

# The Island Climate Update

## 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

## October's climate

- The South Pacific Convergence Zone (SPCZ) was active across southern Papua New Guinea, Vanuatu, and New Caledonia this past month, and was displaced southwest of its normal position.
- Very suppressed convection across much of the region, particularly near Western Kiribati and south of the Equator from Nauru southeast to the Society Islands.
- Below normal rainfall for many areas in the South Pacific, including Samoa and southwestern French Polynesia, but above normal rainfall in Vanuatu.

## 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.
- Below average rainfall is forecast for Western Kiribati, the Marquesas, the Society Islands, Tuvalu, Tokelau, Wallis & Futuna, Samoa, the Northern Cook Islands, and the Tuamotu archipelago.
- Above normal rainfall is expected for Papua New Guinea, New Caledonia, Vanuatu, and Tonga for the coming three months.
- Normal to above normal SSTs are forecast for the southwestern half of the southwest Pacific region. Normal to below normal SSTs are forecast for the northeast half of the southwest Pacific, except for the Society Islands which are projected to have near normal SSTs.



## Climate developments in October 2008

The South Pacific Convergence Zone (SPCZ) activity strengthened in October relative to previous months. A consolidated region of enhanced rainfall was observed in satellite data during October 2008, extending southeast from southern Papua New Guinea toward Vanuatu and New Caledonia. A localised region of suppressed convection expanded during the month to the south of the Equator, encompassing northeast of the Solomon Islands, and extending through the central southwest Pacific to Pitcairn Island. The regional circulation for the month was characterised by more frequent anticyclones over eastern Australia, with a ridge of high pressure extending over the Tasman Sea and the southwest Pacific to the north of New Zealand. Lower than normal pressure also developed to the north of the Marquesas Islands.

Rainfall was below average for many countries in the Southwest Pacific during October 2008. A new monthly low rainfall total was recorded at Bora Bora in the Society Islands, which received 14 mm of rainfall (14% of normal). Elsewhere in the eastern half of the Southwest Pacific, the stations in the Northern and the Southern Cook Islands, the Tuamotu archipelago, and the Austral Islands all recorded 20–50% of normal rainfall, with the exception of 175.8 mm (105% of normal) occurring at Rapa on the southern margin of the Austral Islands. Many stations in Fiji and Samoa also received between 25–75% of normal rainfall.

Island Group	Location	Rainfall (mm)	% of avg	Comments
Vanuatu	Bauerfield	327	461	Record high
Vanuatu	Sola	548	151	Highest monthly total in the region
New Caledonia	La Roche	215	256	Very high
Society Islands	Bora Bora	14	14	Record low
Western Kiribati	Kiritimati	5	8	Very low
Australia	Townsville	4	15	Very low

## Soil moisture in October 2008

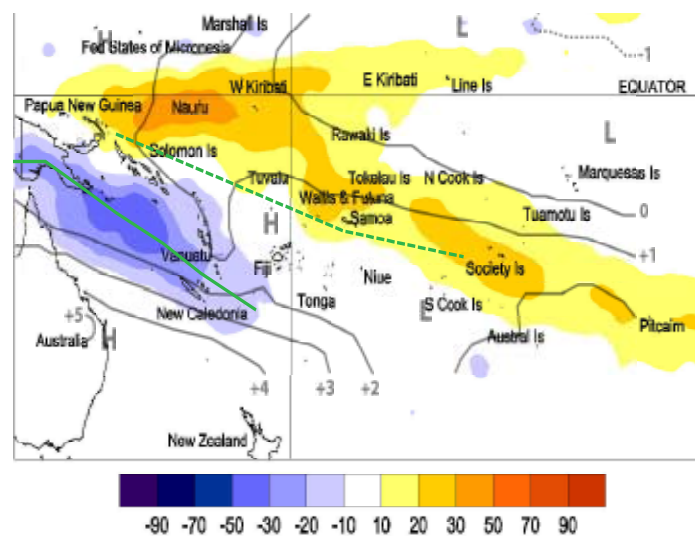
Estimates of soil moisture shown in the map (right) are based on monthly rainfall for one station in each country. Currently there are not many sites in the water balance model, but more stations will be included in the future.

