# CLIMATE SUMMARY NOVEMBER 2018


## Samoa Meteorology Division
## Ministry of Natural Resources and Environment

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**HIGHLIGHTS** **ISSUED: DECEMBER 2018**

- *Average* to *Below Average* rainfall was generally the status for November statistics.. **Pg. 1 & 2**
- Cold temperatures as low as 14.0ºC were experienced for Samoa. **Pg. 3**
- Easterly winds remain dominant for the group in November. **Pg 4 & 5**
- While the Pacific Oceans continue to warm towards El Nino thresholds, other climate indicators have not agreed for such an event to occur, hence the ENSO Outlook remains at "El Nino Alert" **Pg 6**
- A pool of warmer than normal anomalies continue to migrate eastward along the Equatorial region, with cooler anomalies developing in the west. An El Nino event is still anticipated in the coming months.. **Pg 6.**

Figure 1: SPCZ Position in November 2018

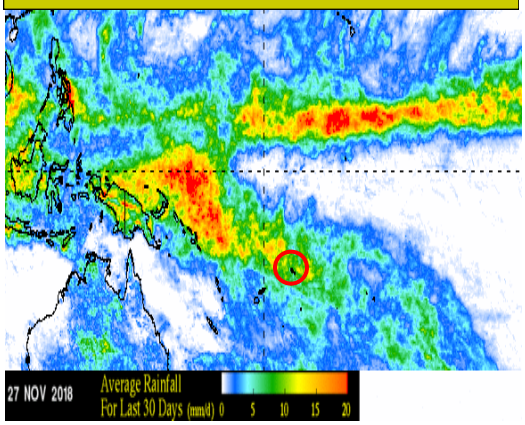
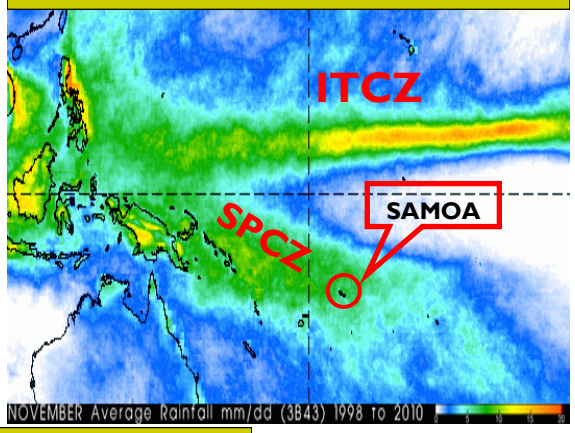



Figure 2: Normal Position of SPCZ in November




## GLOBAL SCALE OBSERVATIONS

A northward fluctuation of the Inter Tropical Convergence Zone was observed for the month of November, and was generally more active than normal. The South Pacific Convergence Zone on the other hand was seen to be confined to the Western Equatorial Region, with enhanced rainfall activity, extending over the group. The positioning of the SPCZ provided fair amount of rainfall for Samoa in November 2018.

## LOCAL SCALE OBSERVATIONS

The first month of the wet season was seen to provide average rainfall for the group. In accordance to the weather summary, easterly wind flow dominated November, with few Convergence Zones developing within the forecast zone. These observations are summarised in Table 1. Moreover, Togitogiga was registered as the wettest station, having received a total amount of rainfall of 626.2mm, where Nuusuatia station was the second wettest with 592.6mm. These wet conditions were enhanced by an active convergence zone which descended over the group on the 5th of the month, where Togitogiga and Saleilua stations recorded their highest one day fall of 221.4mm and 193.8mm respectively. On the contrary, the lowest monthly rainfall was recorded at Apia station having received only 116.3mm, with the second lowest at Fasitoo, with 119.5mm. Further analysis of Novembers statistics showed 7 stations recorded *Below Average*, 7 more with *Average*, 4 with *Above Average* and only one station with *Well Above Average* rainfall.

