

BBG020-P02

Room:Convention Hall

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## Monitoring, assessment and impacts of the seasonal and spatial sedimentation patterns/rates around coral reef ecosystems

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Seasonal and spatial patterns and rates of sedimentation; total mass flux, sediment types, size grades, physical and chemical characteristics (total/organic carbon, total nitrogen and carbonate) contents, have been monthly monitored around the coral reefs of southern Japan Marine Park Areas (MPAs), using sediment traps deployed in the ocean bottom around coral reefs in the coral moat and reef slope in the MPAs of the Ryukyu islands (Ishigaki, Iriomote, Kohama and kuro) during a one year monitoring project. The traps monthly retrieved and analyzed for their sedimentation rates, size grades, physical and chemical characteristics.

The total mass flux ranged between 0.54 to 872 gm-2d-1, and showed a pronounced seasonality (high in summer-autumn and low in spring) at each site, which was consistent with the rainfall and typhoon regime. On the reef flat (Todoroki South and North; Ishigaki), values obtained in July-August (872 gm-2d-1) and August-September (800 gm-2d-1) indicate the high terrestrial discharge from Todoroki River. The size distribution of trapped sediments revealed mostly uni-modal fine sand to mud in the reef flat and gravelly to coarse sand in the reef slope. Trapped sediment particles consist of CaCO<sub>3</sub> (1.2-27.1%) and a non-carbonate fraction (98.8-72.9%), which contains total carbon (4.9-26%), carbonate carbon (CO<sub>2</sub>-C) (0.2-3.1%) and non-carbonate carbon (NC-C) (7.9-25.6%). Total nitrogen content was in the range 0.02-0.48%. TN is contained mainly in the carbonate fraction and NC-C may be contained in the non-carbonate fraction. The low TN/OC ratio of the trapped sediments suggests that they were mostly of terrestrial origin and that both fractions migrated. The high total mass flux derived from Todoroki River exceeded the threshold at which a lethal effect on coral community is caused (Ismail et al., 2005).

Mass mortality of some coral species was markedly recorded around Todoroki River mouth in the moat area. Mortality percentages were estimated along transect lines in the study area using scuba diving and manta tow technique, then plotted on satellite images. The coral mortality correlated with the measured sea water physical, chemical and oceanographic characteristics as well as the prevailed measured meteorological parameters during the course of study. Using time series analysis techniques, the results showed a strong correlation of the coral mortality with the prevailed high sedimentation rates, turbidity, low tide, rainfall, and high water temperature. The study revealed the importance and the role of using sediment traps in the monitoring around the coral reef ecosystems health, reef management and conservation.

Keywords: Monitoring, assessment, impacts, sedimentation, coral reefs, southern Japan