CLIMATE SUMMARY SEPTEMBER 2020

Samoa Meteorology Division

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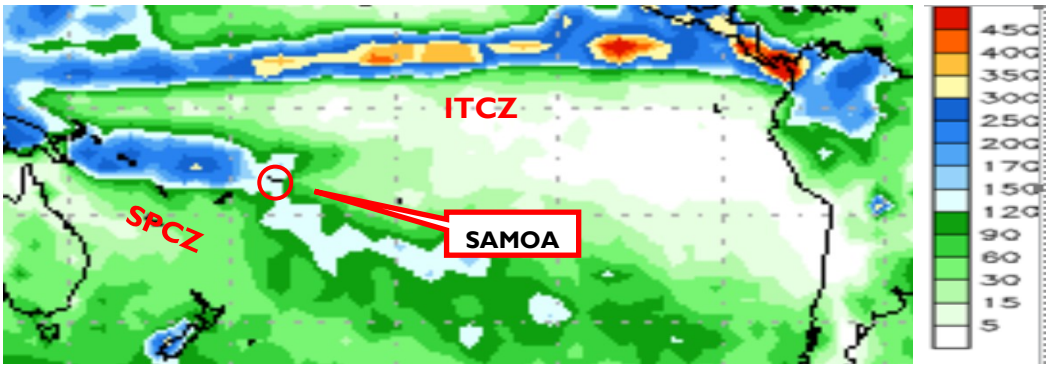
HIGHLIGHTS

- '*Well Above Average*' rainfall recorded in September 2020. **Pg 1 & 2**
- Highest daytime temperature of 32.2^{0}C was recorded at Saoluafata station **Pg 3**
- Easterly winds remain dominant for most of the areas with north easterlies influencing the windward side of the islands **Pg 4 & 5**
- El Nino Southern Oscillation (ENSO) has now reached La Nina thresholds. **Pg 6**
- Sea Surface temperatures continue to cool, and remaining within La Nina values for September. **Pg 6**

Figure 1: SPCZ Position in September 2020



GLOBAL SCALE OBSERVATIONS

A significant amount of rainfall was observed over the islands in September 2020. According to Figure 1 above, the activeness and positioning of the South Pacific Convergence Zone (SPCZ) was a major influence to the climate in the previous month. With a slight displacement to the north, the SPCZ still fluctuated over the Samoa islands, and extending towards the Cook Islands. The Inter Tropical Convergence Zone, was also seen to be more active than normal, while sustaining its normal September position along the equatorial region.

LOCAL SCALE OBSERVATIONS

In regards to the activeness of the SPCZ in September, rainfall statistics showed a *Well Above Average* rainfall status across the island. It was observed that the highest monthly rainfall of 843.0mm was recorded at Togitogiga station, whereas the second highest rainfall of 779.8mm was recorded at Lotofaga station. Moreover, rainfall activities were significant for most part of the month, where Nuusuatia station registered the highest one day fall of 170.0mm on the 05th, with the second highest of 160.8mm on the 22nd. On the other hand, the lowest rainfall of 160.2mm was observed at Aopo station, with the second lowest of 183.6mm at Faleolo stations. The differences between rainfall received in the northern region compared to the southern region is mainly due to the geographical influence on the climate for Samoa.