Table 1: Rainfall Statistics in November 2018

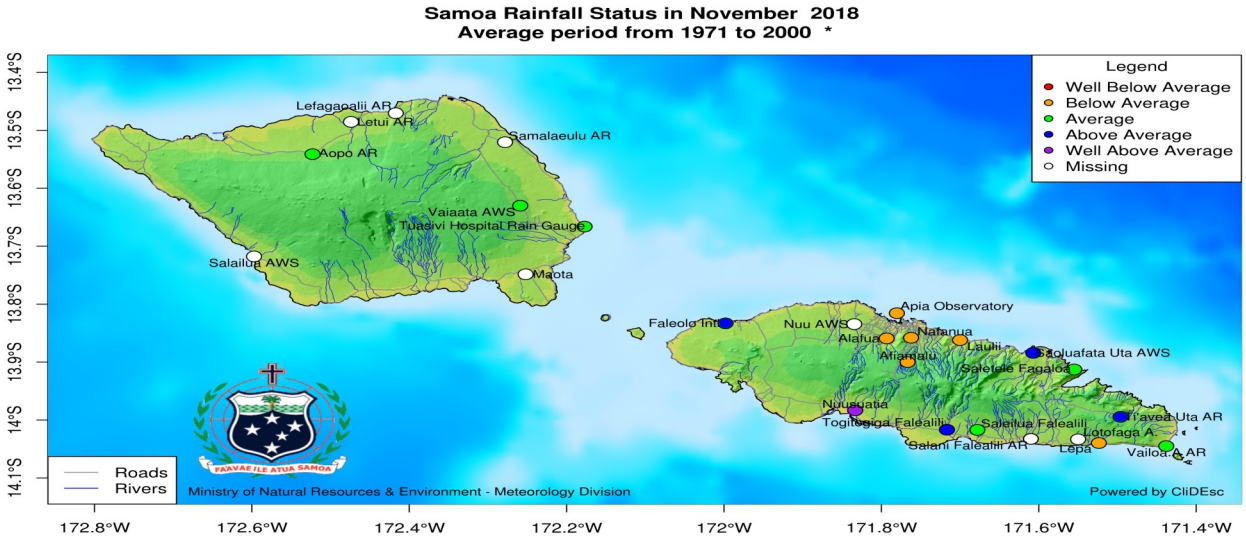
*This table displays the rainfall status of all stations in the country in November 2018*

| Stations | November Rainfall (mm) | November 30 Year Long Term Average | % of Average | 1 day fall (mm) | Date | # of Rainy Days | Rainfall Status |
|---|---|---|---|---|---|---|---|
| **UPOLU** | | | | | | | |
| Afiamalu | 286.9 | 421 | 68 | 58.8 | 03rd | 26 | Below Average |
| Alafua | 162.1 | 215 | 75 | 59.3 | 15th | 16 | Below Average |
| Apia | 116.3 | 262 | 44 | 46.5 | 15th | 17 | Below Average |
| Faleolo | 233.1 | 177 | 132 | 53.6 | 07th | 19 | Above Average |
| Fasitoo | 119.5 | 177 | 68 | 37.8 | 08th | 12 | Below Average |
| Gagaifo Lefaga | 371.8 | 334 | 111 | 75.6 | 04th | 18 | Average |
| Laulii | 234.9 | 392 | 60 | 122.0 | 16th | 12 | Below Average |
| Lepa | 235.4 | 582 | 40 | 40.4 | 06th | 21 | Below Average |
| Nafanua | 184.5 | 305 | 60 | 57.0 | 15th | 19 | Below Average |
| Nuusuatia | 592.6 | 316 | 188 | 185.4 | 05th | 24 | Well Above Average |
| Saleilua | 494.8 | 555 | 89 | 193.8 | 05th | 24 | Average |
| Saletele | 313.4 | 653 | 48 | 63.2 | 07th | 27 | Average |
| Saoluafata | 396.6 | 329 | 121 | 114.4 | 16th | 22 | Above Average |
| Ti'avea | 444.0 | 355 | 125 | 94.6 | 17th | 25 | Above Average |
| Togitogiga | 626.2 | 444 | 141 | 221.4 | 05th | 29 | Above Average |
| Vailoa.A | 227.6 | 279 | 82 | 43.2 | 05th | 21 | Average |
| **Savaii** | | | | | | | |
| Aopo | 326.2 | 272 | 120 | 80.8 | 15th | 17 | Average |
| Tuasivi | 284.0 | 285 | 100 | 112.0 | 07th | 17 | Average |
| Vaia'ata | 395.8 | 418 | 95 | 70.6 | 15th | 19 | Average |

| Well Below Average <40% | Below Average 40%-80% | Average 80%-120% | Above Average 120%-160% | Well Above Average >160% |
|---|---|---|---|---|

