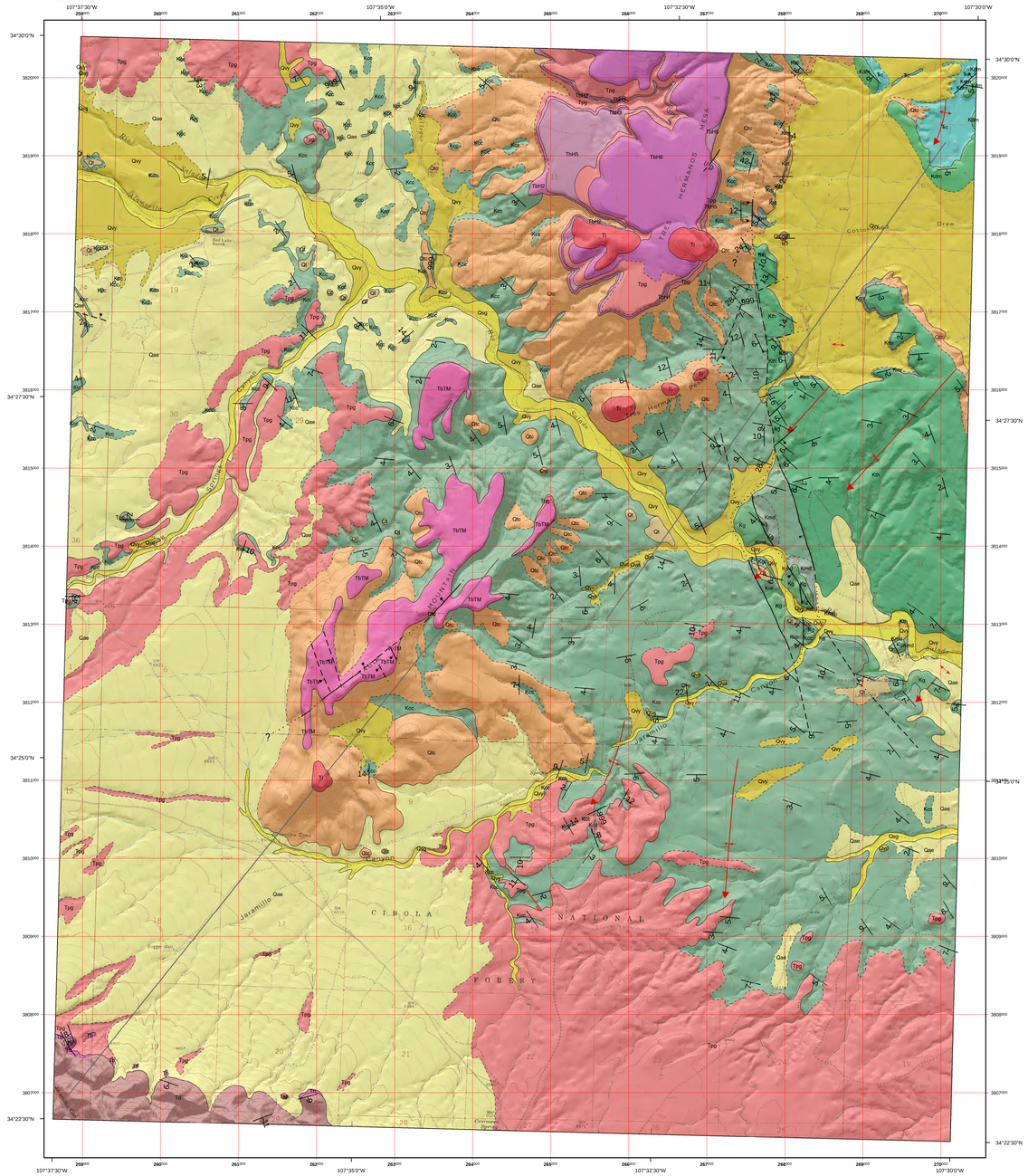
NMBGMR Open-file Geologic Map 172
Last Modified 19 May 2008



