

Holocene climate records in stalagmites from the Ryukyu Islands, Japan

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Stalagmites can have continuous deposition of calcium carbonate over long periods of time and well-selected stalagmites are accurately datable with high-precision U-Th dating methods (e.g., Shen et al., 2002). Stable oxygen isotope signatures in stalagmites have been used as a paleoclimate proxy (e.g., McDermott, 2004) because the isotopic values can be controlled by those of the drip water and the cave temperature (e.g., Hendy, 1971). Since 2000, stalagmite-derived oxygen isotope time series have been widely used to reconstruct hydroclimate variations in East Asian monsoon regions during the Quaternary (e.g., Wang et al., 2001).

Here, we present oxygen and carbon isotope time series of 20 stalagmites collected at 5 caves in the Ryukyu Islands, Japan. The Hendy Test performed in this study suggests that the stable isotope profiles along the center of stalagmite growth appear to be primarily of environmental origin with little effects of kinetic fractionation. Since 2009, we have observed cave environments using loggers and collected water samples to establish relationship between oxygen isotope composition of drip waters and stalagmites. We generate a well-dated time series of the oxygen and carbon isotope ratios in stalagmites using a high-precision U-Th dating method to reconstruct hydroclimate changes around the Ryukyus during the Holocene. Coupled with previously published stalagmite records from China (e.g., Wang et al., 2001) and Japan (Shen et al., 2010; Sone et al., 2013; Uemura et al., 2016), our study can allow a better understanding of past spatial climate changes associated with the East Asian Monsoon variability.

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