

IRVING REEF

10°52'28.26"N, 114°55'08.198"E

Geographic area

Irving Reef is an oceanic coral atoll resembling a tall triangle with a tail that has developed on the top of a seamount in the northern part of the Spratlys. It is located 192NM northwest of the island of Palawan, over 250NM north of the island of Borneo and over 300NM southeast of mainland Vietnam. The closest shallow geographic features are West York Island, just under 12NM northeast and Menzies Reef, under 17NM north. The atoll extends 10km on its long southwest-northeast axis and reaches 1.6km along its northwest-southeast axis.

Land area above water

There is one small 34m by 10m above-water sand bank in the 26 March 2013 satellite image. Comparison with satellite images from 19 February 2012 and 7 October 2014 shows that whilst sand tends to gather in this area, the exact location, size and shape of the sand bank vary and it seems highly improbable that it will always be above water at high tide. The sand bank visible in the 26 March 2013 satellite image is unlikely to remain above water once the sea level rises by 66cm as expected at Mean High Water Spring.

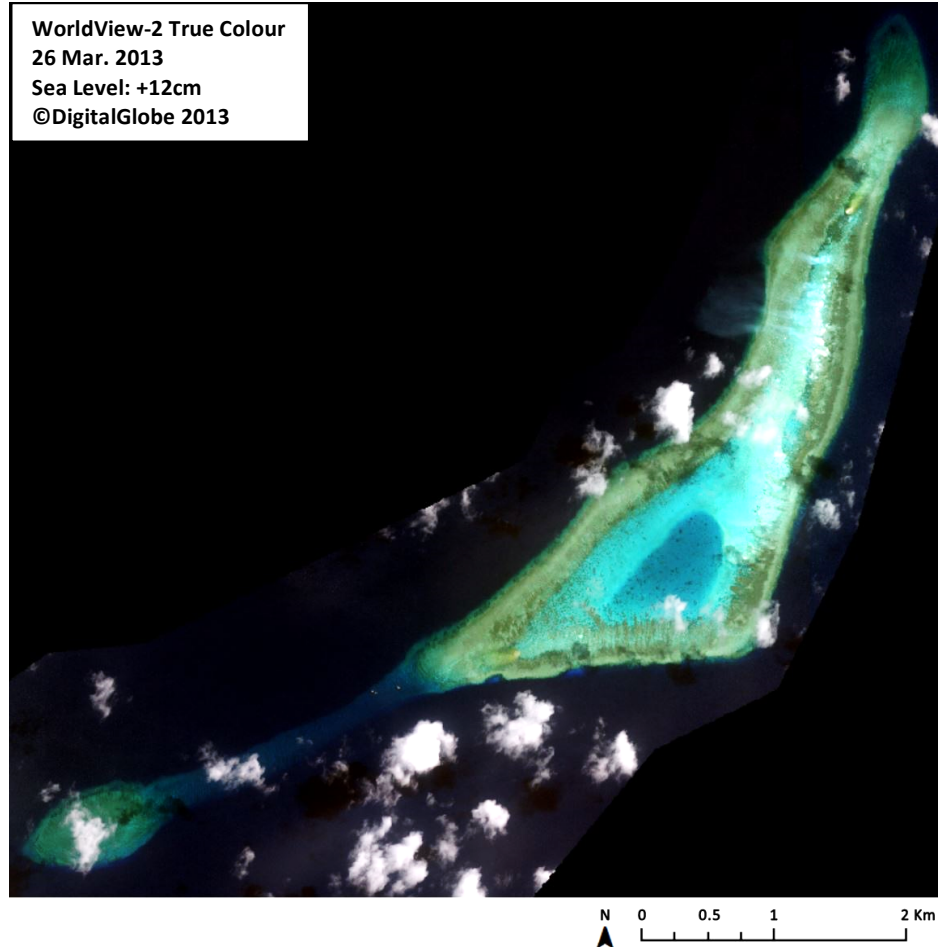
Human infrastructure

There are no man-made structures visible on this reef as at 7 October 2014.

