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Lake Magadi is a hypersaline, alkaline lake located in the southern Kenya Rift Valley. The modern basin is arid and underlain by 40-60 m of trona (NaHCO3.Na2CO3.2H2O). Outcrop studies by Baker (1958) and Eugster (1967,1980) of the Magadi basin have provided evidence, such as fish and invertebrate fossils, for fresher lake conditions in the basin’s history. A drilling expedition in the summer of 2014 as part of the Hominin Sites and Paleolakes Drilling project (HSPDP) extracted four sediment cores, to a maximum depth of 197m, from Lake Magadi. The sediment types, mineralogy, sedimentary structures and diagenetic overprints of three of these cores will be discussed in detail (1A, 1C, and 2A). Detailed measured sections were developed for each core and lithologies were described in terms of grain size, roundness, sorting, and mineralogy, and crystal textures Correlations have been made using tephra deposits, sedimentary structures (e.g. mud cracks) and mineralogy. Paleoenvironments were interpreted from sedimentary structures and facies associations.

Carbonate grains, Mg-calcite crystals, gastropod and ostracode fossils below 170 m in Core 2A indicate a freshwater system early in the basin’s history, followed by common lake level fluctuations, evidenced by gravels, mudcracked muds, and diatom-bearing muds, and finally increasing salinity in the basin, shown by evaporites in the upper 60 m of the core. These interpretations can be the basis for further analysis of the Lake Magadi cores, including, lake chemistry evolution, tectonic evolution of the basin, and the detailed analysis of micro-fossils and diagenetic siliceous sediments. Combined, these analyses will allow us to reconstruct the tectonic and climatic history of the Magadi basin.

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