

Natural radionuclides included in the deposits and water of Oga-Yumoto hot springs, Oga Peninsula

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Large scale travertine mounds which accumulated from approximately 30000 to 5000 years BP. are exposed in the Oga-Yumoto hot springs in the north coast of the Oga Peninsula. They are expected as a recorder of hot spring activity during late Quaternary. Radiation was found in the hot spring water and present calcareous deposit (Takashima, et al., 2008). However it has not been conducted quantitative analysis of concentration of radionuclides included in the water and deposits in Oga-Yumoto hot springs, and therefore not been identified their origin. In this study, in order to determine radionuclides and their concentrations, both ICP-MS analysis and gamma-ray measurement with Ge detector were performed on the hot spring water, present and past deposits in Oga-Yumoto hot springs. Radioactivity concentrations of U-series nuclides range from 243.6 to 1083.7 Bq/kg in the deposits and 12.3 Bq/kg in the hot spring water. In the past deposit, radiation is only detected samples younger than several thousand years. On the other hand, Th-series nuclides were not detected in the past deposits. However the concentrations of Th series nuclides in the present samples are relatively high ranging from 304.1 to 4594.0 Bq/kg. The values of both radioactivity concentration tend to change depending on mineral species and distance from spring well. Deposits rich in iron oxide-hydroxide show obviously higher radioactivity concentration than those rich in the carbonate. The concentration of Th and U in the deposits are very low, almost hundreds and tens ppt order, respectively. Therefore it can be said that parent nuclides included in the Oga-Yumoto hot springs are Ra-226 in U-series and Ra-228 in Th-series. The fact the presence of Ra-228, a relatively short-lived nuclide suggests prompt upwelling of hot spring water without holding after reaction with the source rocks.

Keywords: natural radionuclide, Oga-Yumoto hot springs, travertine