

A left-lateral tear fault connects the N-dipping San Cayetano and Red Mountain faults across a ~10 km left step. The top lower Pico map indicate that this Ventura River tear fault also affects the footwall of this fault system, and forms an important boundary for the geometry of the S-dipping, N-directed thrust faults, the Padre Juan-Javon Canyon (Fig. 4). East of our proposed tear fault, the N-directed faults become blind below the top lower Pico, the S-directed Taylor thrusts appear, and there is a significant right bend in the fold axis of the Ventura Avenue-Rincon anticline. The change in fault geometry is very abrupt, between 2 cross sections spaced 1.2 km apart in Grigsby (1986). Our interpretation that this NE-SW fault affects the footwall of the Red Mountain fault supports it forming an important boundary to earthquake ruptures. The Rincon anticline trend continues offshore to the south of Santa Barbara. The structure changes in orientation and style across several NE-SW trending cross faults. In particular, the structure of the syncline north of the Rincon Anticline changes abruptly across the Fernald Point fault. The 0.9 km left-lateral displacement across the fault is mostly absorbed in the steepening flanks of the syncline on the west side of the fault.

## CONCLUSIONS

Structure-contour maps of a ~1 Ma horizon were completed, digitized, imaged, and restored to an initial horizontal state over part of onshore and offshore Ventura basin and the structural shelf to then south. A map of the ~1.8 Ma top lower Pico Formation was mostly completed, and will be visualized and restored in a renewal of this project. Vertical motions due to faulting and folding across the Oak Ridge fault east of Santa Paula increased from 2 mm/yr between 1.8 and 1.0 Ma to 4.5 mm/yr in the last million years. Post-1 Ma and post-~200 ka vertical motions have been about 2 mm/yr at the west edge of our restoration, south of Santa Barbara. Post-1 Ma and inferred Holocene vertical motions have been about 1 mm/yr a few kilometers west of the coastline. Horizontal motions since 1 Ma include linked left-lateral strike-slip and shortening. The subvertical coastal segment between Santa Paula and Ventura is predominantly left-lateral strike slip with some footwall folding. For restoration of the published structure-contour map, left slip is 1.5 mm/yr. Modification of this map by addition of a tear fault across Ventura basin at Santa Paula allows the published left slip of 3.5 mm/yr to be used, in which case more than 2 mm/yr of left slip continues to the west edge of our restored area near 119° 45' W. Abrupt changes in fold vergence and trend suggests left-lateral tear faults at Santa Paula and along the Ventura River.

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