

# Japan Geoscience Union Meeting 2011

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

©2011. Japan Geoscience Union. All Rights Reserved.



BPT002-13

Room:201B

Time:May 25 12:15-12:30

## Growth-rate influences on coral climate proxies tested by multiple clone culture experiment

Erika Hayashi<sup>2</sup>, Atsushi Suzuki<sup>1\*</sup>, Toyoho Ishimura<sup>1</sup>, Takashi Nakamura<sup>3</sup>, Akira Iguchi<sup>5</sup>, kazuhiko Sakai<sup>4</sup>, Akihiro Iwase<sup>4</sup>, hodaka kawahata<sup>2</sup>

<sup>1</sup>Geological Survey of Japan, AIST, <sup>2</sup>The University of Tokyo, <sup>3</sup>Faculty of Science, University of the Ry, <sup>4</sup>Tropical Biosphere Research Center, Univ, <sup>5</sup>AORI, The University of Tokyo

While coral-based climate reconstruction has been increasingly reported from many tropical sites, potential ambiguity of oxygen isotope thermometer intrinsic in biomineralization process attracts much attention, including so-called "vital effects", "growth-rate-related kinetic effect", "[CO<sub>3</sub><sup>2-</sup>] effect" and so on. Here we study growth-rate influences on skeletal oxygen and carbon isotope ratios based on a long-term culture experiment using *Porites australiensis* clone colonies. The oxygen isotope ratios of colonies showed negligible influence of growth rate over a large variation (2 - 10 mm yr<sup>-1</sup>) based on the comparison of the seasonal minimum oxygen isotope values during summer. Intercolony variation in the winter extremes can be attributed to growth slowdown / cessation during the cold months. Positive shift in carbon isotope ratios for slower-growing corals was found, and it can be attributed to a kinetic behavior of calcification reaction. Seasonal fluctuation pattern in carbon isotope ratios did not correspond to light intensity. These lines warrant the signal recording ability of coral skeletal oxygen isotope ratios from a long-lived colony of clonal growth as paleo-climate archives, and pose implication for the proper interplication of carbon isotope ratio records.

Keywords: coral, oxygen isotope ratio, Sr/Ca ratio, skeleton