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.

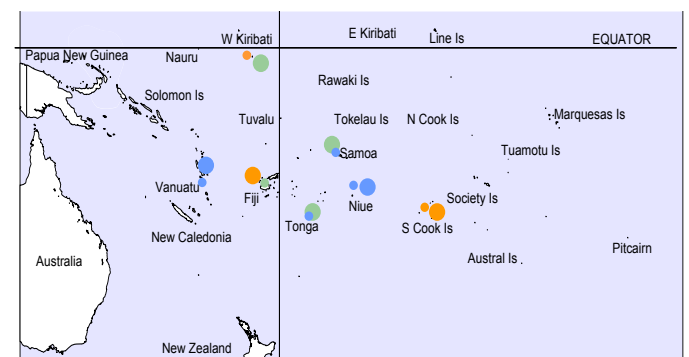
Nadi (Fiji) and Rarotonga (Southern Cook Islands) project dry soil moisture conditions. Soils continued to be moist (at field capacity) for the time of year at Port Vila (Vanuatu) and Hanan (Niue), while moderate soil moisture is projected for Apia (Samoa), Nuku'alofa (Tonga), and Tarawa (Western Kiribati).

In Samoa, the continuation of well-below normal rainfall has meant water restrictions are still in place in Apia, which experienced the lowest monthly rainfall total for the past five years. Western Kiribati also received lower than normal rainfall, with 37% of normal recorded at Tarawa. Eastern Kiribati recorded well below normal rainfall during the month. 5.1 mm (8% of normal) fell on 4 October in Kiritimati, which accounted for the entire monthly total for that island.

In the western Southwest Pacific, rainfall totals were near to above normal in the southwestern Solomon Islands, and also in northern and western New Caledonia, with a high monthly rainfall total recorded at La Roche (215 mm, 256% of normal). A new monthly record was established at Bauerfield, Vanuatu, which recorded 327 mm (461% of normal) rainfall.



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 October 2008 position of the South Pacific Convergence Zone (SPCZ) is contracted slightly toward Papua New Guinea and displaced southwest of its normal position. 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).



October 2008      October 2007

- Wet
- Moderate
- Dry

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

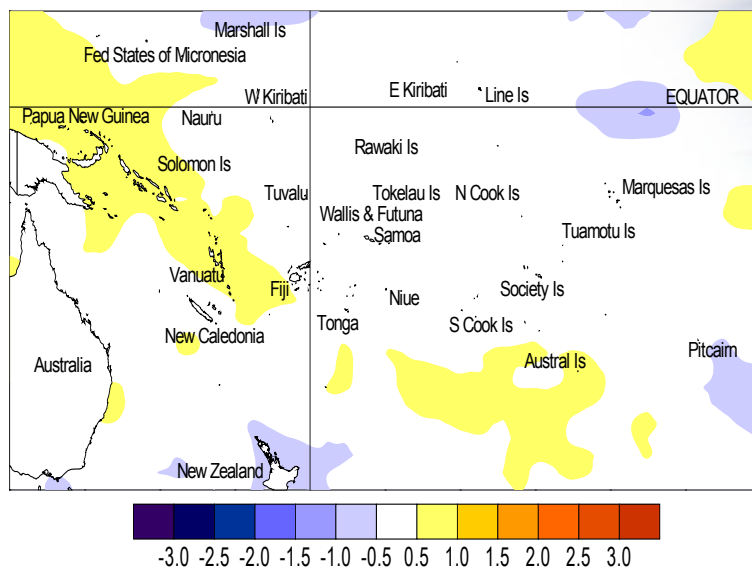
## El Niño/Southern Oscillation (ENSO)

During October, ENSO-neutral conditions were well established in the equatorial Pacific ocean, but the Tropical Pacific atmosphere continued to exhibit La Niña-like characteristics. The SOI remains positive at around +1.5 (an August-October mean of +1.2), consistent with enhanced trade winds about and west of the Date Line.