Figure 3: Rainfall Status Map in November 2018

*This rainfall map is generated using observation data from Table 1*




* Newer stations use only data that is available as they do not have enough for a 30 year average

## TEMPERATURE

Table 2: Air Temperature Statistics

*This table displays the temperature statistics recorded across stations in November 2018*

| Stations | Temperature (Degree Celsius) | | | | |
|---|---|---|---|---|---|
| | Mean Daily Temperature (°C) | Extreme Temp Max (°C) | Date | Extreme Temp Min(°C) | Date |
| Afiamalu | 22.5 | 28.0 | 05th | 14.0 | 30th |
| Apia | 27.9 | 32 | 23rd | 21.4 | 30th |
| Alafua | N/A | N/A | N/A | 19.9 | 30th |
| Faleolo | N/A | N/A | N/A | 21.5 | 30th |
| Saoluafata | 27.0 | 33.0 | 23rd | 20.9 | 30th |
| Vaiaata | 28.4 | 33.0 | 30th | 22.6 | 05th |
| N/A = Data Not Available | | | | | |

While mean daily temperatures ranged from 22.5°C to 28.4°C, the warmest daytime temperature of 33.0°C were recorded at Saoluafata on the 23rd and at Vaiaata on the 30th. On the other hand, clear skies on the 30th provided cool conditions, with the lowest night time temperature of 14.0°C recorded at Afiamalu station.

## ATMOSPHERIC PRESSURE

Table 3: Atmospheric Pressure at Mean Sea Level (MSL)

*This table displays the atmospheric statistics recorded across two stations in November 2018*

| Station | Highest MSL Pressure (hPa) | Date | Lowest MSL Pressure (hPa) | Date | Average MSL Pressure (hPa) |
|---|---|---|---|---|---|
| Apia | 1015.1 | 01st | 1007.0 | 08th | 1011.1 |
| Faleolo | 1015.5 | 01st | 1007.3 | 08th | 1011.5 |

The highest Mean Sea Level (MSL) pressure of 1015.5hPa was recorded at Faleolo station on the 01st. The lowest however was registered at Apia station, of 1007.0hPa on the 08th, providing average temperatures for Samoa.

*(Note: Generally, high pressure systems associate with good weather conditions whereas low pressure systems associate with bad weather conditions)*

## WIND

Figure 4: Wind Speed and Directions

*The following diagrams show the different wind speed and direction that recorded daily at 9am across the country in November 2018.*

Figure 4a : Apia Station

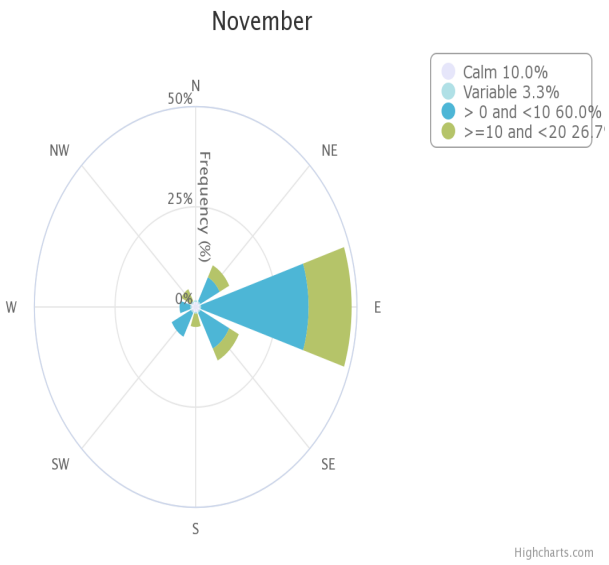
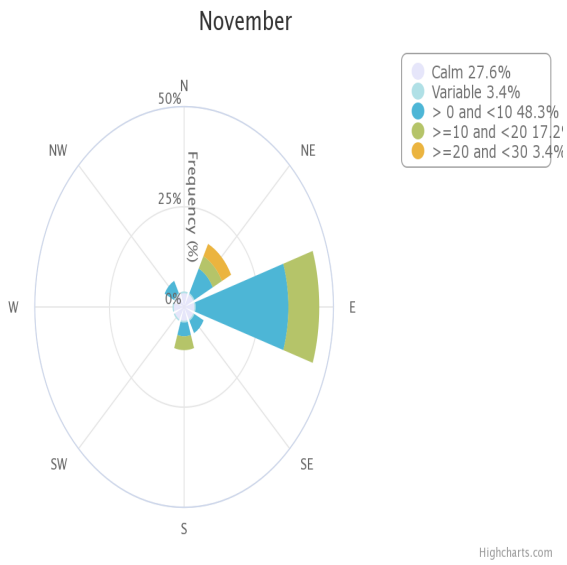



