

Number 82, July 2007

The Island Climate Update

Collaborators

Pacific Islands National
Meteorological Services

Australian Bureau of
Meteorology

Meteo France

NOAA National Weather
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NOAA Climate
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June's climate

- South Pacific Convergence Zone (SPCZ) west of the Date Line
- Enhanced convergence southwest of New Caledonia; suppressed convection over the Equator, and Fiji
- Above average rainfall in Southern French Polynesia; well below average rainfall in parts of Fiji
- Warmer than normal in many Southwest Pacific islands, especially New Caledonia

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

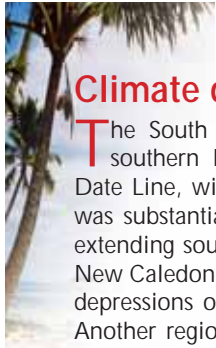
- Conditions in the Pacific region suggest development of a La Niña
- Below average rainfall over Western and Eastern Kiribati
- Above average rainfall over Samoa and the Northern Cook Islands

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Taihoro Nukurangi

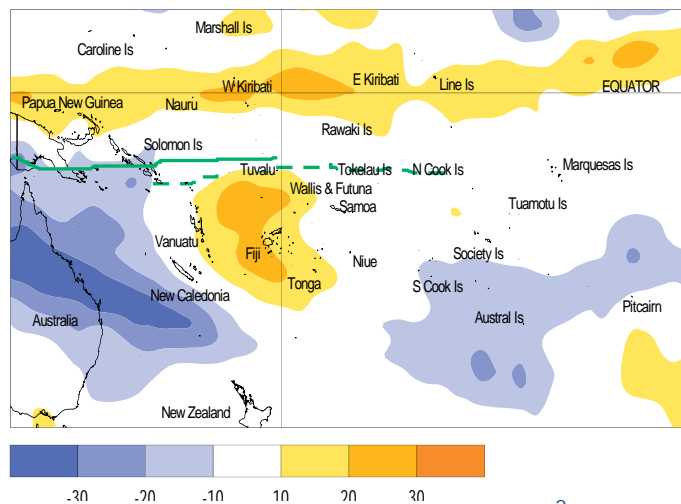


Climate developments in June 2007

The South Pacific Convergence Zone (SPCZ) extended from southern Papua New Guinea east towards Tuvalu and the Date Line, with little activity east of the Date Line. Convergence was substantially enhanced over the north and east of Australia, extending southeast across the Tasman Sea to the region south of New Caledonia due to the development of at least three significant depressions off the eastern Australia seaboard during the month. Another region of enhanced convergence affected the Southern Cook Islands and the Austral Islands. An elongated region of suppressed convection occurred along the equator from northern Papua New Guinea, across the Date Line, and east to South America. Another region of suppressed convection existed over Fiji, extending towards Vanuatu and Tonga.

Rainfall was at least 125% of normal in parts of Southern French Polynesia. High rainfall totalling 225 mm within 24 hours occurred at Koumac, in New Caledonia, towards the end of June. This was the wettest June on record over the tropical part of Australia, in more than 100 years of measurement. June rainfall was 50% or less of normal over much of Fiji, and also below normal over much of Western Kiribati, Wallis and Futuna, central and southern Tonga, and parts of northern and central French Polynesia.

June mean air temperatures were above average in most Southwest Pacific islands located between 14° and 25°S. Anomalies were largest in New Caledonia, where temperatures were more than 2.0 °C above average at many locations and it was the warmest June on record for about 60% of recording sites. Temperatures were 1.0 °C or more above average in parts of Vanuatu, Fiji, Niue, the Southern Cook Islands, and southern French Polynesia, and at least 0.5 °C above average in Vanuatu, Tuvalu and Tonga. Several Fijian locations recorded their highest June extreme maximum air temperature on record.

