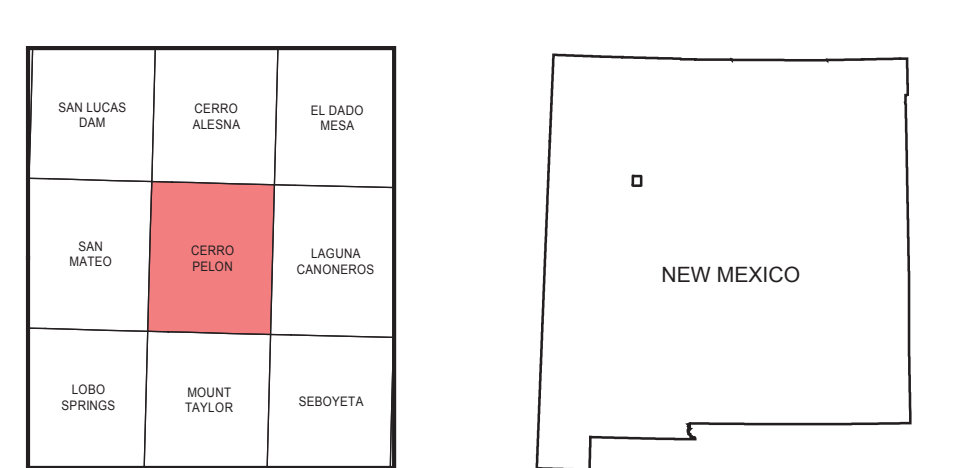


Base map from U.S. Geological Survey 1970; from photographs taken 1965. Field checked in 1970, revised in 1993.
1027 North American datum, UTM projection, zone 18N
100-foot contour interval. Topographic features are shown in blue.



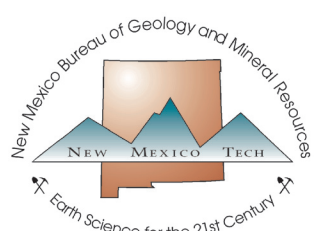
QUADRANGLE LOCATION

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

[575] 835-4590

This and other STATEMAP quadrangles are available
for free download in both PDF and ArcGIS formats at:

<http://geoinfo.nmt.edu>

Geologic map of the Cerro Pelon quadrangle,
Cibola and McKinley Counties, New Mexico.

June 2010

by
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Quaternary

Alluvium—Deposits of sand, gravel and silt in alluvial valley bottoms; locally include stream terraces, alluvial fans, and canyon wall colluvium; valley floor alluvium is typically fine-grained, silty and sand dominated deposits with interbedded gravel beds, whereas low terrace deposits are predominantly sand and gravel. Qal is mostly Holocene in age; maximum thickness of various alluvial deposits is uncertain but may exceed 15 m.

Colluvium—Poorly sorted slope wash and mass wasting deposits from local sources; mapped only where extensive or where covering critical relations; thickness can locally exceed 15 m.

Eolian deposits—Windblown and sheet wash deposits of silt and fine sand 0.2 to greater than 1 m thick on various mesas.

Terrace deposits—Deposits of sandy pebble to boulder size gravel underlying terrace surfaces located approximately 5 to 15 m above local base level; mapped only in upper Salazar Canyon; deposits are only a few meters thick.

Landslides—Poorly sorted debris that have moved chaotically down steep slopes; slumps or block slides partially to completely intact, that have moved down steep slumps and block slides usually display some a rotation relative to their failure plane; ages vary from Holocene to mid- to late-Pleistocene; thicknesses vary considerably depending on the size and nature of the landslide.

Alluvial fans—Typically fan-shaped deposits of coarse to fine gravel and sand, silt, and clay within and at the mouths of valleys; associated with present drainage and usually not incised; grades into alluvial deposits along main channels; probably Holocene to middle Pleistocene in age; occasionally subdivided into young (Q_{ayf}) and old (Q_{af}) fans; maximum exposed thickness about 15 m.

