

# 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

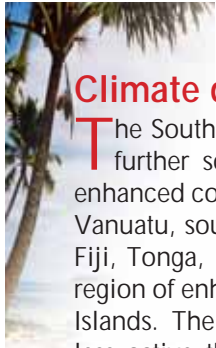
## February's climate

- South Pacific Convergence Zone (SPCZ) further south than normal, with enhanced convection from the region northeast of Vanuatu, southeast to southern French Polynesia
- Suppressed convection and very low rainfall over the Northern Cook Islands, Tokelau, and northern French Polynesia; Wet in parts of Western Kiribati and much of Fiji
- Warmer than normal throughout New Caledonia and French Polynesia
- No tropical cyclones in February; four so far this season

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

- ENSO conditions are expected to remain neutral in the tropical Pacific for the March – May season
- Near or below average rainfall likely over Tuvalu and the Marquesas Islands





## Climate developments in February 2007

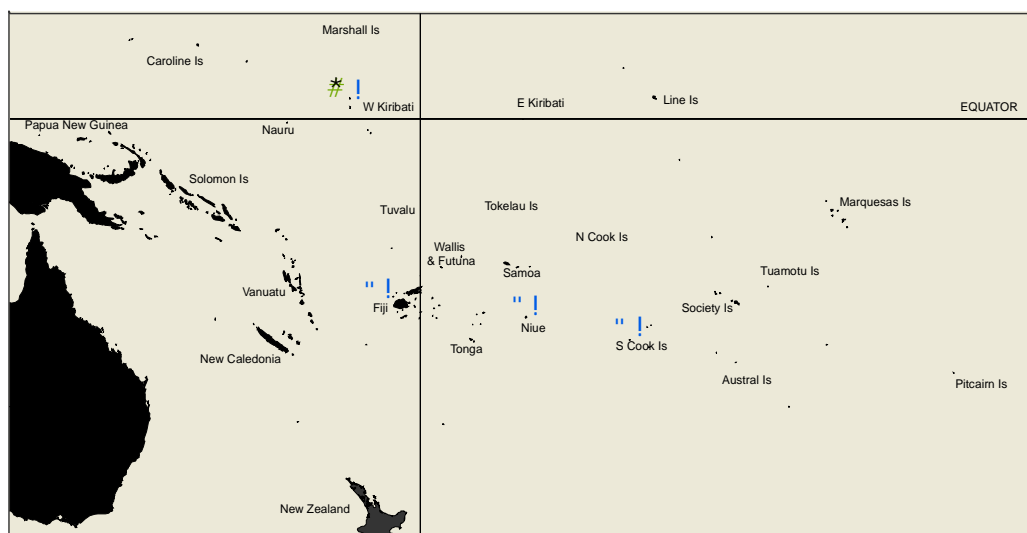
The South Pacific Convergence Zone (SPCZ) was located further south of its normal location in February, with enhanced convection extending from the region northeast of Vanuatu, southeast to southern French Polynesia, including Fiji, Tonga, Niue, and the Southern Cook Islands. Another region of enhanced convection existed north of the Solomon Islands. The Inter-Tropical Convergence Zone (ITCZ) was less active than in previous months north of the equator. A region of suppressed convection and low rainfall existed north of the SPCZ, centred over the Northern Cook Islands, extending over Tokelau and Eastern Kiribati, and also toward northern French Polynesia.

February rainfall was 25% or less of normal in the Northern Cook Islands, Tokelau, and parts of Northern French Polynesia. Rainfall was also low, being 50% or less of normal in much of New Caledonia. In contrast, rainfall was above average (at least 150% of normal) in parts of Western Kiribati and Tuvalu, and at least 125% of normal throughout much of Fiji. Flood producing rainfall occurred in parts of Fiji, some locations recording approximately 100 mm or more, on February 2nd, 3rd, and 9th; Labasa recording 272 mm within 24 hours during that period.

February mean air temperatures were about 1.0 °C above average in parts of French Polynesia, and 0.5 °C above average in New Caledonia. New Caledonia recorded its first warmer than normal month in the past six months.

