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The Island Climate Update

El Niño/Southern Oscillation (ENSO)

- Strong El Niño conditions were established in September 2015.
- Sea Surface Temperatures (SSTs) and precipitation anomalies continued to intensify in the eastern Pacific.
- El Niño is virtually certain (99% chance) to continue in October – December 2015.

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 of climatology.

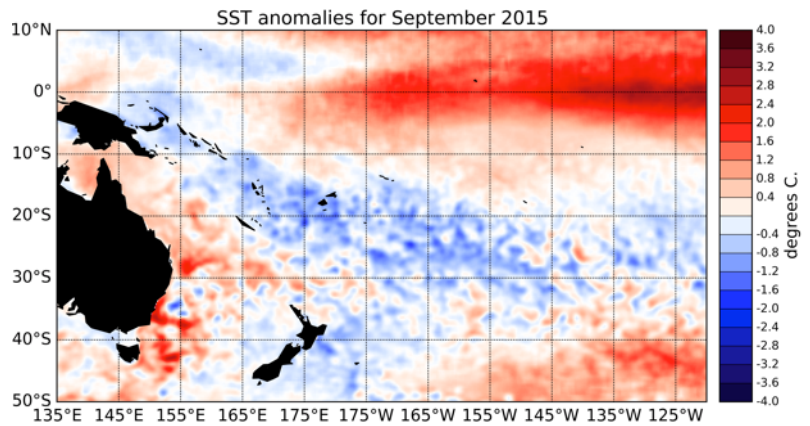
Multi-model Ensemble Tool for Pacific Island (METPI) rainfall and sea surface temperature forecasts

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



El Niño/Southern Oscillation (ENSO)

Strong El Niño conditions were established during September 2015. Sea surface temperature (SST) anomalies in the NINO3.4 region are close to +2°C (+1.96°C), while they exceed this threshold in the NINO3 region (eastern Pacific: 90°W – 150°W), with the latest monthly value reaching +2.12°C. The NINO4 index (in the western Pacific) remains stable at +1.1°C. Sub-surface ocean temperatures in the eastern Pacific have remained much higher than normal, with anomalies exceeding +7°C off the South American coast (east of about 120°W and at about 75m depth). The atmosphere remained fully coupled to these ocean anomalies. The Southern Oscillation Index (SOI) was strongly negative (-1.7 for September 2015), and westerly wind anomalies (weaker trade-winds) dominated the central and western equatorial Pacific. Consistent with these patterns, convection and rainfall was suppressed over Indonesia and large parts of the Maritime Continent, while enhanced convective activity and rainfall were observed in the central and eastern Equatorial Pacific. The South Pacific Convergence Zone (SPCZ) was again this month mostly suppressed in the southwest Pacific, and the Inter-Tropical Convergence Zone (ITCZ) was displaced towards the Equator in the eastern Pacific. The ENSO Precipitation Index (ESPI) reflects strong El Niño conditions with a value of +2.25 (value to the 30th of September).