Base map from U.S. Geological Survey 1964, from photographs taken 1963, field checked in 1964.
1927 North American datum, UTM projection – zone 13N
1000-meter Universal Transverse Mercator grid, zone 13, shown in red

QUADRANGLE LOCATION

Magnetic Declination
May, 2008
9° 52' East
At Map Center

1:24,000

1 0.5 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0.5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

New Mexico Bureau of Geology and Mineral Resources
Open-file Geologic Map

OF-GM 172

Mapping of this quadrangle was funded by a matching-funds grant from the STATEMAP program of the National Cooperative Geologic Mapping Act, administered by the U. S. Geological Survey, and by the New Mexico Bureau of Geology and Mineral Resources, (Dr. Peter A. Scholle, *Director and State Geologist*, Dr. J. Michael Timmons, *Geologic Mapping Program Manager*).

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This and other STATEMAP quadrangles are (or soon will be) available for free download in both PDF and ArcGIS formats at:

http://geoinfo.nmt.edu/publications/maps/geologic/ofgm/home.html

This draft geologic map is preliminary and will undergo revision. It was produced from either scans of hand-drafted originals or from digitally drafted original maps and figures using a wide variety of software, and is currently in cartographic production. It is being distributed in this draft form as part of the bureau's Open-file map series (OFGM), due to high demand for current geologic map data in these areas where STATEMAP quadrangles are located, and it is the bureau's policy to disseminate geologic data to the public as soon as possible.

After this map has undergone scientific peer review, editing, and final cartographic production adhering to bureau map standards, it will be released in our Geologic Map (GM) series. This final version will receive a new GM number and will supercede this preliminary open-file geologic map.

DRAFT

Geologic map of the Table Mountain quadrangle, Socorro County, New Mexico.

May 2008

by
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COMMENTS TO MAP USERS

A geologic map displays information on the distribution, nature, orientation, and age relationships of rock and deposits and the occurrence of structural features. Geologic and fault contacts are irregular surfaces that form boundaries between different types or ages of units. Data depicted on this geologic quadrangle map may be based on any of the following: reconnaissance field geologic mapping, compilation of published and unpublished work, and photogeologic interpretation. Locations of contacts are not surveyed, but are plotted by interpretation of the position of a given contact onto a topographic base map; therefore, the accuracy of contact locations depends on the scale of mapping and the interpretation of the geologist(s). Any enlargement of this map could cause misunderstanding in the detail of mapping and may result in erroneous interpretations. Site-specific conditions should be verified by detailed surface mapping or subsurface exploration. Topographic and cultural changes associated with recent development may not be shown.

Cross sections are constructed based upon the interpretations of the author made from geologic mapping, and available geophysical, and subsurface (drillhole) data. Cross-sections should be used as an aid to understanding the general geologic framework of the map area, and not be the sole source of information for use in locating or designing wells, buildings, roads, or other man-made structures.

The map has not been reviewed according to New Mexico Bureau of Geology and Mineral Resources standards. The contents of the report and map should not be considered final and complete until reviewed and published by the New Mexico Bureau of Geology and Mineral Resources. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the State of New Mexico, or the U.S. Government.

DESCRIPTION OF MAP UNITS

CENOZOIC

Alluvial deposits (Pleistocene-Holocene)

Qsg Sand, gravel, and silt in modern ephemeral stream channels, 0-15 m thick.

Qtc Talus and colluvium, 0-10 m thick.

Qae Sand, silt, and gravel deposited on upland surfaces by fluvial and eolian processes.

Qvy Valley-fill sands, silts, and gravels near modern stream grade, 0-15 m thick.

Qvo Older valley-fill sands, silts, and gravels >2-3 m above modern stream grade, 0-10 m thick.

Qt Stream terrace sands, silts, and gravels related to the ancestral Rio Salado; 0-7 m thick.

Neogene volcanic deposits

Tb **Basaltic lava flows (Pliocene)** — subscripts correspond to flow units of Baldridge *et al*. (1987), in ascending stratigraphic order, except TM = Table Mountain; K-Ar dates from Baldridge *et al*. (1987); sample numbers correspond to analyses in Table 1.

