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ABSTRACT

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GEOCHEMICAL EVIDENCE FOR INCREMENTAL EMPLACEMENT OF PALMS PLUTON, SOUTHERN CALIFORNIA

The objectives of this study are, generally, to analyze and understand internal processes that produce melts in an oceanic-continental subduction setting; and, specifically, to understand the assembly of a Cretaceous magmatic arc pluton (Palms pluton), including the timing of melt emplacement(s) and melt evolution from the source. SiO_2 concentrations vary from ~ 69-76 % by weight. Whole rock trace element concentrations vary up to 7 times. Zircon analysis shows a minimum age difference in the pluton of 3 my, if considering the uncertainties of the oldest and youngest samples. According to the model made from the HEAT program, this is approximately six times longer than the estimated crystallization time of one batch of melt with the same physical properties as the Palms pluton. Two distinct sources, perceived from chemical analysis of premagmatic zircons, are found throughout the pluton. REE compositional patterns show a hybridization of Proterozoic and Mesozoic sources in some, but not all, Palms pluton granites. This data suggests that the pluton formed from multiple intrusions and the Proterozoic source remained relatively consistent throughout the pluton's assembly with few additions of younger Mesozoic source material.

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