Review of TCO-SP performance for the 2020/21 Southwest Pacific TC season

Long-Range Tropical Cyclone Outlook for the Southwest Pacific (TCO-SP)

Seasonal review generated: 17th May 2021 (v2)

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TCO-SP
Long-Range
Tropical Cyclone Outlook
for the Southwest Pacific
www.tcoutlook.com

TCO-SP is a long-range tropical cyclone outlook based on a method recently published in *Scientific Reports*.

2020/21 SWP TC seasonal summary

- Eight tropical cyclones (TCs) were observed within the Southwest Pacific (SWP) region (0°-35°S, 135°E-120°W) between 1st November 2020 and 30th April 2021 (Figure 1). This is three TCs less than the 1970-2020 average (11 TCs) and one TC less than the nine observed in the previous 2019/20 TC season.
- For the majority of the SWP TC season, La Niña conditions persisted, peaking in November 2020 with NINO3.4 anomalies of -1.42°C[1] and returning to ENSO neutral conditions by the end of the TC season. La Niña conditions typically result in increased TC activity in the south-southwest part of the SWP (Magee et al., 2017).

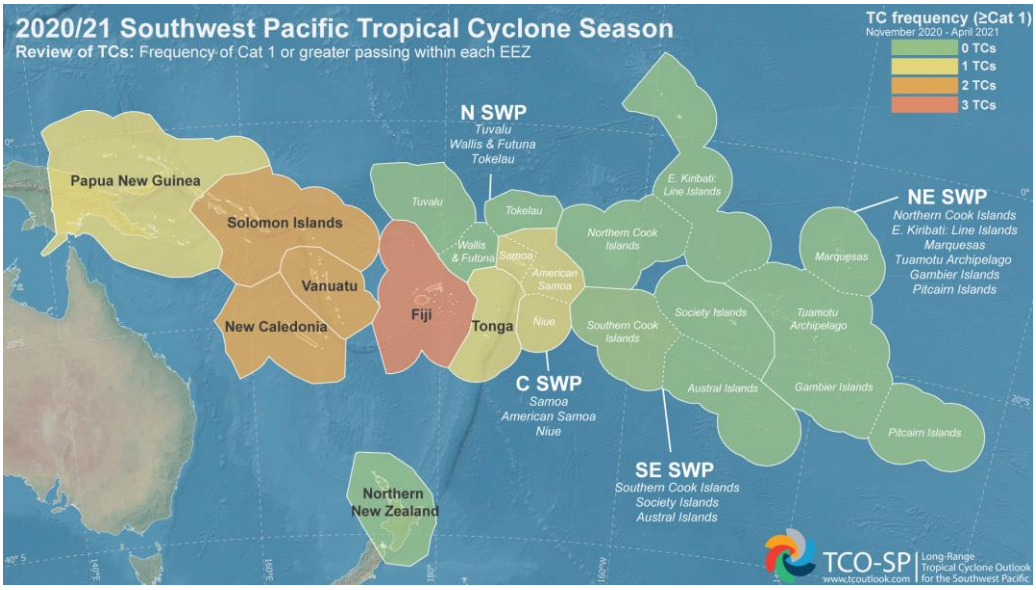

Figure 1: Frequency of TCs (Category 1 or greater) passing within each exclusive economic zone (EEZ) during the November-April 2020/21 SWP TC season

Review of TCO-SP performance for the 2020/21 tropical cyclone season

- Deterministic guidance from TCO-SP performed exceptionally well (Figures 2-4), successfully predicting a normal to below-normal 2020/21 Southwest Pacific TC season in July 2020, four months before the start of the TC season (Table 1 and Figure 4).
- The TCO-SP prediction of a normal to below-normal SWP TC season persisted for all pre-season outlook months (July-October) (Figure 2 and 4).
- For pre-season outlooks for all locations, the expected TCO-SP TC range was correct for 98% of cases (Figure 4).
- For in-season outlooks, the expected TCO-SP TC range was correct for 83% of cases (Figure 4).

[1] Climatological normal of 1981-2010. NINO3.4 ERSSTv5 values obtained from https://www.cpc.ncep.noaa.gov/data/indices/sstoi.indices.

