

The Island Climate Update

February's climate

- The South Pacific Convergence Zone (SPCZ) was displaced southwest of its normal position and was very active.
- Very suppressed convection near Western Kiribati and south of the Equator from Nauru east to the Northern Cook Islands.
- Normal to well above normal rainfall for many areas in the western region of the South Pacific, with many a new record established in Townsville, Australia.

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

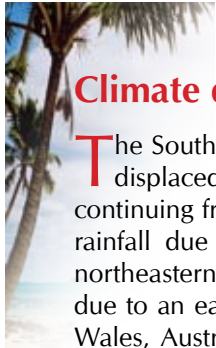
World Meteorological
Organization

MetService of
New Zealand

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

- La Niña-like conditions exist in the tropical Pacific. Many climate models project continuation of La Niña through to the end of summer 2009.
- Below normal rainfall is forecast for Tuvalu, Tokelau, and the Northern Cook Islands.
- Above normal rainfall is expected for the Austral Islands, the Southern Cook Islands, Vanuatu, New Caledonia, Tonga, and Papua New Guinea.
- 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.





Climate developments in February 2009

The South Pacific Convergence Zone (SPCZ) activity was displaced south and west of normal during February, continuing from the trend last month. A region of enhanced rainfall due to intensified convection was observed over northeastern Australia and Papua New Guinea. High rainfall due to an east coast low significantly impacted New South Wales, Australia during the middle of the month, however the most important event in Australia was the severe heat wave that occurred from 6–8 February and the associated bush fires in Victoria. Suppressed convection intensified during near the Equator during February, and encompassed the region northeast of the Solomon Islands that included Nauru, Tuvalu, and Tokelau. There was also suppressed convection near the Pitcairn Islands. The regional circulation was characterised by more frequent high pressure across the southern and central portions of the South Pacific; and lower than normal pressures to the northwest of New Zealand and to the northeast of the Marquesas.

There were few high rainfall records during February, only Townsville, Australia reported a new monthly high of 989 mm (339 % of normal). Vanuatu and New Caledonia received well above normal rainfall for the month. In particular, the north Tasman Sea region to the west of New Caledonia and north of New Zealand had well above normal rainfall due to a sub-tropical low pressure system and Tropical Cyclone Innes that occurred in mid-to-late February.

In general, normal or below normal rainfall occurred for the central and northeastern parts of the south Pacific during

Island Group	Location	Rainfall (mm)	% of avg	Comments
Australia	Townsville	989	339	Record high; Highest monthly total in the region
New Caledonia	Belep	402	244	Very high
New Caledonia	La Tontouta	401	295	Very high
Solomon Islands	Henderson	600	211	Very high
Kiribati	Kanton	27	26	Very low
Tuvalu	Nanumea	13	5	Very low

Soil moisture in February 2009

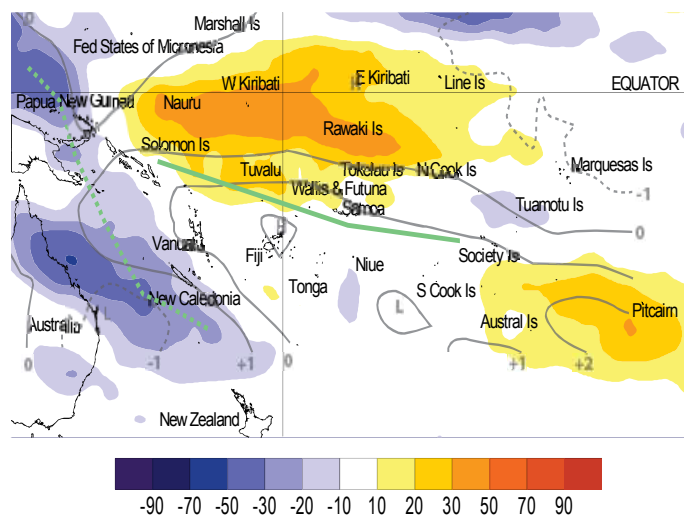
Estimates of soil moisture shown in the map (right) are based on monthly rainfall for one station in each country. Currently there are not many sites in the water balance model, but more stations will be included in the future.

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. 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.

