

The Island Climate Update

August's climate

- The South Pacific Convergence Zone (SPCZ) was not as well-defined in August as in previous months.
- Very suppressed convection from Western Kiribati to Eastern Kiribati and south of the Equator from Nauru to the Northern Cook Islands.
- Well-below normal rainfall for most areas in the South Pacific, including Tonga, Samoa, Vanuatu, and Fiji.

El Niño/Southern Oscillation (ENSO), seasonal rainfall, and sea surface temperature forecasts

- Neutral ENSO conditions exist in the tropical Pacific at present. Most climate models project neutral ENSO conditions persisting into early 2009.
- Average or below average rainfall is forecast for Western Kiribati and Tuvalu, and also Tokelau, the Northern Cook Islands, Pitcairn Island, and the northeastern half of French Polynesia.
- Above normal rainfall is expected to be centralised near Vanuatu, north of New Caledonia, and east of the Solomon Islands. Near-to-above average rainfall is forecast for Fiji, Niue, Tonga, Papua New Guinea, the Solomon Islands, and New Caledonia for the coming three-month period.
- Normal to above normal SSTs are forecast to extend from near Papua New Guinea, southeast to the Austral Islands and Pitcairn Island, including Fiji, Vanuatu, New Caledonia, Tonga, and Niue. Normal to below normal SSTs are forecast for northeastern French Polynesia, including northern Tuamotu and the Marquesas Islands.

Collaborators

Pacific Islands National
Meteorological Services

Australian Bureau of
Meteorology

Meteo France

NOAA National
Weather Service

NOAA Climate
Prediction Centre
(CPC)

International Research
Institute for Climate
and Society

European Centre
for Medium Range
Weather Forecasts

UK Met Office

World Meteorological
Organization

MetService of
New Zealand



Climate developments in August 2008

The South Pacific Convergence Zone (SPCZ) continued to exhibit diminished activity in August relative to previous months. Only a small region of enhanced rainfall was observed in satellite data during August 2008, centred near Papua New Guinea. A region of suppressed convection expanded south of the Equator, and extends from Nauru and Western Kiribati to Eastern Kiribati, and southeast to the Southern Cook Islands and Society Islands. The regional circulation was characterised by more frequent anticyclones to the northwest of New Zealand and highs to the southwest of Pitcairn Island.

Rainfall was well above average for northern New Zealand and Takaroa, French Polynesia, but these sites were the exception for the South Pacific region during August 2008. Most countries had global rainfall averages below 80% of normal rainfall. No monthly record high monthly rainfall totals were recorded for any reported climate monitoring site.

French Polynesia experienced low rainfall totals in the southern island groups, with Bora Bora and Tahiti recording 40% and 31% of normal rainfall, respectively. The southern fringe of the Austral Islands and Tuamotu archipelago also had low monthly rainfall totals. In Samoa, many locations also had well-below normal rainfall, with many stations recording 10–30% of normal precipitation. Record low rainfall was recorded at La Roche, New Caledonia (9 mm,

Country	Location	Rainfall (mm)	% of avg	Comments
Tonga	Salote	7	7	Record low
New Caledonia	La Roche	9	11	Record low
Samoa	Faleolo	10	6	Very low
Vanuatu	Tanna	8	14	Very low
Fiji	Nadi	3	4	Very low
Australia	Cairns	2	8	Very low

Soil moisture in August 2008

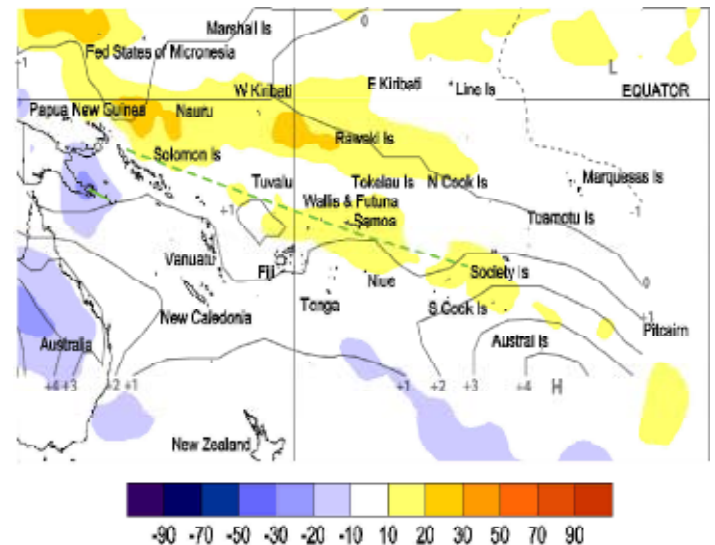
Estimates of soil moisture shown in the map (right) are based on monthly rainfall for one station in each country. Currently there are not many sites in the water balance model, but it is planned to include more stations in the future.

