Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

BPO003-P01 Room:Convention Hall Time:May 26 14:00-16:30

Three sets of temperature proxy revealed from coral Porites cylindrica

Alrum Armid[1], Ryuji Asami[2*], Tandri Fahmiati[3], M. Ali Sheikh[1], Hiroyuki Fujimura[1], Tomihiko Higuchi[1], Eiko Taira[4], Ryuichi Shinjo[1], Tamotsu Oomori[1]

[1]University of the Ryukyus, [2]University of the Ryukyus, [3]University of Haluoleo, Indonesia, [4]Aqua Culture Okinawa Co., Japan

Numerous studies on scleractinian corals, especially massive Porites corals, have been conducted to establish potential tracers (Sr/Ca, Mg/Ca, and U/Ca) of sea surface temperature (SST) (e.g., Beck et al., 1992; Min et al., 1995; Mitsuguchi et al., 1996). In particular, the Sr/Ca of aragonitic coral skeleton is widely used to reconstruct SST variability using modern and fossil corals (e.g., Gagan et al., 1998). It should be noted that most of previously published paleothermometers have been derived from massive Porites corals, thus evaluation of other coral species as useful proxy is also significantly required which may provide more detailed investigation of paleoenvironmental reconstruction with high temporal and spatial resolution. Recently some investigations suggested that the coral Mg/Ca ratio significantly reflects not only seawater temperature, but also skeletal growth effects (Inoue et al., 2007). In order to examine such effect, data on culture experiment of coral species having variable growth rate are needed.

With these objectives in mind, we conducted a laboratory culture experiment utilizing scleractinian branching coral Porites cylindrica to examine the incorporation of Sr, Mg and U into the skeletons under three temperature settings (22, 26, and 30 degrees C), and subsequently evaluate the reliability of Sr/Ca, Mg/Ca, and U/Ca as potential seawater temperature proxies. The advantage of using P. cylindrica is that it has a relatively higher growth rate of up to ˜3 cm/year (Custodio III and Yap, 1997) compared to massive Porites corals. P. cylindrica is a branching stony coral widely distributed in the tropical-to-subtropical Indian and Pacific Oceans and is very common in shallow water near the coast (Veron, 2000). Hence, results of this study will provide new valuable information for reconstructing past SST variability, which will contribute to the development of paleoceanography and paleoclimatology.

Keywords: Porites cylindrica, paleothermometer, metal/Ca ratio, culture experiment, distribution coeffiient

Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

BPO003-P02 Room:Convention Hall Time:May 26 14:00-16:30

Long-term preservation of organic carbon originated from the foraminiferal cell under dysoxic/anoxic conditions

Hidetaka Nomaki[1*], Nanako O. Ogawa[1], Naohiko Ohkouchi[1], Hiroshi Kitazato[1]

[1]JAMSTEC

Benthic foraminifera are major components among deep-sea benthic ecosystems and are known as major consumers of phytodetritus. However, subsequent digestion and mineralization processes of ingested organic matters are still unclear. Here we operated a long-term incubation experiment to reveal how the ingested organic matters were degraded or mineralized by benthic foraminifera under dysoxic to anoxic conditions. Two different organic matters, algae and bacteria, were labeled with ^{13}C and fed onto the surface sediments in a closed system of *in situ* feeding core. After 1.5 years, the sediments were recovered and foraminiferal specimens were isolated from the sediments. Although the ^{13}C-label was found at extremely low abundances in the bulk sediments and in overlying water as dissolved inorganic carbon, the label was found at high concentration in dead foraminiferal tests particularly in algae-added cores. Benthic foraminiferal feeding affects largely to the distribution and subsequent preservation/mineralization of organic matters produced at both the oceanic surface and seafloor. It further suggests foraminiferal test serves highly isolated space for preserving organic matters from surrounding environments.

Keywords: Sediment-water interface, Benthic foraminifera, organic matter, Carbon mineralization, burial

Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

BPO003-P03 Room:Convention Hall Time:May 26 14:00-16:30

Perspectives in stable oxygen isotope analysis as paleo-thermometer in biogenic carbonates

Saburo Sakai[1*]

[1]JAMSTEC

In this presentation, I'll summarize the recent progress of the high-resolution analyses of stable oxygen isotopes of biogenic carbonates as paleo-thermometer. Especially, the cold-water coral and fish otolith are treated as materials in order to describe the d18O-thermometer and clumped-isotope thermometer (d47).

Keywords: biogenic carbonate, oxygen isotope, paleo-thermometer