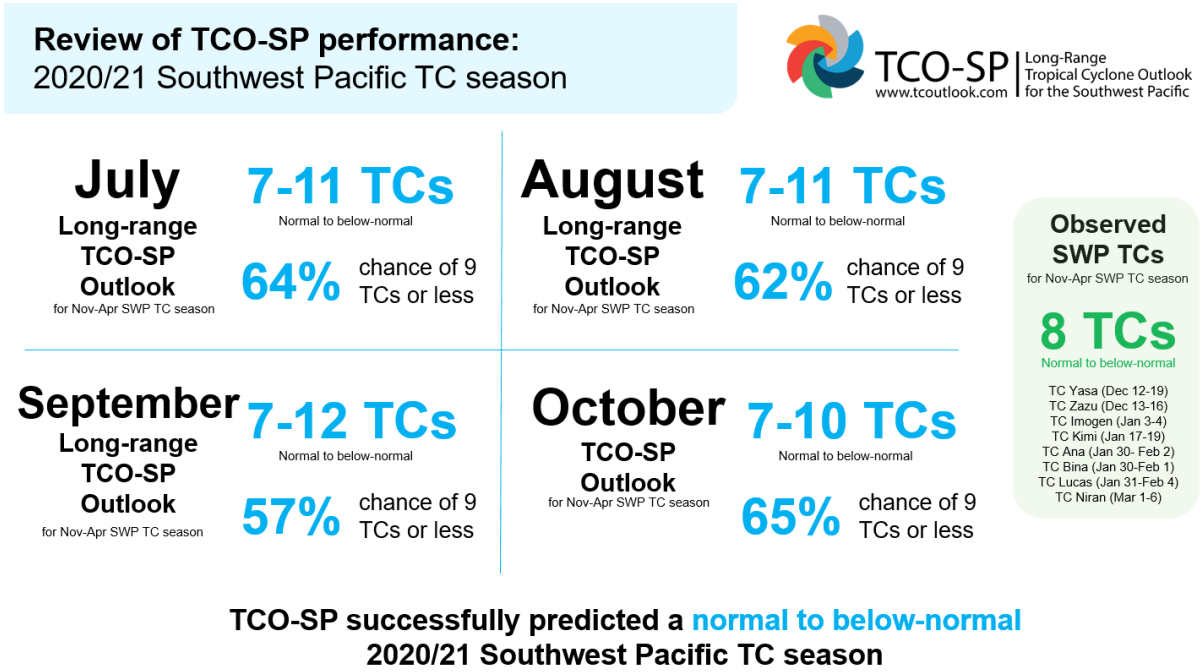

Figure 2: Infographic of pre-season TCO-SP performance for the SWP region.

