

The Island Climate Update

Collaborators

Pacific Islands National
Meteorological Services

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Meteorology

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Organization

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New Zealand

May's climate

- South Pacific Convergence Zone (SPCZ) extended from Papua New Guinea, over northern Vanuatu, across Niue to the Austral Islands of French Polynesia, and was displaced southwest of normal.
- Suppressed convection from Western Kiribati to Eastern Kiribati and about the Equator with low rainfall, especially near Nauru.
- Below normal rainfall for the northern part of the Southern Cook Islands, Tuvalu, northeastern French Polynesia, and in parts of Australia, but record high rainfall in Tonga, Samoa, and near record high rainfall in Niue.

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

- The strong La Niña episode present in the Pacific during past months is all but gone, but effects of the event are expected to persist into the Southern Hemisphere winter. Most climate models project neutral ENSO conditions for the end of winter and through late 2008.
- Average or below average rainfall is very likely along the equatorial Pacific from Western Kiribati to Eastern Kiribati, including Tuvalu, the Northern Cook Islands, Tuamotu, the Austral Islands, the Society Islands, and the Marquesas.
- Enhanced convection is likely to continue along a southwest displaced SPCZ, with average or above average rainfall for Papua New Guinea, Vanuatu, New Caledonia, the Austral Islands, Fiji, Tonga, Niue, Wallis & Futuna, and the Southern Cook Islands.



Climate developments in May 2008

The South Pacific Convergence Zone (SPCZ) extended from Papua New Guinea southeast to northern Vanuatu, across Fiji and Niue to the Southern Cook Islands and Austral Islands, with an overall displaced position southwest of normal for May. A large region of very suppressed convection persisted along the Equator extending from Western Kiribati and included Nauru, Tuvalu, Tokelau, the Northern Cook Islands, and Eastern Kiribati.

Rainfall was well above average in parts of New Caledonia, Vanuatu, Tonga, and Niue due to a southwest-displaced SPCZ. New high monthly and near-record rainfall totals were recorded at Fua'amotu Airport, Tonga, with 343.5 mm (254% of normal), and Maota, Samoa with 584.6 mm (257% of normal). Fiji stations had high rainfall totals ranging from 150 – 225% of normal. Very high rainfall and flooding also occurred in Efate, Vanuatu in late May.

Solomon Islands rainfall varied across the country during the past month. Honiara and eastern Kira Kira had above normal, and Lata and Taro below normal rainfall. Aitutaki reported near-record low monthly rainfall, while Rarotonga Airport was above normal, indicating a north-to-south split in rainfall over the Southern Cook Islands.

Near or below normal rainfall fell over much of French Polynesia, Tuamotu, the Northern Cooks and all of Kiribati. Rainfall has been below average for the past 11 months in

Country	Location	Rainfall (mm)	% of avg	Comments
Tonga	Fua'amotu	343.5	254	Record high
Samoa	Maota	584.6	257	Very high
Niue	Liku	353.7	218	Very high
French Polynesia	Bora Bora, Motu	26	23	Very low
Australia	Sydney	3	3	Record low
Tuvalu	Nui Island	43.7	20	Record low

Soil moisture in May 2008

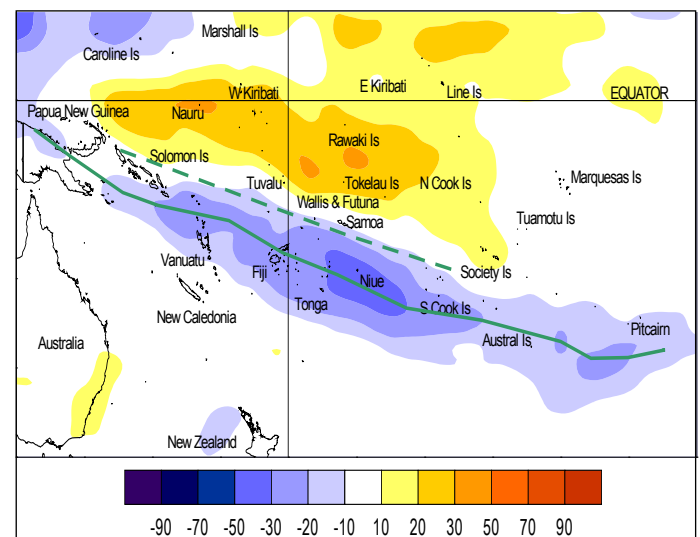
Estimates of soil moisture shown in the map (right) are based on monthly rainfall for one station in each country. Currently there are not many sites in the water balance model, but it is planned to include more stations in the future.