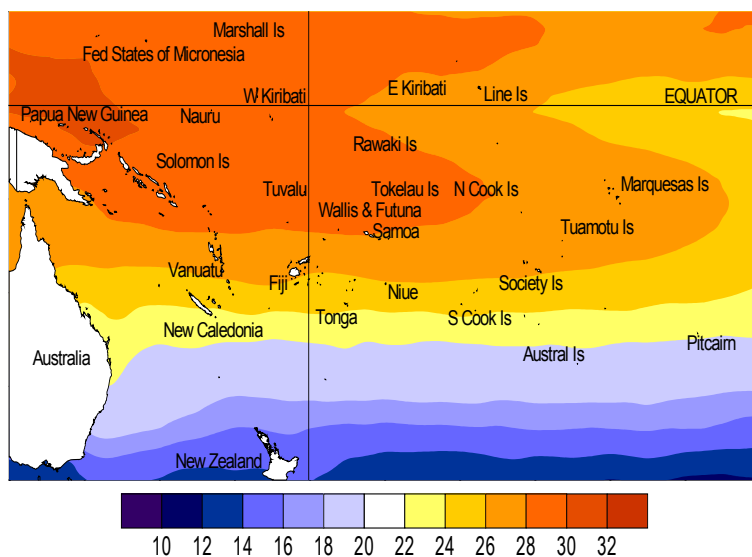
SST anomalies in October were close to neutral across the Equatorial Pacific: The NINO3 anomaly for October was +0.2°C (3-month mean +0.6°C), and the NINO4 anomaly was zero (ASO mean 0.1°C). Equatorial subsurface temperature anomalies are now relatively weak, with a -1 to -2°C anomaly centre near 140°W (weakened from -3°C in September).

Tropical Pacific precipitation patterns continue to show a La Niña signal, with the TRMM ENSO precipitation index at -1.26 for October, after weakening earlier in the month. OLR anomalies show suppressed Equatorial convection about and west of the Date Line. A convective pulse associated with the Madden-Julian Oscillation is passing through the Indonesian region during late October, and is expected to move over the Western Pacific in early November. This is on average associated with negative MSLP anomalies over New Zealand and positive anomalies to the north. The SPCZ was more active during October than last month. The Southern Annular Mode (SAM) was predominantly positive in October, and is predicted to continue along a positive trend into November.

Almost all models indicate neutral conditions continuing through to the end of autumn 2009. The NCEP discussion of 9 October indicates ENSO-neutral conditions through to early 2009, with a small possibility of a return to La Niña conditions. The IRI summary of 16 October gives a 90% probability of ENSO-neutral conditions in the October to December season, and the probability of El Niño 2% and La Niña only 8%. The Australian weekly tropical summary of 21 October suggests ENSO-neutral conditions persisting through the austral autumn.



Sea surface temperature anomalies (°C) for October 2008



Mean sea surface temperatures (°C) for October 2008

## Forecast validation: August to October 2008

A large region of suppressed convection was forecast over Tuvalu, Tokelau, the Northern Cook Islands, Tuamotu, the Society Islands, Pitcairn Island, and the Marquesas during August to October 2008, with average-to-below or below average rainfall expected for those countries. Enhanced convection for the same period was projected from Papua New Guinea extending in a band southeast toward Vanuatu and through Tonga, with above average rainfall forecast for those countries. Near-to-above average rainfall was forecast for Fiji, Niue, the Solomon Islands and New Caledonia. No clear precipitation guidance was offered for Eastern Kiribati, Western Kiribati, the Southern Cook Islands or the Austral Islands.

The rainfall outlook for the August–October 2008 period was very good compared to what was forecast, the island group global station ‘hit’ rate being 77%, 19% higher than average for forecasts made during August and 16% higher than the average for all months combined. Rainfall totals were overestimated for the west-central part of the South Pacific, including Niue and Tonga and for the eastern fringe of French Polynesia.

Forecast statistics compiled over the last nine years indicate the multi-ensemble strike rate will continue to improve toward the end of the year.