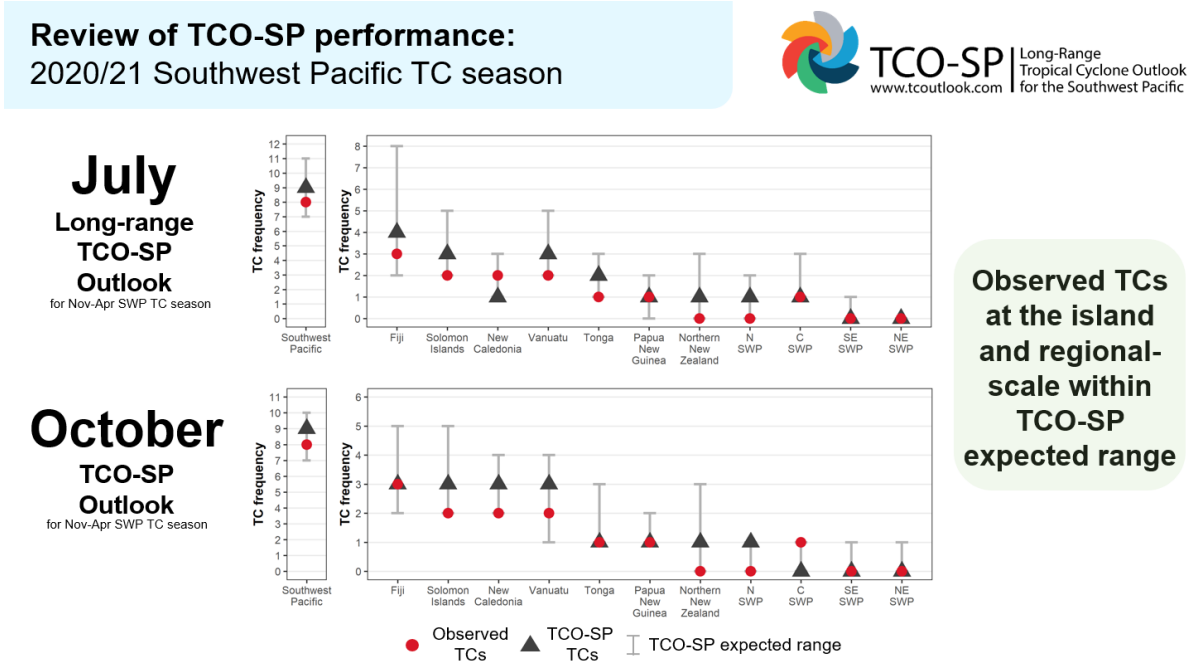

Figure 3: Infographic of July and October TCO-SP pre-season outlook performance for the 12 regional and sub-regional locations considered by TCO-SP.

Table 1: Review of deterministic TCO-SP guidance. Pre-season and in-season outlook predictions with expected range (in parentheses) are compared with observed TC counts (extracted from IBTrACS). For in-season outlooks, TCO-SP predictions for the Dec-Apr, Jan-Apr and Feb-Apr seasons were released in November, December and January, respectively. Shaded columns represent the observed TC counts for the Nov-Apr season, and three shorter seasons (Dec-Apr, Jan-Apr and Feb-Apr).

		Pre-Season					**In-Season**					
		TCO-SP outlook (outlook generated for the Nov-Apr TC season)				**Observed**	**Dec-Apr**		**Jan-Apr**		**Feb-Apr**	
		Jul	Aug	Sep	Oct	Nov-Apr	TCO-SP predicted (Nov)	**Observed**	TCO-SP predicted (Dec)	**Observed**	TCO-SP predicted (Jan)	**Observed**
	Southwest Pacific	9 (7-11)	9 (7-11)	9 (7-12)	9 (7-10)	8	9 (6-10)	8	8 (7-10)	6	6 (5-8)	4
Island Scale Models	Fiji	4 (2-8)	3 (2-5)	3 (2-6)	3 (1-5)	3	3 (2-5)	3	2 (1-3)	2	2 (1-6)	2
	Solomon Islands	3 (2-5)	2 (1-3)	2 (1-4)	3 (2-6)	2	3 (2-5)	2	3 (2-6)	2	2 (1-5)	2
	New Caledonia	1 (1-3)	2 (1-4)	2 (1-4)	3 (2-4)	2	3 (2-4)	2	3 (2-4)	2	2 (1-4)	2
	Vanuatu	3 (2-5)	2 (2-3)	2 (2-3)	3 (2-4)	2	3 (1-4)	2	3 (2-5)	1	2 (0-3)	1
	Tonga	2 (1-3)	2 (1-5)	2 (1-4)	2 (1-5)	1	1 (1-3)	1	2 (1-3)	0	2 (1-4)	0
	Papua New Guinea	1 (0-2)	2 (1-3)	2 (1-2)	2 (1-5)	1	1 (1-2)	1	2 (1-3)	1	1 (1-2)	1
	Northern New Zealand	1 (0-3)	1 (0-4)	1 (0-4)	1 (0-3)	0	1 (0-3)	0	1 (0-4)	0	1 (0-5)	0
Subregional models[a]	**N SWP** (Tuvalu, Wallis & Futuna, Tokelau)	1 (0-2)	1 (0-2)	1 (1-3)	0 (0-1)	0	1 (0-1)	0	1 (1-2)	0	0 (0-0)	0
	C SWP (Samoa, American Samoa, Niue)	1 (1-3)	1 (1-2)	1 (1-2)	1 (0-2)	1	0 (0-1)	1	1 (1-2)	0	0 (0-0)	0
	SE SWP (Southern Cook Islands, Society Islands, Austral Islands)	0 (0-1)	0 (0-0)	0 (0-1)	0 (0-0)	0	0 (0-1)	0	1 (0-1)	0	0 (0-1)	0
	NE SWP (Northern Cook Islands, E Kiribati: Line Islands, Marquesas, Tuamotu Archipelago, Gambier Islands, Pitcairn Islands)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0	0 (0-1)	0	0 (0-0)	0	0 (0-0)	0

[a] Sub-regional models – where individual island TC climatology shows less than 1.5 TCs per season, geographically neighbouring exclusive economic zones (EEZs) have been merged to increase sample size (Click here for more information).

