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A meta-analysis of Holocene fluvial units in the Nile catchment

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There have been numerous site- and reach-based studies in the Nile catchment employing radiocarbon and, more recently, OSL dating to reconstruct Holocene river histories but with no attempt to critically evaluate and synthesise these data at a catchment scale. In this paper we present the first meta-analysis of all published and publically available radiocarbon and OSL dated Holocene fluvial units in the Nile catchment and relate them to changing river dynamics and climate. Dated fluvial units are separated both geographically (into the Nile Delta and White, Blue, and Desert Nile catchments) and into depositional environment (floodplain and palaeochannel). Taking the Nile catchment as a whole, the majority of dates fall between c. 8600-2600 cal. BP with only 10 fluvial units in the last 2000 years. The most striking pattern to emerge from this initial analysis is a 900-year absence of floodplain units between c. 2650-1750 cal. BP. This gap is mirrored by a significant increase in dated palaeochannel units between 3250-2150 cal. BP suggesting a major period of both channel and channel network contraction, especially in the Desert Nile. These changes coincide with a marked reduction in river flow. The impacts of these major and permanent changes in river flow and channel dynamics on riverine civilizations in the Nile Valley are discussed.