Fiji Climate Outlook
November 2018 to January 2019
& February to April 2019

ISO 9001:2015

ISO 9001:2015 certified Climate Services

Issued: November 13, 2018   ***Volume 12 : Issue 11**

1.0   HIGHLIGHTS

- *Average* or *below average* rainfall is likely over most parts of the country during the November 2018 to January 2019 and February to April 2019 periods;

- A weak El Niño event is likely to establish in the last quarter of this year;

- The anticipated El Niño event can potentially suppress Wet Season rainfall over Fiji;

- Air temperatures over Fiji are likely to be *above normal* during both the November 2018 to January 2019 and February to April 2019 periods;

- Occasional periods of very hot and humid conditions are likely in the coming months;

- The sea surface temperatures in the Fiji region are expected to be *normal* through the November 2018 to January 2019 and February to April 2019 periods.

- The official 2018/19 Tropical Cyclone season began on 01 November 2018 and will end on 30 April 2019. One to two tropical cyclones are predicted to affect either directly or indirectly this season and all communities are requested to remain prepared throughout the season.

2.0   RAINFALL & TEMPERATURE OUTLOOK

NOVEMBER 2018 TO JANUARY 2019 RAINFALL OUTLOOK

The SCOPIC model favours *average* or *below average* rainfall during the November 2018 to January 2019 period. Apart from the Central Division, confidences in the SCOPIC predictions at this time of the year ranges from *moderate* to *very high*. The global climate models favour *average* rainfall in the Fiji region during the same period. Rainfall activity is expected to pick up as the country progresses towards the peak Wet/Tropical Cyclone Season (January to March 2019).

The SCOPIC model rainfall predictions are as follows (Table 1):
Western Division   : Generally ***below average*** (Confidence - *high* to *exceptional*)
Central Division   : ***Average*** or ***below average*** (Confidence - *low* to *moderate*)
Northern Division : ***Average*** or ***below average*** (Confidence - *moderate* to *very high*)
Eastern Division   : ***Below average*** (Confidence - *good* to *high*)
Rotuma   : ***Below average*** (Confidence - *moderate*)

Global Rainfall Models (e.g. ECMWF, NSIPP, IRI, NCEP, etc.):
The global climate models favour *average* rainfall in the Fiji region during the November 2018 to January 2019 period (Figures 3a & 3b: two of the several global climate models that the Fiji Meteorological Service uses).

FEBRUARY TO APRIL 2019 RAINFALL OUTLOOK
The SCOPIC model rainfall predictions are as follows (Table 2):
Western Division   : Generally ***below average*** (Confidence - *moderate* to *high*)
Central Division   : Equal chances of ***below average***, ***average*** and ***above average*** (Confidence - *low*)
Northern Division : ***Average*** or ***below average*** (Confidence - *very low* to *moderate*)
Eastern Division   : ***Average*** to ***below average*** (Confidence - *low* to *moderate*)
Rotuma   : ***Average*** to ***below average*** (Confidence - *very low)*

TEMPERATURE OUTLOOK:

The air temperatures over the Fiji Group are predicted to be *above normal* during both November 2018 to January 2019 and February to April 2019 period (Figures 4 & 5). Occasional periods of very hot and humid conditions are likely during the forecasted period. The sea surface temperatures in the Fiji region is expected to be *normal* during the November 2018 to January 2019 period (Figure 2a & 2b).

The X LEPS % scores, which are used to categorize the confidence of the outlook are as follows: ***Very Low****: X < 0. 0*   ***Low****: 0 ≤ X < 5*   ***Moderate****: 5 ≤ X < 10*
Good*: 10 ≤ X < 15*   ***High****: 15 ≤ X < 25*   ***Very High****: 25 ≤ X < 35*   ***Exceptional****: X ≥ 35*

*Prior to July 2006, the Fiji Islands Climate Outlook was incorporated in the Fiji Islands Weather Summary

3.0   EL NIÑO SOUTHERN OSCILLATION (ENSO) CONDITIONS

Current El Niño Southern Oscillation (ENSO) Status

The tropical Pacific Ocean continues warming towards weak El Niño, while the Indian Ocean, a positive Indian Ocean Dipole is underway. The Sea Surface Temperatures (SST) are warmer than average along the equator in the Pacific Ocean, across much of the tropics to the north of the equator and much of the eastern Pacific both north and south of the equator. The SST within the NINO3 and NINO3.4 regions are both above the El Niño thresholds. Moreover, the sub-surface temperatures for the five days ending, show warmer than average temperatures in the top 150 meters of the of the equatorial Pacific.

