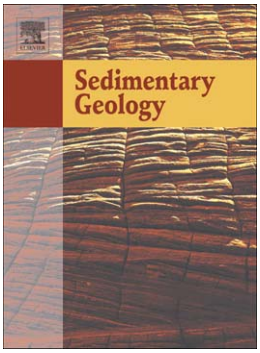

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Punctuated Sediment Discharge During Early Pliocene Birth of the Colorado River: Evidence from Regional Stratigraphy, Sedimentology, and Paleontology

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ABSTRACT

The Colorado River in the southwestern U.S. provides an excellent natural laboratory for studying the origins of a continent-scale river system, because deposits that formed prior to and during river initiation are well exposed in the lower river valley and nearby basinal sink. This paper presents a synthesis of regional stratigraphy, sedimentology, and micropaleontology from the southern Bouse Formation and similar-age deposits in the western Salton Trough, which we use to interpret processes that controlled the birth and early evolution of the Colorado River. The southern Bouse Formation is divided into three laterally persistent members: basal carbonate, siliciclastic, and upper bioclastic members. Basal carbonate accumulated in a tide-dominated marine embayment during a rise of relative sea-level between ~6.3 and 5.4 Ma, prior to arrival of the Colorado River. The transition to green claystone records initial rapid influx of river water and its distal clay wash load into the subtidal marine embayment at ~5.4–5.3 Ma. This was followed by rapid southward progradation of the Colorado River delta, establishment of the earliest through-flowing river, and deposition of river-derived turbidites in the western Salton Trough (Wind Caves paleocanyon) between ~5.3 and 5.1 Ma. Early delta progradation was followed by regional shut-down of river sand output between ~5.1 and 4.8 Ma that resulted in deposition of marine clay in the Salton Trough, retreat of the delta, and re-flooding of the lower