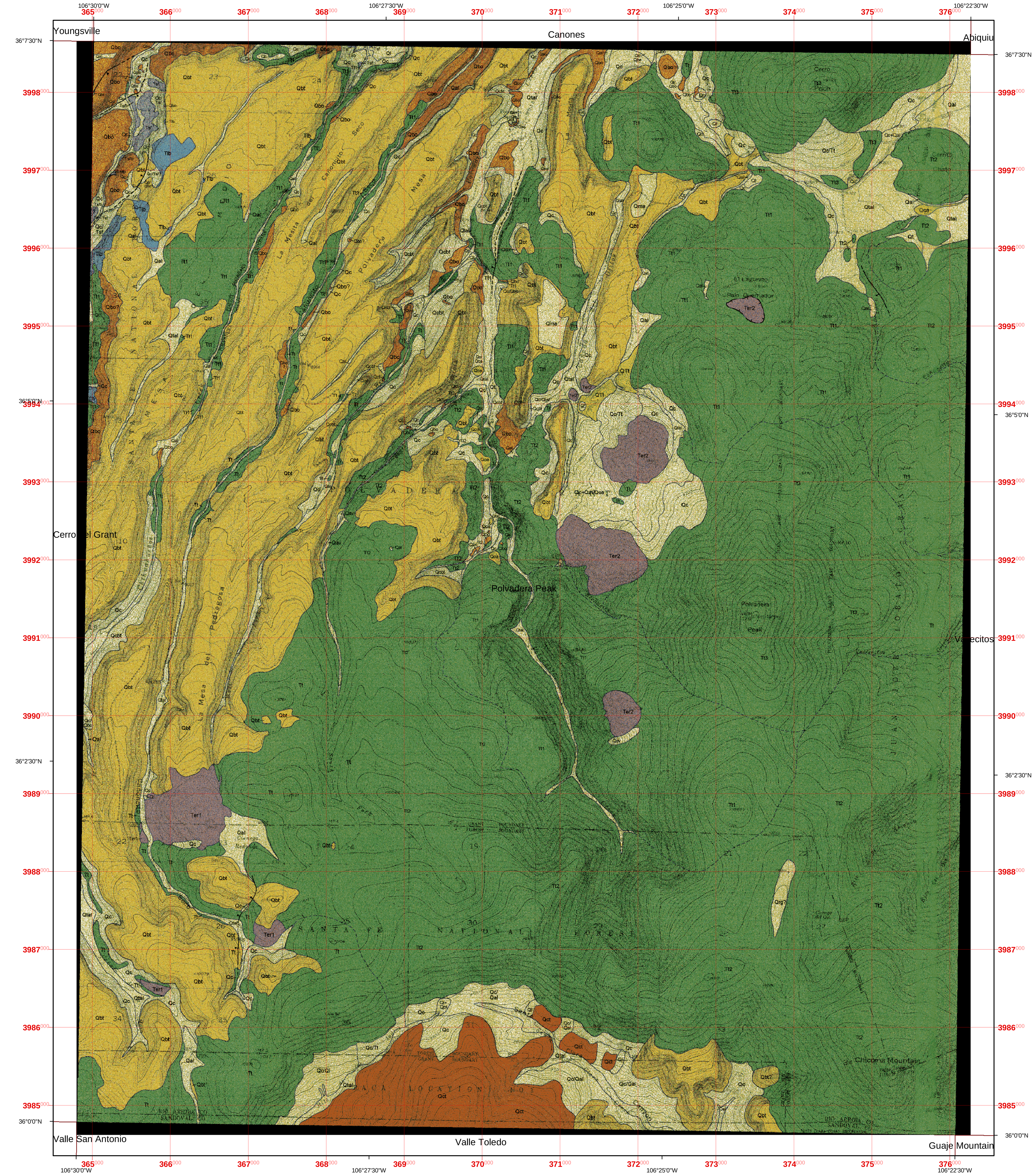

EXPLANATION

Geologic Mapping by:

Kempter, K.A., Kelley, S., and Fluk, L.

Qal – Alluvium. Late Pleistocene to Holocene. Alluvial deposits in modern drainage bottoms. Deposits include conglomerates, sands, and silts. Holocene terrace deposits less than 1 meter above drainage bottoms are included. Alluvium in canyons in the western portion of the quadrangle is dominated by weathering products of the Bandelier Tuff (primarily **Qbt**), while alluvium in eastern canyons is dominated by fluvial clasts of Tschicoma dacite (**Tt**). Obsidian fragments common. Maximum thickness can exceed 4 meters.

