

Contact metamorphism of the White Mountain Peak metavolcanic complex, eastern California

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ABSTRACT

The NNW-trending White-Inyo Range represents the eastern continuation of the Sierran volcanic-plutonic arc along the central California-Nevada state line. South of White Mountain Peak, the NE-trending, steeply SE-dipping Barcroft structural break transects the orogenic belt. This high-angle reverse fault downdropped deformed, weakly recrystallized, mid-Mesozoic, mildly alkaline, White Mountain Peak mafic and felsic metavolcanic flows, interlayered volcanogenic metasedimentary strata, and minor subvolcanic plugs against a folded Neoproterozoic-lower Paleozoic quartzite and carbonate metasedimentary section on the south. The Middle Jurassic Barcroft granodioritic pluton later intruded the Barcroft break; the Middle Jurassic Cottonwood, and Late Cretaceous McAfee Creek + Pellisier Flat granitoids also invaded the superjacent section on the NE. Heating of the White Mountain Peak metavolcanic complex by the Barcroft and nearby plutons caused a southeastward progressive increase in metamorphic grade, producing neoblastic biotite, epidote, and hornblende in mafic volcanic rocks + minor hypabyssal stocks, and biotite + epidote ± andalusite in felsic volcanic rocks + volcaniclastic strata. Gradual increases in biotite Ti and plagioclase An contents reflect this SE metamorphic zonation. Utilizing hornblende-actinolite, muscovite-celadonite, and biotite solid solutions, thermobarometry indicates lithostatic pressures of 2-3 kbar during recrystallization, with temperatures ranging from a background value of ~350 °C far from the Barcroft pluton, to >500 °C along the intrusive contact. Physical conditions were similar to those developed in the Neoproterozoic-lower Paleozoic platform strata directly south of the Barcroft granodiorite. The region constitutes a typical example of the *P-T* evolution of the late Mesozoic Californian crustal margin, where episodic magma emplacement caused widespread contact metamorphism.