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The Island Climate Update

Collaborators

Pacific Islands National
Meteorological Services

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May's climate

- South Pacific Convergence Zone (SPCZ) further south than average
- Suppressed convection from Nauru to Eastern Kiribati
- High rainfall in parts of central French Polynesia
- Very dry in southern Tonga
- Temperature: above average in parts of Tonga, and French Polynesia; below average in New Caledonia

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

- The tropical Pacific is now in a neutral ENSO state
- Below average rainfall expected over Tuvalu, Tokelau, the Northern Cook Islands, and the Marquesas Islands
- A large region of enhanced convection from Papua New Guinea southeastwards to the Austral Islands



Climate developments in May 2006

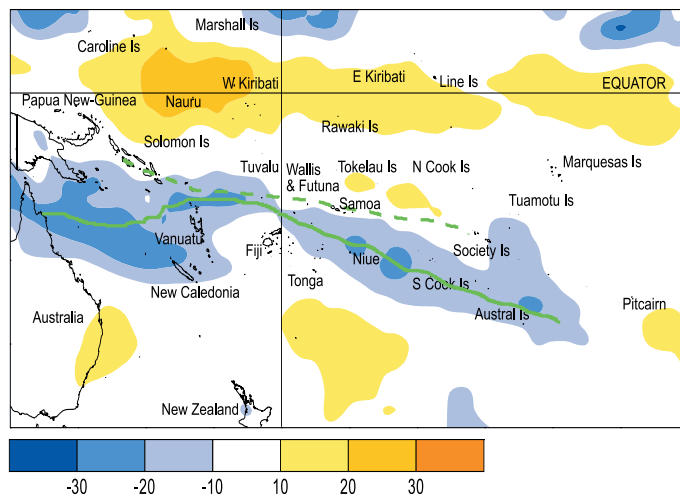
The SPCZ was displaced further south than average during May, extending from the Coral Sea east towards Vanuatu, and across the Date Line southeast to the Austral Islands of Southern French Polynesia. Enhanced convection occurred within the SPCZ region, as well as over much of New Caledonia.

Rainfall was at least 150% of average throughout much of central French Polynesia, and near or above average over much of Vanuatu. Rainfall was above average in Niue. Mixed rainfall anomalies occurred in Fiji. Much of New Caledonia's rainfall occurred during the last 10 days. Rainfall was well above average in the northern parts of New Caledonia and below average in the southern parts. More than 200 mm fell in the mountains on the 29th, with at least 100 mm in many other areas.

A region of suppressed convection continued to affect Nauru and Western and Eastern Kiribati, extending to the region north of the Marquesas Islands. Rainfall was well below average in southern Tonga.

Mean air temperatures were about 1.0 °C above average in parts of Tonga and Southern French Polynesia, at least 0.5 °C above average in central French Polynesia, and slightly below average over New Caledonia.

Tropical Southwest Pacific mean sea-level pressures tended to be above average west of the Date Line, and below average further east. Equatorial surface easterlies weakened along the equator, occurring in 69% of observations at

