Number 177, June 2015

The Island Climate Update

El Niño/Southern Oscillation (ENSO)

- El Niño is now underway in the Tropical Pacific.
- All oceanic and atmospheric indices have crossed the conventional El Niño thresholds.
- El Niño is very likely (90% chance) to continue in June – August 2015.

The South Pacific Convergence Zone

- The SPCZ is expected to be positioned north of climatology in the western Pacific.

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

- Below normal rainfall is forecast for Fiji, Tonga, Vanuatu and Papua New Guinea. Normal or below normal rainfall is forecast for the southern Cook Islands, Samoa, the Society Islands, the northern Cook Islands, the Marquesas, Niue, the Solomon Islands, Tokelau, the Tuamotu archipelago, Wallis & Futuna and New Caledonia.
- Above normal rainfall is forecast for western Kiribati, eastern Kiribati and Tuvalu. Normal or above normal rainfall is forecast for Pitcairn Island.
- Above normal SSTs are forecast for eastern and western Kiribati. Normal or above normal SSTs are forecast for the Marquesas, the northern Cook Islands, Tokelau and Tuvalu.

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

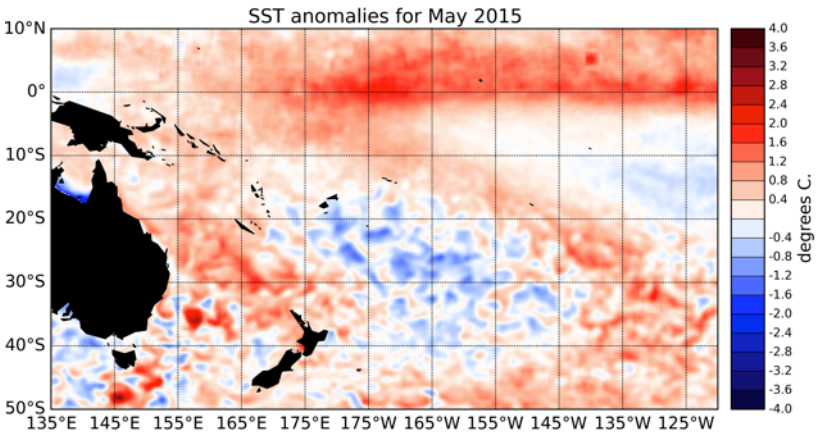
NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION U.S. DEPARTMENT OF COMMERCE

SPREP

NIWA Taihoro Nukurangi

El Nino/Southern Oscillation (ENSO)

