

Number 172 January 2015

The Island Climate Update

El Niño/Southern Oscillation (ENSO)

- The Equatorial Pacific Ocean is currently above El Niño thresholds. Regional atmospheric circulation has yet to align to the oceanic conditions, producing rainfall patterns in the subtropics that are not entirely consistent with El Niño.

South Pacific Convergence Zone

- The SPCZ is expected to be positioned northeast of normal for the coming three months. Intense convection is expected south and east of the Bismarck Archipelago.

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

- Normal or below normal rainfall is forecast for Vanuatu, New Caledonia, Tonga and the Marquesas.
- Above normal rainfall is expected for Western Kiribati and Papua New Guinea.
- The sea surface temperature anomalies associated with El Niño are expected to persist along the Equator, while the subtropics are also expected to warm in the coming months.

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

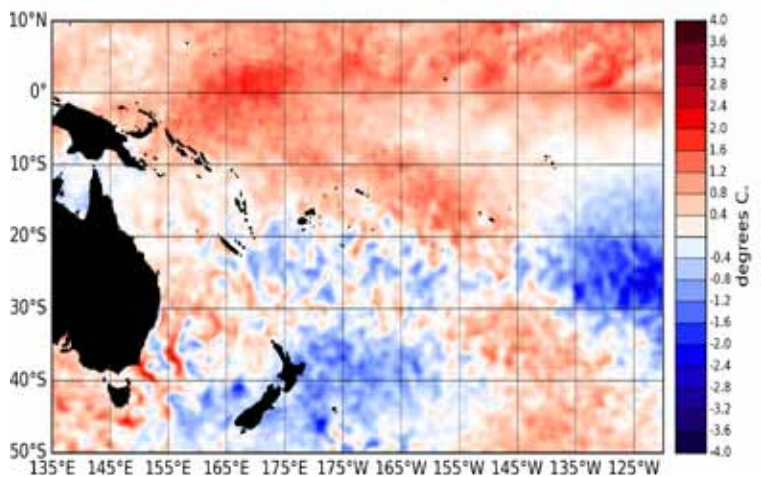
MetService of
New Zealand



El Niño/Southern Oscillation (ENSO)

The atmosphere has yet to show a clear coupling to the anomalously warm equatorial Pacific Ocean. Sea Surface Temperatures (SST) in the equatorial Pacific Ocean have changed little since November 2014, and are just over El Niño thresholds. Monthly SST anomalies are currently 0.8°C above normal in the NINO3.4 region. NINO3 monthly value is at +0.8°C and NINO4 at +1.0°C. Sub-surface ocean temperature anomalies over +2°C persist at about 100m depth or shallower east of the Dateline to the South American coast. However, other ENSO indicators have yet to reach El Niño thresholds. The Southern Oscillation Index (SOI) value for December is -0.7, and still shows no signs of persistence below -1.

The latest TAO array observations show no significant westerly wind anomalies along the equatorial Pacific. Rainfall and convection anomalies are also lacking a clear El Niño signature at present. The NASA ENSO Precipitation Index (ESPI) for the 30 days to 4 January was -0.71, a value typically associated with weak La Niña conditions. Both the Inter-Tropical Convergence Zone (ITCZ) and South Pacific Convergence Zone (SPCZ) were well-defined during December 2014; convection east of the Dateline has increased off the Equator, but convection is still weak close to the Equator.

