Number 184, January 2016

The Island Climate Update

El Niño/Southern Oscillation (ENSO)

- Strong El Niño conditions continued in December 2015.
- Sea Surface Temperatures (SSTs) anomalies weakened slightly in the central and eastern equatorial Pacific but still exceed +2ºC.
- El Niño is certain (100% chance) to continue over the coming season (January – March 2016).

The South Pacific Convergence Zone

- The SPCZ is expected to be positioned north and east of its normal position.

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

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

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

NEW ZEALAND MINISTRY OF FOREIGN AFFAIRS & TRADE Aid Programme

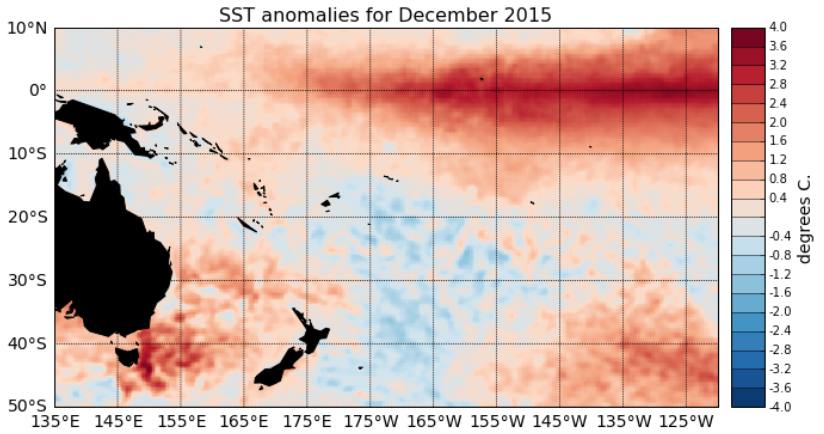
NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION U.S. DEPARTMENT OF COMMERCE

SPREP

NIWA Taihoro Nukurangi

El Nino/Southern Oscillation (ENSO)

Strong El Niño conditions continued to dominate the Tropical Pacific during December 2015. The latest monthly sea surface temperatures (SST) anomalies in the central and eastern Pacific have weakened slightly but still exceed +2°C. The latest monthly SST anomalies in the NINO3.4 is at +2.3°C, with a similar value in the NINO3 region (eastern Pacific: 90°W – 150°W). The NINO4 index (in the western Pacific) has remained stable at about +1.6°C for December 2015. Sub-surface ocean temperature anomalies in the eastern Pacific have decreased significantly over the last month (December 2015) and reach now about +5°C at 75-100m depth near 120°W (compared to peak values of about 7°C earlier last month). The Southern Oscillation Index (SOI) is weakly negative at -0.6 for the month of December, however strong westerly wind anomalies (weaker easterly trade-winds) continue to affect the western and central Pacific. Convective activity and rainfall also continue to be higher than normal in the central and eastern Pacific, while parts of the Maritime Continent are still experiencing drier than normal conditions. The Intertropical Convergence Zone (ITCZ) was clearly displaced towards the Equator in the central and eastern Pacific, and the South Pacific Convergence Zone (SPCZ) was shifted to the north and east of normal, both signals being consistent with El Niño. The ENSO Precipitation Index (ESPI) reflects strong El Niño conditions with a value of +2.34 (value to the 12th of January 2016).