The information displayed is based on a simple water balance technique to determine soil moisture levels. Addition of moisture to the 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 were made at the end of the month, and for practical purposes, generalisations were made about the available water capacity of the soils at each site.

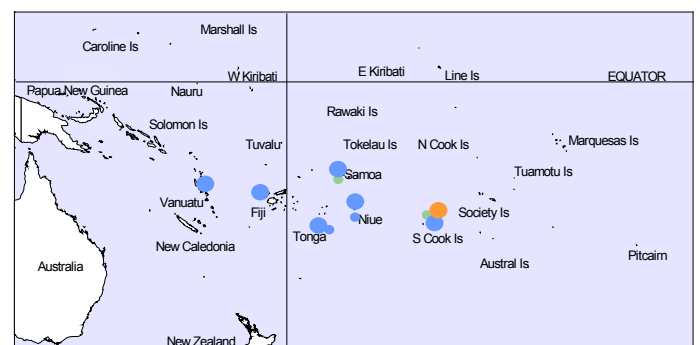
French Polynesia reports important soil moisture deficits equal to or greater than 50% still exist at multiple sites. Soils continued to be moist (at field capacity) for the time of year at Nadi (Fiji), Hanan Airport (Niue), and in Tonga. In the Southern Cook Islands, conditions are wetter in the southern part of the island group.

Western Kiribati. Record low rainfall was recorded at Nui Island, Tuvalu (20% of normal). French Polynesia reports this is the ninth consecutive dry month, with 72% of normal rainfall recorded in Northern Tuamotu and the Society Islands. Very low rainfall (2% of normal) was also recorded at Townsville, Australia, and a monthly record low (4 mm, 3% of normal) occurred in Sydney. The Australia Bureau of Meteorology reports this was the driest May since 1900.

Tropical Southwest Pacific mean sea-level pressures were below average to the northeast of New Zealand and above average over eastern Australia, producing more south westerly winds across the southwestern south Pacific than in previous months.



Outgoing Long-wave Radiation (OLR) anomalies, in Wm^2 are represented by hatched areas. High radiation levels (yellow) are typically associated with clearer skies and lower rainfall, while cloudy conditions lower the OLR (blue) and typically results in higher rainfalls. The May 2008 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, which is based on mean January rainfall for the South Pacific (after Linacre and Geerts, 1998).



May 2008
 ● Wet
 ● Moderate
 ● Dry

May 2007
 ● Wet
 ● Moderate
 ● Dry

Estimated soil moisture conditions at the end of May 2008, using monthly rainfall data.

El Niño/Southern Oscillation (ENSO)

During May, La Niña conditions have continued to weaken and overall the tropical Pacific is close to neutral, although some remnants of La Niña persist. In the equatorial Pacific Ocean the east-west dipole is still evident in the temperature anomalies, but the cold pool near the South American coast has weakened due to the presence of a warm water tongue off the coast of Ecuador.

Across the equatorial Pacific, ocean surface temperature anomalies have continued to ease from previous months. The NINO3 anomaly became positive during May at +0.2 °C (3-month mean of +0.1 °C), a progressive warming from 1.5 °C in February 2008. NINO4 remains below normal at 0.8 °C in May (3-month mean around 1.0 °C), but this negative anomaly at the surface does not extend below about 100m. A positive sub-surface temperature anomaly persists west of the Date Line, and a new positive anomaly has developed near South America above 100m.