Figure 4b: Faleolo Station




For Apia station (Figure 4a), easterly winds were sustaining throughout the month, with noticeable variable winds. Light winds (1-10km/hr) were the dominant wind speeds.

Further west of the island, Faleolo station experienced the Easterlies as dominant, with significant **strong** north easterly winds. Nonetheless, light winds of 1-10km/hr were the most occurring for Faleolo station.

Figure 4c : Afiamalu Station

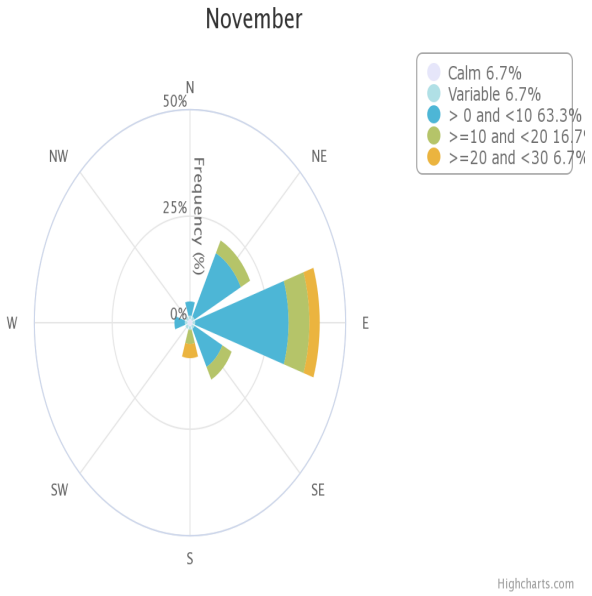
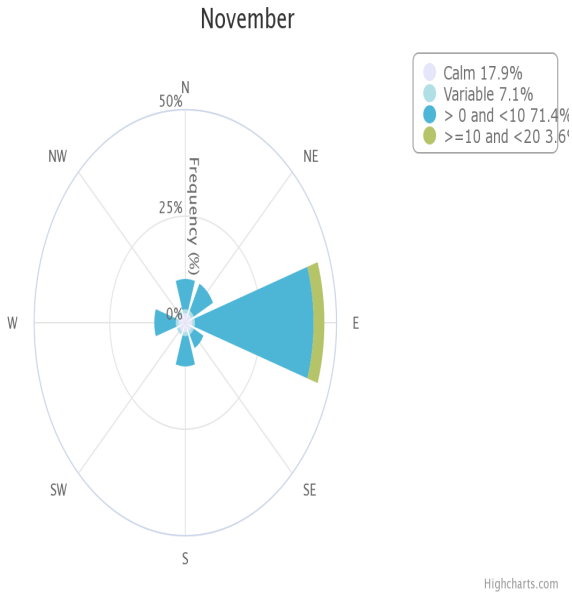



Figure 4d: Nafanua Station




Although variable at times, Easterly winds remained dominant at Afiamalu station (Figure 4c). For wind speeds, light winds of 1-10km/hr were persistent, with gusts of up 30km/hr.

Variable winds were recorded at Nafanua station (Figure 4d), with persisting easterly winds for the month of November. The wind rose also illustrates the high occurrence of light winds (1-10km/hr) for this station. As seen in Figure 4, modest winds were recorded for most stations, particularly in early November.

