



Grain-size and grain-shape analyses using digital imaging technology: Application to the fluvial formation of the Ngandong paleoanthropological site in Central Java, Indonesia

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This study implements grain-size and grain-shape analyses to better understand the fluvial processes responsible for forming the Ngandong paleoanthropological site along the Solo River in Central Java. The site was first discovered and excavated by the Dutch Geological Survey in the early 1930's, during which fourteen *Homo erectus* fossils and thousands of other macrofaunal remains were uncovered. The *Homo erectus* fossils discovered at Ngandong are particularly interesting to paleoanthropologists because the morphology of the excavated crania suggests they are from a recently-living variety of the species. The primary scientific focus for many years has been to determine the absolute age of the Ngandong fossils, while the question of exactly how the Ngandong site itself formed has been frequently overlooked. In this study I use Retsch CAMSIZER digital imaging technology to conduct grain-size and grain-shape analyses of sediments from the terrace stratigraphy at the Ngandong site to understand if there are significant differences between sedimentary layers in grain-size and/or grain-shape, and what these differences mean in terms of local paleoflow dynamics over time. Preliminary analyses indicate there are four distinct sedimentary layers present at Ngandong with regard to size sorting, with the fossil-bearing layers proving to be the most poorly-sorted and most similar to debris-flow deposits. These results support hypotheses by geoarchaeologists that the fossil-bearing layers present at Ngandong were deposited during special flow events rather than under normal stream flow conditions.