## Tropical Pacific rainfall – October 2008

Territory and station name	October 2008 rainfall total (mm)	October 2008 percent of average
<b>Australia</b>		
Cairns Airport	82	199
Townsville Airport	4	15
Brisbane Airport	55	59
Sydney Airport	67	85
<b>Cook Islands</b>		
Penrhyn	85	49
Aitutaki	N/A	N/A
Rarotonga Airport	40	39
<b>Fiji</b>		
Rotuma Island	255	75
Udu Point	51	31
Nadi Airport	69	67
Nausori	221	108
<b>French Polynesia</b>		
Hiva Hoa, Atuona	83	85
Bora Bora	14	14
Tahiti – Faa'a	28	28
Tuamotu, Takaroa	23	20
Gambier, Rikitea	N/A	N/A
Tubuai	42	32
Rapa	48	41
<b>Kiribati</b>	176	105
Tarawa	48	37
Kanton	53	77
<b>New Zealand</b>		
Kaitaia	76	76
Whangarei Airport	56	51
Auckland Airport	91	115
<b>New Caledonia</b>		
Ile Art, Belep	30	55
Koumac	28	101
Ouloup	72	112
Ouanaham	101	154
Poindimie	115	93
La Roche	215	256
La Tontouta	40	93
Noumea	42	85
Moue	110	138

Territory and station name	October 2008 rainfall total (mm)	October 2008 percent of average
<b>Niue</b>		
Hanan Airport	114	61
Liku	217	148
<b>North Tasman</b>		
Lord Howe Island	79	59
Norfolk Island	27	30
Raoul Island	27	34
<b>Samoa</b>		
Faleolo Airport	139	60
Apia	121	53
Nafanua	168	N/A
Afiamalu	161	N/A
Maota	146	N/A
<b>Solomon Islands</b>		
Taro	N/A	N/A
Munda	198	80
Auki	266	125
Honiara	40	26
Henderson	93	107
Kira Kira	341	142
Santa Cruz, Lata	447	127
<b>Tonga</b>		
Niuafu'ou	N/A	N/A
Mata'aho Airport	N/A	N/A
Lupepau'u	133	75
Salote Airport	184	202
Nuku'alofa	70	55
Fua'amotu Airport	42	41
<b>Tuvalu</b>		
Nanumea	81	48
Nui Island	138	71
Funafuti	172	64
Nuilakita	N/A	N/A
<b>Vanuatu</b>		
Sola	548	151
Pekoa	328	182
Lamap	276	242
Port Vila	250	272
Tanna/Whitegrass	98	N/A
Aneityum	237	249

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: November 2008 to January 2009

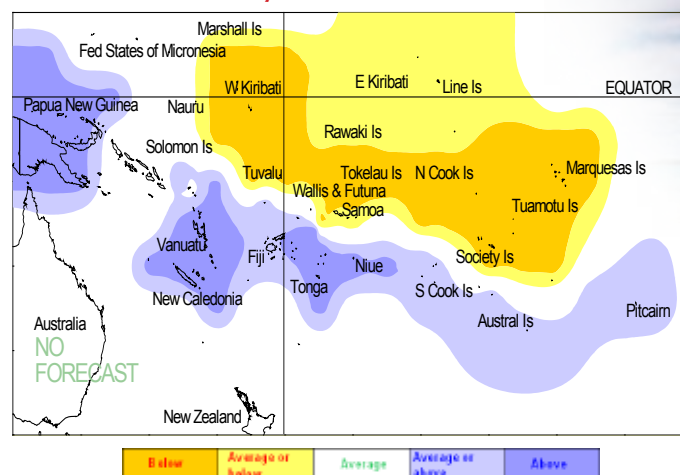
During the November 2008–January 2009 forecast period, a region of suppressed convection is likely to encompass the central and eastern Southwest Pacific, in a region extending from Western Kiribati to the Marquesas Islands and the Society Islands, including Tuvalu, Tokelau, Wallis & Futuna, Samoa, the Northern Cook Islands, and the Tuamotu archipelago. Below normal or near-to-below normal rainfall is expected for those countries.

Enhanced convection is expected to be focused near Papua New Guinea, and also near Vanuatu, New Caledonia, Tonga, Fiji, and Niue with above average rainfall. Near-to-above average rainfall is forecast for the Southern Cook Islands, the Austral Islands, and Pitcairn Island for the next three-month period. No clear precipitation forecast is offered for the Solomon Islands.

