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ERUPTIVE HISTORY OF THE SUTTER BUTTES VOLCANO - REVIEW, UPDATE, AND TECTONIC CONSIDERATIONS

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The Sutter Buttes form an isolated volcano in California's Central Valley, 82 km NNW of Sacramento. The Buttes consist of a central core of numerous silicic to intermediate domes that intruded through and strongly deformed a surrounding ring of Cretaceous to Tertiary Great Valley sedimentary rocks (Williams and Curtis, 1977, Univ. of CA Pub., v.116). Flanking the volcano is a broad apron of pyroclastic and fluvial deposits. Volcanism began at the Sutter Buttes approximately 1.56 Ma ago. Preliminary magnetostratigraphic data indicate that the volcanism continued at least until the Jaramillo normal polarity subchron, about 0.9 Ma ago.

Relationship of the Sutter Buttes magma system to the southern Cascades or to the Sonoma-Clear Lake Volcanics has not been established. Intrusions appear to be isolated within a zone of intersecting crustal fractures, including the Willows fault, the axial Central Valley suture between oceanic and Sierran crust (Harwood and Helley, 1987 USGS Prof. Paper 1359), and a possible E-W striking fault that appears as a continuous ridge on the basement structural contour map of the area. Inception of volcanism at the Sutter Buttes was nearly synchronous with the opening of the asthenospheric window under this part of California. The northward progression of the northern edge of the asthenosphere-rooted thermal anomaly (Fig. 1, modified from Severinghaus and Atwater, 1990, GSA Memoir 176) may be responsible for Sutter Buttes magmatism, in a similar mode as the production of the Coast Range volcanism, described by Fox, et al (1985, GSA Bull., v.96).