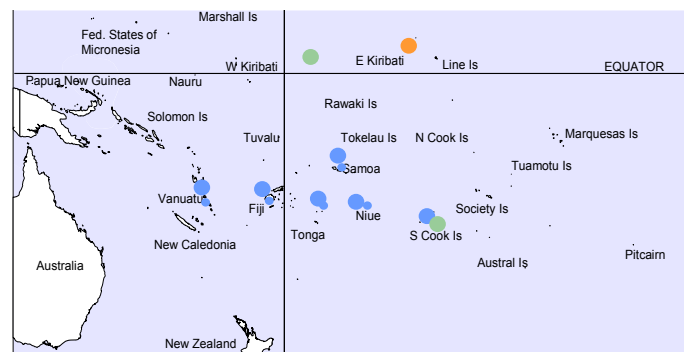
Nadi (Fiji), Hanan (Niue), Port Vila (Vanuatu), Rarotonga (Southern Cook Islands), and Apia (Samoa) project moist (at or near field capacity) soil moisture conditions. Soils are moderate for the time of year at Kanton (Kiribati).

February. Low rainfall totals (30–60% of normal) persisted for many stations in the Cook Islands, Kiribati, and French Polynesia. Hiva Hoa in the Marquesas Islands received 78 mm of rainfall (50% of normal), while Nanumea, Tuvalu received only 13mm of rainfall (5% of normal). Elsewhere in the eastern half of the southwest Pacific, the stations in the Tuamotu archipelago and the Austral Islands all recorded normal or below normal rainfall, except at Tubuai, which received a record high total of 290 mm (166% of normal).

Northern New Zealand experienced a relatively wet month, with the northern part of the country recording well above normal rainfall (140–230% of normal). The Solomon Islands had a relatively normal month, except at Honiara and Henderson.



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 February 2009 position of the South Pacific Convergence Zone (SPCZ) was displaced southwest of its normal position, and much more coherent than last month. The average position of the SPCZ is identified by the dashed green line, which is based on mean January rainfall for the South Pacific. Mean sea level (MSL) pressure anomalies (in hPa) are shown as grey lines.



February 2009 February 2008

- Wet
- Moderate
- Dry

Estimated soil moisture conditions at the end of February 2009, using monthly rainfall data. Soil moisture projections for individual Pacific Island countries are dependent on data availability at the time of publication.

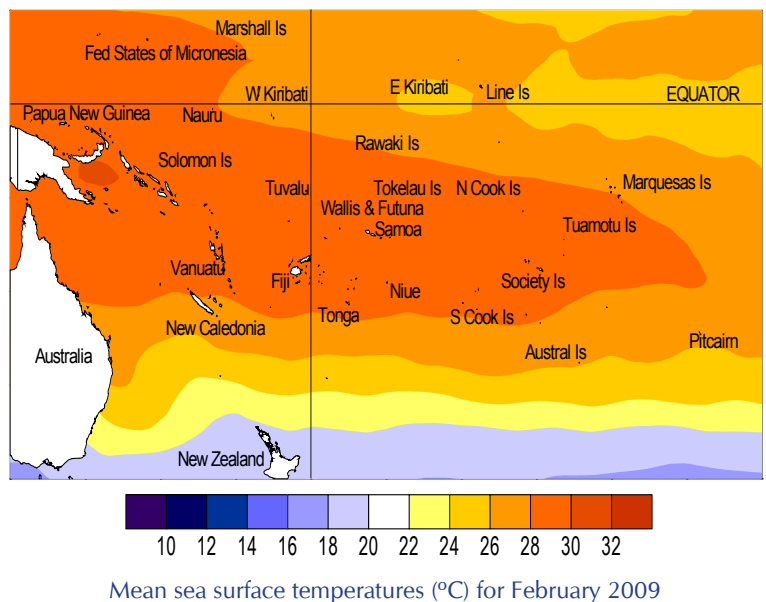
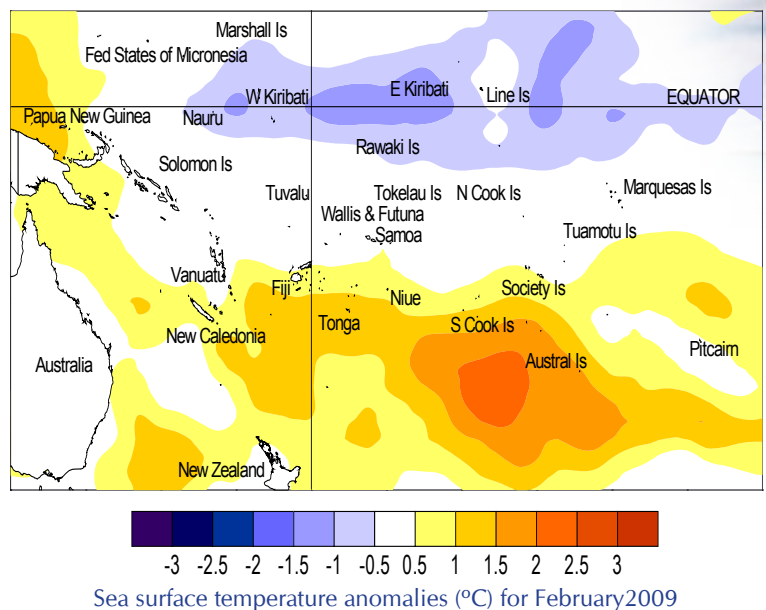
El Niño/Southern Oscillation (ENSO)

