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NUKU'ALOFA, TONGA

2020–2021 Tropical Cyclone Season Updated Outlook for Tonga

“There is a moderate chance (45%) for at least 1 Tropical Cyclone to occur for the remainder of the TC Season (08th March – 30th April 2021). If a Cyclone affects Tonga during the remainder of the Cyclone season, there is a 25% chance that this cyclone could be Severe”

(Issued: 08thMarch 2021)

Recent Tropical Cyclone Activities

Since the official start of the 2020-2021 Tropical Cyclone (TC) season on the 1st November 2020, two TCs has occurred and has been recorded over our Southwest Pacific region including Tonga. TC “ZAZU” (category 1) and Severe TC “YASA” (category 5). Both these TC systems occurred in our Tonga area of responsibility during the 13th – 20th December 2020.

TC “ZAZU” mainly affected the land areas and waters of the Vava’u group of islands with damaging gale to destructive force winds with heavy precipitation and flash floods. Severe TC “YASA”, however remained to the far western open waters of the Tongatapu and ‘Eua but had impacts of damaging gale force winds on Tongatapu and ‘Eua and with very rough to high seas accompanied by heavy damaging Northwesterly swells.

TC “ANA” (Category 3), also affected our Tongan Areas of Responsibility on the 30th January – 2nd February 2021. A series of Tropical Depressions (TDs) were also recorded during the last week of January to Mid-February 2021. These were TD 06F (28th – 29th January 2021) and TD 09F (9th – 10th February 2021). All these tropical system coincided within the last active period of our Southwest Pacific Region.

It was also being noted that towards the last weeks of February, the South Pacific Convergence Zone (SPCZ), the rain producing mechanism and cyclogenesis feature of our Southwest Pacific region was very active. It generated TD 10F and TD 11F (23rd -26th February 2021) which brought heavy rainfall events and strong winds over Tonga. Severe TC “NIRAN” (Category 5) also occurred in our Southwest Pacific region, 26th February – 06th March 2021 but had no direct threats to Tonga.

During every cyclone season there are active periods in which potential for tropical cyclone formation is increased. These active periods come around every 30 to 60days on average and lasts for a duration of about 2 to 3 weeks. There are at least three active periods in a typical TC season for the Southwest Pacific region.

The last active period for our current cyclone season occurred between the last week of January to mid-February 2021. This resulted and contributed to the occurrence of TC “ANA”, TD06F, TD 09F, TD10F andTD11F last month. These active periods was the second active period for our current TC season.

Summary of the Updated TC Outlook for Tonga

The next active period for the Southwest Pacific region (including Tonga) which indicates higher chances of TC formation is predicted to start in the **last week of March until mid-April 2021**.

The Tropical Cyclone (TC) activity expected for the remainder of the 2020/21 TC Season to affect Tonga is likely to be around average (1 to 2 cyclones). Historical and statistical records indicate that Tonga could expect a 45% chance of at least 1 cyclone to occur for the remainder of the TC season. These cyclones will most probably occur between late March to mid-April with a 25% chance of at least 1 Severe TC occurring.

Any tropical cyclones passing close to the country, associated active cloud and rain bands may occasionally affect Tonga with marked rainfall and possible flooding, including sea flooding of low-lying coastal areas. Tropical cyclones to affect Tonga for the remainder of the 2020/2021 season should expect to be mostly coming from the Northwest (Fiji Area – 60%) and the rest from the West, North, East and Northeast.

About 4 to 6 named Tropical Cyclones are expected for the South West Pacific in the 2020/2021 season with 1 to 3 reaching severe intensity (Category 3 to 5). Tropical Cyclone formation areas are still expected to develop in the warmer ocean temperatures in the Australia and Papua New Guinea and Solomon regions.

The remainder of the 2020/21 Cyclone Season is expected to bring average or below average rainfall for all of Tonga for the remainder of this cyclone season due to the weakening La Niña conditions of our Pacific region that is currently in place.