Tropical Southwest Pacific mean sea-level pressures

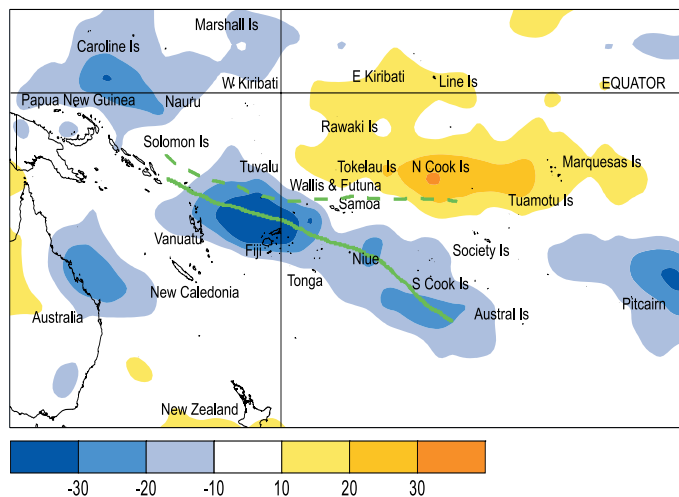
## Soil moisture in February 2007



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

Estimates of soil moisture shown in the map (above) 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 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.



Outgoing Long-wave Radiation (OLR) anomalies, in  $Wm^{-2}$  (blue equals high rainfall and yellow equals low rainfall). The February 2007 position of the 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.

were well above average in the South Tasman Sea, extending ridges of high pressure toward New Caledonia. Pressures tended to be below average in equatorial areas well east of the Date Line, and near average elsewhere in the Southwest Pacific. Equatorial surface westerlies occurred in only 1% of observations at Tarawa, the lowest frequency since April 2006.

Country	Location	Rainfall (mm)	% of average	Comments
Tonga	Salote Airport	23	12	Record low
French Polynesia	Hiva Hoa, Atuona	36	23	Well below normal
New Caledonia	La Tontouta	23	17	Well below normal

### February 2007

- ! Dry
- ! Wet
- \* Moderate

### February 2006

- " Dry
- " Wet
- \* Moderate

Please note that these soil moisture calculations are made at the end of the month. For practical purposes, generalisations were made about the available water capacity of the soils at each site.

At the end of February 2007, Tarawa, Nadi, Hanan, and Rarotongan soils were at field capacity (full).

## El Niño/Southern Oscillation (ENSO)

El Niño conditions in the tropical Pacific diminished quickly during February, and sea surface temperature anomalies across the equatorial Pacific declined steadily.

The NINO3 and NINO4 anomalies were  $+0.2^{\circ}\text{C}$  and  $+0.6^{\circ}\text{C}$  respectively in February (down from  $+1.2^{\circ}\text{C}$  and  $+0.9^{\circ}\text{C}$  in January), with the respective Dec-Jan-Feb 3-month means  $+1.0^{\circ}\text{C}$  and  $+0.9^{\circ}\text{C}$ . The decrease in the warm anomalies were due in part to the resurgence of easterly trade winds moving colder surface waters westwards, and contributing to the rapid eastwards movement of a cold sub-surface (up to  $4^{\circ}\text{C}$  below average at 75m at  $110^{\circ}\text{E}$ ) anomaly into the eastern equatorial Pacific.

The sub-surface warming, seen in recent months, has all but disappeared in the eastern Pacific, and has been replaced by an extensive cold water anomaly between 75 and 175m across the equatorial Pacific east of the Date Line. However, in the western Pacific (just east of the Date Line), a small but shrinking patch of sub-surface warm water still lingers.

The Southern Oscillation Index (SOI) increased to  $-0.5$  in February (up from  $-1.0$  in January) with a 3 month mean of  $-0.6$ .