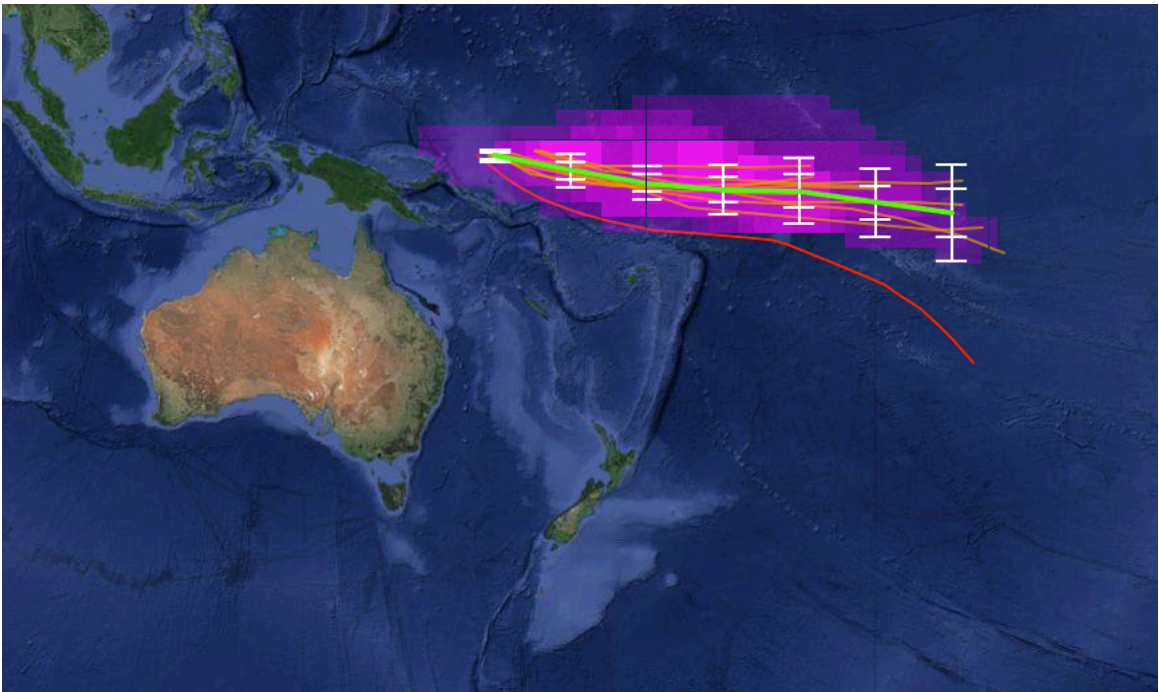


Surface temperature anomalies (°C) for September 2015, data is from the NOAA OISST Version 2 dataset, available at NOAA's Climate Data Center (<ftp://ftp.cdc.noaa.gov/Datasets/noaa.oisst.v2.hires/>)

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 somehow diverge, but the MJO signal is expected overall to remain weak. International guidance indicates that El Niño conditions are virtually certain (99% chance) to continue over the next three month period (October – December 2015) and highly likely (95% chance) to carry on through the summer (January – March 2016).

South Pacific Convergence Zone forecast October to December 2015

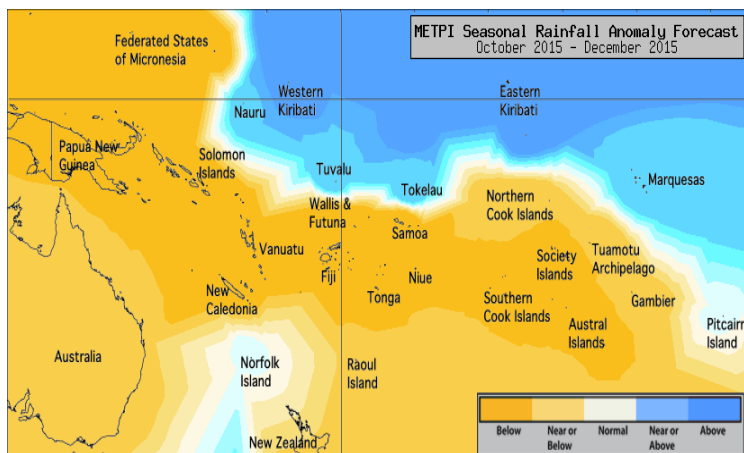
The ensemble of global climate models for rainfall that are used in METPI show an area of higher than normal rainfall associated with the SPCZ position. The green line indicates that average SPCZ position for the forecast period based on the average of eight climate models. The white vertical bars and '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 October – December 2015 forecast period, the South Pacific Convergence Zone (SPCZ) is expected to be situated north of its climatological position and to adopt a more zonal 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.

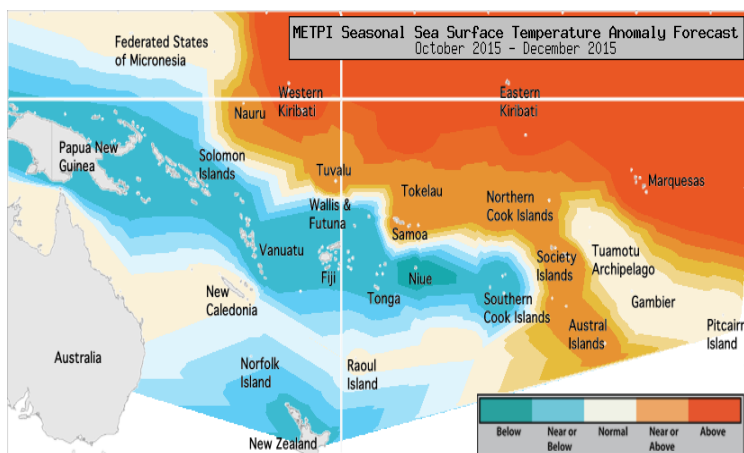
Tropical rainfall and SST outlook: October to December 2015

