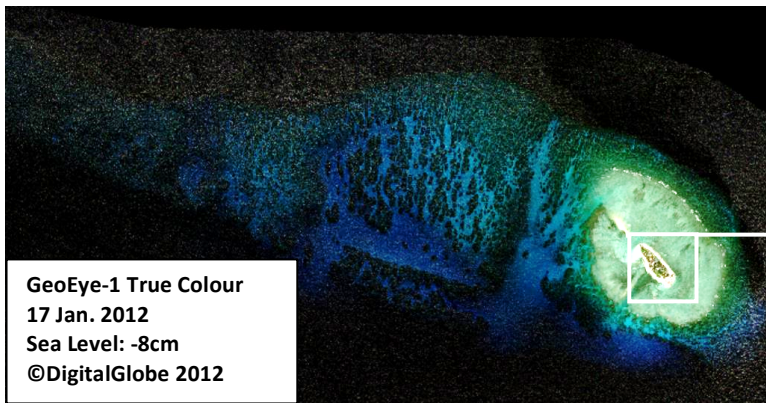


SAND CAY (TIZARD BANK)

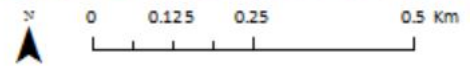
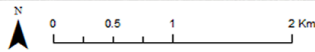
10°22'34.43"N, 114°28'48.46"E

Geographic area

Sand Cay is located on the southeastern side of one of the visible reef platforms that mark the northern outer ring of Tizard Bank, in the northern part of the Spratlys. It is located between Zhongzhou Reef (around 3.6NM east) and Petley Reef (around 5.5NM northeast). This reef formation extends 1.7km along its northwest-southeast axis and reaches 2km along its northeast-southwest axis.



GeoEye-1 True Colour
17 Jan. 2012
Sea Level: -8cm
©DigitalGlobe 2012



Land area above water

There are four above-water land areas visible on Sand Cay shallow reef platform in the 17 January 2012 satellite image, three of which are barren sand banks whereas the fourth and largest one has terrestrial vegetation and is generally designated as Sand Cay (5100m²). There is also a tower surrounded by water. Two of the three sand banks are located southwest of Sand Cay, on the outer edge of the reef flat. The first one is 160m long by 20m wide and is located along the man-made channel dug through reef flat, into Sand Cay; the second sand bank is 20m by 40m. The third sand bank, northwest of Sand Cay, was, on 22 January 2005 and 17 January 2012, around 10m by 100m long. However, satellite images from 31 March 2012, 4 November 2014 and 19 February 2015 show that they are dynamic, change in shape, size and location under the combined effect of astronomic tides, storm surges and wind-waves, and may have even been dredged out (as they are no longer visible in the 2014 and 2015 satellite images and dredging marks are visible instead). Satellite data also show that Sand Cay itself has changed shape and increased in size since 22 January 2005. In 2005, it was 440m long and 140m wide overall (46,000m²), 370m by 90m of which (27,000m²) was densely built-up and planted. The rest was barren sand.

Human infrastructure

In the 17 January 2012 satellite image, new vegetation is visible seaward, on what was barren sand; a 50m man-made extension surrounded by a visible seawall has also been constructed on the southern tip of north cay. Between 31 March 2012 and 4 November 2014, a 60-70m wide extension surrounded by a seawall has been built-up over the reef flat on the southwest-facing side. The jetty has also been extended by 100m. In 2012, Sand Cay has around 20 man-made structures; in 2015, it has 5 more (including two large ones, being 20m by 20m and 30m by 30m) but much of the new land extension is still awaiting development. A round tower (7m diameter) can be seen on the reef flat, less than 100m from Sand Cay's 2014-built seawall. It is located on a 30m-diameter circular platform. The surrounding water is 1m deep. Three non-accessibility devices are installed on the reef flat; two in the southwest, on each side of the channel; another one south. They are 160-200m long.

