Paleoclimatic implications of magnetic properties of aeolian sediments at the Chongokni Paleolithic site in Korea

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Terrestrial wind-blown silt deposit (loess) in inland China has been important targets of paleoclimate studies for the Pliocene-Pleistocene. In particular, low-field magnetic susceptibility shows higher values at paleosol units, providing a means of correlating the terrestrial deposits to the marine oxygen isotope record. Pleistocene deposits resembling to the Chinese loess-paleosol sequences are also distributed in the Korean Peninsula, although their distribution, thickness and depositional ages are limited. We have been investigated magnetic properties of the terrestrial deposits in Korea as a part of collaborative projects between archeologisits and geologists both from Korea and Japan. Here we report results of magnetic analysis of the artifact-bearing sediments of about 8 m thick at the Chongokni Paleolithic site in Gyeonggi-do, Korea. Magnetic susceptibility of this sequence shows increased values at the horizons of paleosol, which are characterized by reddish brown color and soil cracks. Thus, the variations of magnetic concentration in this sequence are comparative to the typical Chinese loess sequence. The susceptibility at the middle and upper intervals show high frequency dependence of more than 10%. This result suggests occurrence of ultra-fine magnetic minerals showing superparamagnetism. Measurements of hysteresis loops indicate presence of magnetic minerals similar to the loess and paleosol samples from Luochuan in China. As previously shown for the Chinese loess and paleosol sequences, the increases in magnetic concentration in paleosol units can be attributed to formation of magnetite or maghemite during pedogenic process under warm and humid climate. It is noticeable, however, that superparamagnetic minerals are dominant even in the intervals between the paleosol layers at the Chongokni site. It is suggested that process of the fossil soil formation is more extended than the arid Chinese loess plateau, probably due to higher precipitation in Korean Peninsula.