

## Paleodirections and intensities from two old kilns in Okayama prefecture

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The archaeological remains such as kilns of Sueki type potteries record very stable thermo remanent magnetization (TRM), because they were baked at a high temperature more than 1,000 °C. In addition, their age are well estimated with very high precision in many cases, by using pottery type morphology. Thus, the archaeomagnetism can be used widely to examine the magnetic secular variation of the past several hundred to thousand years. However, there is very little number of data (direction 682 and intensity 63) which are used to construct the standard curve of the magnetic secular variation in Japan. This study aims to estimate a paleomagnetic directions and intensities of two old kilns (Sayama Shin-ike 1st kiln, Sayama Higasiyama-Oku kiln) of Bizen city, Okayama prefecture and contribute to the improvement of archaeomagnetic database.

For the paleomagnetic direction, we got samples of baked earth obtain from two old kilns (floor and wall; remanent magnetization intensities are  $10^{-1} \sim 10^1$  A/m) and we decided a principal components of measurements of remanent magnetization with stepwise AF-demagnetization under 0~100mT conditions. In the result, we obtained average magnetization directions, of  $D=-13.8 \pm 1.8^\circ$   $I=51.6 \pm 1.6^\circ$   $a_{95}=1.1^\circ$   $k=261.7$  from Shin-ike (n=59) and  $D=-11.6 \pm 2.8^\circ$   $I=46.7 \pm 1.9^\circ$   $a_{95}=1.9^\circ$   $k=253.7$  from Higasiyama-Oku (n=24).

From rock magnetic analyses, the characteristic magnetic mineral recording the remanent magnetization is likely be magnetite. In addition, these samples were almost not influenced by the heating. These results suggest that these samples are suitable for paleointensity measurements (IZZI method and Tsunakawa-Shaw method). In the paleointensity result, obtained average magnetization intensity by IZZI method is  $61.3 \pm 3.2$  uT (Shin-ike, n=4) and  $53.6 \pm 7.1$  uT (Higashiyama-Oku, n=8). intensity by Tsunakawa-Shaw method indicates the results of  $54.1 \pm 10.6$  uT (Shin-ike, n=2) and  $67.1 \pm 10.7$  uT (Higashiyama-Oku, n=2).

The estimated ages from comparison the average magnetization directions and the secular variation curve are consistent with archaeological era (Sin-ike; latter half of 8C, Higasiyama-oku; 9 to 11C) in the range of errors. Field intensities obtained by IZZI method shows the values that is nearer to intensity standard curve of Japan than Shaw method. Thus, as for the samples used in this study, it is supposed that IZZI method is suitable for the measurement of paleointensity.

Keywords: Archaeomagnetism, Paleomagnetic direction, Paleomagnetic intensity, Old kilns of Sueki Potteries