During February, Moderate La Niña conditions continue in the equatorial Pacific Ocean and atmosphere. The SOI remained firmly positive at +1.5 for the month (December – February mean of +1.3). Enhanced easterly trade winds west of the Date Line have weakened during February, but are still stronger than normal.

SST anomalies in February were negative across much of the Equatorial Pacific: NINO3 and NINO4 anomalies were both around -0.7°C for the month (DJF means -0.4°C and -0.6°C , respectively). There is some indication from ocean temperature profile monitoring that the negative SST anomalies may now be easing, though sea surface height anomalies still show a clear La Niña pattern. Equatorial subsurface anomalies continue to show a warm anomaly in the west ($+3^{\circ}\text{C}$ centred near 160°E , 100–200m depth) and a cool anomaly in the east (-3°C near the South American coast, 0–100m depth).

Tropical Pacific convection and precipitation was suppressed near the Date Line, just south of the Equator, and was enhanced across the Tropics at Australian longitudes during February. The TRMM ENSO precipitation index was -0.89 as of 24 February. The MJO is weak and slow-moving over the Indian Ocean, and is expected to remain so into early March.

The set of global climate models assessed by NIWA indicate neutral ENSO conditions will prevail during March – May, and all but one model shows neutral conditions in June – August. The NCEP discussion of 5 February indicates a continuation of La Niña conditions in the coming three month period. The IRI summary of 19 February indicates a 55–60% percent of La Niña conditions persisting through April (40% chance of neutral conditions, 0% for El Niño), reducing to 30–35% for April – June.



Tropical Cyclone Activity and Guidance

Tropical Cyclone (TC) Innes, the second to form in the southwest Pacific during the 2008–09 season, developed on 13 February as a tropical depression east of Fiji. On 17 February, after passing over Vanuatu, and tracking to the southwest across New Caledonia, Innes was upgraded to a TC. No significant impacts or loss of life were reported from this system. Subsequent to the extratropical exit of TC Innes, the dying tropical depression merged with a low pressure system to the east of Australia. This system then generated significant rainfall in northern New Zealand. Countries west of the Date Line, including Vanuatu, the Solomon Islands, and New Zealand, and New Caledonia still have elevated risk for the remainder of the TC season.

Forecast validation: December 2008 to February 2009

A region of suppressed convection was forecast for the central and eastern Southwest Pacific, and Western Kiribati, Tuvalu, Tokelau, the Northern Cook Islands, and the Society Islands, were expected to receive below normal rainfall. Near-to-below normal rainfall was expected for Samoa, Eastern Kiribati, the Tuamotu archipelago, and the Marquesas Islands. Above normal rainfall was forecast for Papua New Guinea, New Caledonia, Tonga, and Niue. Near or above normal rainfall was forecast for the Austral Islands, Fiji, the Southern Cook Islands, and Pitcairn Island. No clear precipitation guidance was offered for the Solomon Islands or Wallis & Futuna.

The rainfall outlook for the December 2008 – February 2009 period was calculated for 16 island groups (four countries did not report rainfall values). The global station 'hit' rate was 70%, 3% higher than average for forecasts made during December and 9% higher than the average for all months combined. Rainfall was overprojected for most of New Caledonia, Tonga, parts of French Polynesia, and underprojected for Western Kiribati and Samoa. Overall, the strike rate for all forecasts combined was 66% for the ICU during 2008.

