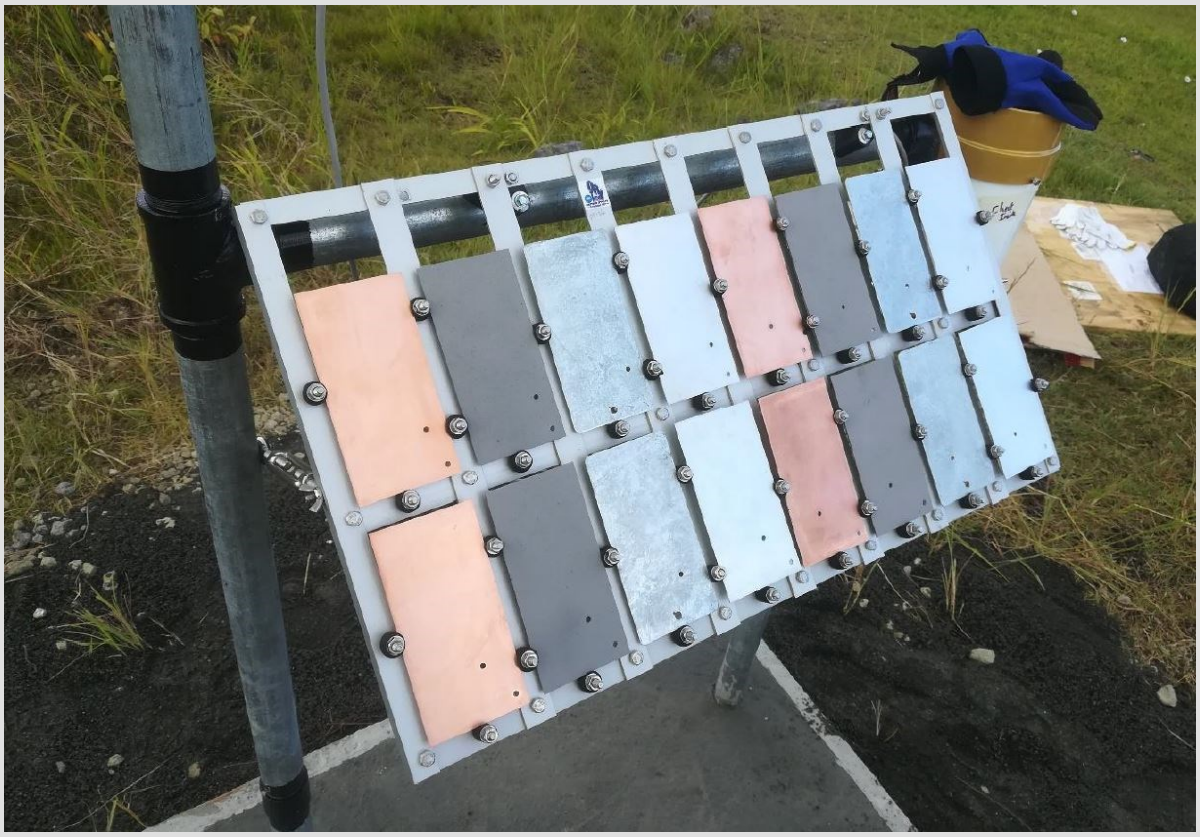
Airai, Palau OR19-4 Site – Atmospheric Corrosivity

Site OR19-4



Palau Site (Image by Geosun).

