No. 2306

Anthropogenic Impact to the Blue Carbon

Atsushi Kubo

Shizuoka University

Summary

Aquatic plants have attracted attention as important sinks for atmospheric carbon dioxide. Carbon dioxide is uptake by photosynthesis of aquatic plants to form organic carbon, and part of the organic carbon produced accumulates in sediments. However, recent human activities such as coastal development, fishing and ship anchoring have caused disturbance of the sediments. Disturbance may cause some of the organic matter to re-suspend and return to the water column, accelerating decomposition and reverting to carbon dioxide. Therefore, this study aimed to quantify the vulnerability of organic carbon accumulated by conducting decomposition experiments of sedimentary organic carbon. Degradation experiments were conducted using sediments of Lake Komuke, where an eelgrass bed is located, and Tokyo Bay, a highly urbanized bay that is a carbon dioxide absorption area. The organic carbon residuals at 7 days relative to the organic carbon content before the start of the decomposition experiment were $83.5 \pm 5.1\%$ and $84.1 \pm 4.9\%$ on average in Lake Komuke and Tokyo Bay, respectively. Organic carbon residuals were mostly above 80%, with most of the persistent organic carbon. Based on the organic carbon sequestration in the sediments of Lake Komuke and the percentage of readily degradable organic carbon, the amount of organic carbon that could be degraded by environmental disturbance was estimated to be 2.8×10^9 gC, which could be released back into the water as dissolved inorganic carbon. The rate of organic carbon deposition in the eelgrass beds in Lake Komuke was $2.7 \pm 1.0 \times 10^5$ gC ha-1 year^{-1}, and this dissolved inorganic carbon release was found to be equivalent to approximately 22 years of carbon sequestration.