Intertidal and submerged area

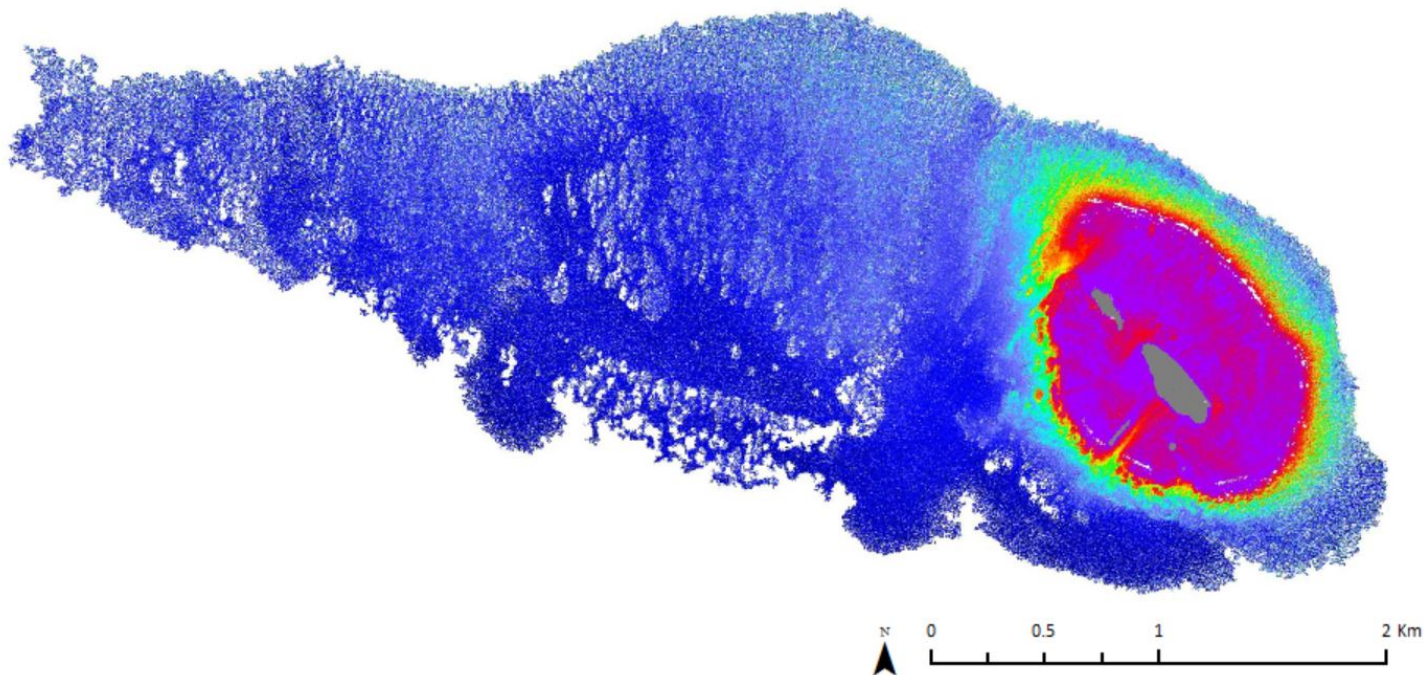
The surface area of the overall reef platform is 9.28km²; the reef flat is 1.01km² and the reef slope 8.2km². The reef flat is mostly flat and 1-1.4m at Mean Sea Level, which results in it remaining submerged at all times, except for very few areas that may be less than 1m deep and uncover at Lowest Astronomical Tide. In any case, the reef flat is expected to be very shallow and not more than a few centimetres deep in many areas at Lowest Astronomical Tide. In 2005 and 2012, patterns on reef flats suggest past human disturbances or activities although no clear dredging marks are visible. In 2014 and 2015, dredging marks occupying the southwest quarter of the reef flat were visible. The longest reef slope area extends 5km northwest from the reef flat. Spurs and grooves are particularly visible on a 6km stretch that follows the northern side of the reef slope and surrounds the eastern and southern sides of Sand Cay.

