
Oral | Symbol A (Atmospheric, Ocean, and Environmental Sciences) | A-CG Complex & General

[A-CG35_28PM1]Land-Ocean Interaction -Water and material cycle for coastal ecosystems-

Convener:*Makoto Yamada(Research Institute for Humanity and Nature), Makoto Taniguchi(Research Institute for Humanity and Nature), Ryo Sugimoto(Faculty of Marine Biosciences, Fukui Prefectural University), Masahiko Ono(National Institute of Advanced Science and Technology), Chair:Makoto Yamada(Research Institute for Humanity and Nature), Masahiko Ono(National Institute of Advanced Science and Technology)

Mon. Apr 28, 2014 2:15 PM - 4:00 PM 421 (4F)

Substances from land which are brought by river or submarine groundwater discharge are important for the process of biological production in coastal areas. The aim of this session is to create an interdisciplinary discussion on the research of ecosystems, fishery resources and water-material cycle in coastal areas, and to discuss the nexus of biological production process and water-material cycle in the coastal areas. Presentations on the water-material cycle, fishery resources and biodiversity in the coastal areas are encouraged. Studies on the nexus of coastal ecosystems and water are also welcome.

3:55 PM - 4:00 PM

[ACG35-P01_PG]Spatiotemporal distribution of organic matter buried in estuarine seagrass meadows

3-min talk in an oral session

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Keywords:carbon sequestration, blue carbon, estuary, seagrass meadows, stable isotope, ¹⁴C dating

Blue Carbon, captured and sequestered by marine organisms, has attracted attention as one of the major sink of atmospheric carbon dioxide. One of the important process for carbon sequestration is burial of organic carbon into sediments. The burial rate of organic carbon is higher in estuaries and seagrass meadows than open oceans. A large amount of terrestrial carbon flows into shallow coastal systems, consequently being buried in the sediment. Also nutrient inflows elevate autochthonous organic matter production in the systems. Therefore, various organic matter compositions, having different origin and bioavailability, are mixed in shallow waters. In this study, we investigate the quality and quantity of organic matter buried in an estuarine seagrass meadow using elemental and isotopic techniques and ¹⁴C dating. Our study site, the Furen Lagoon, is located at the high latitude in Japan. The Furen lagoon is eutrophic due to riverine inflows. Seagrass meadows occupy 67 % of the total area of the lagoon. We collected core samples (about 2 m) in the lagoon along the salinity gradient. TOC (total organic carbon) and TN (total nitrogen), as well as carbon and nitrogen isotopic signatures were analyzed along the depth. Also $\Delta^{14}\text{C}$ was analyzed for dating. In the low salinity zone, $\delta^{13}\text{C}$ was low and C/N ratio was high, indicating that terrestrial organic matter was dominant. These signatures were relatively stable with sediment depth, showing that terrestrial organic matter would have been buried for thousands years. Within the seagrass meadow, $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ were relatively high, indicating that the contribution of autochthonous organic matter (phytoplankton and seagrass) to TOC would increase in the presence of vegetation. $\delta^{13}\text{C}$ fluctuated with sediment depth in the seagrass meadow, showing that the contribution of terrestrial organic matter fluctuated temporally. These results suggest that the lagoon can be the long-term sink of carbon due to autochthonous production and deposition of terrestrial organic carbon.