The Southern Oscillation Index has remained in the neutral ENSO range for the past four weeks, which shows that the atmospheric circulation required to signal the start of the event is not yet present. The SOI value for October was +3, with the five month running mean of –3.6 (Figure 1). The trade winds were close to average across the tropical Pacific, which continue to suggest that the atmosphere and ocean are yet to reinforce each other, which is required to establish the event. Cloudiness near the Dateline has generally remained below average, since mid-September.

Overall, the above oceanic and atmospheric conditions indicate persistence of warmer ENSO-neutral state which favours El Niño development.

El Niño Southern Oscillation Prediction

All global climate models surveyed by the Bureau of Meteorology (Australia) predict that the tropical Pacific Ocean will continue to warm in the coming months. Majority of the models predict that the central equatorial Pacific SST will exceed El Niño thresholds at the end of November 2018. International Research Institute for Climate & Society (IRI) shows more than 80% chances of El Niño developing and further states that, if an El Niño does develop, it is likely to be a weak one.

Figure 1: Southern Oscillation Index (SOI) Graph

Southern Oscillation Index Vs 5-Month Running Mean (January 2012 - October 2018)
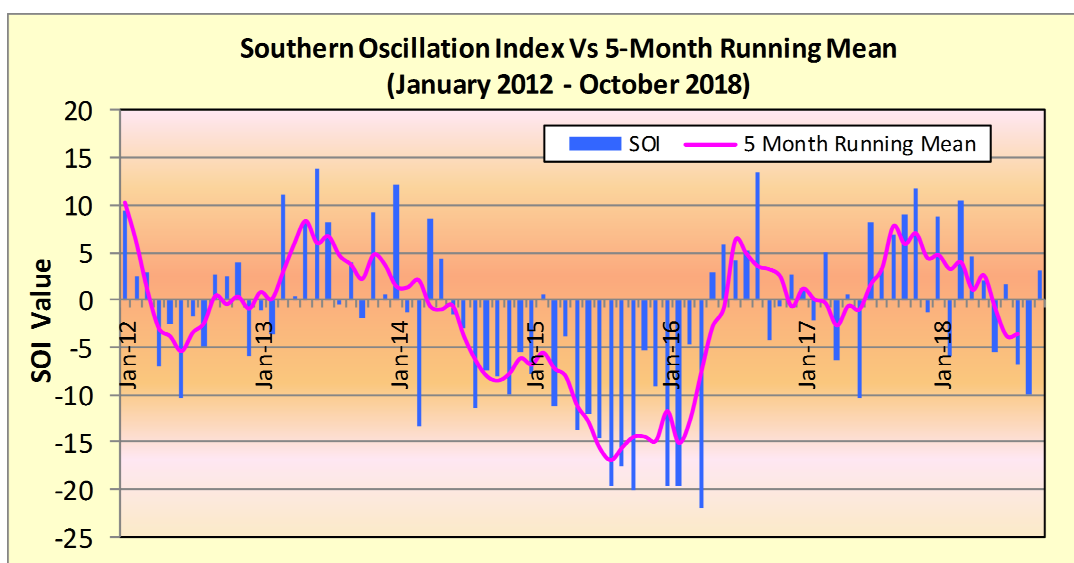
SOI (in bars) and 5 month running mean (continuous pink line)

The SOI for October was +3, with the 5-month running mean of -3.6.

Sustained values of SOI above +7 indicates presence of La Niña conditions and sustained values below -7 indicate El Niño event.