Intertidal and submerged area

The aerial coverage of this coral atoll is 6.88km² comprising a reef flat of 4.47km², a reef slope of 1.95km² and a small lagoon in the southern part of the reef flat of 0.46km² (900m by 500m). The shallow (1.4-1.8m) part of the reef flat is a 200m-wide and nearly 12km-long band on the outer part of the reef flat where it meets the reef slope. In addition to the above-water sand bank in the northern tip of the reef flat, there is another shallow sand bank at the southwestern end of the reef flat, still submerged in the 26 March 2013 satellite image, but most of which is expected to uncover at Lowest Astronomical Tide when the sea level decreases by 1.19m. Other shallow parts of the reef flat are also expected to emerge at Lowest Astronomical Tide, especially on the eastern edge of the reef flat. The inner part of the reef flat, which is mostly sandy and slopes into the lagoon (the back reef), is over 300m wide on the western side of the lagoon but under 150m wide on the eastern side; it is 3-4m deep in the south and 2-3m in the north. The lagoon is 5-6m deep and characterised by a dense reticulate reef system that connects together numerous shallow coral heads and patch reefs that are around 20m wide. The reef slope is very narrow along the three main sides of the atoll (east, west and south). However, the northern tip has a longer reef slope that extends 700m seaward (it is 500m wide and the southwestern tip has a tail-like extension that extends 3.3km at a depth that exceeds 8m and at the end of which a 3-4m deep coral platform can be observed. The spurs and grooves area that connects the main atoll to its southwestern tail end might be good fishing grounds and may explain that two vessels can be observed in this location. Spurs and grooves are visible on the entire reef slope area.

Deep dredging marks are visible in the 23 March 2013 satellite image (over an area of 0.50km²). At least 12 dredgers can also be seen with long sand plumes (visible over 400m seaward from the edge of the reef slope) emanating from their location, suggesting that they were then in operation.

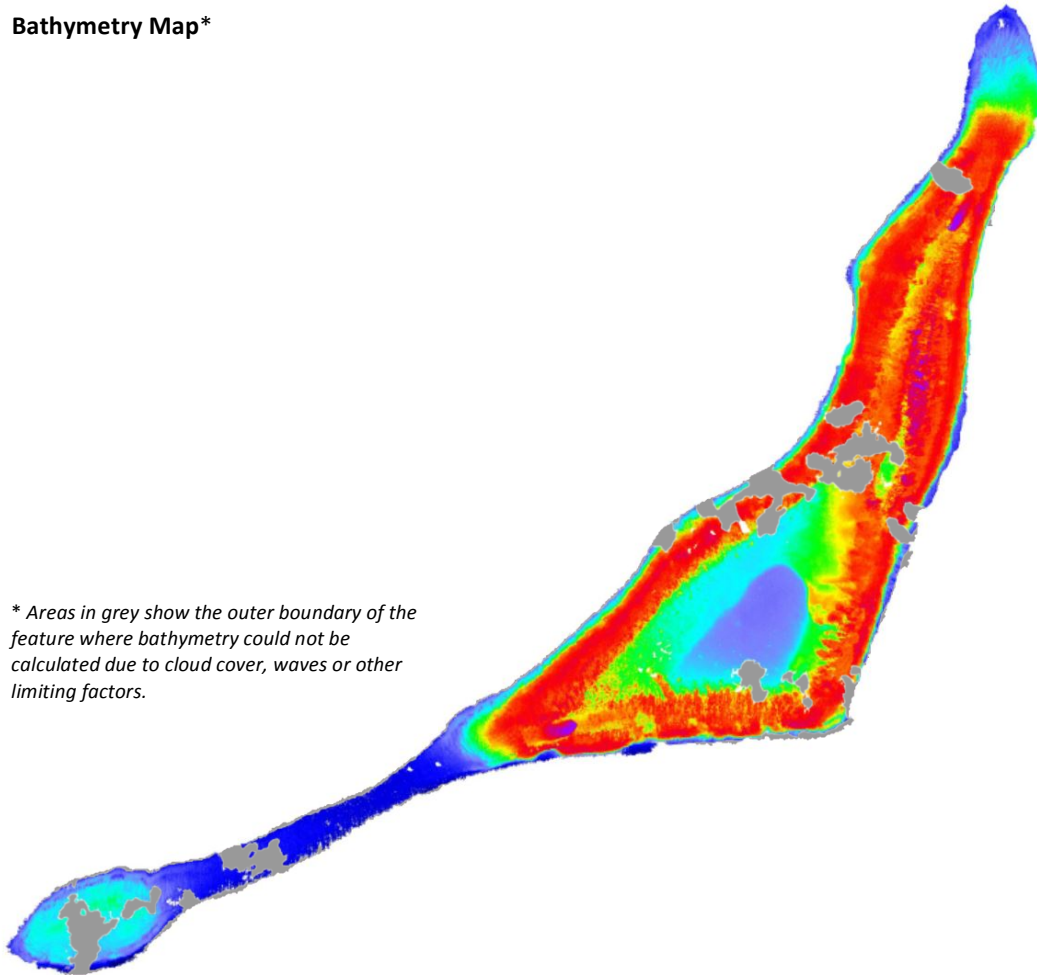


IRVING REEF

10°52'28.26"N, 114°55'08.198"E

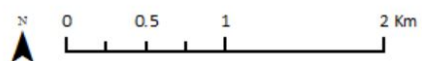
Derived from WorldView-2 satellite data captured on 26 March 2013 [Sea Level: +12cm]

