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Into the bowels of Hades: Investigating an Early Miocene tilted volcano in the Santa Monica Mountains

by

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ABSTRACT

The lower Miocene (Ar-Ar age: 16.3-17.1 Ma) Conejo Volcanics, exposed in and around the Santa Monica Mountains of southern California, offer a unique opportunity to study an exposed cross section of the interior of a volcano and its surrounding volcanic field. The volcanics extend east-west for 80 km from Griffith Park to the Oxnard Plain and north-south 35 km from Big Mountain to the Pacific Ocean. The thickness of the volcanics ranges from 0 m on the edge of the exposures to >9,000 m near the western end of the Santa Monica Mountains. Pillow lavas and incorporated oyster shells indicate a submarine origin for the base of the volcanic pile; spatter cones of bombs and lahar deposits containing petrified wood indicate subaerial accumulation by the end of the eruptive cycle. An isopach map of the volcanics shows that the volcanic field consisted of three separate cones. Fossil wood species in the lahars indicate an above-sea-level elevation of at least 1,500 m. After the volcanic cones became extinct, they were tilted northward during post-Miocene deformation of the Santa Monica Mountains and eroded so as to reveal the interior of the volcanic cones and lava field from the base against the underlying lower Miocene Topanga Canyon Formation to its top against the overlying middle Miocene Calabasas Formation. Interior details revealed include overlap of volcanic flows onto the subjacent sedimentary rocks during growth of the volcanic cones, a lava tunnel, breakup of the cones into large blocks during intrusion of feeder dikes and sills, and intrusion of a volcanic neck through the underlying Topanga Canyon Formation and into and through the volcanic rocks.

BIOGRAPHY

AB and PhD degrees in Geology from UCLA in 1958 and 1969.

Assistant Professor, Associate Professor, and Professor of Geology, California State University, Northridge, 1963-2000.

Leadership Award, Pacific Section, SEPM, 1979

Honorary Membership, Pacific Section, SEPM, 1982

Special Teaching Award, Pacific Section, AAPG, 1992

Distinguished Teaching Award, California State University, Northridge, 1997

George Lefevre Distinguished Faculty Research Award, Sigma Xi Chapter, California State University, Northridge, 1998

Lifetime Achievement Award, Pacific Section, SEPM, 2001

Volunteer Service Award, California State University, Northridge, 2004

Grover E. Murray Memorial Distinguished Educator Award, AAPG, 2007