Figure 2a: ECMWF Sea Surface Temperature (SST) for November 2018 to January 2019

EUROSIP multi-model seasonal forecast
Mean forecast SST anomaly
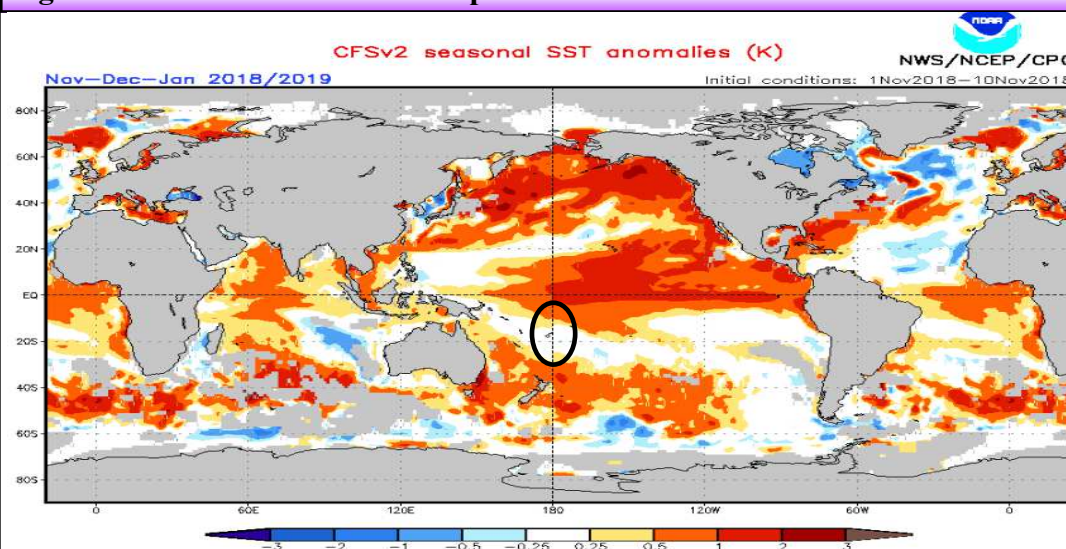Forecast start reference is 01/10/18
Variance-standardized mean

ECMWF/Met Office/Meteo-France/NCEP/JMA
NDJ 2018/19

ECMWF Seasonal SST Forecast favours *normal* SSTs in the Fiji region.
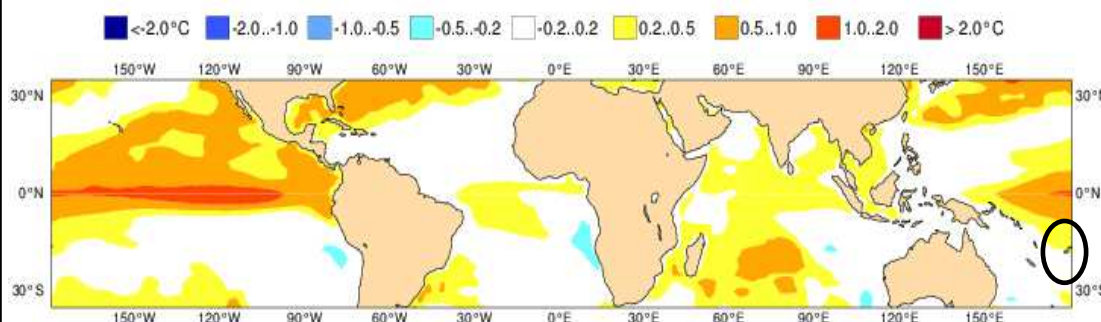
(https:// www.ecmwf.int/en/ forecasts/charts/ seasonal/ season-al_charts_public_euro sip_sst)

Figure 2b: NWS/NCEP/CPC Coupled Model - SST November 2018 to January 2019

NCEP Coupled Model favours *normal* SSTs in the Fiji region.

