

**SOUTHERN SAN GREGORIO FAULT DISPLACEMENT:
STEPOVER SEGMENTATION VS. THROUGH-GOING TECTONICS**

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ABSTRACT

An important outstanding problem is the southern extent of the San Gregorio fault zone (SGFZ) and its postulated continuity with the Hosgri fault zone to the south. Whereas Graham and Dickinson (1978) postulated that the SGFZ is continuous with the Hosgri fault zone, Greene and others (1973) suggested that the main SGFZ turns inland south of Monterey Bay to join the Palo Colorado fault in the northern Santa Lucia Range.

We identified a zone of late Quaternary faulting north of Point Sur that is as much 2 km wide and trends N. 40–50° W. The two most important faults within this zone are the Garrapata fault, which offsets Holocene colluvium; and the Rocky Creek fault, which offsets and deforms marine terrace deposits.

The Garrapata fault strikes N. 55°W., intersecting the coast in a 55-m-wide shear zone, and vertically offsets the lowest marine terrace by 1.7 m. Offshore, a 150-m-wide gap in the kelp aligns with this zone; and onshore features suggesting active faulting include aligned drainage offsets, ridge saddles, and springs. A weak air photo lineament trends N. 52° W. across this terrace, and the shoreline angle appears right-laterally offset as much as 122 m. Along this trend, the Garrapata fault juxtaposes granitic rock and colluvium along a near-vertical shear zone and juxtaposes two different Holocene colluvial deposits with radiocarbon ages of $1,200 \pm 60$ and $9,750 \pm 60$ ybp.

The Rocky Creek fault offsets and deforms a marine terrace deposit at an elevation of 110 m above sea level. This fault offsets Bixby Creek approximately 1.4 km in a right-lateral sense and continues to the south along the linear canyon of Sierra Creek.

Preliminary calculations of slip rates suggest that most displacement is horizontal with an estimated rate of 3 mm/yr on the Garrapata/Palo Colorado fault and an estimated rate of 1.3 mm/yr on the Rocky Creek fault. The average vertical component of slip ranges from 0.03 mm/yr (Garrapata/Palo Colorado fault) to 0.22 mm/yr (Rocky Creek fault). Vertical uplift is ongoing and affects stream sinuosity and gradient on coastal streams between these two fault zones.

Although the continuity of these faults with offshore segments of the San Gregorio fault is still to be confirmed, our results to date strongly suggest that at least some of the dextral shear of the offshore SGF is distributed to an echelon intra-Salinian fault segments of the northern Santa Lucia Range.