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INFLUENCE OF CLIMATE ON THE DEVELOPMENT OF AN ANCIENT PALEOSOL

A nine-meter thick Paleocene paleosol present in the Las Virgenes Sandstone in the Santa Monica Mountains probably represents an ancient soil that developed in a tropical climate. The paleosol is interbedded with sandstones and mudstones that were likely deposited by an ancient fluvial system. A stratigraphic analysis reveals 4 distinct zones in the paleosol. The lowermost Zone 1 is approximately 3 meters thick and consists of a brownish-red fining upward sequence of weathered sandstone and mudstone. Zone 2 is approximately 4 meters thick and is characterized by purple and white blotches floating in a matrix of quartz and kaolinite. Zone 3 is approximately 1 meter thick and consists of mostly iron pisolites, quartz, and kaolinite. The iron pisolites are less than 1 centimeter in diameter. Zone 4 is approximately 1 meter thick and is characterized by iron pisolites in a matrix of quartz and kaolinite. The iron pisolites range from 0.1 centimeters to 2.5 centimeters in diameter. The zones identified are not unlike those encountered in lateritic soils that develop mostly in tropical climates.