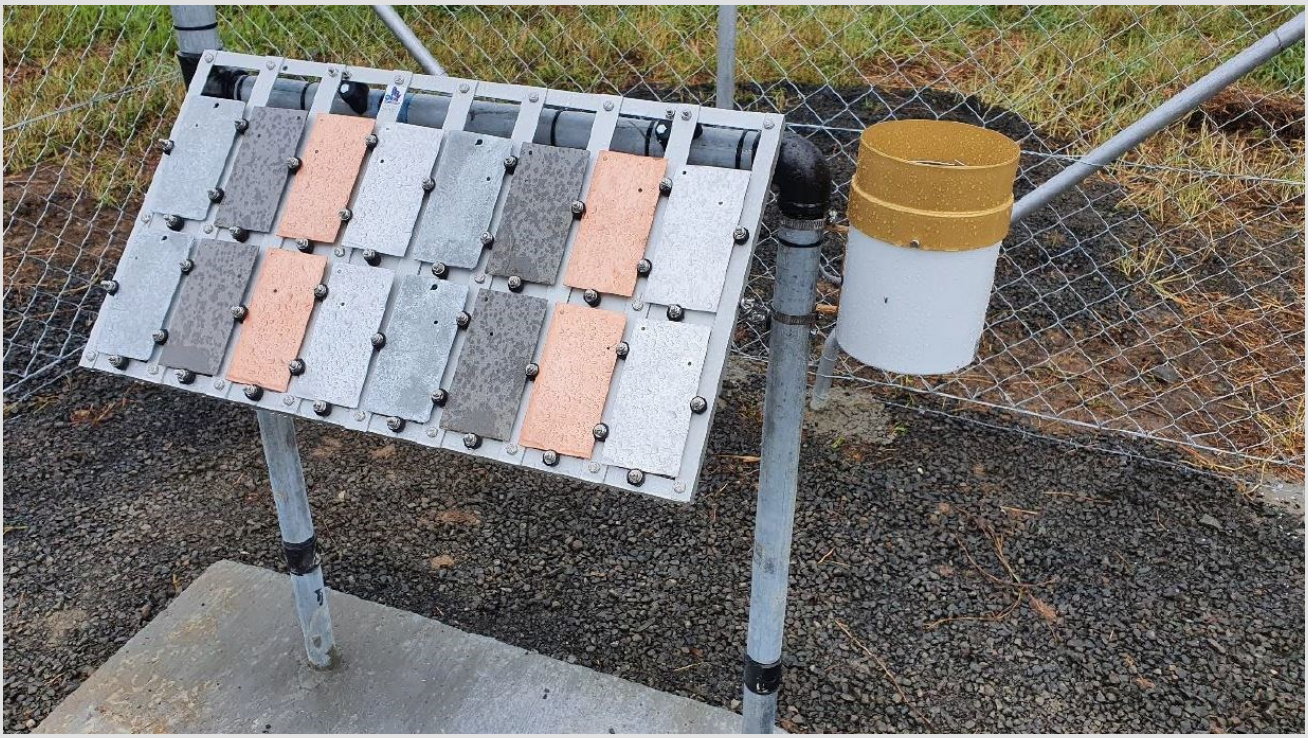
Papua New Guinea OR19-5 Site – Atmospheric Corrosivity

Site OR19-5



Papua New Guinea Site (Image by Geosun).

Background:

The Papua New Guinea site is located at Gurney Airport Alotau Milne Bay, approximately 2.7 km from the Pacific Ocean in mainland Papua New Guinea [1] [2]. The nearest town is Alotuo, a port town in Milne Bay Province positioned about 10-12 km to the east of the airport [1] [3], with a population of nearly 16 000 people [3]. The region's main economic activities include agriculture, fishing, shipping [2], and tourism.

According to the Köppen-Geiger system, the site exhibits a tropical rainforest climate (Köppen Af), with an average yearly temperature of 26.1 ± 1.3ºC, fluctuating between 22.2ºC and 28.7ºC and a mean annual humidity level near 98.4 ± 1.4%. The yearly precipitation level is about 2 000 mm, and the average wind speed is 1.2 ± 0.4 m/s, predominantly in a southwesterly direction [4].

The site is surrounded by large coconut palm tree plantations [5] and positioned next to the airport at an elevation of about 20 m. Apart from the airport and nearby ocean, other sources of air contaminants are likely associated with the coconut plantations and nearby villages.

Per the atmospheric corrosion data given below, the site is classified as C3-C4 (Medium to High) corrosive, i.e., a tropical rainforest marine environment with substantial effect/deposition of chlorides (ISO 9223) [6].

The location of the Alotua, Papua New Guinea Site [1].

Satellite view of the Alotua, Papua New Guinea Site [7].

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GPS Coordinates of Site:	10°18'36.4"S 150°20'16.7"E	**Elevation above Sea Level (m):**	~20 m	**Distance from Ocean (km):**	~2.7 km
ISO 9226 Corrosion Rates and ISO 9223 Corrosivity Classification					
R_{CORR} Mild steel (µm/yr)	61.0 ± 0.2 µm/yr (1st year) and 36.7 ± 0.1 µm/yr (2nd year)				
R_{CORR} Aluminium (µm/yr)	<0.1 µm/yr (Negligible) (1st and 2nd years)				
R_{CORR} Hot Dip Galvanised Steel (µm/yr)	1.9 ± 0.2 µm/yr (1st year) and 1.2 ± 0.1 µm/yr (2nd year)				
R_{CORR} Copper (µm/yr)	1.4 ± 0.1 µm/yr (1st year) and 0.8 ± 0.1 µm/yr (2nd year)				
ISO 9223 Corrosivity Classification	Medium to High (C3-C4)				
Typical surface contaminants	Pollution: Medium salt mix deposition and bird muck Specific contaminants include: Water-soluble salts – 2-32 mg/m^2 Chlorides – <4 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

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[6] ISO (International Organization for Standardization), *ISO 9223 - Corrosion of metals and alloys — Corrosivity of atmospheres — Classification, determination and estimation,* Geneva, Switzerland: ISO, 2012.

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