沖縄島サンゴ化石による完新世中期の海洋環境解析

Fossil coral-based reconstruction of the Mid-Holocene ocean environment in Okinawa-jima, Japan

*浅海 竜司[1]、善村 夏実[1]、嶺井 翔伍[1]、本郷 宙軌[2]、藤田 和彦[1]
*Ryuji Asami[1], Matsumi Yoshimura[1], Shogo Minei[1], Chuki Hongo[2], Kazuhiko Fujita[1]

1.琉球大学理学部物質地球科学科、2.琉球大学理学部
1.Department of Physics and Earth Sciences, University of the Ryukyus, 2.University of the Ryukyus

Quaternary paleoclimate records have been extracted from climate proxies such as deep-sea sediments, ice sheets, trees, speleothems, and corals. 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. However, fossil coral archives provide high resolution windows of generally short duration with which to investigate past atmospheric and oceanic conditions at the tropical/subtropical sea surface. 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. 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 >50-year have been published from fossil corals. Here we present bimonthly resolved oxygen and carbon isotope composition time series from mid-Holocene corals in coral reef sediment cores drilled at the west coast of Okinawa-jima, the Ryukyu Islands, Japan. 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.

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