

Funafuti, Tuvalu OR19-3 Site – Atmospheric Corrosivity

Site OR19-3



Funafuti, Tuvalu Site (Image by Geosun).

Background:

The site is positioned approximately 210 m west of the shores of the west-central Pacific Ocean, at an elevation of 3 m [1] on the island of Fongafale [1], the largest narrow land islet of the atoll Funafuti [2] [3]. The site is also near Funafuti International Airport [1], with Te Namo Lagoon to its left (~250-260 m away), with a surface area of approximately 275 km² [3]. Funafuti's population is roughly 6 300 people [3], and the economy based on services, tourism, subsistence farming and fishing [4].

The site is classified per the Köppen-Geiger system as a hot tropical environment (Köppen Af), with high humidity year-round and a mean temperature of 28.6 ± 0.9 °C, varying between 23.7°C and 30.6°C. The average annual precipitation at the site is nearly 3 100 mm, and the mean yearly humidity level is $75.1 \pm 18.8\%$. Apart from salt deposition from the nearby ocean and lagoon, other airborne pollutants likely originate from the neighbouring airport and several nearby human settlements. The average wind speed at the site is 7.9 ± 2.4 m/s, with gusts of 19.0 m/s, in a predominant southerly direction [5].

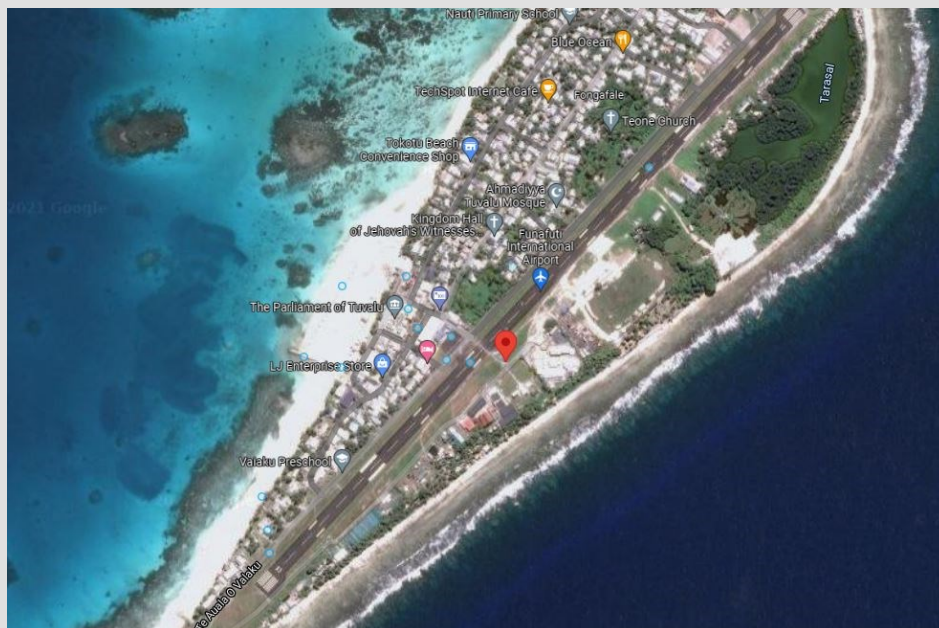
Per the atmospheric corrosion data below, this tropical marine site is classified as Moderately to Highly (C3-C4) corrosive with substantial effect/deposition of chlorides (ISO 9223) [6].

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Position of the Funafuti, Tuvalu Site [1].



Satellite view of the Funafuti, Tuvalu Site [7].

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GPS Coordinates of Site:	8°31'30.3"S 179°11'46.8"E	Elevation above Sea Level (m):	~3 m	Distance from Ocean:	~210 m
ISO 9226 Corrosion Rates and ISO 9223 Corrosivity Classification					
R_{CORR} Mild steel (µm/yr)	56.9 ± 4.3 µm/yr (1 st year) and 46.8 ± 3.0 µm/yr (2 nd year)				
R_{CORR} Aluminium (µm/yr)	~0.1 µm/yr (Negligible) (1 st and 2 nd years)				
R_{CORR} Hot Dip Galvanised Steel (µm/yr)	3.0 ± 0.4 µm/yr (1 st year) and 2.8 ± 0.1 µm/yr (2 nd year)				
R_{CORR} Copper (µm/yr)	1.9 ± 0.2 µm/yr (1 st year) and 2.1 ± 0.2 µm/yr (2 nd year)				
ISO 9223 Corrosivity Classification	Medium-High (C3-C4)				
Typical surface contaminants	Pollution: Some salt mix deposition Specific contaminants include: Water-soluble salts – 6-19 mg/m ² Nitrites – 0.5 ppm Chlorides – 8-12 ppm pH – Neutral to slightly alkaline				



Mild steel – 12 months



Mild steel – 12 months



Mild steel – 24 months



Mild steel – 24 months



Aluminium – 12 months



Aluminium – 12 months



Aluminium – 24 months



Aluminium – 24 months



HDG – 12 months



HDG – 12 months



HDG – 24 months



HDG – 24 months



Copper – 12 months



Copper – 12 months



Copper – 24 months



Copper – 24 months

Works Cited

- [1] Google Inc, "Google Maps," [Online]. Available: <https://www.google.com/maps/place/8%C2%B031'30.3%22S+179%C2%B011'46.8%22E/@-8.5473667,179.1093923,34190m/data=!3m1!1e3!4m3!1m7!3m6!1s0x0:0xffff4dd81a6a000fd!2zOMKwMzEnMzAuMyJTIDE3OeKwMTEnNDYuOCJF!3b1!8m2!3d-8.525087!4d179.196323!3m4!1s0x0:0xffff4dd81a6a000>. [Accessed 12 November 2021].
- [2] Wikipedia, "Fongafale," 13 May 2021. [Online]. Available: <https://en.wikipedia.org/wiki/Fongafale>. [Accessed 12 November 2021].
- [3] Wikipedia, "Funafuti," 11 October 2021. [Online]. Available: <https://en.wikipedia.org/wiki/Funafuti>. [Accessed 12 November 2021].
- [4] Nexus Commonwealth Network, "Tuvalu," Nexus Partnerships Limited, 2020. [Online]. Available: <https://www.commonwealthofnations.org/sectors-tuvalu/business/>. [Accessed 15 November 2021].
- [5] Geosun, *113-World Bank-Tuvalu - Meteorological Data*, 2020-2021.
- [6] ISO (International Organization for Standardization), *ISO 9223 - Corrosion of metals and alloys — Corrosivity of atmospheres — Classification, determination and estimation*, Geneva, Switzerland: ISO, 2012.
- [7] Google Inc, "Google Maps," [Online]. Available: <https://www.google.com/maps/place/8%C2%B031'30.3%22S+179%C2%B011'46.8%22E/@-8.5240745,179.1963881,1797m/data=!3m1!1e3!4m5!3m4!1s0x0:0xaf987502ed525e3c!8m2!3d-8.5250833!4d179.1963333!5m1!1e4>. [Accessed 16 November 2021].