Volcanic Rocks of Mount Taylor, Southern Mesa Chivato and Vicinity

Younger aphyric trachybasalt—Youngest cone and flows erupted from the Cerro Pelón complex; consist of blue-gray to black, fine-grained hawaiite and black to black cinder deposits (Q_{yate}) having very fine sparse olivine phenocrysts and sparse quartz xenocrysts in interstitial to slightly vesicular groundmass. Microphenocrysts consist of plagioclase, clinopyroxene, minor olivine, opaque oxides and very tiny, sparse titaniferous biotite in glass. Cone contains two dikes (Q_{yad}) the most prominent of which trends northeast. Flows overlie units T_{bd}, Q_{yfb}, T_{yymb}, Q_{yts} and T_{tsa}. Sample of flow west of cone has ⁴⁰Ar/³⁹Ar age of 1.26 ± 0.19 Ma. Flows are 530 m thick.

Younger quartz-bearing trachybasalt—Two cone and flow complexes. The southern complex consists of black to gray, fine-grained hawaiite and red to black cinder deposits (Q_{yate}) having sparse olivine phenocrysts and extremely rare quartz xenocrysts. Cone and flow apparently underlie unit T_{yymb} but overlie unit T_{yymb} in Cerro Pelón complex. Flows extend to NE along Sobeyetta Creek. The northern complex consists of gray, medium-grained hawaiite and black to red cinder deposits (Q_{yate}) containing small olivine phenocrysts and sparse quartz xenocrysts in interstitial groundmass. Microphenocrysts consist of plagioclase, clinopyroxene, olivine, orthopyroxene and opaque oxides in glass. Flow apparently originates from summit of cinder cone. Flow apparently overlie unit Q_{yfb} immediately to east and unit Q_{yfb} to west. Flow overlies unit Q_{yts}. Lava from southern flow has ⁴⁰Ar/³⁹Ar date of 1.53 ± 0.07 Ma. Maximum exposed thickness of flow is 25 m.

Younger medium-grained trachybasalt—Cone and flow complex straddling upper Spud Patch Canyon in SW part of quadrangle; consists of gray to black flows and red to black cinder deposits (Q_{ybe}) of hawaiite containing sparse phenocrysts of plagioclase, rare phenocrysts of black augite and sparse xenocrysts of quartz in dense, medium-grained trachytic groundmass; several short, north-trending dikes (Q_{ybd}) are exposed in canyon wall east of cinder cone; overlies unit Q_{yfb}; unit not dated; maximum exposed thickness about 80 m.

Younger aphyric trachybasalt—Cone and flow complex between American and Colorado canyons in south central quadrangle; consists of dark gray flows and black to red cinder deposits (Q_{ybe}) of basalt with rare phenocrysts of plagioclase, tiny olivine, and rare quartz xenocrysts; cone deposits contain beautiful assortment of spinel bombs; overlies unit Q_{yfb}, Q_{yts} and Q_{yts}; dense bomb from one cone has ⁴⁰Ar/³⁹Ar date of 1.76 ± 0.05 Ma; maximum observed thickness about 60 m.

Younger medium-grained plagioclase trachybasalt—Gray to black flows and red to black cinder deposits (Q_{ymp}) of medium-grained basalt containing small, platy, interlocking microphenocrysts of plagioclase and tiny microphenocrysts of olivine and clinopyroxene; cinder cones contain rare fragments of Cretaceous sandstone; cone has young, conical shape; overlies Q_{ymp}. Unit is not dated. Maximum observed thickness is about 60 m.

Younger fine-grained olivine trachybasalt—Single cone and flow complex in south central quadrangle east of American Canyon; consists of dark gray flow and black to red cinder deposits (Q_{yts}) of fine-grained basalt with abundant tiny phenocrysts of olivine; small closed dendritic, cone has ⁴⁰Ar/³⁹Ar date of 1.76 ± 0.05 Ma; maximum observed thickness is 520 m.

