

The Island Climate Update

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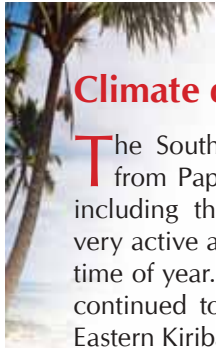
September's climate

- The South Pacific Convergence Zone (SPCZ) over Papua New Guinea to the region south of Tonga; very active and further southwest than normal
- Suppressed convection over Western and Eastern Kiribati and further east
- Record September rainfall in Vanuatu, New Caledonia and parts of Fiji; well below average rainfall in Kiribati, Tuvalu, northern Cook Islands and Marquesas Islands
- Warmer than normal in the subtropical South Pacific, record high temperatures in parts of Fiji

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

- La Niña conditions have developed in the equatorial Pacific, with a 50% chance of persisting through to February 2008
- Enhanced convection and above average rainfall expected from the Solomon Islands southeast to Niue, including Vanuatu, New Caledonia, Fiji, Tonga, and Samoa
- Below average rainfall likely over Western and Eastern Kiribati





Climate developments in September 2007

The South Pacific Convergence Zone (SPCZ) extended from Papua New Guinea to the region south of Tonga, including the Solomon Islands, Vanuatu, and Fiji, being very active and much further southwest than normal for the time of year. An elongated region of suppressed convection continued to persist along the equator from Western and Eastern Kiribati and further east (north of the Equator) toward the coast of South America. Suppressed convection also affected Tuvalu and the northern Cook Islands.

Rainfall was extremely high in areas under the active SPCZ with over 200% or more of normal in Vanuatu, New Caledonia and much of Fiji, and also above normal in Papua New Guinea, Solomon Islands, Samoa and southern parts of Tonga. For New Caledonia, it was the 3rd wettest September on record. In Fiji several sites had their wettest September on record, with a few sites recording more than 400% of normal rainfall. In contrast rainfall was extremely low in the equatorial region with 50% or less of normal throughout Kiribati, the northern Cook Islands and the Marquesas Islands, and also below normal in Tuvalu, Tokelau and Niue. Rainfall was close to normal on Tonga.

September mean air temperatures were 1.0 °C or more above normal in many southwest Pacific tropical islands south of latitude 10°S. Temperatures were 0.5–3.0 °C above normal in Fiji with many sites having their warmest September on record, as well as the highest individual daily maximum extremes (33.0 °C at Viwa Island) and warmest minimums ever.

Tropical Southwest Pacific mean sea-level pressures were below average west of the Date Line, especially in the New Caledonia-Vanuatu region. Higher than normal pressures occurred over the Tasman Sea, New Zealand, and the region south of central French Polynesia in the east.

Equatorial surface easterlies have strengthened since August between 140°E and 160°W occurring in over 75% of observations at Tarawa.

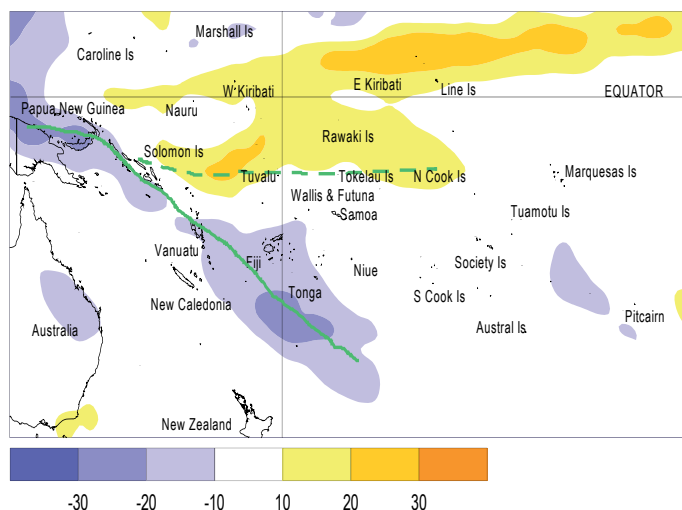
Soil moisture in September 2007

Estimates of soil moisture shown in the map 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 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.

