

Evidence for Reassignment of Kaolinite- and Quartz-Rich Strata of the Basal Tertiary Section in California to the Lower Paleocene

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Most assignments of a mid- to late-Paleocene age for the lower, nonmarine portion Silverado Formation are derived from a 1984 paper by Gaponoff published in Palynology. The mid- to late-Paleocene age was based on the presence of two species: *Momipites tenuipolus* Anderson, and *Plicatopolis triradiata* (Nichols) Frederiksen and Christopher. Gaponoff states these two species were “restricted to the late Paleocene in North America.” Nichols (1973) was cited as a guide to that age; subsequently, Nichols (1992) identified the former species as a characteristic form in the lower Paleocene of the Powder River Basin. The latter species, also originally dated as late Paleocene (Frederiksen and Christopher, 1978), was subsequently found to occur in the early Paleocene in Maryland and Virginia (Frederiksen, 1984). Thus, we can interpret an early Paleocene age for the lower Silverado Formation.

The nonmarine Simi Conglomerate is mineralogically and lithologically similar to the lower Silverado Formation (Schoellhamer and others, 1981; Cox, 1982). Both lie unconformably on Cretaceous marine strata. An “unnamed” pre-Martinez (Danian) marine faunal assemblage in the upper Las Virgenes Sandstone lies stratigraphically above the Simi Conglomerate (Saul, 1983). We infer that the Simi Conglomerate and the lower Silverado Formation are litho- and chrono-stratigraphically equivalent—and early Paleocene in age.

Constraining the kaolinitic, pisolite-bearing Simi Conglomerate and lower Silverado Formation to the early Paleocene implies a need to reconsider the age of similar rocks elsewhere in California. For example, the Simi Conglomerate and lower Silverado Formation bear compelling mineralogic and lithostratigraphic similarities to basal units of the less well constrained “Eocene” Ione (Allen, 1929; Creely and Force, 2007;) and Walker Formations (Bartow and McDougall, 1984) in central California. Hand samples from a basal, 0-2 meter-thick kaolinitic sandstone of the largely Eocene Maniobra Formation (Crowell and Suzuki, 1959; Squires and Advocate, 1986; Ingersoll and others, 2014) in the Mojave Desert are indistinguishable from samples from the Serrano Clay Bed in the lower Silverado Formation in Orange County. All five formations contain bed(s) comprised exclusively of quartz and kaolinite; all lie unconformably upon Cretaceous-age strata or older basement. Similar kaolinite-quartz rocks of Paleocene age are found in San Diego County and Baja California (Peterson and Abbott, 1973; Peterson and Abbott, 1975; Abbott and others, 1976; Abbott and others, 1993).

Lower Paleocene kaolinite-bearing strata in California may record evidence of the K-Pg impact event (Busch and Miller, 2016).