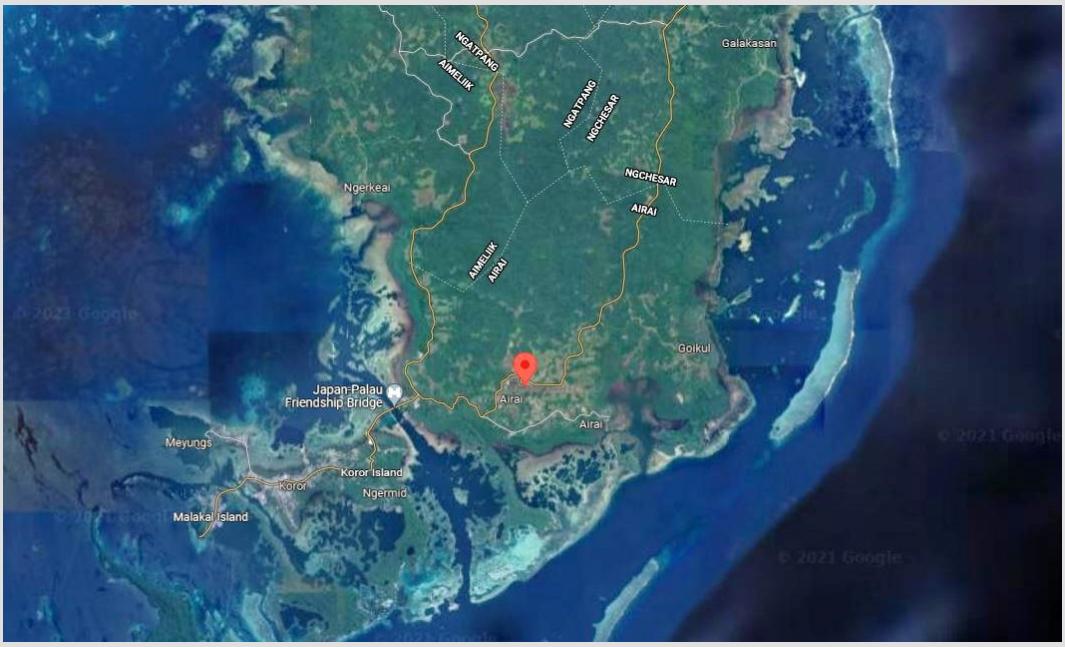
Background:

The Airai, Palau Site is located near Palau International Airport, about 2.4 km northwest of Arai Bay and approximately 2 km from the surrounding barrier reef lagoon [1] [2] of Babeldaob island [3]. The island is part of an archipelago in the Pacific Ocean, comprising around 200 limestone and volcanic islands covered in forests [4]. Palau's population is near 18 000 people, with the economy mainly dependent on tourism, subsistence agriculture and fishing [2].

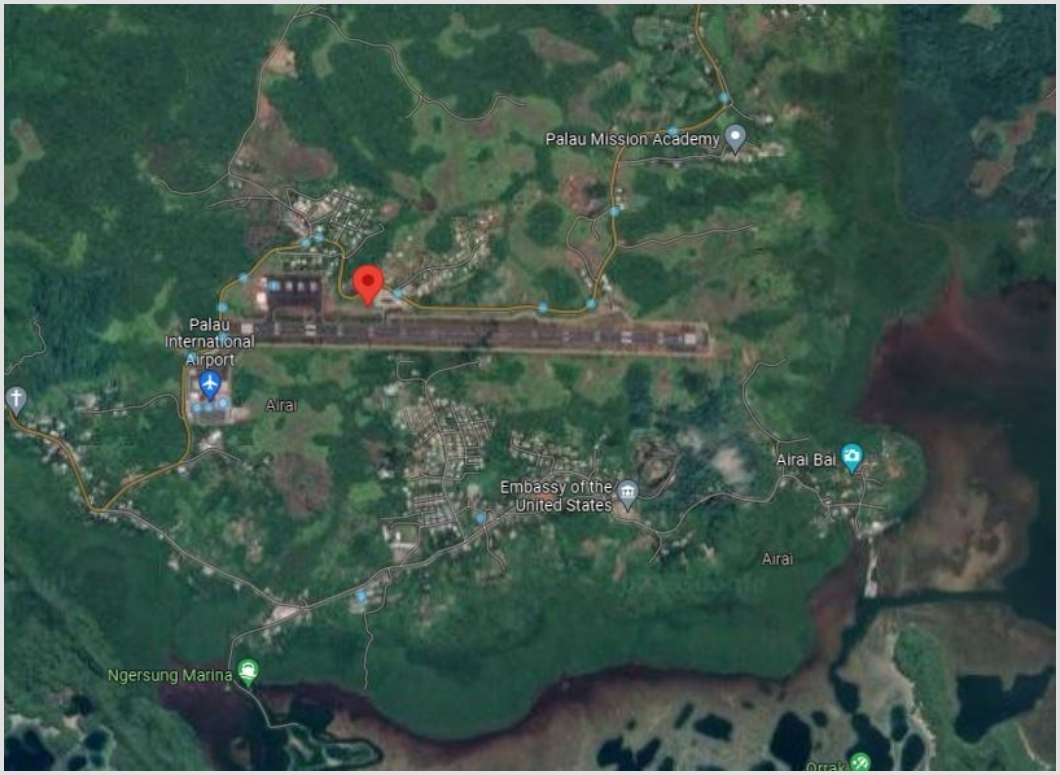
The site has a hot and humid tropical climate (Köppen Af) per the Köppen-Geiger system, with an average yearly temperature of about 27.2 ± 0.7ºC. The daily minimum is approximately 25.1ºC and the maximum 29.2ºC. The average annual precipitation at the site measures roughly 4 000 mm, and the average humidity is 93.3 ± 5.1% [5].

