

## Relationship between climate changes and solar activity in a mid-Holocene stalagmite from Minami Daito, Okinawa

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Correlations between atmospheric  $\Delta^{14}\text{C}$  and oxygen isotope ( $\delta^{18}\text{O}$ ) record of the stalagmites suggest that the variations of Indian and Asian monsoons are influenced by solar activity during the Holocene (Neff et al., 2001; Wang et al., 2005; Duan et al., 2014). To evaluate the influence of solar activity on a small oceanic island in East Asian monsoon region, we investigate multi-proxy records of a stalagmite from Okinawa, Japan. A stalagmite, HSN1, was collected in Hoshino cave in Minami Daito Island, Okinawa, Japan. The  $\delta^{18}\text{O}$  of the calcite was measured using Gas-bench IRMS (Delta V advantage). The isotope compositions of the fluid-inclusion water were measured using a semi-automated version of our fluid inclusion analysis system described in Uemura et al. (2016). U-Th dates were measured at National Taiwan University. The HSN1 stalagmite grew from ca. 6,000 to 8,000 years before present with a high growth rate (ca.  $130\ \mu\text{m}/\text{yr}$ ). The pattern of calcite  $\delta^{18}\text{O}$  variation (e.g., 80-year periodicity) was similar to that of the atmospheric  $\Delta^{14}\text{C}$ .

### References:

Neff et al., *Nature*, 411, 290–293, 2001

Wang et al., *Science*, 308, 854–857, 2005

Duan et al., *Scientific Reports*, 4, 5159, 2014

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Keywords: stalagmite, isotope, solar activity