

Matuyama-Brunhes magnetic polarity transition features from Sangiran, central Java

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<http://www.planet.sci.kobe-u.ac.jp/study/list/geom/hyodo.html>

Magnetostratigraphy was investigated on the hominid fossil bearing formation in Sangiran, central Java, Indonesia, where there has been a hot debate on chronology. The upper pumice bed in the topmost part of the Pohjajar Formation was zircon fission-track dated at 0.18 ± 0.02 Ma. Below this bed, paleomagnetic analyses were made for fine sediments of clays, silts, and silty clays over a sequence about 90 m thick. The preliminary sampling was made at 3-10 m intervals in depth through the sequence on three sections near Bapang, Duet, and Pohjajar villages. 4-5 specimens were collected from each level, and all were subjected to progressive thermal or alternating field demagnetizations at 10-15 steps. The result with the preliminary samples reveals two magnetic polarity zones that a reverse polarity zone is overlain by a normal one. The normal polarity zone includes the fission-track dated bed is reasonably correlated with the Brunhes Chron. The polarity boundary lies around the Upper Tuff of the Bapang Formation is thus correlated with the Matuyama-Brunhes polarity boundary (MBB). Additional samplings by the same method were made at 10cm intervals in depth around the Upper Tuff at two sections, one is the type Bapang Formation and the other is that about 200 m separated from it. The paleomagnetic result shows that the main polarity boundary lies 150 cm below the Upper Tuff, accompanying two short reversal episodes just above it. A transitional (excursion) paleomagnetic field occurs in neither around the main MBB nor in other parts, except in the upper short episode zone. The occurrence of two short episodes above the main MBB as well as rare transitional directions is consistent with the features of a detailed Matuyama-Brunhes reversal transition from the high accumulation rate (50-60cm/kyr) Osaka Bay sediments. These features may be resolved due to less effect of filtering. There are many horizons with unstable remanent magnetizations, from which no characteristic remanent magnetization was obtained. They range below 1m below the main MBB. This feature is also consistent with the result from Osaka Bay. The instability may be due to weak magnetizations acquired in the low intensity transitional field. The present MBB is consistent in stratigraphy with the tektite horizon observed at two separated sites between the Upper and Middle Tuffs. The MBB constrains the younger limit for the uppermost level of Homo erectus fossil (PVI) occurrence in Sangiran.