

CRETACEOUS SAN MARCOS DIKE SWARM OF NORTHERN BAJA CALIFORNIA AND ITS RELATIONSHIP TO THE SANTIAGO PEAK VOLCANICS

Phil FARQUHARSON, CG-Squared Productions and David L. KIMBROUGH,
Department of Geological Sciences, San Diego State University

ABSTRACT

The San Marcos Dike Swarm (SMDS) is a densely-intruded, north-northwest-striking, predominantly silicic regional dike swarm that is exposed over an approximately 100 km-long segment in the west-central portion of the Cretaceous Peninsular Ranges batholith (PRB) in northern Baja California. Dikes range mostly from 1 to 8 meters in thickness and individual dikes outcrop continuously for up to 4 km along strike. Reconnaissance whole rock analyses suggest medium-K calc-alkaline affinities typical of orogenic plate settings. Dike compositions range from basalt to rhyolite and are locally strongly bimodal. Rhyolites are a ubiquitous feature of the swarm and are similar in composition to high-silica rhyolite in the Basin & Range province.

Cross-cutting field relationships and a U-Pb zircon age of 120 ± 1 Ma clearly establish the swarm as an integral feature in the magmatic evolution of the PRB. The SMDS crops out adjacent to an extensive belt of Santiago Peak Volcanics (SPV) which has been previously interpreted as the supracrustal volcanic cover of the western PRB. The similarity in composition and age of the SMDS and the SPV suggests that the dike swarm fed the SPV.

The dike swarm provides a strain marker for PRB deformation history. Reconnaissance data on dike attitudes from widely separated areas of the dike swarm suggest a regionally consistent $N30^{\circ}W$ strike and $75^{\circ}NE$ dip. The dike attitudes are consistent with a common westward tilt of 15° about the $N30^{\circ}W$ longitudinal axis of the PRB. The SMDS may present the first clear structural evidence in support of hypothesized regional tilting, hence allowing for the mechanics and timing of this process to be understood.