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.

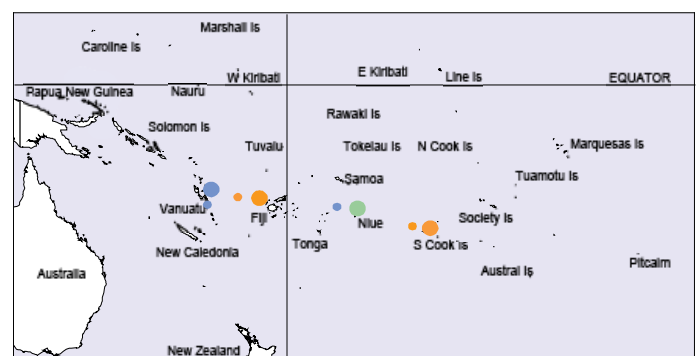
Nadi (Fiji) and Rarotonga (Southern Cook Islands) project dry soil moisture conditions, which is similar to last year at this time. Soils continued to be moist (at field capacity) for the time of year at Port Vila (Vanuatu), while moderate soil moisture is projected for Hanan (Niue).

11% of normal), and very low rainfall also occurred in Niue. Low rainfall also occurred in the Northern Cook Islands, with 82 mm (43% of normal) recorded at Penrhyn.

Fiji also had a drier than normal conditions. A localised high pressure frequently occurred during the month, which generated southerlies onto the country. A weak SPCZ displaced to the northeast of the country and the circulation created fine conditions that helped monthly temperatures to reach +0.7 to 2.9 °C above average with a record high at Nacocolevu of 29.3 °C, breaking a 71-year-old record established in 1938. Warmer than normal temperatures were also recorded for many other Pacific islands during August.



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 August 2008 position of the South Pacific Convergence Zone (SPCZ) is poorly defined from the OLR anomalies this past month. The TRMM satellite rainfall observation of 27 August suggested it was still present, but contracted toward Papua New Guinea and weaker relative to previous months. 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). Mean sea level (MSL) pressure anomalies (in hPa) are shown as grey solid (high pressure) and dashed (low pressure) lines (adapted from Bureau of Meteorology, Australia).



August 2008
 ● Wet
 ● Moderate
 ● Dry

August 2007
 ● Wet
 ● Moderate
 ● Dry

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

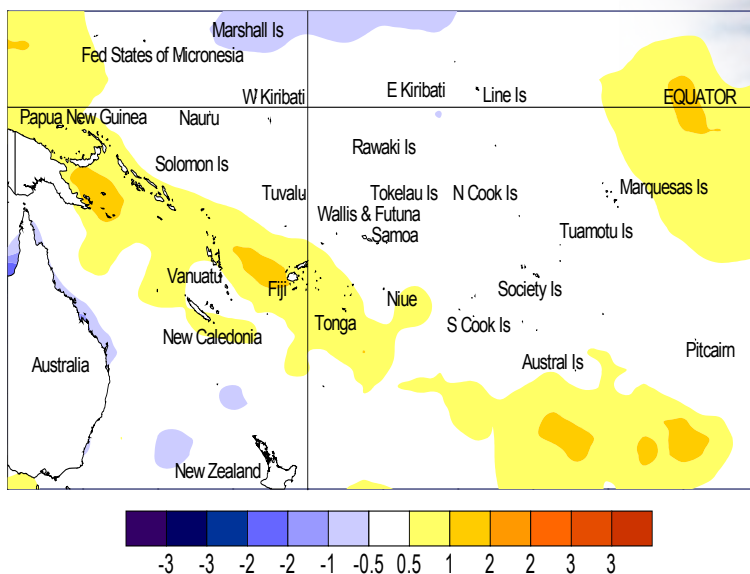
El Niño/Southern Oscillation (ENSO)

During August, ENSO conditions continued to remain near neutral in the equatorial Pacific. A warm water tongue off the coast of Ecuador that developed last month continues to be prominent.

