

Eco-Balance Between Mangrove Area, Lagoon and Coral Reef in Subtropical Region

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A huge variety of ecosystem is seen at mouth of Nagura River, Ishigaki Island, Japan. This area has a large lagoon inscribed as registered wetlands under the Ramsar Convention, as well as subtropical specific ecosystems such as mangrove and coral reef. However, red soil runoff, induced by the land development in the watershed area, causes a drastic change of estuarine environment. Influence of soil and nutrient load on ecosystems of mangrove, lagoon, and coral reef is studied from the viewpoint of material cycling by field observations and numerical simulations. Riparian mangroves play an important role to trap sediment and nutrients transport from the watershed area and supply nutrients to the lagoon and coral reef after they were decomposed into dissolved nutrients. The sediment and nutrients deposited in the lagoon serve as food for crabs. On the contrary, the lagoon area is decreasing due to the sediment deposition and accompanying expansion of mangrove area. In the coral reef, eutrophication caused by the nutrient supply from river also becomes a contributing factor of the coral decrease, as well as sediment deposition. The existence of riparian mangrove accelerates the eutrophication in the coral reef, whereas it works as a buffering zone of soil road. The ecosystems of mangrove, lagoon and coral reef are closely related to each other in terms of material cycling and therefore the soil and nutrient load from the watershed area need to be properly controlled to make a good environment for all ecosystems.