

RECONSTRUCTION OF THE DEPOSITIONAL ENVIRONMENT OF THE MIDDLE MIOCENE PRIMATE LOCALITY, MABOKO ISLAND, KENYA

WATKINS, B. T.

Jane Herdman Labs, Department of Earth and Ocean Sciences, University of Liverpool, 4 Brownlow St., Liverpool, L69 7GP, UK
E-mail: bwatkins60@hotmail.com

Maboko Island is located in the Winam Gulf of Lake Victoria, Kenya. It has long been known for the wealth of primate fossils from the Middle Miocene. The Maboko Formation contains 20 beds that are roughly divided into a finer grained, volcanoclastic lower sequence and a relatively coarse-grained higher sequence. Benefit and McCrossin (e.g. 1997) have excavated thousands of vertebrate fossils from the lower, finer grained beds of the formation. The palaeo-environment has been previously interpreted as the distal part of a semi-arid floodplain. However, recent findings indicate that, at least in the lower part of the sequence, the Maboko sediments display characteristics known to occur in a subaqueous environment. Sedimentologic examination of bed 3, the lowest of the fossiliferous deposits and colloquially known as greensand for its sometimes brilliant green colour, shows that a fundamental component of this bed is extremely well formed ooids. Further, subangular fragments of stromatolites are found to be a minor component, and occasionally function as nuclei for the ooids. A reconstruction of the geometry of this bed indicates that it was most likely a beach ramp. The clay content in bed 3 is relatively low, but X-ray diffraction analysis indicates it is smectitic. The glycolated samples display intense 001 reflections, indicating a high-level of crystallinity. No reflections occurred between 10–17 Å. So, this bed does not contain any mixed layer illite-smectite. X-ray fluorescence spectrometry shows that the MgO content is relatively low, which appears to indicate that this bed doesn't contain Mg-smectites. However, Fe₂O₃ is reasonably high in this bed and others examined. In bed 5, the well indurated deposits generally show planar

bedding, but there are instances of what appears to be relatively low angle cross-bedding. However, the apparent cross-bedding appears to be largely related to localised deformation. Further, in at least one deposit, these bedding structures have been disturbed by bioturbation. The clay content is rather low in all the well indurated deposits of bed 5, and X-ray diffraction analysis identifies them as smectites, with readings very similar to those of bed 3. The smectites from these deposits display the highest levels of Fe₂O₃. SEM investigation shows the smectites to have a „honey-combed” morphology. Analysis of the clay mineralogy of the so-called „brown lens” of bed 5, which has been the most productive of all the fossiliferous deposits, indicates that it is an illite-smectite. Glycolated samples show strong but relatively broad reflections ($d \approx 17$ Å) and moderate reflections at cca. 8.90° 2θ. Nevertheless, the relatively low clay content of bed 5, except for the „brown lens”, does not appear to support the interpretation that these sediments were deposited in the distal section of a floodplain. Kent (1944) proposed that the Maboko area was the site of a vast Miocene lake, but his hypothesis was later discounted. However, in the current study, the sedimentology appears to support Kent's hypothesis.

References

- BENEFIT, B. R., MCCROSSIN, M. L. (1997): Function, Phylogeny, and Fossils: Miocene Hominoid Evolution and Adaptations. Plenum Press, New York, 241–267.
KENT, P. E. (1944): Quarterly Journal of the Geological Society of London, **100**, 85–118.