

The Island Climate Update

El Niño/Southern Oscillation (ENSO)

- Sea surface temperatures in the Equatorial Pacific have crossed El Niño thresholds in November 2014.
- Some atmospheric indicators also indicate a weak El Niño developing.
- Probability for El Niño during the December 2014 – February 2015 period is about 75%.

The South Pacific Convergence Zone (SPCZ)

- The SPCZ is expected to be positioned northeast of normal for the coming three months.

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

- Normal or below normal rainfall is forecast for Fiji, Eastern Kiribati, Niue, Pitcairn Island, Tuvalu, Wallis & Futuna, the Marquesas, New Caledonia, the Tuamotu archipelago and Vanuatu.
- Normal or above normal rainfall is forecast for the Austral Islands, the Society islands, Western Kiribati and Papua New Guinea.
- Above normal sea surface temperatures (SSTs) are forecast for western Kiribati and eastern Kiribati. Normal or above normal SSTs are forecast for Fiji, the Federated States of Micronesia, Samoa, the Solomon Islands, Tokelau, Tuvalu and Wallis & Futuna.

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

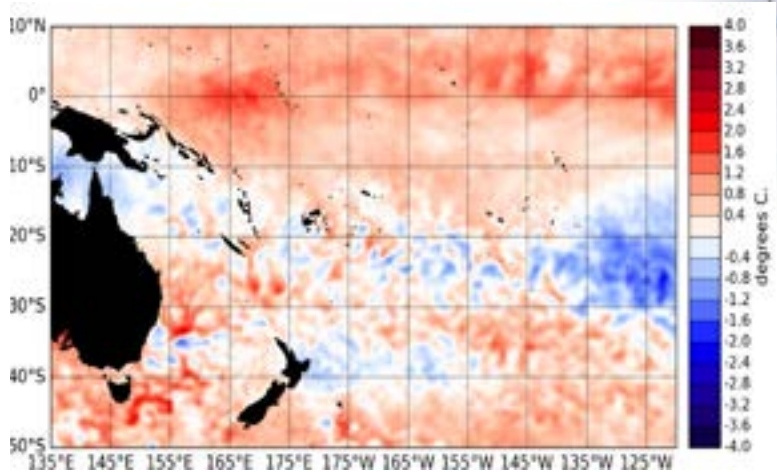
World Meteorological
Organization

MetService of
New Zealand



El Niño/Southern Oscillation (ENSO)

During November 2014, Equatorial sea surface temperatures (SSTs) steadily increased across the equatorial Pacific ocean and all NINO indices have now crossed the conventional El Niño thresholds. Some atmospheric indicators also show signs consistent with a weak El Niño developing. The latest monthly anomaly values for the NINO SST indices are: +0.9 for NINO3.4 (up from +0.53°C in October), +0.92°C for NINO3 (up from +0.68°C last month), and +1.02°C for NINO4 (was +0.75°C in October). Ocean sub-surface temperatures that were present in the central Pacific propagated eastward and reached anomalies of around +4°C at 120°W and 100m depth. Oceanic heat content (0 to 300m depth) also increased in the eastern Pacific to reach about +2°C around 120°W. The Southern Oscillation Index (SOI) is at -1 for November 2014. However patterns of convection and rainfall have not yet caught up and in November convection was actually reduced in the central Pacific, a pattern opposite of El Niño. The latest value for the TRMM ENSO index for the 30 days to 3 December is indeed slightly negative at -0.38 (La Niña side of neutral). A strong Madden – Julian Oscillation (MJO) pulse reached into the Maritime Continent in the last days of November and is forecast to propagate further eastward at least over the next week or so. The region of