Qc/Qcbt – Colluvium. Late Pleistocene to Holocene. Poorly sorted talus, debris, and colluvium in wedge-shaped deposits on hill slopes. Numerous hill slopes beneath mesas of Tshirege Member, Bandelier Tuff (**Qbt**), are covered by **Qbt** colluvium (obscuring the underlying bed rock), and have been mapped as **Qcbt**. Thickness can locally exceed 5 meters.

Qt – Terraces. Late Pleistocene to Holocene. Alluvial deposits near the margins of modern streams or older perched floodplain deposits. Most are fill terrace deposits of sand, silt and gravel < 10 m above modern drainages. Maximum thickness is <5 meters.

Qtal - Undifferentiated terraces and alluvium in modern stream drainages. Late Pleistocene to Holocene. Obsidian fragments common.

Qe – Eolian deposits. Late Pleistocene to Holocene. Poorly bedded fine-grained sand and silt preserved sporadically on terraces and mesa tops. Although no sedimentary structures could be identified, these deposits appear to be primarily eolian in origin, capping older alluvial deposits. Less than 1 meter in thickness.

Qma – Mesa alluvium. Late Pleistocene to Holocene. Poorly sorted sand and debris composed primarily of reworked Upper Bandelier Tuff (**Qbt**). Obsidian fragments common. Though common as isolated patches on **Qbt** mesa tops, these deposits were only mapped in a few localities. Maximum thickness is less than 2 meters.

Ql – Landslides. Pleistocene to Holocene. Unsorted, chaotic debris emplaced during a single detachment event from a steep slope or cliff. Fan-shaped deposits occur where debris spread out on valley floor. Thickness highly variable.

Qoa – Old Alluvium. Quaternary. Older alluvial deposits of gravel, sand and silt that were deposited after the eruption of the Tshirege Member, Bandelier Tuff. Dominant clast lithology is Tschicoma dacite, with subordinate amounts of rhyolite lava and rare Tshirege Member, Bandelier Tuff. In Polvadera Canyon, a remnant of a paleocanyon filled by this unit is exposed along the western edge of the modern canyon. Aggradation of this paleocanyon may have occurred when the downcutting of the river encountered a mound of Tschicoma dacite (Tt1 mound at the confluence of Polvadera Creek and the West Fork Polvadera Creek), impeding erosion and backfilling the canyon with sediment. The modern canyon then incised slightly to the east of this paleodrainage, preserving alluvial deposits along the canyon's western margin. Maximum thickness is approximately 30 meters.

Qbt – Upper Bandelier Tuff, Tshirege Member. Quaternary. White to orange non-welded to welded ash-flow tuff containing abundant phenocrysts of quartz and sanidine. Basal Tsankawi Pumice, though seldom exposed, is typically 1 meter thick and well stratified. Overlying ash-flow tuff beds consist of multiple flow units in a compound cooling unit with thin surge beds (less than 0.5 meters thick) locally exposed. Though mostly lithic poor (2-3% lithic fragments), one of the lower flow units contains > 5% of lithic fragments, appearing similar to facies of the Otowi Member, Bandelier Tuff. Erupted at approximately 1.22 Ma during the formation of the Valles Caldera (Spell et al., 1996). Maximum thickness is approximately 250 meters.

Qct – Cerro Toledo Interval. Quaternary. Rhyolitic lavas erupted within the Toledo embayment along the southern boundary of the quadrangle and poorly exposed fluvial sediments deposited between eruptions of the Bandelier Tuff. The rhyolite lavas are typically white to gray to pink and crystal poor, with sparse phenocrysts of quartz and sanidine. Lithophysal, flow banded and obsidian phases are common. Sedimentary facies are preserved in the South and West Forks of Polvadera Canyon, overlying either Tschicoma dacite or Otowi Member of the Bandelier Tuff. These fluvial facies are poorly consolidated, typically manifested as colluvial rounded cobbles of mixed lithologies (primarily Tschicoma dacite) at the surface. Fluvial cobbles of Otowi Member, Bandelier Tuff, were not recognized, so mapping of this unit was based on stratigraphic position and extrapolation. Maximum thickness is approximately 5 meters.

