



## Transverse Ranges Geomorphic Province



The **Transverse Ranges** are a complex series of east-west trending mountain ranges and valleys that strongly contrast with the northwest trend of the adjacent Coast Ranges and Peninsular Ranges. The section of Cenozoic sedimentary rocks within this province is one of the thickest in the world and regional structural trends are significant in the formation of important oil field structures.

The western limit of the province contains the islands of San Miguel, Santa Rosa, and Santa Cruz. The eastern limit extends into the Mojave Desert, and includes the San Bernardino Mountains to the east of the San Andreas Fault. Within the Transverse Ranges, the San Bernardino and San Gabriel Mountains contain some of the highest peaks in southern California, ranging from 10,000 to over 11,500 feet above sea level.

### **Tectonic Setting**

The Transverse Ranges are caught in a geological vise that has been squeezing them for the past 20 million years, from south to north producing high amplitude compressed folds and faults. The troughs of the folds became deep marine basins

and the peaks are expressed as the ranges. The exceptionally thick sediments were at first rapidly deposited into the deep marine basins, then with continued compression were pressed up into the ranges. Tectonic models suggest that the Ranges rotated nearly 100 degrees clockwise due to plate tectonic movements.

The Transverse Ranges are bisected by the San Andreas Fault system representing a complex section of the tectonic plate boundary. This compression is thought to result from what is called the “Big Bend” in the San Andreas Fault. Overall, the trend of the San Andreas is north by northwest but in this section it bends counterclockwise, that is more northwest. In simple terms, the lands northeast of the boundary are riding on the North American plate with its northwest heading. The lands southwest of the boundary are riding on the more northerly drifting Pacific plate which is pushing into the North American plate.

### **GeoGems**

**Hungry Valley State Vehicular Recreation Area, Gaviota State Park, and Malibu Creek State Park** are the GeoGems that represent the Transverse Ranges. Between five and 20 million years ago, the sedimentary rocks at Gaviota and Hungry Valley and the volcanic rocks at Malibu Creek were deposited in oceanic basins that have been so compressed into folds and faults that they became part of the mountains. Hungry Valley lies along the San Andreas Fault at a point where the Coast Ranges, the Transverse Ranges, and the Sierra Nevada all merge near the boundary of the Mojave Desert geomorphic province.

*Written by Mike Fuller and others, California Geological Survey  
Photo: Pam Irvine*

## Simplified Geologic Map | Transverse Ranges Geomorphic Province



