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ENERGY, INFORMATION, DISASTER
MANAGEMENT, ENVIRONMENT,
CLIMATE CHANGE AND
COMMUNICATIONS (MEIDECC)
NUKU'ALOFA, TONGA

2020–2021 Tropical Cyclone Season Outlook for Tonga

(26 October 2020)

Summary

The Tropical Cyclone (TC) activity expected in the 2020/21 Tropical Cyclone Season to affect Tonga is likely to be around average (1 to 2 cyclones on average). Historical records indicate that Tonga could expect at least 1 cyclone and at most 3 cyclones to occur with a moderate chance (60%) of at least 1 Severe Tropical Cyclone 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 affecting Tonga in the 2020/2021 season should expect to be mostly coming from the West and NW (Fiji Area – 60%) and the rest from the 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 area will be shifted to the warmer ocean temperatures in the Australia and Papua New Guinea regions.

Current dynamics indicate the first tropical cyclone activity for the season in the South West Pacific could be around the beginning to mid-December 2020.

The 2020/21 Cyclone Season will almost certainly bring above average rainfall to all part of Tonga during the cyclone season due to La Nina conditions. In some cases, the average monthly rainfall can double.

Cyclone analysis and outlook for Tonga

The official 2020/2021 TC Season will begin on 01 November 2019 and will end on 30 April 2020. It should be noted that tropical cyclones have occasionally formed outside this period e.g. Tropical Cyclone “Keli” which affected Northern Tonga in June 1997. 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 El Niño–Southern Oscillation (ENSO) is currently in a La Niña phase.

The tropical Pacific Ocean is expected to remain in La Niña conditions throughout the 2020/2021 Cyclone Season.

During La Niña events, Tonga normally receives above average rainfall activities. Climate models are also indicating that above normal rainfall over majority of Tonga during this Tropical Cyclone Season is highly likely. With a La Niña event established and in the view of the rainfall outlook for Tonga, there is an increased risk of heavy rain events and possible flash flooding in low lying areas in Tonga during this Tropical Cyclone Season.

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

Cyclone Season	No. of Tropical Cyclone	No. of Severe Tropical Cyclone
1970-1971	1	0
1974-1975	2	1
1984-1985	3	2
1995-1996	1	0
1999-2000	2	1
2000-2001	1	1
2005-2006	3	1
2008-2009	2	0
2016-2017	1	0
2017-2018	2	2
Average	1.8	0.8

Table 1: Current sea surface temperatures patterns indicates that the 2020/21 Tropical Cyclone season is expected to be similar to 10 other seasons in the past (1970/71, 1974/75, 1984/85, 1995/96, 1999/2000, 2000/01, 2005/06, 2008/09, 2016/17, 2017/18)

An average of 1 Severe Cyclone occurs in moderate La Nina years (similar to the coming season).

