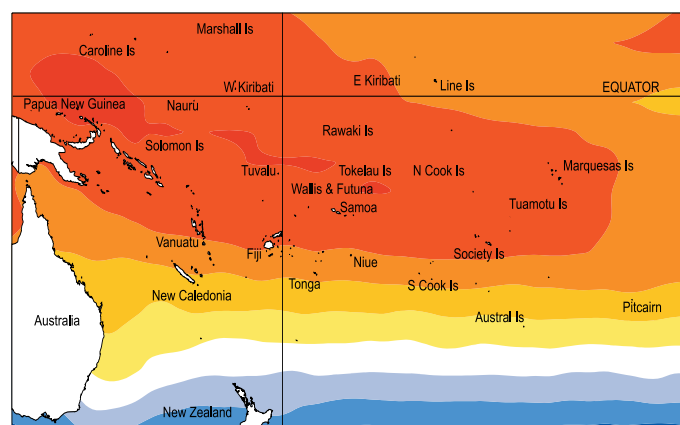
Forecast validation: March to May 2007

Suppressed convection was expected over Tuvalu and the Marquesas Islands, with near or below average rainfall. Enhanced convection and near or above average rainfall was expected over Western Kiribati, the Solomon Islands, and Vanuatu, as well as Samoa, the Society Islands, and Pitcairn Island. Near average rainfall was forecast elsewhere in the region.

A large region of enhanced convection and/or above



Sea surface temperature anomalies ($^{\circ}\text{C}$) for May 2007.



Mean sea surface temperatures ($^{\circ}\text{C}$) for May 2007

No ENSO forecast model retains warm conditions during the remainder of the year. The National Center for Environmental Prediction (NCEP) synopsis suggests a transition from ENSO-neutral to La Niña conditions is possible within the next 3 months, while the International Research Institute for Climate Society (IRI) synthesis gives a probability of 55% for a La Niña by mid-year. The probability of El Niño conditions re-emerging during the forecast period remains at or below 5%.

average rainfall extended from the Solomon Islands southeast over Samoa and toward the Southern Cook Islands, including Fiji, Tonga, Samoa, and Niue. Much of this above average region was further east and hence many islands in this region were wetter than expected. Below average rainfall occurred over Eastern Kiribati, the Northern Cook Islands, and Northern French Polynesia. Rainfall was lower than expected in Eastern Kiribati and the Austral Islands. The 'hit' rate for the March – May 2007 rainfall outlook was just over 60%.



Tropical Pacific rainfall – May 2007

Territory and station name	May 2007 rainfall total (mm)	May 2007 percent of average
Australia		
Cairns Airport	151.0	157
Townsville Airport	2.8	8
Brisbane Airport	71.6	72
Sydney Airport	11.4	12
Cook Islands		
Penrhyn	122.4	67
Rarotonga Airport	196.4	116
Rarotonga EWS	176.2	104
Fiji		
Rotuma	326.4	110
Udu Point	307.2	184
Nadi	26.9	30
Nausori	254.5	103
Ono-I-Lau	285.4	277
French Polynesia		
Hiva Hoa, Atuona	189.8	120
Bora Bora Motu	158.8	143
Tahiti - Faa'a	95.8	93
Tuamotu, Takaroa	36.2	41
Gambier, Rikitea	135.2	98
Tubuai	64.6	38
Rapa	136.0	61
Kiribati		
Tarawa	141.4	73

Territory and station name	May 2007 rainfall total (mm)	May 2007 percent of average
Niue		
Hanan	130.0	90
Liku	201.1	120
New Zealand		
Kaitaia	28.7	24
Whangarei Airport	29.2	27
Auckland Airport	12.0	13
New Caledonia		
Ile Art, Belep	97.4	47
Koumac	53.4	88
Ouloup	174.8	165
Ouanaham	102.6	75
Poindimie	170.6	84
La Roche	61.0	44
La Tontouta	58.0	104
Noumea	57.0	66
Moue	56.8	44
North Tasman		
Lord Howe Island	51.4	32
Norfolk Island	32.0	22
Raoul Island	27.6	22
Tuvalu		
Nanumea	130.7	58
Nui Is	233.8	106
Funafuti	198.3	79
Nuilakita	255.3	109

Rainfall totalling 200% or more is considered well above average. Totals of 40% 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. * denotes synoptic values.

Tropical rainfall outlook: June to August 2007

Enhanced convection is expected over the Solomon Islands, Wallis and Futuna, Samoa, the Northern Cook Islands, and Society Islands, where rainfall is expected to be above average.

