

# The Island Climate Update

## El Niño/Southern Oscillation (ENSO)

- Strong El Niño conditions continued in November 2015.
- Sea Surface Temperatures (SSTs) anomalies exceed +2°C over large areas of the central and eastern equatorial Pacific
- El Niño is certain (100% chance) to continue over the coming season (December 2015 – February 2016).

Collaborators

Pacific Islands National  
Meteorological Services

Australian Bureau of  
Meteorology

Meteo France

NOAA National Weather  
Service

NOAA Climate Prediction  
Center (CPC)

International Research  
Institute for Climate and  
Society

European Centre for  
Medium Range Weather  
Forecasts

UK Met Office

World Meteorological  
Organisation

MetService of New  
Zealand

## The South Pacific Convergence Zone

- The SPCZ is expected to be positioned north and east of climatology.

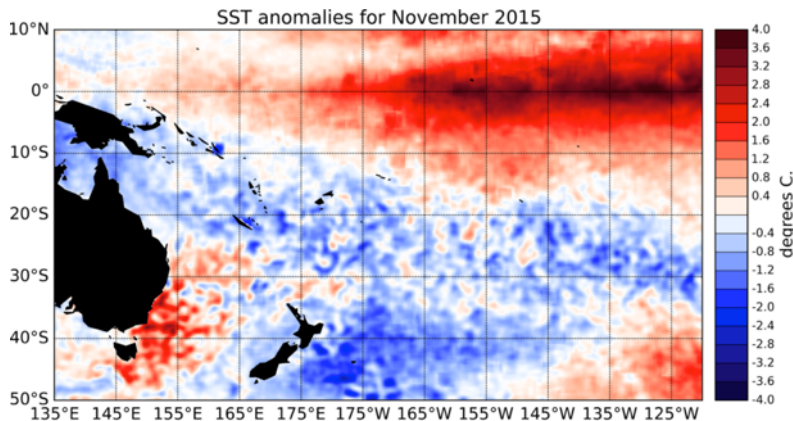
## Multi-model Ensemble Tool for Pacific Island (METPI) rainfall and sea surface temperature forecasts

- Below normal rainfall is forecast for New Caledonia, southern Vanuatu, Wallis and Futuna, the southern Cook Islands, Samoa, Fiji, Niue, Tonga, northern Vanuatu and the Federated States of Micronesia.
- Above normal rainfall is forecast for Eastern Kiribati, Western Kiribati, the northern Cook Island, Tuvalu and Tokelau.
- Above normal SSTs are forecast for western Kiribati, eastern Kiribati and the Marquesas.



## El Niño/Southern Oscillation (ENSO)

Strong El Niño conditions continued in November 2015. The latest monthly sea surface temperature (SST) anomalies exceed +2°C over large areas of the central and eastern Pacific. Sub-surface ocean temperatures in the eastern Pacific intensified in November 2015, with anomalies currently exceeding +7°C off the South American coast (around 120°W and between about 75 and 120m depth). The Southern Oscillation Index (SOI) exhibited large intra-seasonal variability in November, with several excursions in the positive, and is currently weakly negative at -0.6 for November as a whole. However large-scale atmospheric patterns continue to indicate that the atmosphere remains well coupled to the oceanic anomalies. Westerly wind anomalies (weaker easterly trade-winds) have continued to dominate the central and western Pacific. Convection and rainfall was much more intense than normal in the central and eastern Pacific, while parts of the Maritime Continent continued to record large rainfall deficits. The South Pacific Convergence Zone (SPCZ) was again this month displaced towards the Equator in the central Pacific and western Pacific. The Inter-Tropical Convergence Zone (ITCZ) was also shifted towards the Equator in the eastern and central Pacific and suppressed in the western Equatorial Pacific. The ENSO Precipitation Index (ESPI) reflects El Niño conditions with a value of +0.89 (value to the 30<sup>th</sup> of November 2015).