Table 1: Rainfall Statistics in September 2020

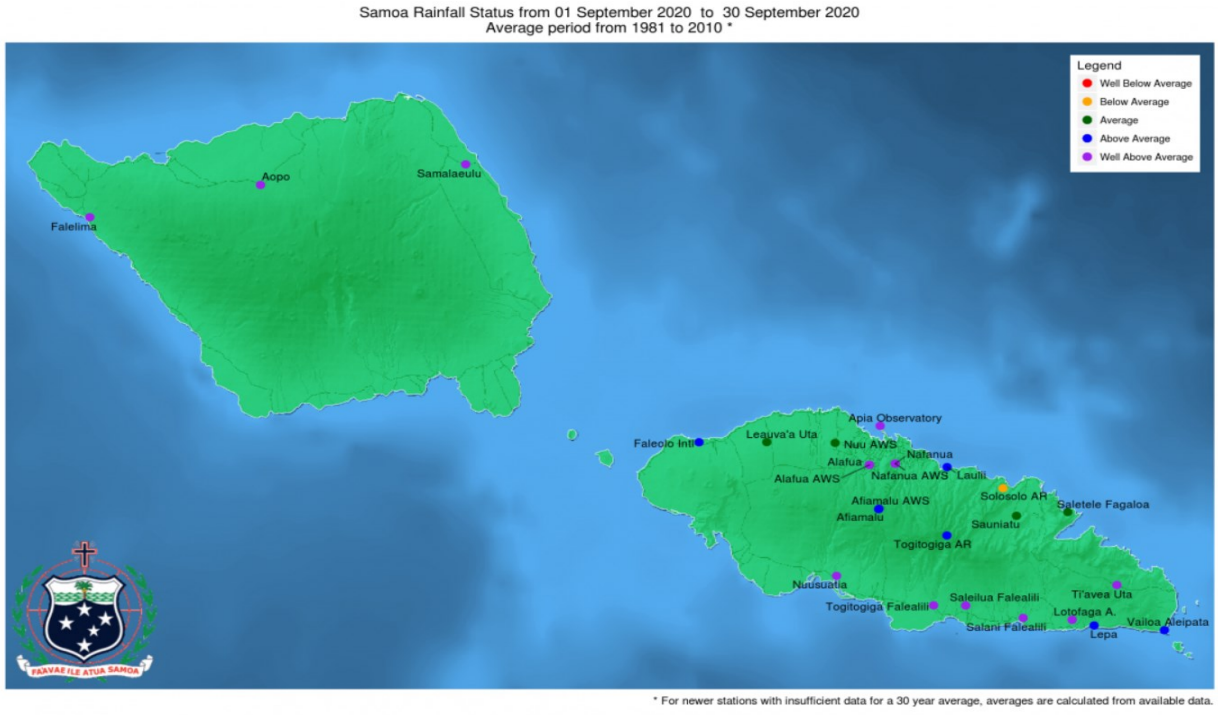
This table displays the rainfall status of all stations in the country in September 2020

Stations	September Rainfall (mm)	September 30 Year Long Term Average	% of Average	1 day fall (mm)	Date	# of Rainy Days	Rainfall Status
UPOLU							
Afiamalu	310.4	197	158	38.0	01st	28	Above Average
Alafua	290.1	141	206	68.4	02nd	19	Well Above Average
Apia	233.1	143	163	56.7	03rd	18	Well Above Average
Faleolo	183.6	98	187	41.2	08th	17	Well Above Average
Laulii	274.5	222	128	78.0	03rd	13	Above Average
Leauvaa	237.4	219	108	32.0	01st	21	Average
Lepa	666.2	347	192	142.2	03rd	22	Well Above Average
Lotofaga	779.8	305	256	140.2	05th	29	Well Above Average
Nafanua	348.2	144	242	88.8	02nd	24	Well Above Average
Nuusuatia	612.2	173	354	170.0	05th	24	Well Above Average
Salani	463.0	305	152	82.4	02nd	26	Above Average
Saleilua	761.6	431	177	160.8	22nd	22	Well Above Average
Saletele	400.2	303	132	33.1	30th	29	Above Average
Saoluafata	355.4	294	121	44.6	03rd	29	Above Average
Tiavea	472.8	249	190	83.8	08th	26	Well Above Average
Togitogiga	843.0	442	191	126.0	06th	30	Well Above Average
Vailoa. A	264.2	197	134	79.6	08th	21	Well Above Average
SAVAII							
Aopo	160.2	258	62	32.2	09th	19	Below Average
Falelima	207.4	86	241	29.2	26th	21	Well Above Average
Samalaeulu	406.0	216	188	69.8	01st	27	Well Above Average
Tuasivi	325.8	153	213	50.0	01st	22	Well Above 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 September 2020

This rainfall map is generated using observation data from Table 1



TEMPERATURE

Table 2: Air Temperature Statistics

This table displays the temperature statistics recorded across stations in September 2020