Tb_{TM} **Alkali olivine basalt (Pliocene)** — light gray in color; phenocrysts of olivine; rare megacrysts of plagioclase, flow approximately 8 m thick; sample number 385; 3.7 ± 0.1 Ma.

Tb_{H6} **Basanite (Pliocene)** — probably a composite unit consisting of coalesced flows from several vents, phenocrysts of olivine; megacrysts of plagioclase and black augite; vesicular, platy parting, light gray in color with spotted appearance on weathered surfaces along eastern Tres Hermanos Mesa, xenoliths of pyroxenite and granulite are abundant; thickness ranges from 8 m along western edge of Tres Hermanos Mesa to 20 m along eastern edge, where it is separated from underlying flow (Tb_{H5}) by 2-4 m of basaltic ash and cinders and, locally, piedmont gravel (*Tpg*); along western Tres Hermanos Mesa this unit is separated from underlying unit (Tb_{H5}) by up to 24 m of piedmont gravels (*Tpg*); sample numbers 356 and 375.

Tb_{H5} **Basanite (Pliocene)** — possibly a composite unit consisting of coalesced flows from several vents, dark gray in color, with phenocrysts of olivine and plagioclase; ranges from dense to vesicular with platy parting; xenoliths of granulite and megacrysts of plagioclase and black augite are present along western edge of Tres Hermanos Mesa; flow is 6-7 m thick and overlies 2-3 m of scoriaceous rubble on southern end of Tres Hermanos Mesa; this unit overlies a thin (< 0.3 m) scoriaceous rubble zone and is separated from underlying flow (Tb_{H3}) by 5 m of basaltic ash, plagioclase megacrysts are common; sample numbers 355, 381, and 382; K-Ar age 4.0 ± 0.1 Ma.

Tb_{H4} **Basanite (Pliocene)** — Does not crop out in the Table Mountain quadrangle.

Tb_{H3} **Basanite with phenocrysts of olivine (Pliocene)** — flow up to 8 m thick, separated from underlying and overlying flows (Tb_{H2} and Tb_{H5}, respectively) by several meters of piedmont gravel (*Tpg*); sample number 384.

Tb_{H2} **Alkali olivine basalt with phenocrysts of olivine and plagioclase (Pliocene)** — xenoliths of granulite and clinopyroxenite are present, and megacrysts of plagioclase and black augite are abundant; vesicular, platy parting; much alteration material and secondary carbonate in vugs and vesicles; flow, up to 8 m thick, overlies <1-3 m of scoriaceous rubble and is separated from Tb_{H1} on southern Tres Hermanos Mesa by 2 m of fine grained brownish sediments (basaltic ash?); sample numbers 380 and 383.

TbH1 **Alkali olivine basalt with phenocrysts of olivine, megacrysts of plagioclase, and vesicular, platy parting (Pliocene)** — much alteration material and secondary carbonate in vugs and vesicles; flow is approximately 6 m thick and overlies up to 1 m of scoriaceous rubble; sample number 379.

Ti **Basaltic vents (Pliocene)** — cinder cones and/or subvolcanic plugs, and dikes; includes plugs of alkali olivine basalt that form Tres Hermanos Peaks (K-Ar age of southwestern peak is 4.3 ± 0.1 Ma.; sample number 417, Table 1) and basanite flow unit intercalated in cinder cone on southeastern Tres Hermanos Mesa (sample number 378, Table 1).

Neogene sedimentary and volcaniclastic deposits

Tpg **Piedmont gravels and sands (Miocene?-Pliocene)** — correlative to Santa Fe Group; volcaniclastic detritus derived from Gallinas Mountains (southern part of quadrangle) and from upthrown, western side of Red Lake fault system to west (northern part of quadrangle); pebble imbrications indicate easterly transport directions on west flank of Tres Hermanos Mesa (Fig. 1), underlies and intercalated with basalt flows Tb_{H2}, Tb_{H3}, and Tb_{H5} on Tres Hermanos Mesa; locally underlies Tb_{TM} near Table Mountain; moderately indurated to nonindurated; 0-60 m thick.

