

ABSTRACT

ANCESTRAL CASCADE ARC VOLCANISM IN THE NORTH-CENTRAL SIERRA NEVADA, CALIFORNIA

Volcanic rocks cover a large part of the northern and central Sierra Nevada, but our understanding of the relative activity and evolution of these rocks is limited. Volcanic activity in this region may be linked to the events like northward migration of the Mendocino Triple Junction (MTJ), Basin and Range extension volcanism, high-K Pliocene volcanism, ancestral Cascade arc volcanism, and Coast Range volcanism. Rocks from Central Sierra Nevada (CSN) may also have gone through the phase from subduction to strike slip related volcanism. This study includes volcanic rocks that were derived from Sonora Pass, Carson Pass, and the Little Walker Caldera, California. We tested the temporal and spatial evolution of CSN volcanic rocks through geochemical analyses, using fractional crystallization and assimilation-fractional crystallization models and trace elements discrimination diagrams. CSN rocks between ~15 to 6 Ma clearly shows arc like signature. In particular the rocks from CSN and Cascade have similar geochemistry with high Ba/La, La/Nb, Ba/Nb ratios. Also alkali-silica diagram and ternary variation diagram show overlap of CSN and Cascades. There is no temporal change in major and trace element patterns of CSN rocks between ~15 to 6 Ma as might have been expected due to the passage of the MTJ.

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