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PALEOSOLS OF THE PALEOCENE SILVERADO FORMATION,
SAN JOAQUIN HILLS, CALIFORNIA:
DEVELOPMENT, DISTRIBUTION AND PALEOCLIMATIC IMPLICATIONS

A Thesis

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ABSTRACT

PALEOSOLS OF THE PALEOCENE SILVERADO FORMATION,
SAN JOAQUIN HILLS, CALIFORNIA:
DEVELOPMENT, DISTRIBUTION AND PALEOCLIMATIC IMPLICATIONS

By

Sonjia Leyva

Paleosols have been used to study conditions such as precipitation rates, temperature, ecological habitats, sedimentation rates, and geomorphology present during formation. Three kaolinitic and lateritic paleosols are exposed in the upper part of the Paleocene Silverado Formation, San Joaquin Hills, California, and are interbedded with arkoses containing quartz, feldspars, biotite and granitic rock fragments. These paleosols mark not only the transition from marine to terrestrial deposition, but, more importantly, record a period of likely subtropical to tropical climatic conditions.

Of the three paleosols, Paleosol 1 is the most completely developed. Paleosol 1 is characterized by four horizons: a complete laterite sequence (Horizon A); a red and white mottled kaolinite horizon (Horizon B); a fine-grained kaolinite horizon (Horizon C); and a

coarse-grained kaolinite horizon (Horizon D). Each horizon contains etched quartz incorporated into a kaolinitic matrix. Paleosols 2 and 3 consist predominantly of kaolinite sequences.

The paleosols are Paleocene tropical to subtropical residual soils that developed through extensive chemical weathering of the arkoses derived from granitic highlands. High precipitation rates associated with subtropical and temperate climates resulted in intense weathering and alteration of the arkose. Iron nodules, mottled red and white kaolinite zones, kaolinite-rich intervals and partially dissolved quartz grains are consistent with laterite development. Feldspars and other labile constituents were altered to kaolinite, while quartz grains were partially etched and dissolved as intense leaching occurred.

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