Bathymetry Map*



** Areas in grey show the outer boundary of the feature where bathymetry could not be calculated due to cloud cover, waves or other limiting factors.*

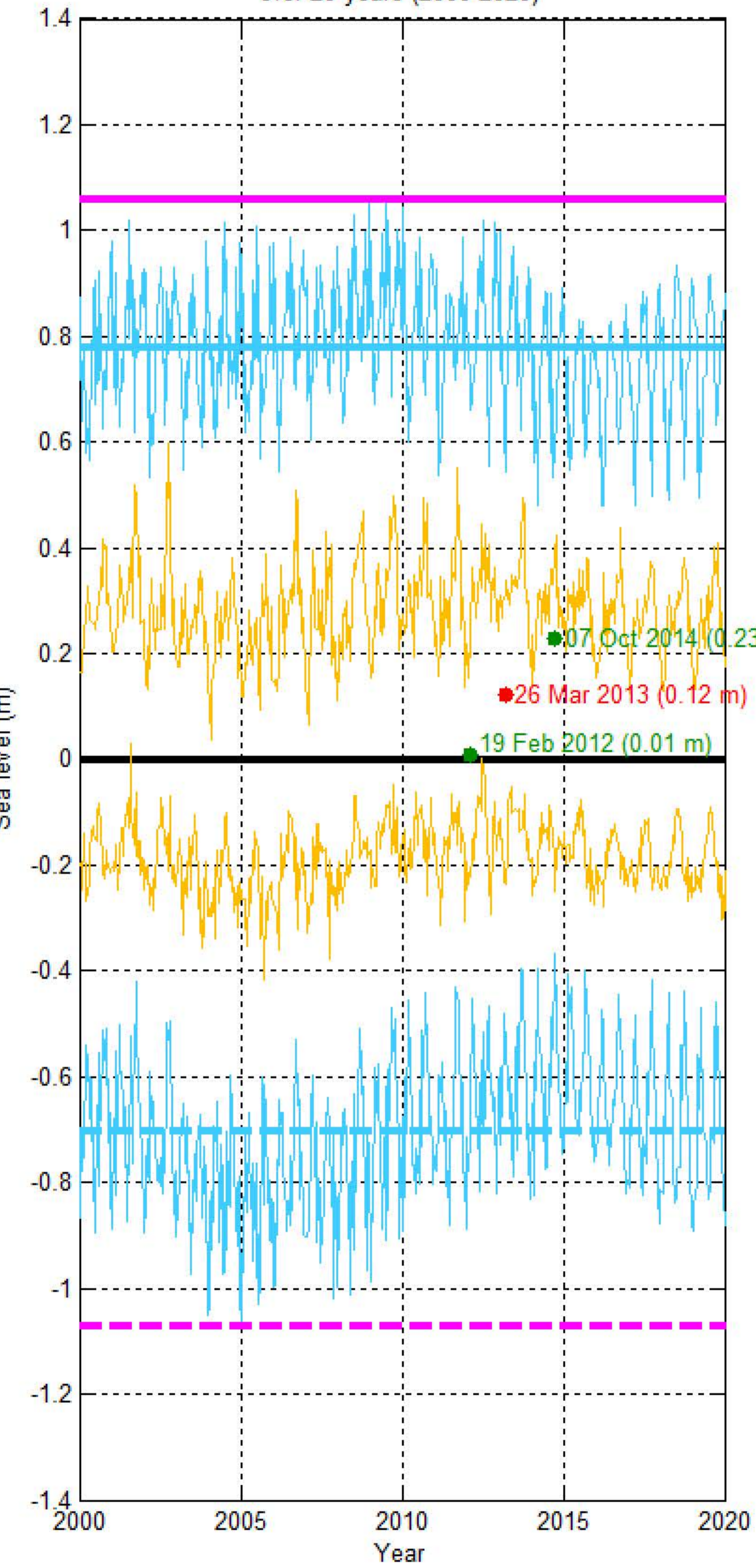
Habitat Classification and Land Cover Map