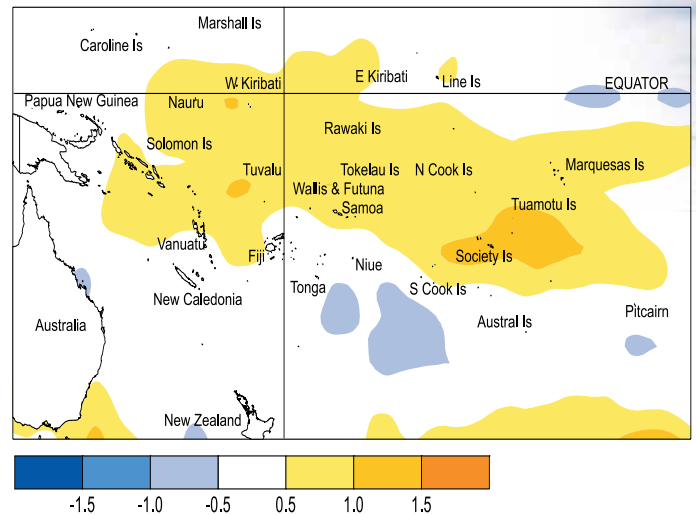
OLR and tropical rainfall anomalies for February indicate enhanced convection west of the Date Line, on the SPCZ at about  $175^{\circ}\text{E}$ , along the North Pacific arm of the ITCZ, and in the Indian Ocean.

The Madden-Julian Oscillation (MJO) is presently weak, and is passing across Indonesia with increased convection. The MJO is expected to continue to propagate eastwards bringing a return to drier conditions/suppressed convection to Indonesia and northern Australia, and a weakening of SPCZ activity by the middle of March when the MJO crosses the Date Line.

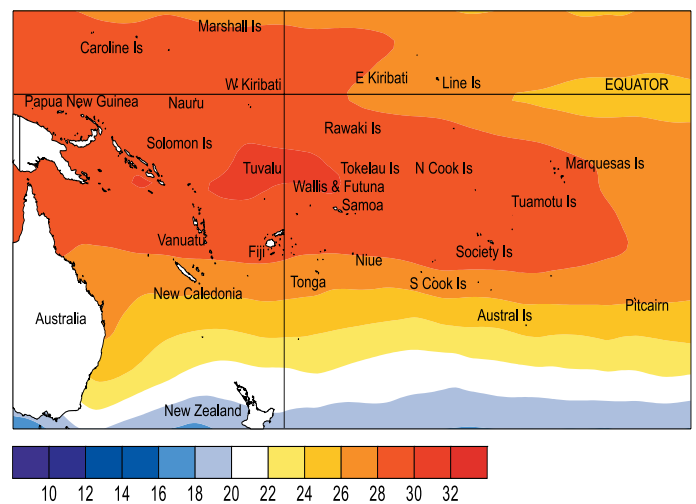
Most ENSO models show neutral states for the next 6-9 months. Many of the models have not been able to capture the speed at which El Niño diminished over the last two months. The NCEP CFS and the NASA-NSIPP models predict a possible transition from neutral to La Niña within the next 3-6 months.

## Forecast validation: December 2006 to February 2007

Suppressed convection with below average rainfall was expected over New Caledonia and Fiji, with average or below average rainfall affecting Papua New Guinea, Vanuatu, Tonga, Niue, the southern Cook Islands, and the Tuamotu and Marquesas Islands. A large region of enhanced convection and above average rainfall was expected over Western and Eastern Kiribati, Tuvalu, and Tokelau, with areas of near or above average rainfall over the Solomon Islands, Wallis and Futuna, Samoa, the Northern Cook Islands, and also Pitcairn Island. Near average rainfall was forecast for the Austral and Society Islands.



Sea surface temperature anomalies ( $^{\circ}\text{C}$ ) for February 2007.



Mean sea surface temperatures ( $^{\circ}\text{C}$ ) for February 2007

The IRI synthesis of a large set of dynamical and statistical models, as well as observations of the ocean surface and sub-surface gives a probability of a La Niña over the next few months at 30%, while the chance of El Niño continuing has dropped to 10%. Neutral conditions are the most likely outcome at 60%.

A large region of enhanced convection and/or above average rainfall affected Nauru and Western Kiribati, extending east, north of the equator (within the ITCZ Zone). Suppressed convection and/or below average rainfall occurred in the Coral Sea and over New Caledonia, as well as Niue, the Northern Cook Islands, and Northern French Polynesia. Rainfall was lower than expected in Eastern Kiribati, and higher than expected in Fiji, and the Society Islands. The 'hit' rate for the December 2006 - February 2007 outlook was just under 60%.

