Oral | Symbol B (Biogeosciences) | B-BG Biogeosciences & Geosphere-Biosphere Interactions

[B-BG21_1AM1]Material cycles in tropical- subtropical coastal ecosystems

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Coral reefs, seagrass meadows, and mangroves characterize tropical-subtropical coastal ecosystems, and possess high biological productivities and resultant active cycling of materials. Recently, these ecosystems have also been recognized as important reservoirs of so-called "blue carbon". However, degradation due to development of adjacent watersheds, reclamations of the waterfront, intensive aquaculture, and the threats of global warming and ocean acidification have been diminishing ecosystem functions rapidly. These ecosystems are in constant interaction, and an understanding of the relevant material cycles requires discussions among researchers studying these ecosystems from different points of view. Therefore, the main objectives of this session are (i) to provide opportunities for discussion among researchers working on coral reefs, seagrass meadows, and mangroves, (ii) to understand the characteristics of the ecosystem functions and their interactions, and (iii) to discuss guidelines for future research areas and for the conservation and management of these ecosystems. Specifically, the session targets studies on material cycles such as those for C, N, P, and other trace elements, freshwater and seawater cycles, and environmental records in sediments and organisms. Researchers and students from various fields such as geochemistry, ecology, oceanography, limnology, geology, and other related fields are expected to participate.

10:15 AM - 10:30 AM

[BBG21-P02_PG]Spatial distribution and its characteristics of stable nitrogen isotopic composition of macroalgae in Nagura Bay

3-min talk in an oral session

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Keywords:Padina spp., Thalassia hemprichii, Stable nitrogen isotopic composition, land-derived nitrogen, Nagura Bay, mangrove swamps and tidal flat

This study, focusing on Nagura Bay in the west of the Ishigaki Island, conducted a field sampling and measurement of $\delta^{15}N$ values of macroalgae, *Padina* spp. and sea grass, *Thalassia hemprichii* in order to evaluate effects of land-derived nitrogen load on the coral reef ecosystem, and to discuss the reasons for the nitrogen load distribution in the bay.In June 2013, 55 samples for each species were collected at about 50 m intervals on 7 transect lines, and their $\delta^{15}N$ and $\delta^{13}C$ values were measured in the laboratory.

At the same time, water samples at stream, spring and sea were collected and their water qualities were measured. Moreover, areas for each land use in related watershed were calculated using GIS to examine the relationship between the nitrate concentration in river water samples and land use, and to identify the source of land-derived nitrogen.As a result, most of the $\delta^{15}N$ values of macroalgae and sea grass linearly decreased from +6 to +2 ‰ with increasing distance from the shoreline. However, the transect lines around the river mouth of Nagura River relatively showed high $\delta^{15}N$ values by about 1 km away from the shoreline comparing with the other transect lines. One of the reasons is probably water flow condition around the river mouth. Some previous studies had showed that the water flow stagnates around there due to the south monsoon wind in spring and summer. Before this field sampling, the mode of wind direction for 3 months was surely south wind. This is why the land-derived nitrogen loads through Nagura River remained around river mouth due to water stagnation and lower dilution in seawater, and the plants could have higher $\delta^{15}N$ values.On the other hand, NO_3-N concentrations have high correlations with ratios of farm land and cultivated areas. Thus, they were perhaps the main nitrogen sources in this study area. Additionally, NO_3-N flux [mg/s], which calculated by flow rate [m3/s] and NO_3-N concentration [mg/l], estimated 81.9 mg/s at the river mouth of Nagura River, and 59.4 mg/s at the upstream. Mangrove swamps and tidal flat exist between the two locations. Thus, the nitrogen source increasing the flux 22.5 mg/s could come from the swamps or their upstream.