The peak time for the occurrence of tropical cyclones in Tonga is from January to March with most events occurring in February. Sea surface analysis indicates that the average La Niña phase conditions of the South-west Pacific region has reached its peak strength and is now weakening and the El Niño Southern Oscillation (ENSO) will return to Neutral Conditions for the remainder of this TC season. Given the diminishing signals of this La Niña event at the moment and returning to Neutral conditions in the next 3 months, Tonga normally receives average or below average rainfall activities in Neutral conditions of the sea surface temperatures. Climate models are also indicating that near normal or below normal rainfall over majority of Tonga during for the remainder of this TC Season. With current weakening conditions at La Niña and in the view of the rainfall outlook for Tonga, there is an increased risk of meteorological droughts in some islands of Tonga for the remainder of this TC Season.

Cyclones that have affected Tonga in the past where current and forecast conditions are similar to the 2020/21 Cyclone Season during March to April are indicated in Table 1.

Cyclone Season	No. of Tropical Cyclone occurring in March – April timeframe of the cyclone season	No. of Severe Tropical Cyclone occurring in March – April timeframe of the cyclone season
1970-1971	0	0
1973-1974	1	0
1974-1975	0	0
1988-1989	1	0
1998-1999	0	0
1999-2000	1	1
2000-2001	1	1
2007-2008	0	0
2010-2011	0	0
2011-2012	0	0
2017-2018	1	1
Average	0.45	0.27

Table 1: Current sea surface temperatures patterns indicates that the 2020/21 Tropical Cyclone season is expected to be similar to 11 other seasons in the past (1970/71, 1974/75, 1988/89, 1995/96, 1999/2000, 2000/01, 2007/08, 2010/11, 2011/12, 2017/18)

Statistical analysis of Tropical Cyclones occurrences in Tonga per ENSO Cycle since 1970

Year	No of Cyclone seasons	No of Cyclones	No of Severe Cyclones	Average	Average No of Severe Cyclones
Neutral Year	19	39	15	2.05	0.79
La Nina Year	11	20	9	1.82	0.82
El Nino Year	14	42	19	3.00	1.36

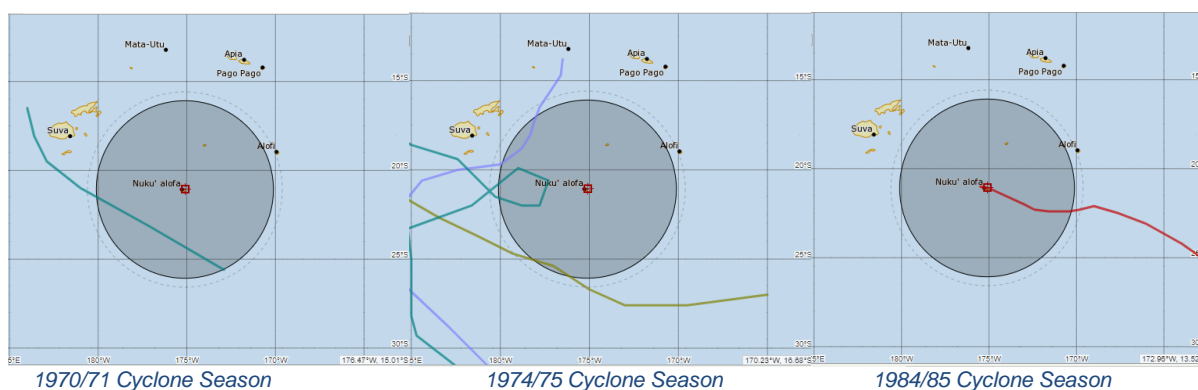
Table 2: Historical statistics of cyclone occurrence since 1970 indicates that during La Nina years there is lower risk of tropical cyclone occurrence