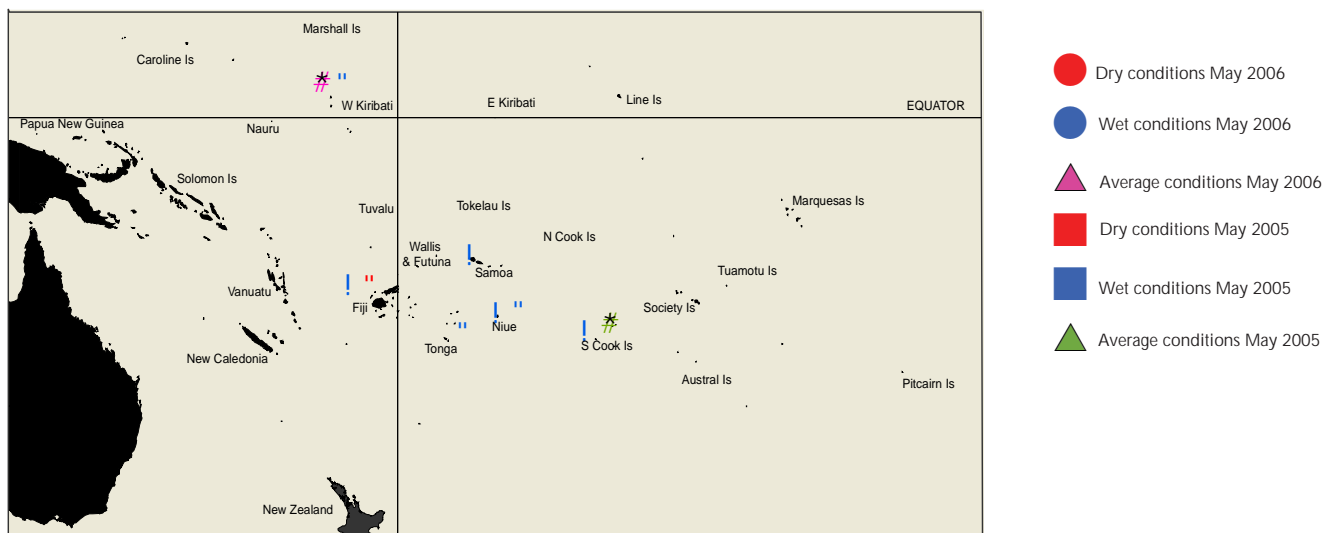


Outgoing Long-wave Radiation (OLR) anomalies, in Wm^{-2} (blue equals high rainfall and yellow equals low rainfall). The May 2006 position of the SPCZ, as identified from total rainfall, is indicated by the solid green line. The average position of the SPCZ is identified by the dashed green line..

Tarawa, the lowest frequency since February 2005. There were several consecutive days with westerlies from 11 to 14 May, and a few brief periods later in the month.

Country	Location	Rainfall (mm)	% of average	Comments
New Caledonia	Poindimie	380	201	Well above average
Fiji	Nadi Airport	229	258	Well above average
French Polynesia	Tahiti – Faaa	432	420	New record
French Polynesia	Tuamotu Hereheretue	292	214	Well above average
New Zealand	Auckland Airport	191	208	Extremely high
Tonga	Lupepau'u	402	210	Extremely high
Tonga	Fua'amotu Airport	34	25	Well below average

Soil moisture in May 2006



Estimated soil moisture conditions at the end of April 2006, 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 with 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 2006, Nadi, Apia, Niue, and Rarotonga were at full soil moisture capacity. Tarawa soils are at their average soil moisture capacity. Soils were drier at the same time last year at Nadi and were average at Rarotonga.

El Niño/Southern Oscillation (ENSO)

The tropical Pacific remains in a neutral state, with the few La Niña features that were present a two months ago erased by sustained warming during April and May.

Equatorial Pacific sea surface temperature anomalies have risen rapidly in the past two months and are now positive across most of the basin. The NINO3 SST anomaly for May was about +0.4 °C and NINO4 was about +0.3 °C: both averages were near zero for March–May.

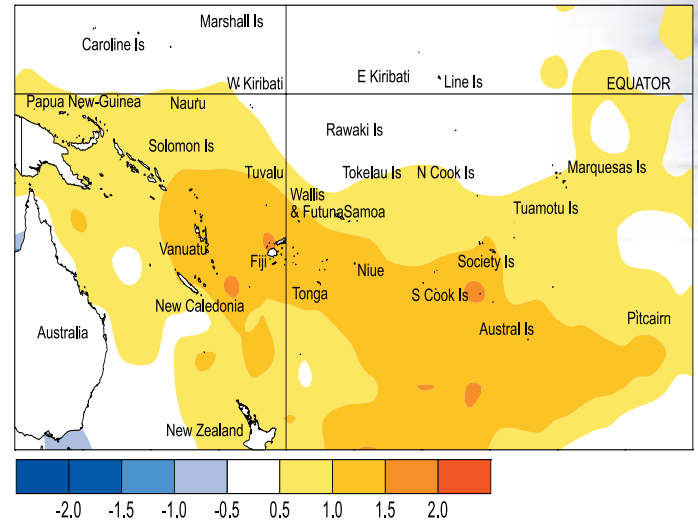
The thermocline has deepened significantly in the east, with a weak positive temperature anomaly at about 50 m depth where a strong negative anomaly had existed in March. The Southern Oscillation Index (SOI) fell to -1.0 in May, from +1.7 in April, with the March–May mean slightly reduced at +0.7.