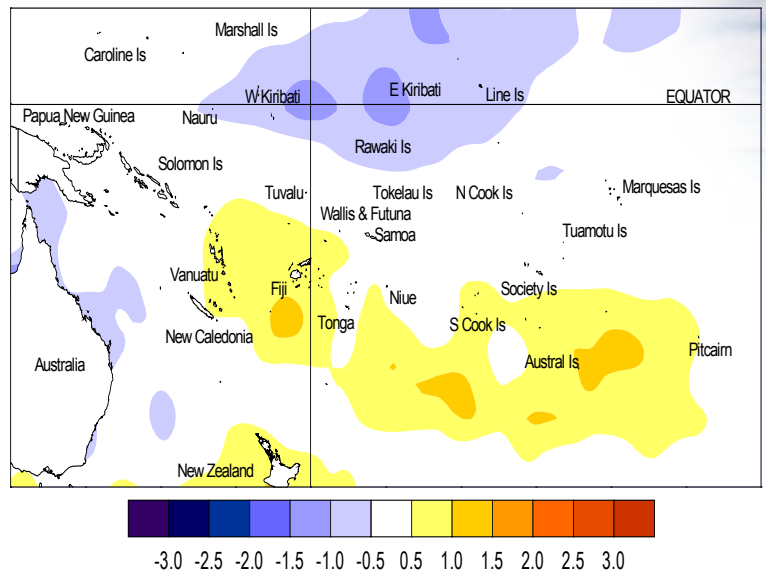
The near-equatorial trade winds have weakened and at the end of May were near normal around and west of the Date Line, with positive (westerly) zonal wind anomalies east of about 160 °W. Convection was enhanced over the Philippines during May and the SPCZ was active from Papua New Guinea through Fiji, slightly south of its normal position. The Southern Oscillation Index (SOI), also shifted to a negative value in May for the first time in ten months, and is -0.5 (3-month mean +0.4).

OLR anomalies show a coherent region of suppressed convection (but weaker than in previous months) extending from 130 °E across the date line toward the Northern Cook and Marquesas Islands. The area of relatively enhanced convection last month along the SPCZ is more consolidated in a narrow band across the Solomons and Vanuatu. In the past month the region to the east of the Date Line around the equator had the most visible OLR changes from the previous month. Overall, the SPCZ is displaced to the southwest of its normal position.

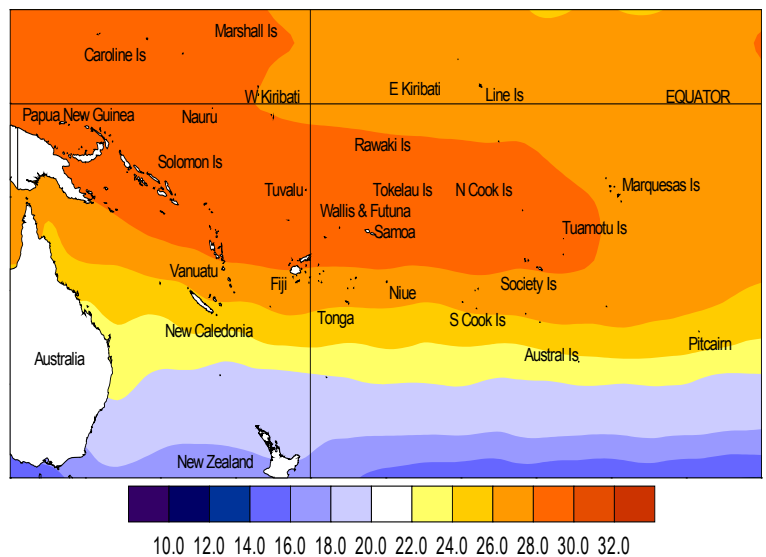
The TRMM ENSO precipitation index was near -1 for May (weakening from a strong La Niña value of -2 in April). The MJO strengthened during May, but current projections suggest little enhancement of subtropical convection east of the Date Line.

Forecast validation: March to May 2008

A La Niña-like pattern was expected, with a large region of suppressed convection forecast along the equatorial Pacific from Western to Eastern Kiribati, including the Solomon Islands, Tuvalu, the Northern Cook Islands, the Tuamotu archipelago, the Marquesas, and the Society Islands. Average rainfall was forecast for Papua New Guinea, Samoa and Tokelau. Enhanced convection was forecast from Vanuatu through to Pitcairn Island, including New Caledonia, Fiji, Wallis & Futuna, Tonga, Niue, and the Southern Cook



Sea surface temperature anomalies (°C) for May 2008



Mean sea surface temperatures (°C) for May 2008

Most climate models indicate ENSO neutral conditions continuing through to the end of 2008. The NCEP discussion of 8 May indicates a transition from La Niña to ENSO-neutral conditions during June/July. The IRI summary of 19 May suggests a 60% chance of a return to ENSO-neutral conditions coming three-month period, with only a 35% chance of La Niña returning. The Australian weekly tropical summary of 27 May suggests ENSO-neutral conditions now exist, but with a few weak La Niña signals still present.