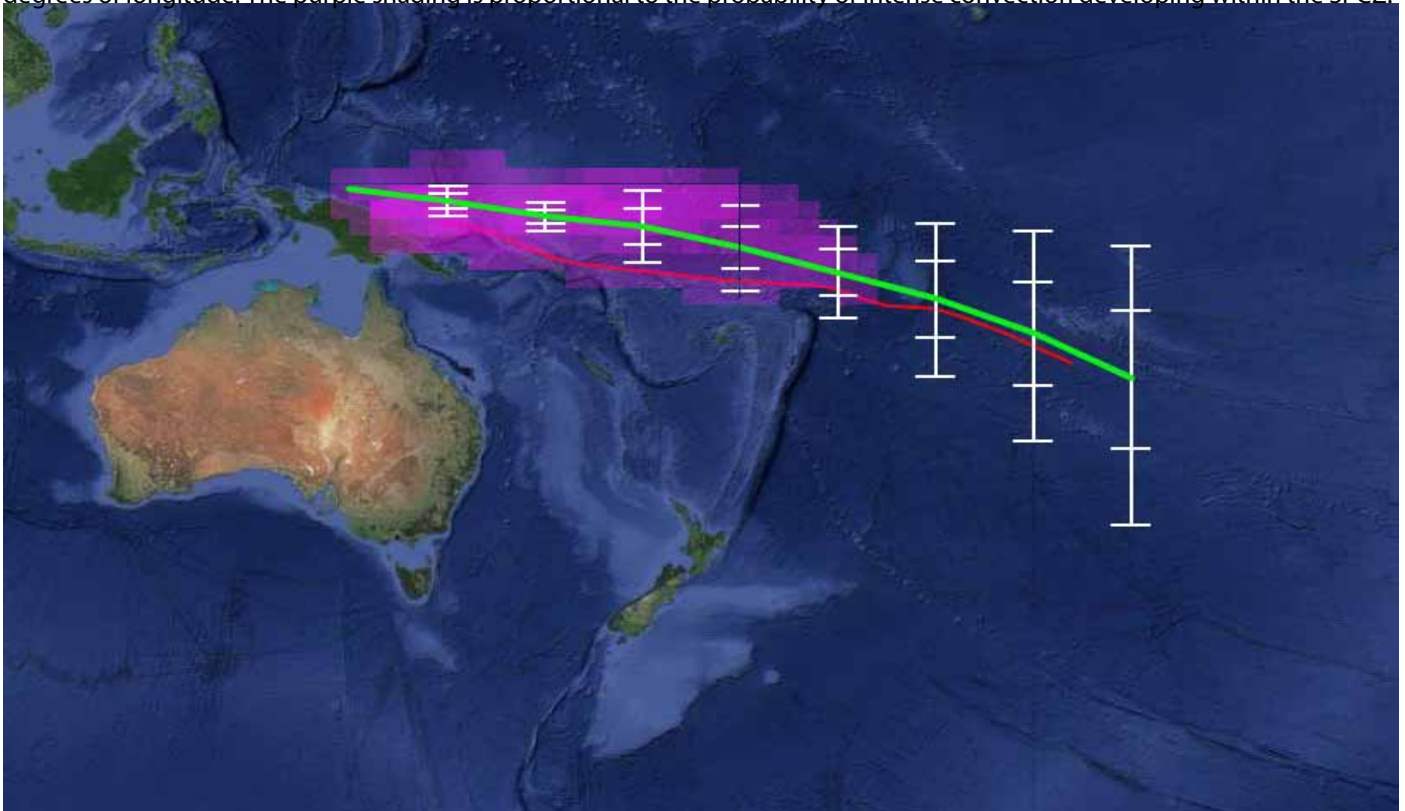


Surface temperature anomalies (C) for December 2014. Data are from the NOAA OISST Version 2 dataset, available at the NOAA Climate Data Center (<ftp://ftp.cdc.noaa.gov/Datasets/noa.oisst.v2highres/>).

Of the ten dynamical models that NIWA monitors 7 indicate El Niño over the next three months and 3 indicate borderline values (above 0.5°C but below 0.7°C). The recent IRI technical ENSO update (18th of December) indicates chances of El Niño reaching 70% or more.

South Pacific Convergence Zone forecast January - March 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 or intense convection within the SPCZ. The green line indicates the average SPCZ position for the forecast period based on the average of available climate models in the METPI rainfall forecast. 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 January - March 2015, the SPCZ is forecast to be located northeast of climatology for this time of year. Enhanced convection is expected west of the International Dateline in many models, with the general branching location of the SPCZ off of the ITCZ forecast east of normal. Uncertainty in the SPCZ position is greatest to the east of the Dateline.