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

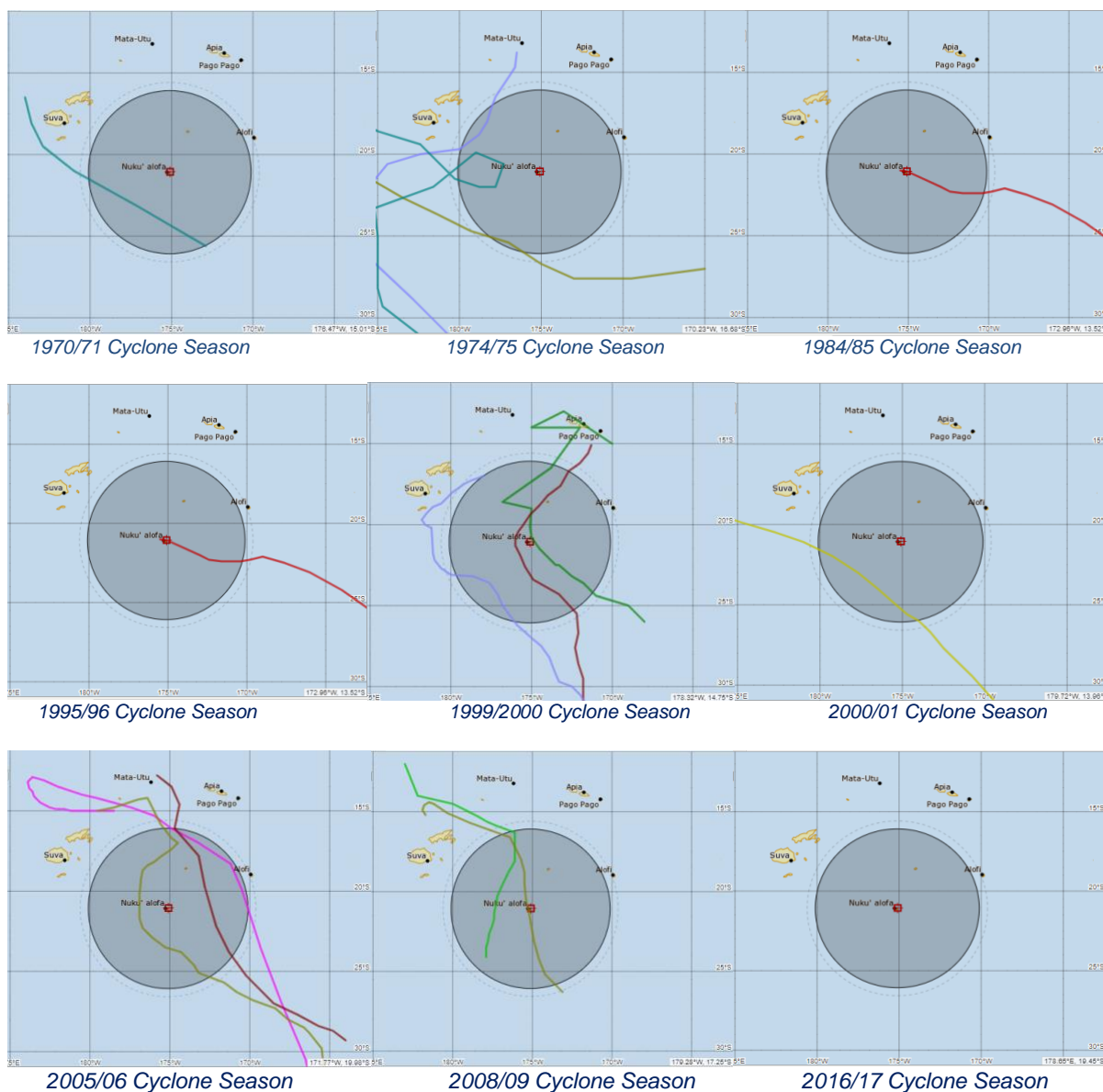
Table 2: Historical statistics of cyclone occurrence since 1970 indicate that during La Nina years there is lower risk of tropical cyclone occurrence

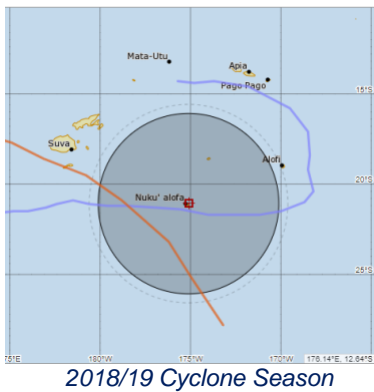
Severe Tropical Cyclones that have occurred in years similar of this coming cyclone season

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 this season.