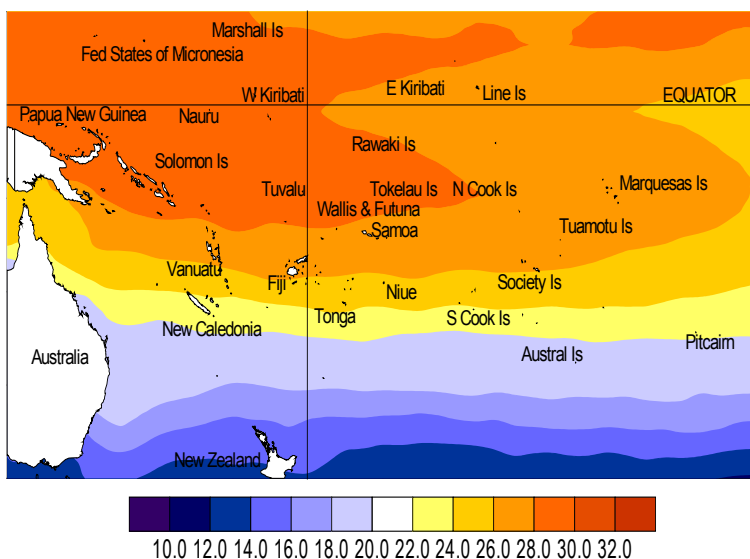
The positive NINO3 anomaly increased during August to +1.1 °C (3-month mean +0.8 °C), and is a continuation of the progressive warming from 1.5 °C in February 2008. However, the warming at depth has weakened. NINO4 remains slightly below normal at 0.1 °C in August (three-month mean around 0.3 °C). The negative anomaly continues to weaken at the surface but has strengthened below 100m.

The near-Equatorial trade winds are slightly enhanced throughout the entire equatorial Pacific. Convection continues to be largely suppressed along the equatorial regions from eastern Papua New Guinea to the central Pacific, but enhanced over central Indonesia. The OLR anomaly field has lost the La Niña signature it displayed in past months and lacked coherence in the Pacific in August, though convection remains weakly suppressed near the Date Line. The SPCZ was moderately active from near the Solomon Islands towards the Southern Cook Islands, but with a noticeable gap over Vanuatu, Fiji, and Tonga. The TRMM ENSO precipitation index was -1.25 at the end of August (weakening from a strong La Niña value of -2 in April). The Madden-Julien Oscillation is non-existent at present.

All ENSO models indicate neutral conditions during spring, and continuing neutral conditions through to the May 2009. The NCEP discussion of 7 August indicates ENSO-neutral conditions during September – November. The IRI summary of 19 August gives an 80% probability of ENSO-neutral conditions in the August – October season, and the probability of El Niño only 15%. The Australian weekly tropical summary of 26 August suggests ENSO-neutral conditions now exist, and persisting through the austral spring.



Sea surface temperature anomalies (°C) for August 2008



Mean sea surface temperatures (°C) for August 2008

Forecast validation: June to August 2008

A La Niña-like precipitation pattern was expected, with a large region of suppressed convection forecast in the southwest Pacific, from Tuvalu and Tokelau, extending south and east to Pitcairn Island and the Marquesas and encompassing the Northern Cook Islands, Tuamotu, and the the Society Islands. Average rainfall was expected for the Austral Islands. Enhanced convection was forecast from Papua New Guinea extending southeastward toward the Solomon Islands and Vanuatu, through to Niue, including Fiji and Tonga. Near-to-above or above average rainfall was expected in those countries for the June–August period. No clear precipitation guidance was offered for Eastern and Western Kiribati, Samoa, and the Southern Cook Islands.

The rainfall outlook for the June–August 2008 period was mixed compared to what was forecast, the ‘hit’ rate being 51%, 11% lower than average. Rainfall totals were overestimated for much of the southern part of the South Pacific, including New Caledonia and the Southern Cook Islands, and for the southwestern fringe of French Polynesia.

Forecast statistics compiled over the last nine years indicate the multi-ensemble strike rate will improve with the shift to springtime.

Tropical Pacific rainfall – August 2008

Territory and station name	August 2008 rainfall total (mm)	August 2008 percent of average
Australia		
Cairns Airport	2	8
Townsville Airport	0	0
Brisbane Airport	16	37
Sydney Airport	44	56
Cook Islands		
Penrhyn	82	43
Aitutaki	N/A	N/A
Rarotonga Airport	41	113
Fiji		
Rotuma Island	236	113
Udu Point	49	58
Nadi Airport	3	4
Nausori	126	86
French Polynesia		
Hiva Hoa, Atuona	82	58
Bora Bora	21	40
Tahiti – Faa'a	15	31
Tuamotu, Takaroa	148	238
Gambier, Rikitea	67	40
Tubuai	69	50
Rapa	117	48
Kiribati		
Tarawa	55	36
Kanton	N/A	N/A
New Zealand		
Kaitaia	154	101
Whangarei Airport	127	91
Auckland Airport	167	154
New Caledonia		
Ile Art, Belep	68	128
Koumac	49	150
Ouloup	15	19
Ouanaham	17	24
Poindimie	83	82
La Roche	9	11
La Tontouta	46	88
Noumea	61	94
Moue	45	50

