

Using Sentinel-2 Imageries to Observe Coastline Changes of Shallow Reef Sandbars in the South China Sea

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The islands of the South China Sea have been attracting significant attention globally in recent years, and the surrounding waters have become a matter of great concern for the neighboring countries. The naturally formed land area has been a focal point, especially its importance to deep-sea fishing. However, some islets and sandbars composed of coral and shell debris naturally formed over the shallow reefs may experience strong and turbulent currents. Meanwhile, their locations change over time susceptible to the influence of the southwesterly flow and the northeast monsoon.

Through long-term observation of satellite images and sorting the images from the last decades, the digitalized vectors from each month can be overlaid and compared to analyze the difference of relative positions. We notice one sandbar in the Spratly Islands exhibits seasonal variations with a regular pattern, drifting northeastward from May to August. Compared to the southwestern position in April, the sandbar moved to a northeast position in September. The maximum drift distance is approximately 300 meters. Subsequently, they begin to drift back southwestward and accumulate. The area of the sandbar varies between 1400 to 4600 square meters year-round.

In this study, we also try to analyze the cause and sandbar migrations by correlating its spatiotemporal pattern with atmospheric parameters. It is observed that the area experience a predominant northeast wind from November to March. Following that, the topography is affected by the northeast monsoon from November to April, with a transition period in May, and the southwest monsoon prevails from June to October.

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