Tropical rainfall and SST outlook: January to March 2015

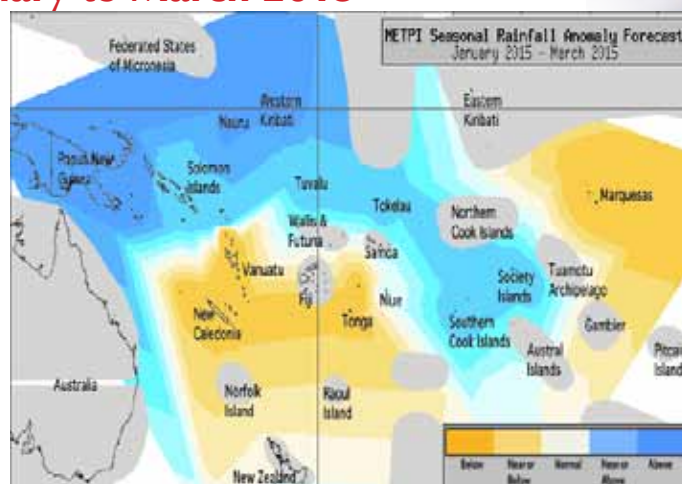
In December 2014, the equatorial Pacific Ocean was still just above El Niño thresholds towards the end of the month. Some – but importantly not all – atmospheric indicators also show patterns consistent with the development of a weak El Niño, however there is no significant coupling as of yet. International guidance indicates that the chance for El Niño developing over the January – March 2015 period is about 70%. This figure has increased compared to forecasts issued last month. Above normal rainfall is forecast for Papua New Guinea and Western Kiribati. Normal or above normal rainfall is forecast for the Solomon Islands, Tuvalu, Tokelau, the Southern Cook Islands and the Society Islands. Near normal rainfall is expected for Niue. Normal or below normal rainfall is forecast for Vanuatu, New Caledonia, Tonga, and the Marquesas. No clear guidance is available for Samoa, the Austral Islands, the Northern Cook Islands, Fiji, Eastern Kiribati, Wallis et Futuna, the Tuamotu Archipelago and the Federated States of Micronesia.

El Niño signals exist for SSTs in the global model ensemble along the Equator, and persistence of warmer-than-normal temperatures are suggested there in the coming three month period. The cool SST anomalies seen in the subtropical and mid latitudes are also forecast to diminish as summer progresses. Normal or above normal SSTs are forecast for Eastern Kiribati, Western Kiribati, Federated States of Micronesia, the Northern Cook Islands, the Solomon Islands, Tuvalu and Tokelau. Near normal SSTs are forecast for Niue, the Marquesas, the Austral Islands, Tonga and the Tuamotu Archipelago. No clear guidance is offered for the remainder of the southwest Pacific in this forecast interval.

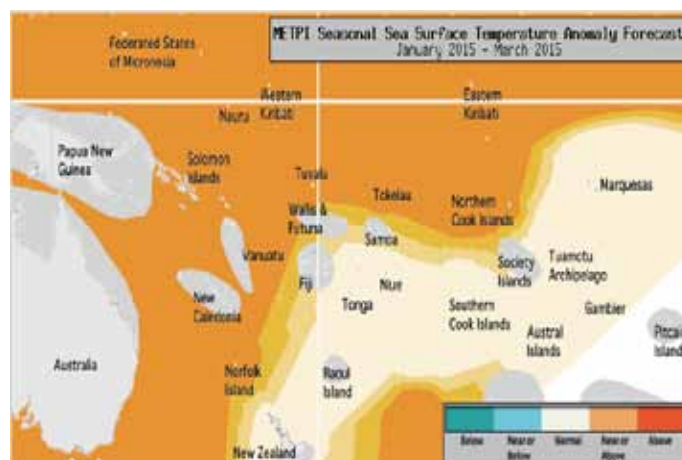
The confidence for the rainfall outlook is high. The average region-wide hit rate for rainfall forecasts issued in January is

