

## **IMPLICATIONS OF CUMULATIVE OFFSETS ALONG THE SAN GREGORIO-HOSGRI FAULT, CALIFORNIA: WHY THE SANTA MARIA BASIN MATTERS**

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Cumulative offsets on the San Gregorio-Hosgri fault derived from analysis of modern aeromagnetic surveys may help resolve the wide range in published offset estimates, but also indicate that the Santa Maria Basin may hold the key to understanding how transrotation of the Western Transverse Ranges is kinematically linked to right-lateral slip on strike-slip faults in the central Coast Ranges. Linear ophiolitic belts that have been cut by the San Gregorio-Hosgri fault produce offset magnetic anomalies that suggest southward-decreasing apparent right-lateral displacements, consistent with the pattern of published southward-decreasing Quaternary slip rates. The southward decrease in apparent offset along the San Gregorio-Hosgri fault requires balancing offsets onto other faults or structures. The 23 km difference in offset between Cape San Martin (148 km) and Pt. Buchon (122 km) could be balanced by 23 km right-lateral slip on the Oceanic-West Huasna fault, which offsets gravity and magnetic anomalies associated with the southeast end of the Pismo syncline (and its underlying ophiolitic basement) by as much as 33 km. The 10-km discrepancy could be taken up in part by minor faulting along the Southwest Boundary fault zone, south of Point Buchon, where marine and helicopter magnetic data suggest 1-2 km of apparent right-lateral offset in places. However, magnetic data do not readily support continuation of the Hosgri fault south of Pt. Arguello and the edges of an elongate gravity low that curves around Pt. Arguello from the Santa Barbara channel into the offshore Santa Maria basin also do not appear to be offset by a southward continuation of the Hosgri fault. Thus, the largest change in offset along the San Gregorio-Hosgri fault is located along the southern part of the fault, given magnetic and geologic evidence for about 90 km of displacement of the Pt. Sal ophiolite (north to San Simeon) and evidence for little or no displacement south of Pt. Arguello. Crustal shortening across the southwestern Santa Maria basin as the sole mechanism to accommodate 90 km of apparent right-lateral offset is unlikely (see Graymer et al., this session). A possible solution is to transfer significant right-lateral displacement onto a proto-Hosgri fault just south of Pt. Sal prior to 5-6 Ma, yet this remains to be tested.