Qbo – Bandelier Tuff, Otowi Member. Quaternary. White to beige to orange non-welded to welded ash-flow tuff containing abundant phenocrysts of quartz and sanidine and sparse mafic phenocrysts. Moderate to abundant lithic fragments (5-12%), primarily of andesitic or mafic lavas. Though not as evident as the overlying Tshirege Member, this unit represents a compound cooling unit of multiple flows. One of the lower flow units is lithic poor (< 5%), resembling facies of the Tshirege Member. Where poorly welded this unit is also poorly exposed, often obscured by colluvium of overlyingTshirege Member. Thus, there is likely much more of this unit than indicated on the map. No exposures of the basal Guaje Pumice were observed in the quadrangle. Basal exposures preserved in the northwest corner of the quadrangle (side canyon to Cañones Canyon), however, reveal an underlying lahar deposit (**Qol**) that may indicate tumescence of the caldera region before the eruption. Erupted at approximately 1.61 Ma during the formation of the Toledo Caldera (Spell et al., 1996). Maximum thickness (exposed in Cañones Canyon) is approximately 200 meters.

QTt – Terrace gravels and conglomerates of uncertain age. Late Tertiary – Early Quaternary. Isolated exposures of older alluvium preserved adjacent to large Tschicoma flow boundaries. May be equivalent to the Puye Formation (Griggs, 1964; Gardner et al., 1986). Mostly coarse boulder conglomerate of Tschicoma dacite with minor amounts of andesite and rhyolite. No clasts of Bandelier Tuff. Maximum thickness is approximately 30 meters.

Ter1/Ter2 – El Rechuelos Rhyolite. Tertiary. At least seven eruptive centers of white to pink rhyolite with subordinate amounts of dark, glassy obsidian. Older, Miocene-age rhyolite centers (Ter1) are exposed at three vent sources in the southwestern corner of the quadrangle. They include flow banded, vitrophyric lava with vesicular horizons with phenocrysts of plagioclase and minor biotite. Ages for this group of rhyolites range from 5.8 – 7.5 Ma (Loeffler et al., 1988). A younger set of rhyolites (**Ter2**) were emplaced along an arcuate fracture adjacent to Polvadera Peak at ~ 2 Ma (Goff et al., 1989). The northernmost eruptive center (~2.5 miles north of Polvadera Peak) is defined by a depression (small caldera structure) termed El Lagunito de Palo Quemador. Rhyolite fragments are typically pumiceous with < 5% phenocrysts of plagioclase, quartz, biotite and hornblende. Geochemical analyses of this rhyolite suggest that it may be more closely related to older Tschicoma-related volcanism (Loeffler, 1984). The three remaining eruptive centers occur along a north-south fracture west of Polvadera Peak. Two large centers occur at the head of Cañada del Ojitos and consist of intrusive and extrusive dome facies with sparse phenocrysts of plagioclase and biotite. The margins of both of these domes include autobrecciated and vesicular horizons with minor obsidian facies. The northernmost of these two domes has apparent landslide scarps on its NW flank, which may explain the two small satellite exposures of this unit in the Cañada del Ojitos valley floor. Lastly, at approximately 1.2 miles SW of Polvadera Peak is a small rhyolite center with abundant obsidian facies, though poorly exposed. Maximum thickness is approximately 150 meters.

Tp – Puye Formation. Pliocene to Early Pleistocene. Poorly exposed alluvial gravels composed almost entirely of Tschicoma lava clasts. Mapped only in the West Fork of Polvadera Canyon where overlain by the Otowi Member of the Bandelier Tuff. May also include older terrace deposits (**QTt**) mapped adjacent to Tschicoma domes in the northeast quadrant of the quadrangle. Maximum thickness is approximately 25 meters.