Stations	Max Temperature (^{0}C)		
	Mean Daily Temperature (^{0}C)	Extreme Temp Max (^{0}C)	Date
Alafua	26.7	31.2	04th
Saoluafata	26.4	**32.2**	19th
Nuu	23.9	31.3	24th

Stations	Min Temperature (^{0}C)	
	Extreme Temp Min(^{0}C)	Date
Apia	22.2	15th
Saoluafata	20.7	24th
Faleolo	21.4	27th
Afiamalu	16.5	13th
Alafua	21.7	24th
Nuu	**15.8**	25th

For September, mean daily temperatures recorded varied from 23.9^{0}C to 26.7^{0}C. However the highest daytime temperature recorded for the month was 32.2^{0}C, registered at Saoluafata on the 19th. Nights were also observed to be cool, with the lowest night time temperature of 15.8^{0}C recorded at Nuu station on the 25th of the month.

ATMOSPHERIC PRESSURE

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

This table displays the atmospheric statistics recorded across two stations in September 2020

Station	Highest MSL Pressure (hPa)	Date	Lowest MSL Pressure (hPa)	Date	Average MSL Pressure (hPa)
Apia	1015.5	07th	1010.2	09th	1013.5
Faleolo	1016.1	17th	1010.1	09th	1014.0

The highest MSL pressure of 1016.1 hPa was recorded at Faleolo station on the 17th. On the other hand, the lowest of 1010.1 hPa was recorded at Faleolo as well, on the 09th of September.

(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 recorded daily at 9am across the country in September. Rainfall activities are associated with dominant wind directions and geographical locations of rainfall stations.

Figure 4a : Apia Station

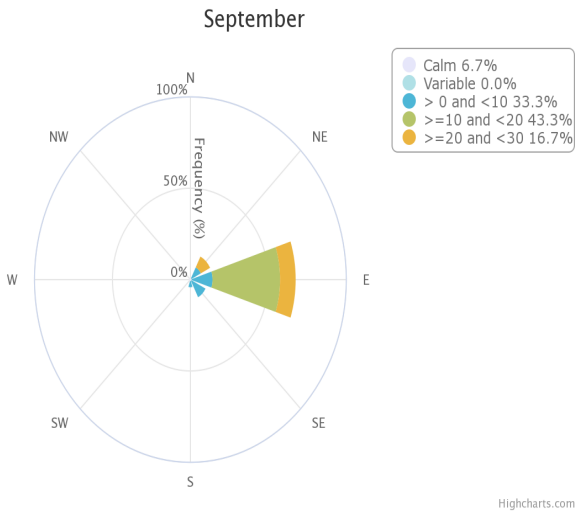
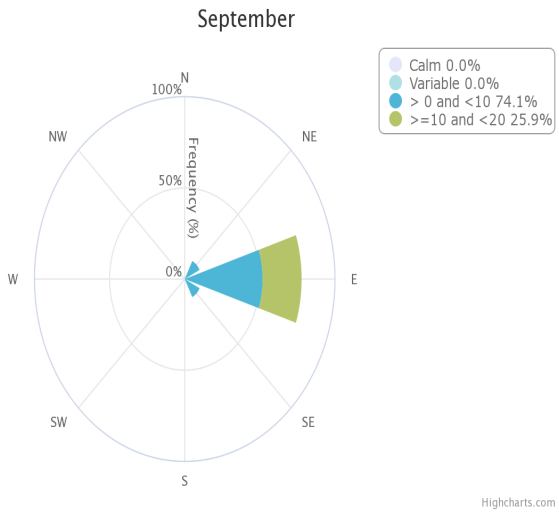


Figure 4b: Saoluafata Station



Both Apia and Saoluafata stations experienced dominant easterly winds, with moderate breeze (21-30km/hr) persisting at Apia, and slight breeze (1-10km/hr) occurring for most of the month at Saoluafata. The dominance of the easterly wind flow for Samoa can be reflected in Figures 4a and 4b above.

