GEOLOGY, MINERAL RESOURCES, AND GEOARCHAEOLOGY OF THE MONTOYA BUTTE QUADRANGLE, INCLUDING THE OJO CALIENTE NO. 2 MINING DISTRICT, SOCORRO COUNTY, NEW MEXICO

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ABSTRACT

The Montoya Butte quadrangle is part of the Mogollon-Datil volcanic field in the Sierra Cuchillo and San Mateo Mountains. Calabaza Alamosa is the main drainage. The purposes of mapping the quadrangle were to 1) map and describe the structures controlling the mineral resources (including the boundaries of the Mogollon-Canyon caldera), 2) describe geologic processes that formed the landscape, 3) determine the mineral resource potential, 4) describe the geoarchaeology, 5) provide regional correlations of the rocks, and 6) provide the data required for studies of the surface and groundwater. Geologic mapping of the quadrangle was at a scale of approximately 1:12,000, using the USGS topographic map as a base as part of the NNMGS state geologic map and mineral resources programs. Outcrop mapping techniques were employed where the approximate extent of the outcrop of the lithology was more than a 200 m-wide, the center of which was used to identify units of the lithology that were removed and replaced to the present. Mapping showed that at least 3 separate geoarchaeological systems were present: 1) the oldest forming the volcanic-epithermal veins (~23-36 Ma), 2) the system forming the Apache Warm Springs Be deposit (~24-25 Ma), and 3) the current, modern system related to Ojo Caliente and other warm springs feeding Calabaza Alamosa. The mineral resource potential of the Apache Warm Springs Be deposit is low to moderate. But, additional exploration drilling could locate additional Be deposits. Any potential exploration or submerging mining would have to plan for environmental issues, especially the effects of mining on the warm and cold springs feeding the Calabaza Alamosa. Most Pueblo sites are found along the Montoya (Qm) and Victoria (Qv) stream terraces, downstream of the intersection of Kelly Canyon with Calabaza Alamosa. The Pueblo people utilized local obsidian and tuff, volcanic ash, and siltstone in the majority of their lithic artifacts (including stone tools, hammer stones, and projectile points) found at the Pueblo sites. Some of the lithic artifacts, including obsidian, chert, quartzite, and silicified wood, are not found in the immediate area and were imported into the canyon. Local clays were likely used in the production of common pottery, but some of the glazed pottery was made elsewhere and imported into the canyon.

LOCATION

Map of the Mogollon-Datil volcanic field showing known caldera color coded by age (from Chapter, 2008). The Taylor Creek Rhyolite is likely to have formed on a shield. Ages are in millions of years. The black hexagon is the approximate location of the Montoya Butte quadrangle.

GEOLGY

Volcanic rocks include an older sequence of andesite, latite, and latite (around 38-36 Ma) followed by a younger sequence of ash flows and rhyolite lavas (around 23-29 Ma) associated with the formation of the Mogollon Canyon (20.4 Ma) and Bear Trap Canyon (24.4 Ma) calderas in the San Mateo Mountains. Quaternary sedimentary rocks eroded from the San Mateo Mountains and Sierra Cuchillo filled the Montoya graben and formed a series of alluvial fans, pediments and stream terraces.

STRATIGRAPH


METHODS OF STUDY

• Compilation of published and unpublished data
• Areas of anomalous structural complexity, hydrothermal alteration, mineralization, and anomalous coloration were delineated, contoured, mapped, and sampled
• Evaluate the NURE data (McLemore, 2010a)
• Geologic mapping of the Montoya Butte quadrangle was at a scale of approximately 1:12,000
• Outcrop mapping techniques were employed in mapping where the approximate extent of the actual outcrop of the lithology was mapped in a darker color, the lighter color was used to identify areas of the same lithology that were covered and replaced to the present.

WATER RESOURCES

Detailed geologic map of the Montoya Butte quadrangle, Socorro County, New Mexico (QTS, R7W).

GEARCHEOLOGY

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