Territory and station name	August 2008 rainfall total (mm)	August 2008 percent of average
Niue		
Hanan Airport	46	38
Liku	71	57
North Tasman		
Lord Howe Island	137	97
Norfolk Island	94	77
Raoul Island	141	110
Samoa		
Faleolo Airport	10	6
Apia	21	19
Nafanua	29	25
Afiamalu	34	21
Maota	52	27
Solomon Islands		
Taro	207	65
Munda	202	77
Auki	228	112
Honiara	50	57
Henderson	52	54
Kira Kira	277	87
Santa Cruz, Lata	320	95
Tonga		
Niuafu'o	N/A	N/A
Mata'aho Airport	20	21
Lupepau'u	N/A	N/A
Salote Airport	7	7
Nuku'alofa	18	16
Fua'motu Airport	35	28
Tuvalu		
Nanumea	67	29
Nui Island	193	87
Funafuti	319	137
Nuilakita	80	40
Vanuatu		
Sola	210	93
Pekoa	63	85
Lamap	N/A	N/A
Port Vila	51	98
Tanna/Whitegrass	8	14
Bauerfield	67	109
Aneityum	40	44

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 and SST outlook: September to November 2008

La Niña conditions have dissipated in the equatorial and subtropical southwest Pacific. During the September–November 2008 forecast period, a region of suppressed convection is likely to encompass Western Kiribati and Tuvalu, and also Tokelau, the Northern Cook Islands, Pitcairn Island, and the northeastern half of French Polynesia, with average-to-below or below average rainfall expected for those countries.

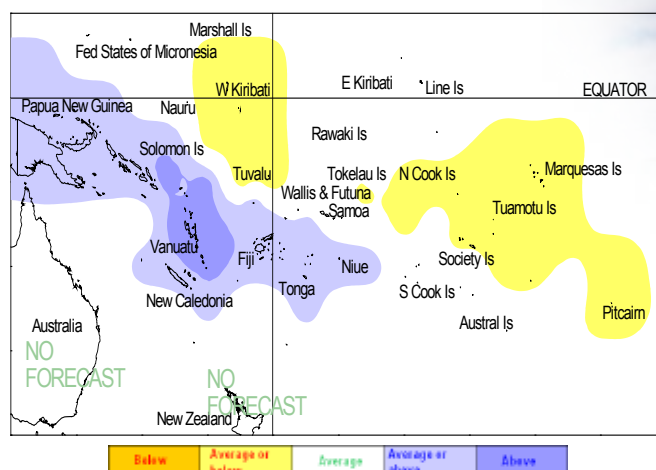
Enhanced convection is expected to be centralised near Vanuatu and north of New Caledonia and east of the Solomon Islands with above normal rainfall. Near-to-above average rainfall is forecast for Fiji, Niue, Tonga, Papua New Guinea, the Solomon Islands, and New Caledonia for the coming three-month period. No clear precipitation guidance is offered for Eastern Kiribati, Tokelau, Samoa, the Southern Cook Islands, or the Austral Islands.

SSTs are expected to be normal to above normal in a band extending from near Papua New Guinea, southeast to the Austral Islands and Pitcairn Island, including Fiji, Vanuatu, New Caledonia, Tonga, and Niue. Normal to below normal SSTs are forecast for the northeastern sector of French Polynesia, including the northern Tuamotu archipelago and the Marquesas Islands.

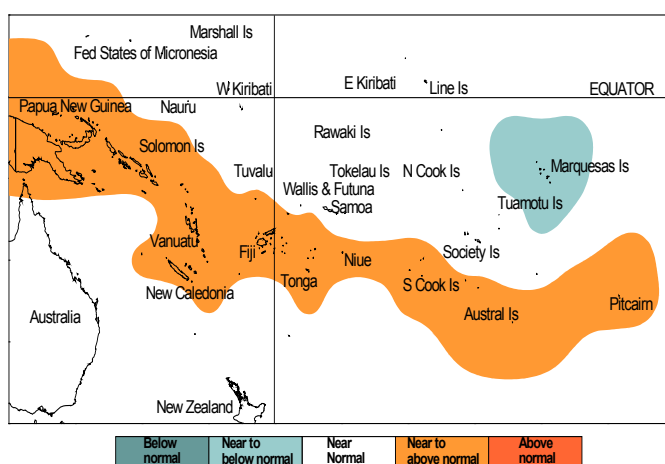
The confidence in the forecast model skill for this seasonal rainfall outlook is moderately high for most Pacific Island countries. In the past, the average region-wide hit rate for forecasts issued in September is 63%, 2% higher than the long-term average for all months combined. The SST forecast confidence is moderately high to high.

