

## Intra-annual to annual time resolution record during 600-1700B.P. from a stalagmite in southwestern Philippines.

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Stalagmite is a cave deposit precipitated from dripwater, and is one of promising archives providing continuous climate information. Its oxygen isotopic value may show a cyclic change due to temperature-dependent fractionation between water and calcite in short time scale, but is generally dependent on the isotopic composition of rainwater. Rainfall in Asia is mainly supplied by summer monsoon, and the oxygen isotopic value is generally low in summer and high in winter. The oxygen isotopic record, therefore, would provide relative intensity of summer monsoon in the past (Wang et al., 2001; 2005). Carbon isotopes also show cyclic pattern synchronizing with oxygen isotopic values, and are possibly due to CO<sub>2</sub> production rate in soil layer in short time scale, while vegetation change affects significantly isotopic values in dissolved inorganic carbon. In this study, we report a stalagmite record from southwestern Philippines. Philippine Sea is characteristic in Indian Monsoon pathway and in ENSO oscillation involving anomalously high sea surface temperature.

We collected a 60-cm-long stalagmite which ages were determined as 2500B.P. to modern by U-Th method. In this study, we focused the middle 20-cm part (1700-600B.P.) to observe 0.2-mm resolution analysis of oxygen and carbon isotopes, and Mg/Ca ratio.

A) 600-720B.P.: Growing by 0.7mm/yr: Carbon isotopic values showed cyclic change with approximately 1.4 permil of amplitude in maximum. This fluctuation occurred repeatedly at least 90 times through the observation section and may represent annual pattern. Similar pattern was also seen in oxygen isotopic values but was weaker as 0.2-1.2 permil in amplitude. Moreover, carbon isotopic values generally fluctuate with 30-40 year cycle which pattern was more distinctly observed in Mg/Ca ratio. Relatively higher growth rate and lower Mg/Ca ratio (0.008 in average) would represent humid condition during the period.

B) 720-1030B.P.: Hiatus: This period suggest a cold and/or dry event other than Little Ice Age (100-500B.P.) and Bond Event 1 (~1400B.P.), or just indicate stopped water supply due to local hydrological change.

C) 1030-1760B.P.: Growing by 0.1mm/yr: intra-annual record was unavailable. Carbon isotopic values showed centennial oscillation within 1.5 permil of amplitude. Mg/Ca ratio showed same periodic oscillation and was higher than the period (A), 0.015 in average. Both oxygen isotopic values and Mg/Ca ratios were gradually increasing toward the period (B), suggesting the accelerated cooling and/or drying condition.