Figure 4c : Afiamalu Station

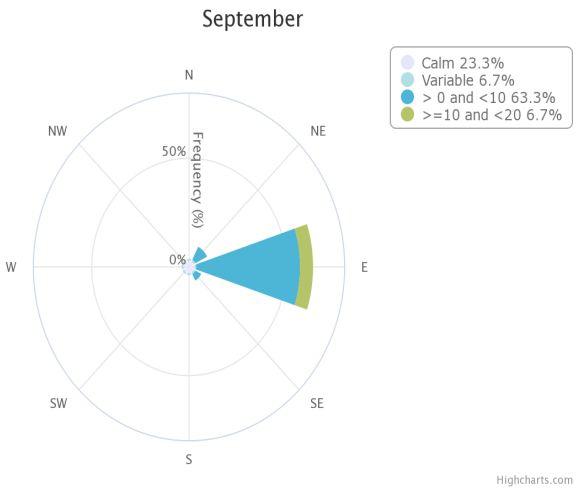


Figure 4d: Nafanua Station

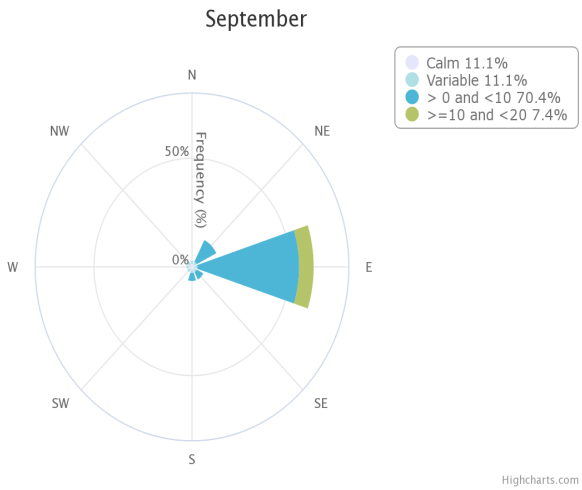


Figure 4e : Alafua

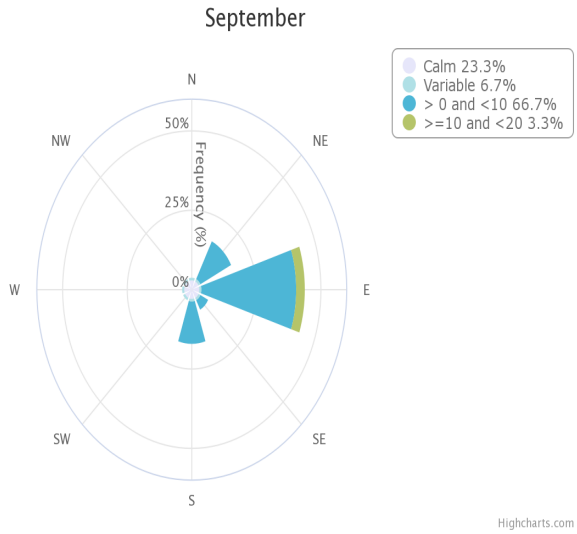
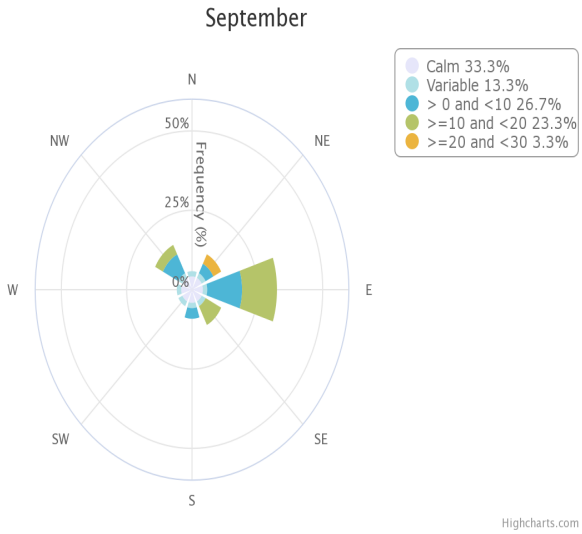


Figure 4f : Faleolo



Easterly winds also dominated all stations as seen above in September, due to a dominant wind flow. While slight breeze (1-10km/hr) were typically the wind conditions for most stations, Faleolo registered gentle breeze (21-30km/hr) during the month, with noticeable variable winds observed as well.

