

1. IN BRIEF

While the El Niño Southern Oscillation state was neutral during the month, some of the indicators in the Pacific Ocean were leaning towards a weak El Niño. The South Pacific Convergence Zone was displaced to north east of its normal position, away from the Fiji Group, a feature typical of an El Niño event. Consequently, most parts of the country registered drier than normal conditions.

Out of the 28 stations, 17 recorded less than half of the normal January rainfall (Figure 1). The driest location was Viwa where a record low rainfall for January was registered with only 5mm during the month. Sigatoka was also significantly dry with 28mm of rainfall, followed by Ono-i-Lau with 53mm, Matuku with 65mm and Nacocolevu with 66mm (Table 2).

Tropical cyclone Tino was the notable event that affected the Fiji Group during the month. It passed to the east of Vanua Levu and then traversed through the Lau Group. While it attained Category 2 intensity as it passed through the Fiji Group, gale force winds were recorded over the land areas of northeastern Vanua Levu and northern Lau Group. The highest observed sustained

wind was at Udu Point with 77km/h, followed by Vanuabalavu with 69km/h and Ono-i-Lau with 52km/h. The highest wind gust was at Udu Point with 117km/h, followed by Vanuabalavu with 103km/h and Sagani with 87km/h (Table 3).

Significant rainfall recorded, particularly over the Central, Northern divisions including northern Lau group due to the active rain bands associated with TC Tino and TD04F between 15th and 17th. Sabata recorded a 24-hour rainfall of 171mm on the 16th, followed by Dewala with 149mm on the 17th (Figure 16). Consequently, there were reports of flooding in the Central and Northern Divisions.

The mean maximum air temperatures were *normal* or above normal at most of the places during the month, while the mean minimum air temperatures were normal or below normal at most places. Vanuabalavu recorded its record low daily minimum air temperature for January during the month since observation began in 1985 (Table 1).

2. WEATHER PATTERNS

The weather in January was influenced by Tropical Cyclone Tino, TD04F, a series of troughs of low pressure system and the southeast Trade winds.

A southeast wind flow prevailed over Fiji from the 1st to the 10th with a high pressure system to the far southeast of the country strengthening the wind flow over the group on the 11th and 12th.

A trough of low pressure lay to the north of Fiji on the 13th and 14th bringing occasional showers and thunderstorms over the group.

On the 15th and 16th, TD04F was situated to the northwest of the country. TD04F was named tropical cyclone Tino on the 17th while it was to the east of Rotuma. It passed to the east of Udu Point on the same day as a Category 2 system.

TC Tino further intensified on the 18th, attained Category 3 intensity while situated between Fiji and Tonga. It continued its south-eastward track, crossing central part of Tonga. Tino together with its active trough of low pressure affected Fiji and brought periods of rain and thunderstorms over the whole country.

A southerly wind flow prevailed over Fiji from the 19th to the 23rd with the winds becoming predominantly southeast from the 24th to the 26th. Another low pressure system then developed over southern Lau Group on the 27th and 28th with the associated weak trough of low pressure affecting the eastern part of the group from the 27^{th} till the end of the month.

Rotuma's weather during the month was mainly affected by a series of troughs of low pressure system and Tropical Cyclone Tino. Tropical cyclone Tino with associated convergence zone directed damaging heavy swells along the coast of Rotuma on the 15th and 16th.