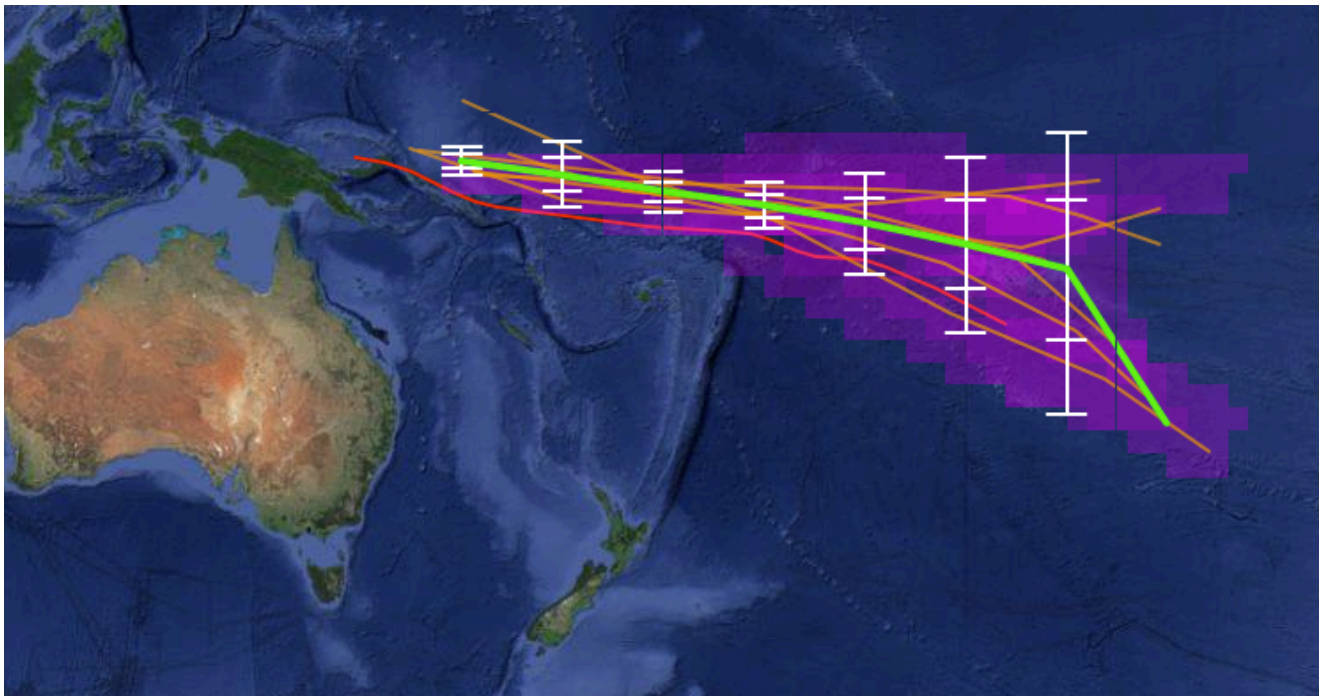


Surface temperature anomalies (°C) for December 2015, data is from the NOAA OISST Version 2 dataset, available at NOAA's Climate Data Center (ftp://ftp.cdc.noaa.gov/Datasets/noaa.oisst.v2.hires/)

A strong Madden-Julian Oscillation (MJO) pulse reached into the central Pacific over the first week of January, and was associated with a very intense westerly wind burst. At the forecast horizon of 14 days, the dynamical and statistical CPC forecasts indicate that this MJO will continue to propagate eastward and weakern. International guidance indicates that El Niño conditions are certain (100% chance) to continue over the next three month period (January– March 2016). Several indicators suggest that although El Niño may have peaked towards the end of December, it is forecast to remain strong over the next three months then decay rapidly, with a return to neutral or a transition to La Niña conditions by the winter (July – September 2016).

South Pacific Convergence Zone forecast January to March 2016

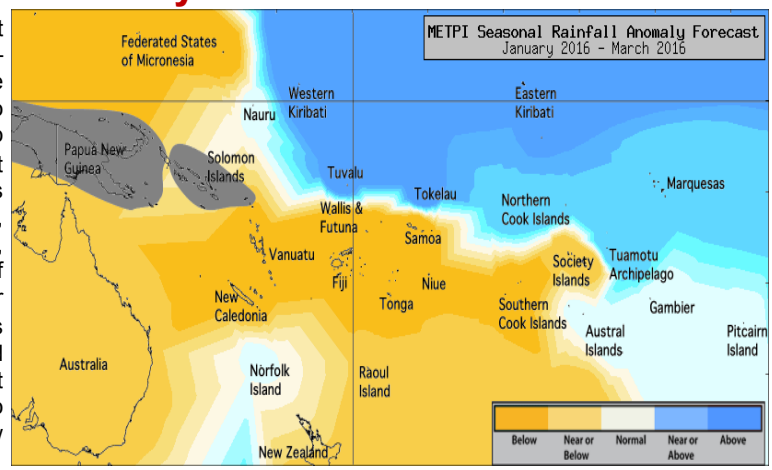
The ensemble of global climate models for rainfall that are used in METPI show an area of higher than normal rainfall associated with the SPCZ position. The green line indicates that average SPCZ position for the forecast period based on the average of eight climate models. The white vertical bars and '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 January – March 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 southeastern Pacific south and in the Intertropical Convergence Zone over and east of the international dateline.