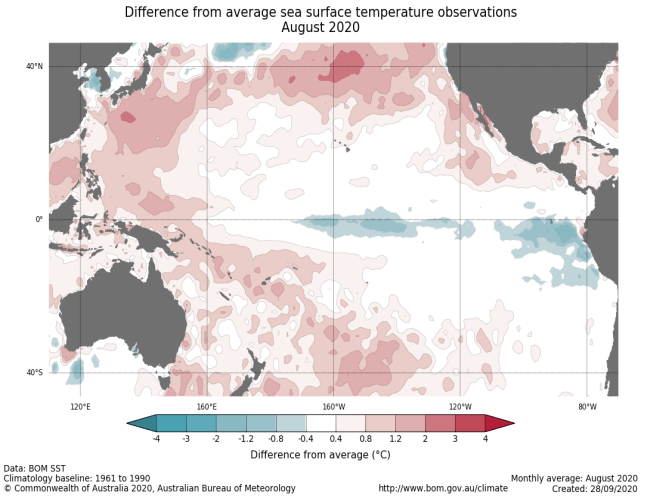
EL NINO SOUTHERN OSCILLATION (ENSO)

CURRENT ENSO STATUS

Climate models have now agreed that to a LA NIÑA, established in the tropical Pacific. All surveyed international climate models indicate this La Niña will persist until at least January 2021.

Oceanic Indicator of ENSO

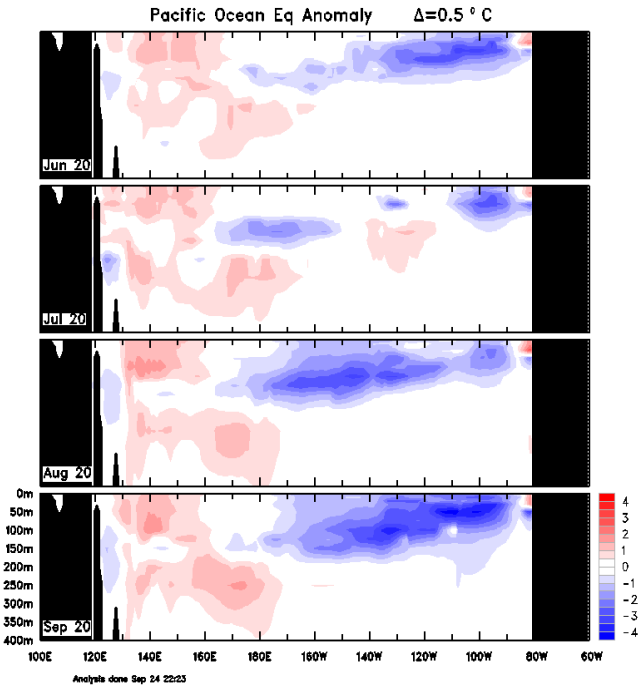
Figure 5: Sea Surface Temperature in September 2020



Cooler anomalies strengthening within the equatorial region has been observed in the last few months, and have continued to sustain those cool Sea Surface Temperatures (SSTs). On the western part of the South Pacific Ocean, warmer anomalies accumulate over the Papua New Guinea, and strengthening further south through Samoa and Fiji.

Furthermore, all NINO indices have cooled significantly in recent months, where the values for NINO 3, NINO 3.4 and NINO 4 were –0.8, -0.7 and –0.3 respectively.

Figure 6: Sub-surface Temperature



The four-month sequence of equatorial Pacific sub-surface temperature anomalies (to 24 September) shows cooler than average water extending across the top 200 m of the sub-surface of the equatorial Pacific east of the Date Line. The strength and extent of cooler than average water has increased month-on-month compared to both August and July.