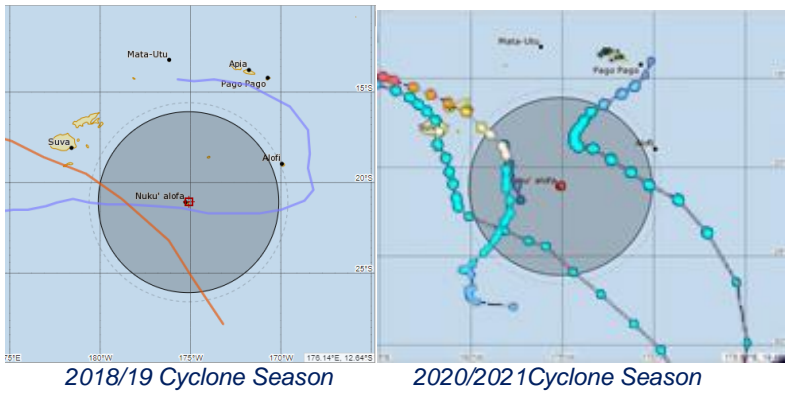
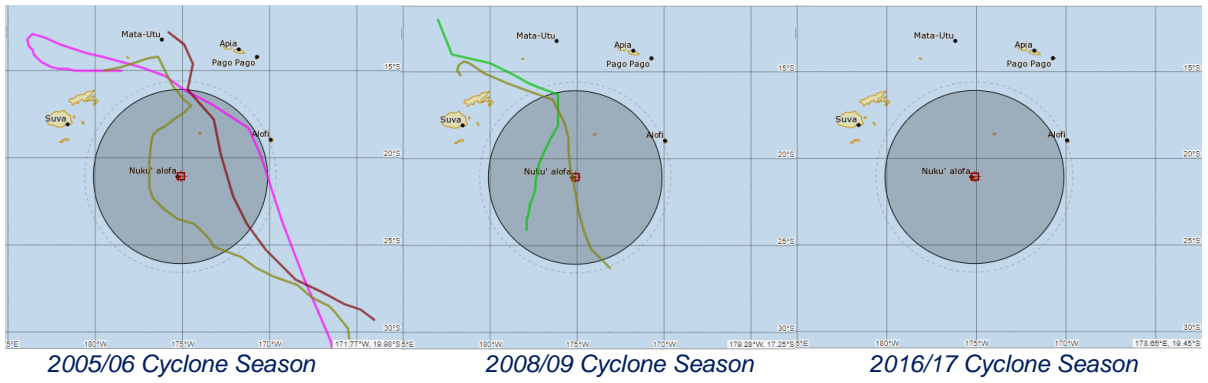
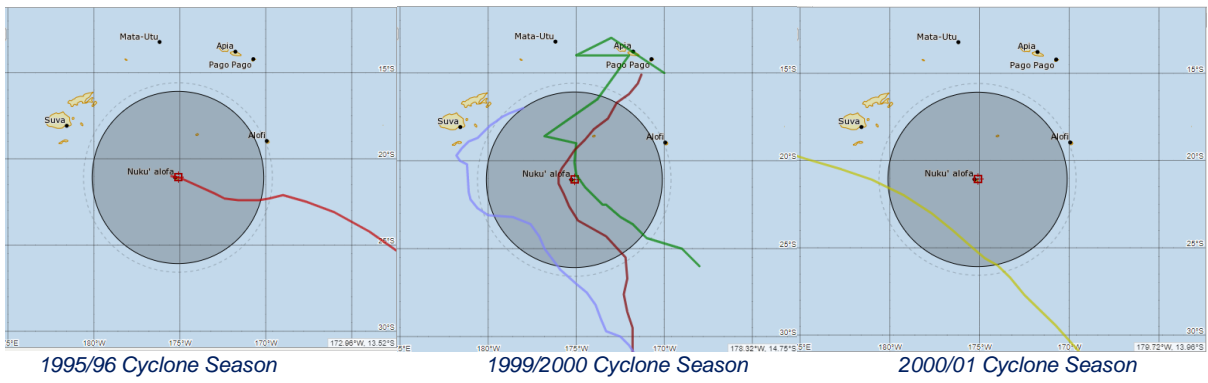
Severe Tropical Cyclones that have occurred in years similar of this coming cyclone season

Island Group	Severe Cyclone	Season
Niufo'ou	VAL (Cat 4)	1974/75
Ha'apai	NIGEL (Cat 3), ERIC (Cat 4)	1984/85
Tongatapu/Eua	MONA (Cat 3)	1999/00
Tongatapu/Eua	PAULA (Cat 4)	2000/01
Tongatapu/Eua	VAIANU (Cat 3)	2005/06
Tongatapu/Eua	GITA (Cat 4), KENI (Cat 3)	2017/18