Tt/Tt1/Tt2/Tt3 – Tschicoma Formation. Late Miocene to Pliocene. Light gray to dark gray coarsely porphyritic lavas, primarily of dacitic composition but also including andesites and rhyodacites. This Formation includes thick, superimposed flows and high-aspect ratio domes. No pyroclastic facies of this unit were observed in the quadrangle. The first and third highest peaks in the Jemez Mountains, Tschicoma Peak and Polvadera Peak, are dacitic domes of this unit located within the quadrangle. Age dates for this unit in the study area range from ~ 7 to 3 Ma with most domes/flows emplaced between 5 to 3 Ma. These domes and flows were subdivided into three general age relationships based on field relationships, age data, and geomorphology of the dome flows: 1) an older sequence of domes and flows (**Tt1**) exposed in the NW and NE quadrants of the quadrangle. In Cañones Canyon and Cañoncito Seco this includes flows of andesitic composition, with phenocrysts of plagioclase, clinopyroxene and orthopyroxene. A large flow exposed along Chihuahueños Creek appears more dacitic, with large plagioclase phenocrysts and minor amounts of pyroxene and biotite. In the NE quadrant these older flows and domes are mostly dacitic to rhyodacitic, with abundant phenocrysts of plagioclase, biotite and hornblende with minor amounts of pyroxene. 2) **Tt2** deposits include the majority of Tschicoma exposed in the quadrangle, including the northern rim rocks of the Toledo embayment. These dacites commonly contain cognate clots of more mafic magmas (vesicular basaltic andesite) ranging in size from 2 to 25 cm. 3) The youngest lavas and domes (**Tt3**) formed Polvadera Peak and Cerro Pelon, both porphyritic dacites with plagioclase the dominant phenocyrst. Cerro Pelon contains both clinopyroxene and orthopyroxene, with minor biotite and hornblende. Maximum thickness exceeds 600 meters.

Tlb – Lobato Basalt. Miocene. Dark gray, fine grained basaltic lavas with phenocrysts of plagioclase, clinopyroxene, orthopyroxene and olivine. This unit is only exposed in the northwest quadrant of the quadrangle, with most exposures along the eastern edge of Cañones Canyon. Here the main basalt flow thins and thickens dramatically, clearly filling in paleotopography at the time of its eruption. The base of the unit is typically hidden by basalt colluvium, although where exposed overlies fluvial deposits of the Santa Fe Group. Presumably, Lobato basalts underlie the thick Tschicoma dacite sequence in the quadrangle, connecting broad exposures at La Grulla Plateau to the west and Lobato Mesa to the east. Maximum thickness is approximately 100 meters.

Tsf/Tsfb – Santa Fe Group. Miocene. Primarily buff to tan, cross-bedded eolian sandstones of the Ojo Caliente Member. Exposures of this unit are limited to Cañones Canyon and Chihuahueños Creek along the northern boundary of the quadrangle. These eolian sandstones are composed primarily of quartz and indicate and clearly indicate a prevailing wind from the west. In Cañones Canyon some exposures of the Ojo Caliente Member are consolidated, outcropping as subdued cliffs. Most of the unit, however, is poorly consolidated, forming buff-colored sand and silt on the canyon slope. At the base of the eolian sequence in Cañones Canyon are isolated exposures of thin basalt flows (**Tsfb**), presumably intercalated with the sedimentary sequence. Overlying the eolian sandstones along the eastern rim of Cañones Canyon are poorly exposed fluvial sandstones with rounded cobbles (2 to 12 cm across) of volcanic origin, primarily andesite with lesser amounts of rhyolite and basaltic andesite. These cobbles may represent early volcanic activity in the Jemez Mountains. Maximum thickness exceeds 200 meters.

Tab? – Abiquiu Formation. Miocene. There is a possible exposure of Abiquiu sandstone in Chihuahueños Canyon along the quadrangle's northern boundary. This thin unit is a quartzose, consolidated sandstone beneath eolian sandstones of the Ojo Caliente Member, Santa Fe Group. Maximum thickness is approximately 5 meters.

Geologic Mapping of the Polvadera Peak 7.5-minute Quadrangle, Northern Jemez Mountains, New Mexico.

Kempter, K.A., Kelley, S., Kelley, S.B., and Fluk, L.

Overview:

The Polvadera Peak 7.5-minute quadrangle is dominated by dacitic lavas of the Tschicoma Formation, erupted between ~ 7-3 Ma (Loeffler et al., 1988; Gardner et al, 1986) and forming some of the highest peaks in the Jemez Mountains, including Polvadera (11, 232') and Tschicoma Peaks (11,561'). These lavas were erupted as high-aspect ratio, viscous, voluminous flows with steep-sided flow lobes. Most of the vent sources for these lavas were from north-south trending structures along the eastern portion of the quadrangle. The western portion of the quadrangle is dominated by flow lobes of the Bandelier Tuff, erupted onto highly irregular surface of distal Tschicoma lava flows. This relatively low topographic region between the Polvadera Peak highlands to the east and the La Grulla plateau to the west, provided the main corridor for pyroclastic flows of the Upper and Lower Bandelier Tuffs extending northward from the Valles and Toledo Calderas. Modern Quaternary canyons dissecting the western portion of the quadrangle reveal the complex pre-Bandelier topography that preceded these eruptions. In isolated exposures within these canyons, the thin sedimentary records of the Puye Formation, Cerro Toledo Interval, and post-Bandelier Tuff alluvium are preserved.