Atmospheric Indicator of ENSO

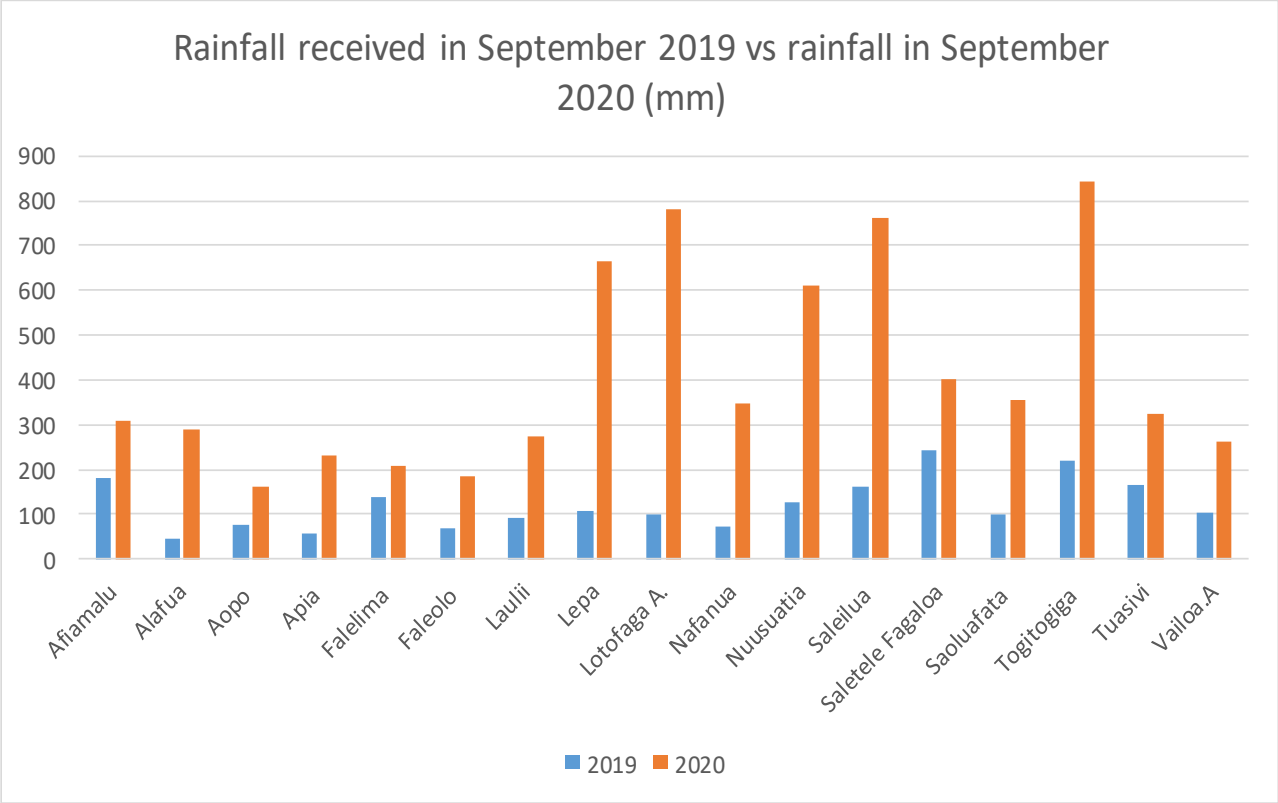
Southern Oscillation Index (SOI)

The 30-day Southern Oscillation Index (SOI) for the 30 days ending 11th of October was +11.7. The 90-day value is also above La Nina thresholds at +9.3

(*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.)

APPENDIX

Figure 7: Graphical representation of total monthly rainfall in September 2019 vs September 2020 in all rainfall stations.



The above figure shows a side by side comparison in rainfall activities during September 2019 and September 2020. the differences between the two years is significant, where September 2020 is evidently the wetter of the two. This is mainly due to the influence of the ENSO status during recent months, where climate indicators approached La Nina thresholds. These *Well Above* Average rainfall statuses have been observed for most of the dry season in 2020, due to this phenomenon. As of now, the ENSO status remains at La Nina, with climate models suggesting a weakening as early as February 2021.