



Deposition of Tar Balls Stranded in Sediments of the Upper Eocene Manning Formation, Somerville, Washington County, Texas

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ABSTRACT

Tar balls recording the stranding of bitumen masses on a marine shoreline during the late Eocene occur in strata of the Manning Formation exposed near the town of Somerville in east-central Texas. They are preserved in carbonaceous mudstone deposited during marine flooding of a coastal peat swamp, probably within an embayment of the Gulf of Mexico shoreline. The tar balls occur as tabular masses of post-oil solid bitumen (grahamite) and contain some inclusions of sediment and wood particles. They have irregular surfaces, made rougher by cracks produced by modern weathering after being exposed from the sediment matrix. The tar balls are severely biodegraded and dominated by resins, asphaltenes, and organic acids, as derivative by-products of a biodegraded liquid petroleum source. Elemental (C, H, N, O, and S) composition, SARA (saturates, aromatics, resins, and asphaltenes), and ion chromatograph analyses are presented. Small masses of botryoidal silica occur on surfaces of larger tar balls, the result of burial diagenesis associated with freshwater flushing by silica-rich pore fluids. The source of these bitumens is interpreted to be an offshore submarine petroleum seep in the Gulf of Mexico. This dates oil migration in the Gulf of Mexico as occurring at least as early as late Eocene.

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