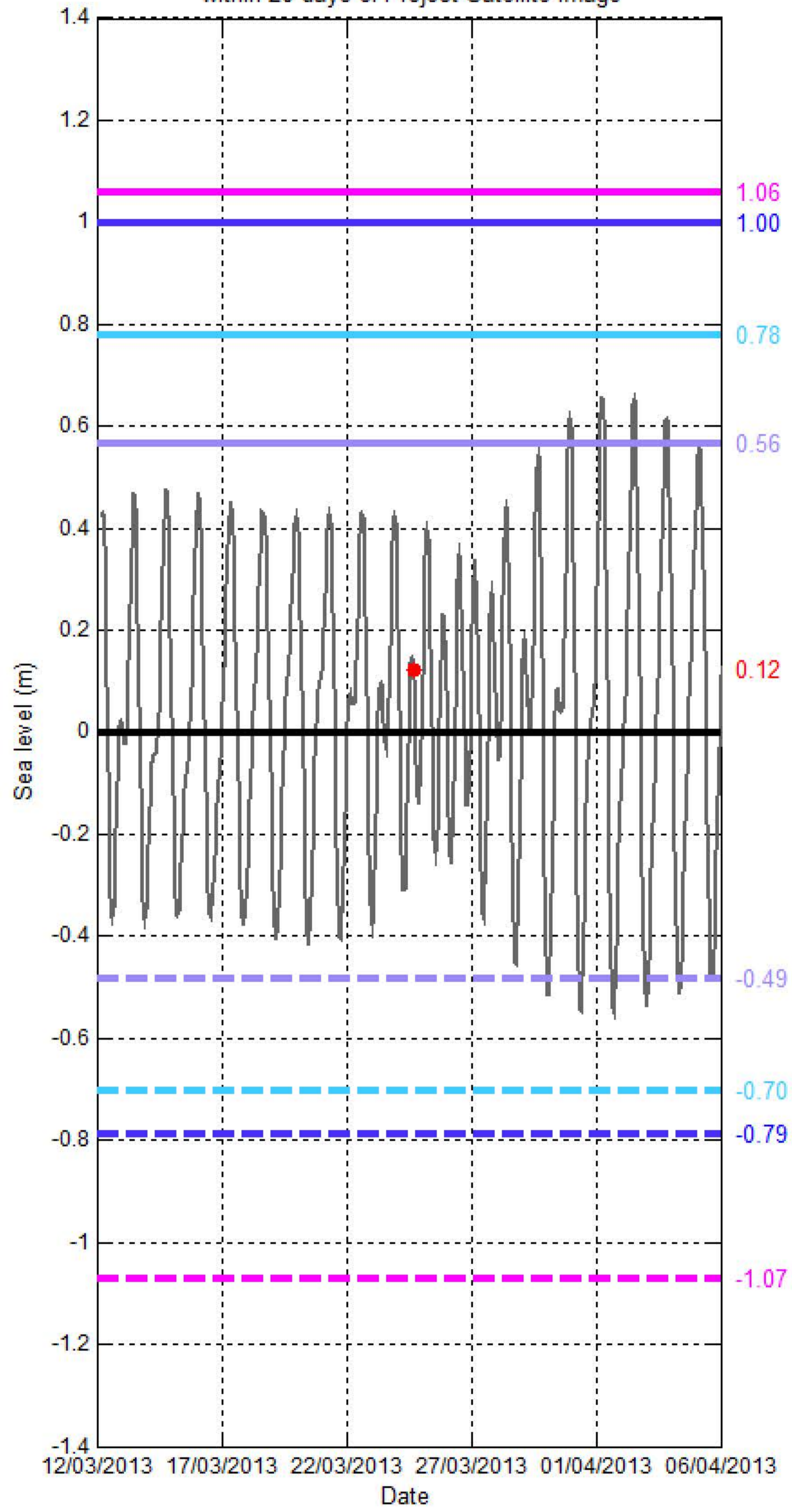
Sea level (SL) at IRVING REEF

[10°52'28.26"N, 114°55'08.19"E]