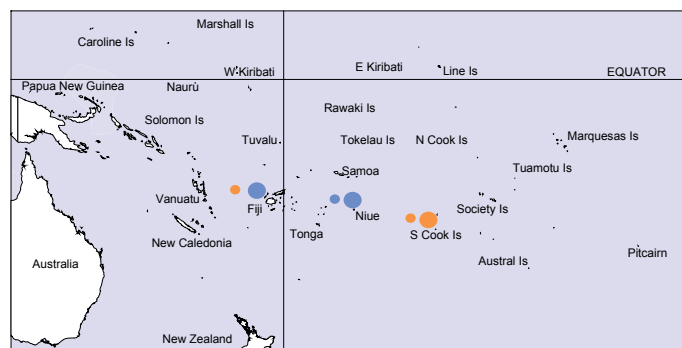
At the end of September 2007, soils were moist (at field capacity) for the time of year at both Nadi (Fiji) and Hanan (Niue), while soils were dry at Rarotonga.



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 mean higher rainfalls. The September 2007 position of the South Pacific Convergence Zone (SPCZ), as identified from total rainfall, is indicated by the solid green line, and is much more southwest than normal. The average position of the SPCZ is identified by the dashed green line.

Country	Location	Rainfall (mm)	% of avg.	Comments
Vanuatu	Lamap	285	380	Well above average
Vanuatu	Aneityum	400	500	Highest on record
New Caledonia	Poindimie	419	455	Highest on record
Fiji	Labasa	350.3	487	Highest on record
Fiji	Levuka	384.5	447	Highest on record
New Caledonia	Moue	314	532	Highest on record
Kiribati	Tarawa	19	15	Extremely low
French Polynesia	Atuona	16	22	Extremely low
Cook Islands	Penrhyn	24	16	Well below average

Country	Location	Mean temp. (°C)	Dep. from avg.	Comments
Fiji	Nadi	26.7	+2.4	Extremely high
Fiji	Laucala Bay	26.0	+1.9	Extremely high



September 2007
 ● Wet
 ● Moderate
 ● Dry

September 2006
 ● Wet
 ● Moderate
 ● Dry

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

El Niño/Southern Oscillation (ENSO)

La Niña conditions have become more developed in the tropical Pacific during September.

Sea surface temperatures (SST) in the equatorial Pacific became more strongly negative east of 140°W, and the cold area anomaly expanded west as far as the Date Line. A warm 'horseshoe' is continuing to develop in the extratropics of both hemispheres in the western Pacific. This is also evident during September in the sea surface height anomalies. The NINO3 anomaly was -0.9 °C in September (JAS average -0.7) and the NINO4 anomaly is now negative for the first time since early 2006, at -0.1°C for September (JAS average +0.2 °C). There are significant equatorial subsurface negative temperature anomalies, with an extensive 2 °C below average region at 100 metres in the eastern Pacific, with positive anomalies (+1 °C) in the same layer west of the Date Line.

Equatorial easterly wind anomalies strengthened around and east of the Date Line. The SOI in September is still neutral (+0.1) with a JAS average of -0.1.

Tropical OLR anomalies show suppressed convection from west of the Date Line right across the Pacific north of the equator. The TRMM-based ENSO precipitation index has become more negative, and is -0.9, in the weak La Niña range. The SPCZ was very active and displaced south west. The Madden-Julian Oscillation (MJO) is very weak at present.

Overall, these show a La Niña in progress with coupling between the ocean and atmosphere between the warmer western Pacific and cooler eastern Pacific. Convective coupling has also occurred to a limited degree with increased convection in Papua New Guinea.