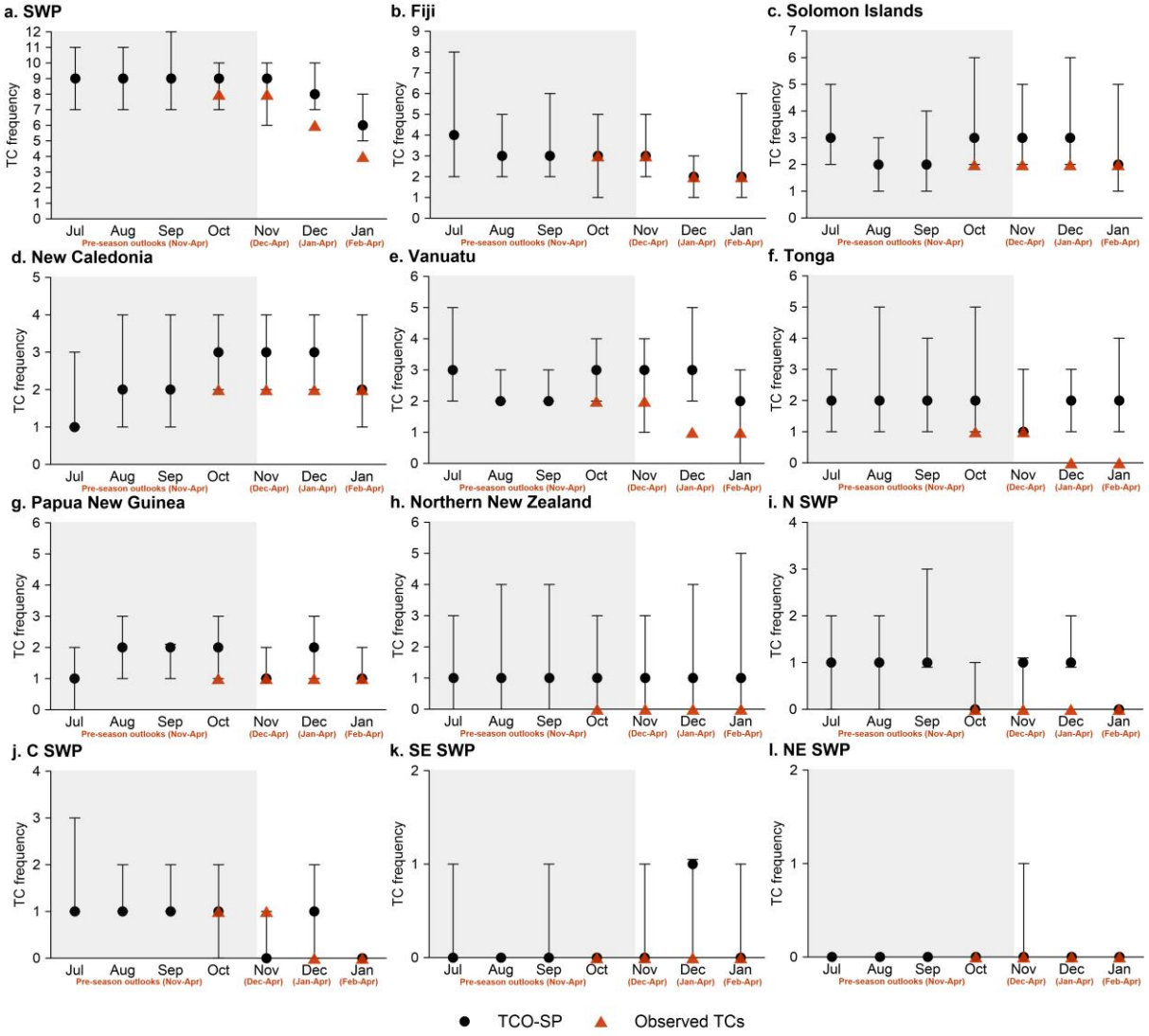

Figure 4. Comparison of predicted TC counts from TCO-SP (including probable range; error bars) and observed TCs for 12 TCO-SP regions. The shaded area indicates pre-season outlooks, while outlooks generated in November, December and January are for the remaining December-April, January-April and February-April part of the season, respectively. The observed TCs (red triangles) for October refers to the observed number of TCs during the November-April TC season and the July-October TCO-SP (black dots) pre-season values are the prediction for the November-April TC season.

Questions? Contact:

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References

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