*Previously known as the Fiji Islands Weather Summary and Monthly Weather Summary

Volume 41 : Issue 01

3. RAINFALL

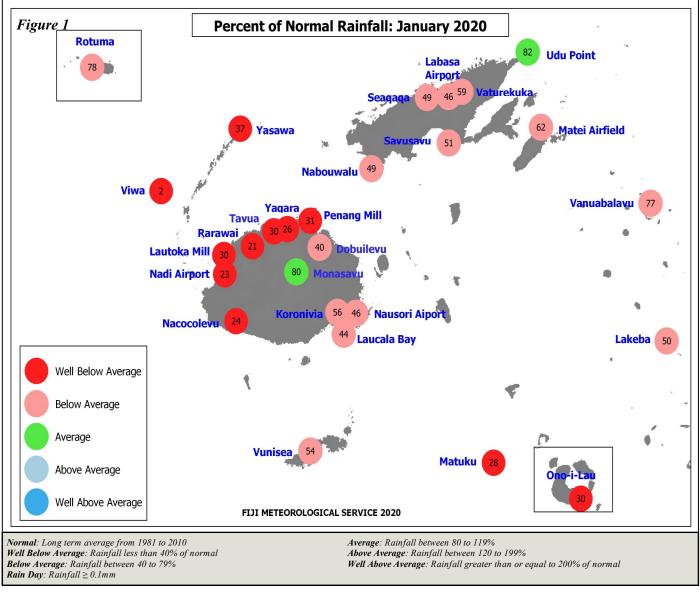
Rainfall in January was generally *well below average* or *below average*. Out of the 28 stations, 11 stations recorded *well below average* rainfall, 13 *below average*, while 4 stations registered *near average* rainfall (Table 2).

Viwa recorded its lowest ever January rainfall, with a monthly total of only 5mm of rainfall. Sigatoka was also significantly dry with 28mm of rainfall, followed by Onoi-Lau with 53mm, Matuku with 65mm and Nacocolevu with 66mm. On the other hand, the highest total monthly rainfall during the month was recorded at Monasavu with 527mm, followed by Tokotoko (Navua) with 328mm, Keiyasi with 318mm, Udu Point with 312mm and Waini-koro with 287mm.

Tropical cyclone Tino and the associated active trough of low pressure, including tropical depression, TD04F, resulted in significant rainfall in certain parts of the country, particularly the Central, Northern Divisions, and northern Lau Group, between 15th and 17th. Sabata recorded a 24hour rainfall of 171mm on the 16th, followed by Dewala

with 149mm on the 17th, Nakawaqa with 120mm on the 17th, Nayarabale with 117mm on the 17th, Vanuabalavu with 113mm on the 17th, Dreketilailai with 112mm on the 17th, Labasa Airport with 110mm on the 16th and Udu Point with 103mm on 17th.

Viwa registered only 7 rain days (day with rainfall ≥ 0.1 mm) during the month, followed by Labasa Airport Tavua and Sigatoka with all 10, and Yaqara and Momi with both 11. In contrast, Monasavu recorded the highest number of rain days with 25 days, followed by Koronivia with 24, Nausori Airport and Matei Airfield with both 22, and Rotuma, Wainikoro, Doubuilevu and Nasinu with all 21.



4. AIR TEMPERATURES

A. <u>Maximum Daytime Air Temperatures</u>

Generally *normal* to *above normal* mean monthly maximum air temperatures were recorded at most of the places during the month. Of the 22 climate stations, 12 stations reported *normal* (anomalies within $\pm 0.5^{\circ}$ C) temperatures, 7 *above normal* (\geq +0.5°C), while 3 stations registered *below normal* (\leq -0.5°C) temperatures (Table 2 & Figures 2-5).

The warmest average monthly daytime temperatures were observed at Keiyasi with 33.1°C, followed by 33.0°C at Seaqaqa, 32.8°C at Viwa and 32.6°C at Rarawai Mill (Ba). On the other hand, the coolest monthly average day-time temperatures were recorded at Monasavu with 25.6°C, followed by Nadarivatu with 26.5°C, Rakiraki with 29.6 °C and Vunisea with 29.7°C.

The highest daily maximum air temperature during the month was report at Seaqaqa with 35.8°C on the 11th, followed by Nacocolevu and Keiyasi with 35.5°C on the 15th and 29th, respectively, and Momi with 35.4°C on the 4th. In contrast, the coolest day-time temperatures were recorded at Monasavu and Nadarivatu with both 23.5°C on the 17th, followed by Koro Island with 26.4°C on the 17th and Vaturekuka with 26.7°C on the 17th.

