

The Island Climate Update

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June's climate

- The South Pacific Convergence Zone (SPCZ) extended from Papua New Guinea, over northern Vanuatu, across Niue to the Austral Islands, and was displaced southwest of normal.
- Very suppressed convection from Western Kiribati to Eastern Kiribati and about the Equator weakened.
- Below normal rainfall for the northern part of French Polynesia, New Caledonia, and in parts of Australia, but record high rainfall in Fiji and Samoa.

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

- The strong La Niña episode present in the Pacific during past months has dissipated and neutral conditions exist. Most climate models project neutral ENSO conditions for the remainder of 2008.
- Average or below average rainfall is very likely in the southwest Pacific encompassing the Northern Cook Islands, Tuamotu, the Society Islands, the Austral Islands, and the Marquesas.
- Enhanced convection is likely from Papua New Guinea extending southeastward toward Vanuatu, through to the Southern Cook Islands, including Fiji, Niue, and Tonga, with above normal rainfall expected.



Climate developments in June 2008

The South Pacific Convergence Zone (SPCZ) extended southeast from Papua New Guinea to Fiji and Niue and across to the Southern Cook Islands and Austral Islands, with an overall displaced position southwest of normal. A region of suppressed convection that was persistent along the Equator during the austral spring and summer has contracted, but still extends from Western Kiribati to Eastern Kiribati including Tuvalu, Tokelau, and the Northern Cook Islands. An area of suppressed convection emerged to the southwest of the SPCZ and encapsulated New Caledonia for a majority the month.

Rainfall was well above average in most of Fiji, Samoa, Tonga, and northern Vanuatu due to a southwest-displaced SPCZ. New high monthly rainfall totals were recorded at Faleolo and Apia, Samoa, with 242 mm and 470 mm (260% and 353% of normal, respectively), as well as at Lakeba, Fiji, with a record high of 574 mm (736% of normal). Many stations in Fiji had high monthly rainfall totals ranging from 150 – 250% of normal, with more than 100 mm falling in a 24-hour period at several locations from 11 - 16 June. Heavy sustained rainfall also caused flooding in Samoa on 7 June and 15 June.

New Caledonia was located outside of the SPCZ during June, and experienced record monthly low rainfall at many locations and a global station mean of -21% of normal precipitation. Record low rainfall was also recorded at

Country	Location	Rainfall (mm)	% of avg	Comments
Samoa	Faleolo	242	260	Record high
Samoa	Apia	470	353	Record high
Fiji	Lakeba	574	736	Record high
Fiji	Vunisea	421	334	Record high
New Caledonia	Koumac	3	5	Record low
Cook Islands	Penrhyn	22	15	Near-record low

Soil moisture in June 2008

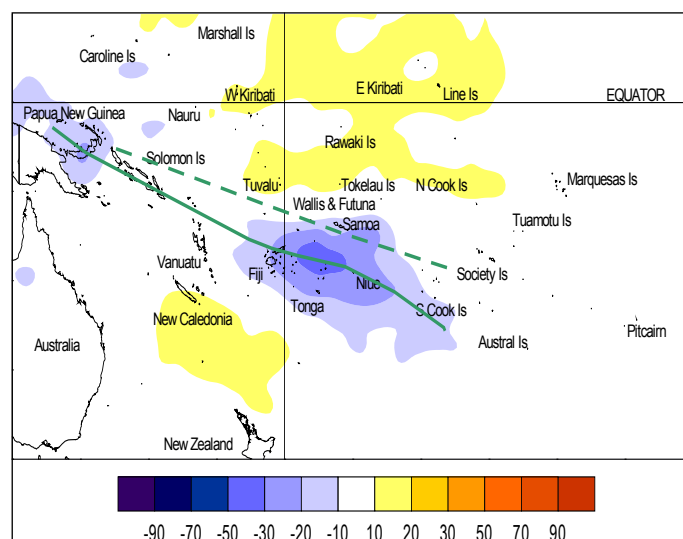
Estimates of soil moisture shown in the map (right) are based on monthly rainfall for one station in each country. Currently there are not many sites in the water balance model, but it is planned to include more stations in the future.

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.

