Quaternary outcrop and core stratigraphy of the Magadi Basin, South Kenya Rift. . International Paleolimnology Association-International Association of Limnogeology Meeting, Stockholm, Sweden June 18-21, 2018

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Cores from Lake Magadi (South Kenya Rift) contain a nearly-continuous sedimentary sequence that rests on trachyte (1.08 Ma). Fifteen major facies were laid down in a series of fresh to highly saline lakes, wetlands and playas. The sediments are distinctive in lacking pedogenic horizons, which are common in other lacustrine rift sequences. This reflects the basin’s location in a tectonic sump where continuous aquatic environments were maintained by geothermal and/or meteoric springs even during dry periods. Five geochemical zones and sixteen subzones can be distinguished based on major and trace elements and mineralogy. An upward decline in Ca:Na ratios and rise in (K2O+NaO)/Al2O3 ratios reflect increasingly saline and alkaline palaeolakes. Rare Earth Element data become more varied upwards reflecting the evolution of strongly alkaline carbonate brines. Calcite and Mg-calcite give way to zeolites above 98 m core depth (~325 ka) with zeolites and trona dominating above 60 m (~98 ka), reflecting a transition from moderately saline to strongly saline lakes. Seven diatom zones can be distinguished with well-preserved floras dated to 472–18 ka. Pollen are present throughout most of the core, reflecting the presence of anoxic environments through much of the 1-million-year record. The geochemical, diatom and pollen data suggest progressive aridification since about 510 ka superimposed on many wet-dry cycles and with increased variability during periods of high eccentricity-modulated precession. Particularly intense aridity developed between 455–325 ka that may correlate with calcrete formation between the poorly dated Oloronga and Green beds, in outcrop. The transition to extremely arid conditions in the Magadi Basin coincides with a global shift in climate patterns at the Mid-Brunhes Event, partially overlaps with mammalian extinctions in the South Kenya Rift (500–400 ka), and corresponds with a change from Acheulean to Middle Stone Age tools in the nearby Olorgesailie Basin.