## Tropical cyclones

No named tropical cyclones occurred in the Southwest Pacific in February; the total remaining at four so far this season, for the region east of 150°E.

There are still several months left for the tropical cyclone season, with indications of some activity possible in our region over the coming week. On average, about three tropical cyclones can normally be expected in the Southwest Pacific during March, with a further two during the April–May period.

Future issues of the ICU will provide updates on information relating to further occurrences of tropical cyclones in the region.

## Tropical Pacific rainfall – February 2007

Territory and station name	February 2007 rainfall total (mm)	February 2007 percent of average
<b>Australia</b>		
Cairns Airport	713.2	156
Townsville Airport	543.8	186
Brisbane Airport	116.6	68
Sydney Airport	106.2	100
<b>Cook Islands</b>		
Penrhyn	63.6	19
Rarotonga Airport	180.6	89
Rarotonga EWS	166.2	82
<b>Fiji</b>		
Rotuma	437.9	136
Udu Point	329.7	132
Nadi	513.8	176
Nausori	298.1	111
Ono-I-Lau	228.6	118
<b>French Polynesia</b>		
Hiva Hoa, Atuona	54.8	35
Bora Bora Motu	172.6	73
Tahiti - Faa'a	175.4	81
Tuamotu, Takaroa	98.0	51
Hereheretue	174.2	106
Gambier, Rikitea	272.6	156
Tubuai	180.6	90
Rapa	89.6	48
<b>Kiribati*</b>		
Tarawa	302.4	166
<b>Niue</b>		
Hanan	253.0	107
Liku	188.3	76

Territory and station name	February 2007 rainfall total (mm)	February 2007 percent of average
<b>New Zealand</b>		
Kaitia	171.4	223
Whangarei Airport	109.8	116
Auckland Airport	37.6	57
<b>New Caledonia</b>		
Ile Art, Belep	120.4	73
Koumac	104.6	69
Ouloup	101.8	51
Ouanaham	67.2	28
Poindimie	177.6	50
La Roche	62.6	29
La Tontouta	23.0	17
Noumea	37.2	30
Moue	102.0	57
<b>North Tasman</b>		
Lord Howe Island	38.8	33
Norfolk Island	65.2	80
Raoul Island	147.4	100
<b>Tonga</b>		
Queen Lavinia	301.4	121
Lupepau'u	209.9	96
Salote Airport	22.7	12
Fua'amotu Airport	240.1	109
<b>Tokelau</b>		
Nukunonu	7.4	3
<b>Tuvalu*</b>		
Nui Is	243.0	71
Funafuti	873.3	276
Nuilakita	416.0	130

Rainfall totalling 200 percent or more is considered well above average. Totals of 40 percent 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: March to May 2007

Enhanced convection is expected over Western Kiribati, the Solomon Islands, Vanuatu, Samoa, the Tuamotu Islands, the Society Islands, and Pitcairn Island, where rainfall is expected to be near or above average.

