Clay Analysis of Jōmon Earthenware
——Jōsō Clay Layer and Clay Analysis of Earthenware——

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Introduction

Clay analysis of Jomon and other earthenware was performed based on the type of earthenware excavated. Comparative examination were made of body clay among earthenware of same type and a different period. Investigations of pottery techniques and introduction of various wares from other areas enabled us to examine the area where the earthenware was made and to know about the flow of earthenware.

In this report, the Joso Clay Layer which extends widely over Tokyo, Chiba and Ibaragi Prefectures, and the clay used for earthenware made in various areas were analyzed and the results were compared to determine the clay layer used for manufacturing of the subject earthenware. Two analysis methods were applied as follows.

(1) Primary mineralogical estimation using polarizing microscope by KAMUJOH Tomohiro, and (II) Elemental analysis by X-ray fluorescent analysis by ISHIKAWA Takashi.

(1) Primary mineralogical estimation using a polarizing microscope

Clay samples were collected from the Miyazuka Site and the Harada-North Site in Tsuchiura City, Ibaragi Prefecture. For the Miyazuka Site, minerals contained in the samples from the site were analyzed for the Kanto Loam Layer, Joso Clay Layer, Ryugasaki Gravel, and Narita Upper Layer. For the Harada-North Site, due to a tight time schedule, analysis was limited to the Joso Clay Layer and clay used for Jomon and Yayoi earthenware which was collected from the ground surface of the site.

The Joso Clay Layer was formed during the falling period of Ontake Volcano First Floatstone Laxer (Pm-1), which is wide area volcanic ash layer seen in the Lower Sueyoshi Loam Layer in the Kanto loam. As for heavy minerals among primary minerals, characteristic minerals in the Ontake Volcano First Fragmented Rock Layer, including zircon, were recognized. Among light minerals, high temperature type quartz was proved to be contained in a rather large amount.

Some Jomon and Yayoi earthenware excavated from the Harada-North site contained zircon, a heavy mineral, as well as high quartz, a light mineral. Joso clay was supposed to be used to make the body of the earthenware. In addition. some of earthenware excavated from the sites in the surrounding areas included zircon and high quartz, but some did not, depending on the manufacturing period and type of the earthenware. Comparative examination of these earthenware will lead to good results in the future analyses of earthenware body clay.

(II) Elemental analysis by X-ray fluoresent analysis method

Clay layers including the Joso Clay Layer and the Upper Narita Layer have been weathered, and more sialic than the Kanto Loam Layer. By using an alkaline metal element and an alkaline earth metal element as indexes, the Joso Clay Layer and the
Upper Narita Layer are identifiable. Since the Joso Clay Layer is contrasted to Ontake Permissible Layer (Pm-1), it is understood that its characteristic of richness in zircon is reflected in the results. A sample of the Kanto Loam Layer was collected from the Miyazuka Site, which is supposed to correspond to the Lower Musashino Loam Layer, judging from the comparison with the Tama New Town area in Tokyo. Comparisons of clay layers at the Miyazuka Site and the body clay of earthenware excavated from Harada-North Site led us to suppose that the earthenware from the Harada-North Site was made mainly from clay which has common characteristics to that of the clay layer at the Miyazuka Site, with some adjustment to it. Histological variations can be seen in the clay which is generally classified into the Joso Clay Layer depending on the sampling points. Therefore, comparisons of clay and earthenware collected from remote points are not necessarily effective. Sintering experiments on the clay layer from the Miyazuka Site made clear that the 6th and 7th Joso Clay Layers were more similar to the body clay of the subject earthenware, which coincided with the results of X-ray fluorescent analysis and so on.