Table 3: Statistically severe tropical cyclone events that have occurred during La Nina years like this season there is a higher risk for a severe tropical cyclone to affect Ha'apai, Tongatapu and 'Eua during the 2020/21 Cyclone Season

Cyclone tracks during LA Nina Cyclone Seasons with Sea Temperatures similar to this year





Expect Cyclone tracks to dominantly approach Tonga from the Northwest and West direction. There is higher risk of tropical cyclones to affect Ha'apai, Tongatapu and 'Eua if Tonga experiences any cyclones for the remainder of this TC season.

Rainfall Analysis for the 2020/21 Cyclone Season (La Nina)

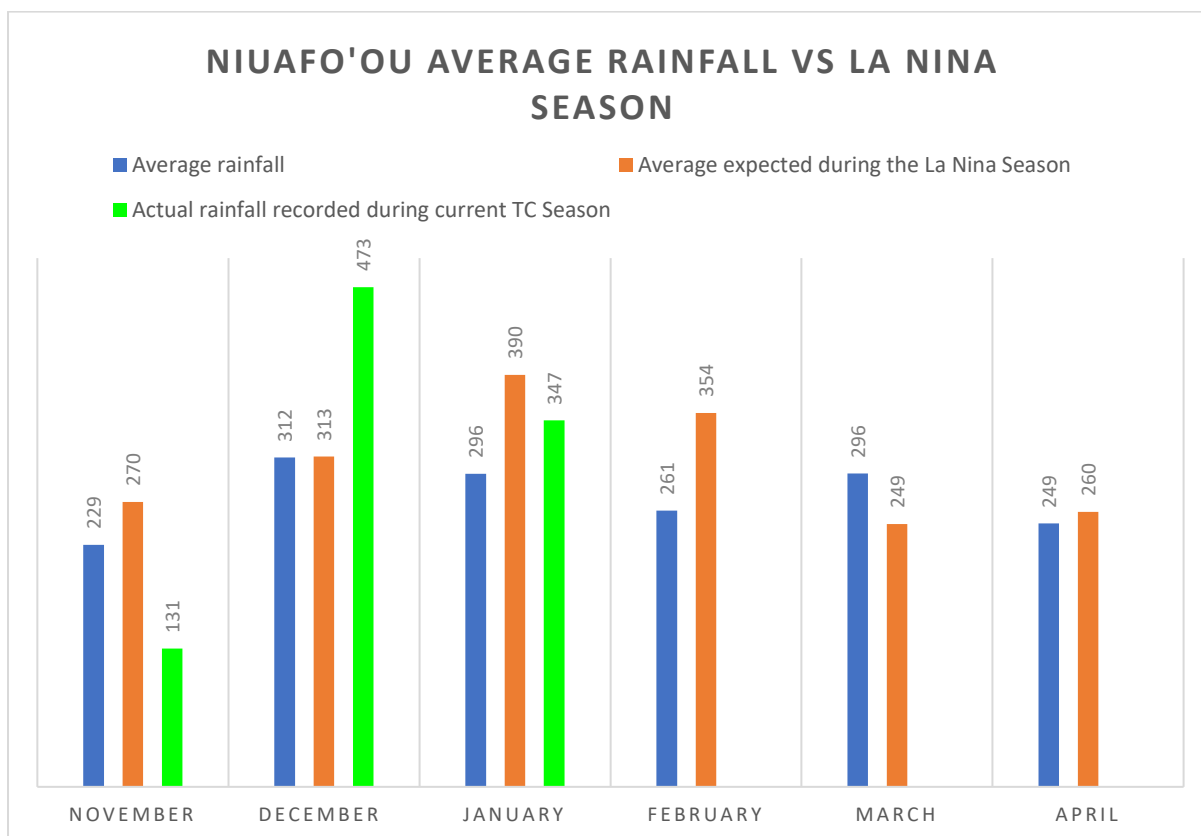


Figure 1: Expect peak above average rainfall in January and February for Niuafo'ou

