Number 189, June 2016

The Island Climate Update

El Niño/Southern Oscillation (ENSO)

- El Niño has ended. All the El Niño – Southern Oscillation indices have now returned to near neutral levels.
- Neutral conditions are favored (54% chance) over the coming three months (June – August 2016).
- A transition to La Niña conditions later this year is likely.

The South Pacific Convergence Zone

- The SPCZ is expected to be positioned close to its climatological position.

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

- Below normal rainfall is forecast for Fiji, Niue, Tonga, eastern Kiribati, western Kiribati, northern Vanuatu and the Federated States of Micronesia.
- Above normal rainfall is forecast for the northern Cook Islands, Tokelau, Tuvalu and the Tuamotu archipelago.
- Normal or above normal sea surface temperatures are forecast for the Federated States of Micronesia, the northern Cook Islands, the Tuamotu archipelago and New Caledonia.

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

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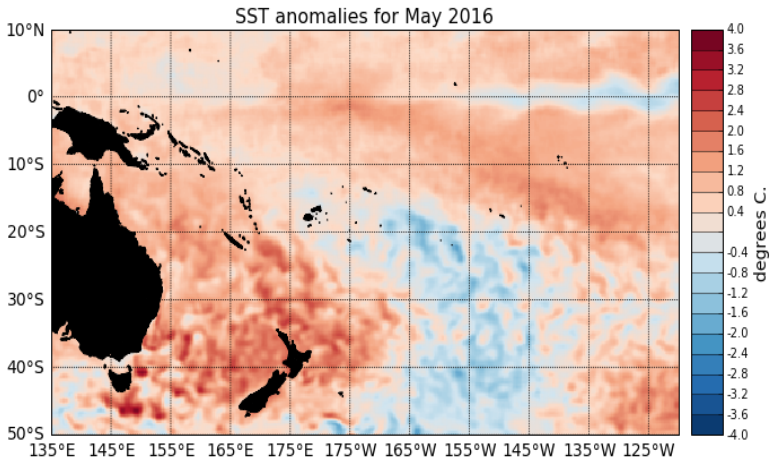
NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION U.S. DEPARTMENT OF COMMERCE

SPREP

NIWA Taihoro Nukurangi

El Nino/Southern Oscillation (ENSO)

Ocean-Atmosphere conditions in the Tropical Pacific have now returned to a near normal state after a rapid demise of the El Niño event, which peaked in late 2015. Sea Surface Temperature anomalies in the central Pacific are close to normal, and slightly cooler than normal sea surface temperatures have emerged in the eastern equatorial Pacific. The latest monthly SST anomaly in the NINO3.4 region is +0.5°C, the NINO3 region (eastern Pacific: 90ºW – 150ºW) is currently at +0.28°C, and the NINO4 index (in the western Pacific) is at +0.7°C. Cooler than normal sub-surface waters have continued to spread eastward from the western Pacific, and temperatures are more than 4ºC below normal between 50 and 100m depth east of about 160ºW. Enhanced convective activity and rainfall near and east of the Dateline in the equatorial Pacific (usually associated with El Niño events) has weakened further in May, and zonal wind in the equatorial Pacific has returned to near normal, and weak westerly wind anomalies (i.e. intensified trade winds) are present in the far western Pacific. The Southern Oscillation Index (SOI) has recently switched to positive values (value for May 2016: +0.4). The ENSO Precipitation Index (ESPI) is also on the La Niña side of neutral with a value of -0.43 (value to the 7th of June 2016). The Madden-Julian Oscillation (MJO) was weak in the western Pacific over May as a whole. At the forecast horizon of 14 days, the Climate Prediction Center (CPC) dyamical and statistical forecasts are in disagreement, but overall there are low chances of inc-



