

Archeomagnetic direction and intensity of ancient settlements at Koushin district, central Japan

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Archeomagnetic direction and intensity were estimated from baked soils obtained at four archaeological sites (Idegawa-minami site of the 6th century, Wada-taishido site of 9th century and Takabatake site of 11th-12th century in Matsumoto city and Kamihara site of 9th-10th century in Hokuto city), Koushin district, central Japan. 62 baked soil samples were obtained from heated ground at the ancient housings. These soils are reddened and consolidated because of heating during cooking. It is expected that these soils recorded stable TRM, though these baked soils from ancient kitchens were hardly experienced so high temperature as to those from pottery kilns and furnaces used in iron smelting (studies of Sue ware; Shibuya et al., 2015, JpGU).

As a result of PAFD and PThD, 47 samples from 12 ancient housings had stable TRMs whose directions were parallel to the earth magnetic field at the time when TRM was acquired. Directions from some samples which showed lower NRM intensity and susceptibility were not concentrated to the past magnetic field. Our site-mean directions are almost identical with those from the secular variation curve in Japan (Hatakeyama et al., in prep.) with a few exceptions. Archeomagnetic directions obtained from Matsumoto city are plotted on right side of the secular variation curve, suggesting that declination become higher due to local magnetic anomaly. According to present distribution of earth's magnetic field, declination is slightly higher of about 1-2 degree around Koushin district than surrounding region (GSI, 2010). This may result in eastward distribution of archeomagnetic data from Matsumoto city.

Using Thelie-Coe method (Coe, 1967), archeomagnetic intensities were estimated from 20 specimens with high magnetic susceptibility at Kamihara site. Obtained intensities showed wide range of 16.7~73.9 μ T. Excluded data from specimens with low magnetic susceptibility and NRM intensity, mean intensities are estimated as follows: 51.9 \pm 2.1 μ T (A.D. 850~900), 57.3 \pm 4.4 μ T (A.D. 850~950). These values are consistent with the values from previous study in Japan (e.g. Sakai, 1980; Yoshihara et al., 2003).

Keywords: secular variation, archeomagnetism, archeomagnetic direction, archeointensity, archaeological site