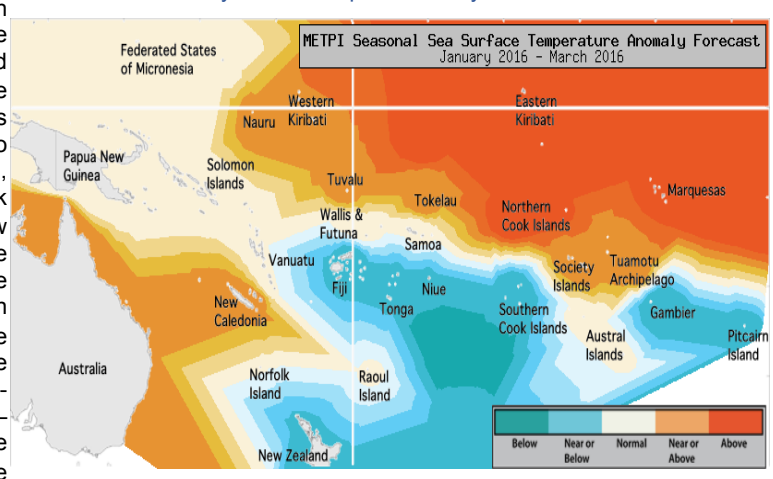
Tropical rainfall and SST outlook: January to March 2016

The dynamical models are all in agreement to forecast continuing strong El Niño conditions for the January – March 2016 period, and the SPCZ is forecast to be displaced east of its normal position (see page 2), leading to many island groups in the southwest Pacific forecast to experience drier than normal conditions over the forecast period (January – March 2016). Below normal rainfall is forecast for New Caledonia, the southern Cook Islands, Samoa, southern Vanuatu, Wallis and Futuna, Niue, Tonga, Fiji, northern Vanuatu and the Federated States of Micronesia. Normal or below normal rainfall is forecast for the Society Islands. Normal or above normal rainfall is forecast for the northern Cook Islands, the Marquesas and the Tuamotu archipelago. Above normal rainfall is forecast for eastern Kiribati, western Kiribati, Tuvalu and Tokelau. No clear guidance is available again this month for Papua New Guinea and the Solomon Islands.



Rainfall anomaly outlook map for January – March 2016

As El Niño is forecast to continue over the January – March 2016 period, the large positive Sea Surface Temperature (SST) anomalies currently present in the central and eastern equatorial Pacific are expected to persist over the next three months. 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, the Marquesas and the northern Cook Islands. Normal or above normal SSTs are forecast for New Caledonia, the Society Islands, Tokelau, Tuvalu and the Tuamotu archipelago. Normal or below normal SSTs are forecast for the southern Cook Islands, Fiji, Niue, Pitcairn and Tonga. Near normal SSTs are expected for the remaining Pacific Island groups. The confidence for the rainfall outlooks is moderate to high. The average region-wide hit rate for rainfall forecasts issued for the January – March season is about 67%, four points higher than the average for all months combined. The confidence for the SST forecasts is also moderate to high.



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

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

The Island Climate Update

Cover Photo:
Wendy St George,
NIWA

Visit the Island Climate Update at:
www.niwa.co.nz/climate/icu

Follow us on Twitter: @ICU_NIWA

Your comments and ideas about the Island Climate Update are welcome. Please contact:

Dr Nicolas Fauchereau, NIWA,
41 Market Place, Auckland, New Zealand
E-mail: Nicolas.Fauchereau@niwa.co.nz

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

ICU Editorial Team:
Nicolas Fauchereau:
Nicolas.Fauchereau@niwa.co.nz
Andrew Lorrey: Andrew.Lorrey@niwa.co.nz
Nava Fedaeff: Nava.Fedaeff@niwa.co.nz
Petra Chappell: Petra.Chappell@niwa.co.nz

Acknowledgements:
This bulletin is produced by NIWA and made possible with financial support from the New Zealand Ministry of Foreign Affairs and Trade (MFAT), with additional support from NOAA and the Secretariat for the Pacific Regional Environmental Programme (SPREP).

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.

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