

---

 [JJ] Evening Poster | M (Multidisciplinary and Interdisciplinary) | M-IS Intersection

## [M-IS10]Paleoclimatology and paleoceanography

convener:Yusuke Okazaki(Department of Earth and Planetary Sciences, Graduate School of Science, Kyushu University), Atsuhiko Isobe(Research Institute for Applied Mechanics, Kyushu University), Akihisa Kitamura(静岡大学理学部地球科学教室, 共同), Masaki Sano(Faculty of Human Sciences, Waseda University)  
 Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)  
 Past environmental changes and events at multi-decadal to tectonic timescale toward an understanding of Earth climate system by an integration of terrestrial and marine proxy studies and numerical modeling will be discussed. We welcome a variety of paleo-environmental studies from a wide range of background. In particular, a series of presentations relating to the Anthropocene will be planned. This is a merged session of A-OS31 "Linkage between oceanography and paleoceanography in marginal, shelf and coastal oceans" and M-IS23 "Paleoclimatology and paleoceanography" sessions at JPGU 2017. We hope that this session will provide an opportunity to promote communication between participants from multidisciplinary field.

---

## [MIS10-P16]Mid-Holocene oceanographic variability reconstructed from geochemistry in fossil corals from Okinawa-jima, Japan

\*Ryuji Asami<sup>1</sup>, Hiroto Toriyabe<sup>2</sup>, Natsumi Yoshimura<sup>2</sup>, Syogo Minei<sup>2</sup>, Chuki Hongo<sup>2</sup>, Ryuichi Shinjo<sup>2</sup>, Kazuhiko Fujita<sup>2</sup>, Takashi Sakamaki<sup>3</sup> (1.Graduate School of Science, Tohoku University, 2.Faculty of Science, University of the Ryukyus, 3.Graduate School of Engineering, Tohoku University)

Keywords:coral skeleton, fossil, oxygen isotope composition, Sr/Ca and U/Ca ratios, paleo-temperature and -salinity, Ryukyu Islands

Quaternary paleoclimate records have been extracted from climate proxies such as deep-sea sediment, ice sheet, trees, speleothems, and coral. Continuous long cores from sediments and ice sheets play a leading role in Quaternary paleoclimate reconstructions, although the slow rates of sedimentation frequently preclude them from reconstructions on seasonal and interannual time scales. On the other hand, fossil coral archives provide high resolution time series during selected windows of generally short duration with which to investigate atmospheric and oceanic conditions at the tropical/subtropical sea surface in the past. Massive *Porites* corals, living in shallow waters of the tropical to subtropical oceans, precipitate annually banded aragonite skeletons. These colonies provide robust chronological control and allow sub-sampling at monthly-to-seasonal resolution. The ages of fossil corals are determined accurately by radiocarbon and uranium-series dating methods. Oxygen isotope composition of coral skeleton reflects variations in sea surface temperature and seawater oxygen isotope composition (salinity) with the latter being closely related to the precipitation-evaporation balance at sea surface and changes in water mass transport. Coral Sr/Ca and U/Ca ratios can be used as a paleo-thermometer. Therefore, long-lived corals can be a powerful proxy for documenting paleoceanography at seasonal, interannual, and decadal time scale, but only a few long-records of several decades have been published from fossil corals.

Here we present bimonthly-to-monthly resolved oxygen isotope, Sr/Ca, and U/Ca time series from modern and mid-Holocene (4,400-5,000 yrs BP) corals in coral reef sediment cores drilled at the west coast of Okinawa-jima, Ryukyu Islands, Japan. X-ray image and geochemical analyses clearly showed annual skeletal growth bands and seasonality in geochemical profiles, which enable to establish robust time series of geochemical composition in corals. Our coral-based climate reconstruction significantly

shows seasonal-to-decadal time scale variability of thermal and hydrologic conditions in the northwestern subtropical Pacific during the mid-Holocene. Importantly, the interannual and decadal scale variability of surface ocean environments recorded in the coral geochemistry can be useful for understanding the East Asia Monsoon during the Holocene.