SAND CAY (TIZARD BANK)

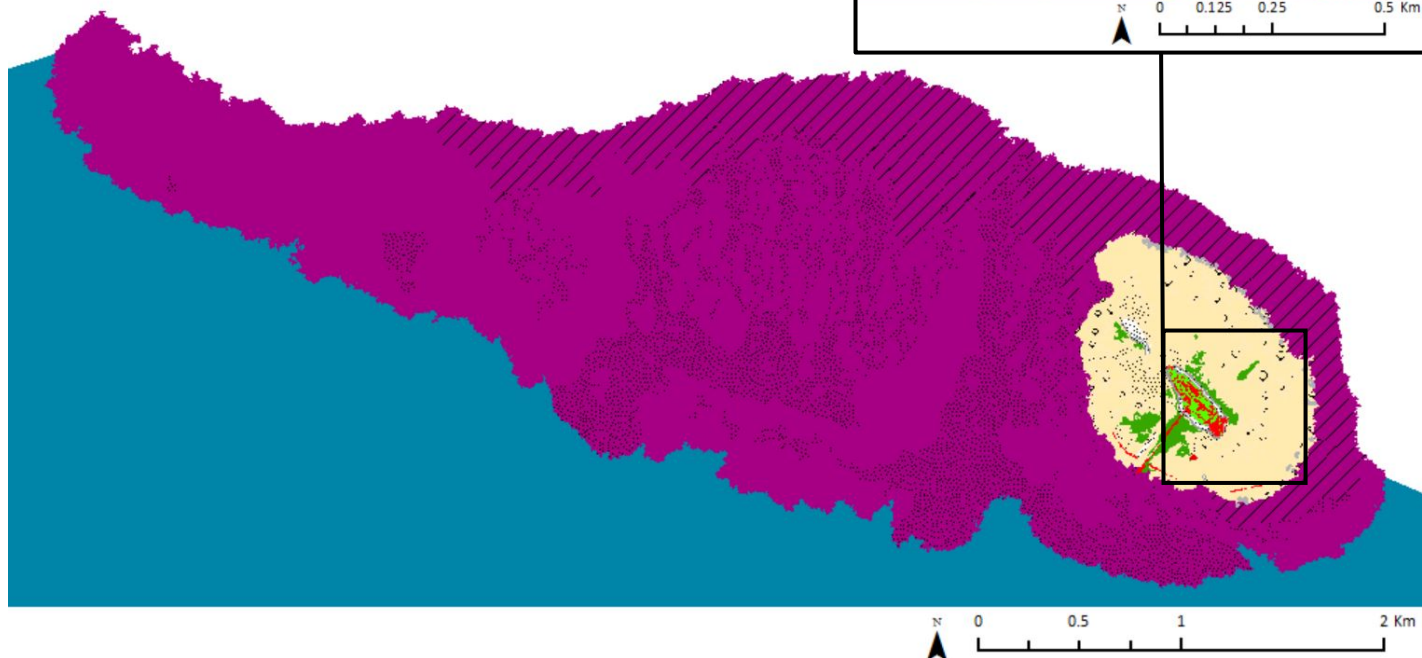
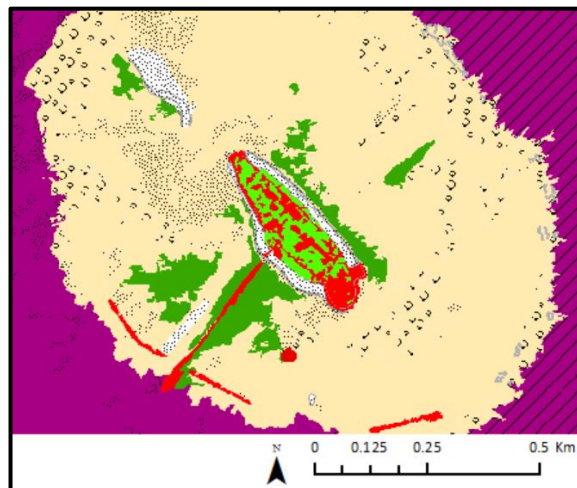
10°22'34.43"N, 114°28'48.46"E

