

68-6 - LATE CRETACEOUS INTRA-ARC TRANSPRESSION AND THRUSTING IN THE SOUTHERN CALIFORNIA BATHOLITH



Sunday, 15 October 2023



3:00 PM - 3:15 PM



326 (3, David L Lawrence Convention Center)

Abstract

The Late Cretaceous arc flare-up event from 90 to 70 in the Transverse Ranges of the Southern California Batholith was temporally and spatially associated with the development of a large contractional shear system that includes discontinuous segments of the Tumamait shear zone (Mt. Pinos), the Alamo Mountain-Piru Creek shear zone, the Black Belt shear zone (Cucamonga terrane), and the Eastern Peninsular Ranges shear zone. The age and kinematics of these shear zones inform the tectonic setting of the continental arc in Southern California during the beginning of the Laramide orogeny and during postulated large-magnitude dextral translations along the margin (the Baja-BC hypothesis).

The Mt. Pinos sector of the Southern California Batholith preserves the intra-arc, transpressional Tumamait shear zone and the ductile-to-brittle Sawmill thrust, both of which record Late Cretaceous deformation. The batholith and shear zone are hosted by Mesoproterozoic biotite gneisses and migmatites (1750-1760 Ma), Neoproterozoic biotite granites (660 Ma), Permo-Triassic granitic gneisses and amphibolite (260-250 Ma), and Late Jurassic granites and gneisses (160-140 Ma). Late Cretaceous rocks are variably deformed and include porphyritic granodiorite gneisses and peraluminous granites emplaced at 86 to 70 Ma. Mylonites of the Tumamait shear zone affect all rocks in the area and generally strike NW-SE and dip moderately to the NE and SW. Mineral stretching lineations plunge shallowly to the SE. Mylonitic fabrics are folded into a regional, SE-plunging synform that results in alternating bands of sinistral and dextral shear fabrics. Syn-kinematic titanites from 5 mylonitic samples give a 720-700°C temperature range, and lower-intercept $^{206}\text{Pb}/^{238}\text{U}$ dates of 77.0 Ma, 76.8 Ma, 75.1 Ma, 74.2 Ma, and 74.0 Ma. Subsequent folding of the mylonite is linked to N-directed motion on the Sawmill thrust. ^{40}Ar - ^{39}Ar thermochronology ages of 67-66 Ma and onlapping Eocene shales indicate Latest Cretaceous activity on the thrust, prior to Eocene arc collapse. Based on the age of the Tumamait shear zone, we speculate that it is related to sinistral deformation observed in the nearby Alamo Mountain-Piru Creek and the Black Belt shear zones. We attribute the younger Sawmill thrust to collision of the Hess oceanic plateau with the Southern California Batholith after 70 Ma.

Geological Society of America Abstracts with Programs. Vol. 55, No. 6, 2023
doi: 10.1130/abs/2023AM-394372

© Copyright 2023 The Geological Society of America (GSA), all rights reserved.

Author



Joshua Schwartz

California State University at Northridge

Authors



Elena Miranda

California State University Northridge



Keith Klepeis

University of Vermont



Gabriela Mora-Klepeis

University of Vermont

Presentation File(s)

Subscriber Login

Please log in to have access to the presentations and/or handout files.

Last Name:

Subscription ID:

Login

[Forgot ID/Help](#)

View Related
