

Geologic Map of the Holt Mountain Quadrangle, Catron County, New Mexico

By
Jim Ratte, Scott Lynch, and Bill McIntosh

April, 2006

New Mexico Bureau of Geology and Mineral Resources
Open-file Digital Geologic Map OF-GM 120

Scale 1:24,000

This work was supported by the U.S. Geological Survey, National Cooperative Geologic Mapping Program (STATEMAP) under USGS Cooperative Agreement 06HQPA0003 and the New Mexico Bureau of Geology and Mineral Resources.



New Mexico Bureau of Geology and Mineral Resources
801 Leroy Place, Socorro, New Mexico, 87801-4796

The views and conclusions contained in this document are those of the author and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government or the State of New Mexico.

Geologic Map of the Holt Mountain Quadrangle
by
Jim Ratte ¹, Scott Lynch ², and Bill McIntosh ³.

¹ U.S. Geological Survey, Denver Federal Center M.S. 962, Denver, CO, 80225

² New Mexico Institute of Mining and Technology, 801 Leroy Place, Socorro, NM, 87801

³ New Mexico Bureau of Geology and Mineral Resources, 801 Leroy Place, Socorro, NM, 87801

The Holt Mountain quadrangle is critical to the interpretation of the volcanic history of the Mogollon Mountains caldera complex. It contains the most complete exposures of the Cooney Tuff, the oldest of the major caldera-forming ignimbrite sequences in the Mogollon Range at ~34 Ma. The Cooney Tuff consists of three mappable ash-flow tuff members that have an aggregate thickness on the order of 1000 meters, indicative of a volume sufficient to require major caldera-forming eruptions in Late Eocene time. These partially to densely welded ignimbrites are exposed intermittently along the approximately 30 mile (50km) southwestern front of the Mogollon Range, from the Mogollon mining district, north of the quadrangle, to the mouth of the Gila River canyon upstream from the town of Cliff (Ratté and Gaskill, 1975. Cooney Tuff outcrops in the Holt Mountain quadrangle are interpreted to be largely intracaldera deposits; the only known outflow Cooney Tuff being located in the Big Lue Mountains and Clifton 15 minute quadrangles toward the Arizona border to the west (Ratté and Brooks, 1995).

The caldera source for the Cooney Tuff, the proposed Mogollon caldera, is believed to have been centered beneath the Mogollon Range where its presence has been largely obscured by continued volcanism and the formation of the younger Gila Cliff Dwellings and Bursum calderas, 28 Ma. However, a possible segment of the structural wall of the Mogollon caldera is represented by a fault in the cliffs on the east side of Whitewater Canyon above the Catwalk Trail, fig--. This NNW trending fault extends into the Holt Mountain quadrangle about ½ mile east of the Whitewater Picnic Ground, but is cut off by a NE trending fault that presumably moves the proposed structural wall to the west, beneath the Gila conglomerate in the alluvial fans along the Mogollon range-front fault.

The eastern half of the Holt Mountain quadrangle consists largely of intrusive-extrusive rhyolite domes and flows, Fanny and Nabours Mountain rhyolites, which mark the ring-fracture zone of the Bursum caldera. The Bursum caldera collapsed in response to the eruption of the Bloodgood Canyon Tuff (not exposed in the Holt Mountain quadrangle) and was subsequently filled by the Apache Spring Tuff, which is exposed mainly on the resurgent dome of the caldera, along the crest of the Mogollon Range. However, Apache Spring Tuff also is exposed in the bottom of Whitewater Creek and along the Whitewater Pack Trail in the northeastern part of the Holt Mountain quadrangle, and in spectacular cliffs on both sides of Big Dry Creek in the southeastern corner of the quadrangle. There, much of the Apache Spring Tuff consists of crudely layered, intracaldera meso- and megabreccia from the caldera walls in a matrix of Apache Spring Tuff, fig- This caldera-fill is cut by a swarm of rhyolite dikes as much as tens of meters thick, which are best exposed in the east wall of the canyon of Big Dry Creek, fig-.

Mineralized rocks are present along the Mogollon Range front from the Mogollon mining district in the Mogollon quadrangle, north of the Holt Mountain quadrangle, to the Gila fluorspar district

at the mouth of the Gila River canyon above Cliff (Ratté and others, 1979). Silver, gold, and base metals (lead and copper) were mined at Mogollon, mainly before WW II. The mineralization there has been dated at about 17 Ma. Numerous prospects for both base and precious metals occur elsewhere in the Holt Mountain quadrangle (references), and fluorspar was mined in Little Whitewater Creek. The most important prospects in the quadrangle are a lead-zinc deposit at the Uncle John mine above the forks of Big Dry Creek, near the eastern edge of the quadrangle, and precious and base metal occurrences in the Wilcox mining district in the south-central part of the quadrangle, along the Mogollon range front, mainly from Holt Gulch to the Chipmunk Spring area. The alteration and mineralization in the Wilcox district appears to be related to the dacitic intrusion of Holt Gulch and the rhyolite of Wilcox Peak, which intrudes it. The dacite of Holt Gulch is pervasively propylitized and the rhyolite dikes and small plutons of the Wilcox Peak rhyolite and associated wall rocks (mainly dacite of Holt Gulch?) are altered to an argillic or advanced argillic stage over a large area. Dickite and alunite are common on hill 6881, west of Chipmunk Spring in Goat Corral Canyon, and the alunite has been dated at about 33Ma (Marvin, and others, 1987, entry 53, p.36). Most recently (1970's), major exploration for molybdenum had advanced to the drilling stage by a major mineral exploration company, but was curtailed by a worldwide glut in the supply of that metal.

References cited:

Marvin, R.F., Naeser, C.W., Bikerman, M., Mehnert, H.H., and Ratté, J.C., 1987, Isotopic ages of post-Paleocene igneous rocks within and bordering the Clifton 1° x 2° Quadrangle, Arizona-New Mexico: New Mexico Bureau of Mines and Mineral Resources Bulletin 118, p.63

Ratté, James C., and Gaskill, David L., 1975, Reconnaissance Geologic Map of the Gila Wilderness Study Area: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-886, scale 1:62,500

Ratté, James C. and Brooks, William E., 1995, Preliminary Geologic map of the Big Lue Mountains 15 Minute Quadrangle, Greenlee County Arizona and Catron and Grant Counties, New Mexico: U.S.G.S. Open File Report, OF 95-263, map scale 1: 48,000

Ratté, James C., David L. Gaskill, Gordon P. Eaton, and Donald L. Peterson, U.S. Geological Survey, and Ronald B. Stotelmeyer and Henry C. Meeves, U.S. Bureau of Mines, 1979, Mineral Resources of the Gila Primitive Area and Gila Wilderness, New Mexico, U.S Geological Survey Bulletin 1451, p.229