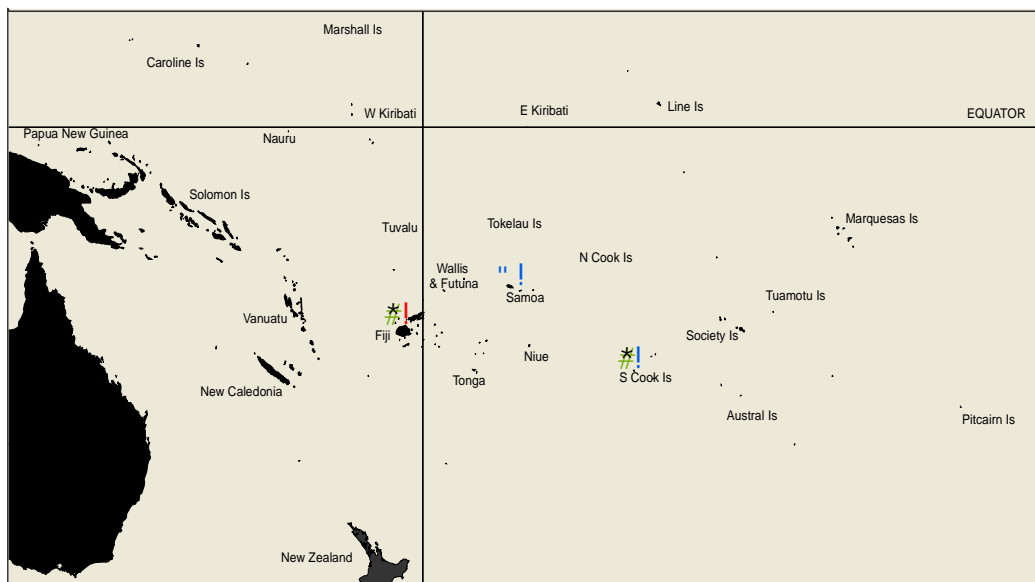


Outgoing Long-wave Radiation (OLR) anomalies, in Wm^{-2} (blue equals high rainfall and yellow equals low rainfall). The June 2007 position of the SPCZ, as identified from total rainfall, is indicated by the solid green line. The average position of the SPCZ is identified by the dashed green line.

Tropical Southwest Pacific mean sea-level pressures were generally below average in the tropical Southwest Pacific from Papua New Guinea to the region just east of the Date Line, as well as in the Tasman Sea equatorial surface easterlies occurred in 87% of observations at Tarawa, an increase of 20% from that of May.

Country	Location	Mean Monthly Temperature (°C)	Difference from average (°C)
New Caledonia	Noumea	23.3	+2.1
Fiji	Nadi Airport	25.6	+1.4
Niue	Hanan Airport	24.7	+1.5
Cook Islands	Rarotonga Airport	24.3	+1.3
French Polynesia	Rapa	20.7	+1.6

Soil moisture in June 2007



Estimated soil moisture conditions at the end of June 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 June 2007, Apia and Rarotongan soils were at field capacity while Nadi soils were dry.

El Niño/Southern Oscillation (ENSO)

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

The pattern of sea surface temperature (SSTs) anomalies resembles conditions typical of La Niña, 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 130°W to the South American coast. Surface temperatures have changed only slowly over the past three months.

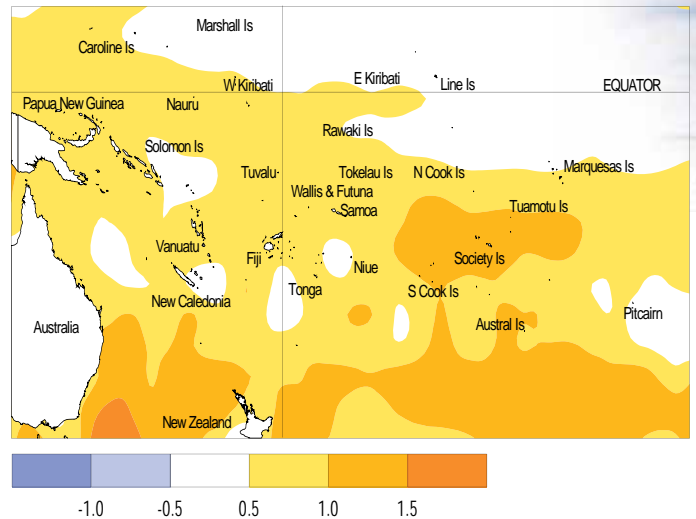
The NINO3 anomaly was -0.3°C in June (no change from May, and an AMJ average of -0.2), while the NINO4 anomaly was $+0.5^{\circ}\text{C}$ in June (up from $+0.3^{\circ}\text{C}$ in May, and an April–June mean around $+0.4^{\circ}\text{C}$).