NOTE: Rainfall and sea surface temperature estimates for Pacific Islands for the next three months are given in the tables below. The tercile probabilities (e.g., 20:30:50) are derived from the averages of several global climate models. They correspond to the odds of the observed rainfall or sea surface temperatures being in the lowest one third of the distribution, the middle one third, or the highest one third of the distribution. For the long term average, it is equally likely (33% chance) that conditions in any of the three terciles will occur. *If conditions are climatology, we expect an equal chance of the rainfall being in any tercile.

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



Rainfall outlook map for September to November 2008



SST outlook map for September to November 2008

Summary of the Island Climate Update end-user workshop in Vanuatu

Andrew Lorrey (NIWA), Jim Salinger (NIWA), and Salesa Kaniaha (VMS)

The first Island Climate Update (ICU) end-user consultation workshop was held in Port Vila, Vanuatu on May 13–15, 2008. This workshop was hosted by the Vanuatu Meteorological Service (VMS), with the primary aim to interact with climate information end-users and determine their needs. The intention was to summarise the findings from the interaction and direct them at making improvements to the ICU product, services, and delivery format in the near future. The workshop also provided a template to guide future interactions with end-users that can be adopted by Pacific Island country national meteorological services (NMS) for the purpose of improving uptake of climate forecast information.

The highlight of the meeting consisted of break-out sessions where end-users interacted with climate scientists from Vanuatu (VMS), Australia (Bureau of Meteorology), New Caledonia (Meteo-France), and New Zealand (NIWA). This interaction was formed around a series of questions aimed at determining the common climate forecast issues, needs, and requirements among the end-users. Key end-users at this workshop included representatives from government, public works, health, energy, and agriculture sectors.

Workshop findings

The workshop demonstrated that the current ICU presentation and content has great value to Pacific Island NMS organisations because it contains a comprehensive South Pacific climate overview. The ICU document increases the confidence of in-country forecasts and outlines the regional climate context that enables the verification of local forecasts. However, it was also recognised that some of the ICU content is too technical and needs to be simplified. Common requests indicated the major areas needing immediate improvement are:

- More data on humidity, temperature, rainfall, SSTs, and evapotranspiration;
- Development of run-off and soil moisture indices;
- Greater lead time for temperature, drought, and tropical cyclone forecasts;
- Language simplification and graphics improvements;
- Faster delivery and better distribution of forecast information;



Participants of the Island Climate Update workshop, Vanuatu Front Row (L to R): Andrew Lorrey (NIWA), Jim Salinger (NIWA), Bakoa Kaltonga, First PA, Ministry of Infrastructure and Public Utilities, Barry Biggs (NIWA), Salesa Kaniaha (VMS), Malony Albert (Reporter, Television Blong Vanuatu-TBV). Back Row: (L to R): Elizabeth Graham (Radio Vanuatu), Mercy Nalawas (VMS), James Renwick (NIWA), Janita Pahalad (BoM), Temau Tehei (Meteo-France, New Caledonia), Paul Eastwood (SOPAC), Peter Feke (VMS), Brian Phillips (Vanuatu Climate Change Office), Steven Niptik.

Scheduled changes to the Island Climate Update

Recommended improvements that were suggested for the ICU from the Vanuatu workshop and previous surveys undertaken in 2006 and 2007 are underway. Expansion of the ICU website will include forecast details, climate diagnostics, tropical cyclone information, feature articles, and overall improved graphics. Many of the changes and product upgrades will be completed by April 2009, and some have already been included in the printed version of the ICU, like the new multi-ensemble sea surface temperature forecast (see page 5). In addition, supporting materials from the Vanuatu end-user consultation workshop can be provided upon request by email.

A schedule of improvements to the ICU that will be undertaken this year can be found at: www.niwascience.co.nz/ncc/icu The ICU team appreciates all of the feedback on how the product can be changed to assist the uptake of climate forecast information. Further suggestions about how this product can be improved can be made via email to Andrew Lorrey. I

Visit The Island Climate Update at:
www.niwascience.co.nz/ncc/icu
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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.

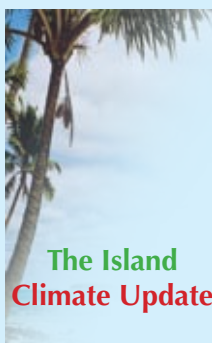
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This summary is prepared as soon as possible following the end of the month, once the data and information are received from the Pacific Island National Meteorological Services (NMHS). Delays in data collection and communication occasionally arise.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



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