RESOLVING THE TEMPORAL HISTORY OF A STRUCTURAL TRAP: AN UPLIFT HISTORY OF THE SANTA SUSANA MOUNTAINS, WESTERN TRANSVERSE RANGES, SOUTHERN CALIFORNIA

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ABSTRACT

The Santa Susana Mountains formed in the hanging wall of the Santa Susana reverse fault system in the western Transverse Ranges of southern California. The Saugus Formation is a Plio-Pleistocene formation that is exposed in the footwall of the Santa Susana fault and was cut off from sediment sources to the north by the re-activation of the Santa Susana fault and subsequent uplift. Previous studies have attempted to identify a slip rate, time of initiation, and rates of uplift through stratigraphic correlation and structural restoration. Uplift of the Santa Susana Mountains was estimated to be at 2.3-0.7 Ma. A 1993 study determined this by examining the Saugus Formation through paleomagnetism to determine the deposition age and examination of macroscopic clast assemblages throughout the formation to determine provenance. However, no modern geochronology has been applied to determine the provenance of the Saugus.

U-Pb detrital zircon geochronology will be used to identify temporal trends in sediment contribution from approximately six distinctive pre-activation provenance sources for the Saugus Formation. It is expected that the changing detrital zircon spectra upsection recorded changes in the sediment sources as regional structures and topography evolved. By examining the provenance trends of the Saugus Formation, this study will attempt to corroborate the previous uplift date and provide more information on changes in structure and sedimentation that were occurring during uplift. This will provide a better understanding on the sediment dispersal trends in the western Transverse Ranges and the development of the structural features present in the region.

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