The Southern Oscillation Index (SOI) has risen in the last month to $+0.4$, and so is now more in phase with the oceanic part of ENSO than in earlier months.

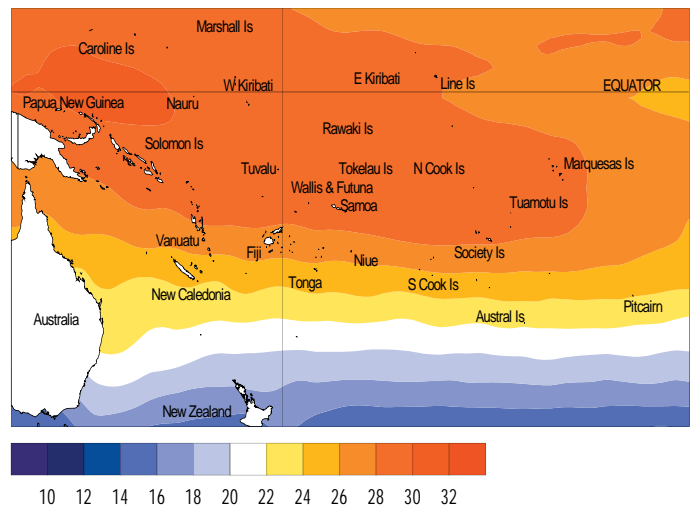
Subsurface data for June shows a slight weakening of the negative anomaly in the top 150 metres between the Date Line and the South American coast. There has been the appearance of a small “warm-blob” at 110°W (and depth of 50 m), probably in response to a prominent westerly wind burst along the Pacific equator during May. However, during June the trade winds picked up and are now stronger than is usual for this time of year.

OLR and tropical rainfall anomalies for June indicate suppressed convection along the equator in the Pacific. The ENSO Precipitation Index of -1.13 (May value was -0.40) indicates a strengthening of a (weak) cold ENSO event. The global sea surface height (SSH) anomaly continues to show 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 magnitude of SSH in June has slightly decreased since last month. The Madden-Julian Oscillation is presently weak with its centre of activity to the west of the Date Line.

The dynamical models show a transition to La Niña conditions over the next 3 months, with this persisting for the remainder of the year before a return to neutral conditions early in 2008, whilst the statistical models project neutral ENSO states for



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



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

the next 6–9 months. No model indicates warm conditions during the remainder of the year. Historically, the next few months are a favourable period for La Niña development. The NCEP synopsis suggests a transition from ENSO-neutral to La Niña conditions is possible within the next 1–3 months, while the IRI synthesis gives a probability of 55% for a La Niña by November. The probability of El Niño conditions re-emerging during the forecast period remains at or below 5%.

Forecast validation: April to June 2007

Suppressed convection and below average rainfall was expected over Eastern Kiribati, with near or below average rainfall in Western Kiribati. Enhanced convection with above average rainfall was forecast for the Tuamotu Islands, with near or above average rainfall in the Society, and Marquesas Islands, the Cook Islands, Pitcairn Island, Wallis and Futuna, Tokelau, and Samoa, and also in the Solomon Islands and Vanuatu. Near average rainfall was expected elsewhere in the region.