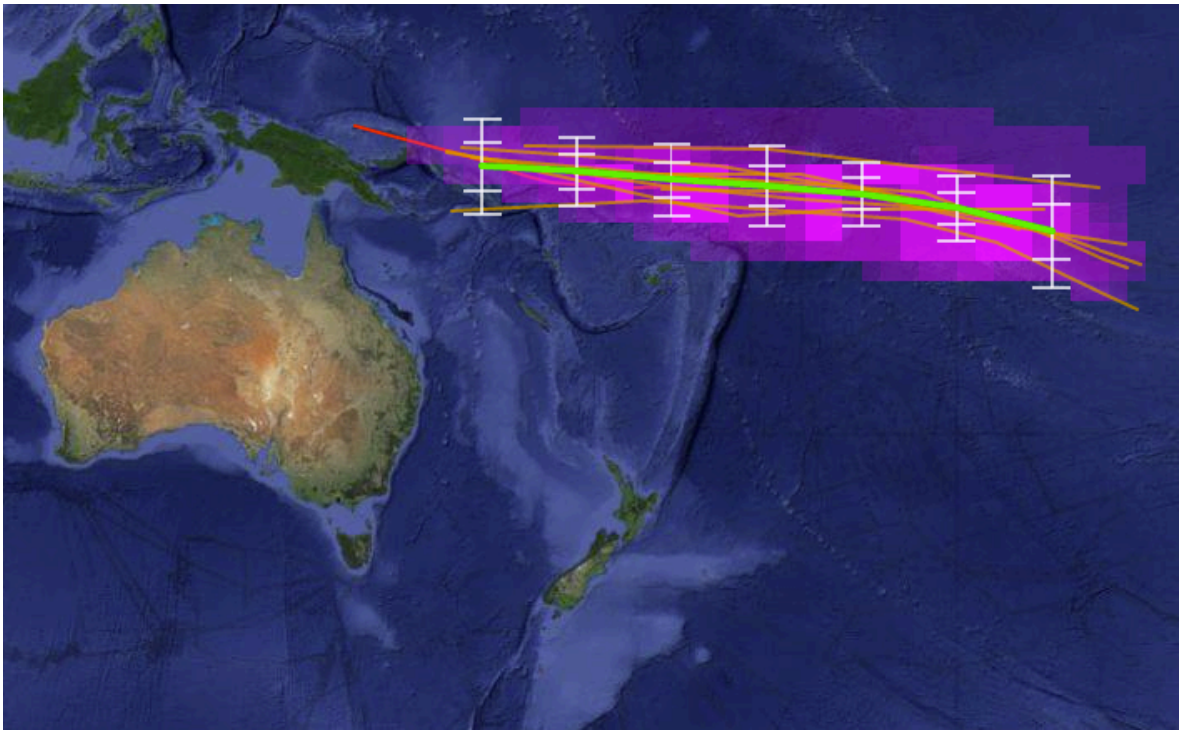
Surface temperature anomalies (ºC) for May 2016, data is from the NOAA OISST Version 2 dataset, available at NOAA's Climate Data Center (ftp://ftp.cdc.noaa.gov/Datasets/noaa.oisst.v2.hires/)

-reased intra-seasonal convective activity in the western Pacific.

International guidance indicates that neutral ENSO (El Niño - Southern Oscillation) conditions are most likely (54% chance) over the next three month period (June – August 2016), as a whole, but a transition to La Niña is also possible over the same period (43% chance). The likelihood of La Niña conditions establishing in the Pacific increases later on, with 58% chance in September-November 2016 and 61% in December 2016 – February 2017.

