72. Deino, A.L., King, J., Heil, C., Potts, R., Behrensmeyer, A.K. and Dommain, R., 2016, Chronology of the Olorgesailie Drilling Project Core 1a, Koora Graben, southern Kenya Rift. Geo. Soc. Amer. Ann. Mtg., Denver, CO 26-29 Sept., 2016.

The Olorgesailie Drilling Project (ODP) is investigating the sedimentological, volcanological and paleoenvironmental history of the Koora Basin, southern Kenya Rift, proximal to the Pleistocene Olorgesailie archaeological and fossil area. Two long cores (54 and 166 m) were obtained from the northern Koora Basin in 2012. Here we report on the geochronological results from the longest of these (Core 1A).

Core 1A is characterized by a wide range of deposits that include laminated deep-lake facies with diatomites, shallow-lake and near-shore facies, fluvial deposits, and multiple paleosols. Numerous intercalated tephra deposits are also present, some as direct fallout but mostly as pyroclastic materials fluvially transported from vents in the central Kenya Rift. Tephra beds are especially common in the upper two-thirds of the core, and >20 units have been dated by the single-crystal, incremental heating 40Ar/39Ar dating approach to a precision of ±0.3 to 10% (dependent on grain size, feldspar chemistry, and the number of crystals available for analysis). Ages range from the 1.1 Ma Magadi Trachyte at the bottom of the core to ~90 ka tephra near the top. Paleomagnetic analysis of core samples has located the Brunhes/Matuyama Chron boundary, providing a critical high-precision chronostratigraphic datum in the lower part of the core. All chronostratigraphic information has been smoothed using a Bayesian stratigraphic analysis (BChron), providing a reasonable fit to the data, and best predicted ages and confidence intervals for the entire core.

The density of chronostratigraphic data define a progressively increasing sedimentation rate from ~6 cm/ka near the base, to ~160 cm/ka at ~225 ka (~75–90 m depth), commensurate with a relatively abrupt voluminous input of volcaniclastic material. Above ~75 m the sedimentation rate again decreases. No major hiatuses are discernable; and no major deflections are evident in the sedimentation rate curve, with the exception of the decrease in rate following the maximal volcanic activity mentioned above. Tight age control of the chronostratigraphy will allow the many paleoenvironmental proxies measured and planned for the ODP core to be assigned a suitable age and uncertainty, which then can be linked to the archaeological and paleontological records of the Olorgesailie Basin.