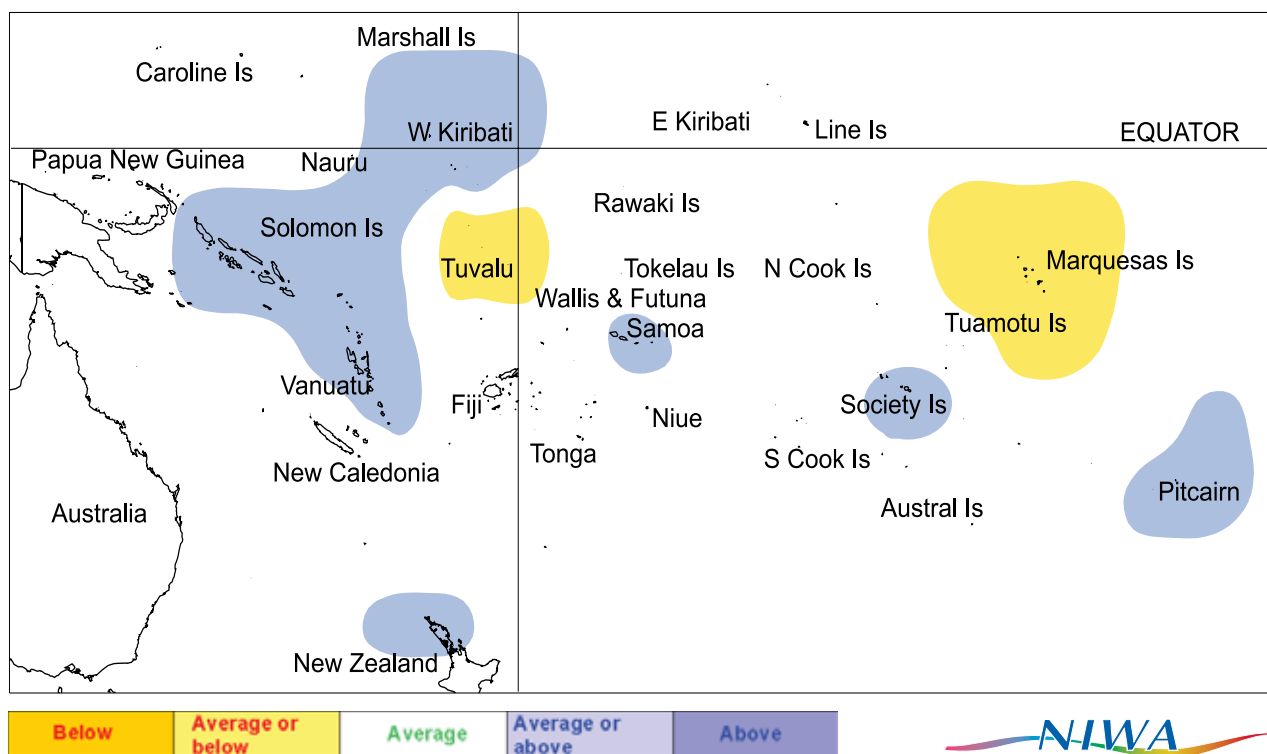
Rainfall is expected to be near or below average over Tuvalu and Marquesas Islands.

Near average rainfall is likely for other countries in our forecast region with no trend forecast for New Caledonia and Fiji.

The forecast model skills are low to moderate during this time of the year.

Island group	Rainfall outlook	Outlook confidence
Western Kiribati	20:40:40 (Near or above average)	Moderate
Solomon Islands	15:45:40 (Near or above average)	Moderate
Vanuatu	20:40:40 (Near or above average)	Moderate
Samoa	20:40:40 (Near or above average)	Moderate
Tuamotu Islands	20:40:40 (Near or above average)	Moderate
Society Islands	20:40:40 (Near or above average)	Moderate
Pitcairn Island	20:40:40 (Near or above average)	Moderate
Papua New Guinea	20:45:35 (Near average)	Moderate
Eastern Kiribati	35:45:20 (Near average)	Low – moderate
Wallis and Futuna	20:45:35 (Near average)	Moderate
Tokelau	35:45:20 (Near average)	Low – moderate
Tonga	20:45:35 (Near average)	Moderate
Niue	20:45:35 (Near average)	Moderate
Northern Cook Islands	35:45:20 (Near average)	Low – moderate
Southern Cook Islands	20:45:35 (Near average)	Moderate
Austral Islands	20:45:35 (Near average)	Moderate
New Caledonia	35:35:30 (Climatology)	Low – moderate
Fiji	35:35:30 (Climatology)	Low - moderate
Tuvalu	40:40:20 (Near or below average)	Moderate
Marquesas Islands	40:40:20 (Near or below average)	Moderate

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 March to May 2007.

# Island Climate Update review 2006 and continuation in 2007

Linda Yuen (SOPAC) and Jim Salinger (NIWA)

After 6 years in providing the climate sensitive sectors of the Pacific with regional climate outlooks, the Island Climate Update (ICU) project conducted its first review survey during 2006. It was aimed at gauging the quality and application of the bulletin amongst subscribers and prospected end users. A questionnaire modified from the Pacific ENSO Applications Center's (PEAC) review was distributed through fax and electronic mail to the known ICU subscribers and readers.