The trade winds are close to their normal strength across the Pacific. Patterns of convection have weakened during May, but retain the La Niña-like character seen in April, with somewhat suppressed convection along the equator about and east of the Date Line, and some enhanced convection over northern Queensland and Papua New Guinea. The NASA ENSO precipitation index for May was -0.3 (indicative of weak La Niña). The “double ITCZ” structure seen earlier has now disappeared.

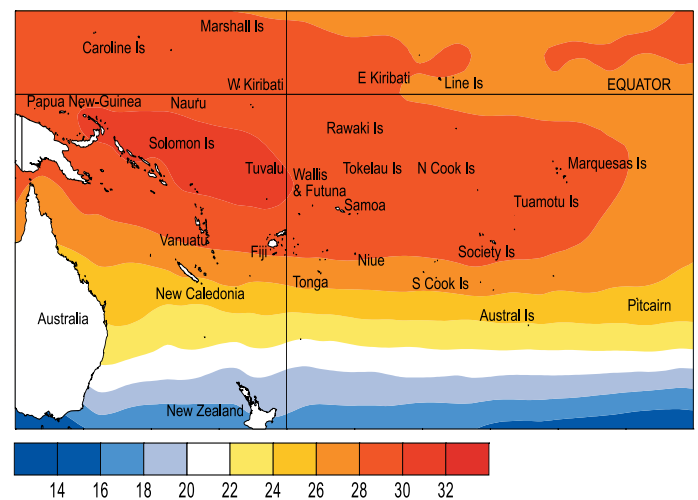
Almost all global ENSO forecast models are in the neutral range for June–August, though the Australian POAMA model predicts a short-lived cooling over the next few months. Most models indicate weak warming through the rest of the year, with three approaching an El Niño state by late 2006. NCEP and the IRI both call for neutral conditions through the rest of the year. The IRI gives a 90% chance of neutral conditions through July.

Madden-Julian Oscillation (MJO)

The Madden-Julian Oscillation (MJO), the eastward progression of both enhanced and suppressed tropical rainfall cycling at 30 - 60 days, is an equatorial travelling pattern of anomalous convection that has been operating on a 30 day timescale this season. Based on the recent short periodicity of events, it seems the most likely time for renewed activity of the MJO over the near-equatorial longitudes of India/SE Asia would be around the middle



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



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

of June, moving later into the western Pacific. However, at this time of year other influences are also operating and any MJO influences are likely to be weak in the South Pacific.

During this period, when an active phase of the MJO enters the South Pacific, it enhances precipitation. The MJO is usually more active in the South Pacific wet season (November–April).

Forecast validation: March to May 2006

Suppressed convection with below average rainfall was forecast for Eastern and Western Kiribati, with near or below average rainfall in Tuvalu, Tokelau, the Northern Cook Islands, and the Tuamotu and Marquesas Islands. Near or above average rainfall was forecast for Papua New Guinea, and from Fiji southeast to Pitcairn Island, including Tonga, the Southern Cook Islands, and the Austral Islands. Near average rainfall was expected elsewhere in the region.

Areas of enhanced convection or above average rainfall affected the region near Papua New Guinea, and also the Society Islands. Suppressed convection or below average rainfall occurred over Western Kiribati and Tuvalu. Rainfall was higher than expected in Northern French Polynesia and Tokelau, and lower than forecast in parts of Fiji. The overall rainfall anomaly pattern was similar to what was expected, the hit rate for the March–May 2006 outlook being about 60%.