(http://www.cpc.ncep.noaa.gov/products/CFSv2/imagesInd3/glbSSTSeaMaskInd1.gif)

Figure 3a: ECMWF Rainfall Outlook for November 2018 to January 2019

ECMWF Seasonal Forecast favours *average* rainfall in the Fiji region.

(https://www.ecmwf.int/en/forecasts/charts/seasonal/seasonal_charts_public_eurosip_precipitation/time=2017090100,2904,2017123100&forecast_type_and_skill_measures=tercile%20summary)
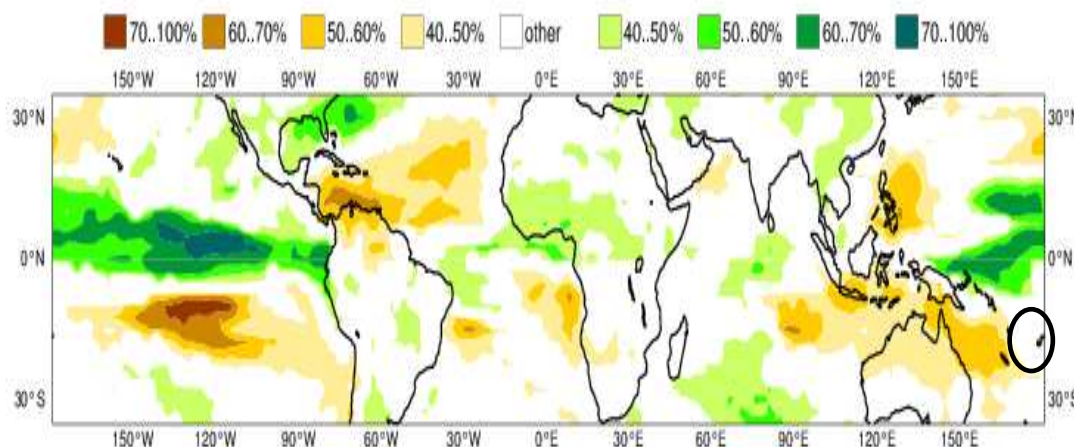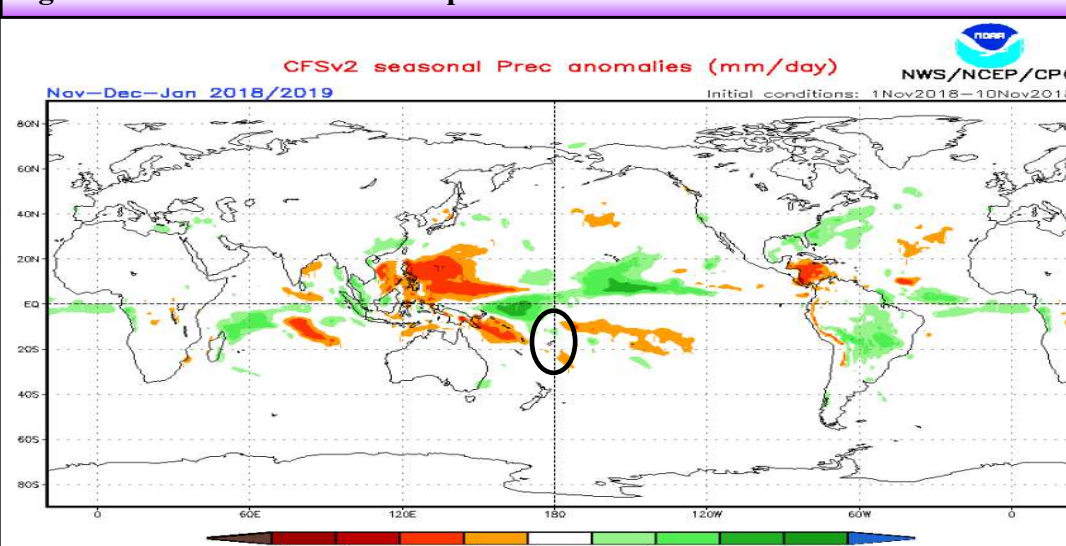
Figure 3b: NWS/CEP/CPC Coupled Model - Rainfall Outlook for November 2018 to January 2019

NCEP Coupled Model forecast favours *average* rainfall in most parts of the Fiji region.