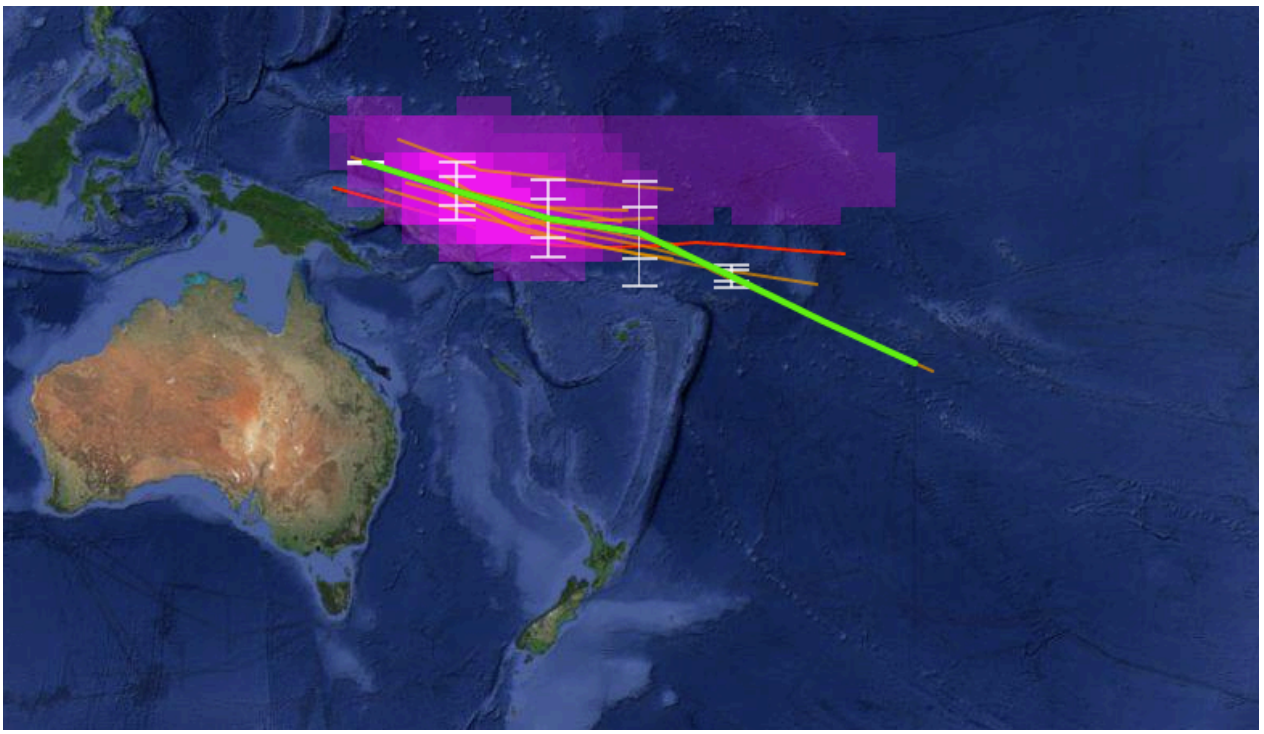
Sea Surface Temperatures (SSTs) have increased considerably in the eastern Pacific and are showing a pattern typical of El Niño. The SOI has dropped further in the negative and is at -1.2 for May 2015. Convection and rainfall anomalies along the Equator are also indicative of an active coupling between the Ocean and the Atmosphere, with dry conditions over the Maritime Continent and wetter than normal conditions over and to the east of the International Dateline. The ENSO Precipitation Index (ESPI) is over the El Niño threshold at +1.85 (value to the 3rd of June). Monthly SST anomalies are currently above the 1°C mark in *all of the NINO regions*: The NINO3.4 index value is +1.1°C, NINO4 (in the west-central Pacific) is currently at +1.1°C and the NINO3 index (in the eastern Pacific) has seen a dramatic increase during May 2015, and now reaches +1.2°C above normal. Sub-surface ocean temperature anomalies in the eastern Pacific have intensified further and now exceed +5°C between 50 and 100m depth off the South American coast (east of ~110°W). In the western Pacific (west of ~160°E), negative anomalies are present between 100 and 200m depth. Positive upper ocean heat content anomalies (upper 300m of the Ocean) have intensified in the eastern Pacific and now reach more than +2.5°C off the coast of South America. The Madden-Julian-Oscillation (MJO) was mostly inactive in the region during May 2015. At the forecast horizon of 14 days, both the dynamical and statistical CPC forecasts indicate that intra-seasonal convetive activity will remain weaker than normal in the western Pacific. International guidance indicates that El Niño conditions are very likely (90% chance) to continue over the next three months period (June – August 2015). The likelihood of El Niño persisting or strengthening as we reach into spring is also very high (above 80%).



Surface temperature anomalies (°C) for May 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/)

South Pacific Convergence Zone forecast June to August 2015

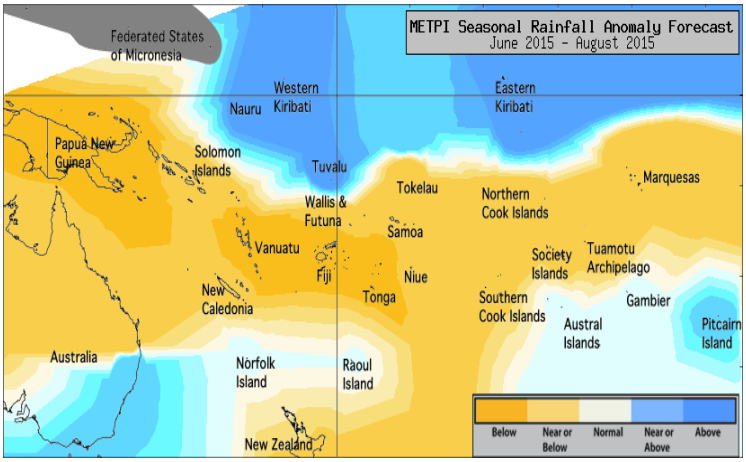
The ensemble of global climate models for rainfall that are used in METPI show an area of higher than normal rainfall associated with the SPCZ position. The green line indicates that average SPCZ position for the forecast period based on the average of eight climate models. The white vertical bars and '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.



During the June to August 2015 period, the South Pacific Convergence Zone (SPCZ) is forecast to be positioned north of climatology west of the International Dateline. The SPCZ is also expected to extend less eastward than normal. Areas of higher than normal convective activity are expected in the root zone of the SPCZ extending towards the International Dateline.