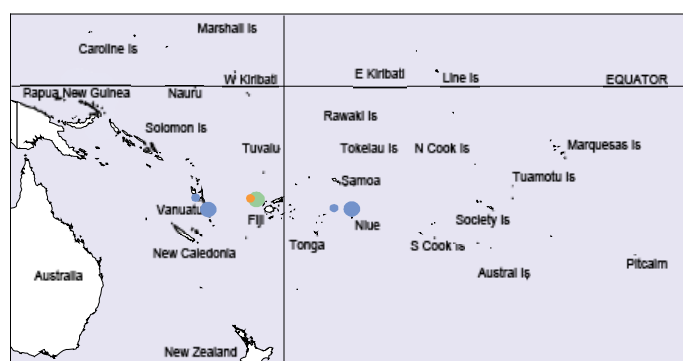
French Polynesia reports there are still important soil moisture deficits in the Tuamotu and Marquesas Islands. Nadi (Fiji) projects dry soil moisture conditions which is in contrast to many other stations that received high rainfall in June. Soils continued to be moist (at field capacity) for the time of year at Port Vila (Vanuatu) and Hanan Airport (Niue).

Norfolk Island (30 mm, 20% of normal), and near-record low rainfall also occurred at Townsville, Australia (0.8 mm). A near-record monthly low rainfall total was also recorded at Penrhyn in the Northern Cook Islands (22 mm) and in southern Vanuatu at Aneityum (83 mm).

Near or below normal rainfall fell over much of French Polynesia and Tuamotu, which have received below average precipitation for much of the past year. French Polynesia reports a 20% rainfall deficit overall, and dry conditions in the Marquesas and the Tuamotu Archipelago, with only Tahiti receiving near-normal rainfall for the month.



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 result in higher rainfall. The June 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).



June 2008
 ● Wet
 ● Moderate
 ● Dry

June 2007
 ● Wet
 ● Moderate
 ● Dry

Estimated soil moisture conditions at the end of June 2008, using monthly rainfall data. Soil moisture projections for individual Pacific Island countries are dependent on data availability at the time of publication.

El Niño/Southern Oscillation (ENSO)

During June, La Niña conditions continued to weaken in the equatorial Pacific. Overall the tropical Pacific temperatures are close to neutral, although some remnants of La Niña persist east of the Date Line. A warm water tongue off the coast of Ecuador has strengthened since last month.

Across the equatorial Pacific, ocean surface temperature anomalies have continued to ease from previous months. The NINO3 anomaly increased during June to +0.5 °C (3-month mean +0.2 °C), and is a continuation of the progressive warming from -1.5 °C in February 2008. NINO4 remains below normal at -0.5 °C in June (3-month mean around -0.7 °C), but this negative anomaly continues to weaken at the surface does not extend below 100 m. A positive sub-surface temperature anomaly persists west of the Date Line and is weakening, and the positive anomaly has intensified near South America above 100 m.

The near-Equatorial trade winds are slightly enhanced in the central equatorial Pacific and near normal elsewhere. Convection was largely suppressed along the equatorial regions from the eastern Pacific through to Indonesia. The SPCZ was active from near Fiji towards the Southern Cook Islands. The Southern Oscillation Index (SOI), also shifted to a slightly positive value in June, and is +0.4 (3-month mean +0.1). The TRMM ENSO precipitation index was around -1.2 at the end of June (weakening from a strong La Niña value of -2 in April). The Madden-Julien Oscillation is very weak at present.

OLR anomalies show a coherent but weak region of suppressed convection extending from 170 °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 Fiji, Niue, and Tonga. In the past month the region to the east of the Date Line around the equator had the most visible OLR changes. Overall, the SPCZ is still displaced to the southwest of its normal position.

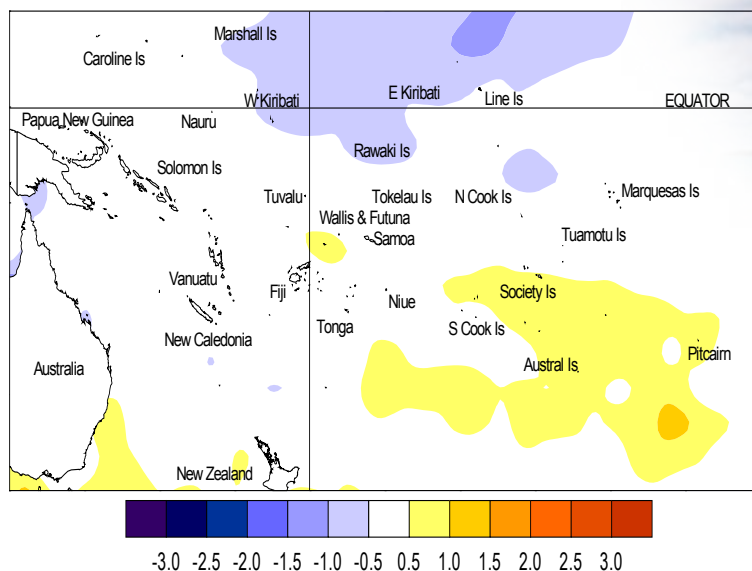
All dynamic and statistical climate models bar one (NASA-NSIPP) indicate ENSO neutral conditions during July–September, and continuing neutral through to March 2009. The NCEP discussion of 5 June indicates a transition from La Niña to ENSO-