Geologic mapping of this quadrangle has provided several new insights into the volcanic and sedimentary history of the region, including:

1) Major volcanic centers for Tschicoma Formation lavas are recognized and separated into three age-distinctive episodes: a) an older phase (mapped as Tt3) that includes crystal-rich, hydrous mineralogy in the northeast corner of the quadrangle, and dacitic lavas with relatively non-hydrous mineralogy in the northwestern corner of the quadrangle, b) an intermediate phase (mapped as Tt2) that includes most of the lavas erupted along the rim of the Toledo embayment, including some flows rich with cognate clots of more mafic compositions, and c) a younger eruptive episode (Tt1) forming the steep-sided domes of Cerro Pelon and Polvadera Peak.
2) Detailed mapping of the El Rechuelos Rhyolite distinguishes two major pulses of activity: an older (Late Miocene) phase (Ter1) represented by three separate vents in the southwestern corner of the quadrangle, and a younger phase (Late Pliocene, Tt2) erupted along a N-S-trending structure along the western margin of Polvadera Peak and including 4 discrete vents.
3) Our mapping reveals a much greater extent of Lower Bandelier Tuff (Qbo) than previously known.
4) Recognition of broad exposures of the Ojo Caliente Member of the Santa Fe Group in Cañones Canyon. These well-sorted eolian sandstones clearly indicate a prevailing wind from the west during the time of deposition. A thin fluvial sequence capping the eolian section contains well-rounded volcaniclastic cobbles – possibly recording the erosion of Paliza Canyon Formation volcanic units in the central Jemez Mountains.
5) A possible exposure of Abiquiu Formation sandstone in Chihuahueños Canyon, representing the oldest-known geologic unit in the region.
6) Recognition of a post-Bandelier Tuff, older alluvial deposit (Qoa) in Polvadera Creek Canyon, representing an episode of fluvial aggradation unrecognized elsewhere in the region. When downcutting of the canyon resumed, incision occurred slightly eastward of the Qoa-filled paleocanyon.

Structure:

Few major structures were recognized in the course of mapping this quadrangle. Although numerous steep-sided contacts between volcanic units occur throughout the area, the majority of these relationships were interpreted as depositional, especially those between flow lobe boundaries of Tschicoma lavas and overlying (valley-fill) Bandelier Tuff. Although it is likely that faults within the Tschicoma Formation exist, more detailed mapping of individual flow units would be needed to help identify these structures.

Two calderas, or collapse features, occur in the quadrangle. To the south, the topographic rim of the Toledo Embayment represents a major collapse feature that likely occurred during the formation of the Toledo Caldera at approximately 1.6 Ma (Gardner and Goff, 1996). The actual structure, however, is obscured by voluminous flows of Cerro Toledo rhyolite lavas (Qct) and modern colluvium (Qc) from the Tschicoma rim rocks. A second, much smaller collapse feature occurs at El Lagunito de Palo Quemador in the northeast portion of the quadrangle. This feature is approximately 1/4 x 1/2 km in size and is filled by obsidian and devitrified El Rechuelos rhyolite. This small caldera likely formed after an explosive eruption of the rhyolite, as no lava flows of the rhyolite are recognized outside of the caldera.