Derived from GeoEye-1 satellite data captured on 17 January 2012 [Sea Level: -8cm]

Bathymetry Map



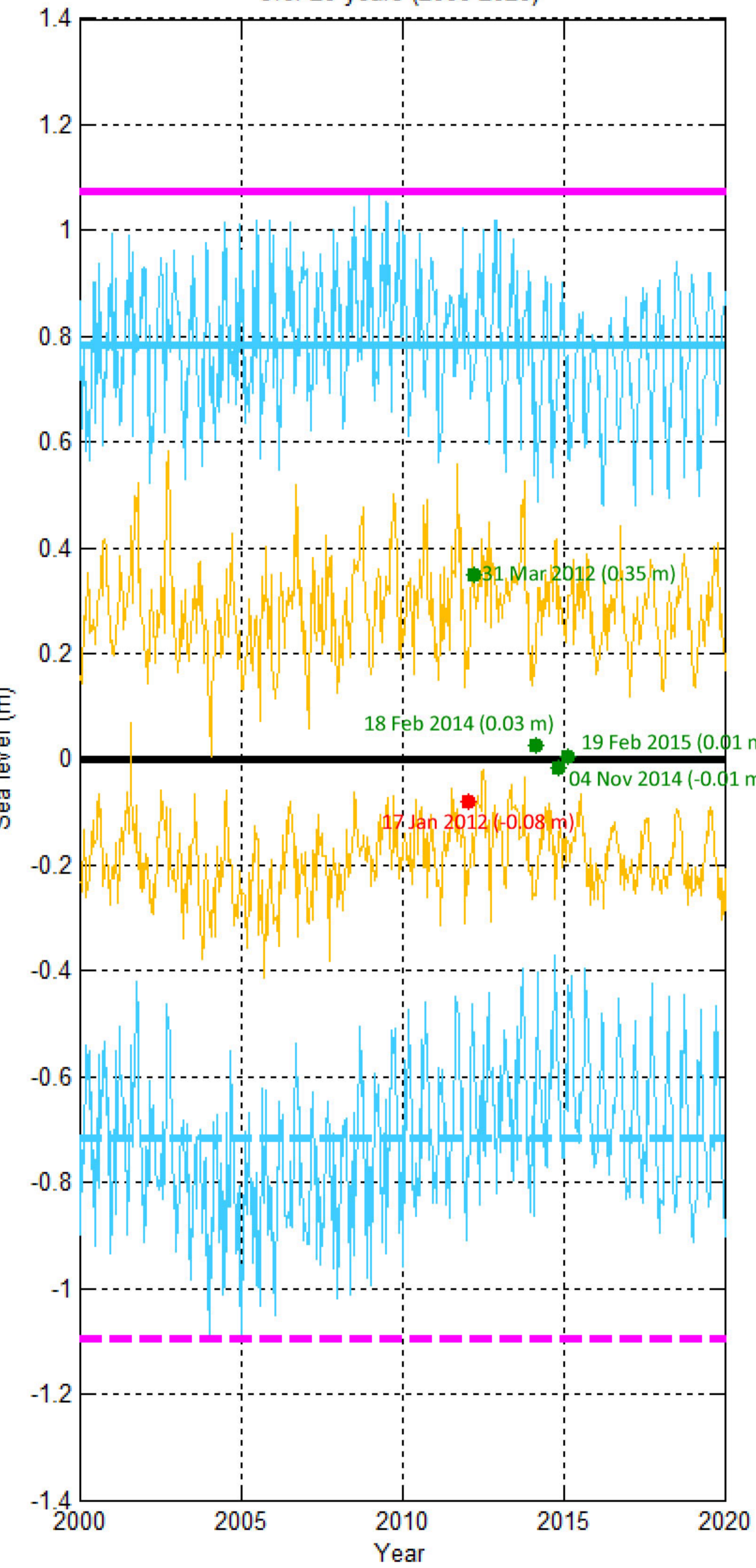
Habitat Classification and Land Cover Map