Forecast validation: April to June 2008

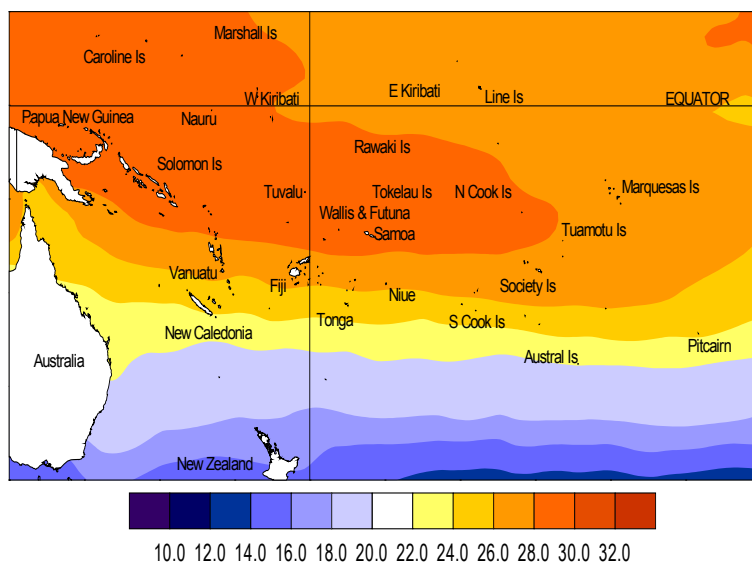
A La Niña-like pattern was expected, with a large region of suppressed convection forecast along the equatorial Pacific from Western to Eastern Kiribati, including the Solomon Islands, Tuvalu, the Northern Cook Islands, the Tuamotu archipelago, the Marquesas, and the Society Islands. Average rainfall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

Tonga, and Niue, with above average rainfall expected.

The rainfall outlook for the April – June 2008 period was very similar to what was forecast, the ‘hit’ rate being 69%, 15% higher than average. Rainfall totals were underestimated slightly for the northern fringe of French Polynesia, and higher than anticipated rainfall occurred in Samoa.



Sea surface temperature anomalies (°C) for June 2008



Mean sea surface temperatures (°C) for June 2008

neutral conditions during June–July. The IRI summary of 18 June gives a 75% chance of a return to ENSO-neutral conditions in the June to August period, and the probability of returning to La Niña only 15%. The Australian weekly tropical summary of 27 May suggests ENSO-neutral conditions now exist, and will persist through the austral spring.

Tropical Pacific rainfall – June 2008

Territory and station name	June 2008 rainfall total (mm)	June 2008 percent of average
Australia		
Cairns Airport	19	39
Townsville Airport	1	4
Brisbane Airport	122	172
Sydney Airport	127	101
Cook Islands		
Penrhyn	22	15
Aitutaki	64	68
Rarotonga Airport	35	31
Fiji		
Rotuma Island	374	163
Udu Point	341	294
Nadi Airport	50	77
Nausori	362	240
French Polynesia		
Hiva Hoa, Atuona	101	58
Bora Bora	70	76
Tahiti – Faa'a	123	193
Tuamotu, Takaroa	82	91
Gambier, Rikitea	136	84
Tubuai	92	79
Rapa	161	80
Kiribati		
Tarawa	N/A	N/A
Kanton	N/A	N/A
New Zealand		
Kaitaia	166	111
Whangarei Airport	148	90
Auckland Airport	157	135
New Caledonia		
Ile Art, Belep	41	34
Koumac	3	5
Ouloup	19	14
Ouanaham	71	46
Poindimie	104	53
La Roche	64	42
La Tontouta	5	7
Noumea	12	10
Moue	25	19

Territory and station name	June 2008 rainfall total (mm)	June 2008 percent of average
Niue		
Hanan Airport	167	111
Liku	131	162
North Tasman		
Lord Howe Island	79	43
Norfolk Island	30	20
Raoul Island*	81	48
Samoa		
Faleolo Airport	242	190
Apia	470	287
Nafanua	464	237
Afiamalu	617	157
Maota	457	105
Solomon Islands		
Taro	N/A	N/A
Munda	N/A	N/A
Auki	N/A	N/A
Honiara	N/A	N/A
Henderson	N/A	N/A
Kira Kira	N/A	N/A
Santa Cruz, Lata	N/A	N/A
Tonga		
Niuafu'o	152	138
Mata'aho Airport	312	231
Lupepau'u	269	213
Salote Airport	132	165
Nuku'alofa		
Fua'motu Airport	91	90
Tuvalu		
Nanumea	N/A	N/A
Nui Island	N/A	N/A
Funafuti	N/A	N/A
Nuilakita	N/A	N/A
Vanuatu		
Sola	473	164
Pekoa	349	225
Lamap	139	107
Port Vila	115	79
Tanna/Whitegrass	6	
Bauerfield		
Aneityum	83	54