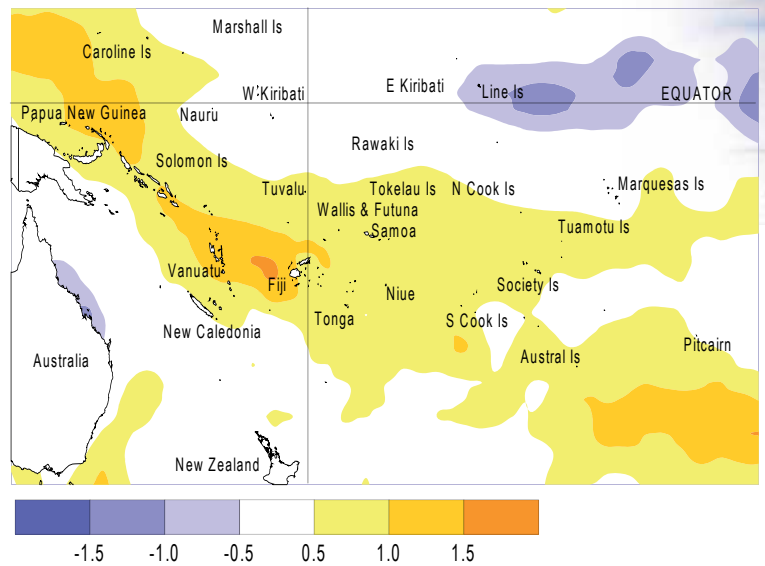
Model forecasts have strengthened, with eight of the nine dynamical models indicating La Niña conditions through to February 2008. Only two of the six statistical models have singled out the developing cold conditions. These suggest the current event peaking towards the end of the year.

The NCEP synopsis suggests La Niña conditions

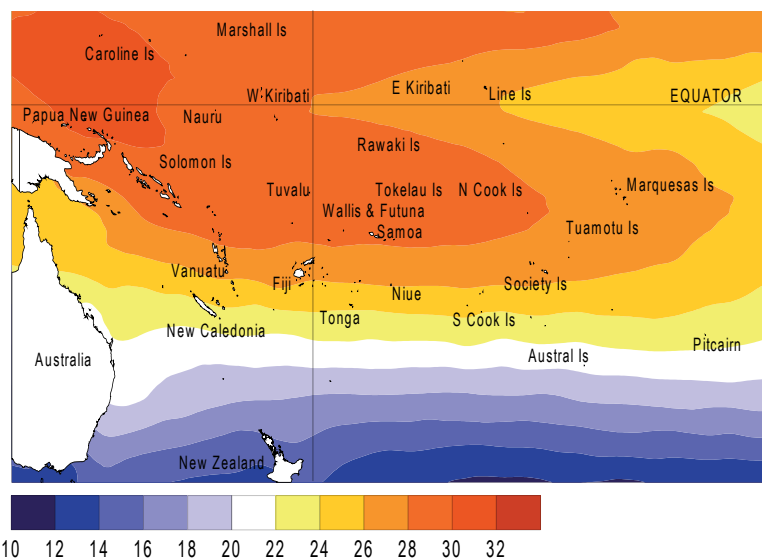
Forecast validation: July to Sep 2007

Enhanced convection and above average rainfall were expected over Samoa and the Northern Cook Islands, with near or above average rainfall forecast from the Solomon Islands southeast to French Polynesia, including Vanuatu, Fiji, Tonga, Wallis and Futuna, Niue, and the Southern Cook Islands.

Suppressed convection with below average rainfall was expected over Western and Eastern Kiribati, with near or below average rainfall in Tokelau and Tuvalu. Near average rainfall was expected elsewhere.



Sea surface temperature anomalies (°C) for September 2007



Mean sea surface temperatures (°C) for September 2007

will develop further during the next 3 months. The IRI synthesis gives a probability of 65% for a La Niña for the remainder of the year. The probability of El Niño conditions re-emerging during the forecast period remains at or below 10% until AMJ 2008, with the probability of returning to ENSO-neutral below 50% during 2007.

