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Prairie mound morphology and age in the Arkansas River Valley, south-central United States

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Within the United States mounded landscapes are found in the Pacific Northwest, Midwest, Central Valley of California and Lower Mississippi River Valleys. These unique landscape features have been described as Mima mounds, prairie mounds, patterned ground, pimple mounds, hogwallows, and silt mounds. Although mounded soils are found in a variety of physiographic regions, their origin is not well understood.

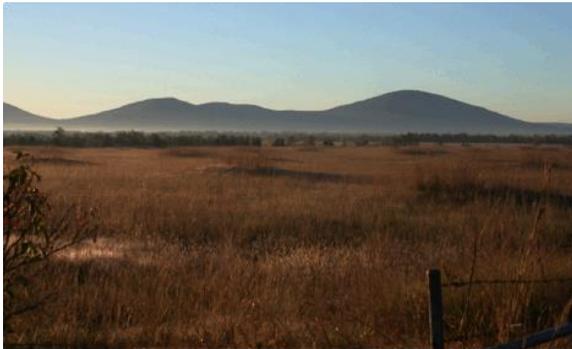


Figure 1: Prairie mounds (foreground), Arkansas River Valley, south-central United States

In the Arkansas River Valley of the south-central United States prairie mounds are prevalent in undisturbed areas north of the Ouachita Mountains in eastern Oklahoma and west-central Arkansas (Fig. 1). In this region a prairie mound and adjacent intermound area were bisected via a trench. Soil profiles were described to a depth of bedrock in the center of the mound (~ 1 m high and ~ 30 m diameter) and in the adjacent intermound area. Differences between the two soils included a thicker (61 cm) A horizon overlying a cambic (Bw) horizon that formed above a fragipan (Bx) in the mound, while the intermound has a thinner (22 cm) A horizon overlying a Bw horizon above a gleyed (Bg) horizon. The parent materials in both soils include eolian silt loam

material over a clayey, shale-derived residuum. Pocket gopher (*Geomys bursarius* (Shaw)) bioturbation of the solum above the Bx horizon in the mound was prevalent, while the intermound contained gopher krotovinas above the Bg horizon and crayfish (*Cambarus spp.*) krotovinas to depth of bedrock.

Two depths within the mound Bx horizon were sampled in triplicate for optically stimulated luminescence (OSL) geochronology. The Bx horizon was selected to avoid gopher bioturbation in the upper solum. The upper Bx horizon (108 cm depth) ranged in age from 24 – 10 ka, while in the lower Bx horizon (126 cm depth) ranged in age from 38 – 21 ka. These results suggest that mounds in this region may be older than previously reported. Seifert et al. [1] dated shallower soil depths (< 60 cm) in two prairie mounds in the Arkansas River Valley and concluded that these mounds are relict nebkhas formed in a late prolonged Holocene drought approximately 2400 to 700 years ago. The results of this study suggest that prairie mound forming processes in the Arkansas River Valley were occurring in the Late Pleistocene.

References:

[1] Seifert, C.I., R.T. Cox, S.L. Forman, T.L. Foti, T.A. Waskelewicz, and A.T. McColgan. (2009). *Quat. Res.* 71:329-339.