A large region of near or above average rainfall is expected from Papua New Guinea southeastwards to the Tuamotu Islands including Vanuatu, Tokelau, Tonga, Niue, and the Southern Cook Islands.

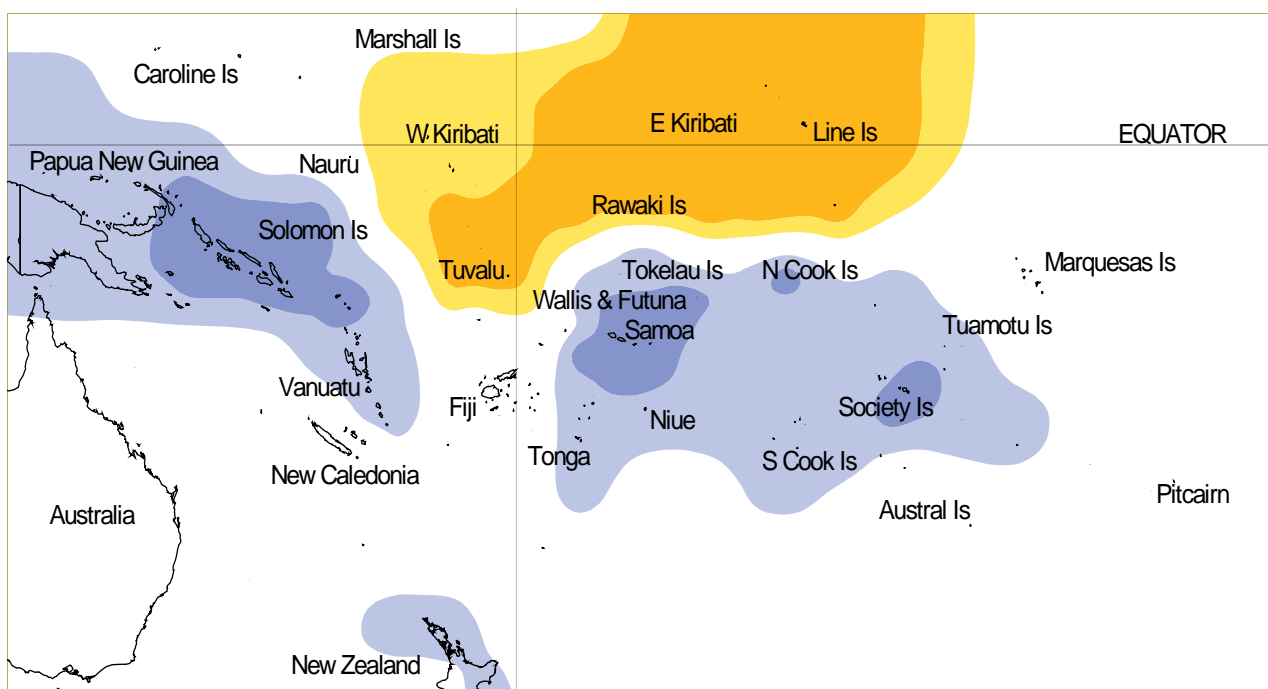
Suppressed convection is likely over Eastern Kiribati and Tuvalu where rainfall is expected to be below average. Near or below average rainfall is likely over Western Kiribati.

Rainfall is expected to be near average over rest of the countries in the region.

The forecast model skill is generally moderate for this time of the year.

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

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.



Rainfall outlook map for June to August 2007

Summary of the 2006–07 tropical cyclone season

Stuart Burgess, NIWA

The 2006–07 Southwest Pacific tropical cyclone season had seven occurrences (east of 150°E), one less than the average (1976–77 to 2005–06) number normally expected for the region in the tropical cyclone season (Figure 1), and the same number as the 2005–06 season. ICU tropical cyclone guidance, produced in September 2006, was for an above normal frequency of occurrences in parts of the Southwest Pacific near and east of the Date Line, due to expected weak to moderate El Niño conditions. The first tropical cyclone of the season occurred on 22 October, making this the earliest start to the tropical cyclone season since that of 1997. Such an early start is consistent with El Niño conditions. However, the El Niño dissipated earlier than expected in January, having an effect on the total number of tropical cyclones over the remainder of the season. The last tropical cyclone occurred unusually late in May.