Tropical Pacific rainfall – September 2007

Territory and station name	September 2007 rainfall total (mm)	September 2007 percent of average
Australia		
Cairns Airport	4.0	11
Townsville Airport	2.0	18
Brisbane Airport	40.2	114
Sydney Airport	40.6	65
Cook Islands		
Penrhyn	24.0	16
Rarotonga Airport	65.0	60
Fiji		
Rotuma	162.4	68
Udu Point	328.8	291
Nadi	217.5	311
Nausori	308.5	187
Ono-I-Lau	210.3	194
French Polynesia		
Hiva Hoa, Atuona	16.2	22
Bora Bora, Motu	52.6	82
Tahiti – Faa'a	38.0	75
Tuamotu, Takarua	102.4	124
Gambier, Rikitea	194.6	144
Tubuai	63.6	67
Rapa	88.2	54
Kiribati		
Tarawa*	19.2	15
Kanton*	1.7	2
Niue		
Hanan	84	72
New Zealand		
Kaitaia	175	132
Whangarei Airport	168	124
Auckland Airport	61	62

Territory and station name	September 2007 rainfall total (mm)	September 2007 percent of average
New Caledonia		
Ile Art, Belep	160.4	302
Koumac	82.2	216
Ouloup	197.4	308
Ouanaham	185.4	218
Poindimie	418.8	466
La Roche	148.4	200
La Tontouta	88.6	287
Noumea	123.8	302
Moue	313.8	532
North Tasman		
Lord Howe Island	150.0	106
Norfolk Island	111.8	123
Raoul Island	106	96
Samoa		
Apia	198.6	106
Faleolo Airport	156.8	139
Tonga		
Niuafu'o	161.7	113
Mata'aho Airport	128.4	94
Lupepau'u	114.7	94
Salote Airport	132.7	120
Nuku'alofa	110.5	91
Fua'motu Airport	158.2	134
Tuvalu		
Nanumea*	44.7	26
Nui Island*	140.0	76
Funafuti*	168.4	82
Nuilakita*	116.7	60
Vanuatu		
Sola	336.1	133
Pekoa	323.1	223
Lamap	285.2	380
Port Vila	165.0	190
Tanna/Whitegrass	97.4	
Aneityum	400.3	500

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: October to December 2007

A La Niña-like pattern, with the SPCZ displaced further southwest than usual. A large region of enhanced convection is expected from the Solomon Islands southeast to Niue, with above average rainfall likely over the Solomon Islands, Vanuatu, New Caledonia, Fiji, Tonga, Niue, and Samoa.

Average or above average rainfall is expected in Papua New Guinea, the southern Cook Islands, Society and Austral Islands.

Suppressed convection is expected in the equatorial Pacific over Western and Eastern Kiribati, with below average rainfall.

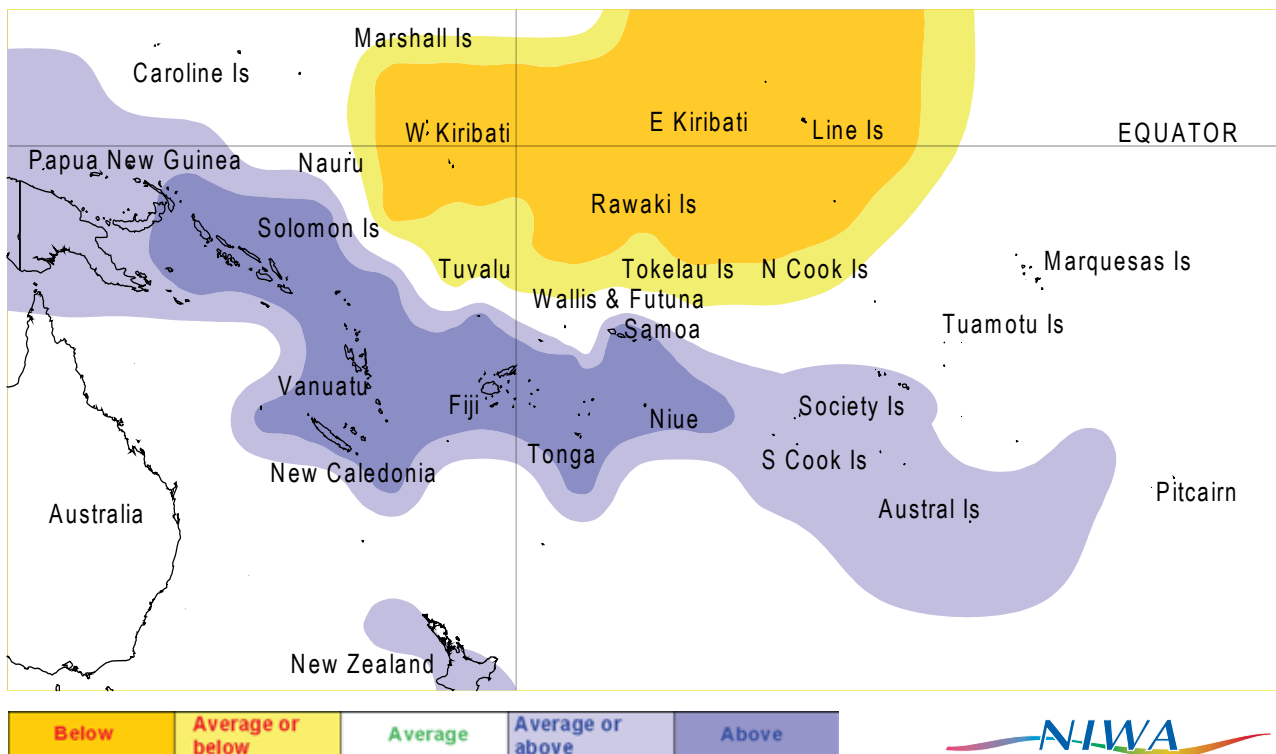
Near or below average rainfall is likely in Tokelau, the Northern Cook Islands, and Tuvalu.