Tropical Pacific rainfall – February 2009

Territory and station name	February 2009 rainfall total (mm)	February 2009 percent of average
Australia		
Cairns Airport	638	140
Townsville Airport	989	339
Brisbane Airport	132	77
Sydney Airport	128	121
Cook Islands		
Penrhyn	178	52
Aitutaki	172	73
Rarotonga Airport	108	53
Fiji		
Rotuma Island	263	82
Udu Point	247	99
Nadi Airport	243	83
Nausori	255	95
French Polynesia		
Hiva Hoa, Atuona	78	50
Bora Bora	114	48
Tahiti – Faa'a	130	60
Tuamotu, Takaroa	174	90
Gambier, Rikitea		
Tubuai	290	166
Rapa	113	57
Kiribati		
Tarawa	103	57
Kanton	27	26
New Zealand		
Kaitaia	177	230
Whangarei Airport	137	144
Auckland Airport	116	176
New Caledonia		
Ile Art, Belep	402	244
Koumac	359	236
Ouloup	183	92
Ouanaham	364	150
Poindimie	722	204
La Roche	205	96
La Tontouta	401	295
Noumea	173	140
Moue	427	237

Territory and station name	February 2009 rainfall total (mm)	February 2009 percent of average
Niue		
Hanan Airport	338	143
Liku	196	79
North Tasman		
Lord Howe Island	75	65
Norfolk Island	206	254
Raoul Island	198	134
Samoa		
Faleolo Airport	194	52
Apia	154	42
Nafanua	157	N/A
Afiamalu	221	N/A
Maota	194	N/A
Solomon Islands		
Taro	261	86
Munda	315	87
Auki	422	111
Honiara	497	170
Henderson	600	211
Kira Kira		
Santa Cruz, Lata	487	123
Tonga		
Niuafu'ou	N/A	N/A
Mata'aho Airport	125	49
Lupepau'u	165	76
Salote Airport	185	95
Nuku'alofa	74	35
Fua'amotu Airport	144	65
Tuvalu		
Nanumea	13	5
Nui Island	N/A	N/A
Funafuti	N/A	N/A
Nuilakita	N/A	N/A
Vanuatu		
Sola	409	117
Pekoa	399	127
Lamap	340	133
Port Vila	345	130
Tanna/Whitegrass	356	N/A
Aneityum	228	77

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.

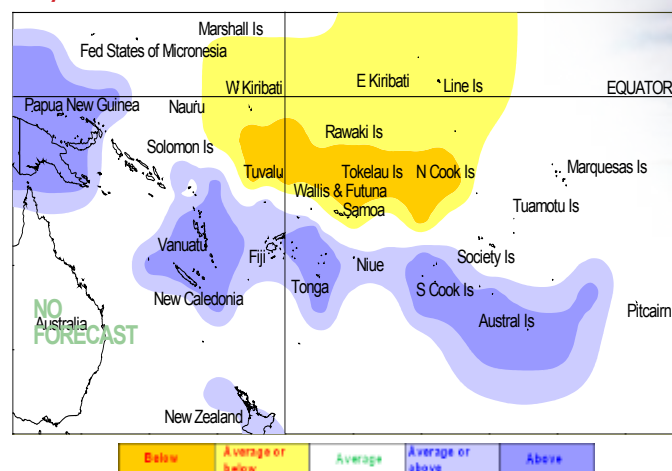
Tropical rainfall and SST outlook: March to May 2009

During the March–May 2009 forecast period, a region of suppressed convection is likely to encompass the central and eastern Southwest Pacific, extending to the southeast from Tuvalu to the Northern Cook Islands, including Tokelau, where below normal rainfall is expected. Near-to-below normal rainfall is expected for Samoa, Eastern Kiribati, and Western Kiribati.

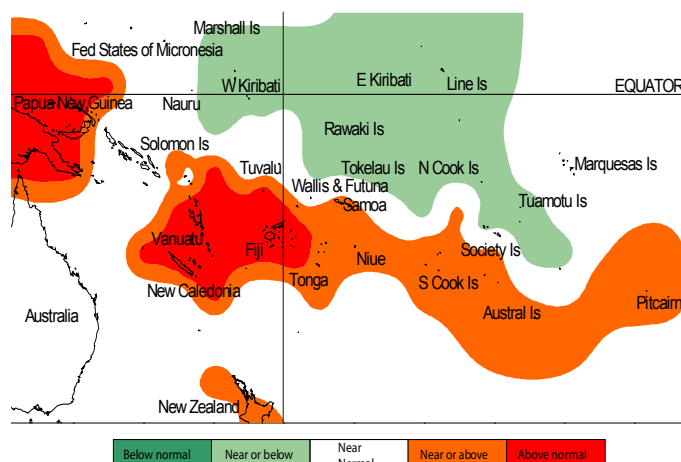
Enhanced convection is expected to extend southeast from Papua New Guinea, and include New Caledonia, Vanuatu, Tonga, the Southern Cook Islands and the Austral Islands, where above normal rainfall is forecast. Near or above normal rainfall is forecast for the Fiji and Niue. Normal rainfall is anticipated for the Marquesas, Pitcairn Island, and also the Society Islands. No clear precipitation guidance is offered for the Solomon Islands, Tuamotu, or Wallis & Futuna for the three-month forecast period.