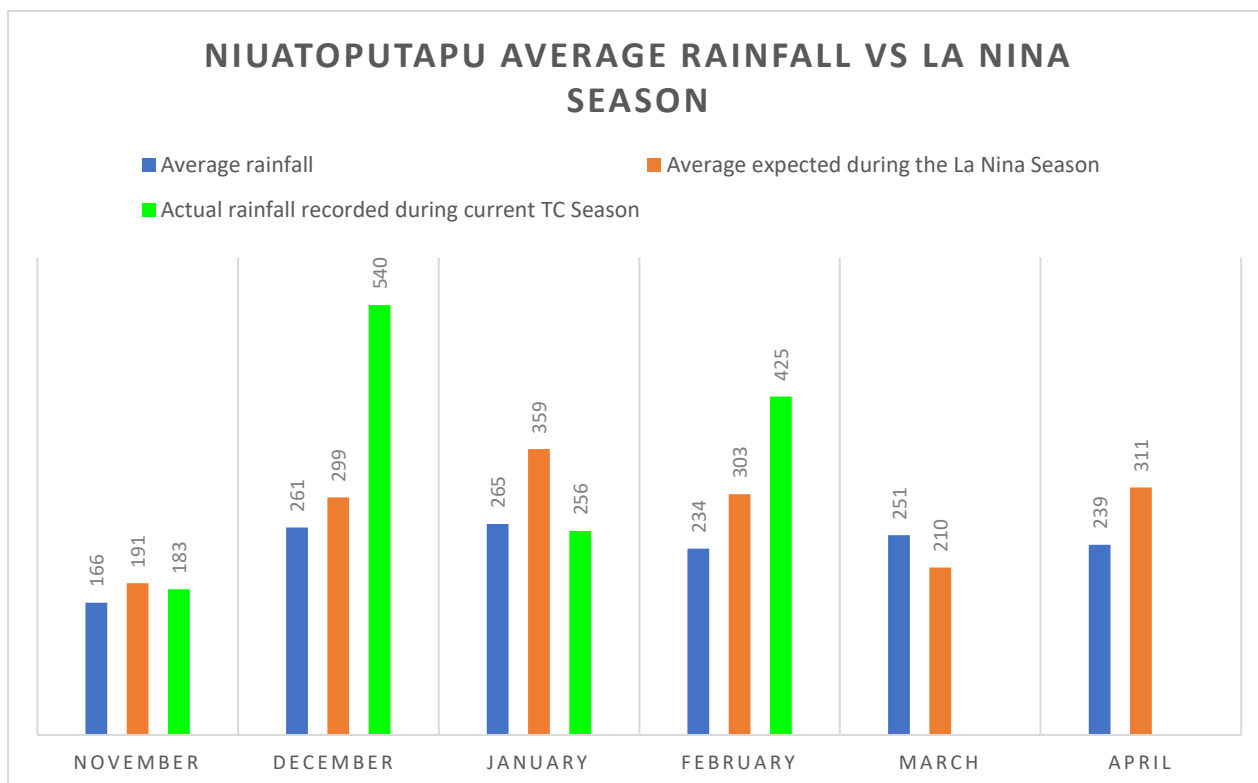


Figure 2: Expect peak above average rainfall in December, January and February for Niuatoputapu