Near average rainfall is expected in Wallis and Futuna, Tuamotu Islands, Marquesas Islands, and Pitcairn Island.

Confidence in the forecast model skill, for this seasonal outlook, is moderate for most Pacific Island countries. In the past, the average region-wide hit rate for forecasts issued in October has been 58%, a little lower than the long term average for all months combined.

Island group	Rainfall outlook	Outlook confidence
Solomon Islands	20:35:45 (Above)	Moderate
Vanuatu	20:30:50 (Above)	High
New Caledonia	25:35:40 (Above)	Moderate-High
Fiji	20:35:45 (Above)	Moderate
Tonga	20:30:50 (Above)	High
Niue	25:30:45 (Above)	Moderate
Samoa	20:35:45 (Above)	Moderate
Papua New Guinea	20:40:40 (Near or above)	Moderate
Southern Cook Islands	20:40:40 (Near or above)	Moderate
Society Islands	20:40:40 (Near or above)	Moderate
Austral Islands	20:40:40 (Near or above)	Moderate
Wallis & Futuna	25:40:35 (Near average)	Low
Tuamotu Islands	30:40:30 (Near average)	Low
Marquesas	35:45:20 (Near average)	Moderate
Pitcairn Island	25:40:35 (Near average)	Low
Tokelau	40:40:20 (Near or below)	Moderate
Northern Cook Islands	40:40:20 (Near or below)	Moderate
Tuvalu	40:40:20 (Near or below)	Moderate
Western Kiribati	50:30:20 (Below)	High
Eastern Kiribati	50:30:20 (Below)	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.



Rainfall outlook map for October to December 2007

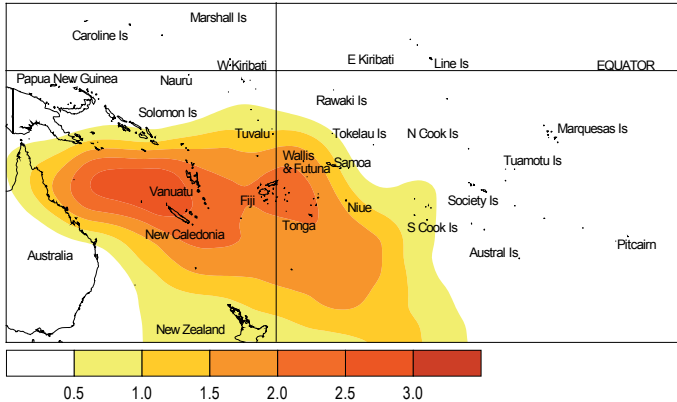


Tropical Cyclone guidance for the 2007–08 season

Dr Jim Salinger, Stuart Burgess, and Dr Jim Renwick, NIWA

Lower risk of tropical cyclones east of the Date Line but all islands should remain vigilant.