A region of weakly enhanced convection and above average rainfall extended south from the Samoa to include Tonga (which was wetter than expected), while suppressed convection and below average rainfall occurred in the equatorial region about and east of the Date Line. Rainfall was also below average (and lower than expected) in the Northern Cook Islands, and parts of Central and Southern French Polynesia. The ‘hit’ rate for the April–June 2007 rainfall outlook was about 65%.

Tropical Pacific rainfall – June 2007

Territory and station name	June 2007 rainfall total (mm)	June 2007 percent of average
Australia		
Cairns Airport	63.8	133
Townsville Airport	110.0	550
Brisbane Airport	107.6	152
Sydney Airport	314.6	250
Cook Islands		
Penrhyn	111.0	78
Rarotonga Airport	103.5	92
Rarotonga EWS	93.2	83
Fiji		
Rotuma	116.7	51
Udu Point	66.4	57
Nadi	1.5	2
Nausori	78.6	52
Ono-I-Lau	47.4	54
French Polynesia		
Hiva Hoa, Atuona	154.0	90
Bora Bora Motu	63.2	69
Tahiti - Faa'a	20.6	32
Tuamotu, Takaroa	91.6	102
Gambier, Rikitea	270.2	167
Tubuai	93.6	81
Rapa	252.6	126
New Zealand		
Kaitaia	172.4	116
Whangarei Airport	93.0	32
Auckland Airport	81.4	70

Territory and station name	June 2007 rainfall total (mm)	June 2007 percent of average
New Caledonia		
Ile Art, Belep	68.2	57
Koumac	248.2	355
Ouloup	102.2	77
Ouanaham	125.2	82
Poindimie	231.6	118
La Roche	166.8	109
La Tontouta	149.2	180
Noumea	127.4	110
Moue	105.4	79
North Tasman		
Lord Howe Island	328.4	178
Norfolk Island	236.2	154
Raoul Island	111.8	66
Samoa		
Faleolo	136.2	146
Apia	176.4	133
Tuvalu		
Nanumea	167.9	84
Nui Is	327.4	165
Funafuti	221.6	103
Nuilakita	121.1	63
Vanuatu		
Sola	250.2	87
Pekoa	279.1	180
Lamap	64.4	50
Bauerfield	131.3	77
Port Villa	201.6	139
Whitegrass	70.5	
Aneityum	72.4	48

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: July to September 2007

The rainfall forecast for the Pacific region for the coming three months depicts a La Niña like pattern.

Enhanced convection is expected over Samoa and the Northern Cook Islands where rainfall is expected to be above average.