In Cañones Canyon, NE-SW-trending faults are exposed that offset Bandelier Tuff and older rocks. Possibly, a major fault extends along the axis of the canyon but is concealed by the thick deposits of Bandelier Tuff. Samples of basalt exposed along the canyon floor may correlate with Lobato basalt along the canyon's eastern rim, and samples of both lavas have been submitted for geochronological analyses. Exposures of Santa Fe Group Ojo Caliente sandstones along the eastern side of Cañones Canyon are consistently tilted to the east at approximately 7-10 degrees, suggesting a proximity to a large structure. Early faulting and canyon formation in the area is suggested by rapidly-thickening deposits of Lobato basalt (Tlb) exposed along the eastern wall of the modern canyon. Faulting in Cañones Canyon repeatedly facilitated erosion and canyon formation, as a deep paleocanyon existed prior to the eruption of the Lower Bandelier Tuff (Otowi Member), evidenced by steep-sided contacts of the tuff with older Ojo Caliente Member sandstones (Tsf) and Lobato basalts (Tlb). A deep canyon formed again prior to the emplacement of the Upper Bandelier Tuff (Tshirege Member). Finally, the modern Cañones Canyon formed, representing one of the major drainages exiting the northern Jemez Mountains.

Volcanic History:

The oldest deposits in the quadrangle, exposed along the northern boundary in Chihuahueños Canyon, may belong to the Abiquiu Formation of Early Miocene age (Manley, 1979). This single outcrop underlies distinctive eolian facies of Ojo Caliente Member sandstone of the Santa Fe Group, which are more extensively exposed in Cañones Canyon. These oldest deposits are both sedimentary in nature, indicating a relatively flat basin-like topography during their deposition. Capping the eolian sandstones are fluvial deposits that include abundant volcanic clasts of intermediate composition, perhaps indicating transport from Paliza Canyon Formation rocks in the central Jemez Mountains at approximately 9 Ma (Gardner, 1986). Overlying these thin fluvial deposits are Lobato basalts, previously dated at 7-9 Ma (Loeffler, 1984) and representing the oldest primary volcanic rocks exposed in the quadrangle. Presumably, these widespread basalts underlie the thick package of Tschicoma Formation lavas that cover the eastern portion of the quadrangle.

Between ~ 7-3 Ma, volcanic activity in the area was dominated by dacitic lava and dome eruptions of the Tschicoma Formation, forming highlands along the western half of the quadrangle. During the early part of this interval, however, small-volume eruptions of rhyolite occurred in the southwestern portion of the quadrangle, representing an early stage of El Rechuelos Rhyolite volcanism. As Tschicoma-related volcanic activity continued, high-aspect ratio flows extending from eruptive sources produced steep-walled flow lobes that are still recognizable in the modern topography. The major dacitic domes erupted during this episode occur along a north-south trend extending from Chicoma Mountain in the south to Cerro Pelon to the north. Puye Formation fanglomerate deposits, contemporaneous with Tschicoma-age volcanism in the eastern Jemez Mountains (Waresback, 1986), are poorly represented in the northern Jemez Mountains. Only one identifiable outcrop of Puye Formation was observed in the quadrangle, underlying Lower Bandelier Tuff

At approximately 2.0 Ma (Loeffler, 1984; Goff, pers. comm) a renewed pulse of El Rechuelos Rhyolite activity occurred along a north-south trending fracture along the western margin of Polvadera Peak. Four eruptive centers are recognized, as viscous domes and short-traveled flows were superimposed on the underlying Tschicoma highland surface. The largest dome, approximately 1.5 km northwest of Polvadera Peak, exhibits landslide scarps along its northwestern flank. Two satellite outcrops of El Rechuelos Rhyolite in Cañada de Ojitos Creek may represent the detached flanks from the original dome, emplaced prior to the eruption of the Bandelier Tuff.

The next major volcanic event was the eruption of the Toledo Caldera and the emplacement of the Otowi Member, Lower Bandelier Tuff at approximately 1.6 Ma (Izett and Obradovich, 1994).. Rare exposures of the base of the Otowi in a side canyon to Cañones Canyon in the northwestern corner of the quadrangle reveal the eruption was preceded by a lahar deposit (Qol) that includes large boulders of Lobato basalt (Tlb) and Tschicoma dacite (Tt). Possibly, tumescence of the region shortly prior to the eruption triggered this lahar deposit. No deposits of Guaje Pumice were observed at the base of the Otowi in the field area. The Toledo embayment along the southern margin of the quadrangle is believed to have formed during this event (Gardner and Goff, 1996). Thick deposits (> 100 meters) of moderately to welded Otowi are preserved in the Cañones Canyon walls.

Between major Bandelier Tuff eruptions the Cerro Toledo interval was emplaced. In the Polvadera Peak quadrangle this includes voluminous rhyolitic lavas that filled the Toledo embayment, and thin fluvial sediments preserved in rare exposures along the South Fork of Polvadera Creek. These sediments are dominantly composed of Tschicoma-related clasts, but also include obsidian and El Rechuelos Rhyolite clasts.