There was no new maximum air temperature record during the month.

B. <u>Minimum Night-time Air Temperatures</u>

Normal to *below normal* night-time temperatures were recorded at most places during the month. Out of the 22 stations, 14 stations recorded anomalies within $\pm 0.5^{\circ}$ C, 5 stations $\leq -0.5^{\circ}$ C, while Rotuma was the lone station that had anomaly $\geq +0.5^{\circ}$ C (Table 2 & Figures 2-5).

The coolest monthly average night time temperatures were recorded at Nadarivatu with 18.0°C, followed by Monasavu with 18.8°C, Labasa Airport with 21.4°C, and Rarawai Mill and Vanuabalavu with both 21.5°C. On the other hand, warmest average night time temperatures were recorded at Rotuma with 25.7°C, followed by Viwa with 25.2°C, and Nabouwalu and Udu Point with both 24.8°C.

The lowest night-time temperature for January 2020 was recorded at Nadarivatu with 12.8°C on the 23^{rd} , followed by Monasavu with 15.8°C on the 3^{rd} , Vaturekuka with 17.2°C on the 24^{th} and Keiyasi with 17.4°C on the 23^{rd} . On the other hand, the warmest minimum air temperature during the month was recorded at Rotuma with 27.3°C on the 9^{th} , followed by RKS Lodoni with 27.1°C on the 10^{th} , and Savusavu and Matei Airfields with both 27.0°C on the 11^{th} and 18^{th} , respectively.

Vanuabalavu recorded its lowest ever January daily minimum air temperature of 18.4°C, replacing a previous record of 19.9°C established in 1991 (Table 1).

TABLE 1. CLIMATE RECORDS ESTABLISHED IN JANAURT 2020							
<u>Element</u>	<u>Station</u>	Observed (record)	<u>On</u>	<u>Rank</u>	<u>Previous</u> (record)	<u>Year</u>	<u>Records</u> <u>Began</u>
Total Monthly Rainfall	Viwa	4.9mm	-	New Low	7.8mm	2010	1978
Daily Minimum Temperature	Vanuabalavu	18.4°C	13 th	New Low	19.9°C	1991	1985

TABLE 1. CLIMATE RECORDS ESTABLISHED IN JANAURY 2020

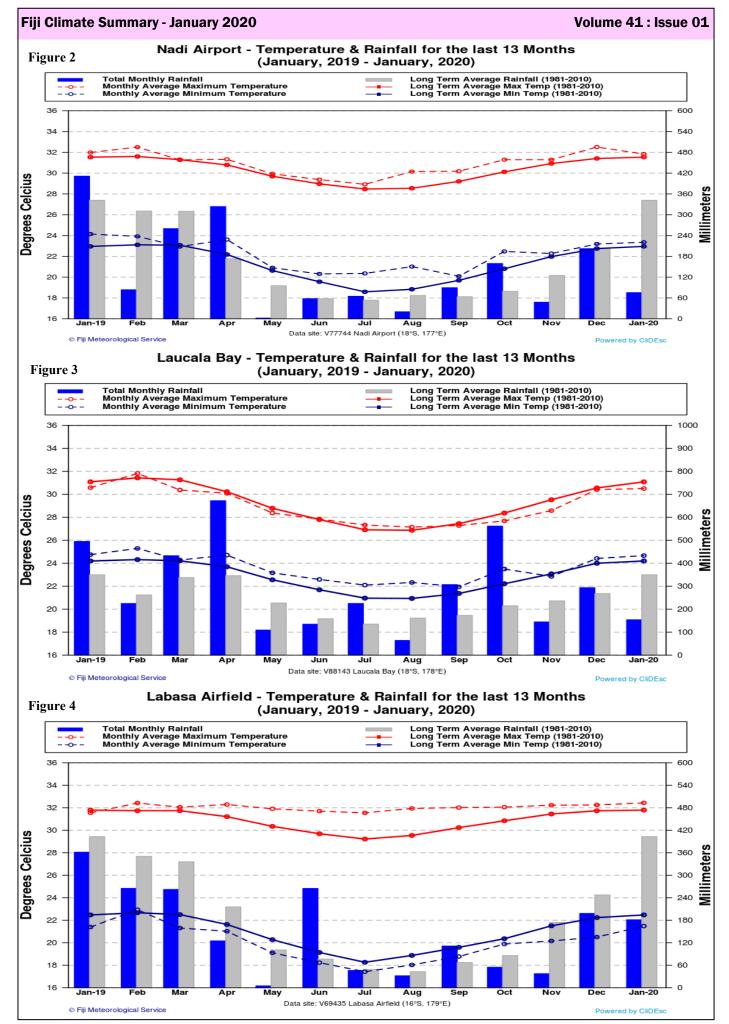
Note: All comparisons in this summary are with respect to "Climatic Normals". This is defined to be the average climate condition over a 30-year period. Fiji uses 1981-2010 period as its "climatic normal" period.