Apart from some salt deposition from the ocean, airborne contaminations likely also originate from the airport and surrounding villages/urban areas. The average wind speed at the site is 1.7 ± 0.9 m/s, with gusts of 16.2 m/s, in a predominant southeasterly direction [5].

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



Position of the Airai, Palau Site [1].



Satellite view of the Airai, Palau Site [7].

Airai, Palau OR19-4 Site – Atmospheric Corrosivity					
GPS Coordinates of Site:	7°22'06.7"N 134°32'23.4"E	**Elevation above Sea Level (m):**	~47 m	**Distance from Ocean:**	~2 km
ISO 9226 Corrosion Rates and ISO 9223 Corrosivity Classification					
R_{CORR} Mild steel (µm/yr)	47.5 ± 1.8 µm/yr (1st year) and 36.1 ± 2.3 µm/yr (2nd year)				
R_{CORR} Aluminium (µm/yr)	0.2 ± 0.1 µm/yr and 0.06 ± 0.01 µm/yr (2nd year)				
R_{CORR} Hot Dip Galvanised Steel (µm/yr)	1.6 ± 0.1 µm/yr and 1.3 ± 0.1 µm/yr (2nd year)				
R_{CORR} Copper (µm/yr)	1.4 ± 0.1 µm/yr and 1.00 ± 0.01 µm/yr (2nd year)				
ISO 9223 Corrosivity Classification	Medium to High (C3-C4)				
Typical surface contaminants	Pollution: Medium salt mix deposition Specific contaminants include: Water-soluble salts – 11-28 mg/m^2 Nitrites – 0.5 ppm Chlorides – 8-16 ppm pH – Slightly acidic				

 **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," Google Inc, [Online]. Available: https://www.google.com/maps/place/7%C2%B022'06.7%22N+134%C2%B032'23.4%22E/@7.402007,134.53205 1,28831m/data=!3m1!1e3!4m5!3m4!1s0x0:0x0!8m2!3d7.3685129!4d134.5398299. [Accessed 2021 November 11 2021].

[2] Wikipedia, "Palau," Wikipedia, 11 November 2021. [Online]. Available: https://en.wikipedia.org/wiki/Palau. [Accessed 2021 November 2021].

[3] Wikipedia, "Babeldaob," Wikipedia, 21 June 2021. [Online]. Available: https://en.wikipedia.org/wiki/Babeldaob. [Accessed 11 November 2021].

[4] Lonely Planet, "Palau," Lonely Planet, [Online]. Available: https://www.lonelyplanet.com/palau. [Accessed 11 November 2021].

[5] Geosun, *110-World Bank-Palau - 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/7%C2%B022'06.7%22N+134%C2%B032'23.4%22E/@7.363076,134.5466912,5701m/data=!3m1!1e3!4m5!3m4!1s0x0:0xe408eca09fdbfc50!8m2!3d7.3685278!4d134.5398333!5m1!1e4. [Accessed 16 November 2021].