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 Cyclones in the Southwest Pacific Basin 2007-08

Jim Salinger, Jim Renwick, and Andrew Lorrey, NIWA

Southwest Pacific tropical cyclones in 2007–08

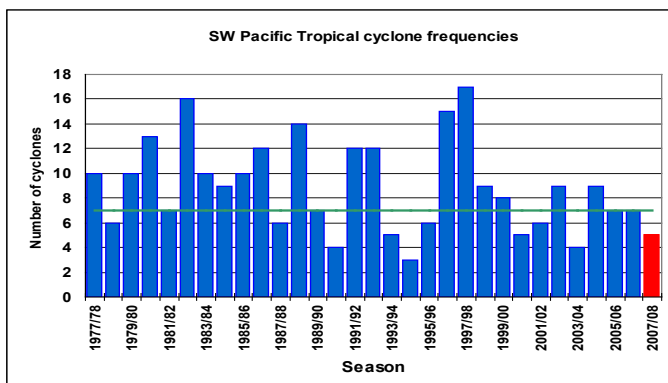
The 2007–08 Southwest Pacific tropical cyclone (TC) season had five occurrences east of 150°E, two less than the seasonal average (1976–77 to 2006–07). This season's TC's were clustered nearer the Date Line in the Southwest Pacific region, with three tracking near Fiji, one to the west and one to the east.

NAME	ORIGIN	DATE	MAX. SPEED (km/h)	CLASSIFICATION
GUBA	Papua New Guinea	13 - 19 Nov. 2007	139	Hurricane
DAMAN	Over Fiji	5 - 9 Dec. 2007	195	Major hurricane
ELISA	SW of Nukualofa, Tonga	10 - 11 Jan. 2008	85	Tropical storm
FUNA	Fiji	16 - 19 Jan. 2008	195	Major hurricane
GENE	NE of Fiji	27 Jan - 1 Feb 2008	185	Major hurricane

Characteristics for named tropical cyclones in 2007-08.

Fewer TC's than average this year

Rather than the normal February–March peak, the season peaked early, with the majority of cyclones occurring in January. The remainder of the season was unusually quiet, with no cyclones recorded. The first tropical cyclone of the season occurred on 13 November, slightly earlier than normal. The season finished unusually early with the last in late January–early February.



Southwest Pacific Tropical Cyclone frequencies, 1977 – 2008.

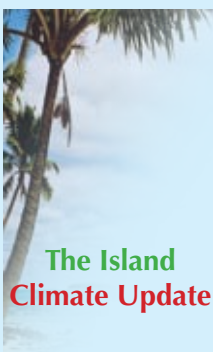
2007–08 tropical cyclone damage

Four Southwest Pacific region tropical cyclones (57%) reached hurricane strength (sustained wind speeds of at least 118 km), two of which reached major hurricane strength (mean wind speed at least 168 km/h). TC Guba was the first of the season, forming near Papua-New Guinea on 13 November, and meandered in the northern Coral Sea, with maximum sustained winds reaching 139 km/h (hurricane force). In New Guinea, it caused major impacts, with flooding leading to at least 170 deaths. TC Daman occurred over 5–9 December near Fiji, with maximum sustained winds of 195 km/h (major hurricane force). This produced heavy rainfall over northern Fiji, with winds flattening villages and causing widespread destruction to roads and property.



Damage to a banana plantation in Vanuatu from tropical cyclone Funa. [Photo: David Gibson, Vanuatu Meteorological Service]

TC Elisa formed on 10 January near the Date Line and moved southwest of Nukualofa, Tonga producing maximum sustained winds of 85 km/h. TC Funa developed near northern Vanuatu then moved southeast toward Tonga on 16-19 January with maximum sustained winds of 195 km/h, bringing heavy rain and storm force winds to Vanuatu which disrupted communication. TC Gene was the last of the 2007–08 season, developing over Fiji and tracking towards New Caledonia. Maximum sustained winds were of 185 km/h. This caused seven deaths on Fiji, left many without power and caused estimated damages of US\$45 million.



The Island Climate Update

Cover Photo:
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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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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