

ENVIRONMENTAL MAGNETIC AND PEDOLOGIC RESULTS FROM THE WUCHENG FORMATION, CHINESE LOESS PLATEAU

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Most studies of the paleoclimate record of the Chinese loess plateau have focused on the Lishi Formation, which represents the upper two-thirds of the 2.6 million year-long sequence. We have been using environmental magnetism to study the Wucheng Formation which represents the lower one-third of the sequence. The Wucheng Formation has a very different physical appearance than the Lishi Formation which is not surprising since the Wucheng Formation represents a time when the climate regime was being influenced quite differently by Milankovitch forcing. We sampled the Wucheng Formation at Jiaodao, about 50 km from the classic Luochuan loess locality. Our methods include measurements of magnetic susceptibility and its frequency dependence, anhysteretic and isothermal remanent magnetization, and hysteresis curves. In many cases, these measurements are being made before and after citrate-bicarbonate-dithionite (CBD) treatment which is useful in separating pedogenic from lithogenic components. We find that among other things, the magnetic susceptibility signal of the Wucheng Formation has higher frequency and lower amplitude variations than the Lishi formation and that episodes of weathering might have been more intense but of shorter duration. These results demonstrate that the relationship among magnetic susceptibility, climatic conditions and duration of pedogenesis are not as straightforward as has been previously suggested; however, we believe that detailed analyses that use a combined magnetic, pedologic and geochemical approach will significantly improve our ability to interpret the paleoclimate record of Chinese loess-paleosol sequence as well as to test and improve existing computer models of global climate change.