# EL NINO SOUTHERN OSCILLATION (ENSO)

## CURRENT ENSO STATUS

Although some of the climate indicators have reached El Nino thresholds, the Pacific Ocean still rests at ENSO neutral state. Because ENSO phase needs to be coupled, the ENSO Outlook remains at El Nino Alert.

## Oceanic Indicator of ENSO

Figure 5: Sea Surface Temperature in November 2018

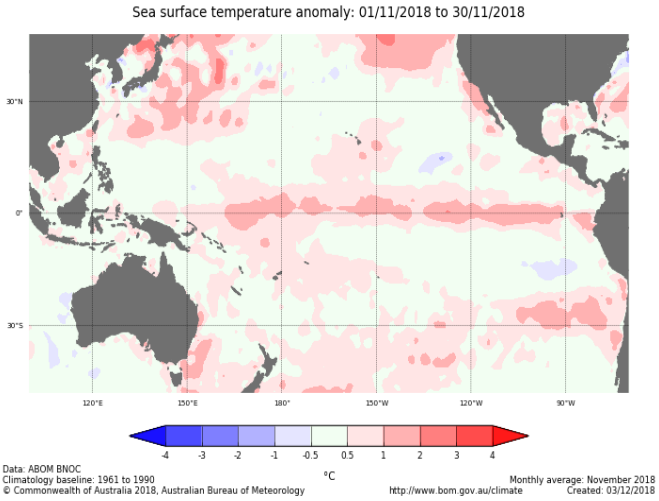
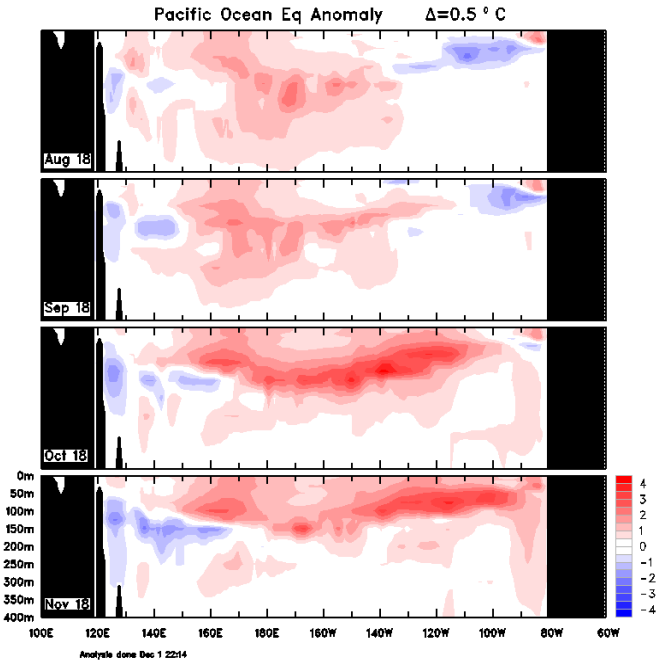



Figure 6: Sub-surface Temperature




## Atmospheric Indicator of ENSO

### Southern Oscillation Index (SOI)

The 30 day Southern Oscillation Index (SOI) to the 2nd of December was +1.6, with the 90 day value of –2.2. These values have been in neutral levels since September, which makes an El Nino event difficult to occur.

*(Sustained positive values of the SOI above +7 indicate La Nina. Whereas sustained negative values below –7 indicate El Nino. Values within –7 and +7 shows neutral conditions.)*

Figure 5 shows how the Sea Surface temperatures for the month of November. Much of the Equatorial region and the Pacific Ocean experienced warmer than normal conditions.

Moreover, our Nino Indices showed a slight increase in temperature , with Nino 3 at + 0.9$^0$C, Nino 3.4 at +0.9$^0$C and Nino 4 at +0.9$^0$C.

The month sequence to November shows that the warmer anomalies have continued to migrate eastward of the Equatorial region. The warm pool extends to a depth of 250m,and stretches from the 140E Longitude to the 100W Longitude. Figure 6 shows that some parts of this warm pool were more than 3 degrees warmer since October. The sub surface temperatures therefore suggest an El Nino event to occur in the next few months, if the atmospheric indicators are to reach thresholds by then.

