

## GSA Connects 2022 meeting in Denver, Colorado

Paper No. 246-5

Presentation Time: 9:00 AM-1:00 PM

### CONSTRAINING THE TIMING AND CONDITIONS OF MAGMATISM AND GRANULITE- TO UPPER AMPHIBOLITE-FACIES METAMORPHISM IN THE LOWER CRUST OF THE SOUTHERN CALIFORNIA BATHOLITH USING U-PB ZIRCON GEOCHRONOLOGY AND TI-IN-ZIRCON THERMOMETRY

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The Southern California batholith contains a geologic record that can help clarify the timing of events that occurred during the Late Cretaceous (100-65 Ma) along the western margin of the North American Cordillera. The subduction of the oceanic conjugate Shatsky plateau beneath North America is postulated to have ended active magmatism in the arc at 88-70 Ma; however, the timing of this event is poorly constrained in Southern California. We use U-Pb laser ablation zircon petrochronology to document the timing and conditions of magmatism and metamorphism in the lower crust of the Cretaceous arc. We focus on the Cucamonga terrane in a part of the Southern California batholith located northeast of Los Angeles in the southeastern San Gabriel Mountains. These rocks contain exhumed lower crustal (7-9 kbar) rocks predominantly composed of granulite-facies metasedimentary rocks, migmatites, charnockite and dioritic to tonalitic gneiss.

We report 20 new zircon dates from 11 samples, including 4 mafic biotite gneisses, 3 mylonitic tonalites, 2 charnockites, a quartzite, and a felsic pegmatite dike crosscutting granulite-facies metasedimentary rocks. New <sup>206</sup>Pb/<sup>238</sup>U ages show that magmatism occurred in the Middle Jurassic (ca. 172-166 Ma), the Early Cretaceous (ca. 120-118 Ma), and the Late Cretaceous (88-86 Ma) at temperatures ranging from 740 to 800 °C. Granulite-facies metamorphism and partial melting of these rocks occurred during the 88-74 Ma interval at temperatures ranging from 730°C to 800°C. Our data indicate that high-temperature arc magmatism and granulite-facies metamorphism continued through the Late Cretaceous and overlapped in timing with postulated subduction of the conjugate Shatsky plateau from previous models. We speculate that termination of arc activity and cooling of the lower crust in response to plateau subduction must postdate ca. 74 Ma.

Session No. 246--Booth# 154

[T29. Structural Analysis of Polyphase Deformation from Orogen to Thin Section \(Posters\): A Special Session in Honor of Sharon Mosher](#)

Wednesday, 12 October 2022: 9:00 AM-1:00 PM

Exhibit Hall F (Colorado Convention Center)

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