SSTs are expected to be above normal around eastern Papua New Guinea, and surrounding Vanuatu, Fiji and New Caledonia. Near normal or above normal SSTs are also expected for Niue, Tonga, Wallis & Futuna, the Southern Cook Islands, the Society Islands, Austral Islands, and Pitcairn Island. Near normal or below normal SSTs are forecast for the Tuamotu archipelago, the Northern Cook Islands, Tuvalu, Tokelau, and Eastern & 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 March is 63%, 1% lower than the long-term average for all months combined. The SST forecast confidence is moderate-to-high for this period.



Rainfall outlook map for March to May 2009



SST outlook map for March to May 2009

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

Training Course on Climate Predictions and Applications, 16–20 Feb 2009

Simon McGree & Arieta Baleisolomone, Fiji Meteorological Service

The five-day training course was the second of three in a series of regional meteorological training courses funded by the Japanese International Cooperation Agency (JICA) and hosted by the Fiji Meteorological Service (FMS). The focus of courses in Phase One (2001-05) was entry to operational level meteorological observations taught according to the World Meteorological Organisation (WMO) standard curriculum. In Phase Two, FMS have been encouraged by JICA to organise higher-level courses on Climate Change and Disaster Mitigation. The first workshop held in 2007 was being a month long operational meteorology training program.

The theme of the February workshop was 'Climate' with the objectives resulting from discussions in 2008 on the future of the Island Climate Update. One central issue of discussion was the need for Meteorological Services in the South Pacific to be able to interpret global seasonal scale rainfall predictions and have greater 'ownership' of seasonal rainfall predictions presented in the Island Climate Update (ICU). The AusAID Bureau of Meteorology Pacific Islands Climate Prediction Project (PI-CPP) was also invited to this workshop to present the latest version of SCOPIC (Seasonal Climate Outlooks in Pacific Islands Countries), a statistical climate prediction model. The course organisers also considered it highly beneficial for the participants to have both the NZAid and AusAID Project Teams available at the same course. Nine Pacific Island nations participated, including the Cook Islands, Kiribati, Niue, Solomon Islands, Samoa, Tonga, Tuvalu, Vanuatu, and hosts Fiji.



NIWA representatives provided overviews of the multimodel approach to seasonal rainfall and sea surface temperature prediction used in the ICU. A new tool in the development stage called METPI (Multimodel Ensemble Tool for Pacific Islands) was shown, and training was delivered on how to use it to provide increased participation by Pacific Island Meteorological services in the ICU process. Bureau of Meteorology representatives provided an overview of statistical based seasonal climate forecasting and tuition on the SCOPIC tool. This was followed by the Online Climate Outlook Forum (OCOF) 17 conducted at FMS and chaired by Mr. Lloyd Tahani of the Solomon Islands Meteorological Service.

The role of RSMC Nadi (Fiji) for Tropical Cyclones and the need for monthly and seasonal Tropical Cyclone Predictions was subsequently undertaken by FMS on Day Three of the workshop. Representatives from the Sugar Research Institute of Fiji and Fiji Electricity Authority participated in a discussion, and demonstrated how seasonal-scale climate predictions have benefited their industries. This discussion was followed by recommendations for PI-CPP and a presentation of certificates.

Overall, the course was very successful, with the first attempt at Pacific Island countries interpretation of global rainfall models included in this month's ICU bulletin. In addition, there are plans to hold the ICU teleconference during the middle of each month in the near future, so there is greater time to gather essential data and utilise information from the PI-CPP OCOF teleconference in the ICU bulletin. Agencies interested in co-funding courses in Fiji are requested to contact the FMS.



Mr. Sasaki (JICA) and Rajendra Prasad (Fiji Meteorological Service) open the workshop on February 16, 2009.

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.

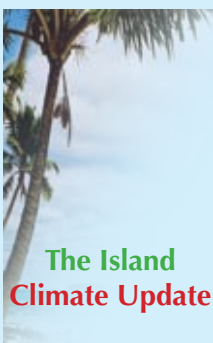
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This summary is prepared as soon as possible following the end of the month, once the data and information are received from the Pacific Island National Meteorological Services (NMHS). Delays in data collection and communication occasionally arise. 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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The Island
Climate Update