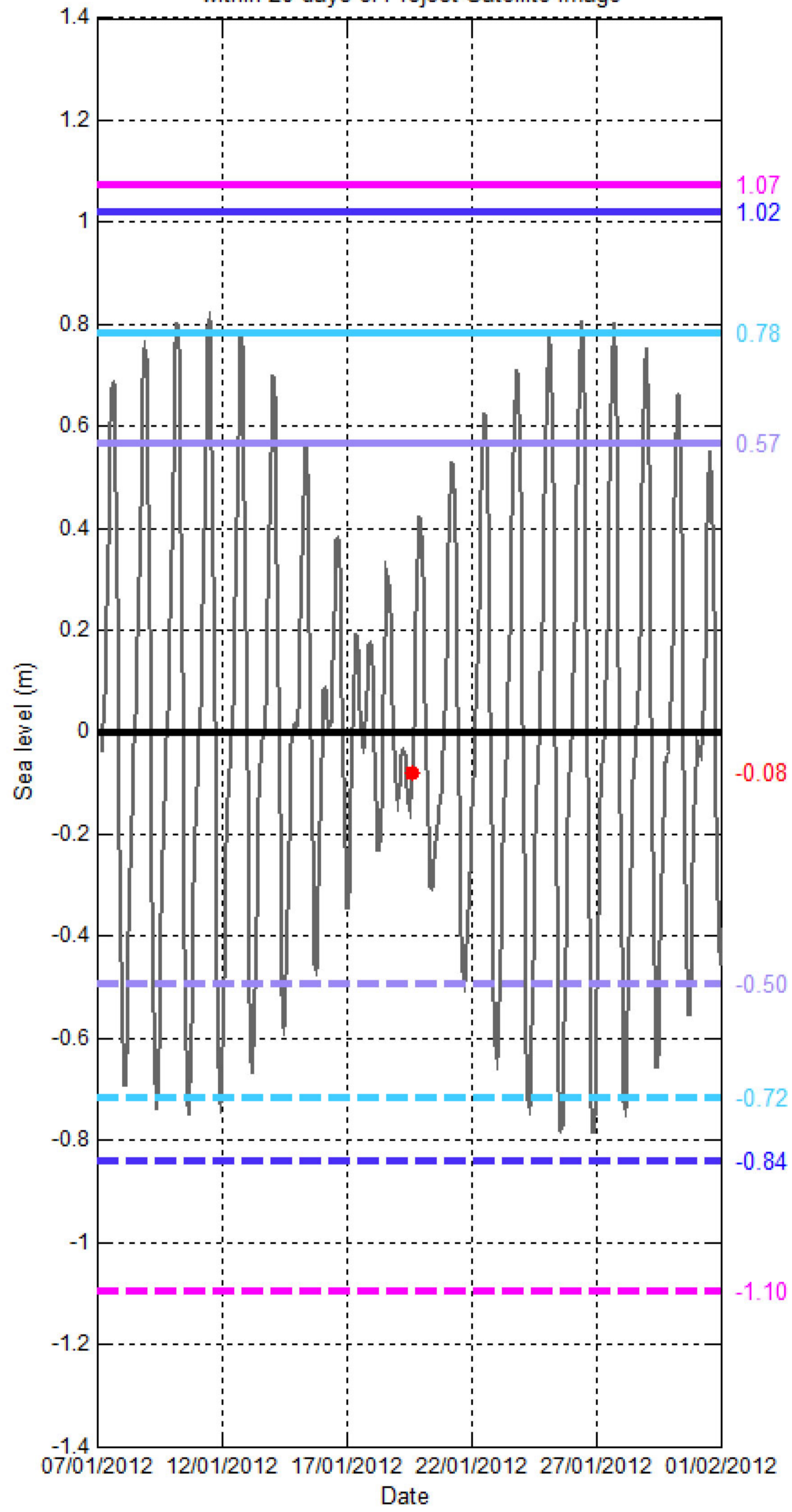
Sea level (SL) at SAND CAY (TIZARD BANK)

[10°22'34.43"N, 114°28'48.46"E]

