A detailed study of Matuyama-Brunhes geomagnetic transition from Pleistocene sediments in Sangiran, Java, Indonesia

Yuko Kamishima[1]; Masayuki Hyodo[2]; Shuji Matsu'ura[3]; Toshikatsu Kanaeda[4]; Megumi Kondo[3]; Yoshihiro Takeshita[5]; Tohru Danhara[6]; Fachroel Aziz[7]; Sudijono[7]; Hisao Kumai[8]

[1] Earth and Planetary Sci.,Kobe Univ; [2] Kobe Univ. R. C. Inland Seas; [3] Fac. of Hum. Life and Environ. Sci., Ochanomizu Univ.; [4] Earth and Planetary Sci., Kobe Univ; [5] Tochigi Prefectural Museum; [6] Kyoto Fission-Track; [7] GRDC, Indonesia; [8] Geosciences,Sci.Osaka City Univ.

A high resolution Matuyama-Brunhes (M-B) geomagnetic polarity transition record was obtained from the Pleistocene fluvio-lacustrine deposits in Sangiran, central Java, Indonesia. The Lower Pumice Bed in the Pohjajar (Notopuro) Formation lies in the topmost stratigraphic level in Sangiran was dated at 0.18 +- 0.02 Ma by fission-track method. Below this bed, a preliminary paleomagnetic study was conducted at several sections near Bapang, Duet, and Pohjajar villages, searching for the M-B boundary (MBB). A clear reverse-to-normal polarity change was found just below the Upper Tuff in the Bapang (Kabuh) Formation, which is overlain by the Pohjajar Formation representing normal magnetic polarity throughout. The polarity change which lies just above a level corresponding to the tektite horizon is reasonably correlated with the MBB. Detailed samplings with 4-5 specimens per level and at 10cm intervals in depth were made around the Upper Tuff at two sections separated by about 200m near Bapang village. Progressive thermal or alternating field demagnetizations at 10-15 steps for all the samples reveal that the main MBB lies 150 cm below the Upper Tuff, and two short reversal episodes occur in the normal polarity zone above the main MBB. The upper episode occurs around a thin unnamed pinkish tuff layer 15 cm above the Upper Tuff for the northern section, and 70 cm above for the southern section. Transitional paleomagnetic fields, whose virtual geomagnetic poles (VGP) fall within a latitude range from -45 to 45 degrees N, rarely occur except in the upper short episode zone. It is noted that neither the main MBB nor another episode accompanies a transitional field. A total of four transitional field directions were observed in the upper episode zone in both sections. Three of them show VGPs locate in central to east Pacific, and one near the north-east coast of South America. This result disagrees with the claims that transitional VGPs cluster around western Australasia, or their pathways follow preferred bands of longitude. The occurrence of two short episodes above the main MBB as well as rare observations of transitional directions is consistent with the M-B transition features from high accumulation rate (50-60cm/kyr) Osaka Bay sediments. The M-B transition from Sangiran may be less affected by filtering in the post-depositional magnetization process. The transition features obtained in this study contradict the hypothesis of a long-lived magnetic flux concentration at the core surface beneath western Australasia.