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

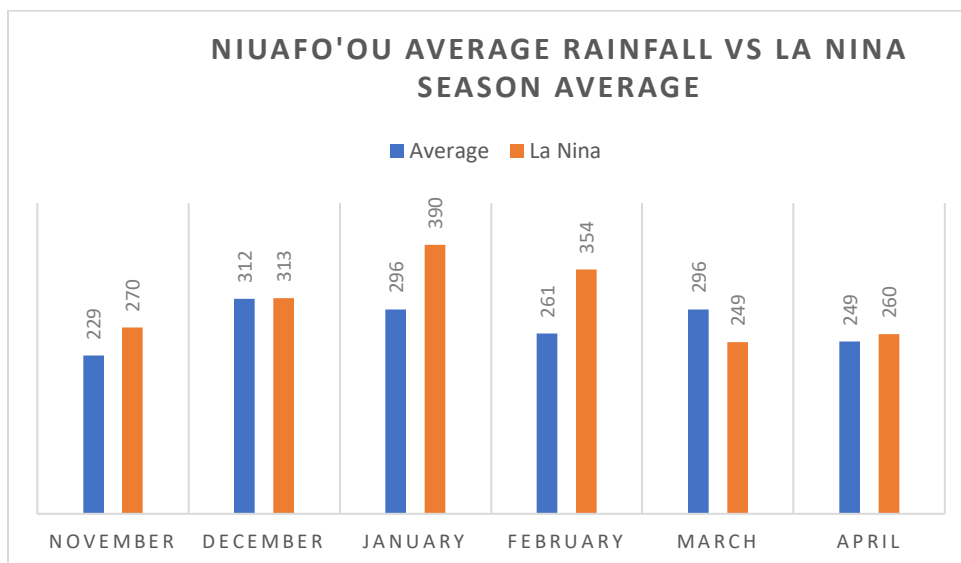


Figure 1: Expect peak above average rainfall in January and February for Niuafu'ou

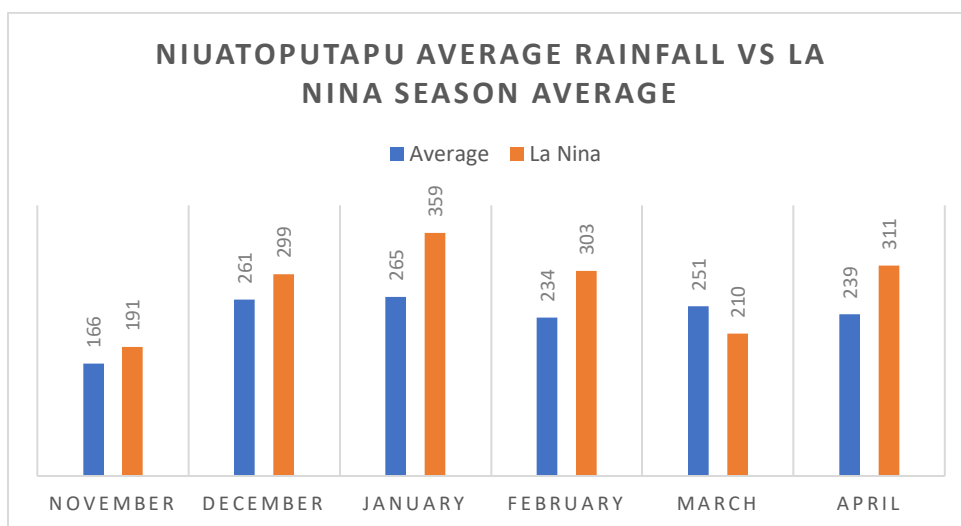


Figure 2: Expect peak above average rainfall in December, January and February for Niuatoputapu

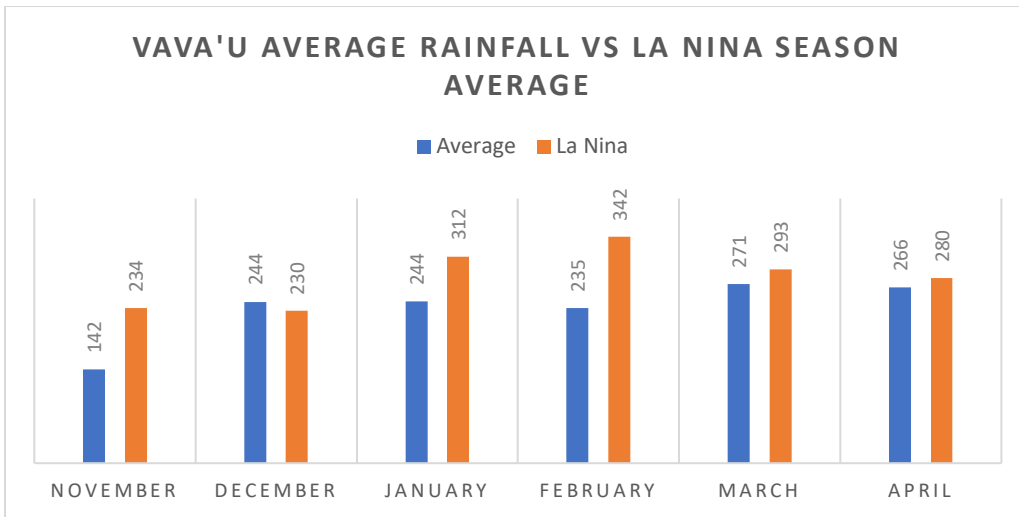


Figure 3: Expect peak above average rainfall in January, February, March and April for Vava'u