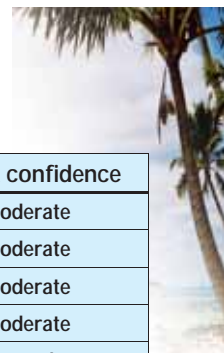
Tropical Pacific rainfall – May 2006

Territory and station name	May 2006 rainfall total (mm)	May 2006 percent of average
Australia		
Cairns Airport	48.0	50
Townsville Airport	28.4	79
Brisbane Airport	10.0	10
Sydney Airport	26.8	28
Cook Islands		
Penrhyn	189.4	103
Rarotonga EWS	118.0	70
Rarotonga Airport	128.5	76
Fiji		
Rotuma	321.9	109
Udu Point	100.8	60
Nadi	229.4	258
Nausori	340.5	137
Ono-I-Lau	77.8	76
French Polynesia		
Hiva Hoa, Atuona	133.8	85
Bora Bora Motu	132.4	119
Tahiti - Faa'a	432.2	420
Tuamotu, Takaroa	90.4	103
Tuamotu Hereheretue	291.6	214
Gambier, Rikitea	246.0	178
Tubuai	153.6	91
Rapa	207.4	93
Niue		
Hanan Airport	180.4	124
New Zealand		
Kaitaia	152.4	128
Whangarei Airport	214.6	199
Auckland Airport	191.2	208
Samoa		
Faleolo	182.8	116
Apia	164.2	94

Territory and station name	May 2006 rainfall total (mm)	May 2006 percent of average
New Caledonia		
Ile Art, Belep	141.6	115
Koumac	174.0	287
Ouloup	115.0	107
Ouanaham	145.2	110
Poindimie	379.6	201
La Roche	131.0	100
La Tontouta	98	138
Noumea	79.0	92
Moue	124.0	103
North Tasman		
Lord Howe Island	165.6	102
Norfolk Island	130.4	91
Raoul Island	57.4	46
Tonga		
Niutoputapu	223.8	134
Lupepau'u	401.6	210
Salote Airport	88.7	52
Fua'amotu Airport	33.5	25
Tuvalu		
Nanumea	114.8	51
Nui Island	119.6	54
Funafuti	230.5	92
Nuilakita	231.1	98
Vanuatu		
Sola	627.8	169
Pekoa	379.5	177
Lamap	124.5	75
Bauerfield	182.2	122
Port Vila	203.9	140
Whitegrass	89.4	
Aneityum	132.1	85

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.



Tropical rainfall outlook: June to August 2006

A large region of enhanced convection with near or above average rainfall is expected from Papua New Guinea southeastwards to the Austral Islands, including the Solomon Islands, Vanuatu, Wallis and Futuna, Samoa, Tonga, Niue, the Southern Cook Islands, and Society Islands.

Near or below average rainfall is likely over the Tuamotu Islands.

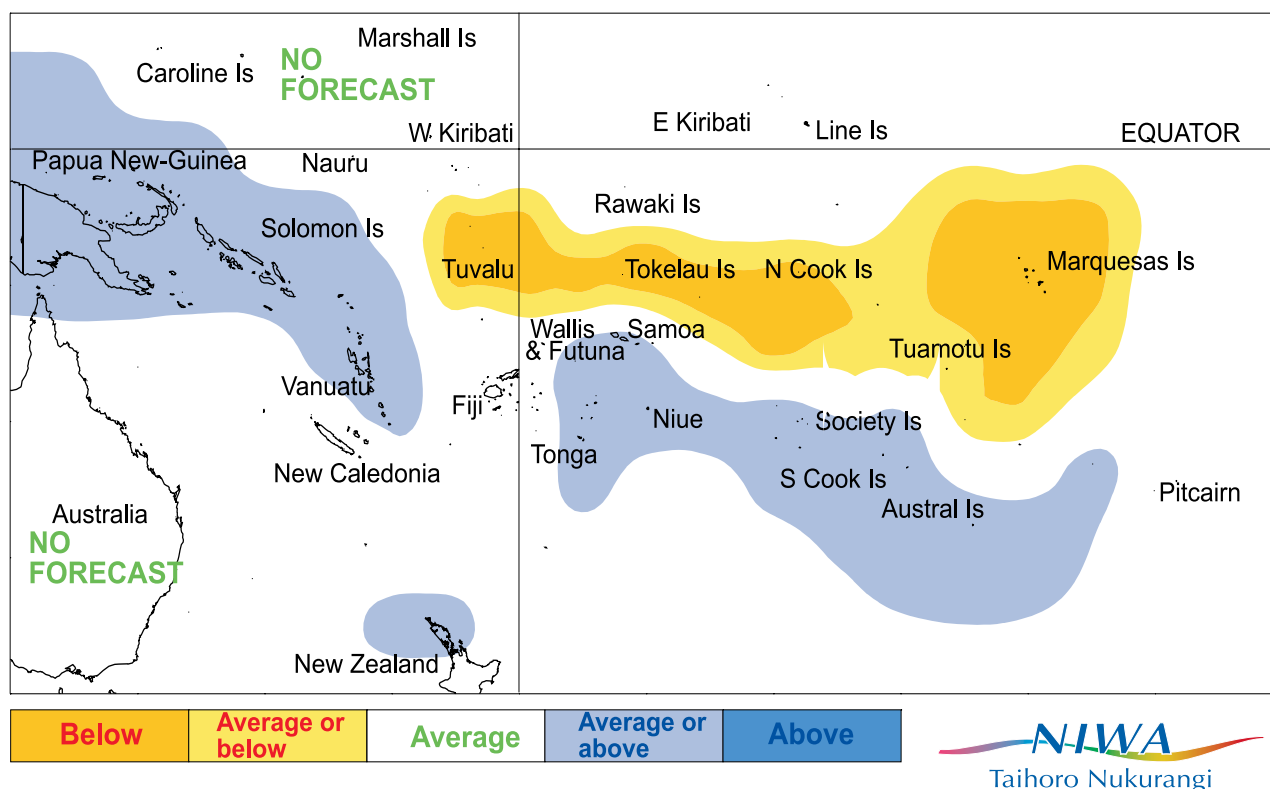
Suppressed convection is expected over Tuvalu, Tokelau, the Northern Cook Islands, and the Marquesas Islands, where rainfall is expected to be below average.