Younger trachybasalt—Three cone and flow complexes in south central quadrangle east of American Canyon, which includes Cerro Osha. Consists of black to dark gray lavas and black to red cinder deposits (Q_{yte}) of relatively aphyric basalt with rare, very tiny phenocrysts of plagioclase; a olivine; two northern cones contain NE-trending dikes (Q_{ytd}) overlies units Q_{yfb}, T_{tsa}, Q_{yts} and Q_{yts} overlies unit Q_{yfb}. Unit unit Q_{yfb} overlies a sequence of flows in NE corner of quadrangle that overlie Q_{yfb} and apparently overlie Q_{yfb}. Various units are not dated and flows are 60 m thick.

Younger spotted trachybasalt—Gray to black lava flows and red to black cinder deposits (Q_{yts}) of distinctive, spotted hawaiite containing rare phenocrysts of plagioclase 5–10 m long, and rare tiny phenocrysts of olivine. The spots appear to be clots of plagioclase microphenocrysts aligned parallel to flow foliations. Overlies Q_{yfb}, Q_{yfb}, Q_{yfb}, T_{yymb} and T_{yymb}. Unit is not dated. Maximum observed thickness is about 120 m.

Younger xenocrystic trachybasalt—Five cinder cone and flow complexes in southern and eastern map area consisting of black to gray, medium to fine-grained hawaiite and red to black cinder deposits (Q_{yte}) having very sparse phenocrysts of olivine, plagioclase, and augite and very rare xenoliths of mantle peridotite and extremely rare fragments of gabbro. Some specimens contain rare quartz xenocrysts; cinder deposits may contain fragments of trachyandesite, trachyandesite, and Cretaceous sandstone. Two cones contain NE-trending dikes (Q_{ytd}). Lavas flowed to east, north and west. Flows overlie units Q_{yts}, T_{ytd}, T_{ytd}, T_{ytd}, T_{ytd} and T_{ytd}. Flows underlie Q_{yfb}, Q_{yfb}, Q_{yfb} and Q_{yfb}. Flow from cone near SW edge of map has ⁴⁰Ar/³⁹Ar date of 1.74 ± 0.03 Ma (McCraw et al., 2009). Flow on Mesa La Cuchilla in NW corner of map has ⁴⁰Ar/³⁹Ar date of 1.74 ± 0.03 Ma. Flow from cone in SE part of map has ⁴⁰Ar/³⁹Ar age of 1.85 ± 0.06 Ma. Maximum thickness of flows is 560 m.

Younger olivine plagioclase trachybasalt—Two cinder cone and flow complexes in central and eastern parts of quadrangle consisting of gray to black, slightly porphyritic lavas and red to black cinder deposits (Q_{yte}) with cones contain NE-trending dikes (Q_{ytd}). Specimens are relatively aphyric, containing tiny rare phenocrysts of olivine, clinopyroxene, and sparse small phenocrysts of plagioclase. The more northerly of the two cones contains rare fragments of gabbro and Cretaceous sandstone. Overlies Q_{yfb}, Q_{yfb} and Q_{yfb}; underlies Q_{yfb}, Q_{yfb} and Q_{yfb}. Unit is not dated. Maximum observed thickness is about 60 m.

Younger fine-grained plagioclase trachybasalt—Light gray flows of aphyric, aphyritic trachybasalt containing a foliated groundmass of very fine-grained plagioclase, clinopyroxene, and minor olivine. Flows originate from unidentified source ENE of the quadrangle. Overlies Q_{yfb} and Q_{yfb}; apparently underlies Q_{yfb}. Sample of flow has ⁴⁰Ar/³⁹Ar age of 2.29 ± 0.07 Ma. Maximum observed thickness is about 10 m.

Younger porphyritic pyroxene olivine basalt—Gray to black flows of very distinctive, speckled, medium to coarse-grained conical porphyritic basalt containing abundant phenocrysts (5–15%) of anhedral to resorbed black clinopyroxene (45 mm), green anhedral olivine (55 mm) and clear to white, zoned subhedral plagioclase (55 mm). Olivine is commonly idiosyncratic and frequently rimmed or intergrown with clinopyroxene. Specimens generally contain a trace amount of xenocrystic quartz. Overlies T_{ytd} and Q_{yfb}; underlies Q_{yfb} and Q_{yfb}. Source is east of quadrangle. Sample of flow has ⁴⁰Ar/³⁹Ar age of 2.31 ± 0.06 Ma. Maximum observed thickness is about 30 m.

