GEOLOGIC AND GEOCHRONOLOGIC CONSTRAINTS ON THE MOJAVE-SNOW LAKE FAULT FROM METAMORPHIC PENDANTS IN THE CENTRAL SIERRA NEVADA, CALIFORNIA

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The Mojave-Snow Lake fault (MSLF) is a hypothesized fault that accommodated up to 200-400 km of dextral strike slip displacement in the Cretaceous, bringing Precambrian-Paleozoic miogeoclinal rocks from the western Mojave Desert to the central Sierra Nevada batholith. Studies using structural, stratigraphic, geochemical, and detrital zircon age data have focused on tying some metasedimentary pendants of the Snow Lake block to miogeoclinal rocks in the San Bernardino Mountains. Our studies are focused on finding direct evidence for the trace of the MSLF in a ~10 km NW-SE striking corridor near the Tuolumne batholith (TB) that is now occupied by Mesozoic metavolcanic rocks separating metasedimentary pendants of miogeoclinal affinity from eugeoclinal pendants of the eastern and western metamorphic belts. U/Pb zircon geochronology on both pendant and metavolcanic strata constrain the age and average slip rate along the MSLF.

Mapping in the Cinko Lake region north of the TB, where metasediments and metavolcanics are juxtaposed, resulted in no evidence for a MSLF, but LA-ICPMS ages of detrital zircons in the Cinko Lake metasedimentary pendant, which represents an overlap sequence on the miogeoclinal strata, yielded a minimum deposition age of 148 Ma ± 7.6 Ma. The metavolcanics to the east are 103-107 Ma old and are likely to have covered the MSLF trace. This provides a 41 m.y. time window for MSLF activity and an average slip rate of ~ 1 cm/yr.

South of the TB, the Strawberry Mine metasedimentary pendant is the eastern-most pendant of potential miogeoclinal affinity. However, the only age constraint for this pendant is a poorly preserved Early Jurassic bivalve Inoceramus pseudomytiloides (Nokleberg, 1981). Our fieldwork in the area found no further fossils in the highly metamorphosed metasediments. The minimum deposition age of this pendant will be important to constraining the Strawberry Mine pendant as part of the Snow Lake block.

Our mapping in Virginia Canyon NE of the TB established the existence of both metasedimentary and juxtaposed metavolcanic units but with no surface expression for the MSLF trace. This pendant represents the eastern boundary of the potential MSLF trace corridor. U/Pb detrital zircon geochronology of alternating metasedimentary and metavolcanic beds will place additional constraints on the MSLF.