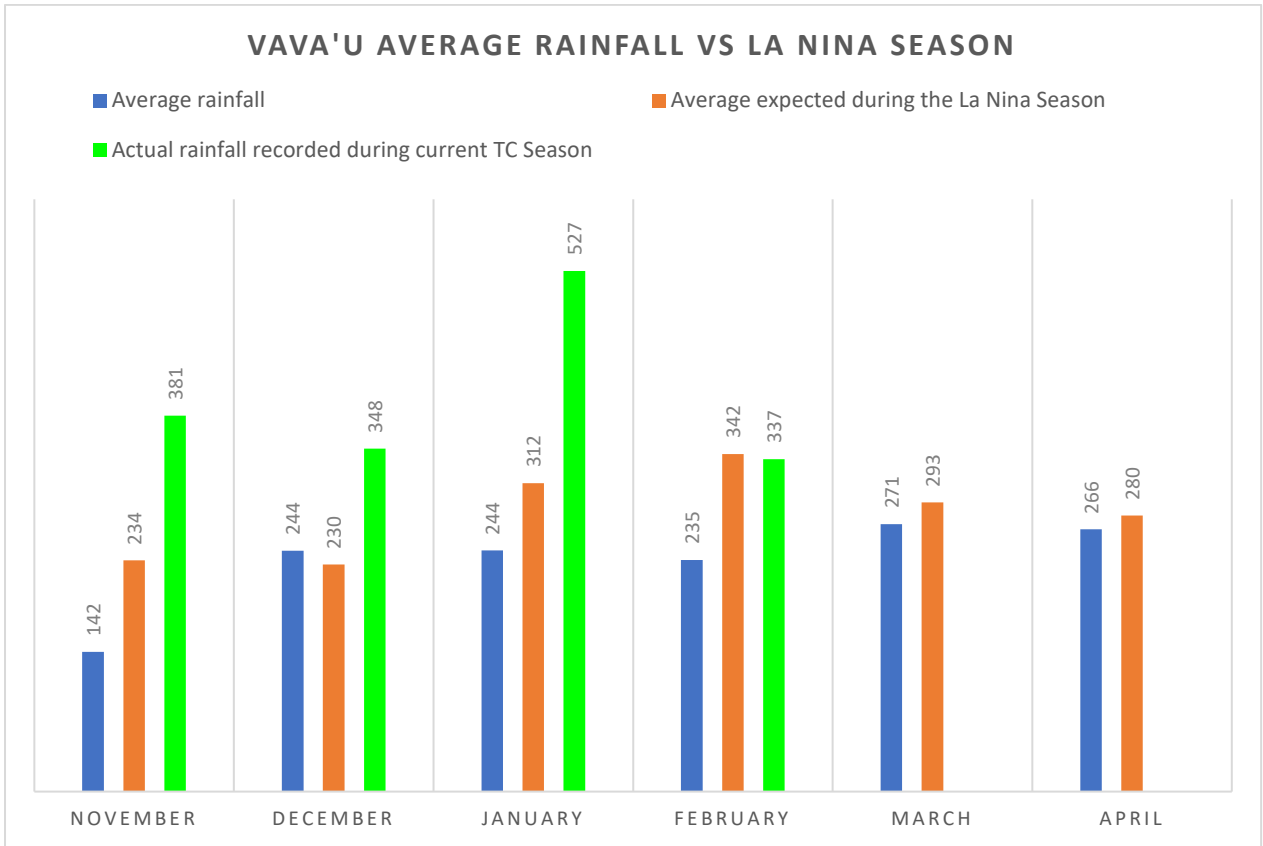


Figure 3: Expect peak above average rainfall in January, February, March and April for Vava'u

