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New chronology for the southern Kalahari Group sediments with implications for sediment-cycle dynamics and early hominin occupation

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Kalahari Group sediments accumulated in the Kalahari Basin, which started forming during the breakup of Gondwana in the Early Cretaceous. These sediments cover an extensive part of southern Africa and form a low-relief landscape. Current models assume that the Kalahari Group accumulated throughout the entire Cenozoic. However, chronology has been restricted to early-middle Cenozoic biostratigraphic correlations and to OSL dating of only the past ~300 Ka. We present a new chronological framework that reveals a dynamic nature of sedimentation in the southern Kalahari. Cosmogenic burial ages obtained from a 55 m section of Kalahari Group sediments from the Mamatwan Mine, southern Kalahari, indicate that the majority of deposition at this location occurred rapidly at 1–1.2 Ma. This Pleistocene sequence overlies the Archaean basement, forming a significant hiatus that permits the possibility of many Phanerozoic cycles of deposition and erosion no longer preserved in the sedimentary record. Calcretes that cement conglomerates and sands throughout the sequence range between 300-500 Ka. Our data also establish the existence of a shallow early-middle Pleistocene water body that persisted for >450 Ka prior to this rapid period of deposition. Evidence from neighboring archaeological excavations in southern Africa suggests an association of high-density hominin occupation with this water body.