Paleogene sedimentary and volcaniclastic deposits

Td **Datil Group (middle Eocene-late Oligocene)** — volcaniclastic rocks of andesite-dacite composition consisting of fluvio-deltaic sandstone, conglomerate, and mudstone, and conglomeratic debris-flow deposits; clasts are light gray and contain abundant phenocrysts of plagioclase, amphibole, and titanomagnetite (± biotite, clinopyroxene); approximately 970 m thick.

Tb **Baca Formation (middle Eocene)** — red-bed sequence of sandstone mudstone, and minor conglomerate of fluvio-deltaic origin; upward-coarsening cycles 5-30 m thick characterize depositional sequences; unit is poorly exposed within quadrangle; estimated thickness 300 m.

MESOZOIC

Cretaceous

Kcc **Crevasse Canyon Formation of Mesaverde Group** — nonmarine sandstone, carbonaceous shale, and minor coal deposited in meandering river and floodplain environments, thickness approximately 650 m.

Kg **Gallup Sandstone of Mesaverde Group** — yellow gray sandstone comprising two upward-coarsening, stacked shore-zone sequences, prominent iron-carbonate cemented horizons common in mid-upper parts of shoreface sequences locally contain *Ophiomorpha* and *Lopha sannionis*; thickness approximately 25 m.

Kth **Tres Hermanos Formation** — continental and marine unit consisting of a basal regressive sandstone (Atarque Member, 4-5 m thick), a medial continental shale and sandstone sequence with thin coals (Carthage Member, approximately 60 m thick) and an upper, transgressive, shore-zone sandstone (Fite Ranch Member, 6-7 m thick); individual members not mapped.

Kmd **D-Cross Tongue of Mancos Shale** — gray to olive gray, slightly calcareous marine mudstone; locally contains concretions, some of which contain fossils (*Prionocyclus novimexicanus*, *Coilopoceralis inflatum*, *Lopha bellaplicata*); poorly exposed; estimated thickness 15-35 m.

Kmr **Rio Salado Tongue of Mancos Shale** — gray to light-brown calcareous marine mudstone with thin (1-2 cm) siltstone beds; *Pycnodonte newberryi* is abundant near base of unit; poorly exposed; estimated thickness 75 m.

Kml **Lower part of Mancos Shale** — medium to dark-gray marine shale; not exposed in quadrangle due to cover; estimated thickness in cross section approximately 90 m.

Kdt **Twowells Tongue of Dakota Sandstone** — light yellowish gray, very fine to fine grained marine sandstone; unit coarsens upward and is highly bioturbated; thickness 1-3 m.

Kdm **Main body of Dakota Sandstone** — light yellowish-gray to very pale reddish-gray, very fine to coarse sandstone; minor pebble-to-granule conglomerate and conglomeratic sandstone at or near base of formation; thickness approximately 8 m.

Triassic

TRc **Chinle Group** — continental red bed sequence of mudstone, minor sandstone, and pebbly sandstone, approximately 580 m thick.

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CORRELATION OF UNITS

Table Mountain Quadrangle

Qsg, Qvy, Qvo	Qtc	Qt	Pleistocene to Recent
unconformity			
Tpg	$Tb_{H1-H6, TM}$, Ti		Pliocene
			Miocene? to Pliocene
unconformity			
Td			middle Eocene-Oligocene
Tb			middle Eocene
unconformity			
Kcc, Kg, Kmd, Kth, Kmr			Upper Cretaceous

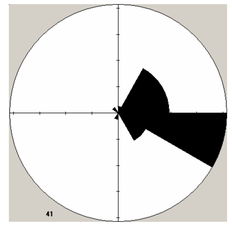

Figure 1. Paleocurrent measurements from pebble imbrications in unit Tpg on west flank of Tres Hermanos Mesa near northern boundary of quadrangle. n = 41.