Eruption of the Tshirege Member, Upper Bandelier Tuff at approximately 1.2 Ma (Izett and Obradovich, 1994) capped the volcanic sequence in the Polvadera Peak region. The underlying Tsankawi Pumice deposit is exposed in several locations and is typically > 1 meter in thickness. Although of similar volume to the earlier Otowi Member, the Tshirege Member eruption was slightly more extensive in the region, lapping onto the Tschicoma and El Rechuelos highland topography in the middle of the quadrangle.

Erosion of the area has been the dominant process in the region in the past million years. Besides Late Quaternary alluvial and colluvial deposits, few sediments appear to have been deposited following the Upper Bandelier Tuff eruption. An exception is an old alluvial channel preserved along the western margin of Polvadera Creek Canyon (Qoa). This deposit, which exceeds 30 meters in thickness, includes clasts of Upper Bandelier Tuff, but is dominated by clasts of Tschicoma dacite and El Rechuelos rhyolite. We interpret a Polvadera Creek paleocanyon backfilled with alluvium when a resistant mound of Tschicoma dacite was exhumed downstream. Eventually, downcutting resumed, with the new canyon offset slightly eastward of the paleovalley.

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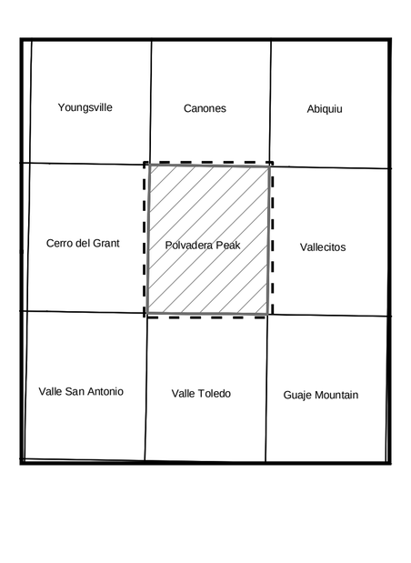
Base from U.S.Geological Survey 1953, from photographs taken 1951 and field checked in 1953.
Map edited in 1977
1927 North American datum, UTM projection -- zone 13N
1000- meter Universal Transverse Mercator grid, zone 13, shown in red

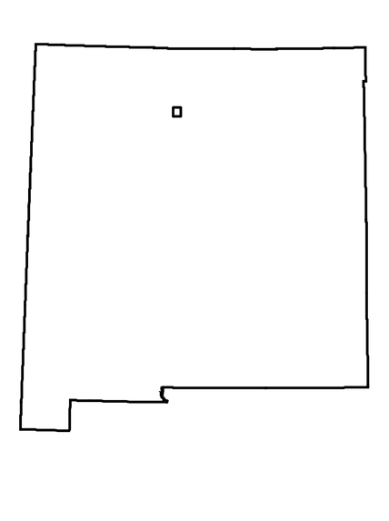
Preliminary Geologic Map of the Polvadera Peak 7.5 - minute quadrangle

by

Kirt Kempter, Shari Kelley, Fraser Goff, and Mike Rampey

May 2004





Magnetic Declination
May, 2004
10º 19' East
At Map Center

1:24,000

0 0.25 0.5 1 1.5 2 Miles

0 0.25 0.5 1 1.5 2 Kilometers

CONTOUR INTERVAL 20 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

DRAFT

NMBGMR OF-GM 96

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.

This work was performed under the STATEMAP component of the USGS National Cooperative Geologic Mapping Program. Funding was provided by the U.S. Geological Survey and the New Mexico Bureau of Geology and Mineral Resources, a division of New Mexico Tech.

New Mexico Bureau of Geology
New Mexico Tech
801 Leroy Place
Socorro, NM 87801-4796

[505] 835-5420
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This draft geologic map was produced from scans of hand-drafted originals from the author(s). It is being distributed in this form because of the demand for current geologic mapping in this important area. The final release of this map will be made following peer review and redrafting in color using NMBGMR cartographic standards. The final product will be made available on the internet as a PDF file and in a GIS format.

Polvadera Peak 7.5-minute Quadrangle Cross Section A - A'