(http://www.cpc.ncep.noaa.gov/products/CFSv2/imagesInd3/glbPrecSeaInd1.gif)

3

Table 1: Three Months: November 2018 to January 2019 Rainfall Outlook

Station (Locations in Figure 4)	Below Average	33 %	Average	67 %	Above Average
	(%)	(mm)	(%)	(mm)	(%)
Western Division					
Dobuilevu	57	644	29	964	14
Penang Mill	58	579	32	926	10
Yasawa-i-rara	63	392	31	632	6
Vatukoula Mine	65	506	29	905	6
Rarawai Mill	69	526	22	961	9
Lautoka Mill	67	443	25	754	8
Vaturu	53	757	38	1200	9
Nadi Airport	63	426.2	30	751	7
Nabou Pine	55	385	41	660	4
Lomawai	73	376	19	680	8
Olosara	73	322	23	608	4
Nacocolevu	64	451	28	721	8
Monasavu Dam	33	1456	42	1873	25
Central Division					
Navua	48	859	25	1140	27
Lami	28	866	42	1157	30
Laucala Bay, Suva	42	696	36	1036	22
Tamavua	36	813	40	1158	24
Nausori Airport	47	743	35	1034	18
Koronivia	44	781	41	1051	15
Naduruloulou	38	836	37	1080	25
Eastern Division					
St. John's College, Levuka	41	496	36	823	23
Lakeba	52	464	35	682	13
Ono-i-lau	57	366	35	520	8
Matuku	51	363	32	593	17
Vunisea	53	481	32	711	15
Northern Division					
Nabouwalu	60	642	32	878	8
Dreketi	54	575	39	944	7
Seaqaqa	55	705	31	955	14
Labasa Airfield	55	568	39	936	6
Savusavu Airfield	49	570	33	728	18
Wainigata	46	679	42	927	12
Udu Point	43	670	42	906	15
Matei Airfield	47	767	35	974	18
Rotuma	51	858	26	1056	23

The FMS uses the Seasonal Climate Outlook for Pacific Island Countries (SCOPIC) Model as its main guidance for predicting climate on a three to six month timescale. SCOPIC bases its calculations on there being a crrelation between sea surface temperatures and rainfall/air temperatures. For some parts of Fiji e.g. the middle of the Dry Zone, this link is very strong. For others e.g. Suva, the link is not as strong, but it is still a useful indicator.

When calculating rainfall for example for the upcoming three month period (e.g. February to April 2015), SCOPIC uses measurements from the current three month period (in this case November to December 2014) to look for similar ocean patterns in the historical record. The rainfall for the following three month period are then used to calculate the probabilities for the outlook period.

Table 2: Three-months: February to April 2019 Rainfall Outlook

Station (Locations in Figure 4)	Below Average	33 %	Average	67 %	Above Average
	(%)	(mm)	(%)	(mm)	(%)
Western Division					
Dobuilevu	38	835	34	1078	28
Penang Mill	47	838	31	1155	22
Yasawa-i-rara	56	553	23	837	21
Vatukoula Mine	52	858	33	1110	15
Rarawai Mill	47	786	37	1070	16
Lautoka Mill	48	736	27	953	25
Vaturu	45	1139	35	1472	20
Nadi Airport	49	681	36	950	15
Nabou Pine	50	645	36	837	14
Lomawai	53	561	29	783	18
Olosara	47	509	36	766	17
Nacocolevu	46	620	39	837	15
Monasavu Dam	30	1265	31	1741	39
Central Division					
Tokotoko, Navua	33	999	30	1205	37
Lami	25	1051	43	1333	32
Laucala Bay, Suva	37	846	27	1055	36
Tamavua	25	994	38	1253	37
Nausori Airport	29	894	34	1043	37
Koronivia	41	931	25	1095	34
Naduruloulou	25	962	40	1258	35
Eastern Division					
St. John's College, Levuka	38	629	47	896	15
Lakeba	50	647	27	827	23
Ono-i-lau	42	480	33	738	25
Matuku	45	528	30	712	25
Vunisea	48	644	29	832	23
Northern Division					
Nabouwalu	42	767	36	1061	22
Dreketi	44	749	35	1029	21
Seaqaqa	40	909	35	1163	25
Labasa Airfield	44	833	29	1176	27
Savusavu Airfield	43	639	30	832	27
Wainigata	39	678	35	915	26
Udu Point	38	783	35	1014	27
Matei Airfield	33	749	36	1013	31
Rotuma	37	882	33	1076	30

