

Tectonic Implications for Along-Strike Variations in the Character of the Mesozoic Peninsular Ranges Batholith of Southern and Baja California

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The Mesozoic Peninsular Ranges batholith (PRb) of southern and Baja California exhibits several along-strike variations that are most pronounced across the Agua Blanca fault (ABF). The Santiago Peak arc segment (SPas) north of the fault is characterized by Cretaceous subarially-deposited metavolcanics with an average composition of dacite in depositional unconformity with continentally-derived metasediments of a Jurassic accretionary prism. Both volcanics and plutonics from the SPas contain inherited zircon of continental derivation. Deformation within this arc segment includes gentle to open folds and brittle faults that trend parallel to the PRb axis. These structures are truncated at high angles by the ABF without deflection.

The Alisitos arc segment (Aas) is characterized by subaqueously-deposited metavolcanics, with an average andesite composition, in thrust contact only with continentally-derived material. Neither volcanics nor plutonics analyzed from the Aas contain inherited zircons. Deformation within the arc segment is defined by a broad fold and thrust belt that parallels and increases in intensity towards the eastern boundary. The fold and thrust belt trend rotates as much as 35° into parallelism with the ABF at the northern end of the Aas.

We propose that these observations imply that the two segments of the western zone currently juxtaposed along the ABF did not share a common history prior to the late Early Cretaceous. The Santiago Peak arc segment north of the fault developed on oceanic lithosphere juxtaposed with the continental margin prior to and during arc magmatism. Conversely, the Alisitos arc segment developed on oceanic lithosphere exotic to North America prior to accretion in the late Early Cretaceous. If this model is correct it implies that the ABF initiated as a transpressional continuation of the suture joining the latter arc segment to the continent and that a portion of the forearc that existed between them was subducted.