

Carbonate production rate estimated based on both the biological calcification and the carbonate chemistry change of seawater in an isolated reef: its controlling factors

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Coral reefs are formed by calcareous organisms, mainly scleractinian corals in tropical and subtropical coasts. Coral reefs play important roles in coastal protection by reducing wave energy. Healthy coral reefs have a potential to keep up with sea level rise and maintain reef structures. However, multiple local and global stressors degrade coral reef ecosystems and threaten their ecosystem functions. To predict whether coral reefs can keep up with contemporary sea level rise, it is important to estimate reef carbonate production rate and its controlling factors. However, the method for carbonate production rate has not yet been well-established. In this study, we estimated reef carbonate production rate based on both the biological calcification and the carbonate chemistry change of seawater and we then analyzed their controlling factors.

Keywords: carbonate production, carbonate system, coral reef, calcification rate, unmanned aerial vehicle