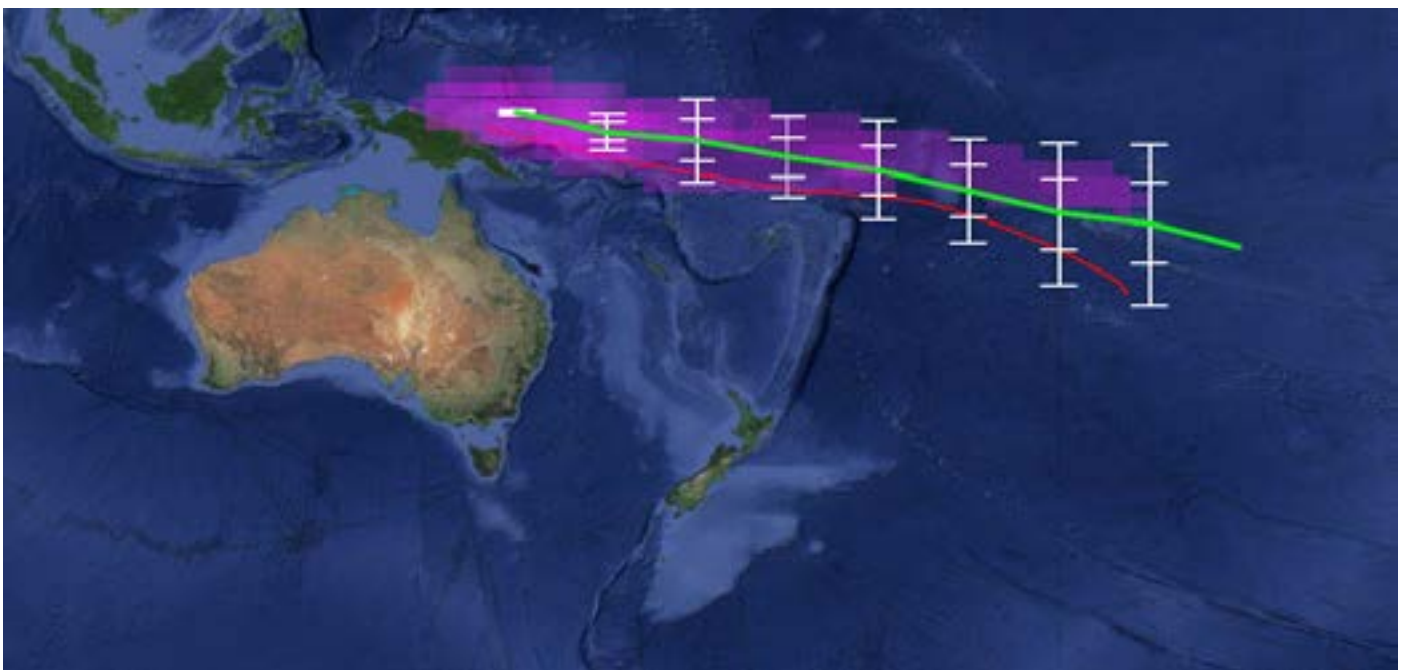


Surface temperature anomalies (°C) for November 2014, data is from the NOAA OISST Version 2 dataset, available at the NOAA's Climate Data Center (<ftp://ftp.cdc.noaa.gov/Datasets/noaa.oisst.v2.highres/>).

enhanced convection and rainfall associated with this event could tip the atmosphere towards a more definitive weak El Niño state. The consensus ENSO forecast from the IRI / CPC indicates that the chance of El Niño developing over the December 2014 – February 2015 period is 75%, a sharp increase compared to ENSO forecasts issued last month.

South Pacific Convergence Zone forecast December 2014 to February 2015

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 the 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 December 2014 - February 2015, the SPCZ is forecast to be located northeast of normal for this time of year. Enhanced convection is expected to the west of the International Dateline in many models, with the general branching location of the SPCZ located east of normal. The uncertainty in the SPCZ position is greatest to the east of the International Dateline.

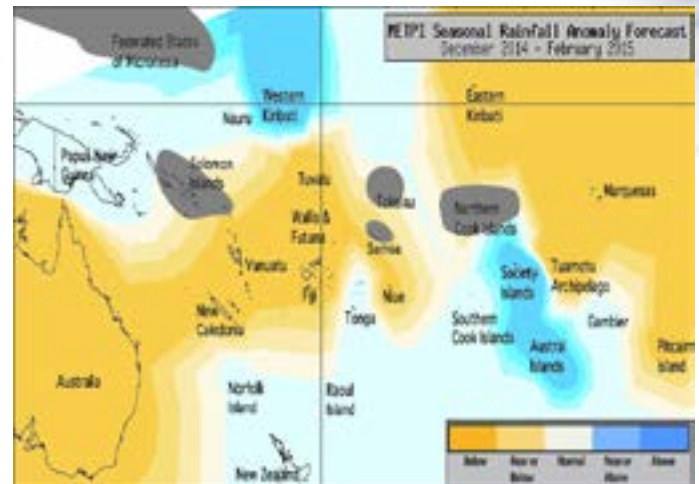
Tropical rainfall and SST outlook: December 2014 to February 2015

