

Soroti OR19-11 Test Site – Atmospheric Corrosivity

Site OR19-11

Installation: 23-01-2020



Soroti Test Site (Image by Geosun).

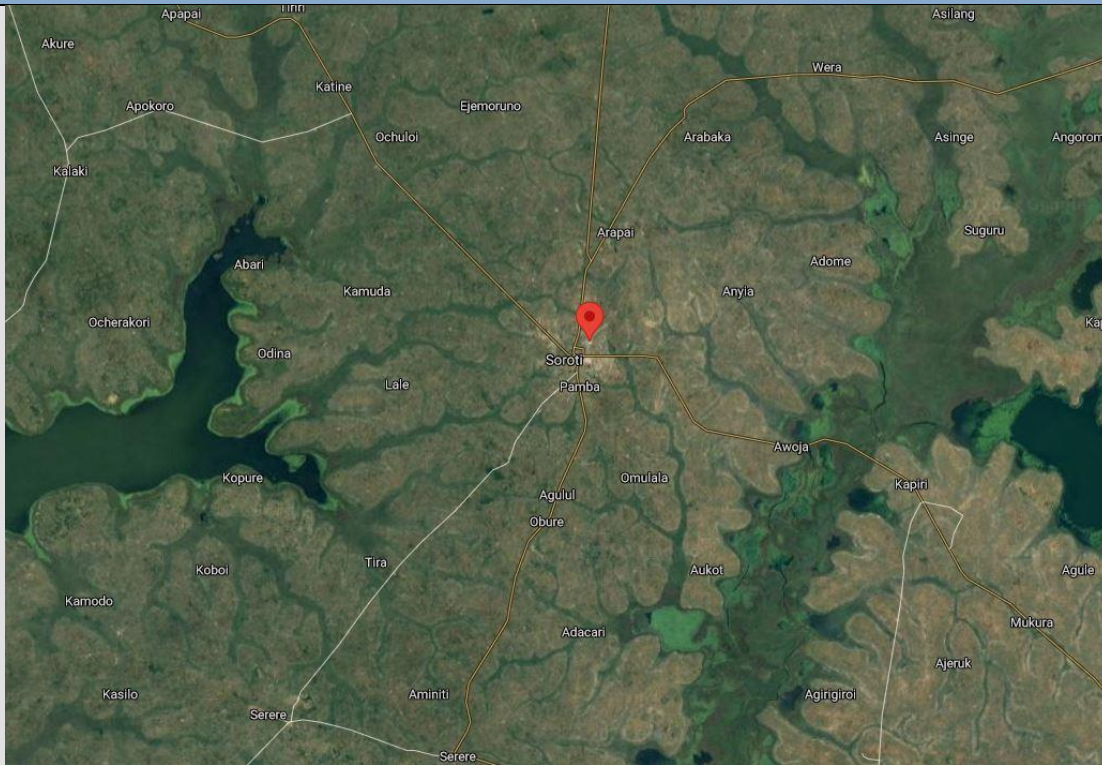
Background:

Soroti is a city located about 150 km to the north of Lake Victoria in Uganda and roughly 885 km from the ocean [1]. It has an estimated (dated 2012) population of 61 000 people and houses an airport (Soroti Airport) that lies approximately 3.5 km (by road) from the city's central business district [2]. The city's altitude is about 1 130 m [2], and its climate is classified per the Köppen-Geiger system as Aw (Tropical savanna) [3] [4], with the main economic activity being agriculture [5]. Soroti Region, as a whole, houses about 2.5 million people [5].

The site is positioned towards the north-eastern side of the city, exhibiting an average yearly temperature, as measured during 2020 - 2021, of $23.7 \pm 1.4^{\circ}\text{C}$, fluctuating between 20.3°C and 28.0°C , and a mean yearly humidity level of $87.0 \pm 11.4\%$. The annual precipitation is approximately 1 275 mm, occurring throughout the year, with the wettest months being March to November and the driest, spanning from December to February [3]. The average wind speed at the site is about 1.8 ± 0.3 m/s, with gusts of up to 3.3 m/s, in a predominant southerly direction.

The site is classified as Low (C2) from a corrosivity perspective, with the corrosion mainly driven by slightly acidic precipitation, some sulphur-based pollutants in the atmosphere and bird muck deposited onto the surfaces.

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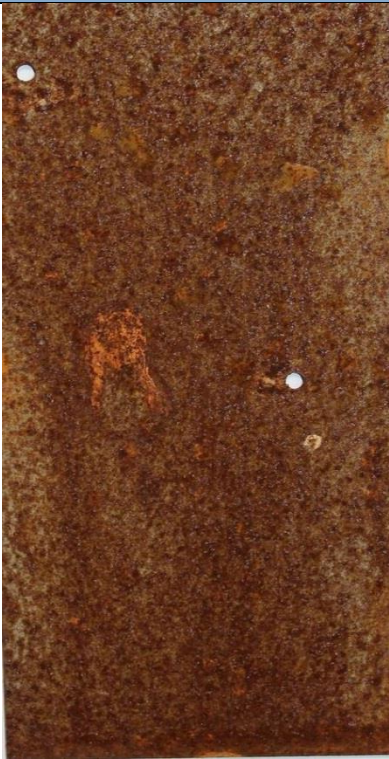
Google Inc Map of the Soroti Region in Uganda.