Figure 4: Air Temperature Outlook - November 2018 to January 2019
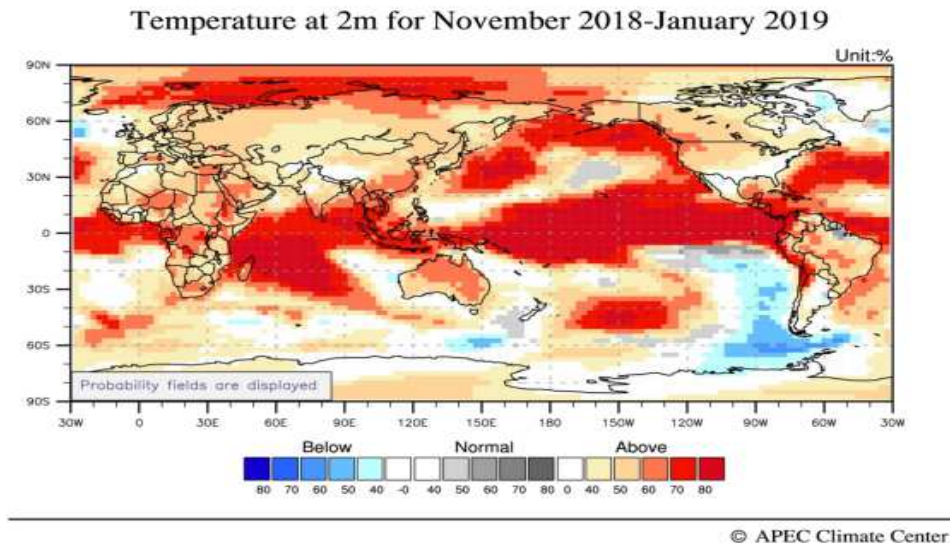
Multi-model ensemble for air temperature predictions favor *above normal* SSTs for Fiji region. Source: APEC Climate Centre.

Figure 5: Air Temperature Outlook - February to April 2019
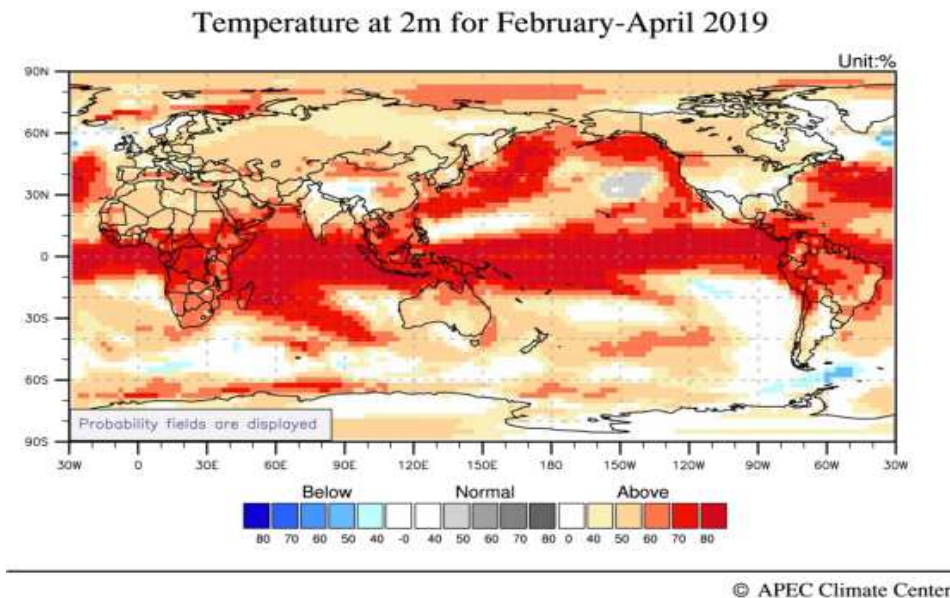
Multi-model ensemble for air temperature predictions. Source: APEC Climate Centre.