Younger plagioclase olivine trachybasalt—Gray to black flows and red to black cinder deposits (Q_{yte}) of basalt containing abundant white, blocky plagioclase (45 mm), pale green anhedral olivine (35 mm) and sparse black clinopyroxene (35 mm) phenocrysts. The olivine is commonly idiosyncratic. Large cone contains two, long NNE-trending dikes (Q_{ytd}) composed of foliated and petrographically similar trachybasalt. Overlies T_{ytd}, Q_{yfb} and Q_{yfb}; underlies Q_{yfb} and Q_{yfb}. Sample of flow has ⁴⁰Ar/³⁹Ar age of 2.29 ± 0.06 Ma. Maximum exposed thickness is about 100 m.

Younger gabbro-bearing plagioclase trachybasalt—Gray, medium to fine-grained hawaiite and black to red cinder deposits (Q_{yte}) containing sparse small phenocrysts of plagioclase and black clinopyroxene; contains rare, resorbed quartz xenocrysts (50 mm), and locally abundant, resorbed gabbro (plagioclase plus clinopyroxene) xenoliths (520 mm). Two small puddles of lava occur within the cone complex in center of quadrangle; a northeast trending slope of unit Q_{yts} is exposed within the flows; cone and flows apparently underlie unit Q_{yfb} to west and underlie units Q_{yfb} and Q_{yfb} to east; overlies unit T_{ytd}; sample of lava from the cone complex has ⁴⁰Ar/³⁹Ar age of 2.30 ± 0.13 Ma; maximum exposed thickness of flows is <25 m.

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Map Unit Descriptions

Q_{yts}

Younger olivine trachybasalt—Gray to black flows and red to black cinder deposits (Q_{yte}) of fine-grained basalt containing 2–4% resorbed olivine phenocrysts (5 mm) of unitarily resorbed green color. The olivine is commonly idiosyncratic. Felted groundmass contains abundant plagioclase and olivine microphenocrysts. The cone contains a NNE-trending dike (Q_{ytd}). Specimens on the cone are fine grained and also contain conspicuous, resorbed plagioclase and clinopyroxene megacrysts. Overlies T_{ytd} and apparently T_{ytd} underlies Q_{yfb}, Q_{yfb} and Q_{yfb}. Sample of flow has ⁴⁰Ar/³⁹Ar age of 2.18 ± 0.06 Ma, but age seems too young to fit stratigraphy and dates of other units. Maximum observed thickness is about 70 m.

Younger fine-grained trachybasalt—Gray, medium to fine-grained basalt and black to red cinder deposits (Q_{yte}) having sparse tiny plagioclase and rare tiny olivine phenocrysts. Lava specimens often have felted appearance. Eroded cone, which lies immediately east of Cerro Osha overlies layer of poorly exposed gabbro (T_{ytd}). Dike of Q_{ytd} cuts flow just south of the cone. Overlies T_{ytd}; underlies Q_{yfb}, Q_{yfb} and Q_{yfb}. Sample of dense bomb fragment in flow has ⁴⁰Ar/³⁹Ar age of 2.37 ± 0.14 Ma. Maximum exposed thickness is about 150 m.

Tertiary (Pliocene)

Volcaniclastic sedimentary rocks—Gray to tan to white debris flows, fluvial deposits and interbedded tuffs (T_{ytd}) shed from the Mount Taylor stratovolcano during growth. Debris flow component is most abundant near source (south and southwest parts of quadrangle) and consists primarily of boulders and cobbles of angular to subangular trachyandesite and trachyandesite in a volcanic sand matrix. Boulders form a lag deposit on surface of debris flows. Fluvial component contains rounded to subrounded cobbles including a higher proportion of basaltic clasts, especially to north. Tuffs consist mostly of thin beds and lenses of tal deposits with vesiculated pumice having phenocrysts of plagioclase, clinopyroxene ± hornblende ± biotite. Underlies a multitude of mafic flows and cones north of Mt. Taylor and in the area extends into the Quaternary; underlies several intermediate composition flows and domes on upper north flank of Mt. Taylor. Overlies a few older, often poorly exposed trachybasalt and intermediate composition rocks throughout the quadrangle; overlies Cretaceous Mesquite Formation in lower San Mateo Canyon. Maximum exposed thickness is 200 m.

