

Linkage between Trace Element Distribution and Growth Ring Formation in Japanese Red Coral (*Paracorallium japonicum*)

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Abstract : This study investigated the distribution of magnesium (Mg), phosphorus (P), sulfur (S) and strontium (Sr) using micro X-ray fluorescence (μ -XRF) along the annual growth rings in the skeleton of Japanese red coral *Paracorallium japonicum*. The Mg, P and S distribution in μ -XRF mapping images correspond to the dark and light bands along the annual growth rings observed in microscopic images of the coral skeleton. The μ -XRF mapping data showed a positive correlation ($r = 0.6$) between P and S distribution in the coral skeleton. A contrasting distribution pattern of S and Mg along the axial skeleton of *P. japonicum* indicates a weak negative correlation ($r = -0.2$) between these two trace elements. The distribution pattern of S, P and Mg reveals linkage between their distributions and the formation of dark/light bands along the annual growth rings in the axial skeleton of *P. japonicum*. Sulfur and P were distributed in the organic matrix rich dark bands, while Mg was distributed in the light bands of the annual growth rings.

Keywords : μ -XRF, trace element, precious coral, *Paracorallium japonicum*

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