The park is located in the Simi Hills, which are a unit of the Transverse Mountain ranges of southern California. This mountain range is the result of tectonic interactions between the North American and Pacific Plates. The portion of the park that is south of Bell Canyon is generally comprised of Miocene sedimentary deposits of the Modelo Formation which date back between 5 and 24 million years ago. The northwestern portion of the park in the upper Las Virgenes Creek valley is comprised of late Cretaceous sedimentary deposits of the Chico Formation, dating back up to 145 million years ago.