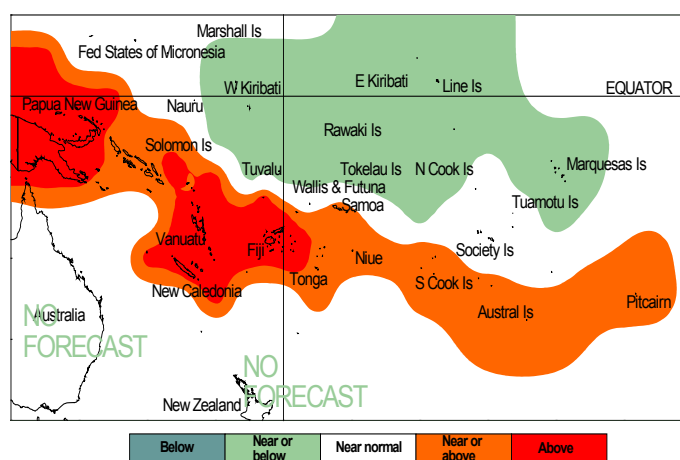
SSTs are expected to be above normal in a band extending from near Papua New Guinea, southeast to Fiji, including Vanuatu, New Caledonia, and the Solomon Islands. Near-above normal SSTs are forecast for Niue, the Southern Cook Islands, the Austral Islands and Pitcairn Island. Normal to below normal SSTs are forecast for the northeastern sector of French Polynesia, including the Tuamotu archipelago and the Society Islands, Tuvalu, Tokelau, and both Eastern and Western Kiribati.

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 November is 64%, 4% higher than the long-term average for all months combined. The SST forecast confidence is moderate for this period.

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.



Rainfall outlook map for November 2008 to January 2009



SST outlook map for November 2008 to January 2009

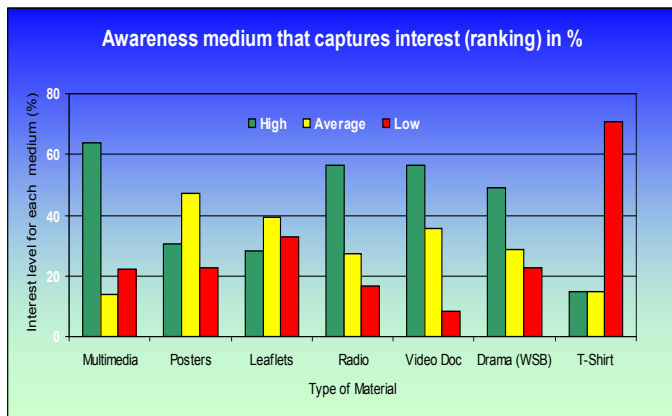
Island Group	Rainfall Outlook	Outlook confidence	Island Group	SST Outlook	Outlook confidence
Papua New Guinea	20:30:50 (Above)	Moderate-High	Fiji	20:35:45 (Above)	Moderate
New Caledonia	20:35:45 (Above)	Moderate-High	New Caledonia	20:35:45 (Above)	Moderate
Niue	20:35:45 (Above)	Moderate-High	Papua New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

# Improving Meteorological Information in Rural Communities

## Jotham Napat, Salesa Kaniaha, and Brian Phillips, Vanuatu Meteorological Service (VMS)

Since 2000, the VMS has initiated vigorous awareness programs throughout the country in an effort to educate rural communities about weather and climate variability. The initiative has covered remote regions that have previously not had the opportunity to engage in climate change, meteorological, environmental, hydrological, and geological awareness exercises. To date, the VMS has covered 90% of the 83 inhabited islands of Vanuatu, but only about 40% of the rural population. This is due to the sparsely distributed settlements in the islands and lack of sufficient funds. Raising awareness of weather and climate through radio programs often falls short due to poor coverage. As a result, new strategic awareness programs need to be developed to cover these remote areas. Information distribution will be assisted by localising source texts that contain detailed meteorological and climate change information in schools, and improving access to more TV programs, more media coverage, and additional profile-raising interactions about climate change and climate variability in rural communities.