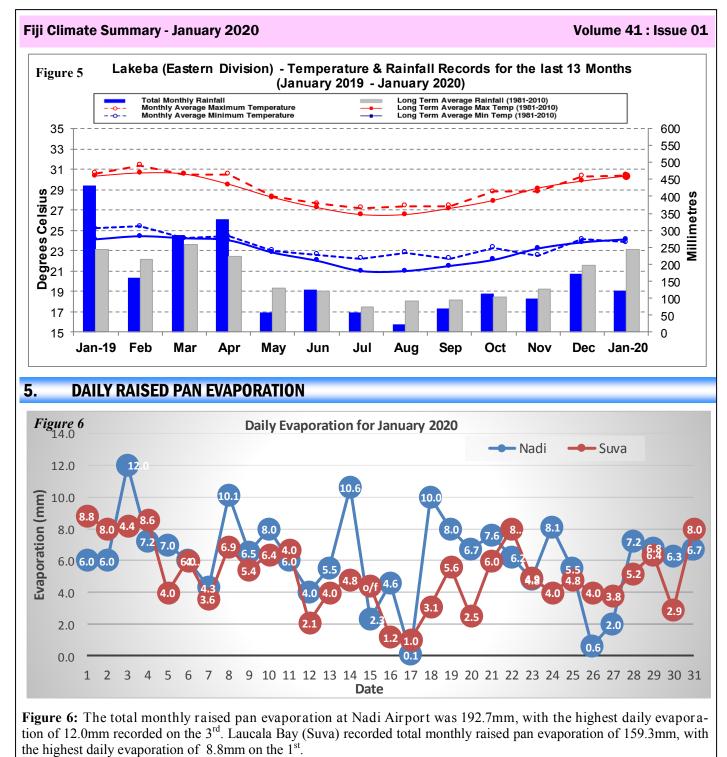
TABLE 2. DAILY CLIMATE REPORTING SITES: SUMMARY FOR JANUARY 2020

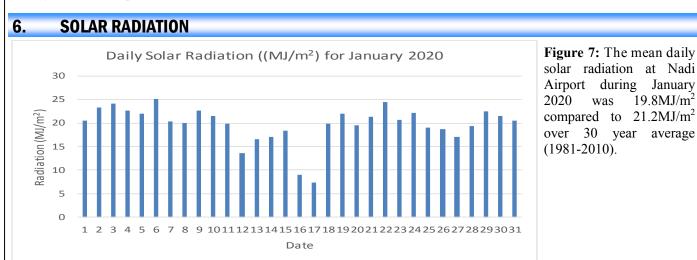
	Volume 41 : Issue 01
RV 2020	

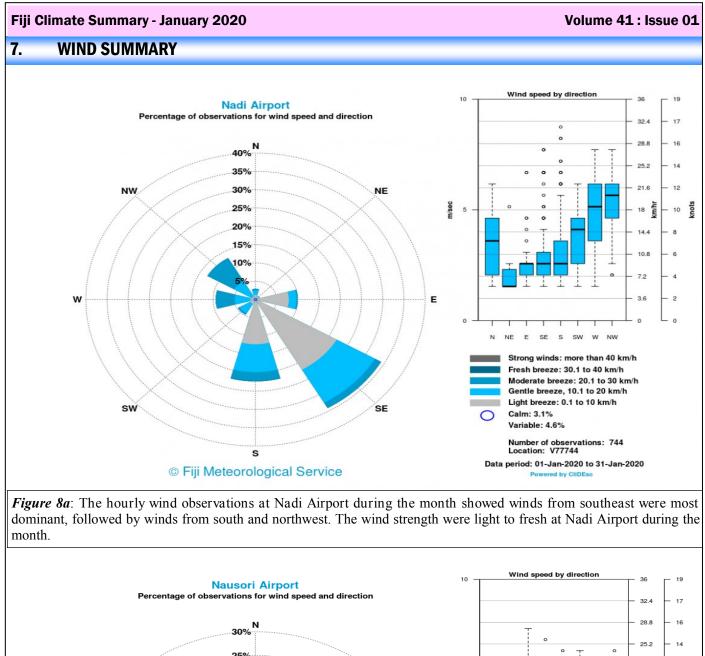
TABLE 2. DAILY CL	TATE REPORTING SITES: SUMMARY FOR JANUARY 2020	
	RAINFALL AIR TEMPERATURES SUNSHINE	
	* DAYS FALL MAX. # MIN. # MAX. MIN. *	
NADI AIRPORT SUVA/LAUCALA BAY NACOCOLEVU ROTUMA VIWA UDU POINT SAVUSAVU AIRFIELD LABASA AIRFIELD NABOUWALU KORONIVIA NAUSORI AIRPORT NAVUA/TOKOTOKO MONASAVU LAUTOKA AES BA/RARAWAI MILL PENANG MILL MATEI AIRFIELD VANUABALAVU LAKEBA YASAWA VUNISEA MATUKU ONO-I-LAU YAQARA AWS LEVUKA AWS KEIYASI AWS LEVUKA AWS KEIYASI AWS LOMAIVUNA AWS NADARIVATU AWS RKS LODONI AWS KORO ISLAND AWS SIGATOKA AWS RAKIRAKI AWS WAINIKORO AWS SAQANI AWS VATUREKUKA AWS KUBULAU AWS SEAQAQA AWS DOBUILEVU TB3	TOTAL RAIN AVERAGE DAILY EXTREME TOTAL * DAYS FALL MAX. # MIN. # MAX. MIN. * MM $\%$ + MM ON C C C C MAX. H NAX. # MIN. * TS 23 14 33 16 31.8 0.3 23.3 0.3 34.4 10 20.6 23 244 116 158 44 16 45 13 0.5 -0.6 22.4 0.1 35.5 15 18.4 201 110 282 102 137 30.3 -0.5 24.8 0.4 32.1 30 22.9 23 143 51 14 76 10 -0.6 23.0 0.1 32.4 31 21.6 2 143 10 16 30.4 -0.2 23.0 0.1 32.0 31 <	