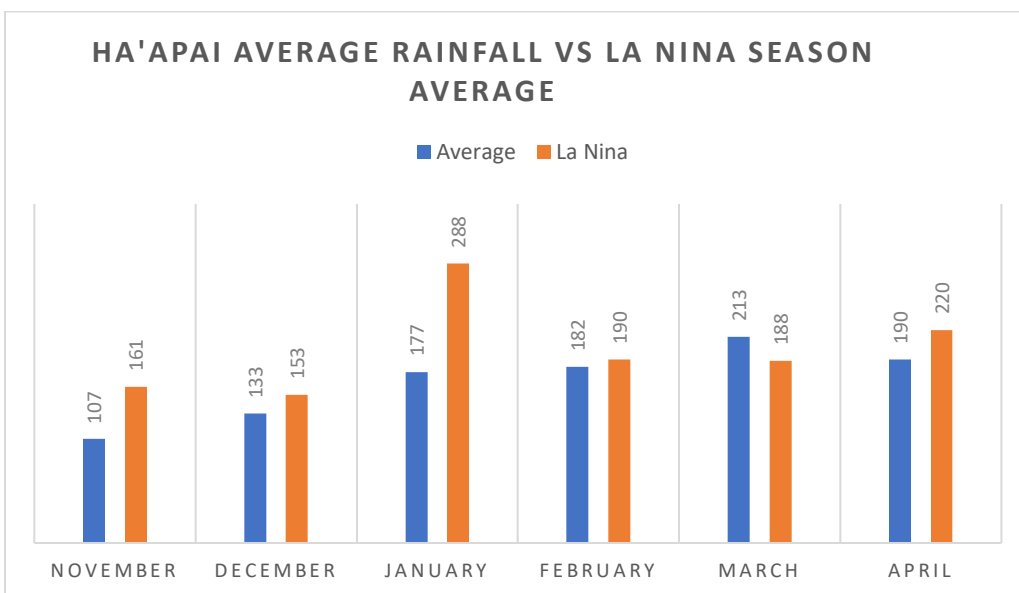


Figure 4: Expect peak above average rainfall in November, December, January and February for Ha'apai

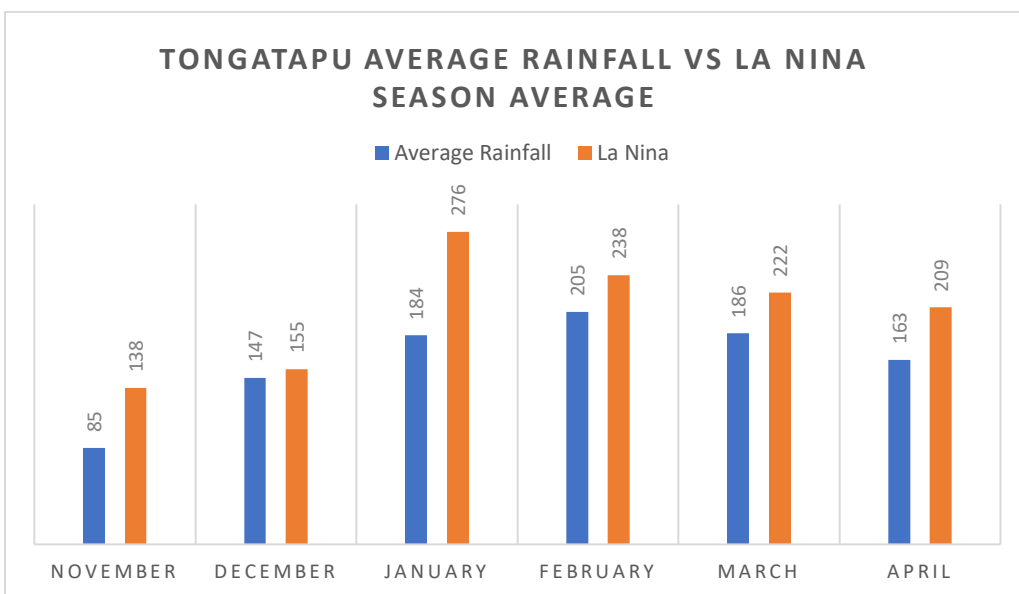


Figure 5: Expect peak above average rainfall in November 2020 to April 2021 for Tongatapu

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 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 season.

An update to this outlook will be issued around the end of January 2021.

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