For the coming tropical cyclone season, from November 2007–May 2008, we are likely to see an average risk of occurrence for those areas of the South Pacific near the Date Line. These countries include Tuvalu, Fiji, Wallis and Futuna, Tonga, and Niue. However, a reduced risk of tropical cyclones is likely in several parts of the South Pacific east of the Date Line. Islands west of the Date Line are still likely to experience tropical cyclones, with a near normal rate of occurrence.



Average annual number of tropical cyclones, weak Nov–May La Niña periods, from 1969/70–2006/07.

Tropical sea surface temperatures, which play an important role in the development of tropical cyclones, are presently below average along the equator across the entire Pacific Basin east of the Date Line. A weak La Niña has developed although conditions in the western Pacific do not yet exhibit this behaviour. This reduces the risk of tropical cyclones east of the Date Line. On average six or seven tropical cyclones can be expected over the entire Southwest Pacific region during a weak La Niña season. This compares with an average of nine or ten over all seasons.

There is a good chance that the first tropical cyclone of the coming season in the South Pacific region may occur before the end of December, which is normal in both neutral and La Niña seasons. In seasons similar to the present, several tropical cyclones usually occur in the region between Vanuatu, New Caledonia, Fiji, and Tonga, with some affecting other areas. In an average season about half of the tropical cyclones that develop reach hurricane force

with mean wind speeds at least 64 knots (118 km/h). Southwest Pacific tropical cyclones are grouped into classes ranging from 1 to 5, with 5 being the strongest. On average four per season reach at least class 4 with mean wind speeds of at least 64 knots or 118 km/h, while two usually reach class 5 with mean speeds in excess of 90 knots or 167 km/h. Last season (2006/07) Cyclone Xavier was particularly severe, reaching class 5 in strength, fortunately missing populated areas. Two others were class 5.

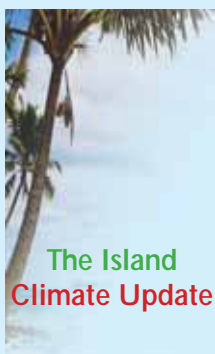
Country	Average over all years	Average over weak La Niña years	Comments
Tuvalu	1.1	0.8	Average risk
Fiji	2.3	2.1	Average risk
Wallis and Futuna	1.8	1.8	Average risk
Tonga	2.0	2.1	Average risk
Tokelau	0.8	0.8	Average risk
Solomon Islands	1.3	0.7	Variable risk - uncertain
Vanuatu	3.0	2.4	Variable risk – uncertain
New Caledonia	2.7	2.4	Variable risk – uncertain
Samoa	1.5	1.1	Variable risk - uncertain
Niue	1.9	1.3	Variable risk – uncertain
Papua New-Guinea	0.6	0.3	Reduced risk
Northern Cook Islands	0.8	0.2	Reduced risk
Southern Cook Islands	1.5	0.6	Reduced risk
Society Islands	0.8	0.3	Reduced risk
Tuamotu Islands	0.4	0.0	Reduced risk
Austral Islands	0.8	0.1	Reduced risk
Pitcairn Island	0.3	0.0	Reduced risk
Marquesas Islands	0.1	0.0	Cyclones unlikely
Western Kiribati	0.0	0.0	Cyclones unlikely
Eastern Kiribati	0.0	0.0	Cyclones unlikely

The average number of tropical cyclones passing within 5° (550 km circle) of the main island groups of the Southwest Pacific over the full **November through May** period. (Based on 37 seasons of data, and for tropical cyclones having mean wind speeds over 34 knots).

For further information:

<http://www.niwascience.co.nz/news/mr/2007/2007-09-21>

In the Pacific islands – contact your local Meteorological Service.



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Wendy St George,
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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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