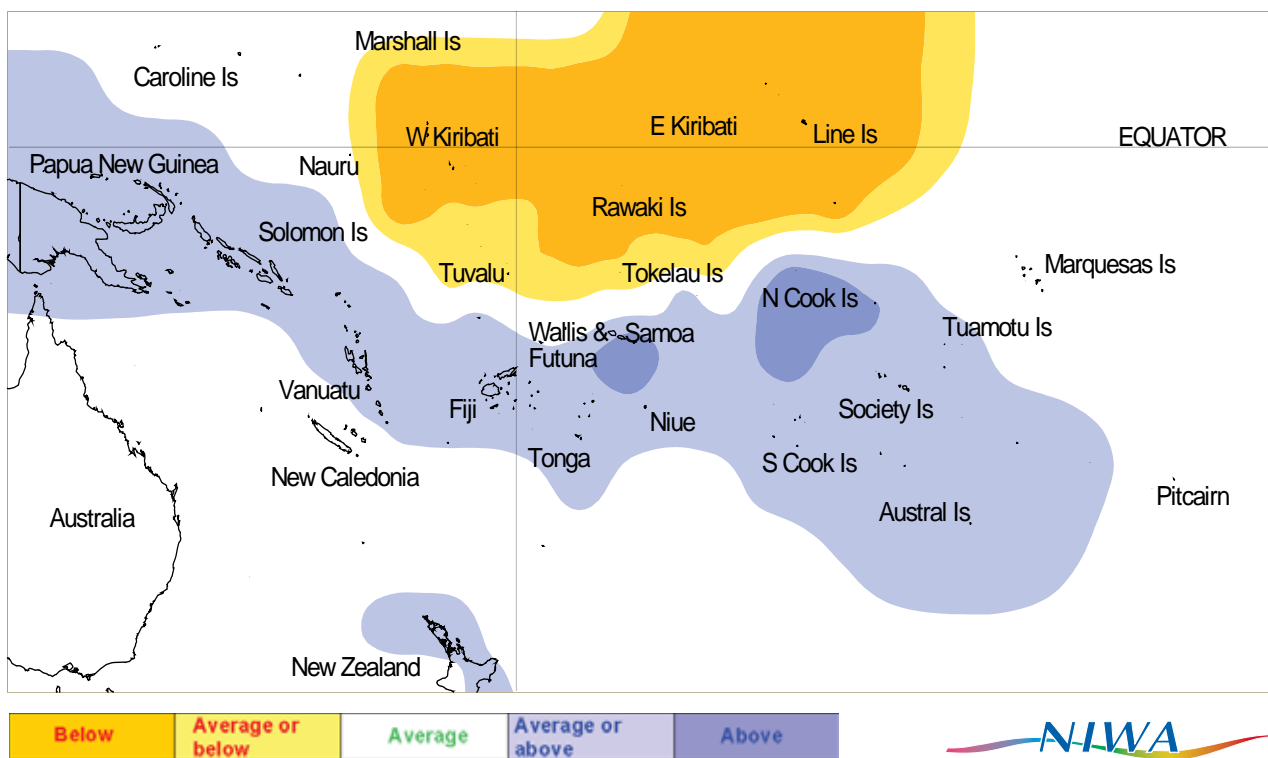
A large region of near or above average rainfall is likely from Papua New Guinea to French Polynesia, including the Solomon Islands, Vanuatu, Wallis and Futuna, Fiji, Tonga, Niue, the Southern Cook Islands, Tuamotu Islands, Society Islands, and the Austral Islands.

Suppressed convection is likely in the equatorial region of Western and Eastern Kiribati, where rainfall is forecast to be below average. Near or below average rainfall is expected over Tuvalu and Tokelau.

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

Island group	Rainfall outlook	Outlook confidence
Samoa	30:30:40 (Above)	Moderate
Northern Cook Islands	30:25:45 (Above)	Moderate
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
Fiji	20:40:40 (Near or above average)	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
Tuaotou Islands	20:40:40 (Near or above average)	Moderate
Society Islands	20:40:40 (Near or above average)	Moderate
Austral Islands	20:40:40 (Near or above average)	Moderate
New Caledonia	25:40:35 (Near average)	Low – moderate
Marquesas Islands	20:45:35 (Near average)	Moderate
Pitcairn Island	30:40:30 (Near average)	Moderate
Tuvalu	40:40:20 (Near or below average)	Moderate
Tokelau	40:40:20 (Near or below average)	Moderate
Western Kiribati	40:30:30 (Below)	Moderate
Eastern Kiribati	40:30:30 (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 July to September 2007

Reviving of rainfall stations in Vanuatu

Jotham Napat, The Director, Vanuatu Meteorological Service

The Schools of the Pacific Rainfall Climate Experiment (SPaRCE) have been working with the Vanuatu Meteorological Services (VMS) since 2005 to strengthen the rainfall recording network in the Republic of Vanuatu.

The Republic of Vanuatu is an archipelago of 83 islands (Figure 1) which spreads from 11°S to 20°S roughly north to south. Transport costs and availability limits the installation and servicing of climate networks here. However, the VMS utilises any available opportunity to install and service climate sites such as VMS staff accompanying other government staff on their visits to the outer islands.

SPaRCE works with local schools and the VMS to expand the climate networks by providing instrumentation and training. The main objective is to involve local schools in installing equipment and recording rainfall information which is then transmitted to the VMS via telephone, email and by other means.

