Beryllium Isotopes Study of Middle Jomon pottery from the Kawarada Site

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We have investigated beryllium isotopes in clay materials of Middle Jomon pottery from the Kawarada site, Nagano Prefecture, Japan, and compared with their typology and mineralogical information.

It is known that sedimentary clays are enriched in $^9$Be, an isotope of cosmic-rays interaction with atmospheric nitrogen and oxygen. Its content in clays reflects the sedimentary condition in which the clays were formed. On the other hand, $^8$Be, the stable isotope of beryllium, is contained in diverse rocks. The content of $^8$Be reflects the geology of the source site where the clay is originated. Thus, the pair of $^8$Be-$^9$Be provides a possible means of discriminating the provenance of the pottery from the others.

Distribution of the $^8$Be and $^9$Be contents in the Kawarada pottery samples indicates an existence of a large group, which consists of ca. 70% of the pottery investigated. It is found that almost all samples of this group are classified into 5 major and sub-major groups of the total 11 mineralogical groups given by Mizusawa in this report. It is noted that all the samples with typologically non-local origin and 5 out of 6 minor mineralogical groups given by Mizusawa are positioned outside of the main grouping of beryllium. These facts should be useful in discussing the way of pottery production such as clay sources and the possible addition of minerals, and their mutual transportation between archaeological sites in the Middle Jomon Period.