Near average rainfall is likely for most of the other islands in the Southwest Pacific.

Rainfall forecast model skills tend to be low to moderate during this forecast period (June–August).

Island group	Rainfall outlook	Outlook confidence
Papua New Guinea	20:40:40 (Near or above average)	Moderate
Solomon Islands	20:40:40 (Near or above average)	Moderate
Vanuatu	20:40:40 (Near or above average)	Moderate
Wallis & Futuna	20:40:40 (Near or above average)	Moderate
Samoa	20:40:40 (Near or above average)	Low – moderate
Tonga	20:40:40 (Near or above average)	Moderate
Niue	20:40:40 (Near or above average)	Moderate
Southern Cook Islands	20:40:40 (Near or above average)	Moderate
Society Islands	15:45:40 (Near or above average)	Moderate
Austral Islands	20:40:40 (Near or above average)	Moderate
Fiji	30:40:30 (Near average)	Moderate
New Caledonia	30:35:35 (Near average)	Low – moderate
Western Kiribati	30:45:25 (Near average)	Moderate
Eastern Kiribati	30:40:30 (Near average)	Low – moderate
Pitcairn Island	30:45:25 (Near average)	Low
Tuamotu Islands	40:40:20 (Average or below)	Moderate
Tuvalu	45:30:25 (Below)	Moderate
Tokelau	45:25:30 (Below)	Moderate
Northern Cook Islands	45:30:25 (Below)	Moderate
Marquesas Islands	45:30:25 (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 2006.

Summary of the 2005–06 tropical cyclone season

S Burgess, NIWA

The 2005–06 Southwest Pacific tropical cyclone season had seven occurrences (east of 150°E), two less than the average number normally expected for the region in a season (Figure 1). There was also one occurrence which originated adjacent to our region – just west of 150°E. ICU tropical cyclone guidance, produced as early as September 2005, was for a normal frequency of occurrences (nine) in the Southwest Pacific. Many of the season's occurrences affected the region west of the Date Line (tracks are shown in Figure 2), with the highest frequency of occurrences in the Coral Sea since at least 1999–2000. This was consistent with weak La Niña conditions in early 2006. There was an even spread of tropical cyclones throughout the January to March period, the last and most severe of the season (tropical cyclone Monica) being in April. Five of the Southwest Pacific region tropical cyclones (71%) reached hurricane strength, and two reached major hurricane strength (sustained wind speeds of at least 168 km/h).

