

海草藻場における炭素隔離・貯留過程の解析

Carbon sequestration and storage in seagrass meadows

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Seagrass meadows are one of the most productive ecosystems and play an important role as carbon reservoirs, storing large amount of organic carbon in the sediments. Estuaries are considered to be a net source of atmospheric CO₂ due to the mineralization of terrestrial carbon but recent studies demonstrated that seagrass meadows in estuaries can be sinks for atmospheric CO₂. The flow of organic and inorganic carbon derived from multiple sources regulates these processes but the knowledge about these relationships is limited. In this study, we evaluated the flow of carbon derived from multiple sources in seagrass meadows using isotopic approaches and associated the flow with the processes of both atmospheric CO₂ uptake and carbon storage in sediments. We estimated the contribution of atmospheric CO₂ to assimilated seagrass carbon by a carbon-source mixing model using radiocarbon concentrations ($\Delta^{14}\text{C}$). The model indicated that the seagrass assimilated 0–40% of its inorganic carbon as atmospheric CO₂. The stable isotopic signatures ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) of both particulate organic carbon (OC) and sedimentary OC suggested that the efficiency of OC storage in sediments would be dependent on OC derived from multiple sources. We will also present the historical changes in carbon storage using sediment core analyses.

キーワード：海草藻場、炭素貯留、同位体分析、堆積物、有機炭素

Keywords: seagrass meadows, carbon storage, isotopic analyses, sediment, organic carbon