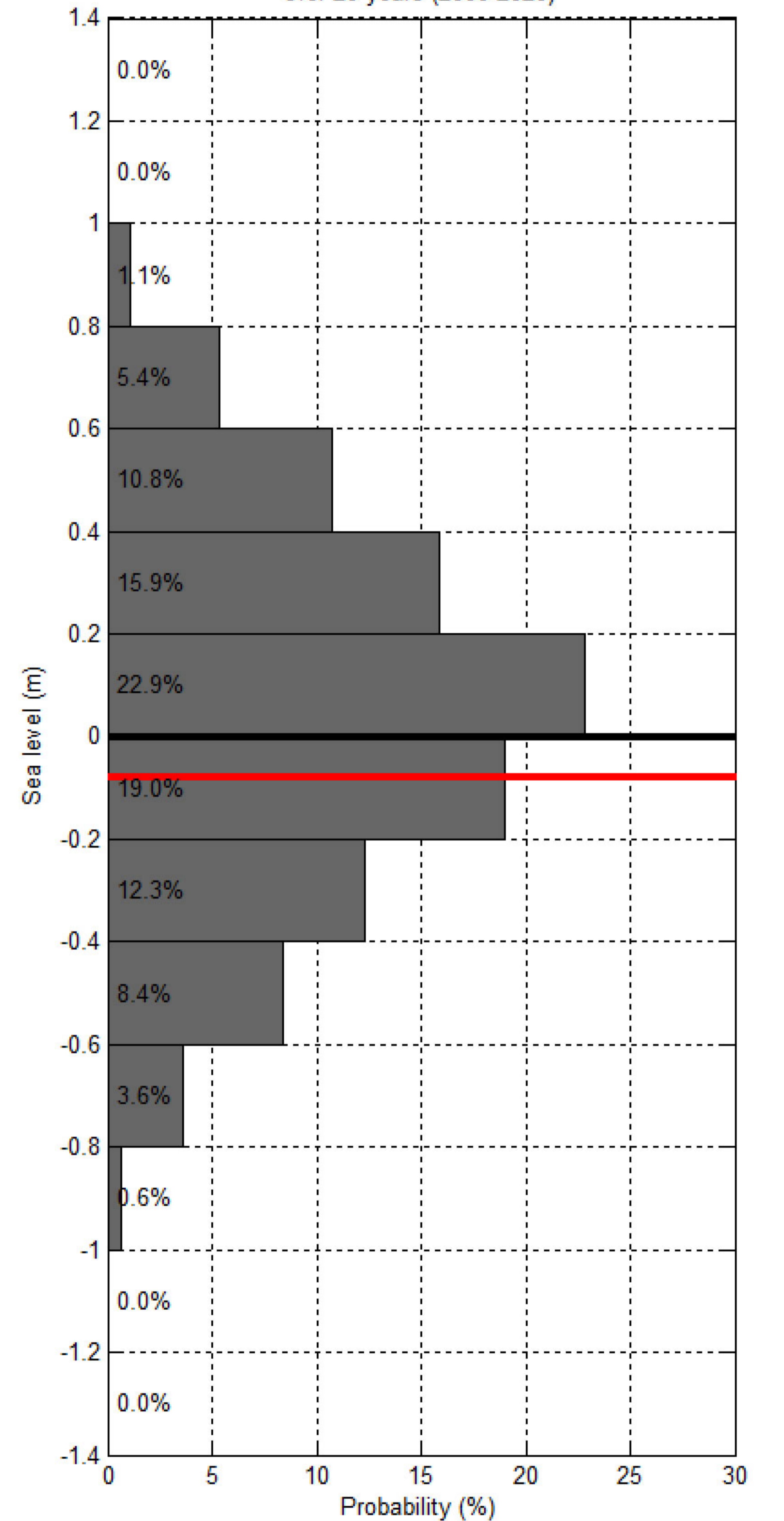
Sea level at spring/neap tide at TIZARD BANK - SAND CAY over 20 years (2000-2020)



Sea level at TIZARD BANK - SAND CAY within 20 days of Project Satellite Image



Probability of sea level at TIZARD BANK - SAND CAY 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