Figure 6. Location of climate monitoring stations in Fiji.

4.0   TROPICAL CYCLONE SEASON 2018/2019 OUTLOOK

The Tropical Cyclone (TC) activity in the 2018-19 TC season within the Regional Specialized Meteorological Center Nadi – Tropical Cyclone Centre (RSMC Nadi-TCC) Area of Responsibility (AoR) (Equator to 25˚ South between 160˚ East and 120˚ West) is predicted to be *normal* or *above normal* with *moderate to high confidence*. In the Southern Hemisphere, the official 2018-19 TC season begins on 1st November 2018 and ends on 30th April 2019. However, the 2018-19 TC season has started `earlier than anticipated with the first TC to form near Solomon Islands and named "Liua" on 27 September 2018.

Seven to nine TCs are expected to occur in the RSMC Nadi-TCC AoR during the 2018-19 season. The average for all the 49 seasons from 1969-70 to 2017-18 is 7.1 TCs. The average for El Niño, La Niña and neutral seasons are 8.6, 6.1 and 6.3 TCs, respectively. Analogues of eight seasons with similar atmospheric and oceanic conditions to present were used for this outlook (Table 1).

TC activity in the South Pacific region is likely to be shifted eastward during the 2018-19 season. This outlook is based upon the status of the El Niño Southern Oscillation (ENSO) over the preceding July to September period. During this period in 2018, neutral conditions were present in the tropical Pacific, but Pacific Ocean was warming towards weak El Niño. The analogue seasons were further narrowed based on international guidance forecast for weak to marginally moderate El Niño conditions during most of the coming TC season. Historically, these conditions have favoured an eastward shift in TC activity in the South Pacific.

TC activity in Solomon Islands, Vanuatu, Fiji, Tonga, Pitcairn Islands and Tuamotu Archipelago/Gambier Islands is likely to be *normal* this season, while there is *reduced* risk for New Caledonia. In contrast, *increased* risk of TC activity is anticipated for Tuvalu, Wallis & Futuna, Tokelau, Samoa, Niue, Cook Islands, Society Islands and Austral Islands. TC activity in the Kiribati and Marquesas area is unlikely (refer to Table 2 for climatological numbers of TCs).

There is *normal* risk of **severe** TCs for Fiji, Tuvalu, Tokelau, Samoa, Tonga, Niue, and Tuamotu Archipelago/ Gambier Islands, while there is *reduced* risk of **severe** TCs for Solomon Islands, Vanuatu and New Caledonia. The risk of **severe** TC is *increased* for Wallis & Futuna, Cook Islands, Society Islands and Austral Islands. Severe TC is unlikely in the Marquesas, Pitcairn Islands and Kiribati regions (refer to Table 3 for climatological numbers of **severe** TCs).

For Fiji, one to two TCs could be expected this season of which one may reach or exceed category three status. For those TCs passing close to the country, associated active cloud and rain bands may occasionally affect Fiji with heavy rainfall and possible flooding, including sea flooding of low□lying coastal areas. With the expectation of TC genesis to be shifted eastwards, there is an elevated risk of TCs for the Northern and Eastern Divisions of Fiji this season.

Historical records show that TCs have occasionally formed outside the official TC Season. Because of this, it is critical that all communities remain alert and prepared throughout the 2018-19 TC season and beyond.