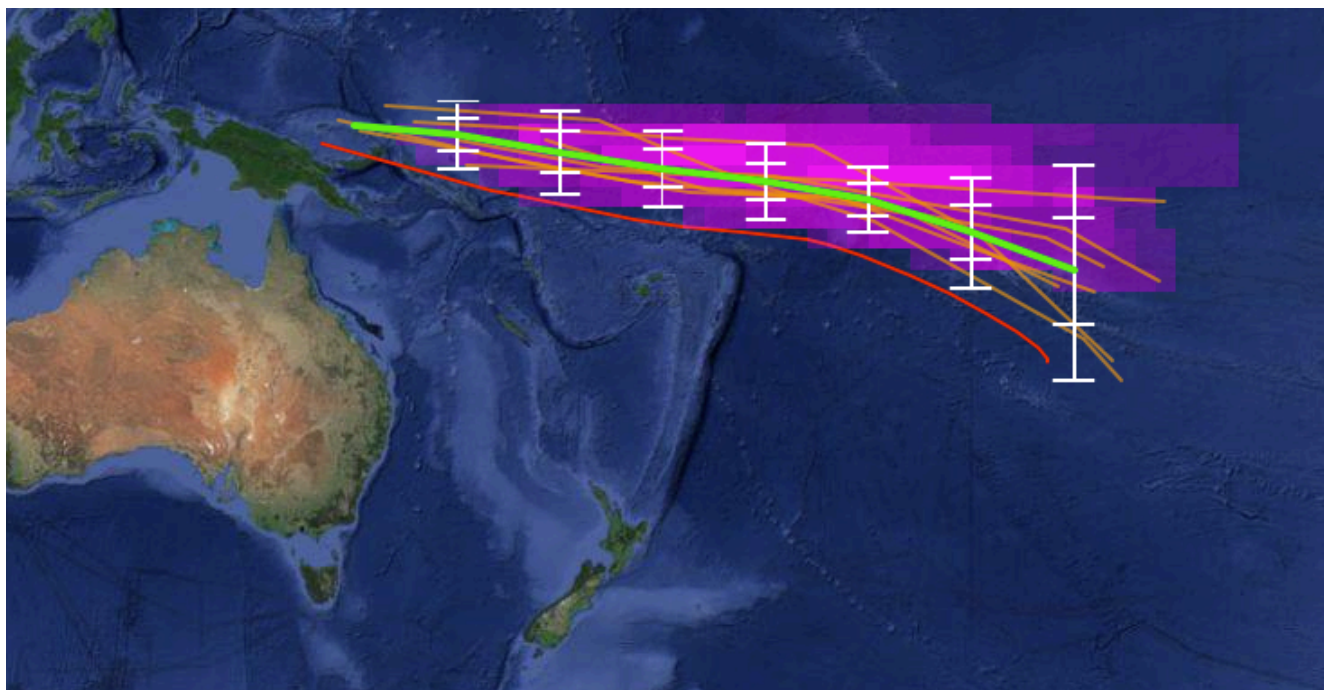


Surface temperature anomalies (°C) for November 2015, data is from the NOAA OISST Version 2 dataset, available at NOAA's Climate Data Center (<ftp://ftp.cdc.noaa.gov/Datasets/noaa.oisst.v2.hires/>)

The Madden-Julian Oscillation (MJO) was mostly inactive over the western Pacific during the past two weeks. At the forecast horizon of 14 days, the dynamical and statistical CPC forecasts diverge again this month: the dynamical forecasts indicate very little intra-seasonal convection over the western Pacific, while the statistical forecast indicate a slight increase in intra-seasonal convective activity propagating into the Maritime Continent. International guidance indicates that El Niño conditions are certain (100% chance) to continue over the next three month period (December 2015 – February 2016) and through to the early autumn (March – May 2016).

## South Pacific Convergence Zone forecast December 2015 to February 2016

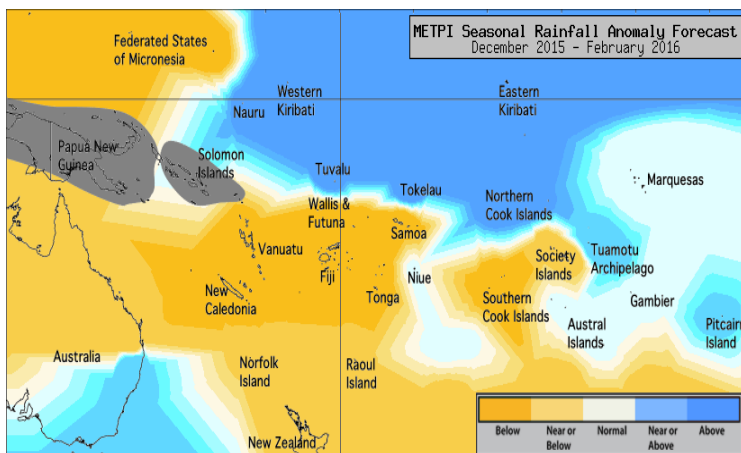
The ensemble of global climate models for rainfall that are used in METPI show an area of higher than normal rainfall associated with the SPCZ position. The green line indicates that average SPCZ position for the forecast period based on the average of eight climate models. The white vertical bars and 'whiskers' indicate the one and two standard deviations between the model projections of the SPCZ position every five degrees of longitude. The purple shading is proportional to the probability of intense convection developing within the SPCZ.



