

The Department of Earth & Environmental Sciences, CSU Fresno Association of Environmental and Engineering Geologists, and Associated Students Inc. presents:

There's gold in those hills! **Miocene volcanoes, hot springs, and** **mineral deposits in the Bodie Hills**

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The Middle to Late Miocene Bodie Hills volcanic field is a >700 km², long-lived (~9 Ma) but episodic eruptive center in the southern segment of the ancestral Cascades arc north of Mono Lake (California, U.S.). It consists of ~25 major eruptive units, including 4 trachyandesite stratovolcanoes emplaced along the margins of the field, and numerous, more centrally located silicic trachyandesite to rhyolite flow dome complexes. Bodie Hills volcanism was episodic with two peak periods of eruptive activity: an early period ca. 15.0–12.9 Ma that mostly formed trachyandesite stratovolcanoes and a later period between ca. 9.2 and 8.0 Ma dominated by large trachyandesite-dacite dome fields. A final period of small silicic dome emplacement occurred ca. 6 Ma. Compositions of Bodie Hills volcanic rocks vary continuously from ~50 to 78 wt% SiO₂, although rocks with <55 wt% SiO₂ are rare. They form a high-K calc-alkaline series with compositions typical of subduction-related continental margin arcs. The oldest eruptive units have the most mafic compositions, but volcanic rocks oscillated between mafic and intermediate to felsic compositions through time. Following a 2 Ma hiatus in volcanism, postsubduction rocks of the ca. 3.9–0.1 Ma, bimodal, high-K Aurora volcanic field erupted unconformably onto rocks of the Miocene Bodie Hills volcanic field. At the latitude of the Bodie Hills, subduction of the Farallon plate ended at ca. 10 Ma, evolving to a transform plate margin. However, volcanism in the region continued until 8 Ma without an apparent change in rock composition or style of eruption. Numerous hydrothermal systems were operative during Miocene volcanism in the Bodie Hills. Several large systems altered volcanoclastic rocks in areas as large as 30 km², but these altered rocks are mostly unmineralized. More structurally focused hydrothermal systems formed large epithermal Au-Ag vein deposits in the Bodie and Aurora mining districts. Economically important hydrothermal systems are temporally related to intermediate to silicic composition domes in geologic settings similar to other important Miocene epithermal Au-Ag deposits in the western Great Basin (e.g., Comstock Lode, Goldfield, and Tonopah).