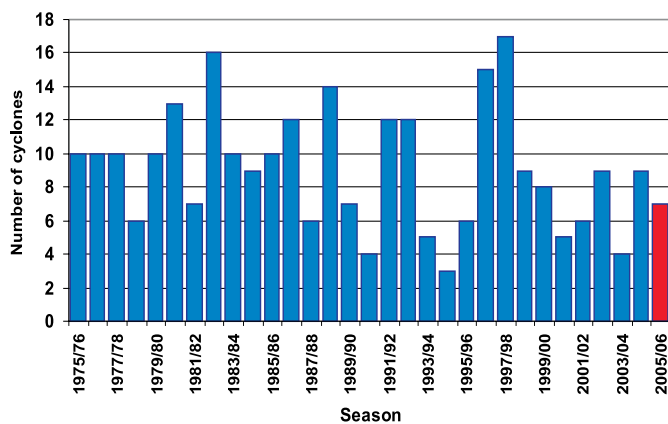


Figure 1: The number of Southwest Pacific tropical cyclones for the 2005–06 season (solid red bar) compared to frequencies during past 30 years. The horizontal green line indicates the 30-year average. Not including Kate, which remained west of 150°E.

'Tam' was the first tropical cyclone of the season, occurring north of Fiji on 12th January, tracking toward Tonga on the 13th, to pass west of Niue, with gale force winds. 'Urmil' occurred on 15th January, tracking well south of Niue with maximum sustained winds of 85 km/h. Tropical cyclone 'Jim' occurred next, with sustained wind speeds of at least 155 km/h (hurricane force). 'Jim', which was located in the Coral Sea on 28th January, tracked southeast to pass between New Caledonia and Vanuatu. A mean speed of 154 km/h (hurricane force) was noted at Pekoa in northern Vanuatu on the 31st.

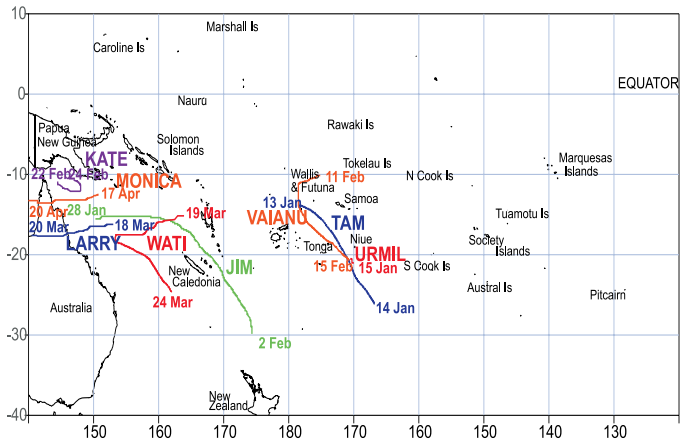


Figure 2. Southwest Pacific tropical cyclone tracks: for the 2005–06 season (including 'Kate').

Tropical cyclone 'Vaianu' from 11 to 15 February, produced sustained wind speeds of 140 km/h. Vaianu affected open waters near Wallis and Futuna and Tonga. Tropical cyclone 'Kate' occurred from 24 to 25 February, with sustained wind speeds of 90 km/h. 'Kate' was fairly localised, occurring over the Coral Sea, south of Papua New Guinea. Tropical cyclones in March were 'Larry' (18th–20th) and 'Wati' (19th–24th). Larry also originated in the Coral Sea and reached major hurricane force. Larry was reported as the worst tropical cyclone to affect the region in 30 years, with estimated maximum sustained wind speeds of 185 km/h, and gusts to 290 km/h. The area between Cairns and Townsville on the Queensland coast of Australia was severely affected, with high winds damaging crops (especially sugar cane and bananas) and property. There was also flooding, and several injuries. 'Wati' affected open waters west of Vanuatu and New Caledonia, with estimated maximum wind speeds to 150 km/h. 'Monica' was the last of the season, and also the most severe, occurring over 17 to 24 April. 'Monica' originated south of Papua New Guinea, and tracked west over Australia's Cape York Peninsula, over the Gulf of Carpentaria, towards Darwin. This was one of the most intense tropical cyclones ever seen in Australian waters, and the strongest on record to affect Australia's Northern Territory, with estimated maximum sustained wind speeds reaching 250–290 km/h, and gusts to 350 km/h.

Above average sea surface temperatures, combined with enhanced convection over the Coral Sea, helped assist the tropical cyclones that developed in that region.



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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

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