For the December 2015 – February 2016 forecast period, the South Pacific Convergence Zone (SPCZ) is expected to be shifted east and north of its climatological position. Areas of higher than normal convective activity associated with the SPCZ are expected in the central Pacific just south of the Equator and in the Intertropical Convergence Zone over and east of the international dateline.

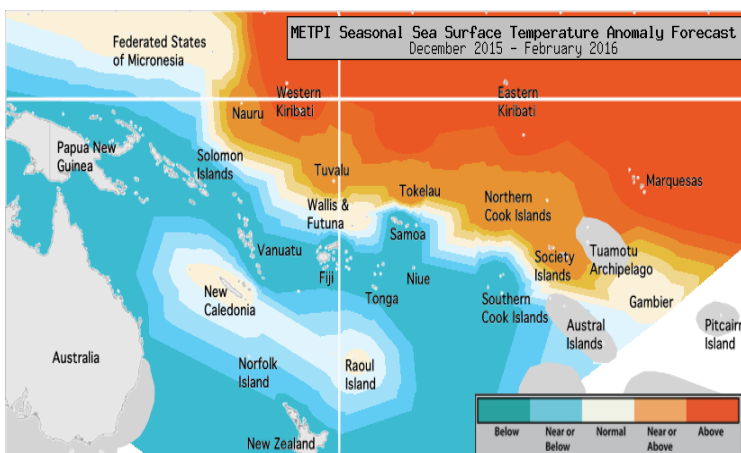
# Tropical rainfall and SST outlook: December 2015 to February 2016

The dynamical models are all in agreement to forecast continuing strong El Niño conditions for the December 2015 – February 2016 period. As a consequence most regions of the southwest Pacific usually affected by the South Pacific Convergence Zone are again forecast to experience a drier than normal December 2015 – February 2016 season. Below normal rainfall is forecast for New Caledonia, southern Vanuatu, Wallis and Futuna, the southern Cook Islands, Samoa, Fiji, Niue, Tonga, northern Vanuatu and the Federated States of Micronesia. Normal or below normal rainfall is forecast for the Austral Islands and the Society Islands. Normal or above normal rainfall is forecast for the Marquesas, the Tuamotu archipelago and Pitcairn Island. Above normal rainfall is forecast for Eastern Kiribati, Western Kiribati, the northern Cook Islands, Tuvalu and Tokelau. No clear guidance is available this month for Papua New Guinea and the Solomon Islands.



Rainfall anomaly outlook map for December 2015 – February 2016

The global model ensemble forecast for SSTs indicates persistence of the higher than normal SSTs currently observed in the central and eastern equatorial Pacific. The region of cooler than normal SSTs present in the southwestern Pacific is also forecast to persist. Above normal SSTs are forecast for western Kiribati, eastern Kiribati and the Marquesas. Normal or above normal SSTs are forecast for the Northern Cook Islands, the Society Islands, Tokelau and Tuvalu. Near normal SSTs are forecast for the Federated States of Micronesia, New Caledonia and Wallis & Futuna. Normal or below normal SSTs are forecast for Fiji, Niue, Papua New Guinea, Samoa, the Solomon Islands and the southern Cook Islands. Below normal SSTs are forecast for Vanuatu. The confidence for the rainfall outlooks is moderate to high. The average region-wide hit rate for rainfall forecasts issued for the November – January season is about 66%, three points higher than the average for all months combined. The confidence for the SST forecasts is also moderate to high.