NASINU TB3	176 21 44 15	
NADI AIRPORT SUVA/LAUCALA BAY NACOCOLEVU ROTUMA VIWA UDU POINT SAVUSAVU AIRFIELD LABASA AIRFIELD NABOUWALU KORONIVIA NAUSORI AIRPORT NAVUA/TOKOTOKO MONASAVU LAUTOKA AES BA/RARAWAI MILL PENANG MILL MATEI AIRFIELD VANUABALAVU LAKEBA YASAWA VUNISEA MATUKU ONO-I-LAU MEAN TEMPERATURE I	109 30 10 43 25 EMPERATURE(C)HUMIDITY WIND SUN RAD DRY WET RH% VP %OF MJ/ N (AVERAGE AT 9AM) KT POS SQ.M 7.6 29.1 24.5 67 27.1 6.5 63 19.8 7.6 28.2 25.0 77 29.2 53 22\$ 7.2 28.5 25.2 76 29.4 51 22\$ 8.3 9.0 30.0 25.9 71 30.2 7.6 28.4 25.5 79 30.4 6.9 29.0 25.2 73 29.1 7.8 28.7 25.0 73 28.8 6.7 28.2 25.1 77 29.4 6.7 27.9 24.8 77 28.9 5.3 7.0 2.2 22.4 21.4 92 24.8 7.7 28.1 24.7 75 28.4 6.8 28.4 25.6 79 30.5 6.0 28.2 25.0 77 29.1 7.1 28.6 25.5 71 29.6 7.1 28.2 25.0 77 29.1 7.1 28.6 25.4 76 29.9 8.3 29.0 26.0 78 31.2 6.9 28.0 24.7 76 28.6 6.6 28.3 25.7 81 31.0 (MAX+MIN)/2; WIND IS MEAN SPEED AT 06,12,18,24 HOURS. ALCULATED FROM SUNSHINE DURATION. # :DEPARTURE FROM LONG-TERM AVERAGES	
(1971-2000). + :NU	ER OF DAYS WITH 0.1 MM OR MORE RAIN. * :PERCENT OF LONG-TERM AVERAGES.B S OF LESS THAN OR EQUAL TO 5 DAYS. U/S: UNSERVICEABLE	LUE

