

THE EARLY CRETACEOUS SANTIAGO PEAK ARC: A CONTINENTAL MARGIN ARC BUILT ON THE NORTH AMERICAN TRIASSIC-JURASSIC ACCRETIONARY PRISM OF SOUTHERN AND BAJA CALIFORNIA

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The Mesozoic tectonic evolution of the laterally-zoned Peninsular Ranges batholith of southern and Baja California remains a poorly resolved issue in Cordilleran geology, in part due to the lack of detailed structural studies on this system. As a result tectonic reconstructions are based primarily on geochemical and stratigraphic data sets. While these data identify the primitive-mafic western zone plutons and volcanics juxtaposed across a narrow transition zone with the evolved-felsic eastern zone plutons and quartz-rich strata, they do not identify the structures attending this transition.

This study characterizing structures developed within the L Triassic-Jurassic turbidite sequences present within the northern part of the transition zone, the Early Cretaceous Santiago Peak Volcanics (SPV) of the western zone, and the contacts between these two units. We have focused our study of these strata on the Santa Ana Mtns., R. Santa Fe, CA, and R. Vallecitos (northern Baja California, MX). In each study area, metapelites of the turbidites possess a moderate bedding parallel foliation, while the sandstones define meter-scale, tight to isoclinal folds with boudinaged limbs. This deformation, combined with a North American provenance for the sediments, small serpentinite bodies along faults within the turbidites, numerous olistoliths, and an overall westward-younging, is consistent with the tectonic setting of a west-facing accretionary prism.

In contrast, deformation within the SPV, the eruptive products of western zone plutons which yield island arc-like chemistries, is typically limited to gentle to moderate tilting without pervasive cleavage development. The Vallecitos area is an exception with both groups of strata exhibiting moderate foliations and steep tilts due to proximity to large plutons.

Observations of the contact between the turbidites and volcanics are consistent with a depositional unconformity. These include a conglomerate with turbidite-derived sandstone clasts locally present along the contact, the lack of identifiable strain from shear across the contact, and intrusive bodies that can be traced from the turbidites, across the contact, and into the flows of the SPV. We thus interpret the Santiago Peak arc as having developed in situ, through and atop the older accretionary prism.