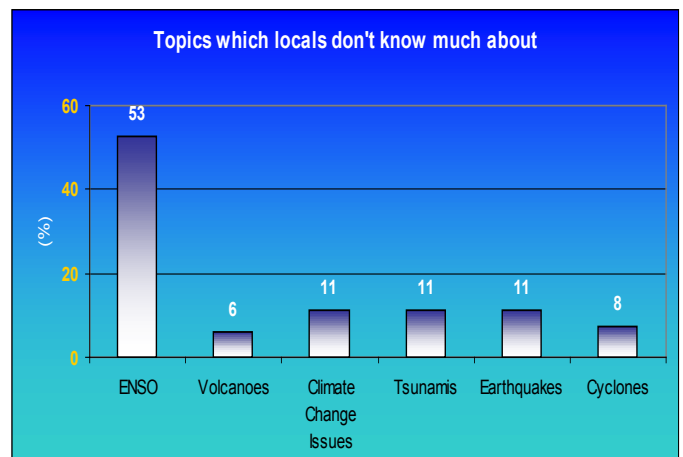
A survey conducted by VMS in 2002 showed that people in rural regions can understand climate and weather concepts better when they are presented through multimedia (power point presentations), suggesting understanding can be facilitated using a combination of audio/visual techniques.



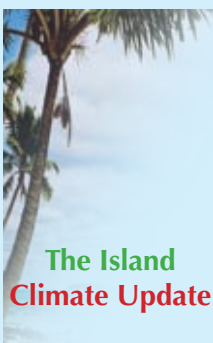
Different mediums used by the VMS for raising awareness and their effectiveness (percentage) to convey messages from the local perspective.

Climate bulletins with the relevant information that can help decision making at the community level have not been overly successful in permeating rural areas. Many communities are still in the grey zone between traditional knowledge of the environment and science when it comes to interpreting meteorological and

climatological phenomenon. There are also some cultural barriers that hinder the acceptance of meteorological information and advice. Events like La Niña or El Niño are not well known in Vanuatu. There are historical accounts of extreme events having occurred in the past, and traditional adaptive measures were developed to alleviate impacts of these situations on the wellbeing of communities. Most of the past extreme events have been in one way or another viewed as the work of sorcerers. For example, The drought related to the El Niño event of 1997/98, severely affected the Vanuatu agriculture, livestock, and water sectors. Chiefs on one island filed a case that led to the arrest of an individual, with the belief that he was responsible for causing the drought. VMS will continue to develop strategies and put in place systems that will enable effective communication between meteorologists and the local people to avoid unfortunate misunderstandings like this in the future.



The capacity of the VMS to provide accurate and timely climate and weather information and improve understanding in rural communities have recently increased with the introduction of the Vanuatu Climate Update, Island Climate Update, and Seasonal Climate Outlook for Pacific Island Country (SCOPIC) software. VMS is also establishing an 'ENSO Desk' that will offer technical assistance and promote a better understanding of ENSO (La Niña/El Niño) and its impacts on different sectors in the country. It will also enable the National Disaster Management Office and VMS to map out the vulnerabilities of different islands to ENSO, and develop a centralized information system on ENSO impacts. This information can then be relayed to communities, and assist the development of an alert system for provincial government use.



### The Island Climate Update

Cover Photo:  
Wendy St George,  
NIWA

Visit The Island Climate Update at:  
[www.niwascience.co.nz/ncc/icu](http://www.niwascience.co.nz/ncc/icu)  
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](mailto:j.salinger@niwa.co.nz)

**Forecasts:**  
Dr. Andrew Lorrey (South Pacific rainfall and SST) and the NIWA National Climate Centre (ENSO)  
**ICU Editors:**  
Andrew Lorrey Email: [a.lorrey@niwa.co.nz](mailto:a.lorrey@niwa.co.nz)  
Jim Salinger Email: [j.salinger@niwa.co.nz](mailto:j.salinger@niwa.co.nz)  
Harriet Palmer Email: [h.palmer@niwa.co.nz](mailto:h.palmer@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.**

### Acknowledgements

This bulletin is produced by NIWA and made possible with financial support from the New Zealand Agency for International Development (NZAID), with additional support from the Pacific Islands Applied Geosciences Commission (SOPAC) and the Secretariat for the Pacific Regional Environmental Programme (SPREP).

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.

The contents of The Island Climate Update may be freely disseminated, provided the source is acknowledged.

Requests for Pacific Island climate data should be directed to the Meteorological Services concerned.