

Revisit of massive *Porites* coral growth under the outbreak of crown-of-thorns starfish and thermal stress in Sekisei Lagoon, Japan

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Recently, shallow water coral reefs have come under high pressure because of the changes in climate due to global warming and water quality due to pollution. Coral reefs, which are distributed from the tropical to the temperate areas, consist of calcareous biotas such as scleractinian corals. As the coral skeletal growth is one of the candidate proxies for representing the whole coral reef health, it can provide vital information for developing effective conservation strategies for coral reefs. However, there are only a few studies on the long-term and *in-situ* verification of the relationships among coral skeletal growth, and changes in coral ecology and climate information.

Sekisei area is located between the Yaeyama Islands and the largest coral reef lagoon in Japan (approximately 400 km²). Continual monitoring of coral and crown-of-thorns starfish (COTS) started in 1983, and the results revealed the negative effects of the outbreak of COTS and the thermal stress-induced severe damage to coral reef ecology. Massive *Porites* coral is one of the key species in the framework of coral reefs in North-West Pacific. The coral continuously precipitates carbonate skeleton over its previous frame, which provides us an opportunity to hindcast the skeletal growth for the long term. Therefore, massive *Porites* coral skeleton in Sekisei Lagoon offers an opportunity to verify whether their skeletal growth is an indicator of coral reef health.

This study shows the revisit of long-term massive *Porites* coral growth (extension rate) estimated from the coral cores in Sekisei Lagoon from 1965 to 2000 reported by Omata *et al.* (2002). Eighty-two coral cores were collected from 12 areas, including reef fronts and patch reefs in Sekisei Lagoon. This study then selected seventy-four coral cores. The average growth anomaly decreased from the 1980s to 1990, which corresponded to decreasing coral coverage. The results imply that the growth of *Porites* coral would be an indicator of the changes in coral coverage by biodisturbance in this area. On the contrary, there were several reductions in extension anomaly, but it did not entirely correspond to the coral bleaching events in 1983 and 1998. These results imply that the growth of *Porites* coral does not represent the coral bleaching events in this area.

References

Omata *et al.* (2002) Skeletal growth history of modern corals in Sekisei Lagoon as a bio-indicator. *JAMSTEC-R 45*, 17-30.

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