Tropical rainfall and SST outlook: June to August 2015

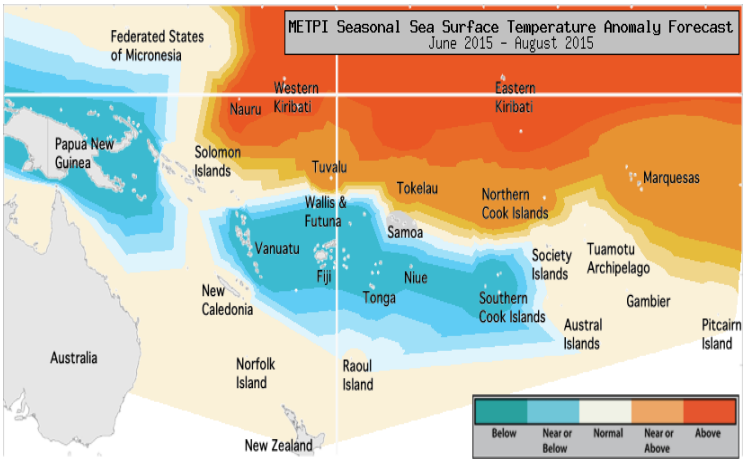
The dynamical model forecasts indicate that the central and eastern equatorial Pacific is likely to experience above normal rainfall in June – August 2015. In contrast, large regions of the southwest and southeast Pacific are expected to experience reduced rainfall, due to El Niño conditions continuing over the forecast period. Below normal rainfall is forecast for Fiji, Tonga, Vanuatu and Papua New Guinea. Normal or below normal rainfall is forecast for the southern Cook Islands, Samoa, the Society Islands, the northern Cook Islands, the Marquesas, Niue, the Solomon Islands, Tokelau, the Tuamotu archipelago, Wallis & Futuna and New Caledonia. Above normal rainfall is forecast for western Kiribati, eastern Kiribati and Tuvalu. Normal or above normal rainfall is forecast for Pitcairn Island. No clear guidance is available this month for the Federated States of Micronesia.



Rainfall anomaly outlook map for June – August 2015

The global model ensemble forecast for SSTs indicates higher than normal SSTs over the central and east equatorial Pacific, with maximum anomalies now positioned to the east of the International Dateline. Above normal SSTs are forecast for western Kiribati and eastern Kiribati. Normal or above normal SSTs are forecast for the Marquesas, the northern Cook Islands, Tokelau and Tuvalu. Normal or below normal SSTs are forecast for Fiji, Niue, Papua New Guinea, the southern Cook Islands, Tonga, Vanuatu and Wallis & Futuna.

The confidence for the rainfall outlooks is generally high. The average region-wide hit rate for rainfall forecasts issued for the June-August season is about 63%, comparable to the average for all months combined. The confidence for the SST forecasts is moderate to high. Note that climatological forecasts are typically associated with moderate confidence.

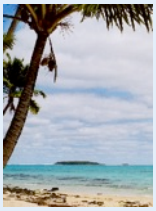


SST anomaly outlook map for June – August 2015

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 (Western)	20:30:50 (Above)	High
Kiribati (Eastern)	20:35:45 (Above)	Moderate-High
Tuvalu	20:35:45 (Above)	High
Pitcairn Island	25:40:35 (Normal or Above)	High
Austral Islands	30:40:30 (Near normal)	High
FSM	33:33:33 (Climatology)	Moderate
Cook Islands (Southern)	35:40:25 (Normal or Below)	High
Samoa	35:40:25 (Normal or Below)	Moderate-High
Society Islands	35:40:25 (Normal or Below)	High
Cook Islands (Northern)	40:35:25 (Normal or Below)	Moderate-High
Marquesas	40:35:25 (Normal or Below)	Moderate-High
Niue	40:35:25 (Normal or Below)	High
Solomon Islands	40:35:25 (Normal or Below)	Moderate-High
Tokelau	40:35:25 (Normal or Below)	Moderate-High
Tuamotu Islands	40:35:25 (Normal or Below)	Moderate-High
Wallis & Futuna	40:35:25 (Normal or Below)	Moderate-High
New Caledonia	40:35:25 (Normal or Below)	High
Fiji	45:35:20 (Below)	High
Tonga	45:35:20 (Below)	High
Vanuatu	45:35:20 (Below)	High
Papua New Guinea	50:30:20 (Below)	High

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



The Island Climate Update

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Wendy St George,
NIWA

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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

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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 Parnters

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