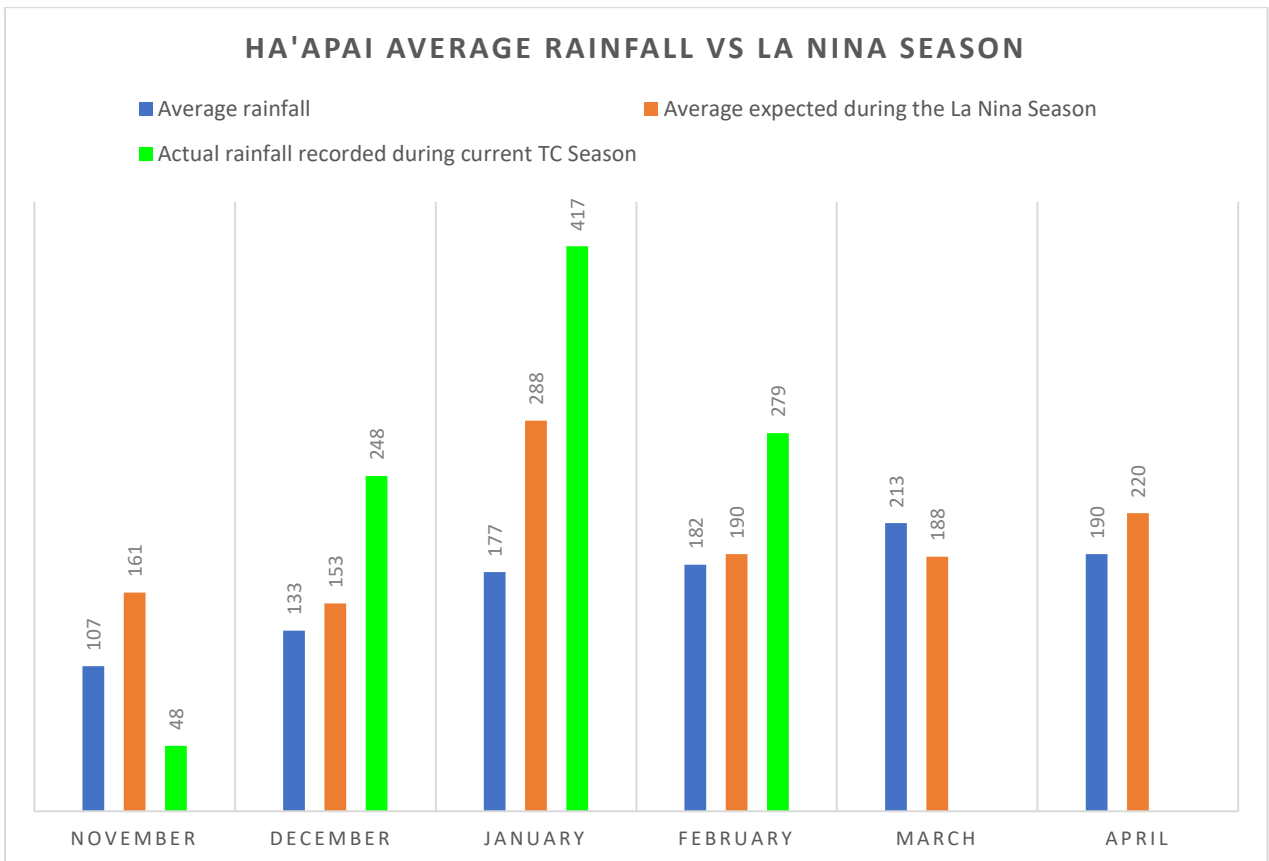


Figure 4: Expect peak above average rainfall in November, December, January and February for Ha'apai

