

BIMODAL DIKES IN THE CORE OF THE PENINSULAR RANGES BATHOLITH: THE SOUTHERN CONTINUATION OF THE SAN MARCOS DIKE SWARM

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The San Marcos Dike Swarm (SMDS) is over 100 km long, consists of hundreds of dikes, and is located in the west central region of the Peninsular Ranges Batholith from eastern San Diego County to the northern Sierra San Pedro Mártir (SSPM), in northern Baja California, Mexico. Previous work on the northern part of the swarm reveals an average strike and dip of 330°-75° NE, with individual dike thicknesses ranging from 1-8 m. Petrographic and geochemical data demonstrate a broad range dike compositions (basalt to rhyolite) with nearly half of all dikes plotting within the rhyolite field. U-Pb geochronology of a single dike in the northern portion of the swarm yields an age of 120 ± 1 Ma (Farquharson, 2004). A similar swarm, named the SSPM segment, to the south of the Agua Blanca fault in the northern SSPM appears to be the southern extension of the SMDS. Located ~30 km east-southeast of San Vicente and bound on the west by the Main Martir thrust, the dikes here have similar density of distribution, petrography and geochronology to the main body of the swarm to the north.

Over 160 separate dikes are exposed in the SSPM segment. Dike widths range from 0.8 to 10m with an average strike and dip of 291°-66° NE. Petrographic and geochemical data revealed that these dikes are generally bimodal but dominated by dacite-rhyolite compositions. The dikes are randomly distributed, with respect to composition, throughout this segment of the swarm. U-Pb geochronology completed on zircons separated from a dacitic dike yields an age of 129.2 ± 1.9 Ma. Unlike dikes in other portions of the swarm, those in the SSPM segment are characterized by relatively strong subsolidus fabrics associated with latest Early Cretaceous shear across the Main Mártir Thrust. Thus, the ~250 m of extension represented by the dikes in this segment is interpreted to be a minimum.

The SSPM segment shows a high degree of similarity to the main section of the SMDS in both local and regional settings. One significant variation, however, is that the orientation of the SSPM dikes are more westerly (~40°) than those in more northerly parts of the swarm. This might be explained by late-stage rotations and distortions resulting from shear along the Main Mártir Thrust or slip along the active Agua Blanca Fault to the north.

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