Relationship of Massive Coral Distribution with wave height, soil particle quantity and water depth in Amitori Bay, Iriomote Island, Japan

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Amitori Bay is located in the northwest region of Iriomote Island, Japan with a few km length. The bay has no access roads, and the bay perimeter is uninhabited, thus, has various natural environments without human impact. In fact, broad areas of coral have developed in the bay, and their life forms, coverages, sizes, and species vary depending on their locations, thus, the bay is considered to be one of the most suitable areas for studying the relationship between coral distribution and physical variables.
We have investigated the relation between tabular and branching coral distribution and physical variables in Amitori Bay using coral distribution investigation, oceanic-atmospheric-riverine observations and numerical simulations using ocean and wave models [e.g., Shimokawa et al., 2014]. In this study, we focused massive coral which is one of representative coral life forms in Amitori Bay other than tabular and branching corals [Shimokawa et al., 2015]. Field observations were conducted to obtain data on coral distributions, sea temperature, sea salinity, wind speed, and river flow rate. Ocean and wave model numerical simulations and soil particle tracking analysis were conducted to obtain the spatial and temporal distributions of wave height and the numbers of soil particles with the observed data.
The conclusions were the following: (i) Massive coral coverage shows an inverse relation with water depth. (ii) Massive coral coverage shows an inverse relation with other coral coverage. (iii) Massive coral coverage shows a weak relation with wave height. (iv) Genus numbers and coverage of massive coral show an inverse and a direct relation with soil particle quantities, respectively. The relation in (iii) is attributable to the strong wave tolerance of massive corals because of their form and stiff skeleton, and to the slight difference of wave height between the east and west sides of the bay. The relation in (iv) results from the fact that coral genera except for Porites with strong ability of mucus removal are hard to survive on the east side with large quantities of soil particles, although various coral genera can inhabit in the west side with small quantities of soil particles.
References:
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