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Laser Ablation ICP-MS for analyzing trace elements in biological carbonates at AORI, The University of Tokyo

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Geochemical features in biological carbonates such as foraminifera, coral, shell and otolith have been widely used as a useful recorder of the past oceanic conditions. During their growth, biological calcium carbonates composed of their skeleton may incorporate trace elements from their ambient seawater. The amount of the trace elements contained in the skeleton is depending on the seawater environments when they grown, hence trace elements in their skeleton preserve historical records of the physical and/or chemical oceanographic information. For example, corals, which live in the low latitude, has the potential for recording the seasonal variations of the oceanic conditions since they have annual bandings and the rapid rates of growth. Strontium in coral skeleton is currently used widely as a proxy of sea surface temperature and uranium is used for ocean redox condition.

In these days, Laser Ablation Inductively Coupled Mas Spectrometry (LA-ICP-MS) has been introduced in the marine environmental studies, which is the powerful technique for analyzing small samples almost undisruptive way. Compared with the conventional solution-based method, it enables us to measure multi-elements in high spatial resolution with little sample preparation. These advantages make LA-ICP-MS a cost effective and attractive analytical tool for analyzing trace elements in biological carbonates.

At present we are trying to set up and develop the method to measure the trace elements in biological carbonates using LA-HR-SF-ICP-MS system at the Atmosphere and Ocean Research Institute, The University of Tokyo. We will present the preliminary results we have obtained so far and the future prospects of our studies.

Keywords: Biological carbonate, Laser ablation Inductively Coupled Plasma Mass Spectrometry, Paleoclimate