This season's occurrences were evenly distributed across the Southwest Pacific region, with four tropical cyclones west of the Date Line and three east of the Date Line (see tracks in Figure 2). Rather than the normal February-March peak, there was a fairly even spread of tropical cyclones throughout the season, with the majority of occurrences occurring during the fourth week in several months (October, November, January, and March). February was unusually quiet, with no occurrences. This season, four of the Southwest Pacific region tropical cyclones (57%) reached hurricane strength (sustained wind speeds of at least 118 km), one of which reached major hurricane strength (mean wind speed at least 168 km/h).

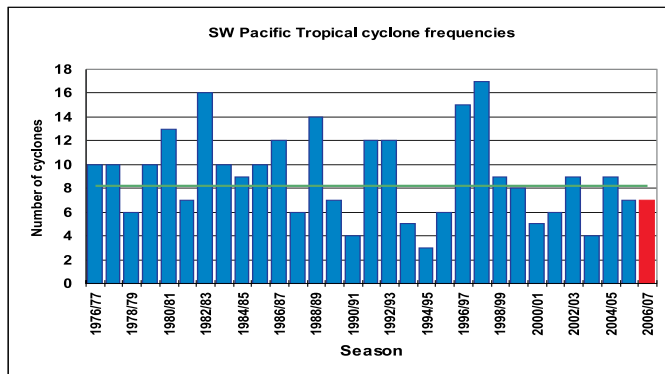


Figure 1: The number of named Southwest Pacific tropical cyclones for the 2006–07 season

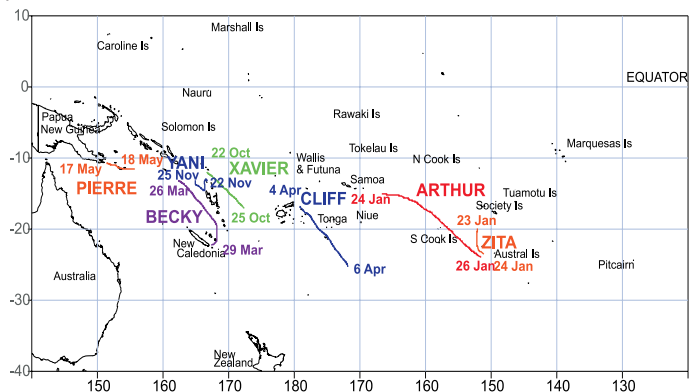


Figure 2: Southwest Pacific tropical cyclone tracks for the 2006–07 season

Tropical cyclone (TC) Xavier was the first of the season, occurring east of the Solomon Islands on 22 October, and tracked between Vanuatu and Fiji, with maximum sustained winds reaching 213 km/h (major hurricane force). TC Yani occurred over 22–25 November, between the Solomon Islands and Vanuatu, with maximum sustained winds of 120 km/h (hurricane force). TCs Zita and Arthur occurred over the period 23–26 January, both producing wind related damage and coastal flooding in parts of the Austral Islands of Southern French Polynesia, maximum sustained winds being 93 and 120 km/h respectively. TC Becky developed in the Coral Sea south of the Solomon Islands on 26 March with maximum sustained winds of 130 km/h. Becky tracked towards Vanuatu and then veered south toward New Caledonia. Fortunately Becky dissipated on approach to New Caledonia, the highest wind gust reaching 90 km/h there. In Vanuatu, there were fallen trees and damage to crops in Espiritu and Malakula. TC Cliff occurred over the east of Fiji and Southern Tonga from 4–6 April, with maximum sustained wind speeds of 102 km/h. Some eastern parts of Fiji suffered minor wind damage and minor to moderate flooding. TC Pierre was the last of the season, occurring over the southeast of Papua New Guinea and sea area south of the Solomon Islands 17–18 May.

Estimates of maximum sustained wind speeds for named tropical cyclones in the 2006–07 season:

Name	Origin	Period of occurrence	Estimated maximum sustained wind speed (km/h)	Classification
Xavier	East of Solomon Islands	22–25 October	213	Major hurricane
Yani	South of Solomon Islands	22–25 November	120	Hurricane
Zita	Austral Islands	23–24 January	93	Tropical storm
Arthur	Southern Cook Islands & French Polynesia	24–26 January	120	Hurricane
Becky	South of Solomon Islands	26–29 March	130	Hurricane
Cliff	North of Fiji	4–6 April	102	Tropical storm
Pierre	South of Solomon Islands	17–18 May	65	Gale



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, Wallis and Futuna

Cover Photo:
Wendy St George,
NIWA

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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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