GPS Coordinates of Site:	1°43'26.4"N 33°37'12.0"E	Elevation above Sea Level (m):	1128 m	Distance from Ocean (km):	~883 km
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ISO 9226 Corrosion Rates and ISO 9223 Corrosivity Classification

R_{CORR} Mild steel (µm/yr)	5.76 ± 0.60 µm/yr (1 st year) and 6.06 ± 0.62 µm/yr (2 nd year)
R_{CORR} Aluminium (µm/yr)	<0.1 µm/yr (Negligible) (1 st and 2 nd year)
R_{CORR} Hot Dip Galvanised Steel (µm/yr)	0.67 ± 0.05 µm/yr (1 st year) and 0.25 ± 0.01 µm/yr (2 nd year)
R_{CORR} Copper (µm/yr)	0.41 ± 0.12 µm/yr (1 st year) and 0.37 ± 0.07 µm/yr (2 nd year)
ISO 9223 Corrosivity Classification	Low (C2)
Typical surface contaminants	Pollution – mainly aluminium-, phosphor- and sulphur-based Specific contaminants include: Water-soluble salts – 12-16 mg/m ² Chlorides – Not detected pH – Somewhat acidic (5.5-6.6)

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Mild steel – 12 months



Mild steel – 12 months

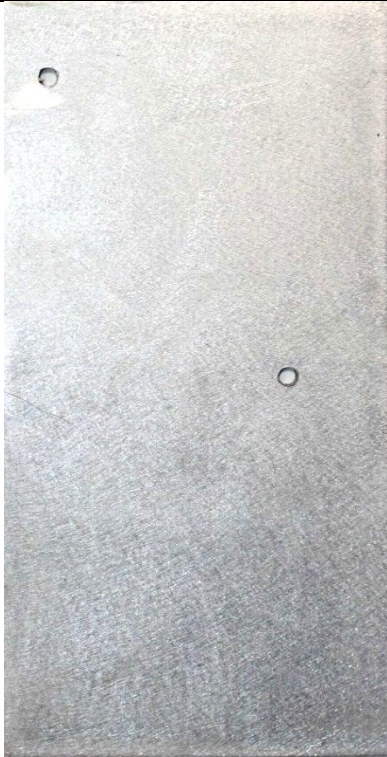


Mild steel – 24 months



Mild steel – 24 months

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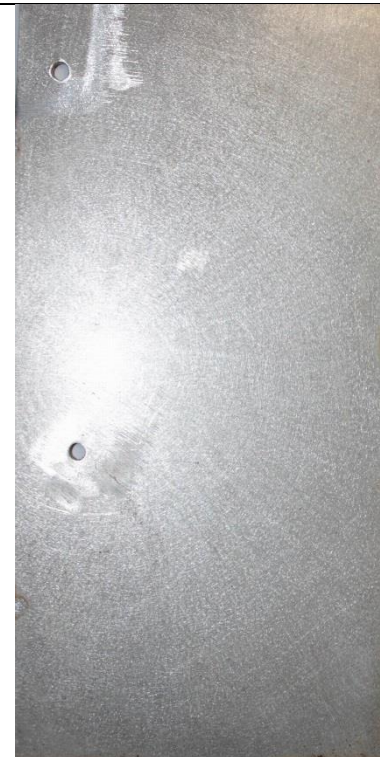
Aluminium – 12 months



Aluminium – 12 months



Aluminium – 24 months

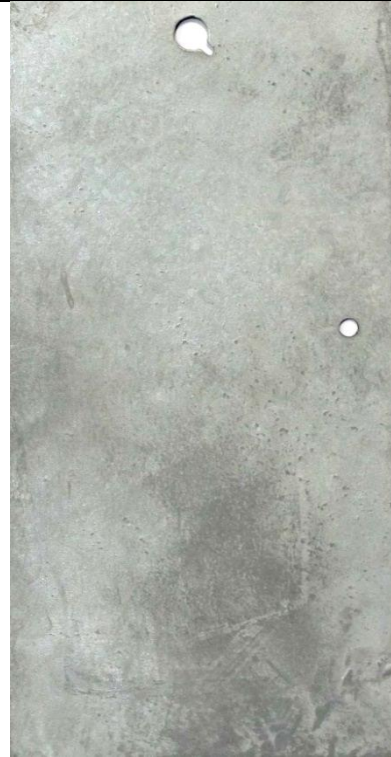


Aluminium – 24 months

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HDG – 12 months



HDG – 12 months



HDG – 24 months



HDG – 24 months

Soroti OR19-11 Test Site – Atmospheric Corrosivity



Copper – 12 months



Copper – 12 months



Copper – 24 months



Copper – 24 months

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Works Cited

- [1] Google Inc, "Google Maps," 29 April 2021. [Online]. Available: <https://www.google.co.za/maps/place/1%C2%B043'26.4%22N+33%C2%B037'12.0%22E/@1.6835288,33.5167188,62187m/data=!3m1!1e3!4m5!3m4!1s0x0:0x0!8m2!3d1.724!4d33.62>. [Accessed 29 April 2021].
- [2] Wikipedia, "Soroti," 27 March 2021. [Online]. Available: <https://en.wikipedia.org/wiki/Soroti>. [Accessed 29 April 2021].
- [3] Climate-Data.Org, "Eastern Region Climate," [Online]. Available: <https://en.climate-data.org/africa/uganda/eastern-region-2584/>. [Accessed 29 April 2021].
- [4] Wikipedia, "Köppen climate classification," 18 April 2021. [Online]. Available: https://en.wikipedia.org/wiki/K%C3%B6ppen_climate_classification. [Accessed 29 April 2021].
- [5] Wikipedia, "Soroti District," 21 March 2021. [Online]. Available: https://en.wikipedia.org/wiki/Soroti_District. [Accessed 29 April 2021].