# APPENDIX

Figure 7: Graphical representation of total monthly rainfall in November 2017 vs November 2018 in all rainfall stations.

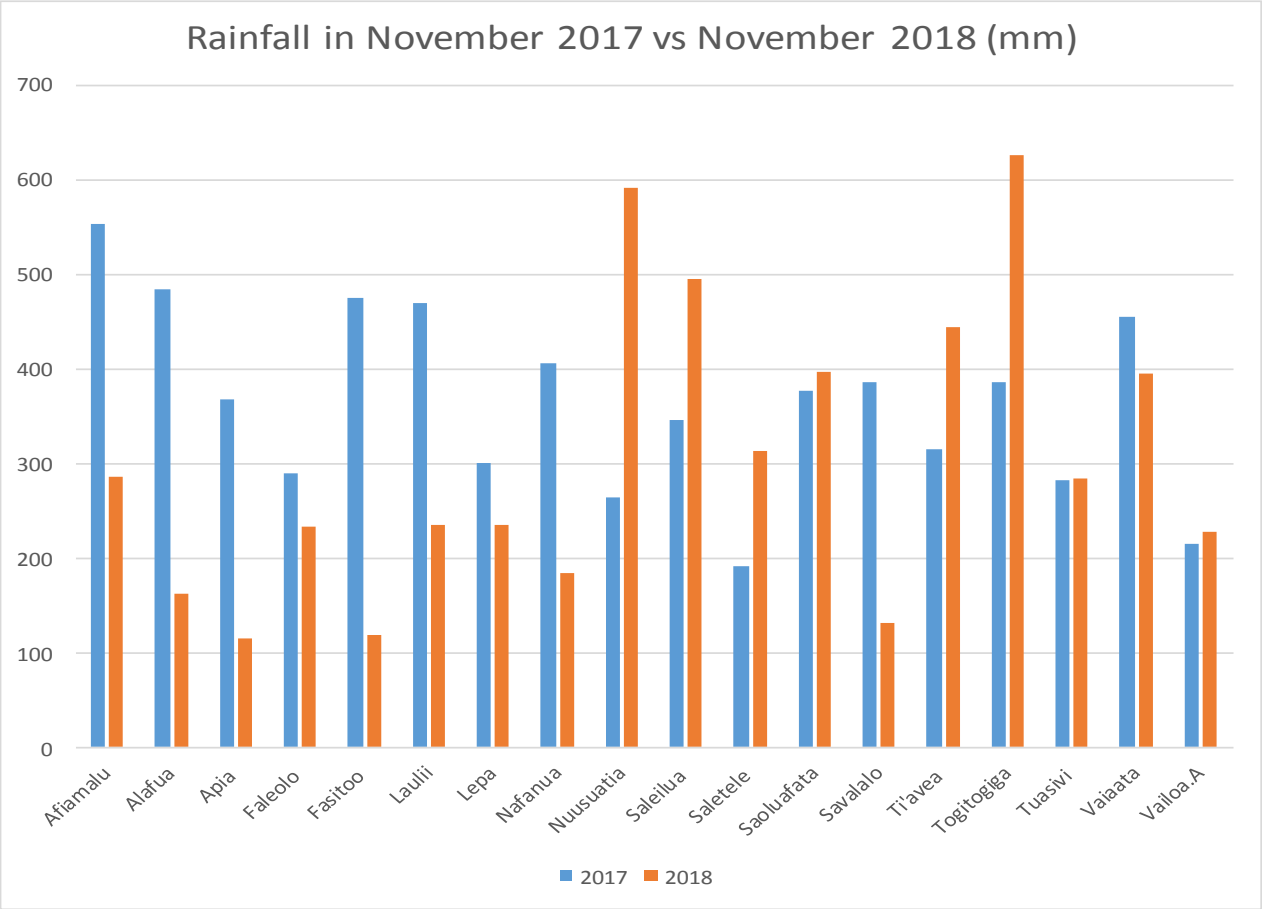



Figure 7 shows that generally, November 2017 experienced more rainfall activity than November 2018, which concentrated mainly to the south of the island and among the highlands. Heavy rainfall advisory were valid from the 5th to the 6th ensuring sufficient rainfall for the month.