4









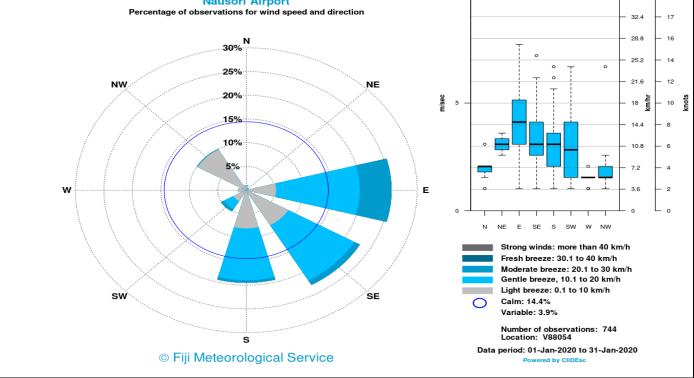
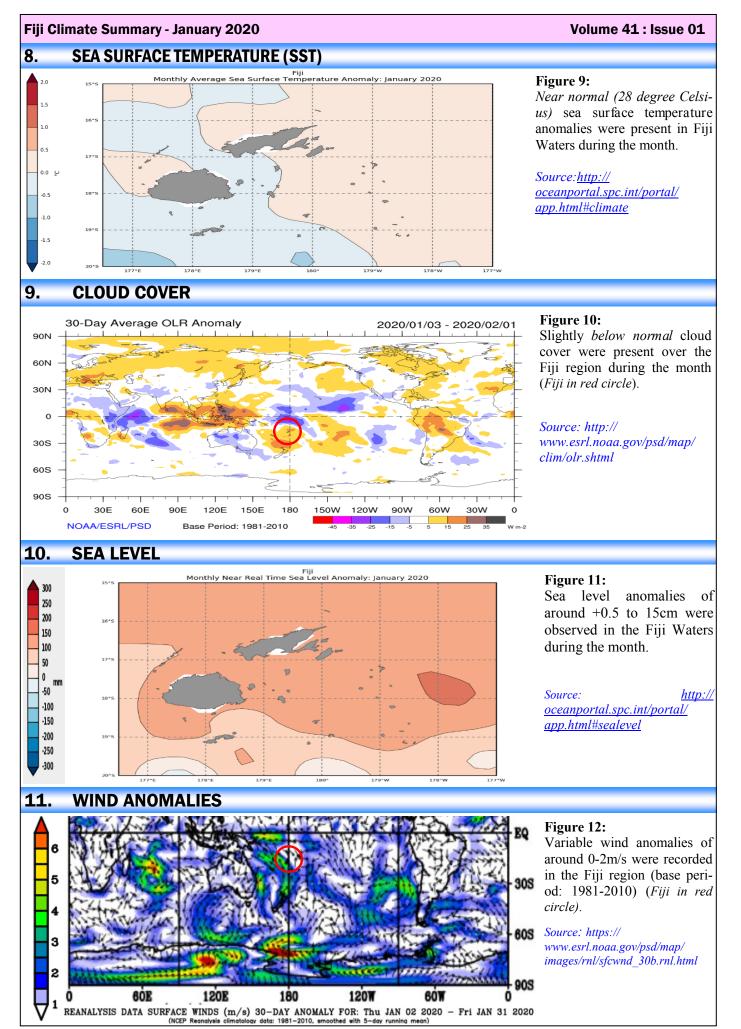


