

Development of new-paleoceanographic proxies based on oxygen isotope analysis of sponge spicule

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The objective of this study is to construct the new-paleoceanographic proxy based on the oxygen isotope ratio of sponge spicule. To examine the variations in water depth and temperature, we selected GH08 surface sediment samples ranging from a water depth of 216 m to 2679 m in the Northwest Pacific. These samples were obtained from the area off eastern Okinawa Island during the GH08 cruise in 2008 by Geological Survey of Japan, AIST. The upper 0–2 cm of each surface sediment was sampled. The sediment samples were washed in a 250-mesh sieve and dried in the oven. In this study, we also analyzed the oxygen isotope ratio of sea-bottom water by laser spectroscopic analysis of Liquid Water Isotope Analyzer (LWIA).

We chose two benthic foraminifers' species *Cibicidoides* sp. and *Cibicidoides wuellerstorfi* to analyze the oxygen isotope ratio. Benthic foraminifer was analyzed by phosphoric acid digestion to carbon dioxide gas and the measurement of the oxygen isotope ratio by IsoPrime at Kochi University. We can recognize that the result of the foraminifera between the oxygen isotope ratio and temperature has a negative trend. In other words, the oxygen isotope ratio of benthic foraminifera in this study shows temperature dependence. Our results agree with those obtained by the previous studies (Marchitto et al., 2014). These results can be regarded as the data of benthic foraminifera in this study is considered appropriate for the reference.

We also analyzed the oxygen isotope ratio of sponge spicule by a new method of iHTR (inductive high-temperature carbon reduction) and CF-IRMS (continuous-flow isotope ratio mass spectrometry) (Ijiri et al., 2014). Some the oxygen isotope ratio values of sponge spicule are consistent with previous reported data (Brandriss et al., 1998, Moschen et al., 2005), which were analyzed the oxygen isotope ratio of biogenic opal (diatom). However, some of the oxygen isotope ratio of sponge spicule don't have any trends. These irregular date has possibility to be influenced by the acid treatment and the difference of gas pressure, and should be evaluated the validity in future experiment used based on additional samples.

Keywords: sponge spicule, benthic foraminifera, stable oxygen isotope, temperature dependence