Alluvial fans—Typically fan-shaped deposits of coarse to fine gravel and sand, silt, and clay within and at the mouths of valleys; associated with present drainage and usually not incised; grades into alluvial deposits along main channels; probably Holocene to middle Pleistocene in age; occasionally subdivided into young (Q_{ayf}) and old (Q_{af}) fans; maximum exposed thickness about 15 m.

Volcanic Rocks of Mount Taylor, Southern Mesa Chivato and Vicinity

Younger aphyric trachybasalt—Youngest cone and flows erupted from the Cerro Pelón complex; consist of blue-gray to black, fine-grained hawaiite and black to black cinder deposits (Q_{yate}) having very fine sparse olivine phenocrysts and sparse quartz xenocrysts in interstitial to slightly vesicular groundmass. Microphenocrysts consist of plagioclase, clinopyroxene, minor olivine, opaque oxides and very tiny, sparse titaniferous biotite in glass. Cone contains two dikes (Q_{yad}) the most prominent of which trends northeast. Flows overlie units T_{bd}, Q_{yfb}, T_{yymb}, Q_{yts} and T_{tsa}. Sample of flow west of cone has ⁴⁰Ar/³⁹Ar age of 1.26 ± 0.19 Ma. Flows are 530 m thick.

Younger quartz-bearing trachybasalt—Two cone and flow complexes. The southern complex consists of black to gray, fine-grained hawaiite and red to black cinder deposits (Q_{yate}) having sparse olivine phenocrysts and extremely rare quartz xenocrysts. Cone and flow apparently underlie unit T_{yymb} but overlie unit T_{yymb} in Cerro Pelón complex. Flows extend to NE along Sobeyetta Creek. The northern complex consists of gray, medium-grained hawaiite and black to red cinder deposits (Q_{yate}) containing small olivine phenocrysts and sparse quartz xenocrysts in interstitial groundmass. Microphenocrysts consist of plagioclase, clinopyroxene, olivine, orthopyroxene and opaque oxides in glass. Flow apparently originates from summit of cinder cone. Flow apparently overlie unit Q_{yfb} immediately to east and unit Q_{yfb} to west. Flow overlies unit Q_{yts}. Lava from southern flow has ⁴⁰Ar/³⁹Ar date of 1.53 ± 0.07 Ma. Maximum exposed thickness of flow is 25 m.

Younger aphyric trachybasalt—Cone and flow complex between American and Colorado canyons in south central quadrangle; consists of dark gray flows and black to red cinder deposits (Q_{ybe}) of basalt with rare phenocrysts of plagioclase, tiny olivine, and rare quartz xenocrysts; cone deposits contain beautiful assortment of spinel bombs; overlies unit Q_{yfb}, Q_{yts} and Q_{yts}; dense bomb from one cone has ⁴⁰Ar/³⁹Ar date of 1.76 ± 0.05 Ma; maximum observed thickness about 60 m.

Younger medium-grained plagioclase trachybasalt—Gray to black flows and red to black cinder deposits (Q_{ymp}) of medium-grained basalt containing small, platy, interlocking microphenocrysts of plagioclase and tiny microphenocrysts of olivine and clinopyroxene; cinder cones contain rare fragments of Cretaceous sandstone; cone has young, conical shape; overlies Q_{ymp}. Unit is not dated. Maximum observed thickness is about 60 m.

Younger fine-grained olivine trachybasalt—Single cone and flow complex in south central quadrangle east of American Canyon; consists of dark gray flow and black to red cinder deposits (Q_{yts}) of fine-grained basalt with abundant tiny phenocrysts of olivine; small closed dendritic, cone has ⁴⁰Ar/³⁹Ar date of 1.76 ± 0.05 Ma; maximum observed thickness is 520 m.

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