The dynamical models are all in agreement to forecast continuing El Niño conditions for the October – December 2015 period. As a consequence most regions of the southwest Pacific usually affected by the South Pacific Convergence Zone are forecast to experience a drier than normal October – December season. Below normal rainfall is forecast for the Austral Islands, New Caledonia, the Society Islands, Wallis & Futuna, the Federated States of Micronesia, the southern Cook Islands, Papua New Guinea, Samoa, the Solomon Islands, Vanuatu, Niue, Tonga and Fiji. Normal or below normal rainfall is forecast for the northern Cook Islands and the Tuamotu archipelago. Near normal rainfall is expected for Pitcairn Island. Normal or above normal rainfall is forecast for Tokelau and the Marquesas. Above normal rainfall is forecast for Eastern Kiribati, Western Kiribati and Tuvalu.



Rainfall anomaly outlook map for October – December 2015

The global model ensemble forecast for SSTs indicates persistence and further intensification of the higher than normal SSTs present in the central and eastern equatorial Pacific, the large region of cooler than normal SSTs in the southwest Pacific is also forecast to intensify and expand. Above normal SSTs are forecast for western Kiribati, eastern Kiribati and the Marquesas. Normal or above normal SSTs are forecast for the Austral Islands, the northern Cook Islands, Tokelau and Tuvalu. Near normal SSTs are forecast for the Federated States of Micronesia, New Caledonia, Pitcairn and the Tuamotu archipelago. Normal or below normal SSTs are forecast for Fiji, Papua New Guinea, the Solomon Islands, the southern Cook Islands, Tonga, Vanuatu and Wallis & Futuna. Below normal SSTs are forecast for Niue.



SST anomaly outlook map for October – December 2015

The confidence for the rainfall outlooks is generally high. The average region-wide hit rate for rainfall forecasts issued for the October – December season is about 66%, three points higher than the average for all months combined. The confidence for the SST forecasts is also generally high.

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)	10:20:70 (Above)	High	Kiribati (Eastern)	20:30:50 (Above)	High
Kiribati (Western)	10:20:70 (Above)	High	Kiribati (Western)	20:30:50 (Above)	High
Tuvalu	15:30:55 (Above)	High	Marquesas	20:30:50 (Above)	High
Tokelau	15:40:45 (Normal or Above)	High	Austral Islands	25:35:40 (Normal or Above)	Moderate
Marquesas	25:40:35 (Normal or Above)	Moderate-High	Cook Islands (Northern)	25:35:40 (Normal or Above)	High
Pitcairn Island	30:40:30 (Normal)	High	Samoa	25:35:40 (Normal or Above)	Moderate
Cook Islands (Northern)	35:40:25 (Normal or Below)	Moderate-High	Society Islands	25:35:40 (Normal or Above)	Moderate
Tuamotu Islands	40:35:25 (Normal or Below)	High	Tokelau	25:35:40 (Normal or Above)	High
Austral Islands	45:35:20 (Below)	Moderate-High	Tuvalu	30:40:30 (Normal)	High
New Caledonia	45:35:20 (Below)	Moderate-High	FSM	30:40:30 (Normal)	Moderate
Society Islands	45:35:20 (Below)	High	New Caledonia	30:40:30 (Normal)	Moderate
Wallis & Futuna	45:35:20 (Below)	Moderate-High	Pitcairn	30:40:30 (Normal)	Moderate
FSM	45:35:20 (Below)	High	Tuamotu Islands	30:40:30 (Normal)	High
Cook Islands (Southern)	50:30:20 (Below)	High	Fiji	40:35:25 (Normal or Below)	High
Papua New Guinea	50:30:20 (Below)	High	Papua New Guinea	40:35:25 (Normal or Below)	Moderate-high
Samoa	50:30:20 (Below)	High	Solomon Islands	40:35:25 (Normal or Below)	High
Solomon Islands	50:30:20 (Below)	Moderate-High	Cook Islands (Southern)	40:35:25 (Normal or Below)	High
Vanuatu	55:30:15 (Below)	High	Tonga	40:35:25 (Normal or Below)	High
Niue	60:30:10 (Below)	High	Vanuatu	40:35:25 (Normal or Below)	High
Tonga	65:25:10 (Below)	High	Wallis & Futuna	40:35:25 (Normal or Below)	High
Fiji	70:20:10 (Below)	High	Niue	50:30:20 (Normal or Below)	High



The Island Climate Update

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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>