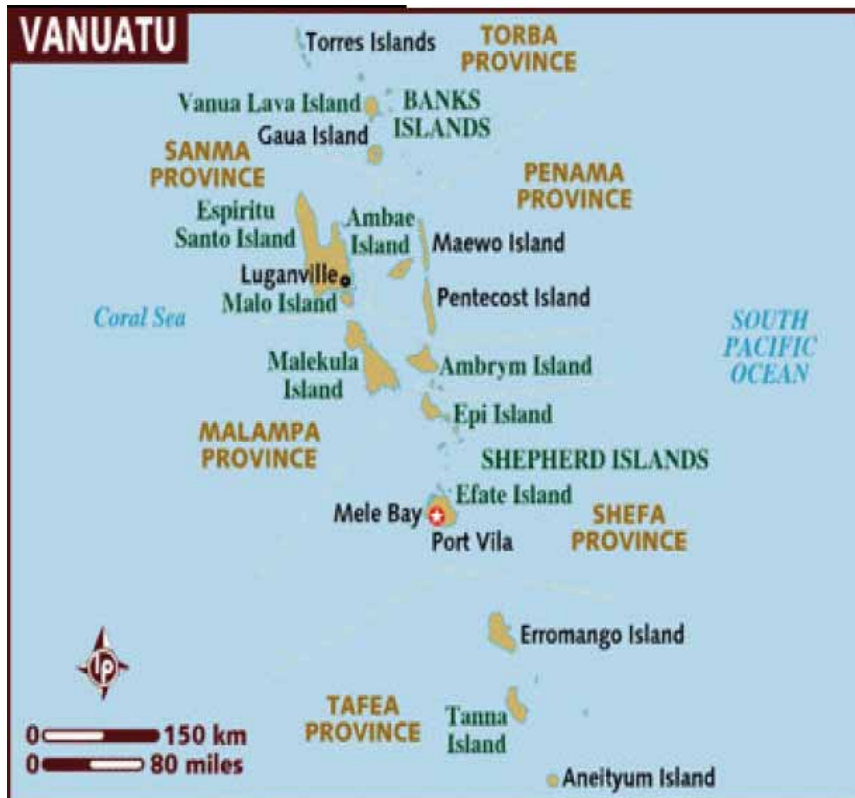


Figure 1 Map of Vanuatu

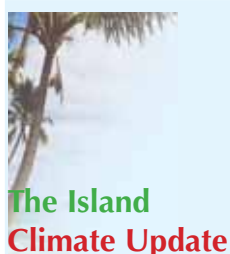
The first phase of funding was used to install rainfall gauges in the various provinces of the Republic of Vanuatu. Firstly, 20 rainfall gauges were installed in the Tafea Province which is made up of 5 islands. On the main island of Tanna, 11 gauges were installed, 3 on Erromango Island, 1 on Aniwa, 2 on Futuna and 3 on Aneityum.

In the Panama Province, 6 sites were installed – 3 on Pentecost and 3 on Ambae. Three further sites were installed on Efaté Island in Shefa Province. In Sanma Province, 2 sites were installed on Espiritu Santo Island.

Overall SPaRCE has funded 31 new rainfall sites in the Republic of Vanuatu, with plans to extend the rainfall recording network further. The project is also strengthening telecommunications, which will improve general communications.

Currently, Tafea Province is the only province which has good coverage of rainfall sites. The next phase of funding will aim at strengthening other provinces like Shefa Province which has a large agricultural and tourism base.

The author would like to acknowledge assistance from SPaRCE and also from various government departments in Vanuatu for the success of this project.



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Wendy St George,
NIWA

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Your comments and ideas about The Island Climate Update are welcome. Please contact:

Project Director: Dr Jim Salinger, NIWA,
Private Bag 109 695, Newmarket, Auckland,
New Zealand. E-mail: j.salinger@niwa.co.nz

Editors:

Ashmita Gosai Email: a.gosai@niwa.co.nz
Stuart Burgess Email: s.burgess@niwa.co.nz

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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