

A comparison of shoreline changes estimated using the base of beach and edge of vegetation line at North Keeling Island

ABSTRACT

The vulnerability of reef islands is often assessed by measuring changes in shoreline positions over time. Historical aerial photographs provide valuable information of past shoreline dynamics and are commonly incorporated in shoreline change assessment. Edge of vegetation line is the most common shoreline proxy adopted for assessments of reef island change because it is a visually distinguishable feature in aerial photographs, when compared to other coastal features such as high water line and base of beach. This study assesses shoreline changes of North Keeling Island from aerial photographs taken in 1987 and 2011 to evaluate the implications of adopting edge of vegetation line (EVL) and base of beach (BB) as shoreline proxies. The Digital Shoreline Analysis System (DSAS) (ArcGIS 10.2) method was applied to calculate shoreline changes using both proxies. Results indicate that EVL and BB generated different rates of change and variations of shoreline behaviour were observed at different locations around the island. The EVL indicated that the surface area of the island reduced in size over the 24 years, while in contrast, BB indicated that the island had accreted. Findings of this study imply that reef island shorelines are dynamic features which vary spatially and an improved understanding of the processes that underlie shoreline behaviour requires a geographical spread of sites for shoreline proxies when assessing shoreline change.