



Southern Coastline Geomorphic Sub-Province



Photo: Pam Irvine

Essentially, the coastline itself qualifies as a distinct geomorphic province evenly divided between north and south. Because the coastline is 1,100 miles long, the climate and water temperatures in the south are more mild than in the north. The flora and fauna vary accordingly. The California coastline is another dynamic boundary zone, of varying width, where geologic forces collide. Coastal landforms include beaches, dunes, tide pools, estuaries, lagoons, steep cliffs, marine terraces, and sea stacks.

The coastline can be subdivided into two sections. The northern section runs the length of the Coast Ranges province; the southern runs along the western edge of the provinces of the Transverse Ranges and the Peninsular Ranges. Along the southern section, the coastal geomorphology is superimposed on the landforms of the Transverse Ranges and Peninsular Ranges geomorphic provinces. The southern coastline trends northwestwardly from San Diego to Point Conception. Due to the orientation, the southern shores are somewhat sheltered from storms that arrive from the west and northwest. A broad continental shelf lies along the southern section. The shallow offshore shelf helps absorb wave energy by causing waves to break further from shore. Sand deposition started roughly 10,000 years ago and is relatively widespread along the southern coast, creating the state's popular beaches.



Photo: Mike Fuller

The position of the shoreline is directly related to sea level and land elevation, both of which are variable through time. Sea level was as much as 400 feet lower during the last Ice Age because so much water was trapped as ice on the glaciers that covered northern and southern latitudes. During this time the shoreline position was as much as several miles west of its current location extending toward the Channel Islands. During the Ice Ages, major rivers cut deep canyons into the continental shelf, creating submarine canyons. During the last interglacial, sea level was approximately 15 to 20 feet higher and coastal wetlands and estuaries were correspondingly much more extensive than they are today.

Tectonic Setting

Portions of the coast have been uplifted due to tectonic forces, while others have subsided. The interplay of uplift and sea level fluctuations produced numerous marine terraces all along the coast. The highest terraces can extend several miles inland to what was once the shoreline. Subsidence along with sea level rise since the end of the last Ice Age has drowned river mouths. This moved the shoreline inland. Such a dynamic setting have produced a long list of landscapes and features including: accreted terranes, marine terraces, islands, sea stacks, dunes, beaches, and concretions.

GeoGems

Three GeoGems that lie along the southern coast are **Gaviota State Park**, **San Onofre State Beach**, and **Torrey Pines State Natural Reserve**. However, for our purposes, Gaviota State Park has been selected as a representative of the Transverse Ranges geomorphic province.

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Simplified Geologic Map | Southern Coastline Sub-Province