Figure 8b: The hourly wind observations at Nausori Airport during the month showed easterly winds were dominant, followed by southeasterly then southerlies. Generally, light to fresh breeze were observed at the station during the month.



12. **TROPICAL CYCLONE TINO**

Tropical cyclone Tino was the 3rd cyclone to occur in the Southwest Pacific during the 2019-20 season. It was the 2nd cyclone to affect the Fiji Group during the season. Tino attained a maximum intensity of Category 3.

A low pressure system was identified on the midnight of the 11th, approximately 230km to the east-southeast of Honiara. At that stage it was slow moving but was also intensifying. At 6pm on the 12th, it developed into a tropical disturbance and was referred to as TD04F. It continued to intensify, becoming a tropical depression on the mid-day of the 16th. It reached tropical cyclone intensity at 3am on the 17th and was named as Tropical Cyclone Tino. At that point, it was located 100km south of Rotuma.

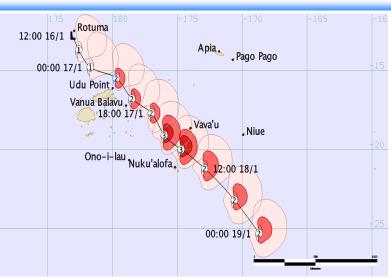


Figure 13: Track map for tropical cyclone Tino.

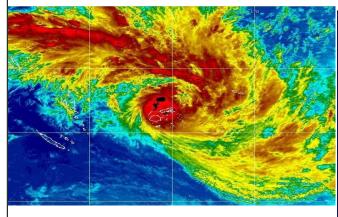
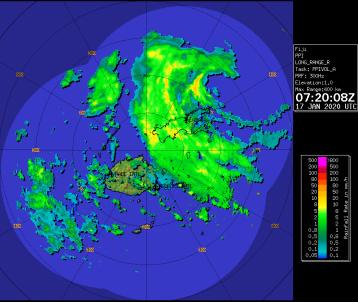


Figure 14: Satellite image of tropical cyclone Tino at 3pm on the 17th. Image source: Himawari-8 satellite.

Initially, tropical cyclone Tino moved in a general south -eastward direction and entered into Fiji's EEZ at 3pm on the 17th as a Category 1 system. It had sustained winds of 85km/hr close to its centre. As it maintained

ry 2 cyclone. Tino exited Fiji's EEZ at 6am on the 18th Fiji. as a Category 2 cyclone.



its southeastward movement, it passed to the east of Figure 15: The eye of tropical cyclone Tino to the northeast of Udu Point at 9pm on the 17th intensifying into a Catego- Udu Point at 7.20pm on the 17th captured by the radar network in

