

Plutonium study on coral reef : Approach from Coral and Sclerosponge Skeletal Growth Bands

Tamotsu Oomori^{1*}, Mutsumi Mori¹, Eri Hirose¹, Hiroyuki Fujimura¹, Takuro NOGUCHI¹, Yoshihito OHTSUKA², Michinari HATTORI², Yuichi TAKAKU²

¹University of the Ryukyus, ²Institute for Environmental Sciences

Growth band of carbonate skeletons of marine organisms is considered as a appropriate proxy of environmental change. Sclerosponge *Acanthochaetetes wellsi* survives at dark area in tropical-subtropical shallow ocean such as under water caves and forms skeletal growth band of Mg-rich calcite with growth rate of 0.4-1.2 mm/year (Oomori et.al., 1998). Sclerosponge samples were collected from the underwater caves at Miyakojima in 2000 and studied on the possible new indicator of marine environmental change in several decades. Skeletal samples were cut into thin plates with ca.5mm thickness and subjected to X-ray densitometry to observe the growth band, then cut into small stabs along with the growth band of skeletons. Powdered samples were subjected to mineral composition (XRD), heavy metal element composition (ICP-MS) and isotope analysis of plutonium ²³⁹Pu/²⁴⁰Pu (HR-ICP-MS). Variation of Mg content of skeletons along the growth band were measured by EPMA. Several advantages of sclerosponge growth band as a proxy of environmental change will be discussed in this paper. *Acanthochaetetes wellsi* enriches Mg, Pb and Pu and etc. in its skeleton. Mg/Ca ratio of Mg-rich calcite skeleton measured by EPMA showed a periodical variation which may correspond to temperature fluctuation in seawater. Contents of ²³⁹Pu and ²⁴⁰Pu in the growth band are high in the interior and decreased exponentially towards the surface, 0.78468 - 0.042925 pg/g and 0.175686-0.007298 pg/g, respectively, which corresponds to the year range 1960 to 2000. ²³⁹Pu/²⁴⁰Pu concentration ratio ranged from 0.2239-0.2088 at the interior (1964 to 1994), which is comparable to the bottom surface sediment of East China Sea and Okinawa Trough (0.21-0.26) to 0.1700 (1995 to 2000) which is similar to global fallout ratio (0.18: Kelly et al., 1999). ²³⁹Pu and ²⁴⁰Pu and ²³⁹Pu/²⁴⁰Pu ratio of coral growth band were also carried on *Porites* sp. which corresponds to 1952-1981. Comparative study will be discussed in this paper.

Keywords: Plutonium, Coral, Sclerosponge