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CORRELATIONS BETWEEN NATURAL SPECTRAL GAMMA AND MAGNETIC SUSCEPTIBILITY LOGS AT KENYAN HSPDP SITES: THE SEARCH FOR A MAGNETIC SUSCEPTIBILITY PROXY

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The Hominin Sites and Paleolakes Drilling Project (HSPDP) is acquiring scientific drill cores at localities in Kenya and Ethiopia. Cores from these sites are being analyzed to reconstruct paleoenvironmental conditions at key hominin fossil sites. Downhole (wireline) and wholecore (multi-spectral core logger) logs from two Kenyan sites are being analyzed and correlated using quantitative methods adapted from time-series analysis and logging in other environments.

Operations at West Turkana and Baringo/Tugen Hills were completed in 2013. The downhole logs required no preliminary filtering, however the wholecore logs had outlier removal filtering and moving average smoothing applied to remove spikes recorded at the ends of the core sections. Further conditioning, such as detrending, is required to correlate the two sets of logs and assign correct field depths to the cores obtained during the drilling operation.

Magnetic susceptibility (MS) logs provide a robust correlation tool in lacustrine settings; however downhole MS logs are not always available. At the West Turkana site, casing could not be removed from the drillsite and only natural gamma (NGR) and spectral gamma (SGR) logs were run. In this case, depth correlations between the downhole and wholecore data are approached in two ways: conditioning of the data to correlate NGR logs, and interpreting the downhole SGR logs to tie to the wholecore logs. For example, Th/K is a useful paleoclimate indicator in mudrocks, where higher ratios (under certain conditions) indicate more humid environments.

SGR logs at the Baringo site were tested against all available logs from the site to determine whether they are useful as proxies for downhole magnetic susceptibility. Initial comparisons of Th/K (calculated from SGR) and magnetic susceptibility suggest there is a correlation between high Th/K (>20) and low magnetic susceptibility (<100 SIx10⁻⁵) at the Baringo site.

These preliminary observations must be tested against core sample analysis; however downhole spectral gamma may serve as a useful tool for both log correlation and as a guide for core sampling.

Authorship of this abstract also includes the entire HSPDP field and ICD teams.

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[T241. Paleoenvironmental Reconstruction of Hominin Sites: Techniques—From the Unique and New to the Tried and True](#)

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