Eolian deposits, soils and climates of the Chesapeake region during the last 40,000 years, and implications for buried Paleoamerican materials

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Abstract:
Eolian deposits are a component of many landscapes in the Chesapeake region, and from a largely archaeological perspective have been the subject of multidisciplinary scrutiny for 15 years. Although some deposits were derived as recently as 1,000 years ago, most date to the late Pleistocene, with the most widespread being a relatively thin (0.5 to 1.5 m) surficial layer of loess amassed during the Younger Dryas cold reversal some 13,000 years ago. This loess (Paw Paw Loess) occurs throughout a broad belt along the west side of the Delmarva Peninsula where the majority of studies have been made. Loess is also present west of Chesapeake Bay, albeit more sporadically. Loess was carried to the Delmarva mainly by prevailing westerly winds lifting silts from the ancestral Susquehanna River floodplain. Western loess appears to have been derived from both the Susquehanna as well as local river valleys. Based on soil development comparable to the Delmarva soils as well as some dating, most of the western loess is also of Younger Dryas origin. Archaeologically, the Paw Paw Loess is highly significant as it was deposited after the arrival of Paleoamericans, and accomplished burial not only of hundreds of km² of late Pleistocene landscapes but also the artifacts (mostly Clovis) contained on them.

Earlier periods of eolian activity have also been documented. Recent findings at Parson’s Island on the east side of the bay identified multiple episodes of deposition beginning roughly 40,000 years ago. A vertical sequence of four buried and discretely dated surface horizons is exposed along a retreating, 3-m high shoreline scarp. Formed in earlier loess, these surfaces are buried by 1.5 m of eolian sand that is then ultimately capped by a 65-cm surface veneer of Paw Paw Loess. The uppermost of the deeply buried surfaces has yielded in situ stone tools, and the teeth of extinct megafauna recovered from the adjacent beach include those of bison, camel, and woodland musk ox. Macrofloral, phytolith and pollen data indicate vegetation suites dominated by grasses and sedges but also containing a number of tree and shrub species including, pine, cedar, fir, willow, alder, birch, and elm. Gradual cooling from 36,308 to 17,133 RCYBP is evinced by a shift from C₄ warm-season grasses to C₃ cool-season types.