Islands, with above average rainfall expected. Near or above average rainfall was forecast for the Austral Islands of French Polynesia, which had a prominent northeast-southwest disparity in the rainfall distribution.

The rainfall outlook for the March–May 2008 period was very similar to what was forecast, the ‘hit’ rate being 68%, 6% higher than average. Rainfall higher than expected occurred in parts of the Solomon Islands and in Samoa.

Tropical Pacific rainfall – May 2008

Territory and station name	May 2008 rainfall total (mm)	May 2008 percent of average
Australia		
Cairns Airport	44.4	46
Townsville Airport	0.8	2
Brisbane Airport	52	53
Sydney Airport	3	3
Cook Islands		
Penrhyn	57	31
Aitutaki	16.5	8
Rarotonga Airport	203.8	121
Fiji		
Rotuma Island	296	177
Udu Point	308.3	185
Nadi Airport	200.8	89
Nausori	376.5	248
French Polynesia		
Hiva Hoa, Atuona	44.8	28
Bora Bora	26	23
Tahiti – Faa'a	44.7	43
Tuamotu, Takaroa	52.4	60
Gambier, Rikitea	133.6	97
Tubuai	140.2	83
Rapa	320.6	144
Kiribati		
Tarawa	N/A	N/A
Kanton	N/A	N/A
New Zealand		
Kaitaia	95.1	80
Whangarei Airport	157.8	146
Auckland Airport	109.2	119
New Caledonia		
Ile Art, Belep	64.6	31
Koumac	55.8	91
Ouloup	125.5	118
Ouanaham	140.4	103
Poindimie	180.6	89
La Roche	89	64
La Tontouta	88.8	159
Noumea	58.2	68
Moue	116.2	89

Territory and station name	May 2008 rainfall total (mm)	May 2008 percent of average
Niue		
Hanan Airport	282.3	195
Liku	353.7	211
North Tasman		
Lord Howe Island	137.4	85
Norfolk Island	94	66
Raoul Island*	127	102
Samoa		
Faleolo Airport	141.8	95
Apia	133.6	75
Nafanua	150.9	32.1
Afiamalu	165.7	53
Maota	584.6	257
Solomon Islands		
Taro	222.6	82
Munda	146.3	60
Auki	240	120
Honiara	203.4	143
Henderson	158.4	120
Kira Kira	591.6	195
Santa Cruz, Lata	302.6	85
Tonga		
Niuafu'o	N/A	N/A
Mata'aho Airport	274.2	164
Lupepau'u	227.5	119
Salote Airport	N/A	N/A
Nuku'alofa	220.9	199
Fua'motu Airport	343.5	254
Tuvalu		
Nanumea	79.2	35
Nui Island	43.7	20
Funafuti	129.3	52
Nuilakita	343.0	146
Vanuatu		
Sola	513.5	138
Pekoa	275.5	129
Lamap	157.3	95
Port Vila	243.2	167
Tanna/Whitegrass	121.3	N/A
Bauerfield	158.9	107
Aneityum	211.9	137

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. N/A denotes data unavailability at the time of publishing, and * denotes synoptic values.