South Pacific Convergence Zone forecast June to August 2016

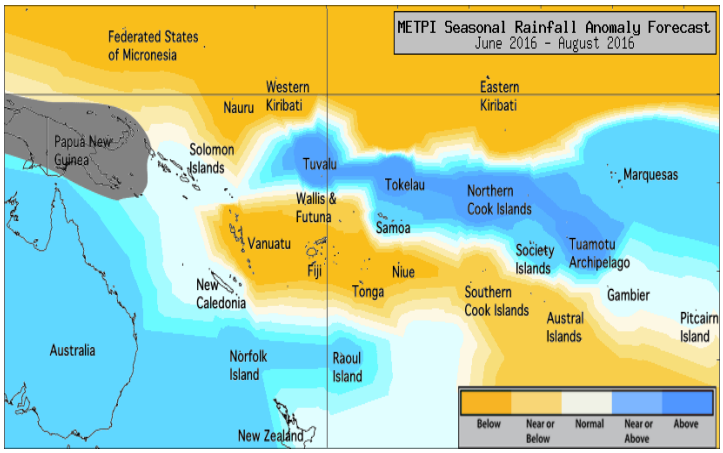
The ensemble of global climate models for rainfall that are used in METPI show an area of higher than normal rainfall associated with the SPCZ position. The green line indicates that average SPCZ position for the forecast period based on the average of eight climate models. The white vertical bars and '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 June – August 2016 forecast period, the South Pacific Convergence Zone (SPCZ) is expected to be situated close to its climatological position. Areas of higher than normal convective activity associated with the SPCZ are expected in the central and eastern Pacific.

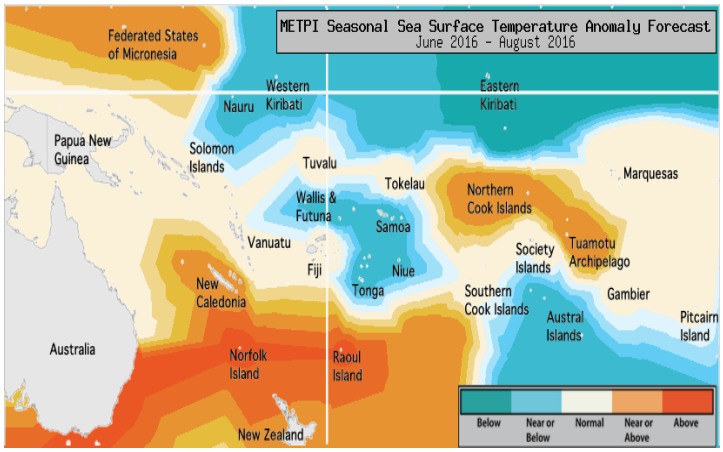
Tropical rainfall and SST outlook: June to August 2016

El Niño – Southern Oscillation (ENSO) neutral conditions are most likely (54% chance) over the next three months period (June – August 2016) but a transition to La Niña is possible (43% chance). The rainfall outlook partly reflects La Niña impacts over the next three months, with the eastern equatorial Pacific at risk of experiencing below normal rainfall. Below normal rainfall is forecast for Fiji, Niue, Tonga, eastern Kiribati, western Kiribati, northern Vanuatu and the Federated States of Micronesia. Normal or below normal rainfall is forecast for Wallis & Futuna, the Austral Islands, the southern Cook Islands and southern Vanuatu. Normal or above normal rainfall is forecast for the Marquesas, Samoa and the Society Islands. Above normal rainfall is forecast for the northern Cook Islands, Tokelau, Tuvalu and the Tuamotu archipelago. Near normal rainfall is forecast for New Caledonia, Pitcairn Island and the Solomon Islands. No clear guidance is available this month for Papua New Guinea.



Rainfall anomaly outlook map for June – August 2016

The first signs of a probable La Niña event developing later in 2016 have started to appear, with cooler than normal surface ocean waters in the eastern Equatorial Pacific. The dynamical models agree to forecast a slow intensification and expansion of this area of cooler than normal ocean waters. The warm ocean waters east of Australia and around New Zealand are also forecast to persist. Normal or above normal SSTs are forecast for the Federated States of Micronesia, the northern Cook Islands, the Tuamotu archipelago and New Caledonia. Below normal SSTs are forecast for eastern Kiribati. Normal or below normal SSTs are forecast for Wallis and Futuna, Niue, Tonga, Samoa, western Kiribati, the northern Cook Islands and the Austral Islands. The average region-wide hit rate for rainfall forecasts issued for the June – August season is about 61%, 2% below the average for all months combined. The confidence for the SST forecasts is moderate to high.



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

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

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