On the 18th at 9am when it was located 220km east of Lakeba, Tino intensified into a Category 3 cyclone. It maintained its southeastward direction, passing through the Ha'apai group in Tonga at 6pm on the 18th. Tino exited Regional Specialised Meteorological Centre, Nadi Tropical Cyclone Centre's area of responsibility on the midday of 19th while a

Station	Maximum sustained wind	Maximum wind gust
Udu Point	77km/hr at 7.50pm on 17 th	117kmhr at 10.00pm on 17 th
Vanuabalavu	69km/hr at 7.20pm on 17 th	103km/hr at 7.10am on 17 th
Ono-i-Lau	52km/hr at 10.40am on 18 th	80km/hr at 7.50am on 18 th
Saqani	48km/hr at 5.40pm on 17 th	87km/hr at 5.20pm on 17 th
Yasawa –i-Rara	48km/hr at 6.00am on 17 th	66km/hr at 4.10pm on 17 th
Vunisea	44km/hr at 8.40pm on 17th	63km/h at 8.40pm on 17 th

Table 3: Significant winds observed during the passage of tropical cyclone Tino.

Volume 41: Issue 01

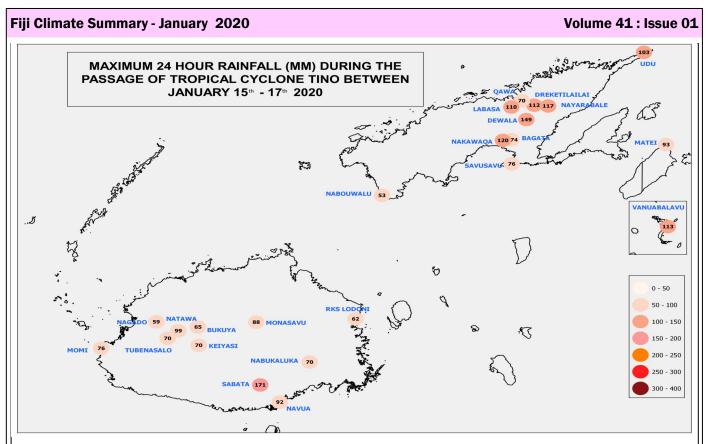


Figure 16: Plotted above are stations that recorded maximum 24-hour rainfall of greater than 50mm during the passage of tropical cyclone Tino and its predecessor, tropical depression TD04F between 15th and 17th.

Category 2 system.

Tropical cyclone Tino resulted in gale to storm force winds while in Fiji's Exclusive Economic Zone. However, winds up to gale force were experienced over the land area, especially in the north eastern parts of Vanua Levu and northern Lau Group. The highest observed sustained wind was at Udu Point with 77km/h, followed by Vanuabalavu with 69km/h and Ono-i-Lau with 52km/h. The highest wind gust was at Udu Point with 117km/h, followed by Vanuabalavu with 103km/h and Saqani with 87km/h

(Table 3).

Tropical cyclone Tino and the associated active trough of low pressure, including tropical depression, TD04F, resulted in significant rainfall in certain parts of the country, particularly the Central and Northern Divisions, including northern Lau Group, between 15th and 17th. Sabata recorded a 24-hour rainfall of 171mm on the 16th, followed by Dewala with 149mm on the 17th, Nakawaqa with 120mm on the 17th, Nayarabale with 117mm on



the 17th, Vanuabalavu with 113mm *Figure 17: Flooded Vunaniu flat on the 16th. Picture source: Fiji Government.* on the 17th, Dreketilailai with 112mm on the 17th, Labasa Airport with 110mm on the 16th and Udu Point with 103mm on 17th (Figure 16). Consequently, flooding were experienced in the Central and Northern Divisions.

Initial damage assessment report indicate that the Northern Division was most significantly affected, with the damages amounting to FJ\$6.15 million. A father and daughter in Serua went missing after they were swept while crossing a flooded creek.

Note: All time in this report are in Fiji Standard Time.