# ABSTRACT

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| **TITLE:** | A Study of Minette Lamprophyre Dikes in the Mount Wilson Quadrangle, Western San Juan Mountains, Colorado: Assessing a Possible Connection to the Navajo Volcanic Field |
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**ABSTRACT:** Swarms of middle Tertiary mafic dikes are exposed along the northern edge of the San Juan Basin in southwestern Colorado. The emplacement of mantle magmas that gave rise to these dikes was close in time and space to large-scale volcanic events in the adjacent San Juan Mountains. The dike swarms in the area reflect widespread incipient extension and invasion of mantle magmas that could have played an important role in regional magmatic events, but the history of these dikes is poorly documented and uncertain. Preliminary studies establish that middle Tertiary mafic intrusive rocks in the region vary from phlogophite-rich minette to pyroxene-rich gabbro. Some of these rocks were involved in the formation of diatreme centers at approximately 27 Ma on the northeastern edge of the Navajo volcanic field. A series of mafic dikes are hosted by Cretaceous to Tertiary plutonic and volcanic rocks near Mount Wilson. Prior descriptions of these rocks hinted that they are related to minette dikes in the Navajo volcanic field, but no detailed work had been conducted on these dikes to assess this possible relationship. In this investigation, detailed field and petrochemical studies were conducted to constrain the characteristics and signatures of these mafic dikes and attempt to place them within a regional context. Data collected in this study establish that mafic dikes in the Mt. Wilson area comprise two suites that have subtle differences in mineral compositions. Rocks from one of the suites were too altered to obtain geochemical data for, but the other suite has geochemical signatures similar to mafic rocks in the Navajo volcanic field. The dominant chemical signatures of mafic dike rocks in the northern San Juan Basin reveal similar alkaline-potassic and LREE-enriched affinities for parent-mantle melts. These trends are consistent with a melt source of metasomatized lithospheric mantle as proposed for magmas in the Oligocene Navajo volcanic field. A new Ar-Ar age determination indicates that the mafic dikes exposed in the study area were emplaced around 7 Ma which is roughly 20 million years later than dikes in the Navajo volcanic field. Taken collectively, the regional data suggest that the northern San Juan basin was a site of protracted (30 to 7 million years ago) mantle magmatism that probably played an important role in the creation of other regional magmatic events such as the San Juan volcanic field.