S15-P08 - U-Th Disequilibrium Dating of Chert from Lake Magadi Sediment Cores. International Paleolimnology Association-International Association of Limnogeology Meeting, Stockholm, Sweden June 18-21, 2018

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Lake Magadi was cored to igneous bedrock in 2014 as part of the Hominin Sites and Paleolakes Drilling Project (HSPDP) to furnish paleoenvironmental context for human evolution in East Africa. Two cores (1A, B and C: 137 m and 2A: 198 m) composed of zeolitic mud, chert, trona, calcite, and sand/gravel, contain a record of Pleistocene/Holocene closed-basin paleoenvironments and paleoclimates in a tectonically-active rift basin. Early syndepositional cherts formed by replacement and cementation of siliceous gels, magadiite, evaporites (trona, gaylussite), diatomaceous deposits, and carbonate fossils (ostracodes and gastropods). Early chertification is demonstrated by randomly-oriented plant and insect fragments, and labyrinth patterns that show lithification of uncompacted siliceous gels. Magadi cherts were dated by uranium-thorium disequilibrium techniques. Cherts incorporate significant uranium (0.6-11 ppm) and minor initial 230Th (230Th/232Th atomic ratios of 6-600 X 10-6 and 238U/232Th concentration ratios of 3-33). Ten cherts in core 1A (24 to 88 m), range in age from 11.8 to 285 ka. Nine cherts from core 2A (36 to 107 m), range in age from 12.4 to 267 ka. Chert dates, along with radiocarbon ages, Ar-Ar dates of tephras, and paleomagnetic dating, provide a robust one-million-year chronology of the HSPDP Magadi cores. The sediment cores record a shift from an early, shallow freshwater lake stage, evolving to a narrow, at times anoxic, meromictic saline lake stage. The assemblage of chemical sediments (zeolites, chert, magadiite, trona, nahcolite) indicates alkaline saline conditions for much of the history of the Magadi basin. One major dry period, from ~455 to 325 ka, overlaps OIS Stage 11, the longest, warmest interglacial of last 500 kyr. Chert dates from trona layers show the first evaporites were deposited in the Magadi basin ~119 ka, much earlier than previously thought.