

Consideration of sea level rise effect on sediment transport process in mangrove forest -preliminary attempt for long-term analysis-

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Preliminary measurement for detecting sea level rise (SLR) effects on mangrove forests has been observed at Iriomote Island, Japan and Ponpei Island, Federal States of Micronesia since 2018. The short term SLR effects were measured by surface erosion and sedimentation. If sedimentation rate on a mangrove forest floor is faster enough to catch up with SLR, the forest will adapt on the change (Fujimoto et.al. 1989). Nevertheless, if it is slower than SLR, or erosion rate becomes greater than sedimentation rate, the forest will NOT adapt on the change (Furukawa et.al. 2002).

According to the observations, existence of following sediment transport mechanisms was suggested i.e. the existence of a sheet-flow transport mechanism in a short period of time when seawater is flooded and drained, the occurrence of steady erosion due to tidal transports, and the temporally and spatially uneven transport mechanism (Furukawa et al. 2019). In particular, it is necessary to clarify the effects of sediment supply from the upstream and micro-topography (creeks) existing on the forest floor.

Therefore, we attempted to measure two-dimensional sedimentation rate and sediment transport in the plot with complex topography conditions in 2019 (Pompeii PK plot: Fujimoto et al. 2019). In particular, we attempted to measure the effects of sediment supply from the upstream side, microtopography (creeks) existing on the forest floor, two-dimensional deposition rate, and sediment transport. In order to examine the effects of tides and rainfall, we observed the spring tide period (during fine weather) and the low tide period (during rainfall) and conducted a short-term trend analysis (Furukawa et al. 2020).

We adapted the typified segment transport mode to the climate data in the area and examined the methodology for examining the long-term trend of change in the plot. It was shown that it is indispensable to carry out long-term continuous observations or use a so-called outflow model in the future.

This research has been done as a part of “Mangrove forests community situation understanding against SLR.”

Keywords: Sea Level Rise, Mangrove Forest, Sediment Transport