Analysis of feedback from the respondents was completed in time to be presented at the Secretariat of the Pacific Regional Environment Programme's (SPREP) 11th Regional Meteorology Services Directors (RMSD) held in Noumea, New Caledonia in July 2006. The results showed that the primary goal of improving the effectiveness of planning processes of climate-sensitive sectors had been achieved. The outcomes have assisted Pacific Island Countries with enhanced climate information and prediction services and improved the understanding of factors driving variability and change on various time scales.

The following 3 key recommendations emerged from the results of the review:

1. Continued production of a regional climate forecasting bulletin;
2. Continue strengthening collaboration with users, including the maintenance and strengthening of ties to core users and expansion to new users;
3. Strengthen and expand critical partnerships with regional partners and programmes.

The results were received well by the participants of the meeting, most of who agreed that the bulletin was widely used and highly valuable to the climate sensitive sectors in the region. Many participants have also written letters to support the project's continuation.

In January, the New Zealand Agency for International Development (NZAID) showed their continued support to the project by granting additional funds for its continuation. The additional funding will see the production of 12 issues of the ICU bulletin in 2007 as well as end user consultation workshops to be held in 2 countries (Tonga and Vanuatu) in mid-2007. The main objective of these workshops is to enhance expertise of the local primary user group (NMS, NHS and NDMO) in the translation of available climate forecast information like the ICU into the local context and effectively disseminate this to the secondary user group which include other climate sensitive sectors and interested parties. This year, SPREP, in addition to the National Institute of Water and Atmospheric Research (NIWA) will be included as a critical partner to strengthen the ICU project.

There will be increased collaboration with NMS and linkages will be made with larger regional programmes such as the Pacific Hydrological Cycle Observing System (HYCOS). Two critical components under the Pacific HYCOS programme that require climate forecasting information include improving capacity in drought and flood forecasting in the 14 participating member countries. Outlooks provided by the ICU cover all these countries and thus will be an important tool in contributing to these components. Other programmes include the Pacific Global Climate Observing System (PI-GCOS), Global Ocean Observing System (PI-GOOS) and the South Pacific Sea-Level and Climate Monitoring Project (SPSLCMP) to improve the quality and efficiency of climate information to climate sensitive sectors in the Pacific region.

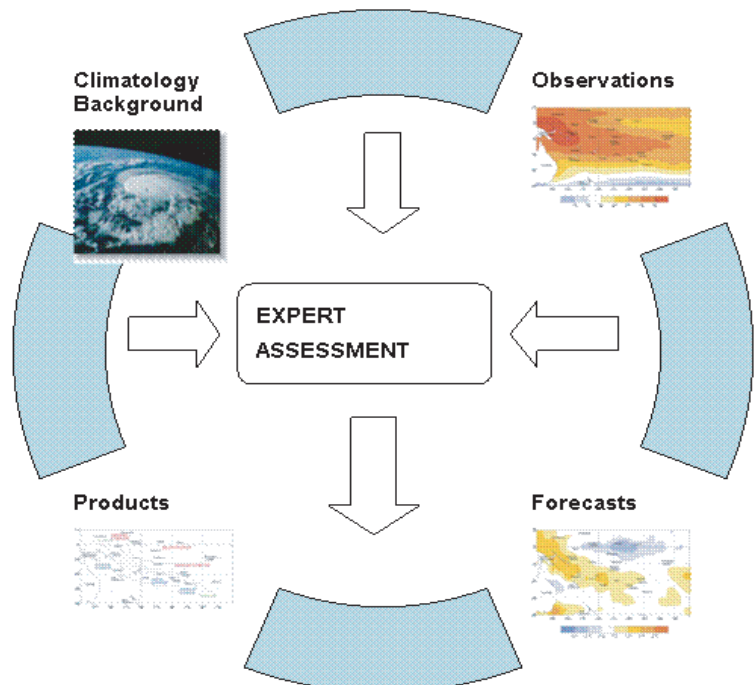


Figure 1 The ICU process

## The Island Climate Update

Cover Photo:  
Wendy St George,  
NIWA

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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)

### Editors:

Ashmita Gosai Email: [a.gosai@niwa.co.nz](mailto:a.gosai@niwa.co.nz)  
Stuart Burgess Email: [s.burgess@niwa.co.nz](mailto:s.burgess@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**

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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.