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	Confidence
Western Kiribati	25:30:50 (Above)	High	Kiribati (Eastern)	25:35:40 (Normal or Above)	High
Papua New Guinea	25:30:50 (Above)	High	Kiribati (Western)	25:35:40 (Normal or Above)	High
Southern Cook Islands	25:35:40 (Normal or Above)	High	Micronesia	25:35:40 (Normal or Above)	High
Society Islands	25:35:40 (Normal or Above)	High	Northern Cook Islands	25:35:40 (Normal or Above)	High
Solomon Islands	25:35:40 (Normal or Above)	Moderate-High	Solomon Islands	25:35:40 (Normal or Above)	High
Tokelau	25:35:40 (Normal or Above)	Moderate-High	Tokelau	25:35:40 (Normal or Above)	High
Tuvalu	25:35:40 (Normal or Above)	Moderate-High	Tuvalu	25:35:40 (Normal or Above)	High
Austral Islands	33:34:33 (Climatology)	Moderate	Niue	30:40:30 (Near normal)	High
Samoa	33:34:33 (Climatology)	Moderate	Marquesas	30:40:30 (Near normal)	High
Northern Cook Islands	33:34:33 (Climatology)	Moderate	Austral Islands	30:40:30 (Near normal)	High
FSM	33:34:33 (Climatology)	Moderate	Tonga	30:40:30 (Near normal)	High
Fiji	33:34:33 (Climatology)	Moderate	Tuamotu	30:40:30 (Near normal)	High
Eastern Kiribati	33:34:33 (Climatology)	Moderate	Southern Cook Islands	30:40:30 (Near normal)	High
Pitcairn Island	33:34:33 (Climatology)	Moderate	Pitcairn	33:34:33 (Climatology)	High
Wallis and Futuna	33:34:33 (Climatology)	Moderate	PNG	33:34:33 (Climatology)	High
Tuamotu	33:34:33 (Climatology)	Moderate	Samoa	33:34:33 (Climatology)	High
Niue	30:40:30 (Normal)	High	Society Islands	33:34:33 (Climatology)	High
Tonga	40:35:25 (Normal or Below)	High	Fiji	33:34:33 (Climatology)	High
Marquesas	40:35:25 (Normal or Below)	High	New Caledonia	33:34:33 (Climatology)	High
New Caledonia	40:35:25 (Normal or Below)	High	Vanuatu	33:34:33 (Climatology)	High
Vanuatu	40:35:25 (Normal or Below)	Moderate-High	Wallis and Futuna	33:34:33 (Climatology)	High

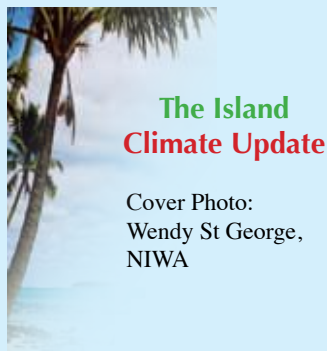


Rainfall anomaly outlook map for January to March 2015



SST anomaly outlook map for January to March 2015

63%, three percent lower than the long-term average for all months combined.



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:

Dr Andrew Lorrey, NIWA,
41 Market Place, Auckland, New Zealand
E-mail: a.lorrey@niwa.co.nz

Forecasts:

Dr. Andrew Lorrey and Dr. Nicolas Fauchereau (South Pacific rainfall and SST forecasts) and the NIWA National Climate Centre (ENSO wrap)

ICU Editorial team:

Nicolas Fauchereau: n.fauchereau@niwa.co.nz
Andrew Lorrey: a.lorrey@niwa.co.nz
Nava Fedaeff: n.fedaeff@niwa.co.nz

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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, 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.co.nz/>

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
<http://www.ecmwf.int/>