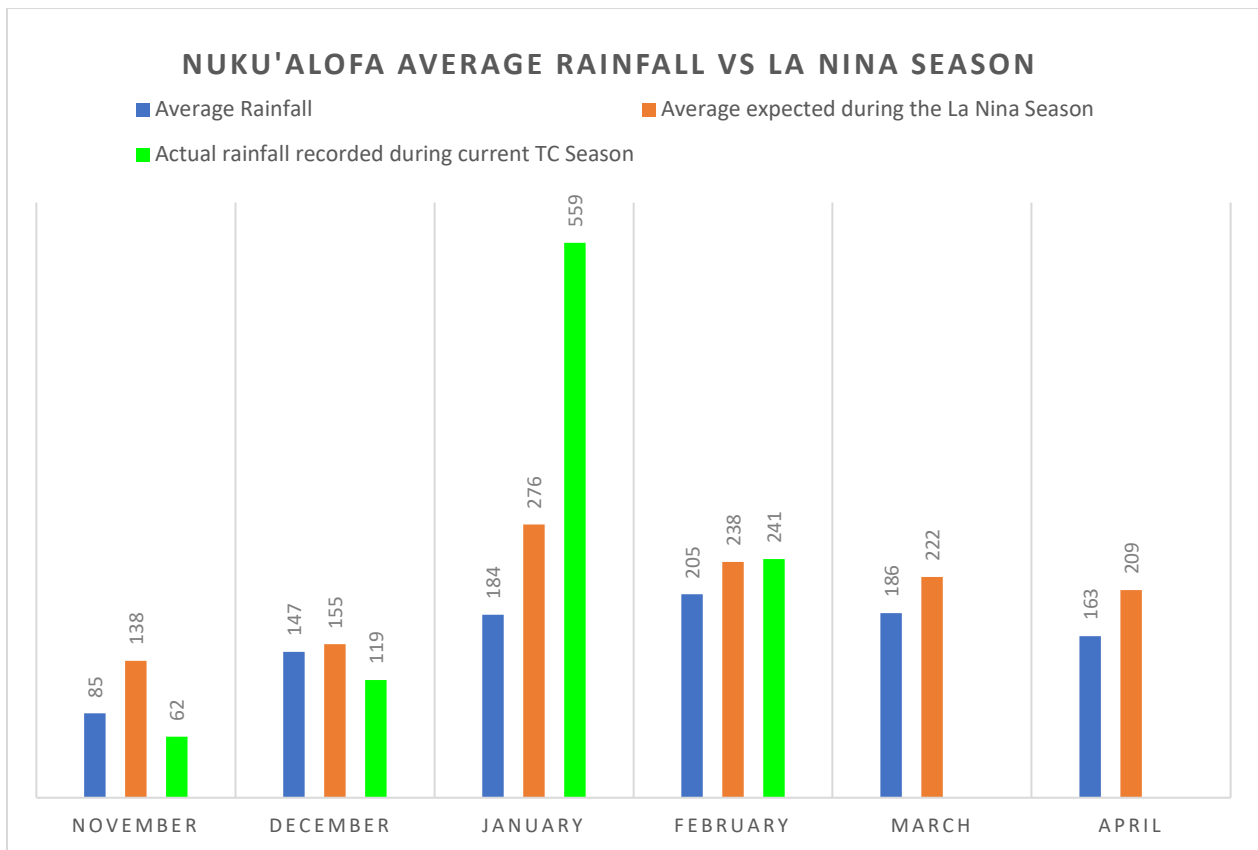


Figure 5: Expect peak above average rainfall in November 2020 to April 2021 for Tongatapu

Likely Sector Impacts during the 2020-2021 Cyclone Season

1. Agriculture

Although there is less likelihood of Cyclone occurrence, it is the cyclone season so strong wind events will happen from time to time and crops prone to wind damage like Banana, Papaya and Breadfruit will be affected. At the same time, La Nina conditions will bring above average rainfall which will good for planting higher rainfall (big leaf plants) crops such as Kava, Taro, Banana and Kape. Weed management will be a must this season in order to get a good harvest.

2. Water

Water surplus during this season is to be expected. Therefore, rain water should be collected and harvested this season as much as possible to be used when the rains stop around April 2021. Clean roofs and replace guttering's.

3. Health

Higher risk of water contamination related diseases occurring due to above average rainfall. Mosquitoes will be abundant due to higher rainfall so mosquito management will be key to prevent mosquito transmitted disease like dengue.

4. Infrastructure

There is an 60% chance of one severe cyclone happening this season so the public are advised to fix shutters and trim trees near the house just in case we get a severe event.

5. Tourism

Moderate risk for Tourism activities due to 60% chance of a severe cyclone occurring.

6. Fisheries

Ocean nutrients will be abundant due to La Nina conditions so expect tuna fisheries to be good as well as trolleying. Expect low to moderate coral bleaching or algae blooms.

7. Utilities

Moderate risk of Communications, Water and Power utilities failures due to tropical cyclone activity. But high risk of flooding related problems.

8. Transport

Moderate risk of above than normal cancellations to ferry and aircraft operations due to stronger winds and tropical cyclone activity. Higher risk of flooding related problems to higher expectation of above average rainfall.

Note of caution

It should be noted that the information provided is only to be used as guidance and the given range of tropical cyclone numbers is indicative only. It is expected that the total number of tropical cyclones could be in the vicinity of the listed values, and not necessarily within the given range. The values are the most likely number of tropical cyclones based on statistical and scientific evidence, including the influences by regional and global weather and climate variability drivers and indices.

All communities should remain alert and prepared throughout the remainder of the 2020-2021 Tropical Cyclone Season and take heed of tropical cyclone alerts, warnings and advisories seriously whenever it is issued to reduce the effects on life and property.

All communities are urged to be vigilant and follow forecast information provided by the Meteorology Department of the Ministry of MEIDECC throughout the remainder of the TC season. An update to this outlook will be issued around late April 2021.

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