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RECONSTRUCTION OF LEAD POLLUTION HISTORY BASED ON ANALYSIS OF CORAL SKELETON SAMPLES

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The skeleton of brain corals (*Diploria strigosa*) collected near the mouth of Haina River in Saint Domingo, Dominican Republic, were analyzed for lead (Pb) in order to reconstruct the history of local pollution of heavy metals in the river catchment area. The micro-samples from the sampling transect along the growth axis of a coral colony (Colony id: SDM13-02) were prepared to study the temporal variability of heavy metal loading from the Haina River. The Pb concentrations in the skeletal samples were measured using an inductively coupled plasma mass spectrometer. Since annual banding in the coral skeleton was not clear, we measured Sr/Ca ratios of micro-samples to determine the age of the coral colony. The age model was constructed by matching Sr/Ca ratio variations with seawater temperature since skeletal Sr/Ca ratio predominantly reflects seawater temperature. The Pb concentrations near the bottom of the colony, which corresponds to the skeletal portion precipitated around 2000, were significantly high as compared to the remaining part of the skeletal transect with Pb variations of baseline/background levels. Another coral colony collected nearby SDM13-02 colony also showed similar temporal variation of Pb along the growth axis. The results suggest that the coral Pb profiles presumably reflect the pollution history of the coastal area off Haina River mouth. Further investigation is required to confirm coral ability for reconstructing heavy metal pollution in the coastal areas. Corals may be unique archives not only for past climate records but also for pollution history.

Recent Publications

1. Satoshi Nakai, Jun-ya Shibata, Akira Umehara, Tetsuji Okuda and Wataru Nishijima (2018) Filtration rate of the ascidian *Ciona savignyi* and its possible impact. *Thalassas: An International Journal of Marine Sciences* DOI: 10.1007/s41208-017-0061-y.
2. Bell T, Nishida K, Ishikawa K, Suzuki A, Nakamura T,

Sakai K, Ohno Y, Iguchi A and Yokoyama Y (2017) Temperature-controlled culture experiments with primary polyps of coral *Acropora digitifera*: calcification rate variations and skeletal Sr/Ca, Mg/Ca, and Na/Ca ratios. *Palaeogeography, Palaeoclimatology, Palaeoecology* DOI: 10.1016/j.palaeo.2017.03.016

3. Nakamura T, Iguchi A, Suzuki A, Sakai K and Nojiri Y (2017) Effects of acidified seawater on calcification, photosynthetic efficiencies, and the recovery processes from strong light exposure in coral *Stylophora pistillata*. *Marine Ecology* DOI: 10.1111/maec.12444
4. Iwasaki S, M Inoue, A Suzuki, O Sasaki, H Kano, A Iguchi, K Sakai and H Kawahata (2016) The role of symbiotic algae in the formation of the coral polyp skeleton: 3-D morphological study based on X-ray microcomputed tomography. *Geochemistry, Geophysics, Geosystems* 17:3629-3637.
5. Wataru Nishijima, Akira Umehara, Satoshi Sekito, Tetsuji Okuda and Satoshi Nakai (2016) Spatial and temporal distributions of secchi depths in the Suo Nada of the Seto Inland Sea, Japan, exposed to anthropogenic nutrient loading, *Science of the Total Environment* 571:543-550.

Biography

Satoshi Nakai has completed his PhD in Tokyo University of Agriculture and Technology and Postdoctoral studies from the Japan Society for the Promotion of Science. He is a Professor at Faculty of Engineering, Hiroshima University, Japan. He has published more than 100 papers in journals.

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