Lower archeointensity results obtained from a floor of the reconstructed (simulated) ancient kiln.

*Yuhji Yamamoto[1], Tadahiro Hatakeyama[2], Yu Kitahara[3], Takeshi Saito[4]

1. Center for Advanced Marine Core Research, Kochi University, 2. Information Processing Center, Okayama University of Science, 3. Graduate School of Integrated Science for Global Society, Kyushu University, 4. Institute of Science, Academic Assembly School of Science and Technology, Shinshu University

Yamamoto et al. (2015) reported that baked clay samples from the floor of a reconstructed (simulated) ancient kiln provided a reliable Tsunakawa-Shaw archeointensity (AI) estimate. The simulated reconstruction was conducted in 1972 to reproduce an excavated kiln of the seventh century in Japan and Sue-type potteries of contemporary style were also fired (Nakajima et al., 1974). Two of the potteries with reddish color were subjected to the Tsunakawa-Shaw archeointensity determinations, resulting in reliable AI estimates when specimens were heated in air in laboratory (Yamamoto et al., 2017 JpGU-AGU Joint Meeting). We have had another opportunity to take samples from a new reconstructed (simulated) ancient kiln at Miki, Hyogo, Japan, which was fired in autumn 2016.

The samples are ones taken from a kiln floor, an inner wall of the kiln body, and two Sue-type (bowl-type and plate-type) potteries with grayish color. They were cut into mini specimens and then subjected to the Tsunakawa-Shaw experiment with two different heating conditions (either in air or vacuum). Yamamoto et al. (2017 AGU Fall Meeting) reported the experimental results except for the kiln-floor samples: successful results were obtained from 26 specimens and the resultant AI estimates are indistinguishable between the heating conditions; except the mean AI estimate obtained from the plate-type pottery heated in air, the sample-mean AI estimates are consistent with the IGRF field of 47.4 microT at the reconstructed location in 2016.

We have newly obtained experimental results from the kiln-floor samples: AIs of the successful results are 29.5-45.7 microT (N=12) for the specimens heating in air, and 29.6-44.3 microT (N=12) for the specimens heating in vacuum. Each upper limit is close to the IGRF field of 47.4 microT at the reconstructed location in 2016, but each mean (38.3 +/- 5.4 microT for air; 34.9 +/- 4.9 microT for vacuum) is significantly lower than the IGRF field. Similar lower AIs were obtained from samples taken from the positions 20 cm below the floor (−20-cm level) of the 1972 reconstructed kiln, and they were probably originated from insufficient acquisition of thermoremanent magnetization (TRM) during the firing (Yamamoto et al., 2015). Natural remanent magnetizations of the present kiln-floor samples also probably were not full TRM but partial TRM resulting in the lower AIs.