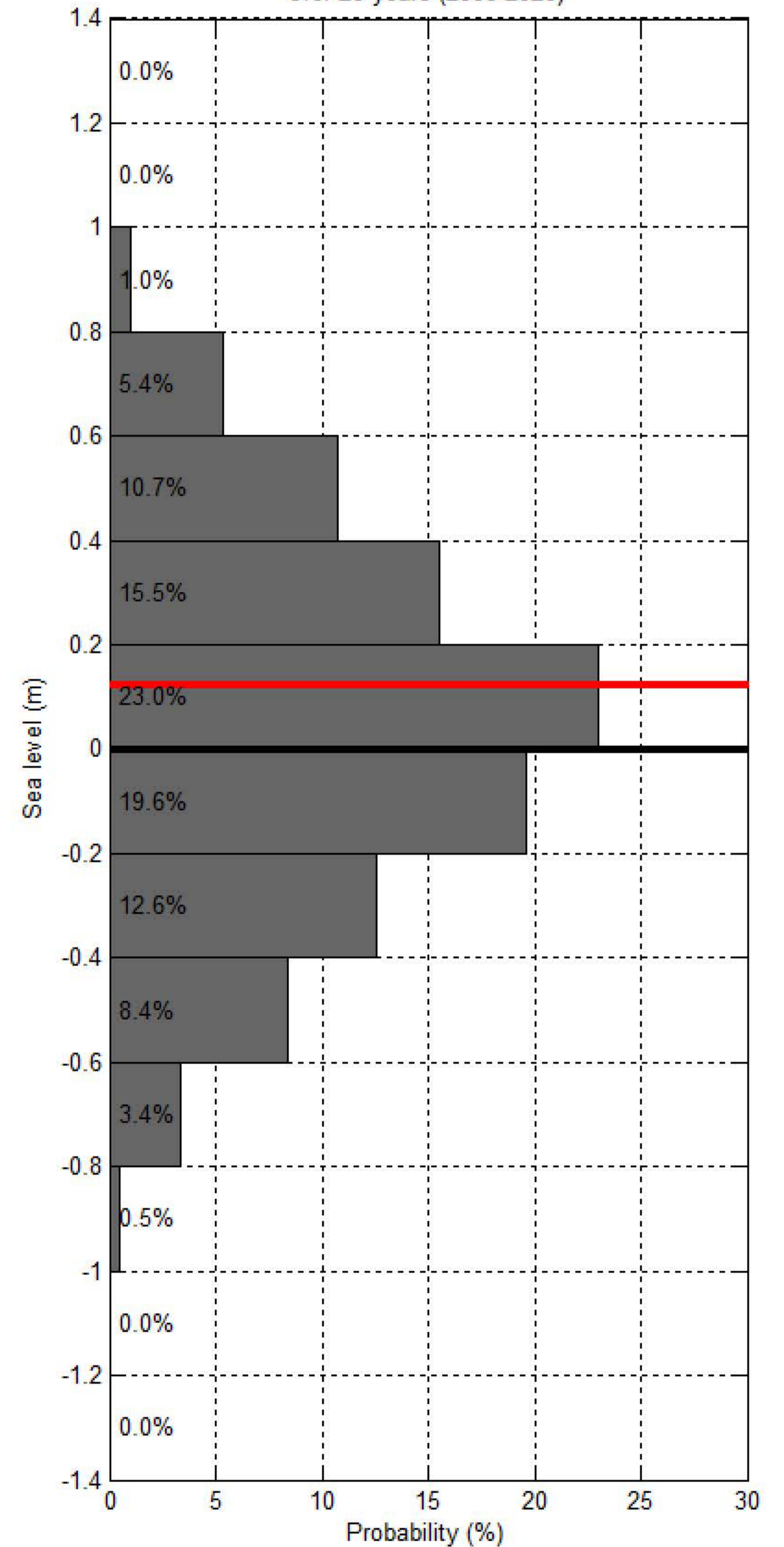
Sea level at spring/neap tide at IRVING REEF over 20 years (2000-2020)



Sea level at IRVING REEF within 20 days of Project Satellite Image



Probability of sea level at IRVING REEF over 20 years (2000-2020)



— Hourly sea level
 — SL at spring tide
 — SL at Mean High Water Spring
 — SL at highest tide of the year
 — SL at Mean Higher High Water
 — SL at Highest Astronomical Tide
 ● Project Satellite Image
— Mean Sea Level
 — SL at neap tide
 — SL at Mean Low Water Spring
 — SL at lowest tide of the year
 — SL at Mean Lower Low Water
 — SL at Lowest Astronomical Tide
 ● Google Earth and Landsat satellite images