The dynamical models forecasts indicate that the west equatorial as well as some parts of the southeast Pacific are likely to experience normal or above-normal rainfall for the December 2014 - February 2015 season as a whole. In contrast, large regions in the east and southwest Pacific are expected to experience reduced rainfall. Normal or below normal rainfall is forecast for Fiji, Eastern Kiribati, Niue, Pitcairn Island, Tuvalu, Wallis & Futuna, the Marquesas, New Caledonia, the Tuamotu archipelago and Vanuatu. Normal or above normal rainfall is forecast for the Austral Islands, the Society islands, Western Kiribati and Papua New Guinea. Near normal rainfall is expected for the Southern Cook Islands and Tonga. No clear guidance is available for Samoa, the Solomon Islands, Tokelau and the Federated States of Micronesia.

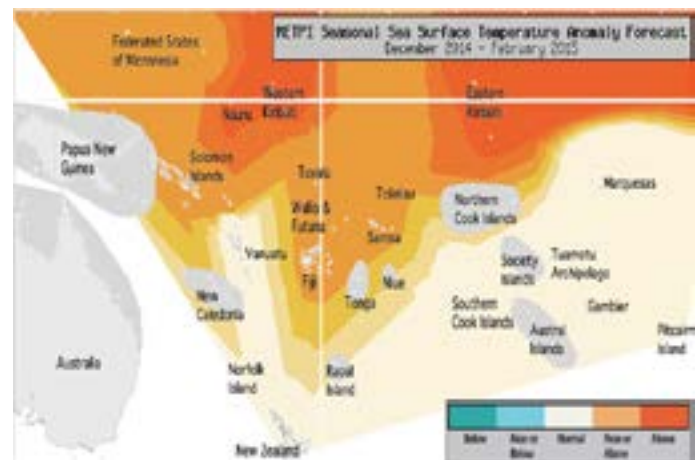
The global model ensemble forecast for SSTs indicate higher than normal SSTs over the whole equatorial Pacific, with maximum anomalies just west of the International Dateline as well as east of about 150°W. Above normal SSTs are forecast for western Kiribati and eastern Kiribati. Normal or above normal SSTs are forecast for Fiji, the Federated States of Micronesia, Samoa, the Solomon Islands, Tokelau, Tuvalu and Wallis & Futuna. Near normal SSTs are forecast for the Marquesas, Pitcairn Island, the southern Cook Islands, the Tuamotu archipelago and Vanuatu. No guidance is available (i.e. equal chances are given to each tercile) for the Austral Islands, New Caledonia, Niue, the northern Cook Islands, Papua New Guinea, the Society Islands and Tonga.

The confidence for the rainfall outlooks is moderate to high. The average region-wide hit rate for rainfall forecasts issued for the December – February season is 64 %, two points higher than the average for all months combined. Confidence

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 anomaly outlook map for December 2014 - February 2015



SST anomaly outlook map for December 2014 - February 2015

for the SST forecasts is generally high.

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

Island Group	SST Outlook	confidence
Kiribati (Eastern)	20:30:50 (Above)	High
Kiribati (Western)	20:30:50 (Above)	High
Fiji	25:35:40 (Normal or Above)	High
FSM	25:35:40 (Normal or Above)	High
Samoa	25:35:40 (Normal or Above)	High
Solomon Islands	25:35:40 (Normal or Above)	High
Tokelau	25:35:40 (Normal or Above)	High
Tuvalu	25:35:40 (Normal or Above)	High
Wallis & Futuna	25:35:40 (Normal or Above)	High
Marquesas	30:40:30 (Near normal)	High
Pitcairn Island	30:40:30 (Near normal)	High
Cook Islands (Southern)	30:40:30 (Near normal)	High
Tuamotu	30:40:30 (Near normal)	High
Vanuatu	30:40:30 (Near normal)	High
Austral Islands	33:33:33 (Climatology)	Moderate
New Caledonia	33:33:33 (Climatology)	Moderate
Niue	33:33:33 (Climatology)	Moderate
Cook Islands (Northern)	33:33:33 (Climatology)	Moderate
Papua New Guinea	33:33:33 (Climatology)	Moderate
Society Islands	33:33:33 (Climatology)	Moderate
Tonga	33:33:33 (Climatology)	Moderate



The Island Climate Update

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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 Services 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 and 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 to PI Met Services then Niue Met Service)

Papua New Guinea
<http://pi-gcos.org/index.php> (follow link to 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