SST anomaly outlook map for December 2015 – February 2016

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 |
|-------------------------|----------------------------|--------------------|-------------------------|----------------------------|--------------------|
| Kiribati (Eastern)      | 10:30:60 (Above)           | High               | Kiribati (Eastern)      | 20:30:50 (Above)           | High               |
| Kiribati (Western)      | 10:30:60 (Above)           | High               | Kiribati (Western)      | 20:30:50 (Above)           | High               |
| Cook Islands (Northern) | 20:30:50 (Above)           | Moderate-High      | Marquesas               | 20:30:50 (Above)           | High               |
| Tuvalu                  | 20:30:50 (Above)           | High               | Cook Islands (Northern) | 25:35:40 (Normal or Above) | High               |
| Tokelau                 | 20:30:50 (Above)           | Moderate-High      | Society Islands         | 25:35:40 (Normal or Above) | High               |
| Marquesas               | 25:35:40 (Normal or Above) | Moderate-High      | Tokelau                 | 25:35:40 (Normal or Above) | High               |
| Tuamotu Islands         | 25:35:40 (Normal or Above) | high               | Tuvalu                  | 25:35:40 (Normal or Above) | Moderate-high      |
| Pitcairn Island         | 25:40:35 (Normal or Above) | Moderate           | Austral Islands         | 30:35:35 (Climatology)     | Moderate           |
| Papua New Guinea        | 35:35:30 (Climatology)     | Moderate-High      | Pitcairn Island         | 30:35:35 (Climatology)     | Moderate           |
| Solomon Islands         | 35:35:30 (Climatology)     | high               | Tuamotu                 | 30:35:35 (Climatology)     | Moderate           |
| Austral Islands         | 40:35:25 (Normal or Below) | Moderate-High      | FSM                     | 30:40:30 (Normal)          | Moderate           |
| Society Islands         | 40:35:25 (Normal or Below) | Moderate           | New Caledonia           | 30:40:30 (Normal)          | Moderate-high      |
| New Caledonia           | 45:35:20 (Below)           | Moderate-High      | Wallis & Futuna         | 30:40:30 (Normal)          | High               |
| Vanuatu (South)         | 50:30:20 (Below)           | Moderate           | Fiji                    | 40:35:25 (Normal or Below) | Moderate           |
| Wallis & Futuna         | 50:30:20 (Below)           | Moderate-High      | Niue                    | 40:35:25 (Normal or Below) | Moderate-high      |
| Cook Islands (Southern) | 55:30:15 (Below)           | Moderate           | Papua New Guinea        | 40:35:25 (Normal or Below) | Moderate           |
| Samoa                   | 55:30:15 (Below)           | High               | Samoa                   | 40:35:25 (Normal or Below) | Moderate           |
| Fiji                    | 60:30:10 (Below)           | High               | Solomon Islands         | 40:35:25 (Normal or Below) | Moderate           |
| Niue                    | 60:30:10 (Below)           | Moderate-High      | Cook Islands (Southern) | 40:35:25 (Normal or Below) | Moderate           |
| Tonga                   | 60:30:10 (Below)           | High               | Tonga                   | 40:35:25 (Normal or Below) | Moderate           |
| Vanuatu (North)         | 60:30:10 (Below)           | High               | Vanuatu (South)         | 45:35:20 (Below)           | Moderate-high      |
| FSM                     | 60:30:10 (Below)           | Moderate           | Vanuatu (North)         | 45:35:20 (Below)           | Moderate           |



## The Island Climate Update

Cover Photo:  
Wendy St George,  
NIWA

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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 Sources concerned.

### 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, Federated States of Micronesia, Fiji, French Polynesia, Kiribati, New Caledonia, New Zealand, Niue, Papua New Guinea, Pitcairn Island, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, Wallis & Futuna.

### Web links to ICU partners:

*South Pacific Meteorological Services*

Cook Islands  
<http://www.cookislands.pacificweather.org/>

Fiji  
<http://www.met.gov.fj>

Kiribati  
<http://pi.gcos.org/index.php> (follow link to PI Met Services then Kiribati Met Service)

New Zealand  
<http://www.metservice.com>

Niue  
<http://pi.gcos.org/index.php> (follow link to PI Met Services then Niue Met Service)

Papua New Guinea  
<http://pi.gcos.org/index.php> (follow link to PI Met Services then Papua New Guinea Met Service).

Samoa  
<http://www.mnre.gov.ws/meteorology>

Solomon Islands  
<http://www.met.gov.sb>

Tonga  
<http://www.met.gov.to>

Tuvalu  
<http://tuvalu.pacificweather.org>

Vanuatu  
<http://www.meteo.gov.vu>

### International Partners

Meteo-France  
New Caledonia: <http://www.meteo.nc>  
French Polynesia: <http://www.meteo.pf>

Bureau of Meteorology (Australia)  
<http://www.bom.gov.au>

National Oceanic and Atmospheric Administration (USA)  
National Weather Service: <http://www.nws.noaa.gov>  
Climate Prediction Center: <http://www.cpc.noaa.gov>

The International Research Institute for Climate and Society (USA)  
<http://portal.iri.columbia.edu/portal/server.pt>

The UK Met Office  
<http://www.metoffice.gov.uk>

European Centre for Medium-term Weather Forecasts  
<http://www.ecmwf.int>