Tropical rainfall outlook: June to August 2008

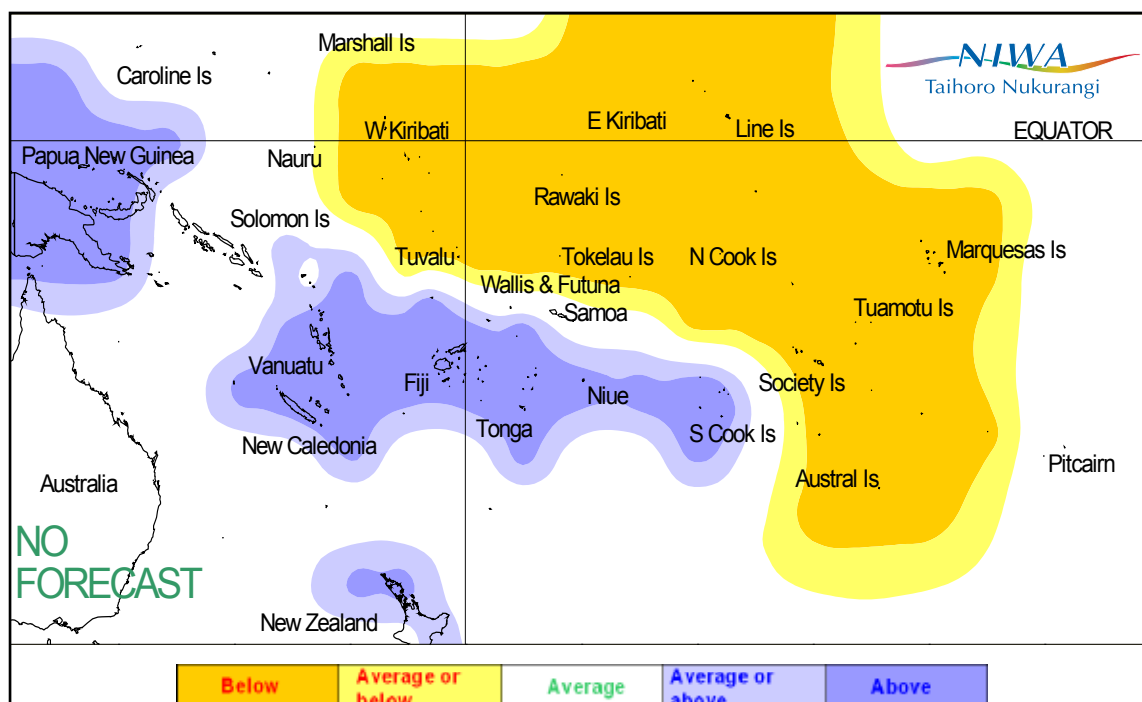
La Niña conditions are still very likely to influence rainfall patterns during this period. A large region of suppressed convection is very likely flanking the equatorial Pacific from Western to Eastern Kiribati, Tuvalu, the Northern Cook Islands, Tuamotu, the Society Islands, and the Marquesas. Average rainfall is likely for the Solomon Islands, Pitcairn Island, and Samoa.

Enhanced convection is likely from Papua New Guinea extending southeastward toward Vanuatu, through to the Southern Cook Islands, including New Caledonia, Fiji, Niue, and Tonga. Above average rainfall is expected in those countries for the coming three-month period.

The confidence in the forecast model skill for this seasonal outlook is moderate to moderately high for most Pacific Island countries. In the past, the average region-wide hit rate for forecasts issued in June is 62%, 1% lower than the long-term average for all months combined.

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 outputs 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. *If conditions are climatology, we expect an equal chance of the rainfall being in any tercile.

Island Group	Rainfall Outlook	Outlook confidence
Vanuatu	15:25:60 (Above)	Moderate-High
Niue	15:30:55 (Above)	High
Tonga	15:30:55 (Above)	Moderate-High
Cook Islands (Southern)	15:35:50 (Above)	Moderate-High
Papua New Guinea	20:30:50 (Above)	Moderate-High
Wallis & Futuna	20:30:50 (Above)	Moderate-High
Fiji	20:35:45 (Above)	Moderate
New Caledonia	25:35:40 (Above)	Moderate
Pitcairn Island	30:35:35 (Climatology*)	Moderate
Samoa	30:35:35 (Climatology*)	Moderate
Solomon Islands	30:35:35 (Climatology*)	Moderate
Austral Islands	40:30:30 (Below)	Moderate
Society Islands	45:30:25 (Below)	Moderate
Tuamotu Islands	50:30:20 (Below)	Moderate-High
Kiribati (Eastern)	55:35:10 (Below)	Moderate-High
Kiribati (Western)	55:35:10 (Below)	Moderate-High
Marquesas	60:25:15 (Below)	Moderate-High
Tokelau	60:25:15 (Below)	Moderate-High
Cook Islands (Northern)	60:30:10 (Below)	Moderate-High
Tuvalu	65:25:10 (Below)	Moderate



Rainfall outlook map for June to August 2008

Climate assessment of the 2007–08 rainy season in New Caledonia

Luc Maitrepierre, Head of Climate Division, Météo-France, New Caledonia

Climate of New Caledonia

In New Caledonia, the rainy season normally occurs between December and April. Like many countries in the western Pacific, the New Caledonia archipelago is under the influence of the Inter Tropical Convergence Zone (ITCZ), and the SPCZ (South Pacific Convergence Zone) during the summer. New Caledonia is subjected to precipitation patterns from both of the convergence zones and instabilities from moist tropical air masses. In addition, New Caledonia is in the western South Pacific basin, where tropical cyclones are active, and often impact the country with heavy rains and high winds. The rain during December – April amounts to 55% to 65% of the annual total, with January – March rainfall representing 40% to 50% of the annual total.

An unusual year

It is important to note that New Caledonia was not directly affected by any tropical cyclone during the past summer, and this makes the high precipitation totals during the 2007–08 rainfall season even more atypical. The deluge over New Caledonia this past year can mainly be explained by the La Niña event that existed in the tropical Pacific Ocean this summer. This event included an ITCZ situated further south than usual during February and March (Figure 1), and a very unusual position of the SPCZ, which was displaced very far to the south and west of its normal location in March.

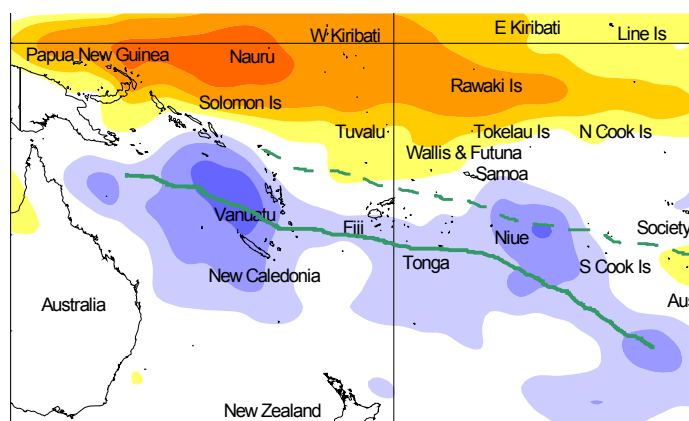


Figure 1: Outgoing longwave radiation showing regions of enhanced (blue tones) and suppressed (orange tones) convection for the South Pacific. The SPCZ (solid green line) was displaced to the southwest of its normal location in March, and was situated over New Caledonia and Vanuatu.

2007–08- A season of records

For the 2007–08 rainy season, the monthly mean precipitation departure from normal was +57% in December, +9% in January, +79% in February, +120% in March and +195% in April, calculated from 28 reference stations. Based on the 1951–2008 reference period, April 2008 is ranked the second wettest April, while March 2008 marked a new record high, surpassing the old record from 1967 of +117% of normal rainfall. The last three months of the 2007–08 rainy season between February and April had a three month mean precipitation departure of +121% of normal, making it the wettest February – April since 1951. The December – April assessment shows a five-month mean departure from normal of +86%, which is a new record slightly above the oldest value of +85% in the 1988–89 season. Extreme rainfall values for December – April rainfall (below) indicate many stations received more rain in five months than they usually do in one year:

- 1282 mm at Koumac, 31% above the annual mean total.
- 2910 mm at Canala, 73% above the annual mean total.
- 3384 mm at Ponérihouen, 26% above the annual mean total.
- 3541 mm at Yaté-Usine, 10% above the annual mean total.
- 1668 mm at Ouanaham, 2% below the annual mean total.
- 893 mm at Nouméa, 16% below the annual mean total.

Rainy season impacts

Agriculture was greatly impacted by abundant rainfall during the 2007–08 rainy season. Moisture and diseases caused by excessive rainfall destroyed tomatoes and lettuce crops. Planting schemes also had to be significantly delayed because the soil was too wet. In addition, roads were severely damaged and many construction industry projects were delayed. The mining industry was also impacted at one location where a large landslide, triggered by high rainfall, terminated in a lagoon resulting in sedimentation and natural habitat destruction. A protest by local ecologists following this event has led to mitigation projects aimed at limiting the environmental impact of mining. One of the more serious outcomes of high rainfall anomalies during the late part of the 2007–08 rainy season was an outbreak of dengue fever, with more than 600 people affected by the disease from January to April. The most recent assessment shows that the epidemic is not finished yet, as more than 250 new cases have been reported since the beginning of May.

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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, Wallis and Futuna.**

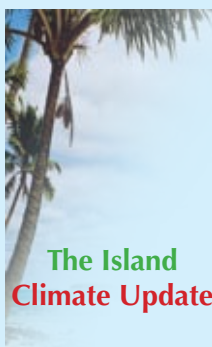
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This summary is prepared as soon as possible following the end of the month, once the data and information are received from the Pacific Island National Meteorological Services (NMHS). Delays in data collection and communication occasionally arise. 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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